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Assessing the Impacts of the GAFTA Agreement on Selected Members' bilateral Agricultural Trade: an Application of the Gravity Model

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Abstract: Trade flows of agricultural commodities have always received a lot of attention in the Arab region, mainly due to their implications on food security, politics and competition. Most international trade theories postulate that free trade regimes have positive effects on bilateral trade. The justification is that regional trade blocks decrease barriers to intraregional trade and hence, member countries are likely to expect some benefits. Whether each member country actually benefits from such agreements is, however, a subject to debate and empirical tests. The gravity model is used in this paper to assess the impact of the Greater Arab Free Trade Agreement (GAFTA), particularly on the volume and pattern of bilateral agricultural trade during the period between 1995 and 2007. Our results reveal that GAFTA did not have the desired effects on the intra-regional volume of bilateral agricultural trade in four out of eight member countries selected for this study. The only countries in the sample that exhibited positive effects in both the import and export sectors are Lebanon and Syria. These findings uncover important facts that are hidden in the results of other studies, which concluded that the GAFTA has led to an increase in total intra-regional volume of trade. The current study adds to the literature by looking at the effects of the agreement on individual member countries' bilateral trade rather than the aggregate volume of intraregional trade.

Key words: Agricultural trad · GAFTA · Bilateral · Gravity model

INTRODUCTION

Trade agreements among the Arab countries are not new. Since 1945, several attempts have been made towards opening markets and promoting the regional and political integration of the Arab world. The most important agreements include *The Treaty for Joint Defense and Economic Cooperation (TJDEC)* signed in 1950, the *Convention for Facilitating and Regulating Transit Trade (CFRTT)* in 1953, the *Arab Economic Unit Agreement (AEUA)* in 1957, the *Arab Common Market (ACM)* in 1964, the *Gulf Cooperation Council (GCC)* in 1981, the *Arab Cooperation Council (ACC)* in 1989 and the *Arab Maghreb Union (AMU)* signed in 1989[1]. Due to stringent trade barriers and political instability in the Arab region, the aforementioned agreements have not been successfully implemented. However, the world was witnessing a significant proliferation of free trade agreements, therefore, the Arab countries also decided to continue their integration efforts for various reasons [2]:

- There are genuine economic and social goals to promote intra and extra-regional trade towards exporting jointly-produced goods and services;
- The Arab countries have a charged history of failed pan-Arab economic and political integration and want to prove that unity is possible;
- These countries, simply do not want to be left behind.

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Of all the agreements in the West Asia and North Africa (WANA) region, the Greater Arab Free Trade Agreement (GAFTA) is the most comprehensive. The GAFTA is a Pan-Arab Free Trade Agreement, signed in 1997 by 14 countries (Bahrain, Egypt, Iraq, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Sudan, Syria, Tunisia and the United Arab Emirates). It was established following the adoption of the agreement to facilitate and develop trade among Arab countries (1981) by the Arab League's Economic and Social Council (ESC). In 2005 Palestine, Jordan and Yemen joined GAFTA and Algeria became the eighteenth member-state in 2009. The GAFTA is supervised and run by the ESC. Indeed, GAFTA is the first agreement that was fully implemented in the region with all tariffs among member countries completely eliminated by January 2005, except Sudan, Yemen and Palestine. The first two countries, being less developed, were allowed extra-time to reduce their import tariffs by 16 percent annually reaching a complete elimination by the end of 2010[1]. Palestine was not requested to reduce its tariffs due to the permanent conflict situation the country has been experiencing. Even the agricultural sector that is frequently subject to sensitivities was fully liberalized by 2005, though subject to a special provision based on agricultural calendar. That is, in 1998, each country was allowed to exclude a maximum of 10 agricultural products from the agreement during the harvest season, in a maximum duration of seven months per year, so offering a seven year transitional period to enable the member countries to cope with adjustments needed in their agricultural production systems.

Member countries in the GAFTA differ widely in their natural resources, volume of economy, area size, populations and standard of living. Many of the Arab countries in the GAFTA region experienced a rapid population growth with rates exceeding three percent (*e.g.* Jordan, Yemen, UAE and Qatar), while the average population growth in most Arab countries has been about 2.1 percent (*e.g.* Bahrain, Egypt, Sudan, Oman, Qatar and Saudi Arabia). In the GAFTA region some 60 percent of the population is under 25 years [7]. In 2011, the total population in the GAFTA region was approximately 350 million people (five percent of the world's population) out of which, 42 percent lived in rural areas. The populations of the individual countries vary from less than one million (Bahrain and Qatar) to 75 million (Egypt), with a total GDP of 655 billion U.S. dollars in 2007 (about 2820 dollars per caput).

In terms of the distribution of per capita income, UNDP [7] reported that Qatar, UAE, Kuwait, Bahrain and Saudi Arabia exhibited wide disparities, while that of Egypt, Sudan and Syria showed relatively small ones. The agricultural value added in the GAFTA region was 11 percent of GDP. Imports of raw agricultural commodities accounted for only less than 1 percent of the total imports of raw materials into the Middle East and North Africa (MENA) zone[2] and the corresponding figure for the exports was 2.3 percent [7]. None of the GAFTA economies is large on a global scale, especially if the oil sector is excluded.

The governments of the GAFTA member countries expected outcomes of this out-reaching agreement to materialize in the form of tangible benefits. Examples of such benefits include a smooth and gradual integration into a liberalized world trading system, reduced inflation [8], empowered GAFTA members with enhanced group negotiating power with third parties (such the WTO or the EU) and increased intra and inter-regional trade due to the removal of tariff and non-tariff barriers benefiting consumers with wider product availability at reasonable prices. The purpose of this study is to investigate whether or not GAFTA had brought about the anticipated benefits, particularly in terms of increasing bilateral imports and exports. The remaining parts of this paper include an overview of the GAFTA, a discussion of the methodologies and data used, the results and discussions of the findings and finally, the concluding remarks.

MATERIALS AND METHODS

The gravity model (GM) proposed by Tinbergen [9] has been widely applied to study trade patterns in both developed and non-developed economies. The GM comes from the Newtonian law of gravity which postulates that the strength of attraction between two objects depends on their respective masses and the distance between them. Likewise, in its basic form, the GM predicts the volume of trade based on the distance between the trading countries and on their relative sizes. The model has been proven to be empirically strong through econometric analysis by including other factors such as population, income and diplomatic relationships between countries. Thus, the gravity model is more suitable for

[1] Resolution of the Arab League Council at its 14th meeting in Beirut regarding offering less developed Arab countries preferential treatment.

[2] The MENA zone includes all GAFTA member countries plus six other countries: Algeria, Djibouti, Iran, Israel, Mauritania and Ethiopia.

empirical analysis of trade patterns than as a theoretical framework to explain trade.

Zero values in bilateral trade flow analysis are common either due to missing data or to total absence of bilateral trade between certain countries. This poses a major problem especially when gravity models are estimated with log-linear specifications. A number of studies circumvented this problem by ignoring the zero trade flows [10]. Removing zeroes would mean that the variables that influence the decision to, or not to trade and the volume of trade will be biased upwards in an Ordinary Least Square (OLS) regression [11]. Another alternative to correct for the zeroes is applying the TOBIT model, which assumes that zero values are small numbers that have been rounded downwards. Hence, this approach suggests replacing the zero values with small constants [12, 11]. All of these approaches lead to selection bias in estimating the gravity equation, especially as is often the case, if the zero trade flows are not randomly distributed [13, 14 and 15]. In this study the GM, with the necessary correction for selection bias, is used to study the changes in volume of bilateral trade that were caused by the GAFTA agreement in selected member countries.

The GM has been applied globally to test the effectiveness of bilateral, regional and multilateral trade agreements. For the Arab region, Hosny [16] used the GM and found that the formation of the GAFTA agreement did, in fact have trade-creation effects that prompted member countries to trade more than they would otherwise. Angulo *et al*. [17] applied the GM to analyze the main determinants of Tunisian olive oil exports during the period 2001-2009. Their results provide evidence that trade relations grounded in historical ties between neighboring countries are likely to continue in the future, suggesting that GAFTA, as being a regional trade agreement among mostly neighboring countries, is likely to be more effective in increasing bilateral trade. They also found positive significant relationships between the importing country's income level and imported olive oil volumes. Al-Atrashand Yousef [18] found that the predictions of the GM were on the higher side than actual intra and inter-Arab trade, suggesting that there is more room for further expansion of trade. The GM has also been widely used to study trade partners in other regions [20-24].

The GM has been criticized for its inability to indicate how trade will affect factor incomes and which country should produce which goods [25]. However, it still remains useful because of the model's highly consistent statistical explanatory power [26-28]. Perfect specialization is the key point on this model and insofar as an exporting country increases the supply of its products, the importing country will increase its consumptions proportionally, thus increasing the volume of trade between them. According to Evenett and Keller [27], Davis [29], Feenstra, Markusen and Rose [30] and Atif, Shah and Zaman [31], the extent of product specialization is correlated with the volume of trade between countries.

Model Specification: The gravity model of trade in international economics predicts bilateral trade flows based on economic sizes and distance between two economic units. Accordingly, trade flows between two countries (*i* and *j*) is given by:

$$F_{ij} = G\frac{M_i M_j}{D_{ij}} \tag{1}$$

Where *F* is the trade flow, *M* is the economic mass of each country (often proxied by GDP), *D* is the distance between the two countries and *G* is gravitation constant. Following Gabrielsson-Kjälland Ädel [32] and Persson [23], the two models (one for exports and one for imports) estimated in this paper take the following form:

$$\begin{aligned}\log(x_{ij}) = {} & \beta_o + \beta_1 \log(GDP_i) + \beta_2 \log(GDP_j) + \beta_3(Pop) + \beta_4 \log(Lat) + \\ & \beta_5 \log+(Agld) + \beta_6 \log(Linder) + \beta_7(D_{ij}) + \beta_8(CL) + \\ & \beta_9(LLOC) + \beta_{10}(GAFTA) + \beta_{11}(GAFTA) + \beta_{11}(NAFTA) + \\ & \beta_{12}(UE) + \beta_{13}(ASEAN) + \beta_{14}(MERCOSUR) + \varepsilon_{ij}\end{aligned} \tag{2}$$

$$\begin{aligned}\log(M_{ij}) = {} & \beta_o + \beta_1 \log(GDP_i) + \beta_2 \log(GDP_j) + \beta_3(Pop) + \beta_4 \log(Lat) + \\ & \beta_5 \log+(Agld) + \beta_6 \log(Linder) + \beta_7(D_{ij}) + \beta_8(CL) + \\ & \beta_9(LLOC) + \beta_{10}(GAFTA) + \beta_{11}(GAFTA) + \beta_{11}(NAFTA) + \\ & \beta_{12}(UE) + \beta_{13}(ASEAN) + \beta_{14}(MERCOSUR) + \varepsilon_{ij}\end{aligned} \tag{3}$$

Where:

- X_{ij} is the value (US$) of exports from country *i* to country *j* (or the value of country *j*'s imports from country *i*);
- M_{ij} is the value (US$) of imports of country *i* from country *j* (or the value of country *j*'s exports to country *i*);
- *Gross Domestic Product i* and *j,* (GDP_i) and (GDP_j), are the proxies for the economic sizes of the country under consideration and that of its trading partner measured in US$. Theoretically, large economies are expected to have larger international trade than small economies;

- *POPi* is the population of the trading country, which may have a positive or negative correlation with trade flows. On the one hand, high population size could bring along a more productive labor and hence the country is likely to import less because domestic consumption would be met from domestic production. On the other hand, domestic production in highly populated countries might be insufficient and therefore the countries may need to import more (and export less) to satisfy high domestic demand;
- LAT_{ij} is the absolute value of latitudinal difference (in degrees) between country *i* and country *j*, which is a proxy for climate variation. Agricultural production has clearly defined the concept of 'latitudinal distribution'. For example, sugar can be produced at a much lower cost in warmer climates, whereas coffee, without such warm climates will simply not survive. Thus, a warmer climate is a comparative advantage for the former but a prerequisite for the later. Building a climate dummy for each country in the sample will exhaust the degrees of freedom in this study, hence, the need to use the absolute value of the difference in the counties' latitudes. Countries with small latitudinal difference are expected to trade less due to the similarities of their agricultural products;
- Agricultural Land Division $(AGLD)_i$ is the size (in ha) of agricultural land which is a variable that enables measuring the comparative advantage of the trading partner in agriculture. Countries with more agricultural land are bound to export more and import less agricultural commodities relative to other countries with less agricultural land;
- *Linder* stands for the Linder effect which is a measurement of the level of similarity in preferences between two economies [33]. It is used in this study to predict trade among countries with similar preferences. Linder is proxied by the absolute difference in the GDP of the trading countries where, the lower the Linder value, the higher the similarity in preferences;
- D_{ij} is the distance (in km) between the two countries, which encompasses the effects of transport costs. The longer the distance (and hence the higher the transport costs) the smaller the volume of trade;
- Common Language (CL) and Landlockedness (LLOC) are dummy variables which take a value of one to indicate the presence of these attributes and zero for absence. Theoretically, *CL*, *CB* and *CONT* are all expected to enhance trade. On the contrary, *LLOC* can discourage trade due to increased transportation costs. Lack of appropriate infrastructure for international trade can also hinder international exchange. However, due to lack of data, infrastructure status was not included in the study;
- *GAFTA* is a membership dummy which takes the value of one when trading countries are GAFTA members and the value of zero, when otherwise;
- North American Free Trade Agreement (*NAFTA*), European Union (*EU*), Association of South-East Asian Nations (*ASEAN*) and the Southern Common Market-Mercado Común del Sur-(*MERCOSUR*) are dummies which take the value of one when the trading partner is a GAFTA member and the value of zero, when otherwise;
- *DU98, DU01* and *DUM05* are dummy variables created to seize the effects of the implementation of the agreement at three points in time-1998, 2001 and 2005 (*i.e.*, one year, four years and eight years respectively after the date of entry into force of the agreement). Such an extended period makes it convenient to trace the evolution of agricultural trade patterns of the member countries. These dummies take the value of zero for the years before the particular year in consideration and one for the subsequent years. The coefficients of these variables are expected to be positive but the magnitudes will depend on the pace of implementation and relative importance of the specific components of the agreement implemented by the member countries. For instance, in 1998, the implementation of the agreement by members was likely to be only partial. However, depending on which component of trade agreement was implemented, a bigger coefficient may be observed.

In this formulation of the model, the parameter estimates for all variables, except the dummy ones, can be interpreted as elasticities. For instance in equation (2), β_1 depicts the percentage change in (X_{ij}) induced by one percent change in GDP_i. In the case of dummy variables, the parameter estimate (β_{10}) for the *GAFTA* dummy shows that GAFTA member countries will have on the average $\{\exp(\beta_{10})-1\} *100$ percent extra export (for equation 2) or import (for equation 3) than non-member countries [35]. Table 1 shows a summary of variables included in both models.

[3]Easy access to ports should reduce transportation costs. However, poor infrastructure and communication and unfavorable geographical position may seriously increase transportation cost [34].

Table 1: Summary of Variables Included in the Models

Variables	Expected signs for each variable: Export model (equation 1)	Expected signs for each variable: Import model (equation 2)	Units of Measurement
Dependent variables:			
Exports (X)			Million US Dollars
Imports (M)			Million US Dollars
Independent variables:			
Income (GDP)	+	+	*US Dollars*
Latitudes (LAT)	+	+	*Degrees*
Agricultural land (AGLD)	+	-	*Square Kilometers*
Linder (LIND)	+	-	*US Dollars*
Population (POP)	-	+	*Million people*
Common language (CL)	+	+	*Dummy*
Landlockedness (LLOC)	-	+	*Dummy*
GAFTA	+	+	*Dummy*
NAFTA	-/+	-/+	*Dummy*
MERCOSUR	-/+	-/+	*Dummy*
ASEAN	-/+	-/+	*Dummy*
EU	-/+	-/+	*Dummy*

Data: Hosny [16] used data from 16 out of the 18 members of the GAFTA to assess benefits from the agreement. For the purpose of this study, we selected data from eight GAFTA member countries-Egypt, Jordan, Lebanon, Morocco, Oman, Saudi Arabia, Syria and United Arab Emirates-for which reliable, comparable and consistent data from the same source was obtained. The use of these eight countries is justified on the following grounds:

- The need to have comparable data stems out of the fact that it allows us undertaking sound inferences in relation to trade patterns of individual countries. Building a large database of comparable cross-national data can be very challenging, particularly if the sources use different methodologies to collect the raw data. Incompatible data can lead to biased results. We consider our database to be fairly solid in terms of methodology and comparability, providing certainty about the empirical findings discussed in the sections to come. Even though availability of reliable, consistent and uniform data dictated that only eight out of eighteen GAFTA members are included without much room for random selection of the study countries, the outcomes of this study are believed to be extremely useful to shed light on the distribution of the benefits of the agreement among member countries on various grounds.
- Those eight countries considered in the study were by far the most important countries in terms of intra-GAFTA trade over the study period (1995-2007). Even though no data was obtained for the last two years (2006 and 2007) covered in this study, in 2005, these eight countries accounted for 80percent of total Intra-GAFTA exports, while the remaining countries exported for only 20 percent (Annex 1). Therefore, an analysis based on these eight countries is believed to provide good insight on the likely impacts emerging from the GAFTA agreement.
- With the exception of Morocco, all countries included in this study completely eliminated all tariffs by 2005 (as established by the GAFTA agreement). Even Morocco has reduced its effective tariffs on the average by 50 percent (Annex 2).
- From among the countries not included in the study, only four countries (Bahrain, Kuwait, Libya and Qatar) fully eliminated their effective tariffs. The other countries barely reduced their import tariffs (ranging from 4 to 15 percent). We point out that in the cases of Bahrain, Kuwait and Qatar, their effective import tariffs were very low before the GAFTA agreement and therefore there was not much effort for these countries to completely eliminate their tariffs (Annex 2).
- The only country not included in the study that significantly eliminated its effective import tariffs was Libya. But as shown in Annex 1, its share in total intra-GAFTA exports was negligible (US$ 4 million which is much less than 1 percent of total intra-GAFTA exports).

Annex 1: Intra-GAFTA export breakdown by countries (2005), Million US$

Countries included in the study		Countries not included	
Egypt	1512	Algeria	928
Jordan	1816	Bahrain	780
Lebanon	925	Kuwait	515
Morocco	374	Libya	4
Oman	2131	Qatar	1730
Saudi Arabia	10170	Sudan	332
Syria	1611	Tunisia	934
UAE	3439	Yemen	548
Total	21978		5771
Share (percent)	80		20

Note: No information available for Iraq.

Source: Abedini J. and Péridy N., 2006. "The Greater Arab Free Trade Area (GAFTA): An Estimation of the Trade Effects". Available at: http://www.google.com/url?sa=t and rct=j and q=intra%20regional%20trade%20%22oman%22%20gafta and source=web and cd=1 and ved=0CB4QFjAA and url=http%3A%2F%2Fwww.gate.cnrs.fr%2Funeca07%2Fcommunications%2520pdf%2FPeridy-Rabat-07.pdf and ei=vPhOUKjrFKeb0QXZ6oCoBA and usg=AFQjCNEtV8Z3G2rEt1WFQ7nPXATavfxcWA

Annex 2: Total and partial elimination of tariffs

Countries included in the study		Countries not included	
Egypt	100%	Algeria	About 15%
Jordan	100%	Bahrain	100%
Lebanon	100%	Kuwait	100%
Morocco	About 50%	Libya	100%
Oman	100%	Qatar	100%
Saudi Arabia	100%	Sudan	About 4%
Syria	100%	Tunisia	About 5%
UAE	100%	Yemen	About 10%

Note 1: No data for Iraq is found

Source: World Bank WITS database (https://wits.worldbank.org/WITS/WITS/Restricted/Login.aspx)

Note 2: Value of AHS (Effectively average tariff actually applied for each country) only.

Source: WITS-World Integrated Trade Solution, World Bank

Therefore, by working with these eight countries, this study not only managed to take into account half of the countries within GAFTA that reduced their effective import tariffs in a significant and meaningful way, but also those which constitute more than three fourths of total intra-GAFTA trade.

Our database for the eight countries included data on GDP and Agricultural land obtained from the World Bank Database (World Development Indicators, 2011). GDP is measured in real values in 2007 prices. Data on Latitude, Distance, Common Language and Land lockedness was taken from the Centre d`Etudes Prospective et d`Information Internationales (CEPII) [36]. Export and Import data was obtained from the United Nations Commodities Trade Section (UN-COMTRADE) and was in real price values of 2007. Following Rose and Spiegel [12] and Santos Silva and Tenreyro [11], a value of one dollar was added and hence implicitly assigned a value of zero to $ln(X_{ijt})$ for observation with no trade, thereby overcoming the problems associated with the estimation of log-linear trade equations with zero values.

Dummy variables were included for the most important trade blocs, *i.e.* the EU, ASEAN, NAFTA and MERCOSUR. Including non-member countries in the sample helped in determining whether being a signatory member in the agreement has any direct relation to the volume of trade. Countries do not trade with member countries only, but rather they have the added advantage of being able to engage in trade even with non-members within and without the region because it enlarges the market for both their exports and imports. There are long term benefits for GAFTA members and non-members which largely consist of future access to dynamic market with the prospects of a high growth rate. The decision to trade with non-members is strategic insofar as it is tied with structural adjustment and the liberalization process. This is a highlight of the great economic implications of countries' decisions on whether to trade or not.

Classifications of commodities in this study were based on the International Trade by Commodities Statistics (ITCS) developed by the Organization for Economic Cooperation and Development (OECD) [37]. ITCS provides statistical data classification according to the Standard of International Trade Classification System (SITC) on imports and exports in quantity and value by commodities and trading partners.

Correction for Selection Bias: The Heckit sample selection model due to Heckman [38][4] was used to estimate equations (2) and (3) as it handles zero values which are common in international trade data. The Heckit model is quite a straightforward way to properly model the decision to trade or not to trade with the necessary

[4] The Heckman model [38] assumes the following:

- The error terms in both the selection equation (4) and the outcome equation (5) are normally distributed with mean 0, variances $\sigma^2\varepsilon$ and $\sigma^2\varepsilon$ and that the error terms in the two equations are correlated with correlation coefficient of $\rho\varepsilon u$: i.e., $(\varepsilon,u) \sim N(0, 0, \sigma\varepsilon e, \sigma^2 u, \rho\varepsilon u)$;
- The error terms are independent of both sets of explanatory variables: i.e., (ε,u) is independent of W and Z;
- The error term in the outcome equation has a unit variance i.e., $Var(u) = \sigma^2 u = 1$. In essence, this is not so much an assumption as a simplification. It is meant to normalize the variance of the error term in what will be a probit regression.

correction for selection bias. The Heckit model involves the simultaneous estimation of two equations. The first equation (called the selection equation) attempts to identify the important factors in the decision whether to trade or not. For the sake of identification, the selection equation has to contain at least one variable which is not included in the outcome equation [39]. Basically, the selection equation regresses the decision to trade which is a dummy variable, on the array of variables believed to affect the decision to trade, *i.e.*,

$$Z_i = W_i \alpha + \varepsilon_i \quad (4)$$

Where,

Z_i = Latent variable, which is the dependent variable of the selection equation which can be thought of as the propensity to be included in the sample (or the conditional probability of engaging in trade);

W_i = Vector of covariates for unit i for the selection equation;

α = Vector of coefficients for selection equation;

ε_i = Random disturbance for unit i for the selection equation.

The second equation that completes the gravity model is the outcome equation, which is the equation of interest which was used to identify the determinants of the intensity of bilateral trade conditional on participation. The value of the dependent variable (Y) which represents the volume of trade (exports or imports) is observed if a second, unobserved value of the latent variable exceeds a certain threshold. The outcome equation is depicted by the following linear relationship:

$$Y_i^* = X_i \beta + ui \quad (5)$$

Where,

Y_i = Dependent variable of the outcome equation (either exports or imports in the case of bilateral trade);

X_i' = Vector of covariates for unit i;

β = Vector of coefficients;

u_i = Random disturbance for unit i.

When using the Heckit model, a decision needs to be made whether to estimate the whole system using the maximum likelihood estimator (MLE) or to use an alternative two-step parametric sample selection model for estimation. While the full MLE may be a marginally better performer (especially in the absence of multi-collinearity), it is also a more burdensome procedure [40]. In the Heckit two-step process, a probit model (the probability modeled in equation 4) is estimated first. Then, the inverse mills ratio, often denoted by ë which is generated from the first step estimation, is included as an explanatory variable in an OLS estimation of the outcome equation. The outcome equation is sometimes subject to problems of collinearity, which is why the performance of the OLS estimator in the two-step estimation procedure improves substantially over the MLE [40-42]. Hence, in this paper we used the two-stage procedure to estimate the bilateral import and export equations.

RESULTS AND DISCUSSION

Parameter estimates from the country-specific selection equations in this study show that the GDP of the country under consideration has mixed effects on each country's decision on whether or not to engage in trade with other countries. For Saudi Arabia and Jordan, an increase in their own GDP leads to a small but significant reduction in their tendency to import from other countries while Lebanon tends to import more as its GDP increases. The coefficient estimates for the rest five countries considered in this study (Egypt, Morocco, Oman, Syria and UAE) however are not only insignificant but also mixed signs showing that their volumes of imports are not affected by the changes in their own GDPs. For Lebanon which is a net food importer, an increase in its GDP is naturally expected to increase its volume of imports. In case of Oman and UAE, the contributions to GDP of their agriculture sectors are very small (1.52 and 2.53 percent respectively) and hence the insignificant responses of agricultural imports to changes in GDP are expected. The results for the remaining five countries however are economically counter intuitive. The effect of own GDP on the decision to export is also found to be mixed where, consistent with the theoretical expectation, it is found to be positive and significant for Lebanon, Saudi Arabia and Syria. The coefficient estimate for Syria is weakly significant (at 10 percent), though. The export decisions by the other five countries however are found to not be affected by the changes in their own GDPs.

These results signal that the GDP of the country under consideration does not explain a country's decision to participate in international trade-suggesting that factors outside the standard gravity model variables could provide the explanation for the unexpected results. For instance, participation in trade with other countries is sometimes driven more by political reasons than economic grounds. Poor infrastructure is also often quoted as a major impediment. This is especially true for developing

economies such as most of the countries included in this study as they are characterized by higher levels of trade protection and poor road and port infrastructure than developed countries and a number of them remain dependent on foreign aid which often imposes conditionalities on bilateral trade decisions. Bhattacharya and Wolde [43] estimate gravity models separately for exports and imports to see whether trade volumes of countries in the MENA region are indeed significantly lower than what would be expected given their economic, cultural and geographical characteristics. Their empirical results show that this is indeed the case: the variables used in standard gravity models cannot explain a significant part of MENA's trade performance, particularly on exports. They also estimated an augmented gravity model where they used the World Bank's Business Enterprise surveys which target business managers in over 100 countries on the main obstacles facing their enterprises. The empirical results from the 'augmented' gravity model show that the survey variables are highly significant in explaining the MENA region's underperformance in trade.

Annex 3: Model results

	Imports				Exports			
EGYPT		DU98	DU01	DU05		DU98	DU01	DU05
Description of variables	Selection	Outcome	Outcome	Outcome	Selection	Outcome	Outcome	Outcome
GDP Egypt	-5.52E-6	0.615	1.965	0.934	-2.6E-6	-1.816	-0.995	-0.985
	(4.2E-06)‡	(1.37)	(1.51)	(1.26)	(4.2E-06)	(0.94)	(1.09)	(0.92)
GDP		1.101***	1.095***	1.101***		1.013***	1.016***	1.009***
		(0.13)	(0.13)	(0.13)		(0.09)	(0.09)	(0.09)
Distance (D)	-4.73E-5**	-1.589***	-1.594***	-1.551***	-1.20E-4***	-1.197***	-1.227***	-1.166***
	(2.1E-05)	(0.39)	(0.38)	(0.38)	(2.1E-05)	(0.29)	(0.29)	(0.29)
Agriculture (AGLD)	-1.02E-4***	4.549	8.241	8.014	-2.01E-4***	-5.683	-4.557	-1.415
	(3.3E-05)	(8.75)	(9.06)	(9.11)	(3.3E-05)	(6.93)	(7.35)	(7.44)
Population (POP)	4.12E-8***				9.50E-8***			
	(1.6E-08)				(1.6E-08)			
Latitude (LAT)	-0.0061	0.0516	0.0411	0.0423	0.00182	-0.151	-0.145	-0.155
	(4.3E-03)	(0.21)	(0.21)	(0.20)	(4.0E-03)	(0.15)	(0.15)	(0.15)
Linder	4.42E-4***	-0.407*	-0.432*	-0.421*	4.06E-4***	0.337*	0.355**	0.329**
	(6.7E-05)	(0.23)	(0.23)	(0.23)	(5.8E-05)	(0.17)	(0.17)	(0.16)
Common Language (CL)	-0.249	0.843	0.836	0.869	-0.176	1.064**	1.047***	1.083***
	(1.7E-01)	(0.58)	(0.58)	(0.58)	(1.7E-01)	(0.35)	(0.35)	(0.34)
Landlocked (LLOC)	-0.174	0.231	0.22	0.269	-0.334***	-1.791***	-1.793***	-1.779***
	(1.2E-01)	(0.37)	0.37	0.38	(1.1E-01)	(0.26)	(0.26)	(0.25)
GAFTA		-4.545***	-4.615***	-4.630***		-0.0814	0.0554	-0.151
		(0.89)	(0.89)	(0.89)		(1.16)	1.39	(1.25)
MERCOSUR		4.035***	4.003**	3.855***		1.084	0.995	1.072
		(1.29)	(1.29)	(1.29)		(1.46)	(1.46)	(1.45)
ASEAN		0.634	0.605	0.558		0.313	0.35	0.274
		0.61	0.61	0.61		(1.98)	(0.51)	(0.50)
EU		(1.738)	91.698)	(1.75)		1.882	1.908	1.806
		(1.81)	(97.55)	(1.8)		(1.56)	(1.56)	(1.56)
Trend		-0.0899	-0.238*	-0.0594		0.134***	0.119	0.197***
		(0.08)	(0.13)	(0.08)		(0.07)	(0.10)	(0.06)
DU98		0.0706				0.529		
		(0.50)				(0.38)		
DU01			0.95				0.33	
			(0.65)				(0.49)	
DU05				-0.629				-0.739**
				(0.49)				(0.37)
Cons		144	386.0**	43.27		-177	-168.7	-357.2***
		(119.01)	(193.97)	110.9		(92.19)	(149.3)	(87.8)
Lag M	1.530***							
	(1.1E-01)							
Lag X					1.270***			
					(1.0E-01)			
Lambda		-1.533***	-1.509***	-1.539***		-0.770**	-0.778**	-0.799**
		(3.2E-01)	(3.2E-01)	(3.2E-01)		(3.4E-01)	(3.4E-01)	(3.4E-01)
Rho		-0.6	-0.57	-0.48		-0.15	-0.18	-0.16
Sigma		2.56	2.65	3.21		5.13	4.32	4.99
N	1091				972			

*, ** and *** represent confidence levels of 90%, 95% and 99% respectively. ‡ Values in closed braces are the standard errors. Source: Model results.

Table 3: Continued

	Imports				Exports			
JORDAN		DU98	DU01	DU05		DU98	DU01	DU05
Explanatory variables	Selection	Outcome	Outcome	Outcome	Selection	Outcome	Outcome	Outcome
GDP Jordan	-2.0E-4***	3.276	4.734	3.777	-0.0001	4.313	1.743	4.151
	(6.3E-05)‡	(2.56)	(2.92	(2.50)	(7.5E-05)	(4.79)	(5.81)	(4.32)
GDP		1.081***	1.105***	1.104***		0.0644	0.0604	0.0587
		(0.11)	(0.11)	(0.11)		(0.14)	(0.14)	(0.14)
Distance (D)	-2.0E-5	-1.316***	-1.327***	-1.329***	-2.0E-4***	-0.337	-0.318	-0.328
	(2.5E-05)	(0.20)	(0.20)	(0.20)	(3.7E-05)	(0.30)	(0.31)	(0.30)
Agriculture (AGLD)	-0.0004***	-1.583	-4.288	-6.913	-0.00016**	1.73	-1.104	1.495
	(7.4E-05)	(7.92)	(8.41)	(7.43)	(7.3E-05)	9.61	(10.04)	8.79
Population (POP)	1.02E-6***	41.51	0.462	-1.099	4.91E-07	-140.1*	-176*	-119.1
	(2.7E-07)	(44.16)	(46.20)	(36.63)	(3.0E-07)	(80.06)	(98.32)	(81.02)
Latitude (LAT)	-0.0137***	-0.204	-0.236	-0.229	-0.0147**	-0.298	-0.309	-0.308
	(4.5E-03)	(0.19)	(0.19)	(0.19)	(5.7E-03)	(0.27)	(0.27)	(0.27)
Linder	2.71E-4***	-0.543***	-0.521***	-0.527***	2.70E-4***	0.772***	0.775***	0.733***
	(4.3E-05)	(0.18)	(0.18)	(0.18)	(4.9E-05)	(0.23)	(0.23)	(0.23)
Common Language (CL)	0.395**	-0.0143	0.108	0.0883	0.1	1.341**	1.368**	1.332**
	(1.6E-01)	(0.48)	(0.49)	(0.49)	(1.7E-01)	(0.54)	(0.54)	(0.54)
Landlocked (LLOC)	-0.301**	1.455***	1.441***	1.427***	-1.143***	0.336	0.326	0.297
	(1.3E-01)	(0.40)	(0.40)	(0.40)	(1.9E-01)	(0.66)	(0.96)	(0.96)
GAFTA		-1.535***	-1.609**	-1.598***		0.884	0.865	0.866
		(0.56)	(0.56)	(0.56)		(0.66)	(0.66)	(0.66)
MERCOSUR		2.384**	2.271**	2.298**		3.717	3.658	3.771*
		(1.00)	(1.01)	(1.01)		(2.27)	(2.27)	(2.26)
ASEAN		1.554***	1.571***	1.563***		0.366	0.377	0.344
		(0.48)	(0.84)	(0.48)		(1.22)	(1.22)	(1.19)
EU		0.529	0.614	0.594		1.013	0.996	0.948
		(0.75)	(0.76)	(0.75)		(0.90)	(0.90)	(0.89)
Trend		-1.047	-0.228	-0.195		3.099	4.156	2.524
		(1.07)	(1.09)	(0.93)		2.09	2.72	2.18
DU98		-1.207*				0.0455		
		(0.67)				0.91		
DU01			0.244				-0.548	
			(0.58)				(0.88)	
DU05				0.463				0.572
				(0.46)				(0.66)
Cons		1458.8	461.9	453.1		-4088.5	-5600.5	-3259.6
		(1458.7)	(1539.67)	(1294.6)		(2941.37)	(3835.96)	(3075.09)
Lag M	1.350***							
	1.1E-01							
Lag X					1.097***			
					(1.2E-01)			
lambda		-1.525***	-1.220***	-1.254***		-1.198**	-1.201**	-1.217**
		(3.7E-01)	(3.3E-01)	(0.3344)		(5.0E-01)	(4.9E-01)	(4.9E-01)
Rho		-0.57	-0.43	-0.36		-0.25	-0.32	-0.41
Sigma		2.68	2.84	3.49		4.79	3.75	2.97
N	954				1135			

*, ** and *** represent confidence levels of 90%, 95% and 99% respectively. ‡Values in closed braces are the standard errors.

Source: Model results.

Table 3: Continued

	Imports				Exports			
LEBANON		DU98	DU01	DU05		DU98	DU01	DU05
Explanatory variables	Selection	Outcome	Outcome	Outcome	Selection	Outcome	Outcome	Outcome
GDP Lebanon	1.10E-4**	-3.039	-3.564	-3.869	2.00E-4***	2.132	2.496	-0.13
	(5.6E-05)‡	(3.10)	(3.15)	(3.20)	(5.8E-05)	2.60	2.71	(2.60)
GDP		0.876***	0.878***	0.879***		0.0833	0.0879	0.0867
		(0.06)	(0.06)	(0.06)		(0.06)	(0.06)	(0.06)
Distance (D)	-4.19E-5***	-0.938***	-0.939***	-0.940***	-5.00E-5***	-0.802***	-0.803***	-0.799***
	(1.3E-05)	(0.12)	(0.12)	(0.12)	(1.4E-05)	(0.10)	(0.10)	(0.10)
Agriculture (AGLD)	-4.80E-4**	-4.046	-0.941	-0.981	-8.4E-4***	-1.101	3.993	2.635
	(2.1E-04)	(3.93)	(3.24)	(3.27)	(2.2E-04)	(3.44)	2.75	2.80
Population (POP)	-1.92E-08	22.32	19.49	36.56	-7.56E-08	24.21	5.602	16.91
	(3.8E-07)	(27.56)	(32.48)	(35.50)	(4.0E-07)	(24.2)	(29.48)	(0.11)
Latitude (LAT)	-0.00266	0.0351	0.0363	0.0369	0.00632**	0.273***	0.278***	0.274***
	(2.9E-03)	(0.09)	(0.09)	(0.09)	3.1E-03	(0.08)	(0.08)	(0.08)
Linder	8.11E-5***	-0.169	-0.17	-0.165	9.87E-5***	-0.0589	-0.0665	-0.0577
	1.5E-05	(0.12)	(0.12)	(0.12)	1.5E-05	(0.11)	(0.11)	(0.11)
Common Language (CL)	-0.382***	-0.482	-0.474*	-0.478*	0.222**	0.710***	0.720***	0.723***
	(9.7E-02)	(0.25)	(0.25)	(0.25)	(1.0E-01)	0.19	0.19	0.19
Landlocked (LLOC)	-0.212*	-0.715**	-0.698***	-0.697***	-0.429***	-1.027***	-1.023***	-1.038***
	(1.1E-01)	(0.25)	(0.25)	(0.25)	(1.1E-01)	(0.23)	(0.23)	(0.23)
GAFTA		1.228**	1.226***	1.229***		1.451***	1.460***	1.452***
		(0.39)	(0.39)	(0.39)		(0.33)	(0.33)	(0.33)
NAFTA		-0.195	-0.198	-0.176		-0.38	-0.457	-0.392
		(1.39)	(1.32)	(1.35)		(1.27)	(1.27)	(1.26)
MERCOSUR		1.094***	1.092***	1.094***		1.438***	1.412***	1.424***
		(0.32)	(0.32)	(0.32)		(0.32)	(0.32)	(0.32)
ASEAN		1.033**	1.028**	1.027**		0.336	0.32	0.314
		(0.41)	(0.41)	(0.41)		(0.41)	(041)	(0.41)
EU		1.545***	1.550***	1.548***		0.558	0.587	0.576
		(0.39)	(0.39)	(0.32)		(0.36)	(0.36)	(0.36)
Trend		-0.19	-0.232	-0.425		-0.249	-0.172	-0.236
		(0.41)	(0.44)	(0.49)		(0.36)	(0.38)	(0.44)
DU98		-0.523				-0.845**		
		(0.41)				(0.40)		
DU01			0.238				0.657	
			(0.41)				0.38	
DU05				-0.132				0.366
				(0.47)				(0.43)
Cons		122	225.6	357.6		137.2	215.9	210.2
		(406.67)	(395.79)	(447)		(361.05)	(348.23)	(396.60)
Lag M	1.598***							
	(8.6E-02)							
Lag X					1.807***			
					(8.9E-02)			
lambda		-2.064***	-2.068***	-2.059***		-1.246***	-1.234***	-1.200***
		(2.3E-01)	(2.3E-01)	(2.3E-01)		(1.7E-01)	(1.7E-01)	(1.7E-01)
Rho		-0.7	-0.61	-0.62		-0.32	-0.34	-0.42
Sigma		2.95	3.39	-3.22		3.89	3.63	2.86
N	1224				1315			

*, ** and *** represent confidence levels of 90%, 95% and 99% respectively. ‡ Values in closed braces are the standard errors.

Source: Model results.

Table 3: Continued

	Imports				Exports			
MOROCCO		DU98	DU01	DU05		DU98	DU01	DU05
Explanatory variables	Selection	Outcome	Outcome	Outcome	Selection	Outcome	Outcome	Outcome
GDP Morocco	-1.79E-6	-0.935	-0.061	-0.608	2.11E-6	0.108	-0.734	-0.508
	(7.5E-06)‡	(1.21)	(1.02)	(1.17)	(8.1E-06)	1.20	(1.03)	(1.15)
GDP		0.901***	0.902***	0.899***		0.182**	0.181**	0.182**
		(0.09)	(0.09)	(0.09)		(0.07)	(0.07)	(0.07)
Distance (D)	-2.42E-5	-0.906***	-0.907**	-0.895***	-5.37E-5***	-0.773***	-0.759***	-0.760***
	(1.7E-05)	(0.28)	(0.28)	(0.28)	(1.9E-0)	(0.27)	(0.27)	(0.27)
Agriculture (AGLD)	-8.69E-6***	3.68	1.436	2.661	-1.12E-5***	12.54	18.43	16.27
	(3.2E-06)	(14.72)	(14.36)	(15.65)	(3.4E-06)	(14.41)	(13.86)	(14.93)
Population (POP)	5.38E-08	-2.57	-3.417	-2.724	7.26E-08	-2.523	-1.616	-2.065
	(4.2E-08)	(5.59)	(5.51)	(5.68)	(4.4E-08)	(6.15)	(6.22)	(6.26)
Latitude (LAT)	-0.00571	-0.195	-0.193*	-0.197	-0.00706*	0.286***	0.292***	0.293***
	(3.7E-03)	(0.10)	(0.10)	(0.10)	(4.1E-03)	(0.10)	(0.10)	(0.10)
Linder	0.000348***	-0.834***	-0.844***	-0.831***	0.000354***	-0.483**	-0.488***	-0.493***
	(4.7E-05)	(0.17)	(0.17)	(0.17)	(5.7E-05)	(0.19)	(0.19)	(0.19)
Common Language (CL)	0.172	0.906***	0.905***	0.908***	0.482***	0.15	0.127	0.127
	(1.1E-01)	(0.28)	(3.19)	(0.28)	(1.2E-01)	(0.27)	(0.26)	(0.26)
Landlocked (LLOC)	-0.101	1.620***	1.624***	1.628***	-0.493***	0.14	0.151	0.151
	(1.2E-01)	-5.8	0.28	0.28	(1.4E-01)	(0.29)	(0.30)	(0.30)
GAFTA		-1.795**	-1.816***	-1.774***		-0.64	-0.655	-0.662
		(0.55)	(0.55)	(0.55)		(0.60)	(0.60)	(0.60)
MERCOSUR		-1.972***	-1.944***	-1.975***		-1.188**	-1.203**	-1.202**
		(0.72)	(0.72)	(0.72)		(0.54)	(0.54)	(0.54)
ASEAN		0.239	0.228	0.248		-2.468**	-2.624**	-2.626**
		0.50	0.50	0.50		(1.05)	(1.04)	(1.04)
EU		-2.561**	-2.494**	-2.473**				
		(1.19)	(1.18)	(1.18)				
Trend		0.065	-0.0357	0.00567		0.216**	0.294***	0.299***
		(0.09)	(0.08)	0.06		(0.09)	(0.08)	(0.07)
DU98		-0.397				0.601		
		(0.48)				(0.43)		
DU01			0.391				0.000854	
			(0.42)				(854)	
DU05				0.192			-0.159	
				(0.46)			(0.43)	
Cons		-103.3	131	26.83		-528*	-765.4***	-743.7***
		(303.82)	(247.17)	(243.91)		(298.31)	(255.13)	(249.56)
Lag M	1.751***							
	(1.0E-01)							
Lag X					1.720***			
					(1.1E-01)			
lambda		-1.706***	-1.716***	-1.720***		-1.559***	-1.577***	-1.577***
		(2.5E-01)	(2.5E-01)	(2.5E-01)		(2.3E-01)	(2.3E-01)	(2.3E-01)
Rho		-0.62	-0.64	-0.65		-0.58	-0.57	-0.57
Sigma		2.75	2.68	2.65		2.69	2.77	2.77
N	1096				1087			

*, ** and *** represent confidence levels of 90%, 95% and 99% respectively. ‡ Values in closed braces are the standard errors.

Source: Model results.

Table 3: Continued

	Imports				Exports			
OMAN		DU98	DU01	DU05		DU98	DU01	DU05
Explanatory variables	Selection	Outcome	Outcome	Outcome	Selection	Outcome	Outcome	Outcome
GDP Oman	1.52E-5	0.74	-1.084	0.677	1.82E-5	2.501	-0.621	2.135
	(1.3E-05)‡	(1.72)	(1.31)	(1.69)	(1.4E-05)	(1.92)	(1.55)	(1.89)
GDP		0.809***	0.809***	0.813***		-0.0607	-0.0619	-0.0584
		(0.08)	(0.08)	(0.08)		(0.08)	(0.08)	(0.08)
Distance (D)	-5.33E-5***	-2.029***	-2.004***	-2.006***	-1.37E-4***	-2.581***	-2.559***	-2.528***
	(1.3E-05)	(0.27)	(0.27)	(0.27)	(1.9E-05)	(0.32)	(0.32)	(0.32)
Agriculture (AGLD)	-9.82E-6	1.76*	1.71*	2.086**	4.73E-5	1.076	0.409	1.202
	(2.6E-05)	(0.91)	(1.00)	(0.95)	(2.8E-05)	(1.09)	(1.20)	(1.11)
Population (POP)	-6.09E-7***	36.83	69.09	72.57	-8.17E-7***	123.4**	147.3**	175.6***
	(1.1E-07)	(40.92)	(50.80)	(38.19)	(1.2E-07)	(49.56)	(62.15)	(46.46)
Latitude (LAT)	0.00884***	0.210**	0.208**	0.210**	0.00336	0.181	0.18	0.177
	(3.4E-03)	(0.10)	(0.10)	0.10	(4.0E-03)	(0.11)	(0.11)	(0.11)
Linder	4.80E-5***	0.00618	0.00928	-0.0136	7.71E-5***	-0.0887	-0.124	-0.14
	(9.1E-06)	(0.21)	(0.19)	(0.19)	(1.1E-05)	(0.26)	(0.26)	(0.26)
Common Language (CL)	0.239	-0.346	-0.349	-0.369	0.222	1.166***	1.192***	1.195***
	(1.3E-01)	(0.41)	(0.41)	(0.40)	(1.3E-01)	(0.38)	(0.38)	(0.38)
Landlocked (LLOC)	-0.359***	-0.876**	-0.853**	-0.809**	-0.479***	-1.278***	-1.234***	-1.197***
	(1.2E-01)	(0.36)	(0.36)	(0.36)	(1.2E-01)	(0.40)	(0.41)	(0.41)
GAFTA		0.544	0.545	0.56		-0.756	-0.778	-0.786
		(0.43)	(1.26)	(0.43)		(0.42)	(0.42)	(0.42)
NAFTA		-1.934	-1.908	-1.663		3.238***	3.261***	3.355***
		(1.50)	(1.49)	(1.48)		(0.86)	(0.87)	(0.86)
MERCOSUR		2.476***	2.459***	2.466***		0.895**	0.86	0.848
		(0.53)	(0.53)	(0.53)		(0.44)	(0.44)	(0.44)
ASEAN		0.772**	0.76*	0.753		-0.691	-0.704	-0.67
		(0.39)	(0.39)	(0.39)		(0.68)	(0.68)	(0.67)
EU		-1.577***	-1.564***	-1.567***				
		(0.40)	(0.40)	(0.40)				T r e n d
		-0.832	-1.239	-1.342*		-2.510**	-2.563**	-3.218***
		(0.72)	(1.22)	(0.72)		(0.88)	(1.24)	(0.87)
DU98		0.944				1.546**		
		(0.59)				(0.67)		D U 0 1
			0.105				-0.254	
			(0.55)				(0.60)	D U 0 5
				-0.919			-1.205**	
				(0.57)			(0.58)	
Cons		1118.5	1479.5	1612.6*		3205.6***	2998.4*	3858.6***
		(867.05)	(1275.43)	(881.20)		(1054.47)	(1553.58)	(1062.98)
Lag M		1.569***						
		(8.7E-02)						Lag X
					1.217***			
					(9.4E-02)			l a m b d a
		-1.111***	-1.151***	-1.229***		-1.304***	-1.337***	-1.425***
		(2.4E-01)	(2.4E-01)	(2.5E-01)		(3.1E-01)	(3.1E-01)	(3.2E-01)
Rho		-0.25	-0.28	-0.36		-0.41	-0.42	-0.48
Sigma		4.44	4.11	3.41		3.18	3.26	2.97
N	1209				1344			

*, ** and *** represent confidence levels of 90%, 95% and 99% respectively. ‡Values in closed braces are the standard errors.

Source: Model results.

Table 3: Continued

	Imports				Exports			
SAUDI ARABIA		DU98	DU01	DU05		DU98	DU01	DU05
Explanatory variables	Selection	Outcome	Outcome	Outcome	Selection	Outcome	Outcome	Outcome
GDP Saudi Arabia	-1.19E-5***	2.755	2.507	2.635**	7.29E-6***	4.052	7.039**	7.090***
	(1.4E-06)‡	(2.00)	(1.46)	(1.30)	(1.5E-06)	(2.96)	(2.84)	(2.59)
GDP		1.290***	1.290***	1.290***		0.0746	0.0727	0.0711
		(0.07)	(0.07)	(0.07)		(0.07)	(0.07)	(0.06)
Distance (D)	-1.90E-6**	-1.274***	-1.275***	-1.278***	-8.5E-5***	-1.952***	-1.929***	-1.987***
	(9.5E-07)	(0.18)	(0.18)	(0.18)	(1.2E-05)	(0.30)	(0.30)	(0.31)
Agriculture (AGLD)	-1.9E-6***	11.77**	12.36**	12.54**	-2.93E-08	15.30***	11.38**	12.65**
	(1.8E-07)	(5.91)	(5.09)	(5.10)	(2.0E-07)	5.60	(5.63)	(5.62)
Population (POP)	4.29E-7***	26.74	45.46	22.68	-1.2E-7**	-23.96	-2.032	
	(4.4E-08)	(92.21)	(64.94)	(55.32)	(4.8E-08)	(99.83)	(0.15)	
Latitude (LAT)	0.00799***	0.128	0.129	0.13	-0.00228	-0.491***	-0.489***	-0.497***
	(2.8E-03)	(0.14)	(0.14)	(0.14)	(3.3E-03)	(0.15)	(0.15)	(0.15)
Linder	3.95E-5***	0.185	0.186	0.187	6.2E-5***	0.455	0.438	0.480**
	(7.0E-06)	(0.18)	(0.18)	(0.18)	(8.6E-06)	(0.24)	(0.24)	(0.24)
Common Language (CL)	0.408***	0.930**	0.934**	0.939**	0.558***	1.381***	1.364***	1.452***
	(1.3E-01)	(0.39)	(0.39)	(0.39)	(1.1E-01)	0.53	(0.53)	(0.53)
Landlocked (LLOC)	-0.196**	-0.806***	-0.810***	-0.814***	-0.564***	-2.047***	-2.018***	-2.154***
	(8.8E-02)	(0.26)	(0.26)	(0.26)	(1.0E-01)	(0.50)	(0.50)	(0.50)
GAFTA		1.113**	1.113**	1.112**		-0.451	-0.453	-0.472
		(0.49)	(0.39)	(0.47)		(0.43)	(0.42)	(0.43)
NAFTA		-0.136	-0.139	-0.14		-0.477	-0.295	-0.316
		(0.80)	(0.82)	(0.82)		(2.07)	(2.11)	(2.10)
MERCOSUR		1.825***	1.825***	1.826***		1.622**	1.636**	1.475**
		(0.37)	(0.37)	(0.37)		(0.66)	(0.67)	(0.66)
ASEAN		1.625***	1.626***	1.628***		1.136**	1.139**	1.127**
		(0.42)	(0.42)	(0.42)		(0.46)	(0.46)	(0.45)
EU		0.0429	0.0432	0.0425		-1.209**	-1.211**	-1.205**
		(0.33)	(0.33)	(0.33)		(0.50)	(0.50)	(0.50)
Trend		-0.853	-1.258	-0.703		0.133	0.297	-0.111
		(1.98)	(1.59)	(1.35)		(0.19)	(2.48)	(0.06)
DU98		0.241				-1.516		
		(1.27)				(0.84)		
DU01			0.037				0.888	
			(0.53)				(0.71)	
DU05				-0.253				-0.0291
				(0.48)				(0.48)
Cons		1054	1543.1	811.2		-523.7	-425.8	-313
		2395.5	2085.27	(1725.96)		(356.26)	(3041.4)	(2652.1)
Lag M	1.183***							
	(7.4E-02)							
Lag X					0.0653			
					(8.6E-02)			
lambda		-2.013***	-1.992***	-1.970***		1.054	0.989	1.255
		(3.3E-01)	(3.24E-01)	(3.2E-01)		(1.1E+00)	(1.1E+00)	(1.1E+00)
Rho		-0.70	-0.64	-0.62		0.21	0.16	0.31
Sigma		2.87	3.11	3.17		5.01	6.18	4.04
N	1563				1783			

*, ** and *** represent confidence levels of 90%, 95% and 99% respectively.

‡ Values in closed braces are the standard errors.

Source: Model results.

Table 3: Continued

	Imports				Exports			
SYRIA		DU98	DU01	DU05		DU98	DU01	DU05
Explanatory variables	Selection	Outcome	Outcome	Outcome	Selection	Outcome	Outcome	Outcome
GDP Syria	-8.18E-7	1.123	-0.603	-0.903	2.42E-5*	0.839	0.31	1.085
	(1.4E-05)‡	(0.90)	(0.83)	(0.92)	(1.3E-05)	(0.99)	(0.94)	(1.03)
GDP		0.546***	0.555***	0.555***		0.690***	0.700***	0.695***
		(0.05)	(0.05)	(0.05)		(0.05)	(0.05)	(0.05)
Distance (D)	-4.84E-6	-0.516***	-0.522***	-0.523***	-3.88E-5***	-0.819***	-0.841***	-0.837***
	(1.2E-05)	(0.11)	(0.11)	(0.11)	(1.2E-05)	(0.12)	(0.12)	(0.12)
Agriculture (AGLD)	-1.38E-5***	28.18	-30.78	0.826	-4.28E-6	25.72	-5.593	-64.7*
	(3.3E-06)	(31.66)	(28.24)	(41.30)	(3.3E-06)	(34.76)	(31.07)	(38.51)
Population (POP)	5.92E-08	20.15	-3.268	-46.01	-3.31E-08	-11.62	-31.24	42.57
	(4.0E-08)	(24.88)	(23.34)	(36.23)	(4.0E-08)	(27.67)	(26.70)	(41.33)
Latitude (LAT)	-0.000341	0.352***	0.353***	0.353***	-0.00518*	0.159*	0.183**	0.180**
	(2.6E-03)	(0.08)	(0.08)	(0.08)	(2.7E-03)	(0.08)	(0.08)	(0.08)
Linder	9.77E-6***	-0.352***	-0.351***	-0.351***	1.01E-5***	-0.223***	-0.226***	-0.225***
	(2.5E-06)	(0.05)	(0.05)	(0.05)	(2.4E-06)	(0.05)	(0.05)	(0.05)
Common Language (CL)	0.146	-1.163***	-1.154***	-1.143***	0.446***	0.578*	0.587*	0.57
	(1.1E-01)	(0.36)	(0.37)	(0.37)	(1.2E-01)	(0.35)	(0.35)	(0.35)
Landlocked (LLOC)	-0.523***	-0.663**	-0.673**	-0.670**	-0.627***	-0.0604	-0.0955	-0.0694
	(1.0E-01)	(0.26)	(0.26)	(0.26)	(1.0E-01)	(0.29)	(0.29)	(0.29)
GAFTA		1.067***	1.082***	1.069***		1.865***	1.916***	1.913***
		(0.40)	(0.40)	(0.40)		(0.37)	(0.37)	(0.37)
NAFTA		-1.806***	-1.828***	-1.823***		-1.235**	-1.274**	-1.269**
		(0.44)	(0.44)	(0.44)		(0.51)	(0.51)	(0.51)
MERCOSUR		0.801***	0.841***	0.859***		0.235	0.224	0.232
		(0.27)	(0.27)	(0.27)		(0.34)	(0.33)	(0.34)
ASEAN		-0.519	-0.502	-0.496		-0.0689	-0.126	-0.11
		(0.32)	(0.32)	(0.32)		(0.34)	(0.43)	(0.44)
EU		-0.335	-0.328	-0.324		-0.464**	-0.462**	-0.462**
		(0.20)	(0.20)	(0.20)		(0.21)	(0.21)	(0.21)
Trend		-0.694	0.267	1.285		0.256	0.85	-0.953
		(0.67)	(0.62)	(0.94)		(0.73)	(0.69)	(1.07)
DU98		1.663***				1.138**		
		(0.44)				(0.51)		
DU01			-0.648**				0.744**	
			(0.30)				(0.34)	
DU05				0.623				-1.124**
				(0.44)				(0.50)
Cons		722.7	-94.98	-1790.4		-618.7	-1104.1	1968.1
		(1095)	(1055.33)	(1598.57)		(1213.14)	(1187.20)	(1822.31)
Lag M	1.684***							
	(7.3E-02)							
Lag X					1.364***			
					(7.4E-02)			
lambda		-1.382***	-1.373***	-1.393***		-1.446***	-1.470***	-1.487***
		(1.6E-01)	(1.7E-01)	(1.7E-01)		(2.1E-01)	(2.1E-01)	(2.13E-01)
Rho		-0.50	-0.48	-0.51		-0.58	-0.59	-0.62
Sigma		2.76	2.86	2.73		2.49	2.49	2.39
N	1706				1698			

*, ** and *** represent confidence levels of 90%, 95% and 99% respectively.

‡ Values in closed braces are the standard errors.

Source: Model results.

Table 3: Continued

	Imports				Exports			
United Arab Emirates		DU98	DU01	DU05		DU98	DU01	DU05
Explanatory variables	Selection	Outcome	Outcome	Outcome	Selection	Outcome	Outcome	Outcome
	(3E-06)‡	(2.78)	(1.37)	(1.89)	(2.8E-06)	(1.94)	(0.97)	(1.34)
GDP		1.029***	1.029***	1.029***		0.413***	0.413***	0.412***
		(0.06)	(0.06)	(0.06)		(0.04)	(0.04)	(0.04)
Distance (D)	-4.18E-5***	-1.112***	-1.112***	-1.112***	-1.2E-4***	-1.502***	-1.504***	-1.503***
	(1E-05)	(0.19)	(0.19)	(0.19)	(1.3E-05)	(0.15)	(0.15)	(0.15)
Agriculture (AGLD)	-0.000132	-0.837	1.843	-1.122	-0.000209	-5.516	-4.539	-6.012**
	(1E-04)	(4.19)	(5.58)	(4.01)	(1.5E-04)	(2.90)	(3.78)	(2.80)
Population (POP)	1.03E-7	1.286	0.263	1.4	3.48E-7	1.435	1.082	1.758
	(3E-07)	(2.62)	(2.92)	(2.59)	(2.8E-07)	(1.75)	(1.97)	(1.72)
Latitude (LAT)	0.00317	0.323**	0.323**	0.323**	-0.000536	-0.0716	-0.0712	-0.0719
	(3E-03)	(0.13)	(0.13)	(0.13)	(3.2E-03)	(0.10)	(0.10)	(0.10)
Linder	-8.08E-6	-0.0876	-0.0877	-0.0875	1.22E-5**	-0.231**	-0.231**	-0.233**
	(5E-06)	(0.16)	(0.15)	(0.16)	(4.9E-06)	(0.11)	(0.11)	(0.11)
Common Language (CL)	0.433***	-0.715*	-0.709*	-0.714	-0.0946	0.812***	0.813***	0.813***
	(1E-01)	(0.41)	(0.41)	(0.41)	(1.6E-01)	(0.28)	(0.28)	(0.28)
Landlocked (LLOC)	-0.169	-0.196	-0.199	-0.197	-0.528***	-1.049***	-1.049***	-1.052***
	(1E-01)	(0.28)	(0.28)	(0.29)	(1.2E-01)	(0.20)	(0.20)	(0.20)
GAFTA		1.307***	1.301***	1.306***		0.156	0.155	0.155
		(0.47)	(0.47)	(0.47)		(0.33)	(0.33)	(0.33)
NAFTA		-0.597	-0.601	-0.598		-1.731**	-1.739**	-1.753**
		(0.90)	(0.90)	(0.91)		(0.73)	(0.37)	(0.73)
MERCOSUR		0.833**	0.834**	0.831**		0.0995	0.102	0.0971
		(0.38)	(0.38)	(0.38)		(0.32)	(0.32)	(0.32)
ASEAN		1.369***	1.365***	1.368**		0.564	0.563	0.566
		(0.43)	(0.43)	(0.43)		(1.32)	(0.32)	(0.32)
EU		-0.726***	-0.726***	-0.726***		-1.706***	-1.708***	-1.708***
		(0.28)	(0.28)	(0.28)		(0.20)	(0.20)	(0.20)
Trend		-0.0573	-0.219	-0.152		0.246	0.0987	0.0315
		(0.44)	(0.21)	(0.22)		(0.30)	(0.15)	(0.15)
DU01		-0.17				-0.205		
		(0.68)				(0.47)		
DU03			0.394				0.175	
			(0.51)				(0.35)	
DU05				0.0082				-0.455
				(0.41)				(0.33)
Cons		110.7	418.1	294.4		-428.1	-145.1	-22.25
		(851.54)	(4.95)	(403.29)		(570.80)	(273.77)	(278.13)
Lag M	1.549***							
	(9E-02)							
Lag X					1.499***			
					(9.7E-02)			
Lambda(98)		-2.446***	-2.432***	-2.441***		-1.606***	-1.603***	-1.598***
		(3E-01)	(3.2E-01)	(3.2E-01)		(2.2E-01)	(2.2E-01)	(2.2E-01)
Rho		-0.73	-0.72	-0.73		-0.59	-0.58	-0.62
Sigma		3.35	3.37	0.34		2.72	2.76	2.58
N	1242				1255			

*, ** and ***represent confidence levels of 90%, 95% and 99% respectively.

‡ Values in closed braces are the standard errors.

Source: Model results.

Findings from empirical studies from other developing regions also support this line of argument. Njinkeu, Wilson and Fosso [44] provide empirical evidence that qualities of ports and air transport infrastructures have positive impacts on African trade, while customs and regulatory environments are the main obstacles to intra-African trade. Even with the developed economies, Summary [45] found that "pure" economic variables which reflect market forces are not the only factors affecting U.S. bilateral trade. Semi-economic and international political factors are also important.Caballero, Quieti and Maetz [46] argue that the political decision is rarely either to trade or not to trade, but whether to impose barriers to trade. Even then, such trade barriers which include both tariff and non-tariff barriers might often prove to be more important on trade participation decisions than the changes in a country's own GDP.

Once a country makes a decision in favor of trade with another country, the next decision becomes one of the magnitude-i.e., how much to import and how much to export. The results from the second stage estimation of the selection model show that with one exception (Saudi Arabia), the GDP of each GAFTA member country did not really influence the volume of its agricultural imports (Annex 3). This result is intuitive at least for three reasons:

- Food demand is generally inelastic and hence substantial changes especially in food imports in response to changes in national GDP are not expected;
- Agriculture constitutes only a very small portion of total GDP making it difficult for these countries to fully meet the domestic demand with local production even in the face of increased GDP;
- Some GAFTA members experienced unprecedented high growth rates of their GDP, which is mainly due to the skyrocketing oil prices [47]. Therefore, during the study period, member countries' own GDP did not significantly affect the volume of agricultural imports and exports. Even for Saudi Arabia, own GDP is significant (at five percent) only in the equation which contains the DU05 variable while it is not in the other two equations showing that substantial changes in GDP are needed (as was the case after 2005 relative to that of before 2005) to lead to significant changes in the volume of agricultural imports.

The GDP of the other trade partner is however found to be an important explanatory variable for the volume of agricultural imports for all the countries (import columns in Annex 2). The main reason for this result is that, as hypothesized by the proponents of the gravity model, countries could solicit larger volumes of their imports from one or only few countries minimizing the risk of supply fluctuations. The effect of the trade partner's GDP on exports is however not consistent across all countries. This result should not also come as a surprise as countries will be keen to export to any country that is willing to purchase their products at the current world market price.

Consistent with the theoretical expectation, the distance variable (D) was found to have a negative and significant effect on the volume of trade for all eight countries included in the sample (Annex 3). Longer distances imply higher transportation cost and often lower quality of perishable food items. This is more so for developing countries which lack good storage and transportation facilities that are fortified with adequate refrigeration. Also, in the absence of a contiguity dummy, the distance variable acts as a proxy for adjacency, thereby increasing the likelihood of more trade because neighbors are likely to have longer history of trade.

The size of their own agricultural land has a negative effect on the decision to import by GAFTA member countries where, the higher the agricultural land, the lower the propensity to import relatively large volumes of agricultural commodities. This result is intuitive and consistent with the theoretical expectation because more cultivated land would, under normal circumstances, lead to more domestic production. The only exceptions are Oman and the UAE for which the decision to trade is not affected by the size of their agricultural land. The explanation for this result is that there have been very little (if any) changes in the size of agricultural land (AGLD) in those small countries while trade volumes have increased over the years. Contrary to expectations, AGLD was not crucial in explaining the variation in volume of agricultural imports and exports for all countries except Saudi Arabia (Annex 3). Among the GAFTA countries included in the sample, Saudi Arabia has the second largest arable land, after Morocco, hence explaining the positive effect of agricultural land size on exports.

The Linder effect[5] variable (LIND) was found to be consistent in its positive and significant effect on the decision to trade (both for imports and exports) for almost all the countries except UAE. Similarities in GDP and hence the demand structure (as proxied by the Linder effect) do not have a significant effect on the volume of agricultural imports and exports for most of the countries except for the negative effects on the imports of Jordan, Morocco and Syria. For these three countries the Linder effect is at work, meaning that the higher the difference in GDP and hence the demand structures of countries, the less the volume of trade with one another. As mentioned earlier, the Linder effect hypothesizes that similarity in preferences enhances bilateral agricultural trade. The results of this study show that this hypothesis does not hold across-the-board and in fact, it does not hold for the majority of countries included in this study.

The coefficient estimates of the common language (CL) variable were found to be insignificant for most of the countries except Morocco, Saudi Arabia and Syria. Given the fast pace of changes in information technology and the rapid globalization process, the insignificance of CL for most of the countries should not be surprising as language is no more limiting exports and imports among countries which speak different language. Hence, in today's world, once we control for the effects of geophysical variables (distance and latitudinal difference), the role that language is expected to play in trade decision making should not be a significant one.

The variable which determines whether the trading partner is landlocked is found to have a consistently negative effect on the decision to export. With the exception of Jordan, Morocco and Syria, the effect on the volume of agricultural exports is also negative and significant. The effect on the decision to and volume of agricultural imports is however mixed, varying substantially across countries. The possible explanation for these variations is that biophysical conditions of trade partners are important only in so far as they have implications on the price of the commodities imported and exported. Given that prices are often quoted as free on board (FOB), exporting to landlocked countries is likely to imply high transportation costs (e.g. poor road infrastructure) to be added to the base price, making the exports from non-contiguous countries to be very high relative to those which are contiguous; thereby discouraging the furthest exporters to the landlocked countries. By the same analogy, as long as the FOB prices quoted and quality of their export commodities are competitive, it should not make any difference whether a country is landlocked or not in terms of the decision to and volume of imports from that country.

The absence of trade barriers including the tariff exemption should, in principle, encourage exports to GAFTA member countries. However, contrary to expectations, GAFTA membership of the trading partners did not have a significant effect on the volume of exports from member countries, with the exception of Lebanon and Syria for which it exhibited a positive effect. On the import side, it was found that the impact of GAFTA membership of trade partners varied substantially across countries. For some countries (Lebanon, Syria, UAE and Saudi Arabia), the propensity to import agricultural commodities from member countries is relatively higher than from non-members. For other countries (Egypt, Jordan and Morocco) GAFTA membership of the trading partners had a negative impact on the volume of imports. The results show that GAFTA did not have any effects on Oman's bilateral trade. One explanation for these results, especially on the imports side, is that import tariffs among some member countries were relatively low and hence had strong trade ties even before the GAFTA agreement and therefore their removal did not have a huge impact on trade. For example, Al-Atrash and Yousef [48] reported that the Mashreq countries (Egypt, Jordan, Lebanon, Syria and Sudan) exhibited a higher level of intra-group trade. Moreover, tariff rates in several of the Gulf States are very low and there are virtually no other barriers to trade other than on goods from Israel [49]. Such conditions that existed prior to the GAFTA agreement might have undermined the impact of the GAFTA agreement.

The other explanation is that despite the tariff exemption and other advantages that GAFTA membership provides in regional trade, most of these countries still cannot compete with some producers outside the region. This can be inferred from the positive and significant coefficients of the other trading blocs (particularly MERCOSUR) in the import equations of all countries except Morocco. ASEAN also plays a significant and positive role in the import equations of five out of the eight countries studied. Another reason is that historically, countries like UAE, Saudi Arabia, Morocco and Oman already had strong trade ties with Europe that

[5]The Linder effect predicts that countries with similar preferences will develop similar industries, but trade among them will still exists. For instance, the UK and the US are industrialized countries with similar preferences for computers. Both have computer industries, and both trade computers.

not only provide market niches for their products, but also promote international cooperation in some cases with conditionalities to intensify trade between them. These ties did not really give GAFTA a noteworthy advantage for entrepreneurs from these countries.

Results from other studies are also consistent with the low intra-regional trade effects found in this study. For instance, Al-Atrash and Yousef [48] estimated a gravity model to address the issue of the potential for significantly expanding intra-Arab trade. Their results suggest that intra-Arab trade and Arab trade with the rest of the world are lower than what would be predicted by the gravity equation, suggesting considerable scope for regional—as well as multilateral—integration. Overall their empirical estimates suggest that total intra-Arab trade should be about 10-15 percent higher than what is observed.

There was no significant difference in the volume of trade before and after the year of agreement and at two other points in time after the initial implementation of the agreement (2001 and 2005). This is evident from the insignificant coefficients of the three year dummies DU98, DU01 and DU05 for all countries. The implication of these results is that neither the full, nor the partial implementation of the agreement had any significant intra-regional trade effects. One possible explanation for these results is that many other important global or regional economic, political and social changes have taken place over the period of the study which may have undermined or countered the effects of the agreement. Moreover, the new millennium was accompanied by huge diversification efforts in the countries included in the sample, which led to the expansion of the manufacturing sector thereby attracting significant foreign investment.

Trade policy has often been cited as the main policy-induced barrier to intra-Arab trade [48, 50]. The trade regimes in the MENA region are among the most protective in the world, with tariff rates that are high and dispersed. Nontariff barriers, including lengthy processes to comply with customs and quality control standards, are still widespread. Nabli [51] argues that the trade-impeding effect of these barriers has been compounded by often persistent overvaluation of exchange rates.

The population size (POP) of the trade partner does not seem to have a clear effect on both the decision and the volume of trade by the GAFTA member countries. This shows that in the gravity model, once GDP, size of agricultural land and geographic proximity are controlled for, the population of the trade partner in and of itself does not have conclusive impact on bilateral trade of member countries.

The coefficient for latitude (LAT), as a proxy for the climate of the importing country, was positive and significant only for Oman, Syria and UAE. The likely reason for this result lies in the aggregation of data because latitudinal differences are expected to affect trade mainly in specific commodities. However, different climate-related comparative advantages for individual agricultural products are lost in this analysis as a result of using aggregated agricultural commodity groups.

The variance inflation factor (VIF) is computed and using the rule of thumb of a VIF value of 10 as the threshold, the results showed that there are no severe collinearity problems in all equations (Annex 4).

Annex 4: Variance Inflation Factor (VIF)

	EGYPT	JORDAN	LEBANON	MOROCCO	OMAN	SAUDI ARABIA	SYRIA	UAE
GDP Egypt	1.28	9.23	4.99	1.86	9.02	7.59	4.07	5.87
Population	4	9.01	4.01	3.86	6.44	5.39	4.04	7.97
AGLD	3.61	3.80	3.17	3.55	4.21	1.96	1.41	2.78
Distance	1.85	2.54	1.89	1.24	1.51	1.77	2.79	1.83
Latitude	1.29	2.24	1.97	1.35	1.22	1.31	1.83	1.59
Linder	1.27	1.21	1.24	1.29	1.57	1.48	1.61	1.25
Common Language	1.73	2.25	1.35	1.21	2.07	2.08	2.88	2.17
Landlocked	1.15	1.17	1.07	1.1	1.16	1.15	1.08	1.16
GAFTA	1.32	1.68	1.66	1.29	1.82	2.07	3.34	2.27
MERCOSUR	1.19	.1.14	1.21	1.16	1.28	1.32	1.27	1.24
ASEAN	1.12	1.09	1.07	1.24	1.04	1.04	1.1	1.05
EU	1.11	1.13	1.16	1.07	1.36	1.38	1.84	1.2
NAFTA	*	*	1.07	*	1.15	1.07	1.11	1.04
Mean VIF	1.74	3.28	1.97	1.69	2.58	2.23	2.14	2.35

*the corresponding variable was dropped due to collinearity problem.

Source: Own estimations based on data from the World Development Indicators, the Centre d`Etudes Prospective et d` Information Internationales (CEPII) and the United Nations Commodities Trade Section (UNCOMTRADE) http://comtrade.un.org/db/

The only exception is the NAFTA variable which is found to have VIF value exceeding 10 in the Egypt, Jordan and Morocco equations. O'brien [52] argues that VIF of 10, 20, 40, or even higher do not, by themselves, discount the results of regression analyses, call for the elimination of one or more independent variables from the analysis, nor do they suggest the use of ridge regression or require combining independent variables into a single index. Instead, threshold values of the VIF (and tolerance) need to be evaluated in the context of several other factors that influence the variance of regression coefficients. However, due to the complexity of handling multi-collinearity in selection models and to avoid the resultant reduction in efficiency of estimates, the NAFTA variable was dropped from these equations.

In summary, the gravity equation performed well in empirically analyzing the bilateral trade patterns where many variables are significant with the expected signs. However, the coefficient in GAFTA, which is the variable that is used to test the most important hypothesis in this study, is statistically significant only in two of the export equations and four of the import ones. This shows that there are some countries such as Egypt, Jordan, Morocco and Oman which did not realize the expected benefits in terms of increased imports and/or exports.

Critics of the GAFTA agreement cite the lack of transportation infrastructure to support increased intra-regional trade in some countries of the studied sample as one potential constraint to benefitting from the agreement. The Arab region spans a great distance as well as variable terrain. Minimally paved roads and scant railway links across countries, combined with border closures and customs bureaucracy, have all been impediments to further movement of goods and services throughout the region. Often, the lack of adequate transportation services is a reflection of the political instability within a particular state, along with state controls on the development of commercial networks in the region and GAFTA currently has no provisions to counter these factors.

The right to suspend certain agricultural products from the liberalization scheme during the crop and harvest seasons for the full eight year transition period (until the full elimination of the tariffs) has reduced the liberalization of intra-regional agricultural trade. Moreover, the intra-GAFTA relations have changed drastically where a larger number of GAFTA members have joined the bilateral and regional trade agreements with other major trading partners like the MERCOSUR and ASEAN. This is demonstrated by the significant coefficients on the corresponding dummy variables in the import and export equations. Given that: 1) the value of agricultural trade does not rank high in intra and extra-Arab trade, 2) import tariffs had already been low and 3) there had already existed bilateral, regional and multilateral trade agreements in certain blocs of the GAFTA region, the low impact of GAFTA on intra-regional trade (one of the major findings of this paper) should not come as a surprise.

Concluding Remarks: The reduction of trade barriers due to the implementation of the Greater Arab Free Trade Agreement (GAFTA) should, in principle, enhance intra-regional trade of agricultural commodities. However, this study came to the conclusion that until 2007, ten years into the agreement, there was little empirical evidence to suggest that GAFTA membership has enhanced bilateral trade across all member countries. On the one hand, this finding is consistent with the findings of Abedini and Péridy [53] for the Agadir agreement between Morocco, Tunisia, Egypt and Jordan. On the other hand, there are other studies by Péridy [54] and Bousseta [55] that analyze whether or not the aggregate intra-regional trade has increased due to the agreement, bringing about some moderate to significant GAFTA effects on regional and sub-regional (particularly intra-Maghreb) trade, respectively.

The discrepancy should not therefore come as a surprise because aggregate regional trade could possibly have increased, but that does not necessarily imply that all members have benefited from the agreement and that the agreement increased the ability of each member to trade with every other member. Our results, along with that of Bousseta [55], are indicative of the possibility that GAFTA is taking undue credit for the already existing trade ties within sub-regional blocs, which are relatively strong. Historically, trade within sub-blocks in the GAFTA region is vital, comprising over 75percent of total Arab region trade for some of such blocs. Analyzing the effects of GAFTA therefore, requires controlling for such sub-regional differences; a direction for a future extension of this study. Moreover, our study includes only eight out of 18 GAFTA members. Although it will not invalidate the results of the current study, the inclusion of all 18 member countries for a wider and critical assessment of the impact of GAFTA on the regional volume of agricultural trade will be more revealing, provided comparable data is available.

According to our results, Lebanon and Syria are the only two sample countries in which the desired effects of the agreement (higher exports and higher imports) seem to have been realized. Lebanon managed to allocate its

meager factors of production to high value added agricultural and agro-industrial exports, such as tobacco, fruits, vegetables, olives, grapes and wines. The late 90s and the early years of the new millennium also constituted a period of rebuilding the physical and financial infrastructure of Lebanon which, after its extended civil war, the country managed to position itself as a Middle Eastern bunking hub. The reopening, in 1996, of the Lebanese stock market and the return of the international banks and insurance companies along with the economic recovery programs could possibly have put Lebanon in a good position to take advantage of the GAFTA agreement to increase its intra-regional trade.

The results for Syria are in agreement with Babili and Naghasa [56] who found that Syria has benefited from the GAFTA agreement. The economic reforms that have been taking place in Syria especially after the year 2000-including the gradual opening of the economy-have enabled the country to take advantage of the GAFTA to increase its international trade. For Syria, GAFTA has createdan outlet for many of its exports. Trade with the US, a major trading partner for many Arab countries, became awkward due to the sanctions which the US government imposed against Syria in 2004. The most comprehensive sanction, the Syria Accountability Act, prohibits the export of most goods containing more than 10percentof US manufactured component parts to Syria. The second sanction was imposed in 2006 against the Commercial Bank of Syria-a State bank that has been the most important financial institution serving the Syrian economic and commercial activities since 1967. This sanction affected imports and exports due to the difficulty in processing foreign payments, shipping of trade documents and other bank services. Yet, on case-by-case basis, some food and medicines which are not on the US Commerce Control List can still be exported to Syria without License Exemption. Others might require License Exception from the US Bureau of Industry and Security which are not always easy to obtain.

The agreement has also brought a partial trade effect on Saudi Arabia and UAE leading to higher imports from GAFTA members. However, even with these countries, attribution remains to be a problem because the full implementation of GAFTA coincided with many important changes in the region in general and the specific member countries in particular. The fierce competition from non-member countries, in addition to other factors like the non-tariff barriers, underdeveloped transportation infrastructure, diversity of currencies and economic structures, differences in tariff levels prior to the agreement and lack of members' commitment, can also reduce the efficacy and uniformity of impacts of the agreement. Generally, the benefits of GAFTA are either not uniform among all the members or are not evident for each member. Hence, GAFTA might have served the political agenda of uniting the Arab countries much more than spurring bilateral trade within the region.

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