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Revisiting Trade-Institutions Nexus: A comparative analysis of South Asian and Global Commodity Trade Controlling for Institutional Homogeneity and Migration

Session 11: Gravity Modeling and Trade Facilitation in South Asia

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ABSTRACT

This paper revisits the trade-institutions connection using a gravity model of bilateral trade for 2005 data covering 229 countries. Institutional impacts are modeled as bilateral institutional homogeneity considering two categories of indicators. Trade specific institutional homogeneities are captured using three variables . Governance specific institutional homogeneities are captured using six variables . Finally, the impact of migration on bilateral trade is captured given the rising evidence to the close connection between migration and trade. The analysis is conducted in two parts: global and South Asian. The results indicate that in the two context s, different institutional homogeneities become contributory towards trade enhancement. For both analyses, the impact of migration remain positive on trade. All impacts are highly significant.

1. Introduction

1.1 Shrinking Distance Effect in International Trade

There should be very few, if any, at this day and age, who would doubt if there were gains from trade. Since 1960s, the world has seen momentous progress in trade volumes, consistently outpacing worldwide growth in GDP, even at such rates as 730 percent in Intra European Union trade over the period 1960-2000. Such advances have been explained repeatedly in the international trade literature both theoretically and empirically (Helpman and Krugman, 1985; Feenstra, 2004; Lejour and Nahuis, 2005 among others). Efficiency gains from trade to its participants have been quantified for numerous countries. Hufbauer and Grieco (2005) state that an average American household enjoys annual benefits worth about \$10,000 (USD) from 'shrinking distances' and increasingly relaxed policy barriers to trade and investment in recent decades. Badinger (2005) estimates that EU countries would have had 20 percent lower income per capita, on average, in the absence of international economic integration. The sources of these rapid expansions of growth have also been documented. Baier and Bergstrand (2001) show that, respectively, the growth in GDP, the reduction of tariffs (owing to multilateral agreements and organizations such as the General Agreement on Tariffs and Trade (GATT) and its successor, the World Trade Organization (WTO)) and declines in transportation costs are the main sources of trade growth. Further, increased outsourcing of production processes across borders is linked to reductions in costs and tariffs for transportation and communication thus enabling trade to happen (Yi, 2003).

Yet, looking at the global picture, the persistent lack of trade between otherwise potential trading partners has continued to baffle many a researcher. Comparing theoretical expectations with actually observed trade patterns, it is clear that countries trade far less than would be expected, taking into consideration only the

potential motivation to exploit scale effects caused by differences in resource endowments, technology and variety of goods produced among countries (Loungani et al., 2002). In an empirical analysis of trade patterns, Eaton and Kortum (2002) argue that if trade were frictionless, trade volume would be five times as great as presently observed. Such deficits have drawn many explanations over the years. Trefler (1995) argues that home bias in consumer preferences (also highlighted by Obstfeld and Rogoff (2000)) may be an important factor in explaining the large deviations in actual trade patterns from those predicted by trade theory. Barriers to trade that are intangible may provide an explanation for home bias, consistent with widely documented evidence, starting with Brocker (1984) and McCallum (1995) who assert that trade falls sharply when crossing international borders. According to the data available for any recent year, many country pairs have a low volume of trade and even more country pairs have no trade at all. Although there are obvious differences in economic strength and size between countries, economic and demographic differences alone would not justify such disproportionality (Linders et al., 2008).

It is from this disconnect that this paper draws its motivation to attempt further articulation of the Distance Puzzle in terms of institutional quality resemblances and human migration flows. The strategy adopted is to estimate a series of specifications of the gravity model of trade controlling for multiple indicators of institutional quality and migration effect.

The paper is organized as follows. After an introduction to the related gravity literature, the indicators of institutional environment considered here are discussed in detail (in section 2). Section 3 details the data and the explanatory variables considered for the estimations. Section 4 lists the series of models estimated. The empirical analysis is conducted in two stages. First, gravity model is augmented in stages with different classes of institutional homogeneity variables and migration effect. The robustness of the included effects at each stage is tested for the total sample (all bilateral combinations) and four sub-samples based on the development status of the origin and destination (north-north, north-south, south-north, south-south). Second, I repeat the analysis to test the respective variable effects on south Asian exports and south Asian imports (controlling for the south Asian partners in each case).

1.2 The 'Force' of Gravity (Model) in International Trade

Analogous to the famous gravity equation in physics, the gravity model considers trade between a pair of countries as an increasing function of their national incomes and a decreasing function of their geographical distance. Since its introduction (according to many authors) by Tinbergen (1962), the model has enjoyed

significant backing and following both in the theoretical and empirical circles. Amongst others, studies by Helpman and Krugman (1985) and Deardorff (1998) show that both new trade theories of product differentiation as well as the classical Heckscher-Ohlin theory of comparative advantage can provide a theoretical rationale for the gravity model of bilateral trade.

The empirical success of the gravity trade model is quite unprecedented and has led to numerous extensions by way of introducing new variables that relate to both countries, and either of the two countries separately in addition to the basic three variables of importer GDP, exporter GDP, and geographical distance. These extensions are often called 'augmented' forms of the model. The logic behind the augmentation comes mainly from the properties of the three main variables, two of which (the economic masses of the two countries) enter the equation to represent unilateral properties while the third (the geographical distance) enters as a bilateral argument of the function. So, whenever the new variables are introduced, they enter either as representative of one partner (often having a complementary representation for the other partner) or as a variable representing some property that is unique to the bilateral relationship. The often-used variables like language, common colonial background, common religion, contiguity are examples of the latter. A third possibility to introduce new variables is to combine two complementary unilateral properties of the two partners by way of an index and include as a bilateral variable. Theoretical basis for the selection of independent variables to be included also follows the same logic behind the basic gravity relationship, i.e. variables representing economic mass and the variables representing the distance between the two partners. The dependent variable of the gravity equation is often the bilateral flow (as either imports or exports) and could appear as total flow or any part of it reflective of a product or a product group according to the researcher's choice. Looking at the literature of the last few decades, especially in the last twenty years, one finds the estimates and the model fit have been robust to varying choices of explanatory variables.

Gravity equation has proved to hold, almost equally, with the use of both cross section and panel data, albeit with certain differences of size and significant across various studies (Disdier and Head, 2008). While the panel specifications undoubtedly facilitate drawing of additional information (time invariant country-pair based effects and time effects), the estimate values of the usual gravity variables have displayed comparable performances under both circumstances, endorsing the continued use of cross sectional data.

2. Measurement of Trade and Governance Institutional Homogeneity

2.1 Institutions homogeneity as a bilateral Characteristic

The inverse relationship between geographic distances and bilateral trade volumes is considered to be one of the most robust empirical findings in economics (Leamer and Levinsohn, 1995). The primary candidate reason behind the distance effect is the 'transportation costs', the logic being that farther one partner is from the other, the more costly it is for the goods to travel between the two countries (Obstfeld and Rogoff (2001), among many others, assert that transport costs cause the distance effects.). There is, however, no consensus on what geographic distances are proxying for. Grossman (1996), Hummels (2001), and others, argue that transport costs are too low to explain the magnitude of the distance effects, particularly after taking into account that gravity models can also explain the flow of literally weightless goods such as financial capital (Portes and Rey, 2005).

What are the other candidates for distanciation of two countries? Tariffs and Non Tariff policy measures undoubtedly top the list. But, there are many less obvious causes of distance. Rauch (2001) focuses on the importance of information costs that are related to physical (and cultural) distances. Deardorff (2001) argues that international trade patterns to a large extent depend on largely unobservable trading costs, instead of factor endowments and technology. Such unobserved effects appear to be very large even between similar countries, such as the USA and Canada. Thus, informal trade barriers may help explain the home bias or border effect in trade (McCallum 1995).

Articulating the 'distance' effect of bilateral trade is undoubtedly a challenge that any single research contribution will never completely meet, since any instance of dissimilarity (or even similarity in certain characteristics) between two countries can logically be hypothesized to cause a negative effect on bilateral flow of goods. The main contenders to the list will be culture, language, political association, use of a common currency etc. Yet, it can be inferred that the unobserved barriers to trade are often related to incomplete or asymmetric information and uncertainty in exchange. This is where the institutional environment in any given country matters. According to North (1990), one of the authoritative intellectuals on the role of institutions in economics, institutions can be defined as 'humanly devised constraints that shape human interaction'. The impact of institutions on transaction costs has received a lot of attention in the literature on economic growth and development (Knack and Keefer 1995), the notion that poor governance entails negative externalities for private transactions being the leading premise. Consequent rises in transaction costs bear negatively on growth and development, an argument that is extended easily to international trade as well (Wei, 2000). Since international exchange transactions involve a number of checks and balances, the effectiveness of domestic institutions in securing and enforcing property rights in economic exchange is an important determinant of

trade costs. In other words, the regulatory environment that is present domestically (along with the perceived image of it by foreigners) shapes the norms and conventions of doing business. These, in turn, may also impact on risk perceptions and preferences in international transactions. Thus, the hypothesis that institutions matter for international trade appear quite logical.

Among the recent contributions towards testing this hypothesis, the work by Anderson and Marcouiller (2002) is noteworthy. They use a gravity model to investigate the hypothesis that corruption and imperfect contract enforcement dramatically reduce international trade. Inadequate institutions are seen as a hidden tax on trade constraining trade as much as tariffs. These authors make a compelling case for the potential biases that might result in the gravity estimates by the omission of variables representing institutional quality. Other recent work highlighting the important role of institutions include Nunn (2007), Ranjan and Lee (2007), both papers looking at contract enforcement and its effect on trade; Leeson (2008) looking at state regulation on trade; De Groot et al., (2004) measuring the impacts of institutional homogeneity on bilateral trade; Meon and Khalid. (2008) investigating the relationship of disaggregated trade to world governance indicators. The last work brings out the interesting result that not all categories of trade has positive correlation with institutional quality (authors estimate an inverse relationship between non-manufactured good exports and institutional quality).

In this study, I select suitable indicators in order to reflect, first, the trade-specific institutional environment and second, the governance related institutional environment in an adequate manner. Under trade specific institutions, first, the quality of the domestic infrastructure and related regulation with special emphasis on business creation and enterprise development matters. This is an aspect of the domestic economy that would equally matter to the promotion of both exports and imports. Most exporting firms depend largely on the domestic institutional quality since many institutional variables such as labor regulation, property rights enforcement, and business taxation bear directly on their regular operations. For the importers engaged in domestic value addition and reexporting, the effect is the same as above. Since most of the imports are directed to domestic sales, business start up environment is equally important for thriving importing and distribution network. I believe the *doing business* data covers a majority of these aspects. Secondly, the quality of the border institutions matter. For exporters, this means better market access abroad, better logistics, and convenient border crossing enforcements. For importers, it includes lesser custom delays, less paper work and less bribing among other benefits. This aspect is well covered in the *enabling trade* data. Thirdly, the quality of the domestic trade related policies which could include many intangible barriers to trade. These could even include explicitly domestically oriented policies that will discourage cross border trade

such domestic industry protection and support. The trade policy restrictiveness effect calculated by Hiscox and Kastner (2004) is used for generating a variable to represent this third aspect of trade specific institutional environment. The general governance environment would mainly determine countries image as a trade friendly location. This would necessarily include the rule of law, political stability, and level of corruption among others. *World Governance Indicators* data provide excellent coverage of these issues and I use them as indicative of the fourth aspect of domestic institutional environment. In the section 2.2, I describe the data sources of the indicator framework in order to justify their choice for the present analysis.

2.2. Gauging Trade Specific Institutional Quality

2.2.1 Quality of Business Institutional Environment: *Doing-business Data*

In order to measure the quality of business environment, I use the data from 'Doing Business' compiled by the World Bank group. These indicators are being used frequently to compare the domestic business environment by various researchers increasingly. The sub-indices and the method of measurement adopted for doing-business indicators can be summarized as follows. The four main categories of business environment evaluated include: (1) Starting a business; (2) Registering property; (3) Getting credit; (4) Contract Enforcement. Under Starting a business category, the emphasis is given to the number of steps entrepreneurs can expect to go through to launch, the time it takes on average, and the cost and minimum capital required as a percentage of gross national income (GNI) per capita. Under registering property category, the ease with which businesses can secure rights to property is measured using the number of steps, time, and cost involved in registering property. Under Getting credit category, measures on credit information sharing, and the legal rights of borrowers and lenders are included. The Legal Rights Index ranges from 0-10, with higher scores indicating that those laws are better designed to expand access to credit. The Credit Information Index measures the scope, access, and quality of credit information available through public registries or private bureaus. It ranges from 0-6, with higher values indicating that more credit information is available from a public registry or private bureau. Finally, under Enforcement of contract aspect, the ease or difficulty of enforcing commercial contracts is measured by following the evolution of a payment dispute and tracking the time, cost, and number of procedures involved from the moment a plaintiff files the lawsuit until actual payment.

2.2.2. Institutional Bottlenecks at Trading Interfaces : *Enabling Trade Data*

To analyze the performance of institutions at the borders, I use the enabling trade data compiled by the world economics forum. The subcategories under which these data are listed include (1) Market access, (2) border administration, (3) transport and communications infrastructure, and (4) the business environment. The first sub index measures the extent to which the policy and cultural framework of the country welcomes foreign goods into the country. Once goods have been allowed in to the country, the second sub index assesses the extent to which the administration at the border facilitates their entry. Once goods have made it over the border, the third sub index takes into account whether the country has the transport and communications infrastructure necessary to facilitate the movement of the goods from the border to destination. Finally, the fourth sub index looks at the regulatory and security environment impacting the transport business in the country. Each of these four sub indexes is in turn composed of a number of pillars of enabling trade, namely: 1. Tariffs and non-tariff barriers 2. Proclivity to trade 3. Efficiency of customs administration 4. Efficiency of import-export procedures 5. Transparency of border administration 6. Availability and quality of transport infrastructure 7. Availability and quality of transport services 8. Availability and use of ICTs 9. Regulatory environment 10. Physical security.

2.2.3. Trade Restrictiveness Effect due to Domestic Policy: *Hiscox and Kastner (2002) ICY index*

I use the ICY index of trade restrictiveness by Hiscox and Kastner (2002) as a measure of the level of policy restrictiveness to trade by a country. The index developed via a gravity estimation reports values for 76 countries. According to the authors, ICY correlates positively with revenues from import duties as a percentage of imports. ICY index is negatively correlated with trade as a percentage of GDP. Furthermore, ICY index is much more closely correlated with both duties and trade openness than duties and trade are with each other. ICY is positively related to Dollar's (1992) index of price distortions, although only weakly; the Dollar index is itself positively correlated with import duties. Finally, ICY is correlated in a strong positive fashion with Lee's (1993) calculations of own-import weighted averages of duties on intermediate inputs and capital goods. The ICY Index scores fit with the traditional contrasts drawn between 'closed' and 'open' economies.

I predict the trade policy effect index values for the remaining countries in my data set making use of the fact that an extremely high (0.87) correlation exists between this index and the GDP per capita (purchasing power parity) values for 2005. Since I am not including the GDP per capita values in the gravity estimation, the above imputation of values does not produce any statistical anomaly to the gravity regressions.

2.3. Gauging Governance Institutional Quality: *World Governance Indicators*

The best compiled indicators available for cross-country measurement of governance is the set due to Kaufmann et al. (various years). The indicators measure six dimensions of governance: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption. The indicators cover 212 countries. The indicators are based on several hundred individual variables measuring perceptions of governance, drawn from 33 separate data sources constructed by 30 different organizations these individual measures of governance to categories capturing these six dimensions of governance, and use an unobserved components model to construct six aggregate governance indicators. According to authors, the detail and the method adopted results in the indicators capturing cross-country differences of governance levels in a statistically significant manner (Kaufmann et al. 2006). The authors provide the following elaboration of the scope of the six categories of governance:

1. *Voice and Accountability (VA)* – measuring the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.
2. *Political Stability and Absence of Violence (PV)* – measuring perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including domestic violence and terrorism
3. *Government Effectiveness (GE)* – measuring the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies
4. *Regulatory Quality (RQ)* – measuring the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development
5. *Rule of Law (RL)* – measuring the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, the police, and the courts, as well as the likelihood of crime and violence

6. *Control of Corruption (CC)* – measuring the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests

2.4 Multidimensional Scaling of Doing Business and Enabling Trade data

I perform (classical) multidimensional scaling (MDS) on sub-indices from doing business dataset and enabling trade dataset, in order to reduce the dimensionality of data while preserving the variability. This also helps to avoid issues of collinearity between sub indices within each dataset. The motivation primarily comes from the need to create a single variable to represent each of the three trade specific institutional dimensions selected for inclusion in this study. Except trade restrictiveness indicator, the data from other two aspects are reduced to two score variables, namely, doing business score and enabling trade score.

MDS is a method similar to factor analysis, but multidimensional scaling methods do not start with a matrix of correlation coefficients, as is common for factor analysis, but with a matrix of dissimilarities. Because many (dis)similarity coefficients have been developed, this gives these methods a greater flexibility. Moreover, less strict assumptions are made than for factor analysis. The conceptual basis for the techniques is rather straightforward. It is assumed that for every two objects i and j of a collection of size n , a (dis)similarity coefficient can be defined. This coefficient indicates the (in) equality, association, interaction, etc. and in general, the proximity or distance between the objects (Shepard 1972). Subsequently, a search is made for a configuration of n points in (Euclidian) space with as few dimensions as possible, so that it meets to the greatest extent the requirement that the distance between points, D_{ij} , be monotonically related to the (dis)similarities (Kruskal, 1964). The coordinates of the points in geometric space are the scale values.

3. Data

This study uses data from 229 countries for the year 2005. The UN trade databases, WDI database, cepii database of gravity variables are primarily used. Data on Business environment is obtained from doing business reports. Data on institutional quality at the border is obtained from the enabling trade reports. The governance variables are obtained from the WGI data set available at the World Bank web site. The trade policy restrictive index was obtained from Hiscox and Kastner (2004) and used for imputation of covert

domestic policy effect on trade for all the countries in the data set. The dependent variable used in the estimations is bilateral imports values.

The homogeneity of the institutional quality variable of the bilateral partners is represented by the ratio between the index values (in the case of the six governance variables) or multidimensional scores (in the case of doing business score and enabling trade score) or the trade restrictiveness score of the two trading partners falling between 0.75 and 1.33. All the institutional variables were thus coded as a dummy variable with 1 for homogeneity and 0 otherwise.

4. Methods

One distinct feature of gravity literature is the recurring comparison alternative specifications and the concerns about the lapses in any given modeling technique are frequent. The apparent ubiquity of the lognormal model has been long challenged, earlier in regional science literature (Flowerdrew and Aitkin, 1982) and later by econometricians (Egger, 2000), an often quoted example being Silva and Tenreyro (2006). The main charge against the lognormal model has been the fact that a log linear model cannot be expected to provide unbiased estimates of mean effects when the errors are heteroscedastic. Silva and Tenreyro (2006) provide empirical evidence suggesting that the resulting biases are likely to be large. In addition to this critique, they suggest the use of an alternative approach to estimation: the Poisson estimator, also suggested by others, i.e. Egger (2000); Matyas (1998). Other complaints refer to the omission of zero bilateral flows and overstatement of coefficient values in the lognormal model compared to alternative specifications. The impact of considerable number of zero bilateral trade flows in the dependent variable, most authors citing this proportion to be over 50 percent of the total observations (which is also the case for 2005 data covering 229 countries used here), a problem identified as early as 1958 (Tobin,1958).

The presence of zero values of the dependent variable in a sample has potentially very important implications for the parameter values estimated using these data. Heckman (1979) generalized the approach to estimation in the presence of zeros, as a problem of estimation in samples potentially involving selection bias. Alternative estimation techniques in literature include mainly count data estimators, selection models of Heckman type, and nonlinear least squares. The numerous empirical contributions to international trade using gravity framework use different techniques mainly based on the discretion of author. The statistical significance of the estimates and considerable size of the estimates often overshadow the often arbitrary choice of estimators. Based on the recommendations of many authors including Silva and Tenreyro (2006), I estimate the gravity model using the Poisson pseudo maximum likelihood method.

Table 4.1 and 4.2 summarize the various models and specifications implemented. In implementing different specifications, the various institutional variables have been introduced in stages. This was performed with the intention of identifying the cumulative explanatory effect of each variable set. As mentioned earlier, the analysis is carried out in two stages: First, the global bilateral flows and next, the South Asian exports and imports. Table 4.3 lists the variables used in the model with their descriptions. In the South Asian analysis, I consider the exports from South Asia to the whole world in the first subsample. I control for south Asian destinations using a dummy variable. Similarly for the second sub sample considering Imports to South Asia from the world, I control for south Asian origins using a dummy variable.

The structural differences between the highly developed countries and the developing countries with regard to economic environment and institutional environment motivate decomposition of the analysis based on the development status of the trading partners. I use the conventional terminology of North and South divide. To Proxy for development status, membership of OECD is used. The total sample is sub-sampled into four categories based on the four possible directions of trade: North –North; North-South; South-North; South-South. The origin of the bilateral flow is always indicated first (i.e. North-South would mean a flow between OECD exporter and a non OECD importer) in the category nomenclature.

Table 4.1: Gravity model implementation for global bilateral flows

Stage No	Variables	Regression No	Sample Description
Stage 1.1	Dependant variable: imports	1	global
	Independent variables: basic gravity variables	2	north-north
		3	north-south
		4	south-north
		5	south-south
Stage 1.2	Dependant variable: imports	1	global
	Independent variables: basic gravity variables + trading institutional homogeneity variables	2	north-north
		3	north-south
		4	south-north
		5	south-south
Stage 1.3	Dependant variable: imports	1	global
	Independent variables: basic gravity variables + trading institutional homogeneity variables + governance institutional homogeneity variables	2	north-north
		3	north-south
		4	south-north
		5	south-south
Stage 1.4	Dependant variable: imports	1	global
	Independent variables: basic gravity variables + trading institutional homogeneity variables + governance institutional homogeneity variables + migration	2	north-north
		3	north-south
		4	south-north
		5	south-south

Table 4.2: Gravity model implementation for South Asian Exports and Imports

Stage No	Variables	Regression No	Sample Description
Stage 2.1	Dependant variable: imports Independent variables: basic gravity variables	1	South Asian exports
		2	South Asian imports
Stage 2.2	Dependant variable: imports Independent variables: basic gravity variables + trading institutional homogeneity variables	1	South Asian exports
		2	South Asian imports
Stage 2.3	Dependant variable: imports Independent variables: basic gravity variables + trading institutional homogeneity variables + governance institutional homogeneity variables	1	South Asian exports
		2	South Asian imports
Stage 2.4	Dependant variable: imports Independent variables: basic gravity variables + trading institutional homogeneity variables + governance institutional homogeneity variables+ migration	1	South Asian exports
		2	South Asian imports

Table 4.3: Variable Description

Code	Description
Dependent Variable	
imports	bilateral imports value
Common Gravity Variables	
l_gdp _x	log of GDP~exporter
l_gdp _m	log of GDP~importer
l_distw	log of weighted distance
contig	contiguity
comlang_off	common language official
PTA	bilateral membership of the same political/ trade association
Governance Institutional Homogeneity Variables	
psnv_sim	similarity of political stability and non violence
cc_sim	similarity of control of corruption
va-sim	similarity of voice and accountability
ge_sim	similarity of government effectiveness
rq_sim	similarity of regulation quality
rl_sim	similarity of rule of law
Trade Institutional Homogeneity Variables	
db_sim	similarity of doing business index (multidimensional scaled)
etr_sim	similarity of enabling trade index (multidimensional scaled)
icyhat_sim	similarity of trade restrictiveness index
Migration	
l_mig	Log of bilateral migration flow

5. Results

5.1. Global results

In table 5.1.1, the results of stage 1.1 are reported. In all the regressions, the three key gravity variables of importers GDP, exporter GDP, and the geographical distance are included in the log form. The estimates for these variables are significant at 1 % level for all the specifications. The estimates display expected signs at all instances and comprehensively reinforce the main impacts of the gravity model. The coefficients of the logged variables display elasticities. The conventional dummy variables such as contiguity and common language are included in all the specifications and the significant trade enhancing impacts are obtained. The results for these dummies are reported as semi-elasticities (i.e. $\partial \ln y / \partial x$ form). Membership of both partners to same trading and political association is captured using a dummy and semi-elasticity is reported. The explanatory power of the pseudo maximum likelihood estimation of Poisson model is reported using McFadden R-squared value. Even though this indicator is not strictly comparable to ordinary R squared values of OLS regressions, reported values display very high model fit.

Table 5.1.1: Results for the estimations in stage 1.1

	global	north-north	north-south	south-north	south-south
l_gdpx	0.784*** (0.0000630)	0.648*** (0.0000108)	0.903*** (0.0000227)	1.019*** (0.0000136)	0.935*** (0.0000195)
l_gdpm	0.819*** (0.0000659)	0.718*** (0.0000110)	0.913*** (0.0000169)	0.978*** (0.0000179)	0.737*** (0.0000188)
l_distw	-0.453*** (0.0000112)	-0.310*** (0.0000146)	-0.941*** (0.0000341)	-0.522*** (0.0000328)	-0.509*** (0.0000313)
contig	1.144*** (0.0000302)	1.325*** (0.0000386)	-0.0926*** (0.000184)	0.858*** (0.000163)	0.972*** (0.0000710)
comlang_off	0.458*** (0.0000275)	0.319*** (0.0000374)	0.445*** (0.0000881)	0.124*** (0.0000751)	1.379*** (0.0000683)
PTA	-0.465*** (0.0000281)	n.a.	n.a.	n.a.	0.309*** (0.0000862)
observations	25131	899	3360	4408	16464
McFadden R-sq	0.861	0.800	0.835	0.852	0.782

Standard errors in parentheses

* p<0.05

** p<0.01

*** p<0.001

Table 5.1.2 lists the coefficients after inclusion of trade specific institutional homogeneity variables to the basic gravity specification in stage 1.1. Though the incremental gains are relatively small, the explanatory power of the model continuously increases with the new variables appearing significant at 1 % level. Homogeneity in the doing business (hereafter abbreviated as DB) score has a negative impact on the commodity trade flows in general according to the semi-elasticities reported. However, treating the global sample as a benchmark, the relative trade deterring effect of the DB homogeneity reduces for north-north (hereafter abbreviated as NN), north—south (hereafter abbreviated as NS), south-north (hereafter abbreviated as SN) and south-south (hereafter abbreviated as SS) flows. Enabling trade (ET) score homogeneity effect display mixed impacts on trade. Trade restrictiveness index (TR), which measure undesirable domestic policy impacts on trade, also shows mixed results. However, the expected sign can be observed for global, NN, and SS flows. The comparison of the effects of the above three variables of NS and SN sub samples reveal that these trade specific institutional indicators behave in a “direction-invariant” manner.

Table 5.1.2: Results for the estimations in Stage 1.2

	global	north-north	north-south	south-north	south-south
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Conventional gravity variables	l_gdpx	0.793*** (0.0000651)	0.650*** (0.000111)	0.957*** (0.000245)	1.020*** (0.000137)	0.979*** (0.000209)
	l_gdpm	0.826*** (0.0000678)	0.717*** (0.000114)	0.926*** (0.000174)	1.023*** (0.000195)	0.776*** (0.000205)
	l_distw	-0.517*** (0.000122)	-0.401*** (0.000172)	-0.926*** (0.000351)	-0.492*** (0.000327)	-0.661*** (0.000401)
	contig	1.151*** (0.000308)	1.305*** (0.000400)	-0.346*** (0.000193)	0.876*** (0.000166)	0.730*** (0.000832)
	comlang_off	0.507*** (0.000286)	0.313*** (0.000400)	0.412*** (0.000893)	0.0831*** (0.000755)	0.970*** (0.000737)
	PTA	-0.301*** (0.000295)	n.a.	n.a.	n.a.	0.559*** (0.000892)
	Trade specific institutional homogeneity variables	db_sim	-0.290*** (0.000231)	-0.211*** (0.000306)	-0.168*** (0.000667)	-0.262*** (0.000530)
etr_sim	-0.183*** (0.000290)	0.0789*** (0.000336)	0.446*** (0.000130)	0.143*** (0.000136)	-1.109*** (0.000166)	
icyhat_sim	-0.273*** (0.000247)	-0.396*** (0.000335)	0.504*** (0.000816)	0.377*** (0.000631)	-0.628*** (0.000700)	
	observations	25131	899	3360	4408	16464
	McFadden R-sq	0.867	0.812	0.844	0.857	0.805

Standard errors in parentheses

* p<0.05 ** p<0.01 *** p<0.001

Table 5.1.3 reports results for the inclusion of governance institutional homogeneity variables to the gravity model of the stage 1.2. The governance homogeneity variables also appear significant at 1 % level while improving the explanatory power of the model further, albeit slightly. Homogeneity of the 'Political Stability and Non Violence' (HPS) index produces mixed impacts on trade across different samples. Homogeneity in Control of Corruption (HCC) index, homogeneity in the Government Effectiveness (HGE), and homogeneity in the Regulatory Quality (HRQ) also have mixed impacts. Homogeneity in Voice and Accountability (HVA) shows consistently negative impacts across the subsamples. However, when the partners have similar Rule of Law (HRL) indices, the trade enhances significantly for all bilateral flows. In contrast to the (trade)direction invariant behavior of trade specific institutional homogeneities in the previous stage, the governance related institutional homogeneities display sensitivity to the direction of flow , i.e. NS vs. SN.

Based on the emerging evidence of the potential trade enhancing effects of bilateral migration (Gould, 1994; Head and Reis, 1998 and Karayi, 2007 among others) , I include the log of bilateral migration as an argument of the gravity model in the stage 1.4. Across all samples the migration displays a positive and significant (at 1% level) trade enhancing effect (see table 5.1.4). The inclusion of migration further improves the explanatory power of the model.

Table 5.1.3: Results for the estimations in Stage 1.3

		global	north-north	north-south	south-north	south-south
Conventional gravity variables	l_gdpx	0.798*** (0.0000663)	0.644*** (0.000115)	0.947*** (0.000244)	1.022*** (0.000141)	1.006*** (0.000213)
	l_gdpm	0.833*** (0.0000691)	0.712*** (0.000118)	0.930*** (0.000180)	1.019*** (0.000195)	0.812*** (0.000210)
	l_distw	-0.581*** (0.000132)	-0.456*** (0.000192)	-0.923*** (0.000354)	-0.502*** (0.000329)	-0.798*** (0.000425)
	contig	1.069*** (0.000326)	1.222*** (0.000432)	0.0497*** (0.000201)	1.018*** (0.000169)	0.584*** (0.0000870)
	comlang_off	0.508*** (0.0000296)	0.256*** (0.0000431)	0.346*** (0.0000939)	0.0300*** (0.0000785)	0.840*** (0.0000767)
	PTA	-0.219*** (0.0000309)	n.a.	n.a.	n.a.	0.590*** (0.0000897)
Trade specific institutional homogeneity variables	db_sim	-0.227*** (0.0000242)	-0.100*** (0.0000332)	-0.196*** (0.0000676)	-0.291*** (0.0000538)	-0.106*** (0.0000900)
	etr_sim	-0.160*** (0.0000429)	0.00234*** (0.0000505)	0.295*** (0.000154)	-0.143*** (0.000156)	-0.425*** (0.000163)
	icyhat_sim	-0.231*** (0.0000262)	-0.354*** (0.0000360)	0.244*** (0.0000914)	0.263*** (0.0000688)	-0.543*** (0.0000747)
Governance related institutional homogeneity variables	psnv_sim	-0.318*** (0.0000355)	-0.392*** (0.0000413)	0.392*** (0.000112)	0.291*** (0.000113)	-0.913*** (0.000149)
	cc_sim	0.0293*** (0.0000419)	-0.0555*** (0.0000506)	-0.238*** (0.000196)	0.445*** (0.000177)	0.184*** (0.000104)
	va_sim	-0.366*** (0.0000405)	-0.0967*** (0.0000464)	-0.720*** (0.000187)	-0.550*** (0.000180)	-0.673*** (0.000139)
	ge_sim	-0.0387*** (0.0000409)	0.00935*** (0.0000466)	0.271*** (0.000151)	-0.136*** (0.000157)	-0.00156*** (0.000133)
	rq_sim	-0.162*** (0.0000385)	-0.0906*** (0.0000450)	0.167*** (0.000146)	0.264*** (0.000154)	-0.446*** (0.000118)
	rl_sim	0.393*** (0.0000499)	0.346*** (0.0000659)	0.530*** (0.000140)	0.0494*** (0.000143)	0.168*** (0.000120)
	observations	25131	899	3360	4408	16464
	McFadden R-sq	0.871	0.820	0.853	0.860	0.817

Standard errors in parentheses

* p<0.05

** p<0.01

*** p<0.001

Table 5.1.4 : Results for the estimations in Stage 1.4

		global	north-north	north-south	south-north	south-south
Conventional gravity variables	l_gdpx	0.795*** (0.00000781)	0.737*** (0.0000157)	0.885*** (0.0000276)	0.989*** (0.0000181)	0.960*** (0.0000263)
	l_gdpm	0.771*** (0.00000963)	0.747*** (0.0000193)	0.882*** (0.0000211)	0.979*** (0.0000258)	0.832*** (0.0000242)
	l_distw	-0.676*** (0.0000145)	-0.715*** (0.0000242)	-0.883*** (0.0000383)	-0.483*** (0.0000350)	-0.965*** (0.0000551)
	contig	0.491*** (0.0000349)	0.358*** (0.0000494)	-0.0995*** (0.000208)	0.936*** (0.000170)	-0.0155*** (0.0000908)
	comlang_off	0.323*** (0.0000297)	0.198*** (0.0000418)	0.279*** (0.0000950)	-0.0616*** (0.0000837)	0.736*** (0.0000754)
	PTA	-0.464*** (0.0000322)	n.a.	n.a.	n.a.	0.456*** (0.0000916)
Trade specific institutional homogeneity variables	db_sim	-0.0682*** (0.0000240)	0.164*** (0.0000343)	-0.213*** (0.0000680)	-0.293*** (0.0000539)	0.0993*** (0.0000873)
	etr_sim	-0.0848*** (0.0000419)	-0.0300*** (0.0000516)	0.350*** (0.000153)	-0.110*** (0.000158)	0.213*** (0.000132)
	icyhat_sim	-0.106*** (0.0000263)	-0.302*** (0.0000367)	0.185*** (0.0000941)	0.344*** (0.0000730)	-0.675*** (0.0000771)
Governance related institutional homogeneity variables	psnv_sim	0.130*** (0.0000328)	0.0367*** (0.0000393)	0.483*** (0.000113)	0.407*** (0.000112)	-0.451*** (0.000122)
	cc_sim	0.201*** (0.0000414)	0.0457*** (0.0000507)	-0.173*** (0.000198)	0.465*** (0.000186)	0.131*** (0.0000991)
	va_sim	-0.369*** (0.0000399)	-0.246*** (0.0000465)	-0.719*** (0.000189)	-0.452*** (0.000182)	0.00249*** (0.000116)
	ge_sim	-0.0633*** (0.0000385)	-0.0958*** (0.0000439)	0.285*** (0.000152)	-0.124*** (0.000163)	0.159*** (0.000116)
	rq_sim	-0.0439*** (0.0000371)	0.0469*** (0.0000434)	0.164*** (0.000143)	0.0666*** (0.000163)	0.141*** (0.000109)
	rl_sim	0.251*** (0.0000493)	0.317*** (0.0000658)	0.490*** (0.000141)	0.153*** (0.000156)	0.210*** (0.000109)
Migration effect	l_mig	0.127*** (0.00000633)	0.124*** (0.0000117)	0.0837*** (0.0000187)	0.0448*** (0.0000143)	0.108*** (0.0000136)
	observations	20762	865	3083	4047	12767
	McFadden R-sq	0.898	0.910	0.855	0.862	0.844

Standard errors in parentheses

* p<0.05

** p<0.01

*** p<0.001

5.2 South Asia Results

This section reports the results of the analysis conducted for South Asia exports and Imports. The institutional homogeneity variables and the migration effect are introduced step wise as in the earlier analysis. As indicated earlier, in both the export and import flows, the South Asian identity of the bilateral partner is captured via dummy variable.

In contrast to global trade picture, the South Asian involvement in trade shows clearer patterns of impacts of institutional homogeneities both in the trade-specific class and the governance related class. Table 5.2.1 displays the basic gravity results along with the South Asian partner dummy. Expected signs, high significance and model fit are observed.

Table 5.2.1 : Results for the estimations in stage 2.1

	South-Asian exports	South-Asian imports
l_gdp _x	0.870*** (0.0000781)	0.784*** (0.0000597)
l_gdp _m	0.794*** (0.0000577)	0.674*** (0.0000790)
l_dist _w	-0.922*** (0.000253)	-1.384*** (0.000255)
contig	0.406*** (0.000335)	0.407*** (0.000304)
comlang_off	0.803*** (0.000214)	0.423*** (0.000235)
saarc _m	-1.805*** (0.000677)	
saarc _x		-2.653*** (0.000673)
observations	1015	720
McFadden R ²	0.877	0.832

Standard errors in parentheses

* p<0.05 ** p<0.01 *** p<0.001

Table 5.2.2 : Results for the estimations in stage 2.2

	South-Asian exports	South-Asian imports
l_gdpx	0.855*** (0.0000778)	0.754*** (0.0000697)
l_gdpm	0.758*** (0.0000679)	0.680*** (0.0000805)
l_distw	-0.948*** (0.000266)	-1.290*** (0.000259)
contig	0.704*** (0.000435)	0.642*** (0.000400)
comlang_off	0.592*** (0.000231)	0.215*** (0.000256)
db_sim	-0.549*** (0.000274)	-0.413*** (0.000243)
etr_sim	0.366*** (0.000533)	0.253*** (0.000536)
icyhat_sim	-0.608*** (0.000298)	-0.475*** (0.000278)
saarc_m	-1.521*** (0.000760)	
saarc_x		-2.230*** (0.000761)
observations	994	708
McFadden R ²	0.888	0.845

Standard errors in parentheses

* p<0.05 ** p<0.01 *** p<0.001

Table 5.2.2 reports the outcome after the inclusion of the trade specific institutional homogeneity variables. The effects of these variables appear significant at 1 % level. Homogeneity in the Db score and TR score indicate trade –detering effects while the homogeneity of ET score indicate significant trade enhancement. According to semi-elasticities of South Asian partner dummy, both export and import flows tend to increase when trading with partners outside of the region.

The incremental effect of the inclusion of the governance related institutional homogeneities are reported in the table 5.2.3. Homogeneities in CC and RQ indicate trade trade-enhancing impacts while the other four homogeneities indicate trade deterring effects for both exports and imports of South Asia. One star k deviation from the previous set of analyses is observed in the effect of homogeneity of RL (which appeared to have a consistent trade enhancing effect in the global analysis. Inclusion of migration effect does not alter the behavior of the above variables markedly. While remaining highly significant, migration effect display consistent trade enhancing impact as was observed previously . The trade deterring impact of the South Asian

partners dummy is consistent in all the eight regressions. Other consistent effect observable is the trade enhancing impact of the homogeneity of ET score and the opposite impact of the other two trade specific institutional homogeneities.

Table 5.2.3 : Results for the estimations in stage 2.3

	South-Asian exports	South-Asian imports
l_gdpx	0.846*** (0.0000787)	0.771*** (0.0000736)
l_gdpm	0.774*** (0.0000707)	0.670*** (0.0000807)
l_distw	-1.059*** (0.000282)	-1.436*** (0.000277)
contig	-0.135*** (0.000609)	0.267*** (0.000537)
comlang_off	0.605*** (0.000231)	0.240*** (0.000256)
db_sim	-0.569*** (0.000274)	-0.411*** (0.000243)
etr_sim	0.483*** (0.000643)	0.439*** (0.000573)
icyhat_sim	-0.524*** (0.000309)	-0.424*** (0.000296)
psnv_sim	-0.323*** (0.000551)	-0.141*** (0.000468)
cc_sim	0.238*** (0.000770)	0.511*** (0.000647)
va_sim	-1.073*** (0.000989)	-0.708*** (0.000820)
ge_sim	-0.477*** (0.00124)	-0.590*** (0.00108)
rq_sim	0.818*** (0.000520)	0.374*** (0.000467)
rl_sim	-0.845*** (0.00105)	-0.744*** (0.000841)
saarc_m	-0.897*** (0.000818)	
saarc_x		-1.964*** (0.000798)
observations	994	708
McFadden R ²	0.898	0.854

Standard errors in parentheses

* p<0.05 ** p<0.01 *** p<0.001

Table 5.2.4 : Results for the estimations in 2.4

	South-Asian exports	South-Asian imports
l_gdpx	0.762*** (0.0000880)	0.799*** (0.0000825)
l_gdpm	0.622*** (0.0000881)	0.696*** (0.0000839)
l_distw	-0.756*** (0.000303)	-1.526*** (0.000306)
contig	0.0289*** (0.000604)	0.0692*** (0.000546)
comlang_off	0.146*** (0.000267)	0.223*** (0.000275)
db_sim	-0.371*** (0.000277)	-0.409*** (0.000244)
etr_sim	0.590*** (0.000620)	0.564*** (0.000549)
icyhat_sim	-0.423*** (0.000327)	-0.503*** (0.000304)
psnv_sim	-0.0144*** (0.000532)	0.0211*** (0.000445)
cc_sim	0.226*** (0.000732)	0.505*** (0.000639)
va_sim	-0.306*** (0.000817)	-0.300*** (0.000686)
ge_sim	0.155*** (0.000933)	0.158*** (0.000828)
rq_sim	0.915*** (0.000496)	0.543*** (0.000452)
rl_sim	-0.579*** (0.000856)	-0.479*** (0.000724)
l_mig	0.206*** (0.0000597)	0.00108*** (0.0000573)
saarc_m	-1.245*** (0.000791)	
saarc_x		-1.529*** (0.000748)
observations	778	618
McFadden R ²	0.913	0.857

Standard errors in parentheses

* p<0.05 ** p<0.01 *** p<0.001

6. Conclusions

This paper attempted to account for the relative impacts of trade specific and governance specific institutional environment on bilateral trade via a series of gravity equations while controlling for migration effects. The analysis included the global flows and south Asian specific flows. Looking at the global sample, particularly the large size of the dataset (covering 229 countries) from a recent year (2005) adds to the generalizability of the outcomes. The poisson pseudo maximum likelihood technique was adopted based on the recommendation made in the recent gravity literature regarding the better performance of poisson model compared to the log normal counterpart. All specifications reported high model fit and explanatory power. At all instances, the conventional gravity variables of exporter GDP, Importer GDP, and distance (along with contiguity, common language and membership in the same political and trading association) explained nearly 75 percent of the variation of the dependent variable, an outcome very similar in size to most previous work with gravity models. Multidirectional scaling was implemented to reduce the dimensionality of two multi-faceted trade specific institutional variables (DB and ET).

Both analyses, global and South Asian, confirm the outcomes for the conventional variables in gravity literature. For the global analysis, the trade specific institutional homogeneity does not display significant trade enhancing effects in general. In fact, in a number of instances, the 3 trade specific homogeneity variables display trade deterring impacts. On the other hand, homogeneity in rule of law and political stability appear to be significantly trade enhancing among the governance related institutional variables. South Asian analysis deviates from the global analysis in that much clearer patterns can be observed. Homogeneity in enabling trade variable consistently show trade enhancing effects in the south Asian analysis while the other two variables of the same category act as deterrents. Among the governance homogeneities, control of corruption and regulation quality display consistent trade enhancing impacts for South Asia.

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