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Institutional Determinants of Bilateral Trade Flows: A Panel Data Analysis

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ABSTRACT

This study analyzes the institutional determinants of bilateral trade flows and homogeneity effect for Pakistan with ECO countries by using panel data for years 2003-2014. Gravity trade model is estimated through panel least squares technique. Impact of institutions is very important for international trade as international businesses involve many governance systems. The results show that average impact of institutional quality and bilateral trade flows is positive. Moreover, institutional homogeneity effect exhibits that bilateral trade flows are positively related with the governance similarity. Thus, institutional quality and institutional homogeneity has dominant impact on the bilateral trade flows.

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1. Introduction

International trade is considered as an engine of economic growth. Many economies are adopting economic integration and opening up their economies to encourage the economic development and for better standard of living. ASEAN, EU and NAFTA are some examples of economic integration. Sustainable development achievement is the main objective of economic planners. EU and ASEAN has promoted international trade, stimulated economic development and encouraged other countries to make economic groups. Present study is based on the Economic Cooperation Organization (ECO). ECO was originally established by Pakistan, Turkey and Iran in 1964 as Regional Cooperation for Development (RCD). Its basic areas were trade, banking, communications, political and cultural affairs, industry, transportation and railway. RCD was renamed in 1985 to Economic Cooperation Organization (ECO). It was recognized after the collapse of Soviet Union to collaborate with the separated states. Central Asian States and Afghanistan were included in ECO in May 1992 so, ECO members were increased from 3 to 10 including Afghanistan, Azerbaijan, Iran, Kazakhstan, Kyrgyzstan, Pakistan, Tajikistan, Turkmenistan, Turkey and Uzbekistan. Major aims and objectives of ECO include sustainable economic development, better living standard of people, promotion of economic, social, technical, cultural and scientific cooperation, elimination of trade barriers for the expansion of intra-regional trade, better infrastructure for

transportation and communication, development of industrial potential, enhancement of agricultural, natural, energy and human resources, privatization and economic liberalization.

Trading opportunities are very good in ECO region. ECO has become a flourishing regional organization and its international importance is increasing but at the same time, the organization faces very hard challenges. There is lack of proper institutions and infrastructure that's why resources are not fully utilized in the region. ECO countries are dependent for their exports and imports on industrial economies therefore joint trade among the member countries has been sluggish over time. Trade potential of the region has not yet explored fully so the need of the time is to collaborate with each other so that higher intra-regional trade target could be accomplished within the ECO region. Pak-ECO trade has many benefits as Pakistan has well established trade traditions, well developed communication and transportation resources, geographical contiguity, religious and cultural bonds etc. Due to less information about demand of consumers and the ineffective marketing techniques to introduce new products, trade is low with ECO region. Greater economic cooperation and joint ventures can be reached in different fields between Pakistan and ECO member countries. Many prospects exist and many other opportunities can be generated, whether these opportunities will be exploited or not, it will depend on the vision and spirit of the planners and policy makers in ECO countries.

The rest of the paper is organized as: Section 2 shows the review of empirical studies. Section 3 explains the model specification. Section 4 illustrates the data and methodology. Section 5 depicts the results while section 6 concludes the paper along with polices.

2. Review of Empirical Studies

This section exhibits the review of empirical studies based on the gravity trade model. Number of empirical research studies has been done on trade determinants as a whole in literature both in developed and developing countries. Studies on ECO countries are very limited in Pakistan particularly on bilateral trade determinants by using gravity trade model and panel data. Institutional framework is an informal barrier to trade other than quota and tariff. Impact of institutions is very important for international trade as international businesses involve many governance systems. Strong and effective domestic institutional mechanism is an important determinant of trade but institutional effect has received very little attention in the literature on international trade. Recent empirical studies of Alvarez et al. (2015), Bojnec and Ferto (2015), De Groot et al. (2004), Koukhartchouk and Maurel (2003), and Anderson and Marcouiller (2002) have investigated the institutional effects on the level of trade. In Pakistan, no study is done so far on institutional determinants of bilateral trade flows and institutional homogeneity effect on the level of trade for ECO countries by using panel data and gravity trade model. This study captures the effect of institutional quality and institutional homogeneity on trade. Table 1 presents some empirical studies based on the gravity trade model.

Table1: Review of Empirical Studies

Author	**Variables**	**Data Type** **Data Sources** **Technique**	**Signs**
Wang (2016)	Bilateral trade flows GDP Per capita GDP Distance Exchange rate Inequality Vegetable oil seeds Border Language, FTA Colonial heritage	Balanced panel data set of 80 countries for years 2000-2013 WDI OECD National Accounts data files IMF, IFS data base CEPII PPML	GDP + Per capita GDP Distance - Exchange rate + Inequality - Vegetable oil seeds + Border + Language + FTA + Colonial heritage +
Alvarez et al. (2015)	Bilateral trade flows Distance Labor competitiveness Sectoral price level Sectoral income share Adjacency Language Governance indicators	Panel data of 186 countries for years 1996-2012 and 2000-2012 UN COMTRADE WDI CEPII World Bank's WGI Panel least squares	Labor competitiveness + Sectoral price level - Sectoral income share - Distance - Adjacency + Language + Governance indicators +/-

Bojnec and Ferto (2015)	Agro-Food exports flows GDP Per capita GDP Distance, Border Language, RFTAs Government size Legal system Access to sound money	Panel data of 29 OECD countries for years 1995-2003 OECD bilateral trade database WDI CEPII EFW PPML	GDP + Border + Language + RFTAs + Distance – Per capita GDP – Institutional quality + Sound money + Tariff + Legal system + Institutional homogeneity –
Rizwanulhassan and Shafiqurrehman (2015)	Bilateral trade flows GDP Per capita GDP Exchange rate volatility Distance Border	Panel data of 5 major SAARC countries for years 1991-2010 IMF DOTS WDI IFS GLS	GDP + Per capita GDP + Exchange rate volatility - Distance + Border +
Ravishankar and Stack (2014)	Exports flows GDP Distance Per capita GDP differential Real exchange rate Landlocked Colony Member of EU	Panel data of 17 countries for years 1994-2007 IMF DOTS IFS WDI CEPII Stochastic Frontier Analysis (SFA)	GDP + Distance - Per capita GDP differential + Real exchange rate - Landlocked - Colony + Member of EU +
Khan et al. (2013)	Trade flows GDP Per capita GDP Distance Cultural similarity	Panel data of 10 countries for years 1990-2010 IMF Database of Economic Outlook CEPII OLS	GDP + Per capita GDP + Distance – Cultural similarity -
Mohmand and Wang (2013)	Exports flows GDP Distance Border Language Religion Trade agreements Member of WTO	Panel data of 142 countries for years 1995-2011 UN COMTRADE WDI CEPII CIA World Fact book Panel least squares	GDP + Distance – Language + Border + Religion + Trade agreements + WTO +
Mukhanov (2013)	Exports flows GDP Per capita GDP Distance Border Language Members of ECO	Panel data of 11 countries for years 2000-2011 UN COMTRADE WDI CEPII Panel least squares	GDP + Per capita GDP + Distance - Border + Language + ECO +
Nasiri and Hassani (2013)	Trade flows GDP, Distance Per capita income Population, Border Language Membership in ECO, EU, ASEAN, and EAEC	Cross sectional data of 161 countries for year 2011 Customs reports of Islamic republic of Iran World Bank United Nations OLS	GDP + Per capita Income + Distance – Language + Membership with ECO and ASEAN +
Malik and Chaudhary (2012)	Imports flows GNP Exchange rate Population size Openness	Panel data of 6 countries for years 1996-2006 IFS, IMF SBP's Publications and Pakistan Economic Survey	GNP + Openness - Exchange rate - Import flows Lagged value +

	Inflation rate Import flows Lagged value Distance	GLS	Inflation rate – Population size +
Achakzai (2006)	Exports flows GDP Per capita GDP Distance Border Language Members of ECO	Cross sectional data of 137 countries for year 2005 UN COMTRADE WDI CEPII OLS	GDP + Per capita GDP + Distance - Border + Language + ECO +
De Groot et al. (2004)	Exports flows National income Per capita income Distance, Border Language, Religion Membership in same PTA Colonial empire Institutional quality	Cross sectional data of more than 100 countries for year 1998 WITS WDI Sala-i-Martin (1997) OLS	GDP + Per capita GDP + Border + Language + Religion + Membership in same PTA + Colonial empire + Distance – Governance indicators +

Source: Authors' compilation

In all these studies, various specifications of gravity trade model have been estimated through least squares technique by using cross sectional and panel data and different explanatory and dummy variables. All studies show expected signs for basic gravity variables of GDP and distance. Trade volumes are positively correlated with GDP while inversely linked with distance. Border and language dummy variables are also positively correlated with trade in almost all the studies.

3. Model Specifications

3.1 Model Specifications for Institutional Determinants of Trade

Following model specifications are used to find the institutional determinants of bilateral trade flows of Pakistan with ECO countries. In each model, bilateral trade flows is used as dependent variable; and GDP, per capita GDP, distance, adjacency, and area are used as independent variables along with governance indicators. All variables are in log form except the dummy variables and governance indicator. As all the governance indicators are interrelated with each other so each governance indicator is used separately in each model to avoid the problem of Multicollinearity.

Model 1: Voice and Accountability

In this model, gravity trade model is estimated with governance indicator of voice and accountability.

$$\log(\mathrm{TRD}_{ij}) = \alpha + \beta_1 \log(\mathrm{GDP}_i.\mathrm{GDP}_j) + \beta_2 \log(PC\mathrm{GDP}_i.PC\mathrm{GDP}_j) + \beta_3 \log(DST_{ij}) + \beta_4(VAC_i) + \beta_5(VAC_j) + \beta_6(ADJ_{ij}) + \beta_7(AREA_i) + \mu_{ij} \quad (1)$$

Model 2: Political Stability

In this model, gravity trade model is estimated with governance indicator of political stability.

$$\log(\mathrm{TRD}_{ij}) = \alpha + \beta_1 \log(\mathrm{GDP}_i.\mathrm{GDP}_j) + \beta_2 \log(PC\mathrm{GDP}_i.PC\mathrm{GDP}_j) + \beta_3 \log(DST_{ij}) + \beta_4(PST_i) + \beta_5(PST_j) + \beta_6(ADJ_{ij}) + \beta_7(AREA_i) + \mu_{ij} \quad (2)$$

Model 3: Government Effectiveness

In this model, gravity trade model is estimated with governance indicator of government effectiveness.

$$\log(\mathrm{TRD}_{ij}) = \alpha + \beta_1 \log(\mathrm{GDP}_i.\mathrm{GDP}_j) + \beta_2 \log(PC\mathrm{GDP}_i.PC\mathrm{GDP}_j) + \beta_3 \log(DST_{ij}) + \beta_4(GEF_i) + \beta_5(GEF_j) + \beta_6(ADJ_{ij}) + \beta_7(AREA_i) + \mu_{ij} \quad (3)$$

Model 4: Regulatory Quality
In this model, gravity trade model is estimated with governance indicator of regulatory quality.

$$\log(\mathrm{TRD}_{ij}) = \alpha + \beta_1 \log(\mathrm{GDP}_i.\mathrm{GDP}_j) + \beta_2 \log(PC\mathrm{GDP}_i.PC\mathrm{GDP}_j) + \beta_3 \log(DST_{ij}) + \beta_4 (RQL_i) + \beta_5 (RQL_j) + \beta_6 (ADJ_{ij}) + \beta_7 (AREA_i) + \mu_{ij} \quad (4)$$

Model 5: Rule of Law
In this model, gravity trade model is estimated with governance indicator of rule of law.

$$\log(\mathrm{TRD}_{ij}) = \alpha + \beta_1 \log(\mathrm{GDP}_i.\mathrm{GDP}_j) + \beta_2 \log(PC\mathrm{GDP}_i.PC\mathrm{GDP}_j) + \beta_3 \log(DST_{ij}) + \beta_4 (RLW_i) + \beta_5 (RLW_j) + \beta_6 (ADJ_{ij}) + \beta_7 (AREA_i) + \mu_{ij} \quad (5)$$

Model 6: Control of Corruption
In this model, gravity trade model is estimated with governance indicator of control of corruption.

$$\log(\mathrm{TRD}_{ij}) = \alpha + \beta_1 \log(\mathrm{GDP}_i.\mathrm{GDP}_j) + \beta_2 \log(PC\mathrm{GDP}_i.PC\mathrm{GDP}_j) + \beta_3 \log(DST_{ij}) + \beta_4 (CCR_i) + \beta_5 (CCR_j) + \beta_6 (ADJ_{ij}) + \beta_7 (AREA_i) + \mu_{ij} \quad (6)$$

Model 7: Composite Governance Indicator
In this model, gravity trade model is estimated with composite governance indicator. Composite index is constructed by taking the simple arithmetic average of the scores of each governance indicator and it shows the average effect of overall governance quality on bilateral trade flows.

$$\log(\mathrm{TRD}_{ij}) = \alpha + \beta_1 \log(\mathrm{GDP}_i.\mathrm{GDP}_j) + \beta_2 \log(PC\mathrm{GDP}_i.PC\mathrm{GDP}_j) + \beta_3 \log(DST_{ij}) + \beta_4 (COMP_i) + \beta_5 (COMP_j) + \beta_6 (ADJ_{ij}) + \beta_7 (AREA_i) + \mu_{ij} \quad (7)$$

Where:

TRDij = Total amount of imports and exports between country i and country j
GDPi = GDP of country I
GDPj = GDP of country j
PCGDPi = Per capita GDP of country i
PCGDPj = Per capita GDP of country j
DSTij = Distance between country i and country j
VACi = Voice and accountability of country i
VACj = Voice and accountability of country j
PSTi = Political stability of country i
PSTj = Political stability of country j
GEFi = Government effectiveness of country i
GEFj = Government effectiveness of country j
RQLi = Regulatory quality of country i
RQLj = Regulatory quality of country j
RLWi = Rule of law of country i
RLWj = Rule of law of country j
CCRi = Control of corruption of country i
CCRj = Control of corruption of country j
COMPi = Composite governance indicator of country i
COMPj = Composite governance indicator of country j
ADJij = Dummy variable of adjacency/common border between country i and country j
AREAi = Dummy variable of total land area of country i
μij = Error term

Studies of Alvarez et al. (2015) and De Groot et al. (2004) have used these governance indicators to find the institutional determinants of trade.

3.2 Model Specifications for Institutional Homogeneity Effect on the level of Trade

Following model specifications are used to find the institutional homogeneity effect on the level of trade of Pakistan with ECO countries. In each model, bilateral trade flows is used as dependent variable; and GDP, per capita GDP, distance, adjacency, and area are used as independent variables along with governance indicators. All variables are in log form except the dummy variables and governance indicators.

Model 1: Institutional Homogeneity

In this model, gravity trade model is estimated by including composite index of governance similarity to see the institutional homogeneity effect on the level of trade.

$$\log(\mathrm{TRD}_{ij}) = \alpha + \beta_1 \log(\mathrm{GDP}_i.\mathrm{GDP}_j) + \beta_2 \log(PC\mathrm{GDP}_i.PC\mathrm{GDP}_j) + \beta_3 \log(DST_{ij}) + \beta_4 (SIMINDEX_{ij}) \\ \beta_5 (ADJ_{ij}) + \beta_6 (AREA_1) + \mu_{ij} \quad (8)$$

Model 2: Institutional Quality and Institutional Homogeneity

In this model, gravity trade model is estimated by including both composite governance indicator and composite index of governance similarity to see the institutional quality and institutional homogeneity effect on the level of trade.

$$\log(\mathrm{TRD}_{ij}) = \alpha + \beta_1 \log(\mathrm{GDP}_i.\mathrm{GDP}_j) + \beta_2 \log(PC\mathrm{GDP}_i.PC\mathrm{GDP}_j) + \beta_3 \log(DST_{ij}) + \beta_4 \log(COMP_i) \\ + \beta_5 \log(COMP_j) + \beta_6 \log(SIMINDEX_{ij}) + \beta_7 (ADJ_{ij}) + \beta_8 (AREA_1) + \mu_{ij} \quad (9)$$

Governance similarity index is constructed by following formula using the methodology of Helpman (1987); Egger (2000, 2002); Shin and Serlenga (2007).

$$\text{Similarityij} = \log \{1-(\text{COMPi} \div \text{COMPi} + \text{COMPj})2 - (\text{COMPj} \div \text{COMPi} + \text{COMPj})2\} \quad (10)$$

A study of De Groot et al. (2004) has used these indices to find the institutional quality and institutional homogeneity effect on the level of trade.

4. Data and Methodology

In present study, panel data of ECO region (10 countries) are used from years 2003-2014 (12 years). Panel data provide more efficient results due to more degree of freedom and more reliability. Panel least square technique is used to estimate the different specifications of gravity trade model to find the economic determinants of trade. Data of all the variables are gathered from UN COMTRADE, WDI, Penn World Table, and CEPII1. Stronger institutional quality tends to increase the international trade and competitiveness. Six governance indicators are used to find the institutional determinants of bilateral trade flows of Pakistan with ECO countries based on Kaufmann and Kraay (2002). Table 2 presents description of all variables used in this study.

Table 2: Description of Variables: Summary and Sources

Variables	Description	Unit	Data Source	Expected Sign
Dependent Variable				
TRD	Bilateral trade flows obtained by adding bilateral imports and bilateral exports	US$	UN COMTRADE	---------
Economic Variables				
GDP	GDP used as a proxy for economic size of the country	Current 2005 US$	WDI	Positive
DST	Distance from capital to capital used as a proxy for trade costs	Kilometer	CEPII	Negative
PCGDP	Per capita GDP used as a proxy for	Current	WDI	Positive

1See "Notes on CEPII's Distances Measures: The GeoDist database" by Mayer and Zignago (2011)

	level of development of the country	2005 US$		
Dummy Variables				
ADJ	Adjacent /common borders assumes the value of 1 if countries share same border and value of 0 otherwise	1 and 0	CEPII	Positive
AREA	Total land area assumes the value of 1 if countries are large size in area and value of 0 otherwise	1 and 0	CEPII	Positive
Institutional Variables				
VAC	Voice and accountability	Estimate	WGI	Positive
PST	Political stability	Estimate	WGI	Positive
GEF	Government effectiveness	Estimate	WGI	Positive
RQL	Regulatory quality	Estimate	WGI	Positive
RLW	Rule of law	Estimate	WGI	Positive
CCR	Control of corruption	Estimate	WGI	Positive
COMP	Composite governance index	Average of all indicators	Calculated	Positive
SIMINDEX	Governance similarity index	Calculated by formula	Calculated	Positive

5. Results and Discussions

Now we discuss the institutional determinants of trade in ECO countries.

5.1 Institutional Determinants of Trade

5.1.1 Descriptive Statistics

Table 3 presents the descriptive statistics of all institutional variables. Average effect of composite index is 0.45 on bilateral trade flows for ECO member countries with maximum value of 0.89 and minimum value of 0.12 and this average effect is 0.49 in case of Pakistan with maximum value of 0.80 and minimum value of 0.25. The standard deviation of composite index is 0.20 and 0.16 for ECO countries and Pakistan respectively which show greater dispersion from their mean value.

Table 3: Descriptive Statistics

	Mean	**Maximum**	**Minimum**	**Standard Deviation**	**Skewness**	**Kurtosis**	**Jarque-Bera**	**Probability**
VACi	-1.27	-0.03	-2.22	0.56	0.42	2.87	3.32	0.19
VACj	-0.95	-0.74	-1.26	0.15	-1.00	2.85	17.98	0.00
PSTi	-0.88	0.75	-2.70	0.79	-0.29	2.92	1.49	0.47
PSTj	-2.32	-1.56	-2.81	0.44	0.73	1.93	14.80	0.00
GEFi	-0.77	0.40	-1.68	0.51	0.44	2.94	3.43	0.18
GEFj	-0.62	-0.37	-0.81	0.18	0.32	1.24	15.77	0.00
RQLi	-0.95	0.42	-2.18	0.73	0.15	1.89	5.97	0.05
RQLj	-0.64	-0.45	-0.88	0.11	-0.39	2.71	3.08	0.21
RLWi	-1.02	0.16	-1.96	0.52	0.61	3.16	6.74	0.03
RLWj	-0.85	-0.73	-0.98	0.07	0.17	2.40	2.14	0.34
CCRi	-0.98	0.17	-1.64	0.44	1.12	3.68	24.44	0.00
CCRj	-0.93	-0.73	-1.07	0.14	0.28	1.26	14.96	0.00
COMPi	0.45	0.89	0.12	0.20	0.66	2.94	7.92	0.02
COMPj	0.49	0.80	0.25	0.16	0.41	2.17	6.15	0.05
SIMINDEXij	0.48	1.00	0.00	0.50	0.07	1.01	18.00	0.00

Source: Authors' calculations

Values of skewness for composite index are 0.66 and 0.41 for ECO countries and Pakistan respectively while for normal distribution, skewness should be zero. Values of kurtosis of composite index are 2.94 and 2.17 for ECO countries and Pakistan respectively while for normal distribution, kurtosis should be 3. This shows that data of ECO countries of all governance indicators follows non-normal distribution. Jarque-Bera test also confirms the same results.

5.1.2 Correlation Matrix

Table 4 displays the correlation matrix of all variables. The sign of the correlation coefficient describes whether the two variables are positively correlated or negatively correlated. The absolute value without regard to sign shows how strong or weak the relationship is.

Table 4: Correlation Matrix

	VACi	**VACj**	**PSTi**	**PSTj**	**GEFi**	**GEFj**	**RQLi**	**RQLj**	**RLWi**	**RLWj**	**CCRi**	**CCRj**	**COMPi**	**COMPj**
VACi	1.00													
VACj	-0.08	1.00												
PSTi	-0.13	0.06	1.00											
PSTj	0.09	-0.86	-0.07	1.00										
GEFi	0.72	0.09	0.17	-0.07	1.00									
GEFj	0.08	-0.73	-0.07	0.87	-0.10	1.00								
RQLi	0.88	0.03	0.13	-0.04	0.79	-0.05	1.00							
RQLj	-0.03	0.44	0.02	-0.35	-0.04	0.08	-0.02	1.00						
RLWi	0.68	-0.02	0.31	0.03	0.92	-0.01	0.77	-0.08	1.00					
RLWj	0.02	-0.27	-0.01	0.37	0.03	0.23	-0.01	-0.18	0.04	1.00				
CCRi	0.65	-0.03	0.12	0.07	0.88	0.07	0.64	-0.01	0.91	0.02	1.00			
CCRj	0.00	-0.06	0.02	0.22	-0.01	0.45	-0.01	0.34	0.01	0.09	0.10	1.00		
COMPi	0.81	0.01	0.31	0.00	0.94	-0.02	0.89	-0.03	0.96	0.02	0.88	0.02	1.00	
COMPj	0.04	-0.28	-0.02	0.56	-0.05	0.77	-0.04	0.40	0.00	0.43	0.09	0.79	0.00	1.00

Source: Authors' calculations

Table 4 shows that the composite governance indicator of ECO countries has strong positive correlation with all governance indicators. Composite governance indicator of Pakistan has strong positive correlation with government effectiveness and control of corruption.

5.1.3 Institutional Determinants of Bilateral Trade Flows: Pakistan with ECO countries

Table 5 presents the estimation results of all the model specifications of gravity trade model for institutional determinants of bilateral trade flows of Pakistan with ECO countries. Equations (1), (2), (3), (4), (5), (6) and (7) are estimated in models 1, 2, 3, 4, 5, 6 and 7 respectively for institutional determinants of bilateral trade flows of Pakistan with ECO countries. Table 5 shows the estimation results of all seven models. Product of GDP coefficient is positive and significant in all seven models. Model 7 shows the average effect of all six governance indicators showing that bilateral trade flows will increase by 1.03% on average with 1% increase in GDP of both countries. Product of GDP shows economic size of a country in terms of market size and production capacity. Higher GDP means higher production capacity, large domestic markets, and large varieties of goods available for trade; so, if GDP of a country increases, its trade volume also increases. Economic growth is also measured by the level of GDP; higher the GDP of a country, higher will be the economic growth of that country and higher will be the trade volume. Economic size does matter for trade therefore, large economies tend to import more because of their higher incomes and also tend to export more because of their large variety of output or production; so, larger the economy, larger will be the trade (Krugman, 2012). Study of De Groot et al. (2004) on institutional determinants of trade also established the positive association between GDP and trade.

Product of per capita GDP coefficient is positive in all seven models. Model 7 shows the average effect of all six governance indicators showing that bilateral trade flows will increase by 0.70% on average with 1% increase in per capita GDP of both countries. Per capita GDP shows the level of development, infrastructure, and purchasing power of a country. These are very essential for bilateral trade as more developed the countries, more will be the trade flows. With the development of a country, transportation facilities become better which enhance the level of trade. People demand more exotic foreign varieties which may lead to the innovation or invention of new products. "Exporting country's per capita GDP should have a positive coefficient when the composition of trade flows

involves capital-intensive products and negative when composition of trade flows involves labor-intensive products. On the other hand, importing country's per capita GDP should have a positive coefficient when composition of trade flows consist of luxury goods and negative when composition of trade flows consist of necessity goods" (Bergstrand 1989). Study of De Groot et al. (2004) on institutional determinants of trade showed positive sign of per capita GDP for importer country while negative sign for exporter country.

Table 5: Panel Data Estimates of Institutional Determinants of Trade

	Model 1	Model 2	Model 3	Model 4	Model5	Model 6	Model 7
Variables	**Voice and Accountability**	**Political Stability**	**Government Effectiveness**	**Regulatory Quality**	**Rule of Law**	**Control of Corruption**	**Composite Indicator**
C	-32.747 (0.0000)	-34.403 (0.0000)	-32.005 (0.0015)	-32.625 (0.000)	-19.674 (0.0175)	-19.849 (0.044)	-28.290 (0.0004)
GDPi . GDPj	1.1230 (0.000)*	1.0614 (0.000)*	1.1075 (0.0003)**	1.1357 (0.000)*	0.84047 (0.0003)**	0.8090 (0.0041)**	1.0302 (0.000)*
PCGDPi. PCGDPj	0.6154 (0.1381)	1.1778 (0.0140)**	0.4572 (0.3721)	0.5678 (0.1789)	1.1467 (0.0062)***	1.0199 (0.0371)**	0.7047 (0.0991)***
DSTij	-1.9692 (0.0041)**	-2.2608 (0.0007)*	-1.6125 (0.0429)**	-1.8891 (0.0073)**	-2.9846 (0.000)*	-2.4025 (0.0012)**	-2.1824 (0.0027)**
ADJij	3.6480 (0.0000)*	3.0149 (0.000)*	3.8345 (0.0000)*	3.9194 (0.0000)*	4.3522 (0.000)*	3.9775 (0.000)*	4.0821 (0.0000)*
AREAi	-2.467 (0.0000)*	-2.436 (0.000)*	-2.655 (0.0000)*	-2.614 (0.0000)*	-2.685 (0.000)*	-2.537 (0.000)*	-2.654 (0.000)*
Governance Indicator i	1.362 (0.0388)**	-2.111 (0.0527)***	0.681 (0.5371)	1.1026 (0.0955)***	3.624 (0.0028)**	2.588 (0.0307)**	2.452 (0.0551)***
Governance Indicator j	0.519 (0.4488)	1.679 (0.0060)**	0.243 (0.6061)	-0.435 (0.2144)	0.496 (0.0949)***	-0.2002 (0.3768)	0.3212 (0.5616)
R^2	0.911396	0.91693	0.90785	0.91125	0.91536	0.91045	0.910296
D.W. Stat	1.944636	2.09181	2.050812	2.004844	1.90328	1.94287	1.921552
F-Statistic	101.7184	109.165	97.43506	101.5354	106.951	100.543	100.3503
Probability (F-Statistic)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Source: Authors' calculations, P values in parenthesis *, **, *** represents the 1%, 5% and 10% level of significance respectively.

Distance coefficient is negative and significant in all seven models. Model 7 shows the average effect of all six governance indicators showing that bilateral trade flows will decrease by 2.18% on average with 1% increase in distance of both countries. Higher the distance among trading countries, lower will be the trade volume as transportation cost increases. "There is very little that economists fully understand about global trade but there is one thing that we do know – commerce declines dramatically with the distance" (Leamer 2007). "The further the distance between two trading countries, the lesser the bilateral trade between them" (Tinbergen, 1962; Poyhonen, 1963; Bergstrand, 1985). All empirical studies conducted on gravity trade model confirmed the negative relationship between trade volume and distance. Adjacency or common border dummy variable is positive as expected and significant in all seven models. Countries sharing the same border tend to trade more. The countries with adjacency have more tendencies to trade than the non-adjacent countries (Leamer 1993; Helliwell 1997). Study of De Groot et al. (2004) on institutional determinants of trade also showed positive relation of border with trade volume.

Area dummy is used to capture the country size. Area coefficient is negative and significant in all seven models. Larger the country size, lower will be the trade volume. Frankel and Romer (1999) used the land area and showed significant impact on trade with negative sign. Study of De Groot et al. (2004) on institutional determinants of trade showed positive relation with trade area. In present study, negative sign of area may be due to the fact that all ECO countries are large in terms of size but are not fully developed and equipped with proper infrastructure of transportation and communication which may cause reduced trade. Governance indicators are the estimates with values ranging from approximately -2.5 to +2.5 indicating weak and strong Governance performance respectively and their log cannot be taken so their interpretation is done by using the exponent values according to the standard deviation from the mean value which provides good indication of governance quality.

Voice and accountability coefficient is positive and significant for ECO member countries while positive and insignificant for Pakistan. Trade will enhance by strong voice and accountability system in trading countries. Countries having fair election system, freedom of expression, and free media, will cause good governance, appropriate policy actions; more awareness will boost the trade among trading countries. From mean, 1% increase

in standard deviation of voice and accountability; bilateral trade flows will increase by 114.4%2 on average in case of ECO member countries and 8.1% on average in case of Pakistan. Study of Alvarez et al. (2015) showed the negative sign for voice and accountability indicator. Study of De Groot et al. (2004) on institutional determinants of trade confirmed the positive sign of voice and accountability indicator.

Political stability coefficient is negative and significant for ECO member countries while positive and significant for Pakistan. Countries having stable governments, absence of violence and absence of terrorism provide safe and secure environment for foreign investors which encourage the trade. From mean, 1% increase in standard deviation of political stability; bilateral trade flows will decrease by 81.1% on average in case of ECO member countries and will increase by 109.3% on average in case of Pakistan. Negative sign of political stability indicator for ECO member countries may be due to the lack of institutional framework and proper implementation of policies in those countries. Study of Alvarez et al. (2015) also confirmed the negative sign for political stability indicator. Study of De Groot et al. (2004) on institutional determinants of trade showed positive sign of political stability indicator.

Government effectiveness coefficients are positive and insignificant for ECO member countries and for Pakistan. Countries having strong government policies, high quality of public and civil services independent of political pressure, proper policy framework and its implementation with true spirit encourage the level of trade. From mean, 1% increase in standard deviation of government effectiveness; bilateral trade flows will increase by 41.6% on average in case of ECO member countries and will increase by 4.5% on average in case of Pakistan. Studies of Alvarez et al. (2015) and De Groot et al. (2004) also confirmed the positive sign of government effectiveness indicator.

Regulatory quality coefficient is positive and significant for ECO member countries while negative and insignificant for Pakistan. Countries having stable framework of policy formulations to promote the development of private sector encourage the level of trade. From mean, 1% increase in standard deviation of regulatory quality; bilateral trade flows will increase by 123.6% on average in case of ECO member countries and will decrease by 4.7% on average in case of Pakistan. Negative sign of regulatory quality indicator for Pakistan may be due to the lack of polices and implementation of those policies for private sector development. Studies of Alvarez et al. (2015) and De Groot et al. (2004) showed the positive sign of regulatory quality indicator.Rule of law coefficient is positive and significant for ECO member countries while positive and significant for Pakistan. Countries having proper enforcement of laws against crime and violence, laws of property rights, efficient police and courts provide safe and secure law and order situation for domestic and foreign investors which encourage the level of trade. From mean, 1% increase in standard deviation of rule of law; bilateral trade flows will increase by 558.2% on average in case of ECO member countries and will increase by 3.5% on average in case of Pakistan. Studies of Alvarez et al. (2015) and De Groot et al. (2004) also confirmed the positive sign of rule of law indicator.

Control of corruption coefficient is positive and significant for ECO member countries while negative and insignificant for Pakistan. Countries having strong anti-corruption departments to exercise their power for public gain and to eliminate corruption secure the investors from any fraud or bribery and encourage the level of trade. From mean, 1% increase in standard deviation of control of corruption; bilateral trade flows will increase by 212.3% on average in case of ECO member countries and will decrease by 2.8% on average in case of Pakistan. Negative sign of control of corruption indicator for Pakistan may be due to the lack of polices and management to operate anti-corruption departments and improper implementation of laws against corruption which may shatter the confidence of investors and cause reduced trade. Studies of Alvarez et al. (2015) and De Groot et al. (2004) showed the positive sign of control of corruption indicator.

Composite governance indicator coefficient is positive and significant for ECO member countries while positive and insignificant for Pakistan. Average effect of all the governance indicators is positive with the level of trade. From mean, 1% increase in standard deviation of composite index; bilateral trade flows will increase by 63.3% on average in case of ECO member countries and will increase by 5.3% on average in case of Pakistan. Study of De Groot et al. (2004) on institutional determinants of trade also showed positive sign of composite governance indicator. Overall results are good fit as coefficient of determination R2 shows that 91% of the variation in bilateral trade flows is due to the explanatory variables. GDP, distance, border, area, political stability and rule of law are found to be the major significant determinants of bilateral trade flows. There is no problem of auto correlation as the value of Durbin-Watson is around 2 in all the models.Probability value of F-statistic is zero in all the seven

2$(2.718^{0.56\times1.362083}-1) = (2.718^{0.7627}-1) = 1.144\times100 = 114.4\%$ All other indicators are also calculated by the same pattern.

models which shows that overall models are significant.

5.2 Institutional Homogeneity Effect on the Level of Trade

Table 6 presents the results of all the model specifications of gravity trade model for institutional homogeneity effect on the level of bilateral trade flows of Pakistan with ECO countries. Equations (8) and (9) are estimated in models 1 and 2 respectively for institutional homogeneity effect on the level of bilateral trade flows of Pakistan with ECO countries. Table 6 shows the estimation results of these two models.

Product of GDP coefficient is positive and significant in both models. Model 1 shows that bilateral trade flows will increase by 1.18% on average with 1% increase in GDP of both countries. Model 2 shows that bilateral trade flows will increase by 1.02% on average with 1% increase in GDP of both countries. Product of GDP shows economic size of a country in terms of market size and production capacity. Higher GDP means higher production capacity, large domestic markets, and large varieties of goods available for trade. Economic growth is also measured by the level of GDP; higher the GDP of a country, higher will be the economic growth of that country and higher will be the trade volume. Economic size does matter for trade therefore, large economies tend to import more because of their higher incomes and also tend to export more because of their large variety of output or production; so, larger the economy, larger will be the trade (Krugman, 2012). Study of De Groot et al. (2004) on institutional determinants of trade also confirmed the positive relationship between GDP and trade volume. Product of per capita GDP coefficient is positive in both models. Model 1 shows that bilateral trade flows will increase by 0.23% on average with 1% increase in per capita GDP of both countries. Model 2 shows that bilateral trade flows will increase by 0.69% on average with 1% increase in per capita GDP of both countries.

Table 6: Estimation Results of Gravity Modelfor Institutional Homogeneity Effect

Variables	**Model 1**	**Model 2**
	Similarity Index	**Composite Governance Index and Similarity Index**
Constant	-34.83682 (0.0000)	-28.07496 (0.0005)
GDPi.GDPj	1.188703 (0.0000)*	1.024507 (0.0000)*
PCGDPi.PCGDPj	0.231916 (0.5879)	0.699460 (0.1021)***
DSTij	-1.279007 (0.0702)***	-2.164331 (0.0032)**
SIMINDEX	0.059840 (0.7128)	0.057366 (0.7407)
COMPi	-	2.438173 (0.0559)**
COMPj	-	0.271612 (0.6406)
ADJij	3.687360 (0.0000)*	4.080503 (0.0000)*
AREAi	-2.559490 (0.0000)*	-2.633569 (0.0000)*
R2	0.907368	0.910402
Durbin-Watson Stat	2.056706	1.903181
F-Statistic	110.1982	89.41696
Probability (F-Statistic)	0.0000	0.0000

Source: Authors' Calculations, P values in parenthesis. *, **, *** represents the 1%, 5% and 10% level of significance respectively.

Per capita GDP shows the level of development, infrastructure, and purchasing power of a country. These are very essential for bilateral trade as more developed the countries, more will be the trade flows. With the development of a country, transportation facilities become better which enhance the level of trade. People demand more exotic foreign varieties which may lead to the innovation or invention of new products. "Exporting country's per capita GDP should have a positive coefficient when the composition of trade flows involves capital-intensive products and negative when composition of trade flows involves labor-intensive products. On the other hand, importing

country's per capita GDP should have a positive coefficient when composition of trade flows consist of luxury goods and negative when composition of trade flows consist of necessity goods" (Bergstrand 1989). Study of De Groot et al. (2004) on institutional determinants of trade showed positive sign of per capita GDP for importer country while negative sign for exporter country.

Distance coefficient is negative and significant in both models. Model 1 shows that bilateral trade flows will decrease by 1.27% on average with 1% increase in distance of both countries. Model 2 shows that bilateral trade flows will decrease by 2.16% on average with 1% increase in distance of both countries. Higher the distance among trading countries, lower will be the trade volume as transportation cost increases. "There is very little that economists fully understand about global trade but there is one thing that we do know – commerce declines dramatically with the distance" (Leamer 2007). "The further the distance between two trading countries, the lesser the bilateral trade between them" (Tinbergen, 1962; Poyhonen, 1963; Bergstrand, 1985). All empirical studies conducted on gravity trade model confirmed the negative relationship between trade volume and distance.

Adjacency or common border dummy variable is positive as expected and significant in both models. Countries sharing the same border tend to trade more. Adjacent countries trade more than non-adjacent countries (Leamer 1993; Helliwell 1997). Study of De Groot et al. (2004) on institutional determinants of trade also showed positive relation of border with trade volume.

Area dummy is used to capture the country size. Area coefficient is negative and significant in both models. Larger the country size, lower will be the trade volume. Frankel and Romer (1999) used the land area and showed significant impact on trade with negative sign. Study of De Groot et al. (2004) on institutional determinants of trade showed positive relation with trade area. In present study, negative sign of area may be due to the fact that all ECO countries are large in terms of size but are not fully developed and equipped with proper infrastructure of transportation and communication which may cause reduced trade.

Composite governance indicator coefficients are positive and significant for ECO member countries while positive and insignificant for Pakistan. Average effect of all the governance indicators is positive with the level of trade. From mean, 1% increase in standard deviation of composite governance index; bilateral trade flows will increase by 62.83% on average in case of ECO member countries and will increase by 4.44% on average in case of Pakistan. Better institutional quality enhances the overall trade by reducing transactions costs. De Groot et al. (2004) also showed positive sign of composite governance indicator.

Governance similarity index coefficients are positive in both models. Average effect of all the governance indicators is positive with the level of trade. Model 1 shows that from mean, 1% increase in standard deviation of governance similarity index; bilateral trade flows will increase by 3.036% on average. Model 2 shows that from mean, 1% increase in standard deviation of governance similarity index; bilateral trade flows will increase by 2.909% on average. Countries with similar levels of institutional quality tend to trade more. Institutional homogeneity raises the similar environment and familiar rules and regulations thus lead to enhance the business, investment and trade between the trading countries. Study of De Groot et al. (2004) on institutional determinants of trade also confirmed the positive sign of governance similarity index.

Overall results are good fit as coefficient of determination R2 shows the value of 0.91 GDP, distance, border, area, and composite governance indicator are found to be the major significant determinants of bilateral trade flows. There is no problem of auto correlation as the value of Durbin-Watson is around 2 in both models. Probability value of F-statistic is zero in both models which shows that overall models are significant.

6. Conclusion and Policy Implications

The main objective of the study is to estimate the different specifications of gravity trade model to find the institutional determinants of bilateral trade flows of Pakistan and to assess the impact of institutional homogeneity on the level of bilateral trade flows of Pakistan with ECO countries. Panel data of 10 ECO countries are used from year 2003 to 2014. The study finds out that institutions are cogent to enhance trade. The results of institutional determinants of trade show that average effect of all the governance indicators as captured by composite index is positive on bilateral trade flows. Stronger the institutional framework of ECO countries; more will be the bilateral trade. Low quality of institutions increases the transaction costs to exchange the goods and services resulting in low trade. This explains why developed countries having strong and efficient institutional mechanism tend to trade more and developing countries have low quality and inefficient institutional framework tend to trade less. The

results of institutional homogeneity effect show that bilateral trade flows are positively correlated with the governance similarity. Trade will increase if trading countries have similar quality of institutions. Thus, institutional quality and institutional homogeneity has dominant impact on the bilateral trade flows. Uncertain and insecure situation about contract enforcement and governance is reduced with a better quality of the institutional framework. Institutional homogeneity raises the similar environment and familiar rules and regulations thus lead to enhance the business, investment and trade between the trading countries. Pakistan is an important strategic partner of the ECO region so Pakistan should use its influence to improve the regional economic integration by full implementation of ECO Trade Agreement (ECOTA) for an eventual free trade agreement in the region. At the institutional level, Pakistan should work with the ECO Secretariat to help establish a joint commission on economic and technological cooperation in the ECO region to facilitate trade in goods and services, mutual investment, technical collaboration, and cross-border trade in energy. Institutional framework should be made strong and efficient in all ECO member countries to enhance the level of trade.

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