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국제학석사 학위논문

Application of Gravity Model to Service Trade

– A Comparison of OECD and Non-OECD
Countries –

중력모형을 적용한 서비스 무역 비교:
OECD 국가와 비OECD 국가를 중심으로

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Abstract

Application of Gravity Model to

Service Trade

-A Comparison of OECD and Non-OECD Countries -

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Background: This study conducts an analysis to investigate the determinants of international service trade flows by utilizing the gravity model and it compares the results of the gravity analysis of OECD and non-OECD countries.

Method: Least-square regression method is utilized to conduct this research. Data collected from UN Service Trade, the World Bank, CEPII, and World Trade Organization are combined and used. Service trade value is used as dependent variable. GDP, per capita GDP, population, distance, contiguous, RTA, language, and colony are used as independent variables.

Results: Gravity model works for service trade with a higher explanatory power for OECD service trade. Independent variables have larger effects on non-OECD service trade.

Conclusions: Service trade of non-OECD countries is much more

sensitive to the distance and to the changes in economic size and individual income. RTA and language, too, have larger impact on service trade of non-OECD countries.

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Keywords: Gravity Model; Service Trade; OECD; non-OECD

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1. INTRODUCTION

Gravity model, in its most basic form, states that the volume of trade between a country pair is positively related to the economic sizes of the countries and negatively related to the distance between them. Gravity model has long been used to investigate the determinants of the international bilateral trade flows starting from 1950s and 60s (Isard 1954; Ullman 1954; Tinbergen 1962; Pöyhönen 1963; Pullianen 1963) and it is accepted as one of the most empirically successful models explaining the international trade (Leamer and Levinsohn 1995; Shepherd 2013). Although there is a vast literature on gravity model and international trade most of it focuses on commodity trade. Because the service trade data on international level has been available starting from early 2000s there is comparatively little number of papers that investigate service trade by utilizing the gravity model and the existing papers focus on OECD countries.

Accordingly, the main purpose of this study is to investigate the determinants of international service trade by utilizing gravity model and to find out whether the gravity model works the same for both OECD and non-OECD country groups, if not, to detect the main differences between them. To answer these questions, first, a regression analysis will be conducted to investigate the determinants of international service trade for a total sample

of 36 countries including both OECD and non-OECD groups and, then, the individual groups of countries will be analyzed separately to capture the differences between them. For this purpose, the basic gravity model variables which are GDP, GDP per capita, population and distance will be utilized along with some additional dummy variables which capture the effects of a common official language, a common regional trade arrangement (RTA), a colonial link or a common border shared by the trading partners on the bilateral service trade between them.

Existing literature on gravity model focusing on international service trade is relatively small as compared to the studies on the same model but covering international merchandise trade and it covers relatively old data from early 2000s. Therefore; international service trade should be investigated further by using the gravity model and the data used should be updated. Also, the existing literature proves that the gravity model is successful in identifying the determinants of service imports and exports of OECD countries confirming that it works perfectly for service trade as it does for merchandise trade. However, it does not answer the question whether the said model works for the service exports and imports of the non-OECD countries. OECD service trade as a percentage of GDP is much higher than non-OECD service trade. Gresser (2012) states that the larger the share of services in economic output of a country, the more prosperous the country. Considering

the distinct difference in income levels and in levels of share of service trade in their GDPs the gravity variables might work differently for two country groups. This is a question which is worth to find an answer considering the growing volume of non-OECD service trade.

To answer the questions mentioned above, a least-squares regression analysis is conducted. The analysis takes after papers reviewed in literature review section. The models used in this paper are similar to those used in those papers reviewed but not one hundred per cent the same. They are modified in accordance with the purpose of this study. Therefore, bilateral service trade flows from thirty-six home countries to their trade partners are investigated in the context of gravity model of international trade.

Findings of this study confirm that gravity model works for international service trade. The coefficients of GDP, GDP per capita, and population variables have positive signs and the coefficient of the distance variable is negative as expected. The positive coefficients of language, RTA and colony dummy variables indicate that the service trade between two countries increases when they share an official language engage in same RTA or have ever had a colonial link. Surprisingly, the contiguous dummy variable which shows whether the trading partners are geographically adjacent or not is insignificant in most of the models for both OECD and non-OECD countries. Overall, the gravity model explains service trade of OECD countries better

than it does that of non-OECD group.

This paper contributes the existing literature in two ways. Firstly, it uses recent data to reconfirm that gravity model works for service trade. Secondly, it conducts an analysis to compare how the model works for the OECD and non-OECD countries. Non-OECD service trade is more vulnerable to the changes in income as compared to OECD service trade. Also, the negative effect of distance on service trade has bigger magnitude in the case of non-OECD countries. As for the dummy variables, sharing an official language and engaging in the same RTA increases the service trade more for non-OECD. This paper is unique in the sense that it compares the determinants of service trade of OECD and non-OECD countries.

The rest of the paper is organized as follows. Section 2 provides a brief definition of services, the origins of the gravity model and its applications in international trade literature, and objectives of this study. Section 3 provides the methods utilized while conducting this study, a detailed definition of the variables used and the model. In Section 4, the results of the regression analysis are presented. Section 5 provides a further discussion on the research questions and results and it is followed by limitations of this study in Section 6. The conclusions are represented in Section 7.

2. LITERATURE REVIEW

2.1 Definition of Services

The term “services” covers a wide range of intangible and heterogeneous products and activities. Services are either the result of a production activity that changes the conditions of the consuming units such as transformation services or facilitate the exchange of products or financial assets such as margin services. Services include transport, telecommunication and computer services, construction, financial services, wholesale and retail distribution, hotel and catering, insurance, real estate, health and education, professional, marketing and other business support, government, community, audiovisual, recreational, and domestic services (WTO, 2010).

	1970	1980	1990	2000	2010
High income: OECD	56	60	65	70	74
High income: non-OECD	-	-	46	58	61
Upper middle income	39	38	44	52	53
Middle income	39	38	44	51	53
Lower middle income	38	40	43	47	51
Low income	-	43	43	44	49
Heavily indebted poor countries (HIPC)	41	44	43	44	47
World	52	55	60	66	69

(Database: World Development Indicators)

Services are increasingly dominating the modern economies (Francois and Hoekman 2010). As indicated in Table 1, percentage share of services in GDP is consistently increasing over time for all country groups of different

income levels. From 1970 to 2010, services as percentage share of GDP increased from 52 per cent to 69 per cent in worldwide basis. In 2010, they represent the highest share of GDP for high income OECD countries with 74 per cent and services in high-income non-OECD countries follow with 61 per cent. WTO (2010) reported very similar statistics on services share in GDP. According to the report, services have a significant impact on growth and efficiency across a wide range of industries and overall economic performance and represent more than two thirds of World GDP with high-income countries having an average of 73 per cent share of services in their GDP while middle- and low-income countries having an average of 54 per cent and 47 per cent share of services in their GDP. Since services have a growing importance for the world economy it is important to understand international service trade flows.

2.2 Gravity Model

The origins of gravity model lie in Newtonian physics. Newton proposed the “Law of Universal Gravitation” in seventeenth century. The law states that the attractive force between two objects i and j is given by

$$F_{ij}=G(M_iM_j/D_{ij}^2)$$

where F_{ij} is the attractive force; M_i and M_j are the masses; D_{ij} is the distance between the two objects and G is a gravitational constant depending on the units of the two objects (Head 2000).

The gravity model is adopted from the Newtonian law of universal gravitation and has long been used in economics since it was first suggested by some scholars in 1950s and 60s (Isard 1954; Ullman 1954; Tinbergen 1962; Pöyhönen 1963; Pulliainen 1963). Its use then was extended by many scholars (Linnemann 1966; Aitken 1973; Leamer 1974; Anderson 1979). Gravity model of international trade, in its most basic form, goes as follows

$$T_{ij}=(GDP_iGDP_j)/D_{ij}$$

where T_{ij} represents volume of trade taken place between two countries; GDP_i and GDP_j are the economic sizes of home country and its trading partner and D_{ij} represents the distance between them. As can be inferred from the equation; economic sizes of the trade partners have a positive effect on the volume of trade takes place between them and distance from each other has a negative effect on it.

The gravity model has been defined as the workhorse of the applied

international trade literature (Shepherd, 2013). Gravity model has the ability to correctly approximate bilateral trade flows so it is accepted as one of the models which produce “some of the clearest results and most robust findings in empirical economics” (Leamer et al. 1995).

2.3 Service Trade and Gravity Model

The gravity model has long been utilized to investigate the determinants of international merchandise trade (see, for example, Frankel, Stein, and Wei 1995; Yu, Zietlow 1995; Tudela, Li 2004; Kien 2009). From all these studies, it is well established that gravity model works for merchandise trade stating that the volume of goods trade between two countries is positively related to their economic sizes and their per capita incomes and adversely related to the distance between them.

Kimura and Lee (2006) find out that there is complementary relationship between goods trade and service trade. Therefore; service trade and goods trade should have some common determinants. As a rule, the volume of service trade between two countries depends mostly on the same factors that determine the volume of goods trade, in other words, on their economic size, their per capita GDPs, and the distance between them, and also on the volume of their goods trade itself (Fieleke 1995). If the gravity model works for commodity trade it should work for service trade, too.

Studies investigating the services trade through the gravity model have started to be conducted much later than the studies on merchandise trade. The reason why scholars have started to conduct research on service by using gravity model only around a decade ago is because the data for service trade on an international level was available starting from early 2000s.

Francois (1993) and Gilbert et al. (2001) were among the first scholars who utilized services trade to examine the determinants of service trade. Francois (1993) finds that US producer services exports and imports are positively related to partner country GDP per capita and population estimating gravity equation for the year 1986. Gilbert et al. (2001) uses imputed data for 38 countries for the year 1997 to investigate the effects of specific regional trading arrangements on bilateral services trade. They find that the standard gravity variables such as economic size and distance have a significant effect on service trade and RTAs have trade-enhancing effects.

Grünfeld and Moxnes (2003) investigate the behavior of and links between services exports and foreign direct investment using OECD data to analyze bilateral services trade for the years 1999 and 2000 finding out that RTAs have small and insignificant effects on services exports. Mirza and Nicoletti (2004), too, uses OECD data for 1999 and 2000 for a different country sample to formulate and test a model of services exports and they find that RTAs have a large effect on services exports.

Ceglowski (2006) estimates gravity equations for bilateral services trade for 28 countries in 1999 and 2000 finding out that geographic and linguistic proximities are key determinants of the level of services trade between two countries and common membership in an RTA has a significant, positive effect on bilateral services trade that is similar in magnitude to the effect estimated for goods trade. Kimura and Lee (2006) estimates gravity equation on bilateral services and goods trade between 10 OECD members for the years 1999 and 2000 finding out that gravity model predicts services trade better than it does goods trade geographical; distance and economic freedom being the most important determinants.

All of the studies mentioned above analyzing service trade by utilizing gravity model are very successful in explaining the determinants of international service trade flows. They all confirm that gravity model works for service trade flows just as successful, or even better (Kimura and Lee, 2006), as it does for commodity trade flows. Looking at their results there is no doubt that traditional gravity model with GDPs of the exporters and importers and the distance between them works just as expected with GDPs having positive signs and distance having a negative sign. Other variables such as sharing a common border, sharing a language, engaging in the same RTA prove to have a positive relationship with service trade flows (Francois (1993), Gilbert et al (2001), Mirza and Nicoletti (2004), Ceglowski (2006),

Kimura and Lee (2006)), but some scholars find out that RTA can also have an insignificant and small effect on service trade flows while they get similar results for other variables (Grünfeld and Moxnes, 2003).

2.4 Objectives

Although being very successful in analyzing service trade utilizing gravity model aforementioned studies have some limitations. Firstly, the data they used is relatively old and needs to be updated. Secondly, all of the previous research focus solely on the OECD countries and service trade of non-OECD countries are yet to be analyzed.

The purpose of this study is to investigate the determinants of international service trade flows and empirically and analyze differences/similarities between services trade of OECD and non-OECD countries by utilizing the gravity model. The hypothesis is that the determinants of service trade work in the same direction for both OECD and non-OECD countries but the degree of their influence and of the explanatory power of the gravity model overall is different for the two groups.

To test this hypothesis, we conduct a least squares regression analysis with a specific focus on original gravity model variables (GDP, GDP per capita, population, distance) to measure the explanatory power of the original gravity model for the service trade for each of the concerned country groups.

Then, we improve our model by adding variables to explore the effects of sharing common border, having colonial relationship, sharing an official language and engaging in the same regional trade arrangement on international service trade flows.

3. METHOD

3.1 Data and Variables

This study utilizes least squares regression method to explore how gravity model works for bilateral services trade for OECD and non-OECD countries for a sample of 36 countries in 2010. The number of the OECD countries is 26 and the number of the non-OECD countries is 10. 26 OECD countries are Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Luxembourg, Netherlands, New Zealand, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, the United Kingdom and the United States. 10 non-OECD countries are Belarus, Bulgaria, Croatia, Cyprus, Hong Kong, Latvia, Lithuania, Russia, Singapore and Tunisia.

3.1.1 *Dependent Variable*

TRADE_VALUE : log of bilateral trade flows (exports or imports) between country i and country j.

The data for this variable is available at UN Service Trade <http://unstats.un.org/>. Service trade on UN website is named as Extended Balance of Payments (EBOPS) Classification and this study uses the data for total services described as Total EBOPS Services, code 200. The main categories under total EBOPS services are transportation, travel,

communication services, construction services, insurance services, financial services, computer and information services, royalties and license fees, other business services, personal, cultural and recreational services, government services, and services not allocated.

3.1.2 Independent Variables

GDP_home : log of GDP of home country

GDP_partner : log of GDP of trade partner

GDPPCAP_home : log of GDP per capita of home country

GDPPCAP_partner : log of GDP per capita of trade partner

POP_home : log of population of home country

POP_partner : log of population of trade partner

The data for GDP, GDP per capita and population is available at: The World Bank <http://data.worldbank.org/> . GDP and GDP per capita values are in nominal US dollars for the year 2010.

DISTANCE : log of distance calculated by the great circle formula, which uses latitudes and longitudes of the most important cities/agglomerations in terms of population

CONTIGUOUS : dummy variable indicating whether the countries share a common border or not. It takes the value 1 if the countries contiguous, 0 otherwise.

LANGUAGE : dummy variable indicating whether the countries share an official common language. It takes the value 1 if the countries share an official common language, it becomes 0 otherwise.

COLONY : dummy variable indicating whether the countries have ever had a colonial link. If the trading partners have ever had a colonial link this dummy variable takes the value 1, it is 0 otherwise.

The data for distance, contiguousness, language, colonial link is available at CEPII (Centre D'Études Prospectives et D'Informations Internationales) <http://www.cepii.fr/>. While calculating the distance only in three cases the economic differs from the capital. Firstly, in case of Germany, Essen is used instead of Berlin. Secondly, in case of Canada, Toronto is used instead of Montreal. And finally, for the United States New York is used instead of Washington. It is hard to give a precise definition of colonial relationship. The term colonization is fairly a general one which is used to describe a relationship between two countries, independent from their development levels, in which one has governed the other for a long period of time and contributed to the current state of its institutions (Mayer and Zignago 2011).

RTA : dummy variable indicating whether the countries have a membership in the same regional trade arrangement. If the trading countries engage in the RTA this variable takes the value 1, it is 0 otherwise.

The data for RTA is available at World Trade Organization

<http://rtais.wto.org/>. Both services and goods RTAs are included in this study considering the fact that goods RTAs stimulate goods trade and the volume of goods trade has a positive effect on service trade, therefore goods RTAs have an indirect positive effect on the service trade. As for the date of entry into force, RTAs which entered into force no later than January 2010 are included in our analysis.

3.2 Model

Least squares regression analysis is conducted by using EViews program. The regression is run separately for exports and imports for three different country groups which are all 36 countries, 26 OECD countries and 10 non-OECD countries for the year 2010.

$$(1) \text{ Trade_Value} = \beta_0 + \beta_1 \text{GDP_home} + \beta_2 \text{GDP_partner} + \beta_3 \text{DISTANCE} + \beta_4 \text{CONTIGUOUS} + \beta_5 \text{LANGUAGE} + \beta_6 \text{COLONY} + \beta_8 \text{RTA} + \varepsilon$$

$$(2) \text{ Trade_Value} = \beta_0 + \beta_1 \text{GDPPCAP_home} + \beta_2 \text{GDPPCAP_partner} + \beta_3 \text{POP_home} + \beta_4 \text{POP_partner} + \beta_5 \text{DISTANCE} + \beta_6 \text{CONTIGUOUS} + \beta_7 \text{LANGUAGE} + \beta_8 \text{COLONY} + \beta_9 \text{RTA} + \varepsilon$$

Model (1) contains total economic sizes of trading in the form of GDP along with distance between them forming the traditional gravity equation. Dummy variables CONTIGUOUS, LANGUAGE, COLONY, and RTA are added to

see the effects of sharing a common border, sharing an official language, having a colonial link and engaging in the same RTA on trade value between countries.

Model 2 contains individual incomes in the form of GDP per capita and populations of the trading partners and the distance between. GDP of a country equals its GDP per capita multiplied by its population, so, in theory; there should not be any problem when individual income and population are used instead of total economic size. This second model is used to explore the effects of individual income and population on trade value. The four dummy variables are included in this model, too.

4. RESULTS

4.1 Service Exports and Gravity Model

Table 2- Gravity Estimates for Service Exports for All Sample (36)						
	1	2	3	4	5	6
GDP_home	1.073	1.046	1.046			
GDP_partner	1.072	1.046	1.046			
GDPPCAP_home				2.519	2.345	2.344
GDPPCAP_partner				0.188	0.177	0.177
POPULATION_home				0.649	0.649	0.653
POPULATION_partner				0.562	0.576	0.58
DISTANCE	-1.319	-0.904	-0.902	-1.254	-0.954	-0.998
CONTIGUOUS		-0.02 (0.934)			0.427	
RTA		1.449	1.45		0.935	0.91
LANGUAGE		1.739	1.737		1.544	1.584
COLONY		0.872	0.868		1.105	1.19
CONSTANT	-27.825	-30.615	-30.624	-19.128	-20.53	-20.295
number of observations	2053	2053	2053	2053	2053	2053
Adjusted R ²	0.61	0.65	0.65	0.58	0.60	0.60

(p-values are included in parenthesis only when they are statistically insignificant.)

Table 2 presents the gravity estimates for service exports for all sample which includes 26 OECD and 10 non-OECD Countries with 2053 observations. Model 1 is the traditional gravity model with GDP values of the trading partners and the distance between them. As predicted, coefficients of GDP values are positive and the coefficient of the distance is negative. In Model 2, extra variables which are CONTIGUOUS, RTA, LANGUAGE, and COLONY are added and their coefficients are positive. As can be seen in the table the coefficient of CONTIGUOUS is insignificant in Model 2 with a p-value of 0.934 so, in Model 3, CONTIGUOUS is taken out.

Model 4 is an alternative to the Model 1, per capita GDPs and populations of the trade partners are used instead of GDPs to explore whether GDP or GDP per capita along with population explain the movements of service exports. In Model 5, four explanatory dummy variables are added to see how sharing a border, engaging in the same RTA, sharing an official common language and having a historical colonial link effect service exports. Despite the coefficient of CONTIGUOUS is significant in this model, it is taken out in Model 6 to compare it to Model 3 which is the best model in first three models. Taking the CONTIGUOUS out did not cause a significant change in the explanatory power of the model considering the adjusted R^2 s of Models

5 and 6 are the same value which is 0.60.

Comparing the adjusted R^2 s of the Models 3 and 6, it can easily be inferred that the Model 3 explains the service exports of 36 countries best with an adjusted R^2 of 0.65. Even though the adjusted R^2 s of Model 2 and Model 3 are the same Model 2 cannot be chosen as the best model since it contains an insignificant variable.

4.2 Service Imports and Gravity Model

Table 3- Gravity Estimates for Service Imports for All Sample (36)

	1	2	3	4	5	6
GDP_home	0.994	0.972	0.972			
GDP_partner	1.022	1.003	1.003			
GDPPCAP_home				1.992	1.869	1.87
GDPPCAP_partner				1.316	1.272	1.273
POPULATION_home				0.779	0.772	0.775
POPULATION_partner				0.798	0.795	0.798
DISTANCE	-1.27	-0.897	-0.897	-1.082	-0.889	-0.914
CONTIGUOUS		0.007 (0.975)			0.236 (0.217)	
RTA		1.328	1.327		0.61	0.596
LANGUAGE		1.441	1.441		0.971	0.992
COLONY		0.957	0.959		1.148	1.189
CONSTANT	-24.938	-27.648	-27.645	-32.07	-32.224	-32.113
no of observations	1993	1993	1993	1993	1993	1993
Adjusted R²	0.61	0.65	0.65	0.71	0.73	0.73

(p-values are included in the parenthesis when they are statistically insignificant.)

Gravity estimates for service imports for all 36 countries are represented in

Table 3. There are 1993 observations in this sample. Model 1 is the regression which represents the traditional gravity model with economic sizes of the trading partners in the form of GDP and the distance between them. For service imports, the coefficients of GDP variables are positive and the coefficient of the distance is negative as predicted by the gravity model. In Model 2, dummy variables are added to the traditional gravity model and the coefficient of CONTIGUOUS turns out to be statistically insignificant. Therefore; in Model 3, the variable CONTIGUOUS is taken out to eliminate the insignificant variable. Model 3 is the best model among the first three with no insignificant variables and with an explanatory power of sixty-five per cent.

Model 4, uses per capita incomes and populations of the trading partner instead of their economic size expressed in terms of GDP. As expected, the coefficients of GDP per capita and population variables are positive and the coefficient of the distance is negative confirming the gravity model works for services imports. In model 5, dummy variables CONTIGUOUS, RTA, LANGUAGE and COLONY are added to see how they work for the service imports. However, the CONTIGUOUS variable proves to be insignificant in statistical terms, thus, is taken out in Model 6. In Model 6, the coefficients of the dummy variables are all positive. Model 6 proves to be the best model among six models with an explanatory power of seventy-three per cent.

4.3 Service Exports – A Comparison of OECD and non-OECD Countries

Table 4- Gravity Estimates for Service Exports-A comparison of OECD and non-OECD countries

	OECD Countries(26)						non-OECD Countries (10)					
	1	2	3	4	5	6	1	2	3	4	5	6
GDP_home	0.96	0.93	0.93				1.07	1.21	1.21			
GDP_partner	0.79	0.8	0.8				1.18	1.13	1.13			
GDPPCAP_home				1.92	1.84	1.83				3.27	3.08	3.09
GDPPCAP_partner				0.08	0.08	0.08				1.46	1.41	1.41
POP_home				0.44	0.45	0.46				0.94	1.017	1.027
POP_partner				0.82	0.79	0.8				0.83	0.82	0.82
DISTANCE	-0.99	-0.83	-0.84	-0.98	-0.76	-0.84	-1.73	-1.27	-1.31	-1.7	-1.35	-1.41
CONTIGUOUS		0.12			0.67			0.49			0.76	
		(0.5)						(0.4)			(0.13)	
RTA		0.51	0.5		0.52	0.47		2.25	2.23		1.4	1.38
LANGUAGE		1.15	1.17		0.96	1.08		2.85	2.85		2.26	2.25
COLONY		0.71	0.79		0.92	1.98		0.77	0.96		0.95	1.24
								(0.2)				
CONSTANT	-19.9	-20.9	-20.9	-14.6	-15.8	-15.2	-27.9	-34.7	-34.5	-43.4	-45.7	-45.4
no of observations	1353	1353	1353	1353	1353	1353	700	700	700	700	700	700
Adjusted R²	0.69	0.71	0.71	0.57	0.6	0.6	0.47	0.54	0.54	0.63	0.67	0.67

(p-values are included in the parenthesis when they are statistically insignificant.)

In Table 4, gravity estimates are shown for service exports in different groups of 26 OECD countries with 1353 observations and 10 non-OECD countries with 700 observations. This table represents a comparison of

OECD and non-OECD countries to investigate how the gravity model works in case of service exports for different country groups.

4.3.1 Gravity estimates for service exports of OECD countries

The first six models show the gravity estimates for OECD countries. Model 1 represents the traditional gravity model with GDPs of trading partners and the distance between them. As predicted by the original model, the coefficients of the GDPs are positive and the coefficient of the distance is negative. In Model 2, CONTIGUOUS, RTA, LANGUAGE, and COLONY dummy variables are added to improve the explanatory power of the model but CONTIGUOUS is revealed to be insignificant and taken out in Model 3 which a higher adjusted R^2 as compared to Model 1.

In Model 4, traditional gravity model is rewritten by using per capita incomes and populations of the trading countries instead of their total economic sizes. The coefficients are as expected. Explanatory power of this model is lower than the Model 1 since it has a lower adjusted R^2 . In Model 5, the same four dummy variables are added and the CONTIGUOUS variable, again, comes out as statistically insignificant. Therefore, it is taken out in Model 6. Model 6 reveals all the dummy variables are positively related to the value of trade between two countries. Comparing the adjusted R^2 s of all 6

models for OECD countries, Model 3 proves to be the best model with an explanatory power of seventy-one per cent with no insignificant variables.

4.3.2 Gravity estimates for service exports of non-OECD countries

The second six models represent the regression results for non-OECD countries. Model 1 shows the estimates for traditional gravity model with an adjusted R^2 of 0.47. In Model 2, CONTIGUOUS, RTA, LANGUAGE, and COLONY dummy variables are added, however, two of them, CONTIGUOUS and COLONY, are discovered to be statistically insignificant. Considering the p-value of the coefficient of CONTIGUOUS variable is much higher than of the COLONY variable's, the variable CONTIGUOUS is taken out first to get rid of the insignificant elements in the model. In Model 3, all of the coefficients are statistically significant including that of the COLONY variable's and this model has a much higher adjusted R^2 , 0.54, as compared to Model 1 for non-OECD (adj. $R^2=0.47$).

Model 4 utilizes per capita GDPs and populations of trading countries instead of GDPs to investigate the determinants of service exports of non-OECD countries by using gravity model. It has much higher adjusted R^2 which is 0.63 as compared to first model. In Model 5, the four dummies are added and the CONTIGUOUS dummy variable comes out statistically

insignificant with a p-value of 0.13. Taking out the insignificant variable, Model 6 proves to be the best model for non-OECD countries with the highest adjusted R^2 (0.67) among the six models and with the coefficients of all variables significant with the expected signs.

To sum up the results for the comparison of the OECD and non-OECD countries for service exports, we can say that the best model for OECD countries is Model 5 with an explanatory power of seventy-one per cent and the best model for non-OECD countries is Model 6 with an explanatory power of sixty-seven per cent. Overall, the best model in Table 3 is Model 3 for OECD countries with the highest value of adjusted R^2 and no insignificant variables.

4.4 Service Imports – A Comparison of OECD and non-OECD Countries

Table 5- Gravity Estimates for Service Imports – A Comparison of OECD and non-OECD Countries

OECD Countries (26)

non-OECD Countries (10)

	1	2	3	4	5	6	1	2	3	4	5	6
GDP_home	0.97	0.94	0.94				0.83	0.9	0.91			
GDP_partner	0.78	0.8	0.8				1.13	1.08	1.08			
GDPPCAP_home				1.47	1.42	1.42				2.63	2.43	2.43
GDPPCAP_partner				1.12	1.09	1.09				1.52	1.49	1.48
POP_home				0.68	0.69	0.69				0.83	0.87	0.89
POP_partner				0.87	0.85	0.85				0.88	0.85	0.86
DISTANCE	-1.03	-0.86	-0.86	-0.9	-0.8	-0.81	-1.49	-1.13	-1.19	-1.53	-1.2	-1.3
CONTIGUOUS		0.001			0.1		0.67			1.14		
		(1)			(0.56)		(0.19)					
RTA		0.59	0.59		0.34	0.34	1.55	1.52		1.09	1.03	
LANGUAGE		1.04	1.04		0.66	0.68	2.23	2.19		1.94	1.88	
COLONY		0.65	0.65		0.8	0.81	1.26	1.46		0.76	1.11	
CONSTANT	-19.29	20.67	20.67	25.67	25.74	-25.68	22.54	26.83	-26.6	38.53	-39.89	-39.3
no of observations	1343	1343	1343	1343	1343	1343	650	650	650	650	650	650
Adjusted R²	0.71	0.74	0.74	0.75	0.76	0.77	0.43	0.51	0.51	0.58	0.63	0.62

(p-values are included in the parenthesis when they are statistically insignificant.)

Table 5 represents the gravity estimates for service imports in two different groups of OECD and non-OECD countries. Number of observations for 26

OECD countries are 1343 while it is 650 for 10 non-OECD countries.

4.4.1 Gravity estimates for service imports of OECD countries

The first 6 tables show the regression results for OECD countries. Model 1 represents the results for the traditional gravity model with the economic sizes of the trading countries in the form of GDP and the distance between them. The coefficients of all variables are as expected, positive for GDP variables and negative for the distance variable and the model has a high explanatory power with an adjusted R^2 of 0.71. The dummy variables CONTIGUOUS, RTA, LANGUAGE, and COLONY are added in Model 2 to see their effects on service imports of OECD countries. All the dummy variables have positive coefficient and are significant except for the CONTIGUOUS dummy so it is taken out in Model 3 to get rid of the insignificance. In Model 3, all of the coefficients are significant with expected signs and this model has an adjusted R^2 of 0.74 which is higher than the first model.

In Model 4, GDP per capita values and the populations of the trading countries used along with the distance between them. The coefficients of the per capita incomes and populations are positive and the coefficient of the distance is negative as predicted by the gravity model. In Model 5, the

dummy variables are added to see their effect on service imports. Since the CONTIGUOUS dummy is insignificant in Model 5 with a p-value of 0.56 it is taken out in Model 6. Model 6 is the best model among the first six models with independent variables which explain the seventy-seven per cent of the service imports of the OECD countries.

4.4.2 Gravity estimates for service imports of non-OECD countries

The six models in the second half of Table 4 represent the gravity estimates for 10 non-OECD countries. Model 1 shows the results for the traditional gravity model with GDPs of the trading countries and the distance between them. Despite the coefficients of all variables are statistically significant and have expected signs, adjusted R^2 of Model 1 is relatively low which means the independent variables explains only forty-three per cent of the movements in the dependent variable. In Model 2, CONTIGUOUS, RTA, LANGUAGE, and COLONY dummies are added and they are revealed to have positive coefficients but the CONTIGUOUS variable has to be taken out because it is discovered to be statistically insignificant. Model 3 is the best model among the first three models for non-OECD countries with an adjusted R^2 of 0.51 which is, still, relatively low.

Per capita GDPs and the populations of the trading countries are utilized

instead of their GDPs in Model 4, and these variables prove to have a much higher explanatory power since this model has a much higher adjusted R^2 which is 0.58, as compared to that of Model 1. The four dummy variables are added to see how they affect services imports of non-OECD countries in models 5 and 6 but in Model 6 the CONTIGUOUS variable is excluded to see exclusion of it causes any improvements in adjusted R^2 . Excluding CONTIGUOUS reduces the explanatory power of the model so the best model for service imports of non-OECD countries is Model 5 with independent variables explaining sixty-three percent of the movements in dependent variable.

From Table 4, it can clearly be seen that the best model for OECD countries is Model 6 and the best model for non-OECD countries is Model 5. Comparing the adjusted R^2 s of these two models we can infer that the gravity model explains service imports better for OECD countries than it does for non-OECD countries.

5. DISCUSSION

As mentioned in the previous parts, one of the purposes of this study is to analyze differences/similarities between services trade of OECD and non-

OECD countries by utilizing gravity model. The results reported above confirm the hypothesis that the determinants of service trade work in the same direction for both OECD and non-OECD countries but the degree of their influence and of the explanatory power of the gravity model is different for each country group. Overall, the gravity model works better for the OECD-country group than it does for the non-OECD-country group or the total sample of 36 countries.

I will elaborate the results further separately for the original gravity model variables and the additional dummy variables. For the original gravity variables it is worthy to note that service trade of non-OECD countries are more sensitive to changes in GDP and GDP per capita. The same amount of change in GDP variables reflects a greater change in service trade of non-OECD countries as compared with the OECD countries. This finding may imply that, for example, an economic or financial crisis which results an abrupt drop in output would cause much more drastic decreases in international service trade of non-OECD countries. OECD countries' service trade flows are less vulnerable to drops in income. It also implies that the same amount of income increase will reflect a much higher service trade increase in non-OECD than it would in OECD member states. Therefore; this result would imply that non-OECD countries have a bigger potential of service trade growth despite their vulnerability.

Also distance has a greater impact on service trade of non-OECD countries as compared to that of OECD group. As the distance increases in case of non-OECD countries the corresponding decrease in service trade is bigger. This finding may have some implications regarding to differences in transportation and travel costs in different country groups. Indeed, Brun et al. (2005) found out that the negative effect of distance on the volume of trade of the rich countries decreased with the advancements in transportation technology and shrinking transportation costs. He also points out that poorer countries cannot enjoy the decreasing negative effects and they suffer from them more as compared to richer countries.

As for the dummy variables, engaging in the same RTA and sharing an official language matters more in case of non-OECD service trade. I will first elaborate the dummy variable RTA. According to the regression results obtained on service exports and imports engaging in the same RTA has greater effects on trade in case of non-OECD countries. This may have some implications regarding to trade barriers. In non-OECD countries trade barriers might be higher so when they engage in the same RTA with the trade partner it might make a bigger difference in service trade flows as compared to OECD countries.

Sharing an official language has a bigger effect on non-OECD service trade. This result may imply that in non-OECD countries language learning costs

higher so they prefer engaging in service trade with countries that they have a common language. On the contrary, in OECD countries language learning costs might be lower and even though sharing an official language with trade partner has positive effects on service trade those effects might not be as big as those in non-OECD.

Another interesting finding of this study is that the dummy variable CONTIGUOUS which is 1 if the trading partners share a border is insignificant in most of the models. Therefore, the models do not represent any evidence that supports that there is a significant relationship between geographical adjacency and the volume of service trade between two countries.

This study contributes to the literature in two aspects. Firstly, it reconfirms that gravity model works for international bilateral service trade flows by using recent data. Secondly, it makes a comparison between the OECD and non-OECD service trade and it finds out that gravity model works for both country-groups but with a higher explanatory power for the OECD group.

6. LIMITATIONS

It should be noted that this study is conducted by using one-year data due to the difficulties with collecting data on non-OECD countries. The year

selected for the analysis of this study, 2010, was the year with the most available data for non-OECD group. Since one of my main focuses was comparing the explanatory power of gravity model in cases of non-OECD and OECD service trade flows I have chosen the period with the largest number of non-OECD countries reporting their international service trade flows to UN Service Trade Database. Further research on non-OECD countries with larger data sets covering longer periods can be conducted.

7. CONCLUSIONS

To sum up, gravity model works for international service trade flows and it works better for non-OECD service trade than it does for OECD service

trade. Non-OECD service trade is more sensitive to the distance between trading countries and changes in their total economic size and the individual income. These results have some noteworthy implications. Non-OECD service trade is more vulnerable to economic crises which cause decrease in national and individual income but it also has a bigger potential to grow if there occurs an increase in GDP and GDP per capita. Non-OECD service trade sensitivity to distance shows that the poorer the country the less it enjoys the improvements in transportation technology and shrinking transportation costs (Brun et al., 2005).

If the trade partners share a common language, have ever had a colonial relationship or engage in the same RTA they trade services more. Common language and RTA factors have larger effects on non-OECD service trade. This result may imply that OECD countries provide higher quality foreign language education and has lower trade barriers. Sharing a common border has no significant effect on service trade in most of the models for both country groups.

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APPENDIX

More on Dependent Variable

All service trade:

Extended Balance of Payments Services classification (EBOPS 2002)

EBOPS standard items

In this study Total EBOPS Services (code: 200) data is used from UN Service Trade Database.

Categories under Total EBOPS Services:

Transportation, Travel, Communication services, Construction services, Insurance services, Financial Services, Computer and information services, Royalties and license fees, Other business services, Personal, cultural, and recreational services, Government services, Services not allocated.

Home Country List:

OECD: Austria, Belgium, Canada, Czech Rep., Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, UK, USA.

non-OECD: Belarus, Bulgaria, Croatia, Cyprus, Hong Kong, Latvia, Lithuania, Russia, Singapore, Tunisia.

Partner Country List:

Afghanistan, Albania, Algeria, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Fas, Burundi, CÃ´te d'Ivoire, Cambodia, Cameroon, Canada, Cape Verde, Central African Rep., Chad, Chile, China, China, Hong Kong SAR, China, Macao SAR, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, Czech Rep., Denmark, Djibouti, Dominica, Ecuador, Egypt, El Salvador, Equatorial Guinea Eritrea, Estonia, Ethiopia, Fiji, Finland, France , Gabon, Georgia, Germany, Ghana, Greece, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hungary, Iceland, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Latvia, Lebanon, Lesotho Liberia, Lithuania, Luxembourg, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, Mexico, Mongolia, Morocco, Namibia, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, Rep. of Korea, Rep. of Moldova, Romania, Russian Federation, Rwanda, Sao Tome and Principe, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sudan, Suriname, Swaziland, Sweden, Switzerland, Syria, Tajikistan, TFYR of Macedonia, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, United Arab Emirates, United Kingdom, Uruguay, USA, Uzbekistan, Vanuatu, Venezuela, Viet Nam, Yemen, Zambia, Zimbabwe.

RTA List

RTA Name	Coverage	Type	Date of notification	Notification	Date of entry into force	Status
Armenia - Russian Federation	Goods	FTA	17-Jun-04	GATT Art. XXIV	25-Mar-93	In Force
ASEAN - Australia - New Zealand	Goods & Services	FTA & EIA	8-Apr-10	GATT Art. XXIV & GATS Art. V	1-Jan-10	In Force
ASEAN – China	Goods & Services	PSA & EIA	21-Sep-2005(G) / 26-Jun-2008(S)	Enabling Clause & GATS Art. V	01-Jan-2005(G) / 01-Jul-2007(S)	In Force
ASEAN – India	Goods	FTA	19-Aug-10	Enabling Clause	1-Jan-10	In Force
ASEAN – Japan	Goods	FTA	23-Nov-09	GATT Art. XXIV	1-Dec-08	In Force
ASEAN - Korea, Republic of	Goods & Services	FTA & EIA			01-Jan-2010(G) / 01-May-2009(S)	In Force
ASEAN Free Trade Area (AFTA)	Goods	FTA	30-Oct-92	Enabling Clause	28-Jan-92	In Force
Australia - New Zealand (ANZCERTA)	Goods & Services	FTA & EIA	14-Apr-1983(G) / 22-Nov-1995(S)	GATT Art. XXIV & GATS Art. V	01-Jan-1983(G) / 01-Jan-1989(S)	In Force
Brunei Darussalam – Japan	Goods & Services	FTA & EIA	31-Jul-08	GATT Art. XXIV & GATS Art. V	31-Jul-08	In Force
Canada – Chile	Goods & Services	FTA & EIA	30-Jul-97	GATT Art. XXIV & GATS Art. V	5-Jul-97	In Force
Canada - Costa Rica	Goods	FTA	13-Jan-03	GATT Art. XXIV	1-Nov-02	In Force
Canada - Israel	Goods	FTA	15-Jan-97	GATT Art. XXIV	1-Jan-97	In Force
Canada - Peru	Goods & Services	FTA & EIA	31-Jul-09	GATT Art. XXIV & GATS Art. V	1-Aug-09	In Force
Central European Free Trade Agreement (CEFTA) 2006	Goods	FTA	26-Jul-07	GATT Art. XXIV	1-May-07	In Force
Chile - Japan	Goods & Services	FTA & EIA	24-Aug-07	GATT Art. XXIV & GATS Art. V	3-Sep-07	In Force
China - Hong Kong, China	Goods & Services	FTA & EIA	27-Dec-03	GATT Art. XXIV & GATS Art. V	29-Jun-03	In Force
China - New Zealand	Goods & Services	FTA & EIA	21-Apr-09	GATT Art. XXIV & GATS Art. V	1-Oct-08	In Force
China - Singapore	Goods & Services	FTA & EIA	2-Mar-09	GATT Art. XXIV & GATS Art. V	1-Jan-09	In Force

Common Economic Zone (CEZ)	Goods	FTA	18-Aug-08	GATT XXIV Art.	20-May-04	In Force
Commonwealth of Independent States (CIS)	Goods	FTA	29-Jun-99	GATT XXIV Art.	30-Dec-94	In Force
EC (27) Enlargement	Goods & Services	CU & EIA	27-Sep-2006(G) / 26-Jun-2007(S)	GATT XXIV & GATS Art. V	1-Jan-07	In Force
EFTA - Canada	Goods	FTA	4-Aug-09	GATT XXIV Art.	1-Jul-09	In Force
EFTA - Chile	Goods & Services	FTA & EIA	3-Dec-04	GATT XXIV & GATS Art. V	1-Dec-04	In Force
EFTA - Egypt	Goods	FTA	17-Jul-07	GATT XXIV Art.	1-Aug-07	In Force
EFTA - Former Yugoslav Republic of Macedonia	Goods	FTA	11-Dec-00	GATT XXIV Art.	1-May-02	In Force
EFTA - Israel	Goods	FTA	30-Nov-92	GATT XXIV Art.	1-Jan-93	In Force
EFTA - Jordan	Goods	FTA	17-Jan-02	GATT XXIV Art.	1-Sep-02	In Force
EFTA - Korea, Republic of	Goods & Services	FTA & EIA	23-Aug-06	GATT XXIV & GATS Art. V	1-Sep-06	In Force
EFTA - Lebanon	Goods	FTA	22-Dec-06	GATT XXIV Art.	1-Jan-07	In Force
EFTA - Mexico	Goods & Services	FTA & EIA	25-Jul-01	GATT XXIV & GATS Art. V	1-Jul-01	In Force
EFTA - Morocco	Goods	FTA	20-Jan-00	GATT XXIV Art.	1-Dec-99	In Force
EFTA - Palestinian Authority	Goods	FTA	23-Jul-99	GATT XXIV Art.	1-Jul-99	In Force
EFTA - SACU	Goods	FTA	29-Oct-08	GATT XXIV Art.	1-May-08	In Force
EFTA - Singapore	Goods & Services	FTA & EIA	14-Jan-03	GATT XXIV & GATS Art. V	1-Jan-03	In Force
EFTA - Tunisia	Goods	FTA	3-Jun-05	GATT XXIV Art.	1-Jun-05	In Force
EFTA - Turkey	Goods	FTA	6-Mar-92	GATT XXIV Art.	1-Apr-92	In Force
Egypt - Turkey	Goods	FTA	5-Oct-07	Enabling Clause	1-Mar-07	In Force
EU - Albania	Goods & Services	FTA & EIA	07-Mar-2007(G) / 07-Oct-2009(S)	GATT XXIV & GATS Art. V	01-Dec-2006(G) / 01-Apr-2009(S)	In Force
EU - Algeria	Goods	FTA	24-Jul-06	GATT XXIV Art.	1-Sep-05	In Force
EU - Andorra	Goods	CU	23-Feb-98	GATT XXIV Art.	1-Jul-91	In Force

EU - Bosnia and Herzegovina	Goods	FTA	11-Jul-08	GATT XXIV Art.	1-Jul-08	In Force
EU - Cameroon	Goods	FTA	24-Sep-09	GATT XXIV Art.	1-Oct-09	In Force
EU - CARIFORUM States EPA	Goods & Services	FTA & EIA	16-Oct-08	GATT XXIV & GATS Art. V	1-Nov-08	In Force
EU - Chile	Goods & Services	FTA & EIA	03-Feb-2004(G) / 28-Oct-2005(S)	GATT XXIV & GATS Art. V	01-Feb-2003(G) / 01-Mar-2005(S)	In Force
EU - Côte d'Ivoire	Goods	FTA	11-Dec-08	GATT XXIV Art.	1-Jan-09	In Force
EU - Egypt	Goods	FTA	3-Sep-04	GATT XXIV Art.	1-Jun-04	In Force
EU - Faroe Islands	Goods	FTA	17-Feb-97	GATT XXIV Art.	1-Jan-97	In Force
EU - Former Yugoslav Republic of Macedonia	Goods & Services	FTA & EIA	23-Oct-2001(G) / 02-Oct-2009(S)	GATT XXIV & GATS Art. V	01-Jun-2001(G) / 01-Apr-2004(S)	In Force
EU - Iceland	Goods	FTA	24-Nov-72	GATT XXIV Art.	1-Apr-73	In Force
EU - Israel	Goods	FTA	20-Sep-00	GATT XXIV Art.	1-Jun-00	In Force
EU - Jordan	Goods	FTA	17-Dec-02	GATT XXIV Art.	1-May-02	In Force
EU - Lebanon	Goods	FTA	26-May-03	GATT XXIV Art.	1-Mar-03	In Force
EU - Mexico	Goods & Services	FTA & EIA	25-Jul-2000(G) / 21-Jun-2002(S)	GATT XXIV & GATS Art. V	01-Jul-2000(G) / 01-Oct-2000(S)	In Force
EU - Montenegro	Goods & Services	FTA & EIA	16-Jan-2008(G) / 18-Jun-2010(S)	GATT XXIV & GATS Art. V	01-Jan-2008(G) / 01-May-2010(S)	In Force
EU - Morocco	Goods	FTA	13-Oct-00	GATT XXIV Art.	1-Mar-00	In Force
EU - Norway	Goods	FTA	13-Jul-73	GATT XXIV Art.	1-Jul-73	In Force
EU – Overseas Countries and Territories (OCT)	Goods	FTA	14-Dec-70	GATT XXIV Art.	1-Jan-71	In Force
EU - Palestinian Authority	Goods	FTA	29-May-97	GATT XXIV Art.	1-Jul-97	In Force
EU - Papua New Guinea / Fiji	Goods	FTA	18-Oct-11	GATT XXIV Art.	20-Dec-09	In Force
EU - San Marino	Goods	CU	24-Feb-10	GATT XXIV Art.	1-Apr-02	In Force
EU - Serbia	Goods	FTA	31-May-10	GATT XXIV Art.	1-Feb-10	In Force
EU - South Africa	Goods	FTA	2-Nov-00	GATT XXIV Art.	1-Jan-00	In Force

EU - Switzerland - Liechtenstein	Goods	FTA	27-Oct-72	GATT Art. XXIV	1-Jan-73	In Force
EU - Syria	Goods	FTA	15-Jul-77	GATT Art. XXIV	1-Jul-77	In Force
EU - Tunisia	Goods	FTA	15-Jan-99	GATT Art. XXIV	1-Mar-98	In Force
EU - Turkey	Goods	CU	22-Dec-95	GATT Art. XXIV	1-Jan-96	In Force
Eurasian Economic Community (EAEC)	Goods	CU	21-Apr-99	GATT Art. XXIV	8-Oct-97	In Force
European Economic Area (EEA)	Services	EIA	13-Sep-96	GATS Art. V	1-Jan-94	In Force
European Free Trade Association (EFTA)	Goods & Services	FTA & EIA	14-Nov-1959(G) / 15-Jul-2002(S)	GATT Art. XXIV & GATS Art. V	03-May-1960(G) / 01-Jun-2002(S)	In Force
Georgia - Russian Federation	Goods	FTA	8-Feb-01	GATT Art. XXIV	10-May-94	In Force
Iceland - Faroe Islands	Goods & Services	FTA & EIA	10-Jul-08	GATT Art. XXIV & GATS Art. V	1-Nov-06	In Force
India - Singapore	Goods & Services	FTA & EIA	3-May-07	GATT Art. XXIV & GATS Art. V	1-Aug-05	In Force
Japan - Indonesia	Goods & Services	FTA & EIA	27-Jun-08	GATT Art. XXIV & GATS Art. V	1-Jul-08	In Force
Japan - Malaysia	Goods & Services	FTA & EIA	12-Jul-06	GATT Art. XXIV & GATS Art. V	13-Jul-06	In Force
Japan - Mexico	Goods & Services	FTA & EIA	31-Mar-05	GATT Art. XXIV & GATS Art. V	1-Apr-05	In Force
Japan - Philippines	Goods & Services	FTA & EIA	11-Dec-08	GATT Art. XXIV & GATS Art. V	11-Dec-08	In Force
Japan - Singapore	Goods & Services	FTA & EIA	8-Nov-02	GATT Art. XXIV & GATS Art. V	30-Nov-02	In Force
Japan - Switzerland	Goods & Services	FTA & EIA	1-Sep-09	GATT Art. XXIV & GATS Art. V	1-Sep-09	In Force
Japan - Thailand	Goods & Services	FTA & EIA	25-Oct-07	GATT Art. XXIV & GATS Art. V	1-Nov-07	In Force
Japan - Viet Nam	Goods & Services	FTA & EIA	1-Oct-09	GATT Art. XXIV & GATS Art. V	1-Oct-09	In Force
Jordan - Singapore	Goods & Services	FTA & EIA	7-Jul-06	GATT Art. XXIV & GATS	22-Aug-05	In Force

				Art. V		
Korea, Republic of - Singapore	Goods & Services	FTA & EIA	21-Feb-06	GATT Art. XXIV & GATS Art. V	2-Mar-06	In Force
Kyrgyz Republic - Russian Federation	Goods	FTA	15-Jun-99	GATT Art. XXIV	24-Apr-93	In Force
New Zealand - Singapore	Goods & Services	FTA & EIA	4-Sep-01	GATT Art. XXIV & GATS Art. V	1-Jan-01	In Force
North American Free Trade Agreement (NAFTA)	Goods & Services	FTA & EIA	29-Jan-1993(G) / 01-Mar-1995(S)	GATT Art. XXIV & GATS Art. V	1-Jan-94	In Force
Pacific Island Countries Trade Agreement (PICTA)	Goods	FTA	28-Aug-08	Enabling Clause	13-Apr-03	In Force
Panama - Singapore	Goods & Services	FTA & EIA	4-Apr-07	GATT Art. XXIV & GATS Art. V	24-Jul-06	In Force
Russian Federation - Serbia	Goods	FTA	21-Dec-12	GATT Art. XXIV	3-Jun-06	In Force
Russian Federation - Tajikistan	Goods	FTA	13-Sep-12	GATT Art. XXIV	8-Apr-93	In Force
Russian Federation - Turkmenistan	Goods	FTA	18-Jan-13	GATT Art. XXIV	6-Apr-93	In Force
Russian Federation - Uzbekistan	Goods	FTA	18-Jan-13	GATT Art. XXIV	25-Mar-93	In Force
Singapore - Australia	Goods & Services	FTA & EIA	25-Sep-03	GATT Art. XXIV & GATS Art. V	28-Jul-03	In Force
South Asian Free Trade Agreement (SAFTA)	Goods	FTA	21-Apr-08	Enabling Clause	1-Jan-06	In Force
South Asian Preferential Trade Arrangement (SAPTA)	Goods	PSA	21-Apr-97	Enabling Clause	7-Dec-95	In Force
South Pacific Regional Trade and Economic Cooperation Agreement (SPARTECA)	Goods	PSA	7-Jan-81	Enabling Clause	1-Jan-81	In Force
Thailand - New Zealand	Goods & Services	FTA & EIA	1-Dec-05	GATT Art. XXIV & GATS Art. V	1-Jul-05	In Force
Trans-Pacific Strategic Economic Partnership	Goods & Services	FTA & EIA	18-May-07	GATT Art. XXIV & GATS Art. V	28-May-06	In Force
Ukraine - Belarus	Goods	FTA	18-Aug-08	GATT Art. XXIV	11-Nov-06	In Force
Ukraine - Russian Federation	Goods	FTA	18-Aug-08	GATT Art. XXIV	21-Feb-94	In Force
US - Australia	Goods & Services	FTA & EIA	22-Dec-04	GATT Art. XXIV & GATS	1-Jan-05	In Force

				Art. V		
US - Bahrain	Goods & Services	FTA & EIA	8-Sep-06	GATT Art. XXIV & GATS Art. V	1-Aug-06	In Force
US - Chile	Goods & Services	FTA & EIA	16-Dec-03	GATT Art. XXIV & GATS Art. V	1-Jan-04	In Force
US - Israel	Goods	FTA	13-Sep-85	GATT Art. XXIV	19-Aug-85	In Force
US - Jordan	Goods & Services	FTA & EIA	15-Jan-02	GATT Art. XXIV & GATS Art. V	17-Dec-01	In Force
US - Morocco	Goods & Services	FTA & EIA	30-Dec-05	GATT Art. XXIV & GATS Art. V	1-Jan-06	In Force
US - Oman	Goods & Services	FTA & EIA	30-Jan-09	GATT Art. XXIV & GATS Art. V	1-Jan-09	In Force
US - Peru	Goods & Services	FTA & EIA	3-Feb-09	GATT Art. XXIV & GATS Art. V	1-Feb-09	In Force
US - Singapore	Goods & Services	FTA & EIA	17-Dec-03	GATT Art. XXIV & GATS Art. V	1-Jan-04	In Force

DATABASES

TRADE_{ij} : UN Service Trade <http://unstats.un.org/>

GDP_i, GDP_j, GDPPCAP_i, GDPPCAP_j, POP_i, POP_j : The World Bank <http://data.worldbank.org/>

DISTANCE, CONTIGUOUS, LANGUAGE, COLONY, SMCTRY : CEPII (Centre D'Études Prospectives et D'Informations Internationales) <http://www.cepii.fr/>

RTA: World Trade Organization <http://rtais.wto.org/>