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The Impact of New Regionalism on Intra-Trade Performance of the Gulf Cooperation Council (GCC) Countries An Econometric Study Using Gravity Model for the Period 2000-2016

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Abstract:

This study aimed at the impact of participation in regionalism trade agreements, On the performance of intra-GCC trade, According to the standard approach of gravity model of international trade,

Based on a set of indicators affecting intra-trade flows: Total trade, the size of the economy expressed in GDP, population index, distance index, imaginary indicator appears to be participating or not participating in regionalism trade agreements.

Keywords: New regionalism, Inter-Trade, GCC, Trade Agreements, Gravity Model.
Jel Classification Codes: F19, F14, F55; C33.

1. Introduction:

The seventies and early eighties of the last century witnessed a kind of "hardening of the arteries" within the European continent, and regional studies were in a state of stagnation and oblivion. With the possibility of the fall of the Berlin Wall, along with the adoption of the European law in 1985 to manage and direct the internal market in Europe, it led to the revival of a new dynamic for the European integration process, and this was the beginning of what is referred to as the "new regionalism" on a global scale. The new regionalism referred to a number of recent trends and developments, such as the amazing increase in the number of regional trade agreements, directed outward with less protectionism as a new type of regionalism dominance within the regions themselves, instead of being controlled by the great powers and the rise of regional pluralism to embody their plans regarding trade, security and various aspects of cooperation. In light of these international transformations, we find the economies of the Arab countries, including the Gulf Cooperation Council countries, keeping pace with these changes by integrating into these new regional arrangements, to improve their economic conditions on the one hand, and to avoid international isolation on the other hand. Study Problem: Based on the above, this study examines the following problem:

To what extent does participation in regional trade agreements contribute to the performance of intra-GCC trade?

Study Hypothesis: To answer the previous problem, we propose the following hypothesis: Participation in regional trade agreements positively affects the performance of intra-GCC trade.

Study Limits: The study limits include the period from 2000-2017, and this period was chosen as a result of several considerations, including the availability of reliable data for all GCC countries, in addition to the period of concluding trade agreements for these countries with external blocs.

Importance of the study: The importance of this study lies in activating such trade agreements, to develop inter-Gulf exchange, and then intensify inter-Arab exchange, to build strong Arab blocs capable of facing the challenges of the global economic system.

Study objectives: This study aims to identify modern concepts about the new regionalism, in addition

to measuring the impact of concluding regional trade agreements on the performance of inter-GCC trade, and then projecting them onto Arab countries as a whole.

Study methodology: To answer the study problem, and to achieve the stated objectives, the descriptive approach was relied upon to determine the theoretical framework of the new regionalism and trade agreements, in addition to the analytical approach based on the gravity model of international trade to analyze the impact of concluding regional trade agreements on the performance of inter-GCC trade.

Previous studies: Some studies have addressed the Gulf Cooperation Council countries, to analyze their trade performance, whether within the region, or with external blocs and agreements, as follows:

1.The study (2008 Houcine Boughanmi) entitled:

The Trade Potential of the Arab Gulf Cooperation Countries (GCC): A Gravity Mode"

This study aims to know whether the GCC bloc was a preferential trade arrangement, through the following problem: Can trade for the Gulf Cooperation Council countries be achieved in the context of emerging preferential experiences in the Middle East and North Africa? The study relied on the gravity model to analyze this effect for the period 1990-2004 with 19 countries as a trading partner within the entire Middle East and North Africa, and the study concluded that Gulf trade exchange is stable according to the estimates of the gravity model only and reached its peak for the period 1993-1996, i.e. it did not live up to what was expected of it.

2.The study of Ahmed Saddam Abdul Sahib and Fatimah Kari (2012),) entitled:

Analysis of Intensity of Intra-Regional Trade in GCC Countries, 1998-2008"

This study aims to analyze trade within the GCC bloc, based on the trade intensity index, by asking about the extent of positivity of the trade intensity index for the GCC countries?, for the period 1998-2008, and the study relied on variables including the average growth rate of per capita income is the dependent variable, gross domestic product, trade openness, local market size, institutional quality, primary income per capita are independent variables, and relied on the following mathematical formulation to evaluate the intensity of intra-regional trade intensity for the GCC countries:

Ci= {[XGCC MGCC] / [X total +M total]} {[XGCC + M GCC]/ [X total+ M total] * [X total M total] / [X total + Mtotal{[

The study concluded that if the trade intensity index is positive, it means an increase in the exports of the GCC countries within the bloc, and with other countries with which trade agreements have been concluded, and vice versa, meaning that there is a direct relationship between the economic growth of the bloc countries and trade.

3. Study (2014 DERBAL Abdelkader, Kadri Nouria) entitled:

ESTIMATION DU COMMERCE A L'INTERIEUR AND ENTRE LES BLOCS MAGHREB AND THE CADRE OF THE LIBRE ZONE ECHANGE A L'AIDE D'UN MODELE GRAVITAIRE (1998-2009(

This study was based on the following problem: What is the impact of the Euro-Mediterranean Partnership Agreement on the development of Euro-Maghreb trade? To answer the previous problem, the researchers relied on a study sample of 30 countries from the European Union and three countries from the Maghreb (Algeria, Morocco, Tunisia). The study period was (1998-2009). To estimate the model, the researchers used the gravity model of international trade based on the variables of gross domestic product, per capita GDP, exports, distance, common borders and common language, the Euromed project that assesses the extent of integration of the Maghreb Union into the European Union. The aim of this study was to verify the extent of trade integration between European countries and the Maghreb countries within the framework of the free trade area (2010-2017), starting with the partnership agreements between the European Union and the three Maghreb countries. The study concluded that the preferences enjoyed by all Maghreb countries in comparison to the European Union were not decisive in bringing about a change in the European

market, which was already open to Maghreb exports. It also became clear that the common borders variable exerts a force of attraction between partners, but language remains statistically insignificant and negatively significant. The result of this study is the relatively low level of intra-Maghreb trade, compared to the European Union countries, especially after the expansion. In the countries of Central and Eastern Europe. The study notes the strong attraction of the European Union countries to the Maghreb countries.

The concept of new regionalism:

The origin of the word new regionalism goes back to the English word "New Regionalism", which is derived from the Latin word 'Region', which means "area" or "territory", and its concept means the area that occupies an important position in the geographical area as an area ranging between the local and the global. The local or national area is within certain borders of countries, and these types of areas are referred to here as micro-regions. As for the global area, it can refer to the total areas (world regions), and the larger regional units (in contrast to non-regional units) or sub-systems between the state and the global system level, which are called (macro-regions). Finally, between the two, the levels that refer to intermediate areas, medium-range arrangements or non-governmental arrangements, i.e. sub-regions (meso-regions). It is also derived from the Latin verb 'Regio' which means an administrative region or a geographical area characterized by similar features, and the word "Regio" is derived from the Latin verb 'Regere' which means 'to rule' or 'to command'. In light of the above, the technical concept of new regionalism was first used by the researcher Norman Palmer in 1991. He defined regionalism as the level most suitable for reconciling rising nationalism on the one hand, and trends towards internationalization on the other hand. It represents "in political circles the establishment of cooperative relations between different social units as a means of enhancing economic and social cooperation, and social welfare has also become a priority." As Mittelmann sees, new regionalism is a powerful force in the process of globalization - as their element in globalization: "It is not only a chapter of globalization, but can also be seen as a response or a challenge to globalization." As for Hetten, he defined New regionalism in contrast to old regionalism as follows: "New regionalism is a multidimensional form of integration, which includes economic, political, social, and cultural conditions, and thus goes far beyond the goal of establishing regional free trade systems or security alliances." Since regional trade agreements directed towards the outside, as a new type of regionalism dominance within the regions themselves, rather than being controlled by the great powers, we take them as a model for new regionalism.

.Regional trade agreements as a model: They can be defined as follows:

As contracts that create mutual rights and obligations between two or more parties, aiming to facilitate the flow of goods and services between those parties that signed them." - It is also known as "an international treaty with restricted membership that includes topics that apply only to its members, and aims to secure or increase access to all member states' markets." The reasons for its establishment are as follows:

1.Economic reasons: which are as follows: Searching for larger markets; Seems faster in concluding negotiations and usually tempts business sectors and politicians; Having common goals and sometimes values; Entering sectors such as investment, competition, technical and labor specifications, and the environment that do not enjoy consensus among WTO members; Deeper integration between the parties; Defensive reasons; Attention and caution against competition; Holding on to investment; Securing access to advanced markets.

2.Political reasons: which are as follows: Increasing negotiating power; Preventing a decline in political and economic reforms; Confirming or encouraging political support.

3. .Regional trade agreements of the Gulf Cooperation Council countries: The most important of which are the following:

4.Free Trade Agreement with India: The two parties signed a framework agreement for economic cooperation that includes their agreement to enter into negotiations to establish a free trade zone between them in order to encourage capital flows between them, establish joint investment projects, and facilitate investments by institutions and companies in various economic, commercial, and industrial fields.

5.Free Trade Agreement with China: The two parties are exploring ways and means to expand and liberalize their trade relations and agree to conclude a free trade agreement between them. They are also seeking to make arrangements to encourage capital flows between them, establish joint investment projects, and facilitate investments by institutions and companies in various economic, commercial, and industrial fields.

6.Free Trade Agreement with the European Free Trade Association (EFTA): This agreement was concluded on 02/25/1989. One of the most important provisions of its twenty-six articles is to strengthen relations between the European Economic Community, on the one hand, and the Gulf Cooperation Council countries, on the other hand, by facilitating the exchange of information related to foreign trade, removing trade barriers, and developing cooperation in the areas of customs and tariffs. The Joint Committee of the Council and EFTA countries also supervises the implementation of the agreement.

Free Trade Agreement with the United States of America: The economic dialogue between the United States and the Gulf Cooperation Council began in 1985, to strengthen economic relations and increase the volume of trade exchange with the GCC countries, by concluding a free trade agreement between the two parties.

Study methodology and variables:

The study uses the standard analysis method, by describing the standard model for estimating the relationship between economic indicators related to bilateral trade flows and total trade in the GCC countries for the period 2000 to 2017, where the total trade of the GCC countries was identified as a dependent variable, while the size of the economy (GDP) and other economic determinants of bilateral trade were identified as independent variables. The aim is to test the impact of participation in concluding regional trade agreements with the rest of the economic variables adopted in the study on the GCC countries to determine the extent to which these agreements contribute to the performance of intra-trade in the GCC countries.

A- The economic model and study variables:

The study model is built based on the problem associated with the effects of regional agreements on intra-trade, using dummy variables. Gravity models provide a primary measure of the impact of regional trade agreements on trade, but they cannot distinguish between the precise mechanisms. Our study will adopt the following methodology:

Do regional trade agreements enhance the volume of trade between members?

$$\mathrm{Ltrt_{ij}} = \beta_0 + \beta_1 \mathrm{Lgdp_i} + \beta_2 \mathrm{Lgdp_j} + \beta_3 \mathrm{LDist_{ij}} + \beta_4 \mathrm{Lpop}_i + \beta_5 \mathrm{Lpop}_j + \beta_6 gatt_i + \beta_7 gatt_j + \beta_8 \mathrm{cu}_i + \beta_9 \mathrm{agsan}_i + \beta_{10} agefta_i + \varepsilon_{ij}$$

Table No. (1): Presentation of standard study variables

Source	The concept	variable
pendent variable		
ps//:comtrade.un.org/data	epresents the volume of intra-trade that reflects the volume of monetary trade flows between country i to country j, and these flows include exports + imports + re-exports + re-imports between country i to country j.	
lependent variables		
p://www.cepii.fr/CEPII/en/bdd_mod	s the total monetary value of goods and services produced by the exporting country during a specific period of time.	p_o

ele/download.asp?id=8	s the total monetary value of goods and services produced by the importing country during a specific period of time.	o_d
	It reflects the weighted geographical distance calculated between the two largest cities of two mutually exclusive countries according to the formula developed by Thierry Mayer in 2002.	stw
	It represents the population size in millions of people of the exporting country.	o_o
	It represents the population size in millions of people of the host country.	o_d
	It represents the customs union between the Gulf countries.	
	It is a dummy variable that represents participation in trade agreements with EFTA countries and takes a value of 1 and vice versa takes a value of 0.	san
o//:www.gcc-sg.org/ar-saoperationAndAchievements chievements/RegionalCooperationandonomicationswithotherCountriesandGroupings ges/WiththeEuropeanFreeTradeAssoci.aspx	It is a dummy variable that represents participation in trade agreements with EFTA countries and takes a value of 1 and vice versa takes a value of 0.	efta
http://www.cepii.fr/CEPII/en/bdd_modele/download.asp?id=8	It is a dummy variable that represents participation in trade agreements with EFTA countries and takes a value of 1 and vice versa takes a value of 0.	t_o
	It is a dummy variable that represents participation in trade agreements with EFTA countries and takes a value of 1 and vice versa takes a value of 0.	t_d

Source: Prepared by researchers

Two important limitations can be noted regarding the use of gravity models to estimate the impact of RTAs:

 RTAs may be endogenous variables (i.e. the causal relationship between the formation of RTAs and trade flows), which affects gravity-based estimates;

 The recent literature is full of models in which RTAs are formed in pursuit of other non-trade objectives, for example South-South agreements have been more successful in non-trade dimensions such as the management of shared resources, than in pure trade liberalization.

The analysis of RTAs should also avoid limiting itself to measuring trade diversion and creation, although these are important issues for the welfare of member states.

A- Estimating the Intuitive Gravity Model:

Among the various options that can be selected when using regression, there are two options that are of particular importance in the context of gravity models. In fact, they are used so widely in applied work that researchers should not usually present results that do not include these two estimation options. The first is "robust", which produces standard errors that are robust to arbitrary patterns of heteroskedasticity in the data. Thus, the "robust" option is a simple and effective way to correct violations of one of the most important assumptions of the OLS method. The second option that is commonly used by gravity modelers is cluster(variable), which allows the error to be correlated within specific groups by the variable, and a common option for gravity models is cluster(distance). After estimating the study model using the OLS method, we obtain the following results:

Table No. (2): OLS estimates for the conventional gravity model

Linear regression — Number of obs = 540; F(10, 29) = 95.45; Prob > F = 0.0000; R-squared = 0.7666; Root MSE = .77158

(Std. Err. adjusted for 30 clusters in distw)

Ltrt	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Lgdp_o	.330371	.2173708	1.52	0.139	-.1142022	.7749442
Lgdp_d	.3835301	.205654	1.86	0.072	-.0370795	.8041398
Lpop_o	.7935882	.2556494	3.10	0.004	.2707265	1.31645
Lpop_d	.6810545	.2324236	2.93	0.007	.2056949	1.156414
Ldistw	-1.121101	.2991986	-3.75	0.001	-1.733031	-.5091713
cu	-.0613832	.1425931	-0.43	0.670	-.3530188	.2302523
agsan	.0245217	.087072	0.28	0.780	-.1535605	.2026039
agefta	-.1361874	.1312365	-1.04	0.308	-.4045963	.1322214
gatt_o	.5588202	.2642382	2.11	0.043	.0183923	1.099248
gatt_d	.3241419	.2569594	1.26	0.217	-.2013991	.8496829
_cons	7.175556	7.830199	0.92	0.367	-8.838999	23.19011

Source: Stata 15.1 outputs

From the outputs of the previous table, we notice that the model fits the data relatively well, as R^2 indicates that the independent variables explain more than 76% of the change in the volume of intra-trade, and the F statistic also indicates that the two models are highly statistically significant. We also notice that the parameters of the variables Lpop_o, Lpop_d, Ldistw, gatt_o are statistically significant at a significance level of 5%, while the variable Lgdp_d was statistically significant at a level of 10%, while the rest of the variables were not statistically significant.

We also used Student t-statistics in the model to test a number of simple hypotheses, and we can also use it to conduct complex hypothesis tests. For example, in the literature on commodity trade, GDP coefficients are often close to unity—some theories suggest that they should be exactly unity—and the following table illustrates this test in our study model: Table (3): Testing the hypothesis that both GDP coefficients are equal to unity

Study model	
0.97	F(29 ,2)
0.3912	Prob > F

Source: Stata 15.1 outputs

We notice from the previous table that since the p-value of the F-statistic of the model is greater than 0.05, we accept the null hypothesis. Accordingly, the property of the GDP coefficients of the exporting and importing country is moving away from unity, which is contrary to the economic literature of gravity models.

Using the same approach, we can test the compound hypothesis that cu, agsan and agefta are not important and influential in inter-trade, meaning that the coefficients in all these variables are jointly equal to zero.

Table No. (4): Testing the hypothesis that cu, agsan and agefta are zero coefficients

Study model	
0.48	F(29 ,3)
0.7001	Prob > F

Source: Stata 15.1 outputs

We note from the previous table, since the p-value of the F-statistic of the model is greater than 0.05, we accept the null hypothesis at the 5% level, which indicates that cu, agsan and agefta are not significant in determining inter-trade.

We also use Ramsey's RESET test to test the goodness of description and identification of the study model (possibility of non-linearity) and ignoring important variables, and the following table shows the results of this test:

Table No. (5): Ramsey's RESET test to describe the two models

Study model	
7.54	F(527,3)
0.0001	Prob > F

Source: Stata 15.1 outputs

We note from the previous table that since the p-value of the F-statistic for the model is less than 0.05, we reject the null hypothesis and accept the alternative hypothesis, which indicates a weakness in the description of the model.

A- Estimating the structural gravity model:

The intuitive gravity model is not without difficulties once advanced concepts from the trade literature are introduced. As a simple example, consider the effect of a change in trade costs between countries i and k on trade between countries i and j. An example of this change is that countries i and k conclude a preferential trade agreement that reduces tariffs on each other's goods. Basic economic theory indicates that such a move may well affect the trade of country j, even though it is not a party to the agreement. The well-known concepts of trade creation and trade diversion are examples of these effects. However, the intuitive gravity model does not explain this problem at all.

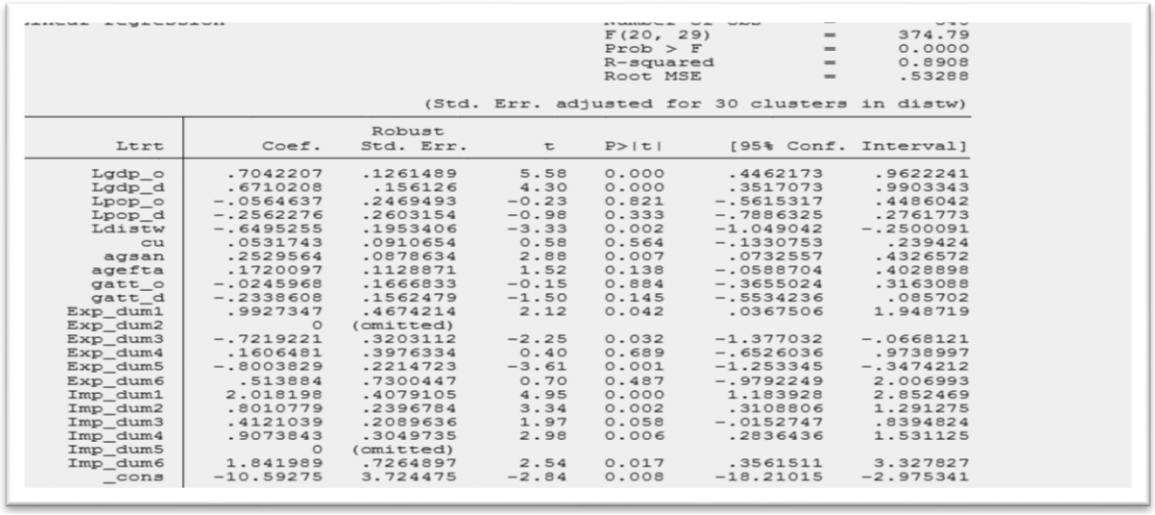
A second problem with the basic model arises if we consider an equal decrease in trade costs across all routes, including domestic trade (goods that a country sells internally). An example is a decrease in the price of oil, which reduces transportation costs everywhere, including within countries. In the basic model, this move would lead to relative increases in trade across all bilateral routes, including domestic trade. However, such an outcome overlooks the observation that despite the change in trade costs, relative prices have not changed at all. In the absence of a change in relative prices, we would expect consumption patterns to remain constant for a given amount of gross domestic product (GDP). This is the second case in which the basic gravity model makes predictions that are at odds with economic theory. A growing number of studies use the gravity model of trade as a general framework for estimating the determinants of bilateral trade flows. However, only the most recent research resolves some of the estimation problems related to the correct specification of so-called multilateral resistance (MR) terms. Omitting controls for multilateral resistance can lead to biased estimates of the coefficients. In addition, this can lead to misleading relative static estimates of the impact of trade barriers on trade.

There are several ways to capture multilateral resistance. While Bergstrand (1985, 1989) suggested using price indices, Anderson and Van Wincoop (2003) estimated multilateral resistance endogenously, and Carrère (2006) used dimension variables as a proxy. Feenstra (2002) instead chose to use origin and destination fixed effects, a fourth method that is the simplest and produces consistent estimates.

Fixed Effects Estimation:

One approach to estimating a theoretical gravity model consistently is to use a fixed effects estimation technique for panel data. The estimation of fixed effects models is simply based on creating dummy variables for each importer and exporter, and then adding them as explanatory variables to the model. However, introducing fixed effects imposes significant limitations on the model due to the third assumption: variables that vary only in the same dimension as the fixed effects cannot be included in the model, because they will be perfectly collinear with the fixed effects. The following table shows the estimates of the gravity model for fixed effects by importer and exporter:

Table No. (6): Estimation of the fixed effects gravity model, importer-exporter



					F(20, 29)	= 374.79
					Prob > F	= 0.0000
					R-squared	= 0.8908
					Root MSE	= .53288

(Std. Err. adjusted for 30 clusters in distw)

Ltrt	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
Lgdp_o	.7042207	.1261489	5.58	0.000	.4462173	.9622241
Lgdp_d	.6710208	.156126	4.30	0.000	.3517073	.9903343
Lpop_o	-.0564637	.2469493	-0.23	0.821	-.5615317	.4486042
Lpop_d	-.2562276	.2603154	-0.98	0.333	-.7886325	.2761773
Ldistw	-.6495255	.1953406	-3.33	0.002	-1.049042	-.2500091
cu	.0531743	.0910654	0.58	0.564	-.1330753	.239424
agsan	.2529564	.0878634	2.88	0.007	.0732557	.4326572
agefta	.1720097	.1128871	1.52	0.138	-.0588704	.4028898
gatt_o	-.0245968	.1666833	-0.15	0.884	-.3655024	.3163088
gatt_d	-.2338608	.1562479	-1.50	0.145	-.5534236	.085702
Exp_dum1	.9927347	.4674214	2.12	0.042	.0367506	1.948719
Exp_dum2	0	(omitted)				
Exp_dum3	-.7219221	.3203112	-2.25	0.032	-1.377032	-.0668121
Exp_dum4	.1606481	.3976334	0.40	0.689	-.6526036	.9738997
Exp_dum5	-.8003829	.2214723	-3.61	0.001	-1.253345	-.3474212
Exp_dum6	.513884	.7300447	0.70	0.487	-.9792249	2.006993
Imp_dum1	2.018198	.4079105	4.95	0.000	1.183928	2.852469
Imp_dum2	.8010779	.2396784	3.34	0.002	.3108806	1.291275
Imp_dum3	.4121039	.2089636	1.97	0.058	-.0152747	.8394824
Imp_dum4	.9073843	.3049735	2.98	0.006	.2836436	1.531125
Imp_dum5	0	(omitted)				
Imp_dum6	1.841989	.7264897	2.54	0.017	.3561511	3.327827
_cons	-10.59275	3.724475	-2.84	0.008	-18.21015	-2.975341

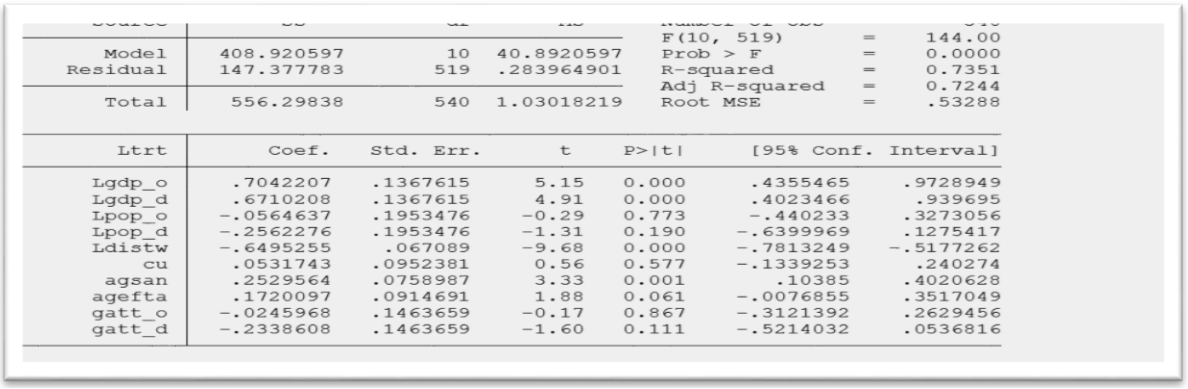
Source: Stata 15.1 output

It will be useful to compare the results of the fixed effects gravity model with the results of the a priori model without fixed effects. The first notable feature is that, as expected, the explanatory power of the model is much greater once fixed effects are included: it goes from about 77% to over 89%. This increase is not surprising given that we have added a large number of variables to the model, but it underscores the important role that factors such as multilateral resistance play in explaining the observed trade outcomes.

A decrease in distance elasticity from -1.12 to -0.65 can also be noted, which is explained by higher transport and shipping costs and lower trade volumes.

Head and Mayer (2014) used an iterative approach to estimate models with two sets of fixed effects, such as exporter and importer, so that it is not necessary to include dummy variables for all cross-sectional data units.

Table (7): Estimation of a two-way fixed effects gravity model, importer exporter



Source	SS	df	MS		
				F(10, 519)	= 144.00
Model	408.920597	10	40.8920597	Prob > F	= 0.0000
Residual	147.377783	519	.283964901	R-squared	= 0.7351
				Adj R-squared	= 0.7244
Total	556.29838	540	1.03018219	Root MSE	= .53288

Ltrt	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Lgdp_o	.7042207	.1367615	5.15	0.000	.4355465	.9728949
Lgdp_d	.6710208	.1367615	4.91	0.000	.4023466	.939695
Lpop_o	-.0564637	.1953476	-0.29	0.773	-.440233	.3273056
Lpop_d	-.2562276	.1953476	-1.31	0.190	-.6399969	.1275417
Ldistw	-.6495255	.067089	-9.68	0.000	-.7813249	-.5177262
cu	.0531743	.0952381	0.56	0.577	-.1339253	.240274
agsan	.2529564	.0758987	3.33	0.001	.10385	.4020628
agefta	.1720097	.0914691	1.88	0.061	-.0076855	.3517049
gatt_o	-.0245968	.1463659	-0.17	0.867	-.3121392	.2629456
gatt_d	-.2338608	.1463659	-1.60	0.111	-.5214032	.0536816

Source: Stata 15.1 outputs

Compared to the previous fixed effects model, we note that the explanatory power of the model has become smaller, moving from about 89% to more than 72%, as a result of not including dummy variables for all cross-sectional data units (6 exporters and 6 importers) in the new model.

As for the significance of the parameters, we note that the parameters of the variables Lgdp_oLgdp_d, Ldistw, agsan, are significant at the 1% level in both models, while the parameter of the variable agefta is significant at the 10% level in the two-way fixed effects model only. We also note that the elasticities are almost identical in the two models.

The Poisson Pseudo-Maximum Likelihood Estimator

The Poisson estimator has a number of additional properties that are desirable in gravity models. First, it is consistent in the presence of fixed effects, which can be introduced as dummy variables as in OLS. Second, the Poisson estimator naturally includes observations for which the trade value

is zero. Third, the interpretation of the Poisson model coefficients is straightforward, and follows exactly the same pattern as in OLS.

Table (8): Estimation of the Poisson Pseudo-Maximum Likelihood Gravity Model PPML

Number of observations: 540
Pseudo log-likelihood: -175222.57
R-squared: .78568507
Option strict is: off

(Std. Err. adjusted for 30 clusters in distw)

trt1	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
Ldistw	-.7828123	.1853345	-4.22	0.000	-1.146061	-.4195634
Lgdp_o	.5657983	.2989636	1.89	0.058	-.0201595	1.151756
Lgdp_d	1.159893	.3751829	3.09	0.002	.424548	1.895238
Lpop_o	-.2652298	.2994651	-0.89	0.376	-.8521707	.321711
Lpop_d	-.780125	.4933705	-1.58	0.114	-1.747113	.1868633
cu	.0712246	.1400088	0.51	0.611	-.2031875	.3456368
agsan	.2459906	.0917766	2.68	0.007	.0661116	.4258695
agefta	.2809035	.1144026	2.46	0.014	.0566785	.5051285
gatt_o	.0998859	.2302348	0.43	0.664	-.351366	.5511377
gatt_d	-.1391145	.176987	-0.79	0.432	-.4860027	.2077736
Exp_dum1	1.225886	1.030848	1.19	0.234	-.7945387	3.24631
Exp_dum3	-.7011659	.6790732	-1.03	0.302	-2.032125	.629793
Exp_dum4	.4728026	.5471135	0.86	0.387	-.5995201	1.545125
Exp_dum5	-.840328	.5834359	-1.44	0.150	-1.983841	.3031852
Exp_dum6	1.133526	1.390861	0.81	0.415	-1.592511	3.859563
Imp_dum1	2.168345	.605057	3.58	0.000	.9824554	3.354235
Imp_dum2	1.457394	.7700328	1.89	0.058	-.051843	2.96663
Imp_dum3	.7419426	.4025387	1.84	0.065	-.0470188	1.530904
Imp_dum4	1.590355	.5711094	2.78	0.005	.4710014	2.709709
Imp_dum6	2.4742	1.279952	1.93	0.053	-.0344599	4.98286
_cons	-32.16287	7.085073	-4.54	0.000	-46.04935	-18.27638

Source: Stata 15.1 output

We will estimate PPML with multi-way fixed effects, as described by Correia, Guimarães, Zylkin (2019a), and the estimator used is robust from a statistical standpoint and convergence issues, due to the procedures developed by Correia, Guimarães, Zylkin (2019b)

Table (9): Estimation of the Poisson quasi-maximum likelihood gravity modelPPMLHDFE

HDFE PPML regression — No. of obs = 540
Absorbing 2 HDFE groups — Residual df = 519
Wald chi2(10) = 1092.20
Deviance = 345827.1939 — Prob > chi2 = 0.0000
Log pseudolikelihood = -175222.5683 — Pseudo R2 = 0.8429

trt1	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
Lgdp_o	.5657983	.207618	2.73	0.006	.1588746	.972722
Lgdp_d	1.159893	.3539016	3.28	0.001	.4662587	1.853527
Lpop_o	-.2652298	.3040446	-0.87	0.383	-.8611462	.3306865
Lpop_d	-.780125	.2984445	-2.61	0.009	-1.365065	-.1951845
Ldistw	-.7828123	.0762307	-10.27	0.000	-.9322218	-.6334028
cu	.0712246	.1581285	0.45	0.652	-.2387015	.3811507
agsan	.2459906	.1107912	2.22	0.026	.0288437	.4631374
agefta	.2809035	.1120805	2.51	0.012	.0612299	.5005772
gatt_o	.0998859	.225646	0.44	0.658	-.3423722	.5421439
gatt_d	-.1391145	.1627107	-0.85	0.393	-.4580216	.1797925
_cons	-29.71884	6.700553	-4.44	0.000	-42.85168	-16.58599

Source: Stata 15.1 outputs

Comparing the results of the PPML model with the results of the PPMLHDFE model, we note that the explanatory power of the PPMLHDFE model was greater than the explanatory power of the PPML model, as it moved from about 78% to more than 84%, despite the fact that the PPMLHDFE model does not include dummy variables for all cross-sectional data units (6 exporters and 6 importers) as is the case in the PPML model.

Regarding the significance of the estimated parameters, we note that the variables Lgdp_d, Ldistw are significant at the 1% level in both models, and the variables agsan, agefta are significant at the 5% level in both models. While the variable Lgdp_o is significant at the 1% level in the PPMLHDFE model and significant at the 10% level only in the PPML model. As for the variable Lpop_d, it is significant at the 1% level only in the PPMLHDFE model. As for the elasticities, we note that they are close in both models and conform to the economic theory. Based on all of the above, it is clear that the PPMLHDFE model is the best. Focusing on the research problem related

to the role of regional agreements in inter-trade, the results of the model estimation indicate the significance of the parameters of the variables agsan, agefta and the insignificance of the parameters of the variables cu, gatt_o, gatt_d, and since the sign of the parameters of the variables agsan, agefta is positive, this indicates a positive direct relationship between the agreements agsan, agefta and the volume of inter-trade.

In conclusion, in this study we tried to measure the impact of participation in the trade agreements of the six Gulf countries, to know the extent of their impact on the volume of inter-trade between them, and according to the set of models used to measure this, the PPMLHDFE model was the best, which allowed us to reveal the complementary relationship and dynamic interactions between the total inter-trade and the variables that explain it. The study resulted in the following:

•Distance has a negative and inverse relationship with the volume of inter-trade exchanges of the six countries, which reflects that transportation and shipping costs have a negative impact on the volume of trade, which is consistent with the classical gravity model. That is, an increase in the distance between i and j by 0.78% will lead to a decrease in exports by 0.76%.

•GDP has a direct relationship with the volume of trade, meaning that the economic dynamism of these countries is in line with economic theory. GDP can also be considered a measure of a country's propensity to import.

•Trade agreements agsan, agefta have a direct relationship with the volume of intra-GCC trade, which proves the validity of the study hypothesis, while the CU agreement and the gatt_o, gatt_d agreement prove the opposite, which reflects the existence of a negative relationship between the number of regional trade agreements between the agreement countries and the trade value of this agreement, which proves the existence of a race-based phenomenon between trade exchanges all over the world.

•Population size variable. It has a negative effect on the volume of trade, meaning that the smaller the population size, the less likely the propensity to import is.

•That is, the results of the study are consistent with the results of the modern standard gravity model and the results of theoretical research.

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