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POTENTIALS OF EGYPT AGRICULTURAL BILATERAL TRADE WITH THE ARAB COUNTRIES: GRAVITY MODEL EVIDENCE

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Abstract

The paper aims at evaluating the determinants of agricultural bilateral trade flows of Egypt with the Arab countries. A gravity model has been used in addition to some other indicators such as relative importance of intra-trade, tendency to export and import, and degree of openness. Two models have been estimated; one is for the Egyptian agricultural exports and the other is for the imports. The biggest Arab partners who represent the majority of the Egyptian bilateral trade are; KSA, Syria, Libya, Sudan, Jordan, UAE, Kuwait, Lebanon, and Iraq. The main features of the gravity model have been introduced well. The gross domestic product has a positive impact on both agricultural exports and imports, and the distance between Egypt and the target countries has a negative impact. Both factors are statistically significant. It's recommended that Egypt encourage foreign investment within the agriculture sector and maintain the road transportation with Arab countries.

Keywords: *Egypt agricultural exports, bilateral trade, gravity model, Arab intra-trade.*

1. Introduction:

Economic cooperation is a main pillar in the developing world that empowers a group of countries with common features in a challenging environment. It aims at achieving the maximum and possible economic efficiency in production and exchange of goods, which can be reached through the efficient distribution of inputs between the different countries (Shokair, 1986). Unlike the economic cooperation, the economic integration is an advanced case of cooperation where countries are located in the same geographical area and looking for an economic unity that allows inputs to freely move from one place to another (Alshara, 2011).

As for the Arab countries, they are rich with natural resources such as arable land, forests, livestock, oil, and mining. Moreover, the geographical area is extended from the Arab gulf in the east to the Atlantic ocean in the west and there is a surplus of capital available for financing the integration process (Aljouzy, 2011). These conditions were early realized by most of the countries and were a cornerstone in developing the intra-trade between them. As the importnce of cooperation was realized; the first agreement for facilitating the trade flows between the Arab countries was signed in 1953 and followed by several other complementary agreements. In 1997, in response to the implementation of the General Agreement of Tariffs and Trade GATT, the they signed the General Agreement on Free Trade Area GAFTA. The agreement was firstly signed by Jordan, United Arab Emirates,

Bahrain, Tunisia, Saudi Arabia, Syria, Iraq, Oman, Kuwait, Lebanon, Lybia, Egypt and Moroco. Later to that date Sudan, Yemen and Palestine have been engaged in the agreement. In 2005, the complete implementation of GAFTA took place (Bebely & Baghasa, 2008).

As a result of implementing GAFTA; the share of the Arab exports in the world exports has increased from 4.4% in 2004 to 6.7% in 2008, and the share of the Arab imports in the world imports has increased from 3.0% in 2004 to 4.3% in 2008. Most important, the Arab intra-trade has achieved an average increase of 25% during the period 2004-2008 (Arab Monetary Fund [AMF], 2008).

The agriculture sector is crucial for the desired economic integration between the Arab countries. Hence, it has the main focus by politicians. Hence, the agricultural intra-trade has achieved a significant move over time. The movement can be realized through the increased share of the agricultural exports in the agricultural intra-trade which reached 21.7% in 2011. Also, it can be realized through the increased share of the agricultural imports in the agricultural intra-trade which reached 20.6% in the same year (AMF, 2012). Refering to the share of the agriculture sector in the Gross Domestic Product (GDP) for the Arab countries in the same year that was very low and represented only 5.55% (Arab Organization for Agricultural Development [AOAD], 2012). Then It's clear enough to notice that the agricultural intra-trade has a good potential over the coming years.

As for Egypt, it's located in the core of the Arab area, and was part of all the agreements signed by them since the first one signed in 1953 for facilitating the intra-trade between the member countries to the General Agreement for Free Trade Area GAFTA. In addition to the general agreements, Egypt has signed several bilateral agreements with many countries. As a result; the Egyptian exports to the Arab countries in 2008 has achieved an annual increase of 41%, and the imports has achieved an annual increase of 25% in the same year (AMF, 2008). Accoring to the AMF (2012) the Egyptian agricultural bilateral trade represents 15% of the total Egyptian agricultural trade as an average of the period 2006-2010.

Despite the Arab countries have signed several agreements to facilitate the intra-trade, it still limited to 11% of the total trade comparing to 40% between the Asian countries, 20% between the Latin American countries, and 60% between the EU countries. The agricultural intra-trade, as a sector of potential integration, is still lower than expected. Meantime, Egypt is one of the rich countries with agricultural resources and it's expected to have a higher contriution to the Arab agricultural intra-trade. However, the Egyptian agricultural bilateral trade with the main partners is still below 15% of the total Egyptian agricultural trade. Hence, the research question that needs an answer is wheather or not the Egyptian agricultural bilateral trade with the Arab partners is at a reasonable level or not?, and wheather or not will have a good potential in the future.

In this regard, this paper uses the gravity model to evaluate the determinants of agricultural bilateral trade flows of Egypt with the Arab countries through investigating; an onverview of the agricultural intra-trade and whether or not Egypt still has some untapped trade potential with its major trading partners. Furthermore, it provides useful indicators for current negotiations for Egypt specific trade promotional policies and bilateral trade.

2. Arab Agricultural Intra-Trade Overview:

As we all might agree; the agriculture sector is very important sector for most countries as it employs the highest percentage of personnel. It's also noticeable that lands fit for most of the common crops including, but not limited to, cotton, cereals, fruits, vegetables, and tropical crops. It's obvious that the idea of the economic integration, in particular, within the agricultural sector can boost the Arab intra-trade.

2.1. Development of the Arab Agricultural Intra-Trade:

The data shown in table (1) shows that the total exports during the period of 2000-2010 varied from a minimum value of 186.70 billion US$ in 2000 to a maximum value of 912 billion US$ in 2008. Exports have been significantly increased with an annual average growth of 63.3 billion US$ during the same period. Annual growth calculated from the trend equations based on the table's data. The agricultural exports within the same period varied from 4.66 billion US$ in 2003 to 21.07 billion US$ in 2010. Agricultural exports have been significantly increased with an annual average growth of 1.55 billion US$ during the same period. The Arab agricultural intra-exports within the same period varied from 1.38 billion US$ in 2001 to 7.28 billion US$ in 2009. The agricultural intra-exports have been significantly increased with an annual average growth of 0.56 billion US$ during the same period. It can be realized that the average growth in the agricultural intra-exports represents only 36% of the average growth of the total agricultural exports, which indicates a good potential for increasing the agricultural intra-exports.

Table 1. Development of the Arab agricultural intra-trade (2000-2010)

Year	Exports (In billion dollars)			Imports (In billion dollars)		
	Total	Agricultural	Intra-Arab	Total	Agricultural	Intra-Arab
2000	186.71	7.90	1.96	166.63	2.01	1.83
2001	243.58	6.77	1.38	152.31	29.98	2.02
2002	221.58	6.82	1.61	155.97	26.02	1.67
2003	241.27	4.66	2.02	176.68	28.45	1.83
2004	408.61	11.12	2.69	261.04	36.91	1.74
2005	559.98	10.20	1.99	317.20	39.24	2.67
2006	67.71	12.09	3.95	375.32	39.72	4.57
2007	777.60	15.11	4.82	495.29	52.54	6.83
2008	912.36	18.36	4.40	576.05	65.28	3.04
2009	654.92	18.77	7.28	529.75	62.03	3.65
2010	689.73	21.07	6.59	577.39	70.54	3.78
Average Annual Growth	63.3	1.55	0.56	50.69	5.82	0.30

Source: calculated from the Arab Agricultural Statistics Yearbook (different issues), The Arab Organization for Agricultural Development.

As for imports; The data shown in the same table shows that the total imports during the period of 2000-2010 varied from a minimum value of 152.31 billion US$ in 2001 to a maximum value of 577.39 billion US$ in 2010. Imports have been significantly increased with an annual average growth of 50.69 billion US$ during the same period. The agricultural imports within the same period varied from 2.01 billion US$ in 2000 to 70.54 billion US$ in 2010. Agricultural imports have been significantly increased with an annual average growth of 5.82 billion US$ during the same period. The agricultural intra-Arab imports within the same period varied from 1.74 billion US$ in 2004 to 6.83 billion US$ in 2009. Agricultural intra-imports have been significantly increased with an annual average growth of 0.30 billion US$ during the same period. It can be realized that the average growth in the agricultural intra-imports represents only 5% of the average growth of the total agricultural imports, which indicates a very good potential for increasing the agricultural intra-imports.

2.2. Relative Importance of The Arab Agricultural Intra-Trade:

The data in table (2) shows a big variance in the relative importance for the agricultural intra-trade in the selected countries during the period 2006-2010. The data refers to a group of countries in which the relative importance of the agricultural intra-trade is high, those countries include; Jordan, Syria, Sudan, and Oman where the agricultural intra-trade represents 76%, 52%, 46%, and 46% of the total agricultural trade respectively. On the other hand; Libya and the Kingdom Saudi Arabia (KSA) are the lowest in the importance of the agricultural intra-trade. The relative importance of Egypt agricultural intra-trade is still lower than the desired average where it only represents 15%. However, this lower percentage may indicate a good potential for Egypt to foster its agricultural trade with the other countries.

Table 2. Relative importance of Arab agricultural intra-trade (2006-2010)

Country	Arab agricultural trade (in million dollars)	Arab agricultural intra-trade	
		(in million dollars)	%
Jordan	3300.50	2523.84	76
Syria	3314.15	1721.66	52
Sudan	974.90	447.00	46
Oman	2003.80	918.80	46
Qatar	1262.90	328.5	26
Bahrain	923.65	224.96	24
Yemen	2355.20	558.74	24
Egypt	9137.20	1404.90	15
Tunisia	4580.00	541.22	12
Morocco	6902.06	361.68	5.2
Libya	2018.50	92.06	4.6
KSA	16815.50	497.62	3

Source: Calculated from the Arab Agricultural Statistics Yearbook (different issues), The Arab Organization for Agricultural Development.

2.3. Tendency to Export and Import:

The tendency to export or import indicates the value of exports or imports as a ratio of the value of the Growth Domestic Product (GDP). The indicator is calculated for both total trade and agricultural trade. As for the total trade; data in table (3) indicates a higher tendency to import than to export in most of the countries, the value of the indicator is 0.36 for imports and 0.33 for exports as an average for all countries. The countries with the highest tendency to export are; Bahrain, Libya, Oman, KSA, and Kuwait. The countries with highest tendency to import are; Somalia, Bahrain, Palestine, Tunisia, and United Arab Emirates (UAE). As for the agricultural trade; the same table indicates a higher tendency to import than to export in most of the countries, the value of the indicator is 0.06 for imports and 0.02 for exports as an average for all countries. The countries with the highest tendency to export agricultural products are; Tunisia, Bahrain, Mauritania, Morocco, and Syria. The countries with highest tendency to import are; Somalia, Yemen, Lebanon, Tunisia, and Mauritania.

As for Egypt; it has been shown a higher tendency to import than to export in both total trade and agricultural trade.

Table 3. Tendency to export and import and the degree of openness for the Arab countries 2006-2010

Country	Total trade			Agricultural trade		
	Tendency to export	Tendency to import	Degree of openness	Tendency to export	Tendency to import	Degree of openness
Algeria	0.38	0.23	0.61	0.001	0.05	0.05
Bahrain	0.68	0.57	1.25	0.06	0.03	0.05
Djibouti	0.08	0.43	0.61	0.001	0.05	0.05
Egypt	0.13	0.25	0.38	0.02	0.04	0.06
Iraq	0.23	0.28	0.51	0.0001	0.02	0.02
Jordan	0.30	0.69	0.99	0.05	0.11	0.16
KSA	0.59	0.23	0.82	0.01	0.04	0.04
Kuwait	0.53	0.19	0.71	0.001	0.02	0.02
Lebanon	0.09	0.37	0.46	0.01	0.07	0.08
Libya	0.65	0.27	0.92	0.0001	0.03	0.03
Mauritania	0.13	0.16	0.29	0.04	0.05	0.09
Morocco	0.17	0.34	0.51	0.03	0.05	0.08
Oman	0.59	0.35	0.94	0.01	0.03	0.04
Palestine	0.08	0.56	0.64	0.01	0.05	0.07
Qatar	0.51	0.22	0.73	0.004	0.01	0.01
Somalia	0.28	0.70	0.97	0.02	0.39	0.41
Sudan	0.16	0.16	0.31	0.004	0.01	0.02
Syria	0.25	0.31	0.56	0.03	0.04	0.07
Tunisia	0.39	0.50	0.89	0.06	0.06	0.11
UAE	0.50	0.46	0.96	0.01	0.02	0.03
Yemen	0.25	0.32	0.56	0.01	0.08	0.09
Average	0.33	0.36	0.70	0.02	0.06	0.08

Source: Calculated from the Arab Agricultural Statistics Yearbook (different issues), The Arab Organization for Agricultural Development.

2.4. Degree of Openness:

The degree of openness indicates the value of both exports and imports as a ratio of the GDP value. It reflects how open a country to trade with the rest of the world. Table (3) shows that the degree of openness for the total trade is high comparing the same indicator value for agricultural trade which means closed agricultural markets. The most open economies for all goods are; Bahrain, Somalia, UAE, Oman, and Libya. The most open economies for agricultural goods are; Somalia, Tunisia, Yemen, Mauritania, Morocco, and Lebanon. As for Egypt; it's considered a balanced economy. Yet the Egyptian exports and imports not well-planned and directed.

2.5. Directions of Egyptian Agricultural Exports and Imports:

The Egyptian agricultural bilateral trade with the Arab countries covers all the countries. However, only 9 countries importing more than 85% of the Egyptian exports and exporting more than 82% of the Egyptian imports. Countries are; KSA, Syria, Libya, Sudan, Jordan, UAE, Kuwait, Lebanon, and Iraq. As indicated in table (4); KSA and Syria are the most important destinations for the Egyptian agricultural exports as they receive 25.5% and 16.9%

of the exports. UAE and Lebanon are the most important origin of the Egyptian agricultural imports as they deliver 34.3% and 18.6% of the Egyptian agricultural imports.

Table 4. Directions of the Egyptian agricultural exports and imports in 2010

Destination of exports			Origin of imports		
Country	Value (in million dollars)	%	Country	Value (in million dollars)	%
KSA	284	20.5	UAE	107	34.3
Syria	234	16.9	Lebanon	58	18.6
Libya	144	10.4	Sudan	44	14.0
Sudan	138	10.0	Syria	17	5.5
Jordan	93	6.7	KSA	14	4.4
UAE	89	6.4	Libya	12	3.8
Kuwait	87	6.2	Jordan	3	1.1
Lebanon	81	5.8	Iraq	2	0.5
Iraq	36	2.6	Kuwait	1	0.4
Total		85.4	Total		82.5

Source: Calculated from the Arab Agricultural Statistics Yearbook (different issues), The Arab Organization for Agricultural Development.

3. Research Methodology

3.1. Theoretical Review

Several empirical studies including, but not limited to, Tinbergen (1962) and Linnemann (1966), showed that trade flows follow the physical principles of gravity. In other words, the two opposite forces determine the volume of bilateral trade between countries or economic blocks or even between a country and an economic block. The volume of bilateral trade is based on; the level of economic activity, income, and the barriers to trade. The latter include in particular transportation costs, trade policies, uncertainty, cultural differences, geographical characteristics, limited overlap in consumer preference schemes, regulatory bottlenecks, and common borders (Anderson & van Wincoop, 2003).

While trade potential is the result of matched export capacities and import demands at the microeconomic level, on a more aggregated level of analysis, proximity in demand, in per capita income, in space, and in culture, are key macroeconomic determinants of export potentials. Thus various combinations of macroeconomic variables, such as GDP and population with geographic distance, are powerful predictors of trade potentials. Hence, gravity equations use these variables and have been used extensively in the empirical literature on international trade (Bayoumi & Eichengreen, 1997; Evenett & Hutchinson, 2002).

The model is widely used in the empirical literature to evaluate the determinants of bilateral trade. It explains a trade-related dependent variable, by the combination of macroeconomic variables, such as country size, income, exchange rates, prices etc., for both countries. Moreover, indicators of transportation costs between the two countries and more general market access variables are commonly added.

3.2. Model Specifications

The gravity model for international trade is a simple empirical model for analyzing trade flows between countries. The history of the model starts with the Newton's Law of Gravitation (Head, 2000). The gravity model of international trade is similar to Newton's gravity equation. In 1687, Newton proposed the "Law of Universal Gravitation". This law argues that the attractive force between two objects 'i' and 'j' is given as following:

$$F_{ij} = G\, M_i\, M_j / D_{ij}^2 \qquad (1)$$

Where,
F_{ij} = Attractive force,
M_i and M_j = Masses of the two objects,
D_{ij} = Distance between the two objects, i and j.
G = Gravitational constant.

Based on the Newton's gravity equation as given above, Jan Tinbergen (1962) proposed a similar functional relation to explain international trade flows. The proposed equation was:

$$F_{ij} = G\, M_i^{\alpha}\, M_j^{\beta} / D_{ij}^{\theta} \qquad (2)$$

Where,
F_{ij} = Volume of trade between two countries i and j.
$M_i(_j)$ = Relevant economic size of country i(j).
D_{ij} = Distance between the countries i and j.

The model states that the bilateral trade flows are positively related to the economic size (GDP or GNI) of country i and j. It, also, states that the bilateral trade flows are negatively related to the distance between the two countries. The simplest form of the model looks like the following form:

$$T_{ij} = A\,(Y_i Y_j)/(D_{ij}) \qquad (3)$$

Where,
T_{ij} = Bilateral trade flows (exports plus imports) between country i and j.
$Y_i(_j)$ = GDP or GNI of country i(j).
D_{ij} = Distance between country i and j.
A = Constant of proportionality.

Considering taking logarithm, the equation looks like the following form:

$$Ln\,(T_{ij}) = a_0 + a_1 ln\,(Y_i * Y_j) + a_2 ln\,(D_{ij}) \qquad (4)$$

The above mentioned equation is the basic equation for the gravity model. However, many adjustments to the model have been taken by several researchers in order to include more variables in the model. In this paper, the adjusted model will be used. GDP and distance will be used in addition to per capita GDP, Foreign Direct Investment (FDI) and having common borders. Hence, the model to be used in this paper can be identified as following:

$$LnX_{ij} = a_0 + a_1 lnY_i + a_2 lnY_j + a_3 lnY_{i(pc)} + a_4 lnY_{j(pc)} + a_5 lnI_i + a_6 lnI_j + a_7 lnD_{ij} + a_8 lnB_{ij} + euij$$

Where:
i = Egypt.
j = Arab countries.
X_{ij} : the total exports from i to j or imports from j to i.
Y_i and Y_j : GDP of countries i and j.
$Y_{i(pc)}$ and $Y_{j(pc)}$: per capita GDP of the countries i and j.
I_i and I_j : foreign direct investments in countries i and j.
D_{ij} : the geographical distance between countries i and j.

B_{ij} : dummy variable indicating having common borders or not.
euij : the normal random error term.
Ln = natural logarithm.

3.3. Variables Included in the Model

1995-2010 time series of data are used in the model. The source of data for agricultural exports and imports, GDP, per capita GDP, and FDI is World Development Indicators database (WDI) developed by the World Bank. Data for distances between countries were obtained from the Distance From To website that present the distances between cities worldwide (www.distancefromto.net/countries.php). Data for having common borders were obtained from Google Maps website which offers maps of the world (www.maps.google.com).

4. Results and Discussion

Data for the variables included in the model has been processed twice and generated two models. The first one is estimated on the basis of Egypt as an exporting country towards the 9 biggest Arab partners; KSA, Syria, Libya, Sudan, Jordan, UAE, Kuwait, Lebanon, and Iraq. The other one is estimated on the basis of Egypt as an importing country from the same countries. Data for the two models has been examined for autocorrelation using Durbin-Watson test. Values of the test for both sets of data show that it's uncorrelated. The data has been, also, examined for multicollinearity, per capita GDP for Egypt was excluded due to this issue.

4.1. Exports' Model

The model shows that the basic features of the gravity model work well. The GDP and distance have shown the expected signs. In other words; the GDP possessing a positive sign and the distance possessing a negative sign, and both are statistically significant. Foreign direct investment in both sides and borders has shown no impact on the exports. The included variables explain 69% of the model as the R^2 of the model is 0.69. The model is statistically significant at 1%.

Table 5. Estimated Results of Two Gravity Models for Egypt

Variable	Exports' model	Imports' model
Constant	-50.23	-91.23
Y_i (GDP_i)	2.06 (5.44)**	3.51 (2.19)*
Y_j (GDP_j)	0.60 (4.10)**	1.20 (1.96)*
D_{ij} ($Distance_{ij}$)	-1.12 (-10.09)**	-2.38 (-5.10)**
$Y_{j(pc)}$ (Per capita GDP_j)	0.22 (2.44)*	-1.16 (-3.03)**
I_i (FDI_i)	-0.024 (-0.23)	-0. 23 (-0.52)
I_j (FDI_j)	0.024 (1.40)	0.023 (0.32)
B_{ij} ($Borders_{ij}$)	0.021 (0.635)	-0.31 (2.19)*
R^2	0.69	0.31
F	42.18**	8.58**

Source: Results of the two models obtained through processing of data using SPSS 18.

Y_i (GDP_i): gross domestic product for Egypt.
Y_j (GDP_j): gross domestic product for partner countries.

D_{ij} ($Distance_{ij}$): the distance between Cairo and other capital cities.
$Y_{j(pc)}$ (Per capita GDP_j): per capita gross domestic product for partner countries.
I_i (FDI_i): foreign direct investment for Egypt.
I_j (FDI_j): foreign direct investment for partner countries.
B_{ij} ($Borders_{ij}$): dummy variable indicating having common borders or not.
(*) refers to significant results at 5% significance level.
(**) refers to significant results at 1% significance level.

As stated in table (5); the estimated coefficient on log of GDP_i is 2.06 which mean that holding other conditions constant, an increase in the Egyptian GDP by 1% will increase agricultural exports to Arab countries by 2.06%. The estimated coefficient on log of GDP_j is 0.6 which mean that holding other conditions constant, an increase in the Arab countries GDP by 1% will increase the Egyptian agricultural exports to by 0.6%. The previous statement indicates that for Egypt to increase agricultural exports it must raise the GDP.

The estimated coefficient on log of distance has the expected negative sign, statistically significant, and is 1.12. This indicates that holding other things constant, Egypt agricultural exports will increase by 1.12% for every 1% decrease in the distance with any of the Arab countries and vice versa.

It's also shown that per capita GDP for Egypt has no role in the model. However, per capita GDP_j is positively affecting the Egyptian exports and statistically significant. The estimated coefficient on log of $GDP_{j(pc)}$ is 0.22 which means that holding other things constant, Egypt agricultural exports will increase by 0.22% for every 1% increase in the per capita GDP in any of the Arab countries and vice versa.

4.2. Imports' Model

The model shows, too, that the basic features of the gravity model work well. The GDP has a positive impact and the distance has a negative impact, and both are statistically significant. Foreign direct investment, as in the exports' model has no impact. However, in this model; borders have shown a negative and statistically significant impact on the imports. The included variables explain 31% of the model as the R^2 of the model is 0.31. The model is statistically significant 1%.

As stated in table (5); the estimated coefficient on log of GDP_i is 3.51 which mean that holding other conditions constant, an increase in the Egyptian GDP by 1% will increase agricultural imports from Arab countries by 3.51%. The estimated coefficient on log of GDP_j is 1.2 which means that holding other conditions constant, an increase in the Arab countries GDP by 1% will increase the Egyptian agricultural imports to by 1.2%.

The estimated coefficient on log of distance has the expected negative sign, statistically significant, and is 2.38. This indicates that holding other things constant, Egypt agricultural imports will increase by 2.38% for every 1% decrease in the distance with any of the Arab countries and vice versa.

Per capita GDP_i has no role in the model. However, per capita GDP_j is positively affecting the Egyptian exports and statistically significant. The estimated coefficient on log of $GDP_{j(pc)}$ is 1.16 which means that holding other things constant, Egypt agricultural imports will decrease by 1.16% for every 1% increase in the per capita GDP in any of the Arab countries and vice versa.

Unexpectedly, having a common border is negatively impacting the Egyptian agricultural imports. The estimated coefficient on log of B_{ij} is -0.31 and statistically significant.

4.3. Discussion and Policy Implications

According to the gravity model features; it's expected to have an impact for the Egyptian GDP on the development of the agricultural exports. However, the value of the coefficient on log of GDP_i (2.06) gives an impressive indicator. There's a good opportunity for Egypt to increase the exports to the Arab countries by increasing the GDP which is an internal factor that can be controlled internally.

As for having a negative sign for the coefficient on log of B_{ij} it might be explained that the main transportation system used in exporting and importing between the Arab countries. The system is poor and insufficient. Ports at the borders are not well equipped to facilitate big shipments. Hence, exporters and importers prefer to use air cargo or sea cargo.

The FDI is expected to have an impact on the agricultural intra-trade. However, the model's results show no effect. The result can be explained as following; foreign investments in most of the Arab countries are directed to other economy sectors rather than the agriculture sector, and probably have an impact on those sectors.

Many researchers have been interested in investigating the determinants of the Egyptian bilateral trade with the Arab countries, EU countries, and COMESA countries. The results of the study are consistent with most of other related researches. L'hsan (2012) refers to a good potential for the Arab exports based on the gravity model results. Most of the reports published by the Arab Monetary Fund and Arab Organization for Agricultural Development refer to potentials for the Arab agricultural intra-trade. Abu Hatab (2010) refers to GDP positive impact and distance negative impact on the Egyptian agricultural exports. Shehata (2011) and Molouk (2012) refer to an impact for GDP on the Egyptian agricultural exports to the members countries of COMESA and the Arab countries.

4.4. Conclusion and Recommendations

Egypt has been part of all regional agreements between Arab countries and has been involved in several bilateral trade agreements with many of them over the last decades. However, its agricultural trade still unsatisfactory and the tendency to import are higher than the tendency to export. The indicators of the exports' model show a high importance of increasing the Egyptian GDP in order to significantly impact the bilateral trade with the partners. It's, also, proved that short distances between Cairo and other capital cities positively increase the Egyptian exports. The gravity model has shown two unexpected results; the first one is the negative impact in case of having a common border and the second is the negative impact of the foreign direct investments.

Hence, the Egyptian government should pay attention to adopting macro policies that encourage increasing the GDP and attracting more foreign investments. The government should, also, pay close attention to investment in roads between Egypt and the neighbor countries such as KSA, Sudan and Libya. Having a package of incentives for investments in the agricultural sector would result a significant impact on Egypt bilateral trade.

References:

Abu Hatab, A. Romstad, E. & Huo, X. (2010). Determinants of Egyptian agricultural exports: a gravity model approach. *Modern Economy*, 1, 134–143.

Aljouzy, J. (2011). Arab economic integration: current situation and potentials. *Journal of South Africa Economics*, 5, 151-163.

Alshara, A. (2011). The Impact of cooperation and partnership agreements on the values of Arab inter-trade (Master Thesis), *Institute of Economics and Commerce Sciences - Academic Center in Ghardaia – Algeria*.

Anderson, J. E. & Wincoop, E.V. (2003). Gravity with gravitas: a solution to the border puzzle. *American Economic Review*, 93(1), 170-192.

Arab Monetary Fund. (2008). *Joint Arab Economic Report 2008*. Abu Dhabi, United Arab Emirates: Arab Monetary Fund.

Arab Monetary Fund. (2012). *Joint Arab Economic Report 2012*. Abu Dhabi, United Arab Emirates: Arab Monetary Fund.

Arab Organization for Agricultural Development. (2012). *Arab Agricultural Statistics Yearbook 2012* (No. 32). Khartoum, Sudan: Arab Organization for Agricultural Development.

Bayoumi, T. & Eichengreen, B. (2007). Is regionalism simply a diversion? evidence from the evolution of the EC and EFTA. In T. Ito & A. O. Krueger (Eds.), *Regionalism versus Multilateral Trade Arrangements* (pp. 141–168). Chicago, NBER-EASE Volume 6, University of Chicago Press. http://www.nber.org/papers/w5283.pdf

Bebely, M. & Baghasa, H. (2008). *The impact of free trade area on the Syrian exchange after the complete implementation*. Damascus, Syria: National Agricultural Policies Center – Ministry of Agriculture.

Head, K. (2000). *Gravity for Beginners*. Retrieved from the United Nations Economic and Social Commission for Asia and the Pacific website: http://www.unescap.org/tid/artnet/mtg/gravity10_reading1.pdf

L'hsan M. A. (2012). Analysis of the Arab intra-trade flows using gravity model. *Journal of Researcher*, 10, 11-21.

Linnemann, H. (1966). An econometric study of international trade flows (Master Thesis), *Netherlands School of Economics, Netherlands*. Available from Google Books.

Molouk, O. (2012). Two-way trade of agricultural commodities in Arab countries. *Egyptian Journal of Agricultural Economics*, 22 (3), 947-973.

Rahman, M. (2010). The factors affecting Bangladesh's exports: Evidence from the gravity model Analysis. *Journal of Developing Areas*, 44 (1), 229-244.

Shehata, E. A. (2011). Economic impact for trade between Egypt and COMESA using gravity model of spatial analysis. *Egyptian Journal of Agricultural Economics*, 20 (4), 1229-1252.

Shokair, L. (1986). *Arab economic unity: experiences and expectations*. Beirut, Lebanon: Center of Arab Unity Studies.

Tinbergen, J. (1962). *Shaping the World Economy: Suggestions for an International Economic Policy*. New York, USA: The Twentieth Century Fund.

World Bank. (2011). *World Development Indicators 1995 to 2010* [statistics]. Available from WDI database.