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**Institutional Determinants of Bilateral Trade: Taking Another Look**

by

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# Institutional Determinants of Bilateral Trade: Taking Another Look

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## Abstract

This paper examines institutional determinants of bilateral trade in a thorough fashion, paying special attention to the issues of selecting institutional measures (using a new dataset), institutional endogeneity (cleansing the endogenous part) and state of the art gravity trade estimations (controlling for multilateral resistance). In terms of the institutional focus, we emphasize, as de Groot et al. (2004), that institutional distance can be an even more relevant determinant of trade than institutional quality on its own, but correct for the technical and substance shortcomings of the afore mentioned paper. We find that not all institutions matter for trade. The consistent effect is that of the quality of origin and destination country's legal institutions, which both increase trade. In terms of political and economic institutions, only the quality of origin's political institutions and destination's economic institutions increase trade, the latter being most salient. More importantly, we highlight the importance of the effect of institutional distance on trade, showing that economic distance affects trade significantly and negatively, an effect practically impossible to dissipate in any specification. Our conclusion in this research is that countries which are more similar in terms of economic institutions, trade more with each other, and that the quality of legal institutions is always conducive to general trade, but surprisingly does not determine your trade partners. Finally, we show that the use of only one of the proxies generally used by the literature to control for institutional environment can be biased and misleading in terms of what is actually being controlled for.

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# I  Introduction

The vacuum in which neoclassical economics operates is one where all transactions happen instantaneously and without cost. Coase (1937, 1960) argued that legal rules in the form of well defined property rights are necessary for obtaining an efficient outcome in cases with externalities. He noted as well, that due to positive costs associated with bargaining, some of these welfare enhancing transaction do not take place. Property rights and legal rules are not the only factors contributing to transaction costs. A large part of transaction costs can be attributed to the limited capacity of the human mind and incomplete information. There are, naturally, other rules, which are named institutions and have a direct or indirect effect on transaction costs, which should be taken into account in economic analysis. "It makes little sense for economists to discuss the process of exchange without specifying the institutional setting within which the trading takes place, since this affects the incentives to produce and the costs of transacting."(Coase, 2005)

The aim of this paper is to examine some of the aspects of institutions in international trade. It is there where the differences in institutional environments are most emphasized and come to the the forefront of importance. If we imagine the number of informal and formal rules necessary to exchange some bushels of wheat for some bushels of corn within a country, we can only imagine the multiplied numerous of informal and formal rules necessary to do the same exchange on an international level. It is not straightforward to exchange a Chinese apple for a French pear, as the firms wanting to do the transaction come from two completely different institutional settings. The institutional efficiency which reduces transaction costs is at least as if not easily more important on the international exchange level, as it is important in domestic transactions.

We concentrate on capturing the entire institutional environment, using a new dataset on institutions, which based on theory disaggregates formal institutional environment into legal, political and economic. The added value of this paper is that it is one of the few that examines the effect of institutional environment on trade, using a comprehensive set of institutional measures derived from the theory, and that it especially concentrates on the effect of institutional distance, which is completely underrated in both theory and empirics. The conclusions are that not all institutions matter for trade. Origin and destination country's legal institutions do increase trade, as do origin's

political institutions and destination's economic institutions. The latter is in fact the most salient out of all institutional variables. Moreover, we highlight the importance of the effect of institutional distance on trade, showing that economic distance affects trade significantly and negatively, an effect practically impossible to dissipate in any specification. Our conclusion in this research is that countries which are more similar in terms of economic institutions, trade more with each other.

Section II of this paper presents the literature in the field of trade and institutions. Section III sets up the theoretical framework, and Section IV proposes an empirical specification of the research question at hand and presents the data used. Section V presents and discusses the empirical results, and Section VI concludes with some thoughts of the issues at hand.

## II    Literature review on trade and institutions

Institutions are important because they matter for growth and can account for cross country income levels differences (Hall and Jones, 1999; Acemoglu et al., 2001; Easterly and Levine, 2003). There is a body of work linking together the literature dealing with geographical and institutional determinants and growth (or income differences) on the one side, and on the other, a more specific body of literature deals directly with the effect of institutions on trade, which is the focus of this paper. Existing literature is summarized in Table 1, with the most relevant paper for our topic discussed in detail below.

Table 1: Literature on trade and institutions

| Authors | Journal | Main inst. proxy | Conclusions | Inst. dist. |
|---|---|---|---|---|
| **Growth (or incomes), trade and institutions** | | | | |
| Dollar and Kraay (2003) | Journal of Monetary Economics | WB WGI | Both trade and institutions are important in the long run, but trade is more important in the short run. | no |
| Rodrik et al. (2004) | Journal of Economic Growth | WB WGI | Institutions are crucial for development, more so than openness or geography, their conclusion being that: "Institutions rule" | no |
| Bhattacharyya et al. (2009) | The Economic Record | ICRG Political risk | The interaction of institutions and trade share affects development and thus that trade share and institutions should be examined as complements. | no |
| **Trade and institutions (focus on contract imperfectiveness)** | | | | |
| Cowan and Neut (2007) | Working Papers Central Bank of Chile | ICRG Political risk | "industries with a more complex intermediate goods structure suffer a relatively larger loss of productivity in countries with poorer institutions" | no |
| Levchenko (2007) | Review of Economic Studies | WB WGI | Institutional differences (legal) are a significant determinant of bilateral trade flows, in the sense that the import share of a particular sector (controlling for the reliance of the sector on contracting institutions) is higher for countries with better institutions. | no |
| Nunn (2007) | Quarterly Journal of Economics | WB WGI | Countries with good contract enforcing institutions specialize in those sectors (products) which rely on contract enforcing the most. | no |
| **Trade and institutions (general approach)** | | | | |
| Anderson and Marcouiller (2002) | The Review of Economics and Statistics | Corruption and Rule of Law (World Economic Forum) | Institutions can considerably reduce international trade, if not of adequate quality. | no |
| de Groot et al. (2004) | Kyklos | WB WGI | Both the home and host countries' quality of institutions matter for trade flows, and institutional homogeneity has an additional explanatory value and significantly and positively effects bilateral trade. | yes |
| Belloc (2006) | Journal of Economic Surveys | / | Institutions affect international trade through three channels; exchange, industrial organization process (the make or buy decision) and financial markets | no |
| Berkowitz et al. (2006) | Review of Economics and Statistics | ICRG Political risk | Both the institutions of the importer as well as exporter matter. Moreover, the effect of institutions differs with regards to product (industry complexity). They find that production costs effect is stronger than the trade costs effect, and consequently, more relevant for complex products. | no |

Cowan and Neut (2007), Levchenko (2007), and Nunn (2007) emphasize the effect of institutions on trade mainly through contract imperfectiveness directly, with a comparative advantage based on better institutions for institution intensive sectors or countries. This channel of influence follows also from theoretical models such as (Acemoglu et al., 2007). They show that comparative advantage emerges from the cross country differences in contracting institutions, as contractual incompleteness leads to the adoption of less advanced technologies. A more general approach to institutions entails looking at a wider range of rules of the games, which can have tangible and more intangible transaction costs, without necessarily pin pointing them down to contractual relationships or basing comparative advantages on them. Examples of such, more general attempts at capturing the effect of institutions on trade include Anderson and Marcouiller (2002), de Groot et al. (2004), Belloc (2006), Berkowitz et al. (2006), with some of them in between the first and second group. Another way of looking at the two ways of including institutions into trade analysis is that mainly, institutions affect trade most directly either through influencing production costs, leading to the comparative advantage treatment of institutions and patterns of trade, or through trade costs, implying an aggregated transaction cost effects. Both approaches yield interesting findings, albeit they are answering different questions. In this paper, we focus on the second type of inclusion of institutions and focus on institutional effects on trade costs.[1]

The work by de Groot et al. (2004) is particularly salient for this paper, as it is one of the few applications of the idea that institutional distance, or as they call it in their paper - institutional homogeneity, must be playing an important role in bilateral trade flows. The authors explicitly research what effect a series of institutional indicators have on bilateral trade flows, when the institutions are included as trade barriers within the standard gravity model. They use bilateral trade data (both imports and exports) for the world in 1998 on a country level, and besides the common border, language, religion and colonial past dummies, use also the set of quality of governance indicators from WB WGI (Kaufmann et al., 2002). They test both the effect of home and host country quality of institutions, as well as the effect of institutional homogeneity. The latter is defined as a dummy variable taking the value of 1 if the countries are institutional homogenous according to a criteria (the institutional distance of a pair of countries being below either under 1, 2 or 3 SD of

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[1]However, the institutional measures used in this paper are highly appropriate for testing the comparative advantage institutional approach through research on sectoral or product level trade.

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the sample). They discover that both the home and host countries' quality of institutions matters, as it increases bilateral trade flows. Institutional homogeneity as well, when defined for a wide enough group (taking either 2 or 3 SD as the cut off value), has an additional explanatory value and significantly and positively affects bilateral trade, but only when looked at broadly (excluding only the countries with a SD of over 2 or 3 in the institutional distance).[2] Moreover, the effect of governance homogeneity does not depend on the levels of governance: "Differences in institutional effectiveness affect trade, independently of the impact of governance effectiveness itself." (de Groot et al., 2004).

That being said, it is important to note that the paper has some technical as well as substance shortcomings, which is one of the reasons for our paper. On the technical side, the data used is a cross-section of countries from 1998, which from the starts limits the econometrics options and has an inherent risk of endogeneity, since dyadic fixed effects and with that - multilateral resistance (see discussion in Section 4) - can not be controlled for. On the substance side, the paper uses WB WGI as their measure of institutions, although these indicators are in fact capturing only governance and should be treated and interpreted as such. When trying to control for the institutional environment, more thought is needed, starting from the theory and arriving at a more complete set of indicators, which can than account for all the dimensions of (at least) formal institutional environment (see more in Section 4).

In summary of the existing literature, the indicators mostly used in the literature to test the effect of institutional quality on trade are the indices from World Bank World Governance Indicators (Kaufmann et al., 2009), predominantly only the rule of law index, or indices from Political Risk Service from ICRG, where also rule of law index is often used. Never, however, do the studies take into account the underlying new institutional economics theory, control for different institutional environments and rarely include any measure of institutional homogeneity or distance.

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[2]Interestingly enough, the authors also show, that the effect of economic development (proxied with GDP p.c.) on trade flows disappears, when controlling for institutional quality, which implies that institutions are in fact the factor driving the development, or at the very least, the effect of development on trade flows.

# III Theoretical framework

A model, which provides a direct link between country characteristics, country pair characteristics, trade flows and which has become the literature's workhorse model for the study of bilateral flows, is the gravity model. It can be theoretically derived from a variety of models, but more interestingly, Head and Mayer (2011a) and Head and Mayer (2011b) show how the gravity relationship can be expressed using only two conditions; importer's budget allocation and exporter's market clearing.

The first condition denotes that expenditures of country $j$ $X_j$ are allocated between goods from different countries, $ij$ being the share of expenditures in country $j$ being spent on goods from country $i$, yielding the total value of trade from country $i$ to $j$ as $X_{ij}$ as $X_{ij} = \Pi_{ij} X_j$. The sum of all shares $ij$ over $i$ is one and the sum of all bilateral flows $X_{ij}$ over $i$ is $X_j$. The crucial step is to show that $\Pi_{ij}$ can be expressed in the multiplicative form $\Pi_{ij} = \frac{A_i \phi_{ij}}{\Phi_j}$ , where $A_i$ are the characteristics of the exporter $i$, $0 \leq \phi_{ij} \leq 1$ measures the accessibility of the market and can be thought of as the total trade costs, and $\Phi_j$ is the degree of competition in the market $j$. The exact form of $\phi_{ij}$ depends on the underlying theoretical model, but the form remains the same. Head and Mayer (2011b) show in their online appendix to Head and Mayer (2011a), that this form is compatible with a wide range of extensively used theoretical models, such as CES national product differentiation models, CES monopolistic competition (Dixit-Stiglitz-Krugman) models, models with heterogeneous consumers, models with heterogeneous industries (comparative advantage) and the newest set of models with heterogeneous firms (Melitz-Chaney type models). We can then write the first step version of the gravity specification as in Equation 1.

$$X_{ij} = \Pi_{ij} X_j = A_i \frac{X_j}{\Phi_j} \phi_{ij} \tag{1}$$

The second condition, the market clearing for the exporter, tells us that the total value of production for each exporter $Q_i$ has to be the same as the sum of shipments to all destinations, including itself: $Q_i = \sum_j X_{ij}$. At the world level, production equals expenditure, so we can write $Q = X$, and thus country j's share in the world expenditure equals the share in the world production $\frac{X_j}{X} = \frac{X_j}{Q}$. Using this identities we can reexpress the market clearing condition as in Equation 2, where $\Phi_i^*$ is the market potential or access term, central in economic geography (see more in Head and Mayer (2011a)).

$$Q_i = \sum_j \Pi_{ij} X_j = A_j \sum_j \frac{X_j \phi_{ij}}{X \Phi_j} X = A_i \Phi_i^* Q \tag{2}$$

Expenditures $Q_i$ of a country are equal to the country's nominal GDP $Y_i$, so we can express $A_i$ as $A_i = \frac{Y_i}{\Phi_i^* Y}$, and substitute it in Equation 1, which yield the theoretical gravity equation specification in Equation 3.

$$X_{ij} = \frac{Y_i}{\Phi_i^* Y} \frac{X_j}{\Phi_j} \phi_{ij} = \frac{1}{Y} \frac{Y_i}{\Phi_i^*} \frac{X_j}{\Phi_j} \phi_{ij} \tag{3}$$

Cross section Equation 3 can then be extended to the time dimension and used to arrive at consistent empirical estimates of factors affecting bilateral trade flows. Trade costs $\phi_{ij}$ are an integral part of trade flows analysis, and it is argued that besides distance, even more important than trade policy instruments are institutional factors such as law enforcement, property rights and informal institutions (Anderson and van Wincoop, 2004). The broad definition of trade costs is for instance in the widely cited paper by Anderson and van Wincoop (2004):

> Trade costs, broadly defined, include all costs incurred in getting a good to a final user other than the marginal cost of producing the good itself: transportation costs (both freight costs and time costs), policy barriers (tariffs and nontariff barriers), information costs, contract enforcement costs, costs associated with the use of different currencies, legal and regulatory costs, and local distribution costs (wholesale and retail).

The quality of institutions in both the country of origin as well as the importing country plays a direct role in the frequency and magnitude of the above trade costs. Specifically, the share of trade costs which is dependent on institutions will be country specific: "Poor institutions [...] penalize trade differentially across countries." (Anderson and van Wincoop, 2004).

We hypothesize that it is not only the quality of institutions of both countries that will have a considerable effect on bilateral trade flows, it is also the institutional distance, calculated as institutional quality of origin country $i$ minus institutional quality of destination country $j$. This notion rests on a logic similar to the gravity equation for intra-industry trade, where similar countries trade with one another. It extends this concept of similarity to institutional framework. We argue that the difference in the quality of institutions is an important determinant of trade costs

and thus trade flows, as firms will tend to trade with firms from similar institutional environments. This in turn aggregates on a macro level to larger trade flows between countries where institutional distance is small (controlling of course, for other relevant factors and especially the levels of relevant institutions).

The studies mentioned in the literature review have established that institutional factors do indeed have an effect on trade, however, they are somewhat arbitrary in choosing which institutions to include. The question this paper deals with is the robust estimates of the effect of institutional quality as well as concentrating on the effect of institutional distance on trade.

## IV    Empirical framework and data

The prevalent model for bilateral trade flows research has for long been the gravity model, and it provides a direct link between trade flows and trade barriers, while incorporating the relevant factors affecting trade flows. One of the first applications of the gravity theory was Anderson (1979), followed by a number of papers, more recently papers such as McCallum (1995), Rose (2000), and Rose and van Wincoop (2001).

Since Anderson and van Wincoop (2003), it has however, became apparent that the multilateral resistance term $\frac{1}{\Phi_i^* \Phi_j}$ from theoretical gravity Equation 3 has to be accounted for. Only including respective countries GDP's in estimation, without the market potential and market competition terms, biases the estimates on the trade cost term, as market competition depends on the capabilities of all exporters present in that market and the ease of market access $\Phi_j = \sum_i A_i \phi_{ij}$. Baldwin and Taglioni (2006) write about the three medals mistakes one can commit in estimating the gravity equation. They name the inclusion of country GDP's in the attempt to correctly capture the market potential and market competition terms as the gold medal mistake.

Equation 3 with the additional time dimension, expressed for a country $i$, can be log linearized and estimated. The time varying term $ln\frac{1}{Y_t}$ is captured with time dummies, while the monadic terms (that vary on the $it$ and $jt$ dimension) are log of GDP per capita and log of population, which accounts both for size of the country and its level of the development. The most interesting

term is the bilateral trade openness term $\phi_{ijt}$ which is proxied with a set of control variables from Head et al. (2010), some of which are time invariant dyadic controls, and some are time variant dyadic controls. The first group of controls (which vary on the ij dimension) are log of distance, shared border, shared language, colonial history and being a colony, while the second group of controls (which vary on the ijt dimension) are regional trade agreeement (RTA), both countries being members of General Agreement on Tarifs and Trade, sharing a currency and the preferential treatment of exports from Aasia-Carribean-Pacific preferential trade countries to the EU.

The institutional quality variables come from Kuncic (2012), who calculates the relative quality of formal institutional environment for all countries in the world in the period 1990 - 2010. Deriving the institutional measures from the theory and using more than thirty existing institutional indices, the underlying quality of legal, political and economic institutions is calculated for each country in every year, relative to all the others. These three institutional monadic variables that vary on the $it$ and $jt$ dimension are additionally used in calculating institutional distance terms, by subtracting the destination's quality of each institutional environment to the origin's one and taking the absolute value of the result. Measures of institutional distance thus vary on the $ijt$ dimension. Institutional distance calculated on the basis of afore mentioned indicators captures the relative distances between countries very well, as it the indicators themselves are calculated on a relative basis.

Consistent estimates of the gravity equation involve controlling for exporter-time fixed effects and for importer-time fixed effects, which besides monadic terms also captures the multilateral resistance term $\frac{1}{\Phi_{it}^* \Phi_{jt}}$ and thus is not biasing the estimates of $\phi_{ijt}$. However, controlling for monadic-time fixed effects firstly presents itself as a technical problem, as the econometric software can not process such a large number of dummies; with 50 years of data and 200 countries, this would imply 20000 dummies would have to be estimated. The literature resolves the problem of multilateral resistance in two ways. The first is by controlling for what it can, which implies, besides the usual explanatory variables, controlling also for time, exporter, importer and dyadic fixed effects. The rationale is that by including all the fixed effects possible, depending of course on specific research focus at hand, the results of the gravity specification should be fairly robust. The second way of controlling for the multilateral resistance is by exploiting the multiplicative form of the gravity equation, as the problematic monadic terms can be canceled out by taking ratios of flows, as for

instance the friction specification used by Head and Ries (2001), or, taking the ratio of ratios, called the tetrads specification in Head et al. (2010). The latter one cancels out everything exporter-time and importer-time specific and allows for consistent estimates of the effect of trade costs and barriers that vary on the $ijt$ dimension, although the explanatory power of this approach is incredibly low. An additional problem with controlling for the importer-timer and exporter-time fixed effects is, that the monadic variables can not be identified anymore. This implies that also the effect of the quality of institutional environment can not be identified in the tetrads specifications, as it varies only on the $it$ and $jt$ dimension. However, the dyadic time varying variables, which vary on the $ijt$ dimension, can still be identified, which also includes institutional distance. Additionally, the tetrads specification in fact leaves very little variation to be looked at, and has to due to this obsessive cleansing property, be taken with a large grain of salt.

Furthermore, the endogenous nature of institutions requires an additional solution, besides controlling for multilateral resistance. Institutions are well known for being correlated with other measures of development. Since the use of panel data with country fixed effects prevents us from using time invariant instruments such as settler mortality (Acemoglu et al., 2001) or latitude and longitude of a country as instruments for institutions, we follow Bnassy-Qur et al. (2007) in cleansing our institutional variables of their endogenous part. We regress GDP per capita of both origin and destination country on each of ours institutional measures, and collect the residual. This makes the collected institutional residuals and calculated institutional distance orthogonal to the capture-all development variable GDP per capita.

We show the structure of the data and the dangers of not controlling for fixed effects properly or not cleansing the institutional variables of their endogeneity with a progression of regressions. We start with the most common, sometimes also called naive gravity equation, and then proceed to include and control for an increasing number of fixed effects, controlling for multilateral resistance, we also show the results of the tetrads specification, where exporter-time fixed effects and importer-time fixed effects are completely controlled for. Finally, we use the orthogonal values of institutional variables in our preferred regression. Next, we are particularly interested in the effect of institutional distance on trade flows, allowing also for alternative specifications of institutional distance and interactions. The world trade data, which includes trade flows between all countries in the world

for a period of almost 60 years, comes from Head et al. (2010), the institutional data, which includes data on relative quality of legal, political and economic institutions for all countries in the world in the period 1990 - 2010 comes from Kuncic (2012), and thorough descriptions of both datasets can be found in the respective papers.

# V   Empirical estimations and discussion

In this section, we show the progression of gravity estimations, from the first one, plagued by several possible homogeneities, than controlling for one by one and finally arriving at out preferred regression, which controls for as much as possible, while still allowing us to identify our variables of interest. We continue with an alternative specification of institutional distance. As a robustness check, we also show the relation of our preferred institutional measures to other indices widely used in the literature.

We take Equation 3 to the data with several ways of controlling for fixed effects, which is shown in baseline gravity results in Table 2.[3] In regressions 1 to 4 we gradually increase the fixed effects included in the estimation, while regression 5 controls for all fixed effect, and also uses the orthogonalized values of institutional measures.

The results in Table 2 point to several empirical findings. The result of the simple, naive gravity specifications, only including time dummies, as regression 1 shows, can be misleading, both in terms of significance as well as the sign on our institutional variables, which is to be expected due to the endogenous nature of institutions. The problematic institutional bias persists even when

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[3]In order for our results to be comparable after the inclusion of institutional variables, we firstly establish some baseline gravity regressions, which replicate the results from Head et al. (2010) using firstly the naive gravity specification, with only year fixed effects, and also gravity specification with year, country and dyadic fixed effects. We are successful in replicating the results, as all the variables have the expected sign, significance and magnitude. Once we established the baseline to start from, we continue with running the same gravity specifications on only the observations, which have institutional values and are later used in the gravity specifications with institutions. Comparing the results of gravity estimations of the subsample with institutional values to the entire sample, the results do not change much. This implies, that the possible changes in the effect of common gravity variables on trade can not be attributed to sample selection issues based on data availability, but to the inclusion of new institutional variables. All the mentioned results are available upon requests and not shown here in the interest of space.

additionally controlling for country fixed effects in regression 2, as we are able to detect a positive and significant coefficient on the legal institutional distance. Not controlling for dyadic fixed effects leads to a biased positive and even significant coefficient on legal institutional distance. There must be something specific in the bilateral relations, which correlates positively with legal institutional distance. Additionally, it is uncommon that hardly any institutional variable that captures levels, is significant. The tetrad regression in column 3 controls for complete multilateral resistance, as it controls for exporter-time and importer-time fixed effects, time fixed effects and dyadic fixed effects. The sign, magnitude and significance of economic institutional distance does not change, implying robustness in our estimates of economic institutional distance. Legal institutional distance, however, is not significant anymore, although it keeps the right sign. Surprisingly, in the tetrad specification, also political institutional distance is significant, and positive, implying that countries that are further apart in terms of their quality of political institutions trade more. We not say anything about the effect of exporter and importer quality of institutions, which can not be identified in this specification.

Our preferred regression is regression 5, which controls both for time fixed effects and dyadic fixed effects, which by construction of multicolinearity also control for exporter and importer fixed effects. Additionally, we orthogonalize the institutional variables to the capture-all variable GDP per capita, and thus take a large step towards purging institutional variables of their endogeneity. The results imply that what effects trade positively, are origin's legal and political institutions, and destination's legal and economic institutions. In terms of subject category, the quality of legal institutions is dominant, as both partner's legal institutions matter. But in terms of magnitude, the most salient institutional factor is the quality of economic institutions in the destination country, as their increase for one standard deviation implies an increase of exports to that country for about 15%. The negative effect of economic institutional distance implies a trade diversion effect. For an exporter, an increase in the quality of its economic institutional environment leads to a shift of exports from the countries economically further away from the exporter to the countries economically closer to the exporter. An increase in economic institutional distance reduces trade by more than 10%. Similar countries, in terms of economic institutions, trade more.

## Table 2: Baseline results

dep. var. ln(exports)

| | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| lnpop_o | 1.249*** | -0.411* | | 0.246 | 0.300 |
| | (0.0107) | (0.210) | | (0.206) | (0.207) |
| lnpop_d | 1.013*** | 1.840*** | | 1.690*** | 1.655*** |
| | (0.0103) | (0.192) | | (0.180) | (0.182) |
| lngdpcap_o | 1.041*** | 0.218*** | | 0.238*** | 0.277*** |
| | (0.0192) | (0.0402) | | (0.0382) | (0.0393) |
| lngdpcap_d | 0.914*** | 0.619*** | | 0.649*** | 0.712*** |
| | (0.0168) | (0.0407) | | (0.0372) | (0.0364) |
| lndistw | -1.184*** | -1.470*** | | | |
| | (0.0238) | (0.0262) | | | |
| contig | 1.060*** | 0.681*** | | | |
| | (0.100) | (0.107) | | | |
| comlang_off | 0.549*** | 0.649*** | | | |
| | (0.0531) | (0.0520) | | | |
| comleg | 0.309*** | 0.287*** | | | |
| | (0.0377) | (0.0324) | | | |
| col_hist | 0.309*** | 0.572*** | | | |
| | (0.0900) | (0.0881) | | | |
| col_always | -1.245 | -2.040 | | | |
| | (1.421) | (1.613) | | | |
| rta | 0.0963* | 0.0964** | 0.118** | 0.0755** | 0.0805*** |
| | (0.0518) | (0.0480) | (0.0472) | (0.0306) | (0.0307) |
| gatt | 0.0555 | 0.258*** | 0.00827 | 0.285*** | 0.277*** |
| | (0.0389) | (0.0442) | (0.158) | (0.0376) | (0.0377) |
| comcur | -0.327*** | -0.269** | 0.0542 | 0.0540** | 0.113*** |
| | (0.118) | (0.128) | (0.0427) | (0.0269) | (0.0264) |
| acp_to_eu | 0.125 | 0.730*** | -1.142*** | -1.175*** | -1.209*** |
| | (0.0947) | (0.0841) | (0.228) | (0.167) | (0.168) |
| legal_rel_o | 0.221*** | 0.0344 | | 0.0219 | 0.0474* |
| | (0.0395) | (0.0312) | | (0.0286) | (0.0268) |
| political_rel_o | -0.114*** | 0.0704** | | 0.0350 | 0.0668** |
| | (0.0376) | (0.0355) | | (0.0349) | (0.0301) |
| economic_rel_o | 0.345*** | -0.00866 | | -0.0422 | -0.0150 |
| | (0.0362) | (0.0270) | | (0.0258) | (0.0258) |
| legal_rel_d | 0.0735* | 0.0360 | | 0.0280 | 0.0549** |
| | (0.0409) | (0.0318) | | (0.0294) | (0.0271) |
| political_rel_d | -0.123*** | 0.0489 | | -0.0104 | 0.0220 |
| | (0.0358) | (0.0358) | | (0.0348) | (0.0306) |
| economic_rel_d | 0.288*** | 0.159*** | | 0.101*** | 0.139*** |
| | (0.0348) | (0.0298) | | (0.0277) | (0.0260) |
| ABSlegal_reldiff | 0.0923*** | 0.246*** | -0.0252 | -0.0599*** | -0.00769 |
| | (0.0306) | (0.0264) | (0.0292) | (0.0229) | (0.0205) |
| ABSpolitical_reldiff | -0.154*** | -0.0238 | 0.0768** | 0.0162 | 0.0308 |
| | (0.0306) | (0.0258) | (0.0363) | (0.0285) | (0.0227) |
| ABSeconomic_reldiff | 0.0348 | -0.163*** | -0.206*** | -0.183*** | -0.105*** |
| | (0.0266) | (0.0237) | (0.0266) | (0.0207) | (0.0198) |
| Constant | -9.576*** | -3.191** | -2.69e-09 | -10.23*** | -11.30*** |
| | (0.300) | (1.329) | (0.0125) | (0.958) | (0.944) |
| Observations | 97,086 | 97,086 | 92,499 | 97,086 | 97,086 |
| R-squared | 0.716 | 0.788 | 0.026 | 0.934 | 0.934 |
| Time FE | YES | YES | YES | YES | YES |
| Exporter FE | NO | YES | YES | YES | YES |
| Importer FE | NO | YES | YES | YES | YES |
| Dyadic FE | NO | NO | YES | YES | YES |
| Orthogonal institutions | NO | NO | NO | NO | YES |

Country pair robust standard errors in parentheses.

When dyadic fixed effects are included, this by construction also controls for exporter and importer fixed effects.

With the tetrads, it is CGM standard errors, and the FE are in fact Exporter-time and Importer-time.

The reference importer and exporter are France and Great Britain.

*** p<0.01, ** p<0.05, * p<0.1

We test the effect of institutional distance by yet another way, following de Groot et al. (2004). In Table 3, institutional quality is redefined with dummy variables. Instead of using the orthogonalized cardinal institutional quality measure from Kuncic (2012), we define institutional quality dummies on legal, economic and political institutional differences as being one, if the orthogonal institutional distance is less than either one, two or three standard deviations of the sample in each year. In Table 3 we confirm our results from Table 2 column 5, both in terms of the effects of institutional levels as well as in terms of the positive effect of institutional similarity/homogeneity (which corresponds to a negative effect of institutional distance) in economic institutions. The effect of economic institutional homogeneity can be, in contrast to de Groot et al. (2004), detected at all the chosen cut-offs, does not depend on the inclusion of institutional levels (apart from one case) and is stable.

## Table 3: Institutional homogeneity

dep. vari. ln(exports)

| | (1) <br> < 1 std. dev. | (2) <br> < 1 std. dev. | (3) <br> < 2 std. dev. | (4) <br> < 2 std. dev. | (5) <br> < 3 std. dev. | (6) <br> < 3 std. dev. |
|---|---|---|---|---|---|---|
| lnpop_o | 0.294 | 0.956*** | 0.283 | 0.943*** | 0.289 | 0.946*** |
| | (0.206) | (0.139) | (0.206) | (0.139) | (0.206) | (0.139) |
| lnpop_d | 1.649*** | 1.322*** | 1.639*** | 1.309*** | 1.644*** | 1.312*** |
| | (0.182) | (0.122) | (0.182) | (0.122) | (0.182) | (0.122) |
| lngdpcap_o | 0.279*** | 0.426*** | 0.279*** | 0.422*** | 0.276*** | 0.420*** |
| | (0.0395) | (0.0319) | (0.0395) | (0.0318) | (0.0393) | (0.0317) |
| lngdpcap_d | 0.714*** | 0.712*** | 0.714*** | 0.708*** | 0.712*** | 0.707*** |
| | (0.0364) | (0.0298) | (0.0364) | (0.0298) | (0.0364) | (0.0297) |
| rta | 0.0746** | 0.200*** | 0.0759** | 0.200*** | 0.0826*** | 0.205*** |
| | (0.0306) | (0.0276) | (0.0306) | (0.0275) | (0.0308) | (0.0275) |
| gatt | 0.269*** | 0.0608** | 0.273*** | 0.0610** | 0.272*** | 0.0591** |
| | (0.0376) | (0.0281) | (0.0377) | (0.0281) | (0.0377) | (0.0281) |
| comcur | 0.114*** | 0.0958*** | 0.107*** | 0.0819** | 0.105*** | 0.0845** |
| | (0.0264) | (0.0341) | (0.0265) | (0.0340) | (0.0265) | (0.0340) |
| acp_to_eu | -1.217*** | -0.830*** | -1.215*** | -0.834*** | -1.216*** | -0.832*** |
| | (0.168) | (0.109) | (0.168) | (0.108) | (0.168) | (0.108) |
| legal_rel_o | 0.0535** | | 0.0518* | | 0.0511* | |
| | (0.0268) | | (0.0268) | | (0.0268) | |
| political_rel_o | 0.0643** | | 0.0623** | | 0.0589** | |
| | (0.0301) | | (0.0301) | | (0.0300) | |
| economic_rel_o | -0.00570 | | -0.00884 | | -0.0116 | |
| | (0.0260) | | (0.0259) | | (0.0258) | |
| legal_rel_d | 0.0609** | | 0.0588** | | 0.0584** | |
| | (0.0269) | | (0.0270) | | (0.0270) | |
| political_rel_d | 0.0196 | | 0.0172 | | 0.0143 | |
| | (0.0300) | | (0.0302) | | (0.0301) | |
| economic_rel_d | 0.148*** | | 0.146*** | | 0.142*** | |
| | (0.0261) | | (0.0261) | | (0.0259) | |
| ABSlegal_reldiff<xSD | 0.0227* | 0.0401*** | -0.00700 | 0.0242 | 0.0160 | 0.0380 |
| | (0.0127) | (0.0115) | (0.0174) | (0.0160) | (0.0268) | (0.0256) |
| ABSpolitical_reldiff<xSD | -0.00865 | -0.00568 | 3.64e-05 | 0.00293 | -0.00587 | -0.0202 |
| | (0.0146) | (0.0130) | (0.0211) | (0.0185) | (0.0410) | (0.0348) |
| ABSeconomic_reldiff<xSD | 0.0159 | 0.0366*** | 0.0821*** | 0.126*** | 0.174*** | 0.247*** |
| | (0.0125) | (0.0129) | (0.0180) | (0.0188) | (0.0339) | (0.0351) |
| Constant | -11.35*** | -13.39*** | -11.35*** | -13.23*** | -11.45*** | -13.35*** |
| | (0.964) | (0.650) | (0.945) | (0.666) | (0.964) | (0.666) |
| Observations | 97,086 | 139,320 | 97,086 | 139,320 | 97,086 | 139,320 |
| R-squared | 0.934 | 0.911 | 0.934 | 0.911 | 0.934 | 0.911 |
| Time FE | YES | YES | YES | YES | YES | YES |
| Exporter FE | YES | YES | YES | YES | YES | YES |
| Importer FE | YES | YES | YES | YES | YES | YES |
| Dyadic FE | YES | YES | YES | YES | YES | YES |
| Orthogonal inst. | YES | YES | YES | YES | YES | YES |

Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Finally, in Table 4, we show that it is not irrelevant how an institutional environment is controlled for. We use three of the most common institutional indicators from the literature to run the gravity equation on our sample. In regression (1) and (2), the indicator Law and Order from ICRG is used firstly on its own, and then along side our institutional measures. When only this indicator is included, the level of legal institutional quality in the origin country has a significant negative effect on trade, and significant positive effect on the destination side. The absolute difference is insignificant. Once we include the complete set of institutional controls, the effect of the destination country's legal environment disappears, although bizarrely, the origin's legal quality maintains its significance and sign. Results with using the indicator Rule of Law Index from World Bank Governance indicators in regressions (3) and (4) go from a significant and positive effect of the destination country's index, to a significant and negative effect of the origin country's index, although in both cases, the institutional distance of rule of law is negative and significant. Regressions (5) and (6) include the entire WB WGI index, where after controlling for institutional environment, the quality levels of destination's governance looses it's significance, but the difference remains negative and significant. The results can be interpreted firstly as robustness checks of our institutional measure, where we can largely confirm the results from before, namely that the quality of destination's country economic institutions and the quality of origin's political institutions has a robust and significant positive effect[4], while the distance on economic institutions impedes trade significantly. Secondly, the results also imply that trying to control for institutions with one simple index can give misleading results on the the institutional measure taken, and, is not capturing the other aspects of institutions (political and economic, in this case).

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[4]Home and destination's quality of legal institutions are not constantly significant, which is not surprisingly due to the inclusion of other legal indicators that also explain such variation, but they do keep the right sign.

Table 4: Comparison to other institutional proxies

|  | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
|  | index=laword | index=laword | index=ruleoflaw | index=ruleoflaw | index=WGI | index=WGI |
| lnpop_o | 0.484** | 0.341* | 0.326 | 0.199 | 0.327 | 0.213 |
|  | (0.201) | (0.206) | (0.210) | (0.218) | (0.211) | (0.219) |
| lnpop_d | 1.654*** | 1.653*** | 1.581*** | 1.639*** | 1.667*** | 1.691*** |
|  | (0.175) | (0.182) | (0.180) | (0.188) | (0.179) | (0.188) |
| lngdpcap_o | 0.284*** | 0.302*** | 0.260*** | 0.295*** | 0.233*** | 0.270*** |
|  | (0.0400) | (0.0401) | (0.0406) | (0.0411) | (0.0407) | (0.0420) |
| lngdpcap_d | 0.717*** | 0.709*** | 0.651*** | 0.666*** | 0.637*** | 0.672*** |
|  | (0.0370) | (0.0372) | (0.0387) | (0.0392) | (0.0392) | (0.0404) |
| rta | 0.0936*** | 0.0854*** | 0.0620** | 0.0561* | 0.0649** | 0.0599* |
|  | (0.0305) | (0.0306) | (0.0307) | (0.0309) | (0.0307) | (0.0308) |
| gatt | 0.290*** | 0.278*** | 0.356*** | 0.336*** | 0.354*** | 0.337*** |
|  | (0.0373) | (0.0375) | (0.0400) | (0.0405) | (0.0401) | (0.0406) |
| comcur | 0.101*** | 0.120*** | 0.103*** | 0.112*** | 0.0806*** | 0.0976*** |
|  | (0.0269) | (0.0272) | (0.0260) | (0.0262) | (0.0255) | (0.0259) |
| acp_to_eu | -1.192*** | -1.213*** | -1.183*** | -1.198*** | -1.176*** | -1.186*** |
|  | (0.167) | (0.167) | (0.167) | (0.167) | (0.167) | (0.167) |
| legal_rel_o |  | 0.0823*** |  | 0.0619** |  | 0.0360 |
|  |  | (0.0274) |  | (0.0295) |  | (0.0286) |
| political_rel_o |  | 0.0584* |  | 0.0797** |  | 0.0773** |
|  |  | (0.0301) |  | (0.0317) |  | (0.0318) |
| economic_rel_o |  | -0.0152 |  | -0.0133 |  | -0.00891 |
|  |  | (0.0257) |  | (0.0284) |  | (0.0296) |
| legal_rel_d |  | 0.0501* |  | 0.0478 |  | 0.0542* |
|  |  | (0.0283) |  | (0.0303) |  | (0.0292) |
| political_rel_d |  | 0.0250 |  | 0.00936 |  | 0.00527 |
|  |  | (0.0305) |  | (0.0320) |  | (0.0332) |
| economic_rel_d |  | 0.140*** |  | 0.152*** |  | 0.168*** |
|  |  | (0.0259) |  | (0.0281) |  | (0.0287) |
| ABSlegal_reldiff |  | -0.0118 |  | 0.0159 |  | 0.00390 |
|  |  | (0.0203) |  | (0.0214) |  | (0.0215) |
| ABSpolitical_reldiff |  | 0.0356 |  | 0.0247 |  | 0.0334 |
|  |  | (0.0226) |  | (0.0236) |  | (0.0236) |
| ABSeconomic_reldiff |  | -0.108*** |  | -0.0894*** |  | -0.0789*** |
|  |  | (0.0196) |  | (0.0212) |  | (0.0211) |
| index_o | -0.0334*** | -0.0534*** | -0.0638 | -0.145*** | 0.0559 | -0.0367 |
|  | (0.0120) | (0.0124) | (0.0493) | (0.0514) | (0.0551) | (0.0612) |
| index_d | 0.0297** | 0.00780 | 0.129** | 0.00264 | 0.173*** | -0.0370 |
|  | (0.0130) | (0.0134) | (0.0503) | (0.0522) | (0.0570) | (0.0638) |
| ABDindexdiff | -0.00136 | 0.00855 | -0.238*** | -0.205*** | -0.253*** | -0.229*** |
|  | (0.00966) | (0.00949) | (0.0374) | (0.0366) | (0.0418) | (0.0408) |
| Constant | -11.90*** | -11.37*** | -10.36*** | -10.53*** | -10.33*** | -10.58*** |
|  | (0.942) | (0.944) | (0.998) | (1.016) | (0.988) | (1.008) |
| Observations | 96,178 | 96,178 | 92,304 | 92,304 | 92,304 | 92,304 |
| R-squared | 0.933 | 0.934 | 0.936 | 0.936 | 0.936 | 0.936 |
| Time FE | YES | YES | YES | YES | YES | YES |
| Exporter FE | YES | YES | YES | YES | YES | YES |
| Importer FE | YES | YES | YES | YES | YES | YES |
| Dyadic FE | YES | YES | YES | YES | YES | YES |
| Orthog. Inst. | NO | YES | NO | YES | NO | YES |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The Law and Order (ICRG), Rule of Law (WGI) and the average WGI indices are not orthogonalized.

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# VI    Conclusion

In this paper we thoroughly examine the effect of institutions on bilateral trade flows within a gravity model. Theoretically, we derive the gravity set up from the two accounting conditions on the exporter and importer side, and make the case for the inclusion of institutions in the trade costs term. We operationalize the theoretical gravity specification controlling also for multilateral resistance.

As opposed to much of the literature, we do not rely on one or another specific institutional index, but use a set of theory based measures on formal institutional environment from Kuncic (2012), who calculates institutional quality of legal, political and economic environment. Besides examining institutional levels, we concentrate on getting unbiased estimates of institutional distance on trade, which is rarely done in the literature.

Using a variety of ways to control for multilateral resistance, and to take special care of the endogenous nature of institutions, we show that both origin and destination legal institutions affect trade positively, while in the case of political institutions, only origin has a positive effect, and in the case of economic institutions, only destination country. The relative quality of destination country's economic institutions affects trade the most. But even more important than the mere levels of institutional quality seem to be the economic institutional distance measure, which has a significant and negative effect on bilateral trade. More similar countries, in terms of their economic institutional quality, trade more with each other.

Moreover, we show that the existing literature on the effect of institutions on trade essentially misspecifies the institutional environment and fails to capture the true effect of institutions on trade, either due to the fact that only one type of institutions is accounted for, or what is controlled for and called institutions, are actually other measures of quality of policy, governance and alike. Also, what is largely overlooked in the literature is, that the effect of institutions on trade lies to a large extent in the institutional distance, and not only levels.

There are several ways forward in this line of research and using the complete institutional quality

measures now available. This paper examines the general effect of institutions and institutional distance on bilateral trade, and does not pursue the issue further. The other general effect of institutions which needs to be examined with the use of a complete set of institutional indicators, is the effect on the production side of the economy, which is found to be even larger than the trade effect by some studies, and associated possible differential effect of institutions and institutional distance based on the institutional complexity on the sectoral level. Going into more details, the issue, so far largely untouched by the literature, is also whether the effect of institutions comes from the extensive or intensive margin of trade, for which firm level data is needed. This opens the door also to further firm level applications.

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