Journal of Applied Economics and Business Studies (JAEBS)

Impact of Institutional Quality on Bilateral Exports: Exploring the role of Development

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ABSTRACT

This study uses the gravity model to analyze the homogeneous and heterogeneous effect of institutional quality and development on bilateral exports. We use the panel data of 61countries for the period 2000 to 2016 and employ the Poisson Pseudo Maximum Liklihood (PPML) econometric technique with a High-Dimensional fixed effect (HDFE) for an estimation that allows the analysis in the presence of high dimensional fixed effects. The findings reveal that the direct effect of institutional quality and level of development on bilateral exports is positive and significant. Further, the institutional quality and the level of development of the exporter country have more impact on bilateral exports than that of the importer country. Our estimation results of homogeneity of institutions show that when both trading countries share the same level of institutional quality, it boosts the bilateral exports. The major finding of this study reveals that the interaction effect of institutional quality and level of development on bilateral exports is positive and significant. High value of interaction term of exporter economy and low value of importer country suggest that interaction effect of institutional quality and level of development on bilateral exports of exporter country have a greater impact than the interaction effect of institutional quality and level of development of importer country due to having the more production and exports facilities in exporter country. Based on the findings, some essential policies are also recommended, followed by some future research gaps.

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1.   Introduction

The economists have a mutual consensus that both trade and institutions are the crucial determinants of growth and income levels. Further, based on the scholars' viewpoint on institutions, trade, and growth, the available literature can be classified into two bunches. First, the recent and past literature exhibits the positive and significant impact of growth on trade (Donaldson, 2015; Bernhofen and Brown, 2005; Frankel and Romer, 1999). Second, the other part of the literature on this topic shows that high-quality institutions are the key determinant of economic growth and development. Despite the direct impacts of institutions on growth, domestic institutions are also intermediaries in explaining the linkage between trade and growth (Shah et al., 2020; Pascali and Luigi, 2017; Florensa et al., 2015; Nunn and Trefler, 2014).

The dramatic rise in the size of trade flows in several emerging market economies raises the question that what factor is essential in determining the international trade flows. However, there is an abundant evidence in the literature that indicates that institutional quality is responsible for this dramatic increase (Angkinand and Chiu, 2011). If the quality of institutions is strong, it reduces the uncertainty in the international transaction thus, it reduces the transaction cost of trade (Hou et al., 2021). If the quality of institution is poor it leads political instability, attract more corruption and the flawed rule of law which increase the uncertainty about expected gain from international transaction thus discourage international trade (Bandyopadhayay and Roy, 2016

Institutional homogeneities are a more important factor than the simple quality of institutions for bilateral trade; thus, the homogeneous quality of institutions positively affects the bilateral trade (Islam and Reshef 2006; de Groot et al. 2004). There is a fascinating reason why we study institutional homogeneity rather than institutional quality; evidently, we want to know that under what conditions institutional homogeneity matters rather than the institutional quality. We extensively knew that there are many countries in the world where institutional quality is simultaneously high, then how can we check the effects of institutional distinctions of these nations on trade flows. However, if the institutional quality of both exporter and importer countries is high yet differs between nations, it is hard to expand the institutional quality more; hence, we use institutional homogeneity.

We consider institutional homogeneity and institutional similarity the "Same Legal Origin" from La Porta et al. (1997 and 1998). If both exporter and importer countries share the same legal origin, then it is considerd that both countries have the same contractual environment (Acemoglu Johnson and Robinson, 2001; Acemoglu and Johnson, 2005). The basic idea about legal origins is that countries have distinct[1] legal

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[1] See Glaeser and Shleifer (2002) for more details and explaination about this distinction of legal origins and their families

origins, and this legal origin widely matters for financial and economic outcomes (La Porta et al., 1997; La Porta et al.,1998).

Beverelli et al. (2018) and Bandyopadhayay and Roy (2016) argue that heterogeneous institutional quality positively affect bilateral exports. However, Dutt and Traca (2010) explore that the heterogeneous institutional quality negatively affects the bilateral exports. In general, the effect of institutional quality on bilateral exports varies across different countries. Hence, the prime focus of the current study is to check the role of development in homogeneous and heterogeneous impact of institutional quality on bilateral exports. However, this study explains the interaction effect of institutions and development, indicating that domestic institutions are the main source of comparative advantage. Within gravity structure and for a complete review on the importace of gravity model in bilateral exports this study is methodologically related to Beverelli et al., (2018).

In present period exchange of goods and services within counties and across different countries is necessary, without it survival of a country is not possible. Institutional quality is also important factor to determine the international trade. In the literature some studies show that quality of institutions affects the bilateral trade positively and significantly, other studies show that there is no linear relationship between institutions and bilateral exports because regional trade agreements and development also affect the bilateral exports (Naanwaab and Diarrassouba, 2013; Bandyopadhayay et al., 2016). However, existing literature does not account for the role of development in the homogeneous effect of institutional quality on bilateral exports. Therefore our focus is to check the role of development in homogeneous and heterogeneous impact of institutional quality on bilateral exports.

The remainder of the study is organized as follows. In section 2, the literature review is discussed, while section 3 presents the methodology and data. Section 4 provides the results and discussion, and section 5 explains the conclusion and policy recommendations.

2.   Literature Review

In recent years, the role of institutions has received much attention from not only on the economic perspective to explain the variations in per capita income across different countries but also their impact on international trade flows (Kuncic, 2013; Francois and Manchin, 2007). However Institutional quality and trade have positive and significant relationship (Do and Levchenko, 2009). Literature on institutions, development and bilateral trade suggests that institutional quality and development positively affect the bilateral trade (Bandyopadhayay and Roy, 2016; Mattew et al., 2017). Moreover large numbers of studies found that there are positive characteristics of innovation; introduction of new varieties, knowledge and cost-decreasing firms, but other side also explains that huge studies recommend that national institutions are key determinant in international trade (Beverelli et al., 2018). Institutional differences are

also source of comparative advantage: employ other things the poor countries may not gain from international trade and factor prices may actually deviate as a result of trade. Thus Institutional changes are more essential determinant of trade flows (Levchenko, 2007).

The nexus of homogeneous institutions and bilateral trade flows also has been discussed widely in literature during recent times. Anderson and Marcouillier (2002) are amongst the first contributors to show that bilateral trade flows are positively affected by trading countries which have same quality of institutions. Some studies show the negative impact of institutional quality on trade (Mendonca et al., 2014), (Gil-Pareja and Llorca-Vivero, 2017). There are also some other studies which show that there is positive effect of institutional quality on trade (Araujo et al. 2016, Beverelli et al., 2018) but Dutt and Traca (2010) show the inconclusive impact of institutions on trade. In the context of relationship between institutions and trade it has shown that there is no linear relationship between institutions and bilateral exports because regional trade agreements and development also affect the bilateral exports (Naanwaab and Diarrassouba, 2013; Bandyopadhayay et al., 2016). So the literature on this topic can be divided into three parts on the basis of connection among these variables.

2.1   Institutions and Trade

Abundant seminal and recent literature suggests that there are significant relationship between institutions and trade (Nguyen et al., 2018; Arif and Chishti, 2020; Chishti, 2020; Chishti, 2021; Chishti et al., 2021; Ullah, Chishti, and Majeed, 2020). There are many cross-country variations in which economic and political lifecycle is planned. A huge literature shows the large cross-country deviations in economic institutions and there is robust relationship between these institutions and trade, as Mendonca et al. (2014) explore that the higher is the variations in the institutional quality among countries the larger its obstructive impacts on trade. Bilateral trade plays very important role in international trade therefore the question is which domestic quality of institution affects the bilateral sectorial trade however, Alvarez et al. (2018) answerd that both the institutional situations at destination and the institutional distance between exporting and importing countries are appropriate elements for bilateral trade flows. A Pioneer study on institutions and trade by North (1993) find that the better quality of institutions reduces the uncertainty in exchange due to incomplete information and imperfect insight. However better quality of institutions play important role by reducing the transaction costs.

2.2   Institutions, development and Trade

The quality of institutions and development widely matter in trade. Institutions with high quality determine the large trade flows and institutions with low quality determine the less trade flows. Domestic institutions are main source of high trade flows and high development. However Institution affects the trade and development such as Beverelli et al. (2018) find that stronger institutions stimulate the trade and

development. Similarly Mattew et al. (2017) examine that stronger institutions enhance the trade. However Dollar and Kraay (2003) investigate that countries with well-developed institutes trade more.

Bojnec et al. (2009) investigate that the effect of level of development on the patterns of bilateral trade is depend on the institutional determinants. Institutional quality also measured by corruption so Bandyopadhayay and Roy (2016) use the interection between corruption and development previously this interection is used by Marjit et al. (2014) and discover that the exports of specific product by the rich countries are negatively and significantly influenced by higher corruption of these nations. Markusen (2013) use the GDP per-capita as a development variable and examines the role of GDP per-capita in determining trade flows and theoratically and empirically conclude that international trade positively and significantly depends on per-capita income of the exporter country but aggregate income remain constant.

2.3   Homogeneous and Hetrogeneous Instituions and Trade

In literature seminal studies use the same legal origin as homogeniety of institutions (De Groot et al., 2004; 2005). The basic idea about legal origins proposd by (La Porta et al., 1997; La Porta et al.,1998) is that countries have distinict legal origins and this legal origins widely matter for finacial and economic outcomes. However La Porta et al. (1998); La Porta et al. (1999) examine the legal rule, origins of this rule and quality of their enforcement covering the protection of corporate creditors and shareholders and finds that civil law nations are weakest and common law nations have strongest legal defense of investor.

De Groot et al., (2004) examine the impact of quality of institutions on the bilateral trade flows using gravity the model, also extend their analysis to the institutional homogeneity between exporter and importer country and find that institutional quality positively affect the bilateral exports and having homogenous institutional quality between pair of countries boosts the bilateral trade faster. Samilary, Islam and Reshef (2006) explore the institutional quality and institutional similarity and find that quality of institutions and similarity of institutions design promote bilateral trade by decreasing the transaction cost. Likewise Miura and Takechi (2014) examine that if the quality of both trading partners is low then they have to improve their institutional quality for international transaction.

On the other side, if the institutional quality of two trading countries is equally high, then institutional homogeneity matter for international trade. In the framework of institutional heterogeneity, Bandyopadhayay and Roy (2016) used the intrection term between corruption and development to investigate the role of development to explain the hetrogeneous quality of institutions on bilateral exports and find that the exports of specific good by the high income countries are negatively influenced by greater domestic corruption and the corruption of importer country also decreases its exports of these goods but imports are less affected by corruption than exports. Marjit et al.(2014)

also use the interection between the corruption and level of development to explore the affect of isntitutions on trade openess and find that the impact of corruption in trade depends on relative factor abundants.

3.   Methodology

3.1   Theoretical background and Empirical Model

The traditional form of Gravity Model forecasts bilateral trade flows with respect to the distance and economic sizes between two nations. Tinbergen (1962) was the 1st to recommend a gravity equation for international trade flows. This model suggests that trade between two nations is directly related to the GDP and inversely proportional to the distance between these countries. Deardorff (1998) derive the traditional Heckscher–Ohlin model within gravity framework, and show that gravity equation could be constant with numerous trade models. More recent study on gravity model developed by Anderson and van Wincoop (2003) which explains the gravity model on Anderson (1979) to add a applied way for the estimation of gravity equations. The basic point of Anderson and van Wincoop (2003) is MRTs. If we do not account MRTs in a gravity model it can leads biased results. Hence the traditional Structural gravity model can be derived as follow.

$$X_{ij} = T_{ij} \frac{Yi \, Ej}{\Pi i \, Pj} \tag{1}$$

Where X_{ij} is bilateral trade from i country (exporting) to j (importing) country, T_{ij} shows any determinant of bilateral trade costs between country i and j (like distance, RTA, country-specific trade related drivers like institutions and etc.). Y_i is total value of production of country i (total sale at home and abroad). E_j is Expenditure in country j. Π_i & P_j are structural MRTs coefficients of the determinants of trade flows. We can also denote multilateral resistance terms as follow:

$$\pi_i = \sum \frac{Tij \, Ej}{Pj}$$

$$P_j = \sum \frac{Tij \, Ej}{\pi i} \tag{2}$$

The above multilateral resistances have numerous interesting properties: MRTs are used to capture the evidence that bilateral trade between two nations are not relies only on the size and distance between them but also show that how these nations are remote from rest of the world. Hence Anderson and van Wincoop (2003) discover that if other things remain same, more multilaterally isolated countries will trade more and more with each other's. Multilateral Resistance Terms (MRTs) is an index which decay the frequency of trade costs on traceable goods if they sell to and on the consumers if they purchase from world market of goods (Anderson and Yotov, 2010; Yotov et al., 2016).

However on the basis of gravity model there are three objectives in this section. First we check the impact of homogenous institutional quality on bilateral exports.

Second we study the effect of heterogeneous institutional quality on bilateral exports. Third we demonstrate the effect of institutional quality on bilateral exports exploring the role of development. We develop our analysis sequentially. We start our analysis from standard gravity model then we show the impact of institutional quality and development on bilateral trade within gravity model.

To achieve our first objective about role of development in homogeneous effects of institutional quality on bilateral exports, we introduce a dummy variable Law_{ij} from (Miura and Takechi, 2014) which takes the value 1 if two countries share the same legal origin and zero for others which captures the homogeniety and non-homogeniety of institutions respectively.

$$lnx_{ijt} = GRAV_{ij}\beta + \beta_1 IQ_{it} + \beta_2 IQ_{jt} + \beta_3 lny_{it} + \beta_4 lny_{jt} + \beta_5 Law_{ij} + \beta_6 ER_{it} + \beta_7 IQ_{it} * lny_{it} + \beta_8 IQ_{jt} * lny_{it} + \eta_{ij} + \mu_t + \varepsilon_{ijt} \tag{3}$$

In order to achieve our second objective of the impact of heterogeneous impact of institutions on bilateral exports by recognizing role of development, we use the following gravity type specification,

$$lnx_{ijt} = GRAV_{ij}\beta + \beta_1 IQ_{it} + \beta_2 IQ_{jt} + \beta_3 lny_{it} + \beta_4 lny_{jt} + \beta_5 ER_{it} + \beta_6 IQ_{it} * lny_{it} + \beta_7 IQ_{jt} * lny_{it} + \eta_{ij} + \mu_t + \varepsilon_{ijt} \tag{4}$$

Equation (3) obtained from equation (1) after log-linearazing and replacing the bilateral trade cost varibale T_{ij} with $GRAV_{ij}$ which include all determinant of trade cost. And also included two main variables of our interest institutional qulity and GDP per-capita. Additionaly we also included Law varibale for homogenity of institutions and excahnge rate varibale. However in equation (3) X_{ijt} is bilateral trade flow from country i (exporting) to country j (importing) in time t. GRAV is including all graveity variables: $LNDIST_{ij}$ is logrithem distance in kilomaters between country i and country j, this distance is measured from capital of exporter country to capital of importer country. $CNTG_{ij}$ is that two countries are sharing the common border or not. If courty i and j speak same officail language($LANG_{ij}$). If two countries share any colonial relationships($CLNY_{ij}$). Wheter the i and j countries have any RTA. IQ_{it} is institutional quality of exporting in time t. IQ_{jt} is institutional quality of importing country in tim t. lny_{it} and lny_{jt} is GDP Per Capita in US dollar of exporter and importer country respectively, GDP per capita is proxy for economic development. ER_{it} is real exchange rate of exporter country in time t which is measurd from local currency to US dollar. η_{ij} is fixed effect which is used to capture the country-pair effects which control the MRTs in the gravity model and μ_t is year fixed effect capturing time-varying effects.

The main terms in equation (4) are the interaction term effects between institutional quality and development. However, this approach allow to explore the indirect impact of institutional quality on bilateral exports relies on the level of development (Bandyopadhay et al., 2016).

$$\frac{\partial \ln X_{ijt}}{\partial IQ_{it}} = \beta_1 + \beta_3 \ln y_{it} \tag{5}$$

$$\frac{\partial \ln X_{ijt}}{\partial IQ_{jt}} = \beta_2 + \beta_4 \ln y_{it} \tag{6}$$

The effect of institutional quality on bilateral exports of exporter country is determined by β_1 likewise, the effect of importer country's institutional quality on bilateral exports can be determined as shown in above equation (6). On the other hand for importer countries the term β_2 dominate and β_2 determined the impact of institutional quality on bilateral exports.

3.2   Description of Variables

Our estimates are from panel data set of 61 poor and rich countries[2] , time period range from 2000 to 2016. Our selection of countries and time period is depend upon the availability of consistent data of bilateral exports and institutional quality. Due to data availability limitations imposed by the United Nations' Commodity Trade Statistics Database (UNCOMTRADE) and Economic freedom of the World (EFW) database for many developing countries in our sample, we choose to deploy the data for the time period 2000 to 2016. Hence, we cannot extend our time period other than 2016 due to data availability restriction. Further, we select countries on the bases of following criteria: 1. country as a context of study, 2. the countries involved in this sample denotes a significant portion of the whole world. 3. Maximum Intra-trading Partners to avoid zero trade. 4. Countries from different regions. For example, Intra-trade among European Union is round about 70 percent, 52 percent for Asian countries, 50 percent for North American regions, 26 percent for South American regions and 18% for African countries (WTO, 2015). But we are restricted by data availability of some countries to select accurate percentage of intra-trade flows.

Our dependent variable is X_{ijt} bilateral exports from i exporting country to j importing country which includes the bilateral exports of all commodities from SITC Revision 2 (Standard International Trade Classification). The source of bilateral exports data is United Nations' Commodity Trade Statistics (UNCOMTRADE) Database. Our first explanatory variable is gravity variables inclusing: logrithem of bilateral distance ($LNDIST_{ij}$) which is proxy for bilateral trade cost between two countries (Beverelli et al., 2018), If both countries share the same border ($CONT_{ij}$), if the both countries share the same official language ($LANG_{ij}$), if two countries share any colonial relationships ($CLNY_{ij}$). The data source for all gravity variables is CEPII' Geo Dist Database. We also include RTA (Regional Trade Agreement) in gravity variable. Our RTA data is from Mario Larch's RTA Database on the basis of Egger and Larch (2008), finally this data set is based on WTO RTA. Our key interested variable is quality of institution of

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[2] There are total 61 countries, 20 poor countries and 41 rich countries. Poor countries mean those countries that are presented as low income or lower middle income countries. Rich countries mean those countries that are presented as upper middle income or high income countries (This classification is made by the World Bank).

exporting country i and importing country j. quality of institution varibale is Economic freedom of the world index which is based on "Fraser Institute for institutions". The source of this variable is Economic freedom of the World (EFW) database. EFW index is based on five sub-indices which capture the degree of economic freedom. These five indices are as follow: (i) size of government (ii) legal structure and protection of property rights (iii) access to sound money (iv) freedom to trade internationally (v) regulation of business, credit and labor. The range of each index is between 0-10, lower value indicates bad and greater value indicates good quality. Our second main variable of interest is development. The proxy for development is Real GDP Per-Capita (Bojenec et al., 2009). This variable is taken in US dollars, constant 2010. Real Exchange rate is also a control variable in this regression. The source of Real exchange rate is United Nations Conferences on Trade and Development (UNCTAD) database .The real exchange rate is defined here as one local currency unit is equal to one US dollar. However We are unable to use bilateral exchage rate data due to large data set and availability of data. So we use local currency to dollar $ exchange rate data. Then we move on interection term between institutional quality and development to check the role of development in effect of instituional quality of bilateral exports, as Bandyopadhayay and Roy, (2016) use interection term between corrpution index and development in their study. This interection term is construct for exporter country by using institutional quality of exporter and development of exporter, and for importer by using institutional quality of importer and development of importer.

We use Homogeneous and hetrogeneous institutional quality in this study. To construct this variaable we follow Miura and Takechi, (2014) they use dummy variable which takes the value 1 for homogeneous institutional quality if two nations are sharing the same legal origin and zero for hetrogeneous institutional quality if both countries are not share the same legel origin. The information of Legal Law Origin provided to us by Andrei Shleifer's website[3]

3.3   Method of Estimation

By following the, Beverelli et al. (2018) we use the PPML estimation method because this method became famous for structural gravity model due to following striking approaches: (1) PPML method deals the problems of heteroskedasticity which often presents in bilateral trade dataset (Santos Silva and Tenreyro, 2006). (2) It deals with zero trade data which is also present in bilateral trade dataset because every country does not trade with all countries. (3) It can be use easily in STATA to estimate the gravity model (Anderson et al., 2016).

We knew in basic gravity model that if we do not control MRTs (which is fixed effects in PPML) then it leads biased estimation as Beverelli et al. (2018) observed that if we do not control MRTs properly in PPML it leads biased estimaton. In STATA

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[3] https://scholar.harvard.edu/shleifer/publications/quality-government

simple PPML command is used to estimate the Poisson Pseudo Maximum Likelihood but according to Zylkin (2018) in simple PPML command we treat fixed effects as exogenous variable which leads biased results. Because in simple PPML command we create dummies for years, exporters and importers then we grouped these dummies to make a single variable of year-fixed-effects, exporter-fixed-effects and importer-fixed-effects then we regress these fixed effects as exogenous variable. In this way these fixed effect dummies correlate with main variable dummies and yield biased result.

To avoid the biased estimation, Zylkin (2018) introduce a new command PPML_Panel_SG (PPML Panel Standard Gravity) to deal fixed effects separately but there is also a problem if we have big data set and large number of variables because it is not too fast command. However a new PPML command PPML_HDFE (PPML with multiple High Dimensional Fixed Effects) is introduced by Correia et al. (2019) having all properties of simple PPML in addition it deal fixed effects saperately and faster command to estimate the PPML estimates. PPML_HDFE is implements a novel and robust method to check the existence of Poisson Pseudo Maximum Likelihood estimates[4]. Recently PPML high dimesnsional command is used by Larch et al. (2019) to test the impact of currency unions on trade for big data set having 200 countries for 65 years and find that this command facilitate the larg data set having fixed effects.

4.   Results and Discussion

4.1   The Impact of Institutions and development on bilateral exports:

In this section we demonstrate the strength of our methods by attaining the partial estimates of the direct effect of domestic institutions and level of developments on bilateral exports. In additions we also develop the institutional homogeneity and institutional heterogeneity affecting the bilateral exports. We start with baseline panel estimation because this is the most popular and standard approach to investigate the effect of institutional quality on bilateral exports by following the previous literature: Tinbergen, 1962; Anderson and Van Wincoop, 2003; Beverelli et al., 2018. The estimation from column (1) of Table (1) is attained with PPML_hdfe established on standard gravity model which is not included institutional quality variables as Hou et al., (2021) and Beverelli (2018) use these variable in their baseline model. In this column we use standard variables which capture the trade cost, including; bilateral distance, contagious border, common official language, colonial relationships and bilateral RTA. In addition we also use the exporter-fixed effect, importer-fixed effect and time-fixed effects in our estimation.

The baseline standard gravity estimates from column 1 of Table (1) reveals the time-invariant effect of gravity variables on bilateral exporter which shows that the distance and contagious border are barriers to bilateral trade while having the common

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[4]   More information about PPML_Panel_SG and PPML_HDFE codes, examples and its help files can be found at website of authors of these command Thomas Zylkin: http://www.tomzylkin.com/

official language, sharing the colonial relations and sharing the bilateral trade agreements encourages bilateral trade. The estimate impact of LN_DIST is negative and significant. The impact of contagious border, common-official language, colonial relationships and RTA is positive and significant; these results are consistent with Hou et al., (2021). But we are more interested in time-varying effects of specific variables on bilateral exports, however our baseline PPML_hdfe estimates is robust to estimate the PPML_hdfe with institutions and development variables.

In order to obtain the various determinants of bilateral exports and the impact of quality of institutions and level of development, the results from column (2) of Table (1) are attained with the same baseline estimation. Additionally we extend it and add GDP per capita of exporter and importer country which is use for level of development. Here the GDP per capita of exporter and importer is positively and significantly affect the bilateral exports. The coefficient of GDP per capita of exporter is larger than importer country. Hence the level of development of exporter matter more than importer's, this results are consistent with Florensa et al., (2015). The estimates from column 3 of Table (1) are attained with same as column 2; in additions to the standard gravity model we introduce here the institutional quality variable EFW for the exporter as well as for importer country which captures the effect of institutional quality on bilateral exports. Mainly we discuss the results from column 4 and column 5 of Table (1) because in column 3 of Table (1) show the average impact of institutional quality and development on bilateral exports.

Further we extended our gravity model and finally we reach our main estimate results where we also included exchange rate as a control variable and our main interested variable homogeneity of institutions along with institutional quality and level of development variables. Three main findings are obtained in column 4 and 5 of Table (1): first our results are enable us to obtain the impact of institutional quality on the bilateral exports in the existence of complete set of exporter-fixed effects, importer-fixed effects and time-fixed effects, this confirms the idea of Beverelli et al. (2018) that if we use fixed effects in our estimation then we will not face any problem of collinearity. If the institutional quality of exporter as well as thee institutional quality of importer country is equally low or relatively low then the institutional quality is imperative in explaining the impact of quality of institutions on bilateral exports. Hence, our results reveal that institutional quality of exporter as well as the institutional quality of importer countries is positive and significant but the institutional quality of exporter country has larger significant value than importer country; however quality of institutions of exporter country is more important than the quality of institutions of importer country to raise the bilateral exports flow. Second we obtain positive and significant impact of level of development on bilateral exports which leads us that high level of development boosts the bilateral exports. In case of development we also obatain the higher positive signifant value of development of exporter country than importer country which confirm that if a country acts as a exporter then the level of

development more important rather than it is importer. These are consistent with Daniel et al. (2006) that the quality of institutions of exporter country is more important for different transactions(exporte and imports).

Third the positive and statistically significant results of law variable (which is used to measure the institutional homogeneity) in column 5 of Table (1) leads that if the both countries share the same level of the institutional characteristics, it promotes the bilateral exports. As suggested by Miura and Takechi (2014) that this results have essential implication for homogeniety of institutional quality, especially for high institutional quality countries. Institutional homogeniety is very important if we have high institutional quality countries in our sample, i.e if the institutional quality of both countries are equally low or relatively low then we can measure the effect of institutional differences on bilateral exports and able to say that improvent in institutional quality will increase the bilateral exports but if the both countries already have high institutional quality at maximum level but different then it is not possible to improve further the quality of institutions because it not reveals that in which path the rule would be improved. However in this situation institutional harmonization will facilitate the bilateral exports (Khan et al., 2020).

Table 1: The Impact of Institutions and development on bilateral exports

VARIABLES	(1) PPML Baseline	(2) PPML Baseline GDP	(3) PPML Baseline EFW	(4) PPML HETRO Main	(5) PPML HOMO Main
LN DIST $_{ij}$	-0.701***	-0.709***	-0.710***	-0.710***	-0.720***
	(0.0127)	(0.0136)	(0.0133)	(0.0133)	(0.0134)
CONT $_{ij}$	0.594***	0.601***	0.598***	0.598***	0.516***
	(0.0259)	(0.0260)	(0.0259)	(0.0259)	(0.0282)
LANG $_{ij}$	0.270***	0.274***	0.271***	0.270***	0.0772***
	(0.0290)	(0.0285)	(0.0286)	(0.0286)	(0.0285)
COL $_{ij}$	0.254***	0.247***	0.245***	0.245***	0.266***
	(0.0296)	(0.0287)	(0.0285)	(0.0286)	(0.0276)
RTA $_{ijt}$	0.444***	0.409***	0.408***	0.410***	0.434***
	(0.0242)	(0.0245)	(0.0243)	(0.0243)	(0.0248)
LN P. GDP $_{it}$		1.001***	0.895***	0.896***	0.896***
		(0.0774)	(0.0873)	(0.0871)	(0.0858)
LN P. GDP $_{jt}$		0.328***	0.199*	0.195	0.201*
		(0.107)	(0.118)	(0.119)	(0.117)
EFW $_{it}$			0.131***	0.137***	0.136***
			(0.0430)	(0.0434)	(0.0439)
EFW $_{jt}$			0.231***	0.233***	0.229***
			(0.0451)	(0.0453)	(0.0451)
ER $_{it}$				0.138*	0.139*
				(0.0816)	(0.0812)
LAW $_{ijt}$					0.244***
					(0.0169)

Constant	28.79***	15.61***	15.32***	15.21***	15.23***
	(0.115)	(1.252)	(1.193)	(1.206)	(1.194)
Observations	56,352	56,250	52,773	52,605	52,605
R-squared	0.932	0.936	0.936	0.936	0.937
Exporter FE	Yes	Yes	Yes	Yes	Yes
Importer FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses.

Note: This Table shows the estimation results of PPML high dimensional fixed effects. All estimation is obtained by absorbing the exporter, importer and time fixed effects which vary over time in panel specification. MRTs are properly controlled by PPML HDFE.

4.2   Interaction effect of institutions and development on bilateral exports:

We also obtain the differential estimate of the interaction impact of quality of institutions and level of development on bilateral exports. Moving on interaction effect of institutional quality and GDP per-capita, we eventually discover robust evidence of asymmetric impacts of institutions and level of development on bilateral exports that the quality of institutions and level of development of exporter country increases the bilateral exports, we also explore the similar distorted impacts of importer country's quality of institutions and level of development on bilateral exports.

The PPML with HDFE regression from Column 1 of Table (2) reveals the positive and significant impact of quality of institutions and level of development on bilateral exports by controlling the bilateral distance, contagious border, common official language, colonial relationship and exchange rate and negative effect of interactive terms, moreover including the individual terms and interaction terms simultaneously in the same regression. Here Interaction terms become negative due to multicollinearity between interactive terms and individual effects as, Adefabi (2011) observed that if we include individual effects and interaction effects simulataneously in the same regression the coefficients change their signs or become insignificant due to enterance of multicollinearity in regression between individual and interacation effects.

Further, Lamsiraroj (2016), Chishti et al., (2020) and Chishti et al., (2021) find that the multicollinearity in regression is due to interaction term and it is constructed because the correlation of two variables that's why this multicollinearity is unavoidable if we include both interaction and individual effects simulateously in the same regression.

The positive and significant impact of quality of institutions and level of development due to the result of direct effect of both variables on bilateral exports. Therefore, it is essential to include the institutional quality and level of development individually alongwith their products to test jointly whether these variables affect the bilateral exportes by themselves or through the interactive terms. However, we find that

institutional qualtiy and level of development dirctly affect the bilateral exports as well as they indirectly affect the bilateral exports by interacting each others.

Similar specification adopted in the column 2 of Table (2) where we include only one individual effect GDP per-capita along with interaction terms which shows that the coefficient of both interaction terms become positive and significant but the coefficient of GDP per capita of importer become insignificant because of multicollinearity. In column 2 of Table (2) it is heterogeneous effects but in column 3 of Table (2) we also check the homogeneous effects, in this column we also find the same results with insignificant effects of individual term.

After the discussion of interaction and individual terms and problem of multicollinearity our main results are presented in column 4 and column 5 of Table (2) where only interaction terms are included while the individual terms are omitted to avoid the problem of multicollinearity which is constructed in interactions. In column 4 of Table (2) heterogeneous interaction impact of institutional quality and level of development on bilateral exports is shown. The coefficient of interaction terms is positive and significant which shows that the interaction effect of institutional quality and level of development is positive and statistically significant these results are correlated with Marjit et al.(2014). In our results the value of interaction term of exporter is high and value of importer country is low which Indicates that interaction effect of institutional quality and level of development on bilateral exports of exporter country have greater impact than the interaction effect of institutional quality and level of development of importer country This happens because most countries want to increase exports to maximize their comparative advantage and government also encourages exports and discourage imports by using trade protection , tariff on imports and subsidy on exports, because exports bring jobs, higher wages and increase the foreign reserves. However the institutional quality and level of development of exporter country supports to increase the exports rather than the imports.

In column 5 of Table (2) our main result of homogenous institutional quality is shown, here all variables are same as column 4 of Table (2) additionally Law variables is add to check the homogeneity of institutions. The coefficient of Law is positive and significant which show that the homogeneous interaction effect of institutional quality and level of developments on bilateral exports is positive and significant. However if the quality of institutions and level of development interact with each and they also have same level of institutional quality, it will boost the bilateral exports these results are consistent with Bandyopadhay et al., (2016).

Table 2: Interaction effect of institutions and development on bilateral exports

VARIABLES	(1) PPML INT full	(2) PPML INT +DEV HETRO	(3) PPML INT +DEV HOMO	(4) PPML INT Main HETRO	(5) PPML INT Main HOMO
LN DIST $_{ij}$	-0.721***	-0.710***	-0.720***	-0.708***	-0.718***

	(0.0134)	(0.0133)	(0.0134)	(0.0127)	(0.0127)
CONT $_{ij}$	0.515***	0.598***	0.516***	0.599***	0.517***
	(0.0281)	(0.0260)	(0.0282)	(0.0258)	(0.0280)
LANG $_{ij}$	0.0783***	0.270***	0.0769***	0.270***	0.0781***
	(0.0284)	(0.0286)	(0.0286)	(0.0289)	(0.0290)
COL $_{ij}$	0.266***	0.245***	0.266***	0.246***	0.267***
	(0.0276)	(0.0286)	(0.0276)	(0.0287)	(0.0277)
RTA $_{ijt}$	0.433***	0.410***	0.435***	0.417***	0.441***
	(0.0249)	(0.0244)	(0.0249)	(0.0238)	(0.0244)
LN P. GDP $_{it}$	1.176***	0.825***	0.825***		
	(0.214)	(0.103)	(0.102)		
LN P. GDP $_{jt}$	0.648***	0.0626	0.0706		
	(0.232)	(0.141)	(0.139)		
EFW $_{it}$	0.594**				
	(0.303)				
EFW $_{jt}$	0.907***				
	(0.269)				
INT $_{it}$	-0.0478	0.0132***	0.0132***	0.0461***	0.0461***
	(0.0320)	(0.00457)	(0.00462)	(0.00356)	(0.00356)
INT $_{jt}$	-0.0704**	0.0225***	0.0222***	0.0267***	0.0268***
	(0.0292)	(0.00482)	(0.00482)	(0.00422)	(0.00422)
ER $_{it}$	0.146*	0.136*	0.137*	0.135*	0.134*
	(0.0819)	(0.0819)	(0.0814)	(0.0810)	(0.0901
LAW $_{ijt}$	0.243***		0.244***		0.243***
	(0.0169)		(0.0170)		(0.0171)
Constant	8.370***	17.30***	17.30***	23.48***	23.54***
	(2.812)	(1.420)	(1.398)	(0.396)	(0.396)
Observations	52,605	52,605	52,605	52,773	52,773
R-squared	0.937	0.936	0.937	0.935	0.935
Exporter FE	Yes	Yes	Yes	Yes	Yes
Importer FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Robust standard errors in parentheses.

Conclusion

Institutions are fundamental determinants of economic exchange within border as well as across the border. Numerous previous studies on the impact of institutions on bilateral trade flows exists, though these studies do not deal satisfactorily with MRTs and interaction effects of homogenous institutions and development on bilateral exports. So we evaluate the causal effect of institutional quality, institutional homogeneity and development on bilateral exports. This study apply a novel methodology which allows to investigate the effect of quality of institutions and homogeneity of institutions as a driver of informal trade barriers on bilateral export flows with proper set of fixed-effects. We employ both institutional quality and level of development for bilateral exports so our approach is consistent with theoretical gravity model.

However, the impact of quality of institutions and development on bilateral export flow that we have estimated is positive and significant. The result of homogenous institutional quality is also positive and significant which reveals that homogenous institutional quality encourages the bilateral export flows. Enrich with consistent estimates of the impact of quality of institutions and level of development on bilateral exports, we also check the interaction impact of quality of institutions and level of development on bilateral exports. We show that quality of institutions and level of development also affects the bilateral exports indirectly; both are interact with each other and affect the bilateral exports significantly and positively. Our homogenous impact of quality of institutions and level of development suggest that if both countries share the same level of institutional quality then the interaction effect of institutional quality and level of development boosts the bilateral exports.

Therefore, government should improve the institutional quality because it leads certainty for international trade which helps the foreign exporters and importers to increase the trade flows. Government should also pay attention to improve the level of development because it facilitates the exporters and importers to boosts the bilateral trade flows. Besides the future research can be done by applying our methodology and estimators, to measure behind the border such as sales taxes, value-added taxes, and trade facilitation for extended period, as well as environmental measures like consumption based carbon emission exports and imports.

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