American-Eurasian J. Agric. & Environ. Sci., 2 (Supple 1): 124-130, 2008
ISSN 1818-6769

Trade Integration of Agricultural Products for Iran and Islamic Countries

H. Karimi-Hosnijeh

Department of Economics, University of Isfahan, Isfahan, Iran

Abstract: With membership of the OIC, Islamic countries have developed a wide and active economic integration which can be effective in the field of global economy and can affect their national and international economic parameters and solve their problems in a smaller ratio than the global scale. Since most of the members of the OIC are developing countries and most of their exporting activity consists of agricultural products, there is an appropriate potential in this economic integration for focus on agricultural products. What will be estimated in this paper, is the trade potential of agricultural products for OIC members; as an important economic integration. The estimation will be done using the Generalized Gravity Model in the Panel Data method. The result states that the trade potential of Iran and the OIC economic integration for agricultural products is 53%, and also declares that the amount of agricultural bilateral transactions between them is increasing. On the other hand, results show that exports of agricultural products to non-member countries and imports of these products from non-member countries have been also on a sensible increase.

Key words: Economic Integration · Trade Potential · Agricultural Products · Organization of Islamic Conference (OIC) · Generalized Gravity Model · Panel Data

INTRODUCTION

In the recent years, we have seen an increasing interdependence between different countries. Fast growth of technology, propagation of financial markets, and the fast movement of the world economy to standards of economic globalization (which all have caused a fast growth in global trading and international share of duty), have all helped to this interdependence of national economies, and besides quickly expanding international competition, they have produced a background for an extended economic cooperation for different countries, specially countries sharing common specifics [1].

Influenced by extension of economic dependence and the economic globalization process, an economic integration is made by an affiliation of a set of different countries which share common specifics are regionally near each other. Besides economic cooperation and will for more economic and trade cooperation, they experience trade liberalization and participate regionally and internationally in different matters such as trade, investment, capital flows, international production, access to larger consumer markets and access to a higher trade potential. With special emphasis on Iran as a main and outstanding member, those countries of the OIC who share a related language, culture and religion, have the acquired potentials for implementing an economic integrating block. This fact seems especially important with concern on gross domestic product (GDP), population (POP) and imports and exports; and shows us a high potential for trade. Moreover, presence of different countries (concerning their degree of development) in this organization can be another positive point that can strengthen the implementation of their economic integration and can bring them static and dynamic advantages of trade and can level their path to future economical growth and development, especially in the economic globalization process[1].

Iran and other members of the OIC can increase foreign trade between each other on the basis of economic integration, and with expansion and development of their imports and exports, they can show a large amount of their bilateral trade relations, and increase their trade potentials. This fact has double importance especially about imports and exports of specific products which these countries have a higher relative advantage in; and causes the competitive advantage of these countries to increase in the level of an international and global scale. Since most of the OIC members are developing countries and most of their exporting activities consist of agricultural products, there seems to be a good potential in this economic integration

Corresponding Author: Dr. Hossein Karimi Hosnijeh, Department of Economics, University of Isfahan Isfahan, Iran

for focusing on agricultural products. Moreover, relative advantage in production of most agricultural products, specialized and cheap workers, vastness of agricultural lands, appropriate climate and high usage of agricultural products, are some specifics that guarantee the appropriate trade potential for agricultural products in this integration. Furthermore, competitive advantage in agricultural products of this integration, can increase exports to non-member countries and emerge different advantages for member countries exporting agricultural products [1].

In the literature, a large number of studies have conducted a role of integration in trade of both developed and developing countries, using various specifications of the gravity theory. Anderson [1] made the first formal attempt to derive the gravity equation from a model that assumed product differentiation. Helpman and Krugman [2] used a differentiated product framework with increasing returns to scale to justify the gravity model. Some researchers have also improved the econometric specification of the gravity equation by which they investigate the effect of trade integration on the trade flows of countries worldwide [3-4].

Tayyebi [5] tested an econometric gravity model with the purpose of disentangling the features that affect the intensity of regional trading flows in the ASEAN. This paper tries to estimate Iran's and other OIC members' trade potentials for agricultural products, over the years 2000-2004. This estimation will be done by estimating a generalized gravity model by utilizing the panel data method. Last but not least, data on variables being used in the paper are derived from valid international sources such as the World Bank, the WTO, and the international statistical yearbooks.

In the upcoming sections of the paper, economic integration of OIC members and their trade potentials will be first of all discussed and further, the paper will go on with discussing import and export of OIC agricultural products. In the next section, a model will be introduced and after that, empirical results will be discussed. Then, we will have a conclusion and at last, policy recommendations will be suggested.

MATERIALS AND METHODS

Economic integration is a start point for economic emerging of countries in a smaller scale. In this integration we can see competition, international cooperation, technology transfer, national and international flows of money and investment, developments regarding transportation and communications, and activity of international companies. The integration also starts a continuous relation between the manufacturing process, consumer markets and international trade. Along with expansion of commercial, regional and outer regional transactions, and density of business relations in a special region of the world, the path to economic development will be leveled for them. In this way each of the members, concerning its economic capacities and abilities (which is the relative advantages in production of products and services that we talked about), can move towards fulfilling other members' needs at a cheaper cost. And with having a vast consumer market, it can quickly pass different levels of economic development and can also level the integration's path to economic growth and development.

Since regional cooperation has smaller dimensions in contrast with the global economy, it seems that the nations taking part in it have less economic and commercial problems to confront. Nowadays, developing countries move towards economic and regional integrations so that they can preserve their national economy from global problems, and that they can solve their economic and commercial problems in a regional scale and at last increase their relative and competitive advantages [6].

Now, if business partners have regional cooperation and similar economic, cultural and political structures, profits from joint foreign trade can be shared between them in a suitable way. If the implementation of the OIC economic integration can cause the member countries to increase their foreign trade, OIC members can have a higher rate of trade than that they have a similar economic, cultural, social and political structure, and with expansion of bilateral trade flows they can take advantage of other benefits of an economic integration (1). Positive specifics that OIC members have which can help them to form an economic coordination and increase their trade potential can be listed as below:

- OIC has the most members after the UN and the WTO.
- They have a lot of cultural specs in common, specially their religion which has influenced their economic and social structure to a high point.
- Islamic countries take up one fourth of the whole world.
- Regarding population, Islamic countries have one fifth of the whole world population in them and this is very important when we consider their consumer markets. Their young population is another very important feature.

- More than one third of the world's resources and specially 70% of the world's oil resources are located in Islamic countries.
- Islamic countries are located in four different continents, yet, they are all located beside and near each other (2).
- Most of them are developing countries and agricultural products take up most of their economic activities and nearly all of them are exporters of oil and raw products and they have a high import of industrial products.
- Their most important economic section is agriculture and services.

The general features listed, declare that OIC members can reach high economic standards in economic cooperation, and with expansion of their bilateral and multilateral transactions, they can reach a high trade potential. Especially about agricultural products, this can give us good results, because most of them are manufacturers of agricultural products and can make an appropriate trade potential for them. Islamic countries' economic standards show that with presence in the OIC economic integration, they can gain different economic sources. Presence of extended consumer markets is a vast feature that confronts the Islamic countries with high export potentials. This is especially important about agricultural products because Islamic countries' special culture which is based on usage of agricultural products, gives them a chance to increase their trade potential for agricultural products.

The Islamic countries' GDP on average in the period under consideration has been around 2657.2 million US dollars where the ratio of the gross product for agriculture to the GDP in these countries has passed 25.57%. For some of them, this ratio is even 54%. Also their per capita income shows an average of 2213 dollars which is quite suitable. Their rates of openness have been also 62% in these years [7]. OIC members' proportion of the whole world trade has been 8.33% in 2004, where their proportion of exports was 9.43% and their proportion of imports was 7.26% in the same year. To pursue this matter, it's good to declare that OIC's exports to non-member countries in 2004 had reached 768.4 billion US dollars and their exports to OIC member countries had reached 95.1 billion US dollars in the same year [8]. These figures show that most of the OIC countries' trade is still with non-member countries and there lies a potential for OIC members to increase bilateral trade between each other. This is not very impossible due to their economic and general index, particularly if the cooperation is based on products that they all have both comparative and competitive advantages.

OIC'S Import and Export of Agricultural Products: Regarding geographical features, OIC members have different climates which have given them a good opportunity for production of different agricultural products. Besides, having desirable lands, abundant and cheap workers and giving a large portion of GDP to agricultural products can strengthen production capacity of agricultural products in Islamic countries.

Among Moslem countries, Iran also has a good ability and an appropriate diversity of climate for producing agricultural products due to its special geographical position and its natural status. In spite of having a high domestic usage and also high amount of annual waste (10%), still a high amount of its agricultural products remain in its non oil export category. Accordingly, it makes sensible that OIC members are the most important trade partners that attract Iran's agricultural products to their markets. Iran's export process for agricultural products to the OIC members has been increasing in the recent years, and with a close glimpse, we can see that also the OIC members' import process for agricultural products has been increasing [9].

The most important group of the agricultural products being exchanged between the OIC members and specially Iran consists of pistachios, potatoes, apples, oranges, melon, onions, garlic and tomatoes. A glance on these products show that they can all be produced in Islamic countries with the best quality and the least costs, and they can be a preface to presence of Islamic countries in a economic integration of agricultural products. In this way, besides increasing their trade potentials, they bring home all the benefits of exports to the member and non-member countries. In this regard, we can mention two indicators of imports-to-imports and exports-to-exports of agricultural products from Islamic countries which have been an average of 0.226 and 0.228 in the years before 2004 [7]. These figures show a trade similarity between Islamic countries in agricultural products, which can show us a good potential from these countries for taking part in economic integrations.

A high potential for manufacturing agricultural products, primary facilities for manufacturing agricultural products, a large consumer market plus similarity in cultural, social specifics and economic structure are common factors among the OIC members resulting in an economic integration of agricultural products.

The Model: The gravity model is a very appropriate model in interpretation of bilateral trade flows and shows us a proper expression of trade potential. This model shows a trade flow from a country (i) to another country (j) by utilizing the economic size of both countries and the geographical distance between them, while the general frame of the model is defined as below:

$$Xij = F(GPPi, GDPj, Dij) \quad (1)$$

In this specification, bilateral trade flows are a straight function of both countries' economic size, and a reverse function of the geographical distance between countries.

Since we assume that the intercept is the same for all trading partners, in the estimation stage they will turn out to be diagonal. In other words, individual units which consist of consumers, manufacturers or member countries of an economic or regional integration, are heterogeneous and may have a lot of differences such as in historical, cultural and political specs, which can influence their trade and may have a relationship with the main variants of the model. A way to overcome this heterogeneity and to control it with concerning its effects is utilization of the panel data method in which we consider a special intercept for each of the business partners. To abolish the diagonal line resulted from individual effects, and the simple parameters some objects have been added to the model, and we conclude with the generalized gravity model. The variables added to the gravity model are: population, the country size and consumer markets, economic structure and infrastructure, and dummy variables for the indication of possible integration between countries [8-10].

The utilized model in this research is the generalized gravity model, which is used for analyzing bilateral trade flows. In this model, estimation of trade potential is done by the panel data method, so that individual and fixed effects related to trade partners are taken into consideration and the heterogeneity will be abolished. So, the model is used as below:

$$LnXijt = \alpha ij + \alpha 1LnYit + \alpha 2\ LnYjt + \alpha 3LnPOPit + \alpha 4LnPOPjt + DINTijt + Uijt \quad (2)$$

In this specification, Ln denotes a logarithm in a natural base and Xijt stands for trade flow of agricultural products from country i to j in a specific period, t. αij is the coefficient of individual effects or intercepts which are known for each of the trade partners, and $\alpha ij \neq \alpha ji$. Yi and Yj are the gross domestic production of both exporter (i) and importer (j) countries, where it is expected that by increase of both them, both countries shall gain a higher ability of attraction and production of products. So it will have positive effect on bilateral trade flows. POPi and POPj denote populations of both trade partners which show the size of their markets. Since this variable influences the size of the market and economy of scale, it will have an indefinite effect on bilateral trade flows. DINT is a dummy variable which shows an effect of the trade integration in agricultural products on the OIC member countries. This variable indicates the trade inside the block which in addition to showing trade potential for agricultural products; it can also explain effects of trade creation. Because of implementing trade integration between members, trade flows will be increased. Uij is a disturbance term.

Pursuing this stage, in accordance to the Linder trade theory, for expressing the economic similarities between trade partners, Linder variable is used in the model as a function of difference of each of the partner countries in per capita domestic gross production (3). It is anticipated that the coefficient of this variable will have a reverse effect on the bilateral trade flows. According to Linder's trade theory, countries with similar structures have more tendencies to trade with each other than to trade with other non-similar countries [11]. Also DEXX and DEXM dummy variables which are indicators of openness of integration to exports and openness of integration to imports, are considered in the model for estimation of integrated members' exports to non-members and their imports from non-members, and show the volume of their trade done with non-members.

What studied in the second stage of estimating the generalized gravity model with the panel data method is the effect of variables that are fixed through time. Variables such as distance, economic structure, neighborhood and etc which are all fixed through time are not straightly involved in the fixed effects model, for they are a specialty for each of the partner countries and are concealed in individual effects and or intercept. So for studying them, regression can estimate intercepts in the first stage on these variables and so:

$$FXij = \beta 0 + \beta 1\ Dij + \beta 2\ STRij + \beta 3\ DTRAij + \beta 4\ DWATij + \beta 5\ DCULij + \mu ij \quad (3)$$

In this framework Fxij stands for individual effects of each trading partners. Dij is the geographical distance between business centers of both countries i and j,

indicating transportation costs. It is anticipated that its effect on trade flows is indirect. STRij is the differences in economic structures of both countries and is shown as a difference between both countries' economic structures [STRij = (STRi – STRj)] (4). Economic structures of partner countries results from a ratio of production in primary section (5) to GDP; which indicates the main economic structure of both countries i and j. This ratio shows us the difference between the two countries in relative advantage, or in availability of production facilities. According to the theory of classical trade, the effect of this variable is considered to be positive on bilateral trade flows. DTRAij, DWATij and DCULij are dummy variables that respectively show the effect of neighborhood in bilateral trade flows, maritime communications and effects of water transportation expenses, and cultural communions (6). The mentioned variables are expected to have a positive effect on bilateral trade flows. μij is an error term.

Following the study on the potential OIC integration trade in agricultural products, we mention again that the research regards the years 1998-2005, so in this way the short run being studied will decrease problems that we might experience in long run studies. For this, we have considered 15-18 main trade partners for each of the economic integration members. Bilateral trade flows of agricultural products between trade partners are opted in a way so that an amount of one million dollars is shown for trade volume. So the empirical results are obtained by estimating a trade gravity model using a balanced panel and the number of observations varies.

RESULTS AND DISCUSSION

Results from the generalized gravity model estimation consist of the two fixed effects (FE) method and the random effects (RE) method, and according to F statistics and Hausman test, the reliable method has been opted appropriately. In addition, the ordinary least squares (OLS) method was also studied in the generalized gravity model estimation. Since the best method has been utilized for estimation of bilateral trade potential so that individual effects of each country can be considered and the diagonal line caused from heterogeneous specs can be abolished, while the provided results are only in regard to the fixed effects method.

In other words, only results related to the fixed effects method have been shown in the result chart. This is because according to the Hausman test, F statistics and amounts of of the mentioned method have the better results in the generalized gravity model. But results from the OLS method are biased and diagonal. We have used help from the Hausman test for deciding on which of the two fixed method and random method to use. Estimations made regarding the balanced effects compatible under both H0 and H1. In other words, under the random effects method where least generalized squares estimators are used, H1 shows consistency of coefficients while H0 doesn't hold [12]. So if the H0 hypothesis is accepted, the random effects method is more preferred than the balanced effects method and is selected as the true interpretation.

Also, because of using temporary data in this stage, different tests have been used for solving the problem of unequal variants. Estimation results of the general gravity model for the OIC economic integration has been reported in the Table 1.

In this table the first case of the general gravity model estimation for OIC economic integration has been provided in three columns. The first column regards the estimations done by Equation 1, and the second one

Table 1: Results of Generalized Gravity Model Estimation

Variables	FE	FE	FE
Constant	-	-	-
Yi	0.69*	0.72*	0.77*
	(1.94)	(1.88)	(1.89)
Yj	0.65*	0.48*	0.42*
	(2.51)	(2.58)	(1.88)
POPi	-0.49*	-0.48*	-0.45*
	(-1.97)	(-1.94)	(-2.01)
POPj	-0.12	-0.10	-0.15
	(-1.75)	(-0.45)	(-0.58)
Lin	-	-.025*	-
		(-3.16)	
DINT	0.43*	0.41*	0.44*
	(1.99)	(1.87)	(2.39)
DEXX	-	-	0.31*
			(1.88)
DEXM	-	-	0.25*
			(2.15)
$\bar{R}^2$	0.96	0.94	0.94
Number of Observations	6000	6000	6000
F Statistics	42.283(0)	48.182(0)	43.788(0)
Hausman Statistics	58.992(0)	77.340(0)	75.935(0)

t statistics are given in parentheses and the sign * shows statistically the 5% significance level.Probability of rejection for the zero hypotheses, F statistics and Hausman statistics are shown in parentheses.

consists of Linder's similarity variant and the third one is about the two DEXX and DEXM variables.

In the balanced effects method, all the coefficients are significant, except for the coefficient for variable of importer countries. The estimated coefficients of the gross domestic production show that one percent increase in GDP results in an increase in the volume of bilateral trade by 65 - 69%. The negative coefficient for POPi shows that exporting countries with more population have fewer tendencies for bilateral trade and prefer domestic use. The coefficient for dummy variable shows a significant and positive value of 0.43 for agricultural products for integration members which is 53 times more than the anticipatable and normal amount of trade estimated with the gravity model, and can increase trade of agricultural products up to 53% for member countries (7). In other words, OIC member integration's trade potential for agricultural products can show ability up to 53% for bilateral trade in agricultural products.

The second row, with emerge of Linder's variant in the model, the coefficient for Linder's variable is significant and has the expected sign. The estimated coefficient for this variable shows a 25% influence on bilateral trade flows which is derived from economic dissimilarities. In other words, this variable shows that economic similarities in OIC countries have a significant impact on the economic integration of agricultural products. In other words, bilateral trade flows of agricultural products are more tangible and have more sustainability between OIC member countries with economic similarities. In addition, entrance of this variable doesn't sensibly influence the coefficient of integration.

The third column of the table which consists of DEXX and DEXM variables shows that the coefficient for variants regarding exports to nonmember and imports from them is significant and has the expected sign. It also shows that integrating member countries can have exports to non-members up to 36% and have imports from them up to 28%. Just as coefficients of these variables show, the OIC economic integration can have more exports in agricultural products than import. Concerning OIC members' ability in production of agricultural products, this fact is fully supported and a good trade potential of agricultural products is shown for member and non-member countries.

Results of the second case of estimation by the generalized gravity model are shown as below:

$$\begin{array}{lllllll} FXij = & 0.56 - 0.29\,Dij + & 0.48\,STRij + & 0.31\,DTRAij - & 0.38\,DWATij + & 0.61\,DCULij \\ & (1.99)\ (-2.43) & (2.61) & (2.84) & (-2.04) & (3.11) \\ & R^2 = 0.69 & & & & \end{array} \quad (4)$$

In this case, all of the coefficients are significant and have the expected signs except for the dummy variables. The coefficient of the distance, which is 0.29, shows that countries with more distance have less tendencies for bilateral trade. In other words, high transportation costs are an obstacle to intense economic cooperation. The economic structure variable has a significant effect on trade flows of agricultural products with an amount of 0.48. That is, similar economic structure of OIC countries will cause increase in the amount of trade flows of agricultural products and will substantially influence the trade flows for these products in the OIC region. The variable of contiguity will also cause an increase in trade flows of agricultural products due to a decrease in distance. The negative coefficient of marine communication indicates that despite having lower expenses, water transportation cannot increase the amount of trade flows. The coefficient for cultural similarities which is 0.61 shows that these similarities can increase the volume of bilateral trade flows between the member countries.

CONCLUSION

International trade relationships and the serious economic dependence, that exist nowadays between different countries of the world, have made connection chains of national economies on the basis of economic parameters such as financial markets, foreign investment, size of economy, size of foreign trade markets, international production and etc; and have provided a background for economic integration. Here, the role of economic integrations is clear, because increasing tendencies for implementation of an economic integration brings with itself different benefits that help national economies to pursue their economic goals.

Economic-regional integrations can have a lot of positive effects on bilateral trade flows, economic growth and welfare of a society and can test competitive potency of member countries and make them ready for global competition in a smaller scale. By exposure of comparative advantages of member countries, they can help them in international trade issues. In this regard, presence of Iran and other OIC member countries in the OIC economic integration for agricultural products was studied and reliable results were concluded for strengthening trade potentials of agricultural products[10].

With concern to their economic specs and their abilities and their relative and competitive advantages in agricultural products, with presence in the OIC economic integration, the OIC member countries can bring their

domestic economies different advantages. They can also increase trade potentials for agricultural products up to 53% and gift them with dynamic and static effects of trade.

Results of the present paper show that the OIC member countries and Iran have appropriate economic specifications for the implementation of an economic integration of agricultural products. Especially the number of the population in this region shows that the needed potentials for increasing exports in agricultural products are available among the OIC member countries.

Abilities in production of agricultural products and comparative and competitive advantages of OIC member countries in agricultural products show that the OIC economic integration can move towards a normal global trade and take abundant advantages of a combination of national economies and this economic integration. Results of the estimated gravity model show that under the economic integration exports of agricultural products from member countries to nonmember countries can increase up to 36% and imports from non-member countries to member countries can increase up to 28%.

According to the empirical results obtained, the following recommendation policies can be proposed:

- Presence of Iran and other OIC member countries in economical and regional integrations can test competitive abilities of the country in global and regional fields and lead them to exposure of relative advantages.
- Presence of Iran and other OIC member countries in specialized economic integrations such as agricultural products is recommended because potentials of production and consumption abilities of these products can make these countries powerful trade partners in the world and increase their trade flows.
- Presence of Iran and other OIC member countries in integration of agricultural products is recommended because their economic and natural specs show a high capacity for production of agricultural products. Besides, high usage of these products can substantially influence their exports of agricultural products make powerful trade partners out of them.
- Common specs such as common religion can make a good background for increase of their economic cooperation and formation of an economic integration among them.
- Presence of Iran and other Islamic countries in economic integration of common agricultural products is recommended because in addition to increasing bilateral trade potentials for agricultural products between them, their ability to export and import these products to and from non-member countries will be increased [10-12].

REFERENCES

1. Anderson, J.E., 1979. A Theoretical Foundation for the Gravity Equation. American Economic Review, 69: 106-116.
2. Helpman, E. and P. Krugman, 1985. Market Structure and Foreign Trade, Increasing Returns, Imperfect Competition, and the International Economy, MIT Press, Cambridge, MA/London.
3. Cheng, I.H. and H.J. Wall, 2000. NAFTA & the Changing Pattern of State Export, Federal Reserve Banks of St. Louis.
4. Egger, P., 2000. A Note on the Proper Econometric Specifications of the Gravity Equation. Economic Letters, 66: 25-31.
5. Tayyebi, S.K., 2005. Trade Integration in ASEAN: An Application of the Panel Gravity Model, in Harvie, C., F. Kimura and H.H. Lee (eds.), "New East Asian Regionalism," Cheltenham: Edward Elgar.
6. Tayyebi, S.K. and M. Moallemi, 2003. Possibility of Trade Integration among selected Islamic Countries. Iranian Economic Review, 9: 91-105.
7. Pirasteh, H., S.K. Tayyebi and A. Hortamani, 2006. The Role of Boundary in Economic Block of OIC Countries focus on Agricultural Sector , International Multi-Conference on the Role of Isfahan in the Development of Islamic Science ,Culture and Civilization, University of Isfahan, pp: 24-44.
8. Sadeghi, S. and M. Hoseini, 2006. Islamic Common Market, Opportunities and Challenges, International Multi-Conference on the Role of Isfahan in the Development of Islamic Science ,Culture and Civilization, University of Isfahan, pp: 1-33.
9. Mahmoudi, A. and H. Valibeigi, 2001. Appropriate Reserve Building and Non-Oil Exports Development (Opportunities and Threats) ,Case Study Decaying Agricultural Products. Iranian Journal of Trade Studies, 5(18): 169-207.
10. Karimi, H.H., 2003. Globalization, Economic Integration and Regional-Trade Arrangements for the Iranian Economy (Opportunities and Challenges), Ph.D. Thesis, University of Isfahan.
11. Arnon, A., A. Spivak and J. Weinblatt, 1996. The Potential for Trade between Israel, the Palestinians and Jordon. The World Economy, 19 (1): 113-133.
12. Hsiao, C., 1986. Analysis of Panel Data, New York, Cambridge University Press.