The Institutional Determinants of Bilateral Trade Patterns

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Abstract

This paper studies the effect of institutions on trade flows, using a gravity model approach. We start from a standard gravity equation that incorporates geographical proximity, language, trade policy and common history. These factors reflect the costs of trade across geographical and cultural distances. The quality of governance and the extent of familiarity with the resulting framework of rules and norms also affect the costs of doing business between any pair of countries. This paper extends the gravity equation to include proxies for institutional quality and institutional homogeneity between trade partners. For this, we use indicators on political stability, regulatory quality, and other proxies that reflect the quality of governance. We test whether institutional homogeneity and institutional quality have an independent impact on trade volume between pairs of countries. We find that having a similar law or regulatory framework promotes bilateral trade by 12% to 18%. Furthermore, a better quality of formal institutions on average coincides with higher trade. An increase in regulatory quality of one standard deviation from the mean leads to an estimated increase of 20 to 24% in bilateral trade. Lower corruption similarly accounts for 17 to 27% extra trade.

Introduction

International trade has grown rapidly over the previous decades, outpacing growth in world output in both goods and services. Declining costs of transportation and technological advances in ICT are often quoted as explanatory factors for the recent trend of international economic integration. Still, Rauch (2001) points out that the intensity of international transactions remains lower than could be potentially expected on the basis of physical distance. He refers to intangible costs of transacting that may be responsible for 'under-trading' across national borders. Trefler (1995) refers to this as the 'mystery of the missing trade'. Specifically, the relatively low intensity of foreign trade may reflect the importance of institutions for the operation of networks of business in international markets. For example, domestic formal institutions affect security and enforcement of property rights, and other aspects of the quality of governance. They influence the uncertainty that surrounds transactions in both domestic and international trade. Furthermore, formal rules affect informal norms of behaviour and interpersonal trust, which influence the mores and conventions of doing business. These, in turn, may also impact on risk perceptions and preferences in international transactions.

In this paper we investigate the hypothesis that institutions matter for international trade. For this, we implement gravity equations to analyse bilateral trade patterns empirically. Statistics that feature both origin and destination of trade allow us specifically to investigate the influence of institutions on the patterns of cross-border transactions. The "gravity model" of bilateral trade is inspired by Newton's equation of gravity in physics, which relates the gravity force with which two bodies attract each other proportionately to the product of their masses, and inversely to the square of their distance. How does this translate into economics? To begin with, geographical distance will be of influence for the intensity of bilateral economic interaction, since it is related, amongst others, to the costs of transportation. If we interpret trade between two countries as the economic analogue for the mutual gravitational force between two bodies, whereas their respective GDPs reflect mass, we see the intuitive rationale for a gravity model of bilateral trade[2]. Although the model has always performed well empirically, its theoretical underpinnings were doubted until recently. Amongst others, work by Helpman and Krugman (1985) and Deardorff (1998) has shown that both new trade theories of product differentiation and classical Heckscher-Ohlin

theory of comparative advantage can provide a theoretical rationale for the gravity model of bilateral trade.

In general, the gravity model considers trade between a pair of countries as an increasing function of their combined economic size and a decreasing function of their geographical distance (Frankel and Rose, 2002). Also, other variables that relate to either of the two countries may enter into the equation (Frankel et al., 1997; Smith, 2002). From the set of possible other variables that could enter into the gravity equation, this paper especially emphasizes variables that reflect institutional quality and institutional similarity. Both institutional quality and cultural or institutional heterogeneity influence the costs of trading, though these costs are different in nature than the transport costs associated with physical distance. Property uncertainty, doubts concerning the quality of governance, and lack of common norms result in relatively high transaction costs associated with trade relations.

This paper is organised as follows. Section 2 illustrates the motivations for studying the impact of institutional performance on international trade flows. Subsequently, the paper discusses the indicators of institutional quality that have been used in the analysis. In sections 4 and 5, we present and discuss the regression results for alternative specifications of a basic and extended gravity model, respectively. In the last section, the conclusions are presented, and some further extensions for research on the role of institutions for trade are proposed.

Institutions, Economic Performance and Trade

The impact of institutions on transaction costs has received a lot of attention in the literature on economic growth and development (e.g., Olson, 1982). Institutions and policy mechanisms, labelled social infrastructure, are recognized as background variables for productivity and growth (Hall and Jones, 1999; Olson, 1996; Knack and Keefer, 1995). Transaction costs arise fundamentally due to opportunistic behaviour in the market and because of uncertainty in the general economic environment. Hence, security of property rights and enforcement of private contracts are central objectives in a sound framework of formal institutions (see North, 1990). But good governance also requires sound and neutral economic policies, which demands independence and autonomy for government structures.

Bad policy induces macroeconomic instability. In this way, poor governance entails negative externalities for private transactions, and consequently raises transaction costs.

We can neatly extend the argument to international trade. Besides the effects of exchange rate variability (see Frankel and Rose, 2002), the effects of governance on the general business and investment climate are an extra concern for the political economy of international trade. Still, little research has been independently targeted at the assessment of the impact of institutions on international trade flows[3]. In a recent paper, Wei (2000) suggests that the effect of good governance on transaction costs may be higher for international trade than for domestic exchange. On the one hand, trade often requires investing in long term business relations, while on the other hand trading partners in international markets have more outside options. Because of the greater extent of competition and higher uncertainty, explained by the incidence of multiple governance systems in international markets, the impact of institutions on cross-border trade is more pronounced. Moreover, the incentive to invest in good governance may then be higher in countries that naturally seek to participate relatively intensively in international markets. We may then expect a substantial positive relation between institutional quality and international trade flows.

If institutions affect trade, this provides support for an additional link between governance and economic performance[4]. Many studies have identified openness to international trade as an important determinant of economic growth (e.g., see Frankel and Romer, 1999). Trade relates positively to economic growth, since openness to international trade enlarges the potential scale of the sales market and increases competitive pressures. Both provide incentives for increased research and development. The intensity of innovation is a key ultimate cause of economic growth, as argued in many new growth theories[5]. Also, trade may increase the absorption of knowledge, through spillovers of technology that are embodied in imports (Lejour and Nahuis, 2000). A positive relation between trade and the quality of institutions is then particularly interesting.

If good governance is the underlying determinant for international competitiveness, it may help us explain the missing trade mystery. Deardorff (2001) argues that international competitiveness to a large extent depends on largely unobservable trading cost, instead of

factor endowments and technology. He emphasizes transaction costs, caused by ineffective institutions. Even if institutions are shown to be of less direct importance for economic performance than trade (cf. Dollar and Kraay, 2002), a strong link between the quality of governance and trade reconfirms the importance of good governance for long-run economic performance.

Description of Institutional Indicators

In our analysis, we make use of both country-specific and bilateral data, from various sources. Gross domestic product for exporting and importing countries are examples of country-specific variables that we include in the analysis. Geographical distance, adjacency, main language and religion, amongst others, are examples of other characteristics that we take into account for each pair of countries. We focus on trade patterns in 1998, for a set of more than one hundred countries. Appendix A further describes the data and their sources.

In this section, we take a closer look at the institutional variables that are central to the paper. We used the database constructed by Kaufmann et al. (2002). They collected data on institutions from different sources and constructed indicators of perceived institutional quality. Each indicator captures some related aspects of the quality of governance. They either reflect the political process, the quality of the state apparatus and its policies, or the success of governance.

The first indicator is "Voice and Accountability" (Voice&Acc.), which reflects the extent to which citizens can participate in selecting government and hold her accountable for the actions taken. This score includes various characteristics of the political process as well as assessments of the independence of the media. This first variable can be thought of as reflecting whether citizens and business can prevent arbitrariness in the behaviour of government and enforce good governance when needed.

The second indicator of institutional quality, "Political Stability" (Pol. Stab.), refers to the perceived likelihood of government being destabilized or overthrown by unconstitutional interference or excesses of violence against persons and possessions. These factors are highly detrimental for the continuity of policy and the stability of the economic environment. Think of the consequences of societal unrest for infrastructure

(roads, ports, electricity, communication channels) and foreign currency markets. The first two governance indicators are foremost fundamental factors underpinning at a deeper level the likelihood of good governance.

The next variable is "Government Effectiveness" (Gov. Eff.), a measure for the quality of government inputs. It represents, amongst others, the perceived quality and independence of the bureaucracy. This indicates the ability of government to formulate and implement good policies. It is a determinant of the quality of governance.

The fourth institutional variable is "Regulatory Quality" (Reg. Qual.). It is directly focused on the quality of implemented policies. It includes the perceived incidence of policies that inhibit the market mechanism, and excessive regulation of foreign trade and business development. We can view this variable as directly related to the economic environment of society. The indicator closely reflects the transaction costs that result from policy intrusion by the state in private trade.

Regulatory quality and the fifth indicator, "Rule of Law" (Rule of Law), more directly indicate the quality of governance. Rule of law indicates society's perceived success in upholding fair and predictable rules for social and economic interaction. Essentially, it focuses on the quality of the legal system and the enforceability of contracts.

The last indicator, "Control of Corruption" (Contr. of Corr.), represents the extent of 'lawless' or unfair behaviour in public-private interactions. It complements regulatory quality and rule of law indicators, pointing at the impact of bad governance on economic interaction. Corruption, like regulatory intrusion, affects transaction costs by adding a 'third-party' involvement to private transaction. An added component of corruption to trading costs is its arbitrary, uncertain nature.

Table 1 below illustrates the data on institutional quality. It presents the sample means and standard deviations for each of these indicators, together with some tentative illustration of the corresponding cross-country deviation of institutional quality.

Table 1.

Some data on governance as illustration: countries at various levels of quality.

Governance Quality	VA	PS	GE	RQ	RL	CC
One s.d. above mean	Spain	France	Hong Kong	Uruguay	Spain	Slovenia
Mean Governance	Slovenia	Morocco	China	Brunei	Tanzania	Jordan
One s.d. below mean	Azerbaijan	Benin	Yemen	Burundi	Azerbaijan	Tanzania
Mean	0.22	0.15	0.14	0.18	0.16	0.09
(s.d.)	(0.92)	(0.88)	(0.92)	(0.79)	(0.95)	(1.00)

Note: Indicator scores have been scaled from –2.5 to +2.5 (see Kaufmann et al., 2002).

We intend to analyse not only the effects of institutional quality on trade, but also the effect of similarity in governance quality. In this way, we capture both the country-specific effects of good governance on trade, and the bilateral influence of institutional distance on patterns of trade.[6] We expect that institutional homogeneity results in similar, hence familiar, informal business procedures, which may reduce transaction costs. To capture similarity in institutional quality, we constructed dummy variables for the various dimensions of governance that we introduced before. If the values for an indicator of institutional quality in two countries are both either above or below the sample mean, we interpret this as indicating institutional homogeneity for this pair of countries; the argument being that both countries have either a relatively low or high score on the indicated dimension of governance. The corresponding dummy variable takes a value of one for such a pair of countries and zero if countries rank on opposite sides from the sample mean. Although arguably a rough method to proxy institutional homogeneity, the estimated effect of homogeneity on trade, measured in this way as a discrete impact, is clear and concise in its interpretation.

Some indicators of governance quality capture the quality of inputs to the 'production' of governance and others reflect government output; some operate at the underlying level of fundamentals and others reflect direct economic impact. However, all of them are interrelated. For that reason, we treat them separately in the empirical analysis, including one dimension of governance in the equation at a time. Adding too many at once results in serious problems of multicollinearity in the regression model.

Basic Results

Before investigating the effects of institutions, we first discuss the regression results for a set of specifications of the gravity equation that take into account the standard variables often applied in the literature. They include gross domestic product (GDP) for both the country of origin and destination ('home' and 'foreign'), geographical distance and several variables that have proven to be effective controls for shared historical, political and cultural background (see Frankel et al., 1997). The latter are dummy variables that indicate the presence of a common border (adjacency), common language, common dominant religion and common colonial history. Furthermore, we control for the effect of economic integration policies by means of a dummy variable: common trade block (often labelled 'free trade agreement'). Table 2 presents an overview of the results of running OLS regressions on six differently specified basic versions of the gravity equation.

Table 2

Basic Gravity Equations, dependent variable: log total bilateral export, home-to-foreign.

Independent Variables	Specification					
	1	2	3	4	5	6
Log GDP home	1.19***	1.26***	1.25***		1.24***	
Log GDP foreign	0.86***	0.90***	0.89***		0.88***	
Log Distance		−1.34***	−1.20***	−0.89***		
Distance					−0.18***	−0.21***
Border Dummy			0.58***	1.09***	1.55***	1.57***
Language Dummy			0.24**··	0.58***	0.25**	0.49***
Trade Dummy			0.90***	1.00***	1.14***	0.94***
Religion Dummy			0.46***	0.75***	0.54***	0.67***
Colonial Dummy			0.57***	0.65***	0.48***	0.54***
Adjusted R2	0.53	0.64	0.65	0.72	0.63	0.72
Number of observations	9554	9554	9554	9652	9554	9652

Note: * indicates statistical significance at 10% (two sided), ** at 5% *** at 1 %. Constant terms, where applicable, are not shown in the table. Specifications 4 and 6 have been estimated with a full set of country dummies.

In accordance to previous studies of bilateral trade using the gravity model, bilateral trade is positively related to the size of domestic outputs. We focus on exports of individual countries as they enter into bilateral trade relations, rather than on total bilateral trade for each pair of countries. This specification of the model explicitly allows us to examine whether the effect of GDP on trade differs for an exporter, compared to an importing country. The results in Table 2 indicate that the elasticity of home-to-foreign export with respect to foreign GDP is lower than the elasticity for GDP in the country of origin. This implies that the effect of larger output on export exceeds the effect of output on import demand. Moreover, the effect sizes indicate that export supply is elastic (reacts more than proportionally) with respect to output, whereas import demand is inelastic. For example, in specification 1, a 1% rise in exporter GDP raises its bilateral export on average with an estimated 1.19%, while a similar rise in importer GDP yields an estimated 0.86% rise in bilateral export. Subsequently we added geographical distance to the set of explanatory variables, as a proxy for transportation costs. The results support the importance of the costs of transport for trade. The further two countries are separated geographically, the less they trade. Specifications that include the natural log of distance as an explanatory variable

show that increasing distance reduces trade more than proportionally. Both the GDP variables and distance are statistically highly significant[7].

In the third specification we add dummy variables that are meant to capture other bilateral factors such as geographical adjacency, and shared political and cultural backgrounds. Following the change in specification, the coefficient on geographical distance falls somewhat in absolute value. This reflects the negative correlation between distance on the one hand and especially common border and free trade agreement on the other. The contribution of the dummies to explaining the size of trade is substantial in economic terms, although they are not as important statistically as GDP or distance. Especially membership of both countries in a common free trade agreement has a large discrete effect on estimated trade. Two members of a trade block, on average, trade 146% more than two countries that do not take part in the same trade block, all else equal[8]. Alternatively, a common language implies that estimated trade rises by 27%. Our results confirm another noticeable pattern often found in the literature. Countries that are directly adjacent trade much more, irrespective of the geographical distance between the countries. The estimated adjacency effect amounts to 79% extra trade, *ceteris paribus*. It reflects a concentration of international trade on a sub-national, regional level, clustering substantially along borders, partly because of the strong distance dependence of trade. This implies that the distance between the two centres of gravity of neighbouring countries overestimates the average distance of trade between them. The argument that the distance measure used leads to an overestimate of the distance of trading holds true for all pairs of countries. However, its relative impact is much larger in neighbour countries than in countries that are far away from each other. A part of the border effect may be related to factors such as good infrastructure and strong cultural, ethnic and other historical ties along borders that are not reflected by other variables. Also the existence of differences in regulation between neighbouring countries may lead to an increased intensity of international trade along the borders, because of the opportunity to take advantage of arbitrage possibilities.

The effect sizes of all bilateral variables are statistically significant at the 5%-level. In the remainder of the paper we will depart from specification 3 to investigate the contribution to the explanation of trade flows of additional country-specific and bilateral

variables reflecting the institutional framework in pairs of countries. We prefer including the natural log of distance in the model, because it slightly improves the overall explanatory power of the model. The alternative specification choices of Table 2 receive specific attention in Appendix B.

The Role of Institutions

In this section we discuss the explanatory role of institutional quality and institutional homogeneity for the intensity of bilateral trade.

A better *quality* of the institutional framework reduces uncertainty about contract enforcement and general economic governance. This reduces transaction costs directly, by increasing the security of property, as well as indirectly, by increasing the level of trust in the process of economic transactions. Interpersonal trust has a complex origin in both culture, economic behaviour and governance, and may not be perfectly correlated to the actual quality of formal institutions (e.g., Linders et al., 2002; Den Butter and Mosch, 2002). However, Knack and Keefer (1997) provide evidence for mutual dependence between formal rules, informal norms and trust. They show that perceived quality of formal institutions is positively related to informal institutions, such as civic norms, and trust. The lower trade costs that result from a better quality of governance increase trade from or with the country in question.

Homogeneity in the perceived quality of institutions (cf. Beugelsdijk and Van Schaik, 2001) may both reflect and give rise to similar norms of behaviour (conventions, business practices) and similar trust in doing business (Linders et al., 2002). Familiarity with and sharing of informal habits and procedures of business reduces uncertainty in bilateral transactions, and adjustment costs between trading partners, independent of whether formal rules are effective or not. This may increase interpersonal trust in doing business together, and positively affects international trade.[9]

Table 3 presents the results for a gravity model as before, which is supplemented with variables for institutional quality and homogeneity. The respective specifications each include an indicator that reflects the perceived quality of a country's institutional framework. The variable relevant for each specification is given in the first row. The indicator is included in the regression as a variable for the country of origin and the country

of destination separately. For each indicator, we present both a specification that exclusively focuses on the quality of governance, and one that also includes a dummy variable constructed to indicate homogeneity in the quality of governance (see Section 3).

Table 3

Extended Gravity Equations, each column presents a gravity model based on an indicator of governance, as highlighted in the first row

Governance	Voice&Acc.		Pol. Stab.		Gov. Eff.		Reg. Qual.		Rule of Law		Contr. of Corr.	
	Quality	Similarity	Quality	Similarity	Quality	Similarity	Quality	Similarity	Quality	Similarity	Quality	Similarity
Log GDP home	1.20***	1.20***	1.21***	1.21***	1.18***	1.18***	1.22***	1.22***	1.21***	1.21***	1.19***	1.19***
Log GDP foreign	0.87***	0.87***	0.86***	0.86***	0.84***	0.85***	0.85***	0.85***	0.86***	0.86***	0.86***	0.86***
Log Distance	−1.17***	−1.17***	−1.17***	−1.17***	−1.17***	−1.16***	−1.22***	−1.21***	−1.18***	−1.17***	−1.18***	−1.18***
Border Dummy	0.70***	0.69***	0.66***	0.65***	0.72***	0.71***	0.64***	0.62***	0.68***	0.66***	0.67***	0.67***
Language Dummy	0.19*	0.18*	0.24**	0.24**	0.29***	0.29***	0.25**	0.25**	0.30***	0.30***	0.27**	0.27**
Trade Dummy	0.94***	0.93***	0.89***	0.88***	0.86***	0.85***	0.88***	0.85***	0.91***	0.89***	0.88***	0.88***
Religion Dummy	0.49***	0.49***	0.52***	0.52***	0.53***	0.53***	0.47***	0.47***	0.51***	0.51***	0.53***	0.53***
Colonial Dummy	0.60***	0.60***	0.58***	0.59***	0.50***	0.50***	0.47***	0.48***	0.51***	0.50***	0.51***	0.51***
Governance Home	0.31***	0.31***	0.22***	0.21***	0.29***	0.28***	0.24***	0.23***	0.20***	0.20***	0.24***	0.24***
Governance Foreign	0.16***	0.15***	0.21***	0.19***	0.23***	0.22***	0.29***	0.27***	0.17***	0.16***	0.16***	0.16***
Governance Similarity		0.08*		0.10**		0.07		0.18***		0.12***		0.02
Adjusted R2	0.66	0.66	0.65	0.65	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Number of Observations	9554	9554	9257	9257	9257	9257	9380	9380	9380	9380	9138	9138

Note: * indicates statistical significance at 10% (two sided), ** at 5% *** at 1 %.

In general, the impact of a higher perceived quality of governance on bilateral trade is positive and highly statistically significant, independent of which indicator of quality is used in the analysis. Because the indicators of institutional quality vary between approximately –2.5 to +2.5, we cannot log-linearize the relation between institutions and trade. The relation necessarily is of a semi-log form. The effect sizes reported are semi-elasticities. To interpret the substantive impact suggested by these effect sizes, we start from the standard deviation of these variables within the sample. The effect on trade of a difference of one standard deviation from the average institutional quality gives a good picture of the contribution to the empirical explanation of the variation in trade flows. Table 1 in Section 3 presents the sample means and standard deviations of the indicators for institutional quality, as well as some illustration of the cross-country spread in the quality of governance.

Although differing between indicators and according to the country's role as exporter or importer, the impact of variation in the quality of institutions on trade is substantial. An increase in regulatory quality of one standard deviation from the mean leads to an estimated increase of 20 to 24% in trade. Lower corruption, on average, accounts for 17 to 27% extra trade.[10]

The effect of similarity in institutional quality, presented in the last row of Table 3, is less significant statistically. Still, the impact can be substantial. To this effect, we find that having a similar law or regulatory framework promotes bilateral trade by 12% to 18%. Institutional homogeneity leads to familiarity with each others formal procedures, and with the informal conventions and habits developed to deal with the governance situation. As a result, the competences of potential trading partners match better. This arguably reduces uncertainty surrounding transaction contingencies, and reduces the adjustment costs that have to be made because of natural unfamiliarity with international trading partners. Also, similarity of informal business procedures may increase bilateral trust. As a result, economic agents get more confidence in being compatible trading partners, compared to the situation of two institutionally heterogeneous countries. The effect of common institutional quality seems not present for the indicators based on corruption and government effectiveness. This is not so surprising, since government effectiveness is not a direct measure of the quality of governance. As a result, the link from a common score on

government effectiveness to familiarity with actual formal procedures, and with informal solutions, need not be so strong. The effect of homogeneity is indeed clearest for the indicators that directly relate to government output, regulatory quality and rule of law. A common extent of corruption may reduce adjustment costs between trading partners, but does not necessarily reduce uncertainty and increase trust in bilateral transactions. The arbitrary and external nature of corruption affecting transactions does not generally lead to informal norms, conventions and procedures of business to surround the problem posed by this aspect of bad governance. On the contrary, corruption is an informal procedure following from bad governance: if one encounters corruption in a transaction, one generally must comply in order to successfully complete the transaction. Corruption poses external transaction costs to bilateral transactions. Consequently, common experience in the extent of corruption need not have a definite positive impact on trade.

Conclusions

Although the world economy has further integrated towards one global market, international trade is not nearly as large as it should be, on the basis of purely objective differences in resource endowments, and taking into account objective resistances to trade caused by transport costs and formal barriers to trade. Economists have come to refer to this as the 'mystery of the missing trade'.

Several observers have drawn the conclusion that subjective resistance exists towards international trade, caused by intangible factors (e.g. Deardorff, 2001 and Rauch, 2001). Often, they refer to the institutional framework for explanations. This paper has therefore intended to explicitly investigate the effect of institutions on the patterns of trade. It starts from the argument that the quality of formal rules that govern economic interaction is an important determinant of the uncertainty and opportunism in market exchange. A low quality of governance increases the transaction costs that are incurred in exchange.

The impact of institutions on private trade and investment is argued to be at least as important in international exchange as in domestic transactions. Moreover, the quality of formal rules affects the informal norms and procedures of doing business that are devised to cope with transactional uncertainty. This creates the possibility that countries with similar

levels of institutional quality may be familiar with each others business practices. This reduces transaction costs.

We find that institutional quality has a significant, positive and substantial impact on bilateral trade flows. The same goes for similar quality of governance, although this depends a bit on which indicator for governance one applies. These results support the thesis that intangible factors are important barriers to trade, and help to explain the missing trade mystery.

An important implication emerges from our separate focus on country-specific quality of institutions and bilateral homogeneity of governance. Although bad governance substantially lowers the possibility to benefit from trade, countries that share this feature may partially offset the negative effects because of a shared history and experience in developing informal procedures to cope with uncertainty and transaction costs. This supports an evolutionary view of (informal) institutional development (e.g. North, 1990). Notably, this effect does not occur when two countries lack a similar experience, pointing at the importance of adjustment costs and trust in international trade (cf. Den Butter and Mosch, 2002). Although this informal evolution of norms and business practices has benefits in partly offsetting negative effects of governance on trade, it also has some potentially important drawbacks. The 'homogeneity effect' creates trade divergence and path dependence. Countries with poor (or good) formal institutions, all else equal, tend to trade more with other countries that have a similar experience. Because of other negative effects of poor governance on long term economic performance, these countries may become locked into a situation of low economic performance. Since they under-trade with countries that have good institutional prospects for high economic performance, they may miss out on beneficial technology spillovers through trade (cf. Lejour and Nahuis, 2000). This provides an additional argument for serious policy concern with the international promotion of good governance.

Further research on the influence of institutions on trade patterns can also focus on sector patterns of trade in merchandize. Tradability differs a lot across different sectors. As a result, parameter estimates for distance may vary substantially in size and importance. Some products can easily be transported in large quantities at a time. Here, the costs of

geographical distance and bureaucratic distortions per unit of value may be lower, relatively. Other products, for example, are more heterogeneous and time-sensitive. They are more prone to costs of search, transport, delay and bureaucratic procedures. As a result, the impact of geographical distance and the quality of governance on trade may be higher for these products. Also, the differences across sectors in the extent of product differentiation may lead to different profit margins. Products with low profit margins may respond more to transaction costs and distance. Thus, interesting questions arise in this respect. Does distance matter more for specific sectors than for others? Do institutions have a differentiated impact on trade, across sectors? Which indicators of governance matter most? Is the effect of similarity in institutions on trade different from a sector-specific point of view, than from an aggregate angle?

All of these questions may be relevant from a policy perspective. Conclusions drawn from aggregate gravity estimations may differ qualitatively and quantitatively from conclusions on the relevant sector level. For example, the discussion on the enlargement of the European Union has emphasized the importance of trade costs and convergence of formal institutions of potential entrants towards Union standards (cf. Nahuis, 2002). Given the economic structure of the entrant countries, we may expect trade to concentrate in certain sectors for exports to and imports from these countries respectively. It would then be important to find out specifically which aspects of institutions matter for exports and imports, in order to assess the necessity and direction of institutional reforms.

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[2] The analogy doesn't entirely follow suit. While the resulting force with which either of the two particles attracts the other is equal (irrespective of their individual mass), trade from one country to the other may in general be different from its counterpart.

[3] Anderson (2001) and Den Butter and Mosch (2002) are examples in the literature that focus on the effects of informal institutions on trade.

[4] On a similar note, Frankel and Rose (2002) use a gravity model approach to argue that a the main benefits of a currency union for economic performance are related to its positive effect on trade and openness, which affect performance beneficially.

[5] See Aghion and Howitt (1998) for an overview of new, or endogenous, growth theories.

[6] Appendix A presents details on the construction of other bilateral variables that represent geographical and cultural distance (i.e., distance, common border, common primary language, common dominant religion and common colonial history).

[7] The large sample size is of course conducive to this fact, but it supports our expectations concerning a relevant, considerable impact of these variables on trade.

[8] This percentage is derived from specification 3, as follows: $(e^{0.9}-1).100\% = 146\%$.

[9] Similarity of informal norms resulting from a similar experience with formal governance is an important potential factor of cultural familiarity. Language, religion and other historical ties are other factors that have received earlier attention in the literature. The general argument of 'cultural familiarity', or 'psychic distance', goes back to Linnemann (1966) and others (cited in Frankel et al., 1997).

[10] This confirms the finding by Tamirisa and Wei (2002) that corruption is an important informal barrier to trade.

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Appendix A. Description of Data

This appendix contains information on the data used in the analysis. First, a description of the variables used in the analysis is presented, as well as a description of their sources. Subsequently, we provide a concise overview of these variables and the abbreviations we assigned to them in our database. Our data set comprised the countries that have been included in Kaufmann et al. (2001). In each regression run, we included those countries for which data on relevant indicators could be found or constructed. The starting point for the data set was that the countries included in the analysis should have data available on the relevant bilateral trade flows and on some of the institutional indicators. They should be included in both the WITS database and the database on governance indicators (see below).

Description of the data sources and the relevant variables

For our analysis, we used data on bilateral trade for 1998 from the WITS database, accessed on courtesy of the Worldbank. The WITS consists of data on exports between pairs of countries. The figures focus on merchandise trade only. The WITS allows us to analyse trade patterns on both the aggregate and sector level, the latter in concordance with 1-digit SITC. For now, the analysis has focused on aggregate trade flows.

For information on the level of domestic production, data from the World Development Indicators (Worldbank 2000, on CD Rom) were used for 1998. Higher production levels reflect higher aggregate purchasing power and greater export supply, which may positively affect bilateral trade.

The data for institutional quality were taken from Kaufmann, Kraay and Zoido-Lobatón (2002), which we also used to construct figures for the bilateral variables reflecting institutional homogeneity. A further description of the institutional variables has been included in the main text. We refer the reader to section 3 for this purpose.

The analysis also includes other bilateral variables: geographical distance, common border, common primary language, common trade agreement, common dominant religion and common colonial history. These have been collected from diverse sources, such as Sala-i-Martin (1997) for religions and colonial backgrounds. The database is available upon request with the corresponding author.

Geographical distance has been measured as the distance from home to foreign 'as the bird flies'. Distance is related to the costs of physical transport of goods and persons, an important part of trading costs. Not all countries in our data set were represented in the database for bilateral distances. For these countries, proxies were constructed using distances from neighbouring countries that were included in the database.

Common border is a dummy variable that indicates whether two countries are adjacent. As argued in the main text, this may independently promote bilateral trade. For countries in our data set that had no adjacency data available from the main source, the CIA factbook (http://www.cia.gov/cia/publications/factbook/) was used to determine whether they shared borders with any other country in the data set.

To assess commonality in primary language, we used a database that distinguished fourteen languages: Arabic, Burmese, Chinese, Dutch, English, French, German, Greek, Korean, Malay, Persian, Portuguese, Spanish and Swedish. In case none of these applied or no data were available, the categories 'other language' and 'non available' were assigned. Using the CIA factbook, these countries have been checked. A dummy variable reflects whether or not two countries have the same primary language, an important aspect of cultural similarity.

Whether pairs of countries take part in common trade agreements has been assessed using WTO data on major regional integration agreements. A dummy variable (common trade block) indicates whether a pair of countries enters into at least one common trade block.

Cultural and/or historical ties between countries may also consist of a common dominant religion or a shared colonial past. Data for religion and colonial background have been taken from Sala-i-Martin (1997). Percentages of the population that adhere to one of seven major religions are presented. These religions are: Buddhism, Catholicism, Confucianism, Hinduism, Jewish religion, Islam, and Protestantism. For some countries, two religions were equally dominant over the others. These countries entered into the analysis with both religions as dominant religion. Commonality of dominant religion implies a value of 1 for the dummy variable 'common religion'.

The dummy variable 'common colony' reflects for each pair of countries whether both of them share a similar colonial history. The data considered the British, French and

Spanish empires only. We also included the colonizers themselves into the respective empires, contrary to the original source. In this way, the figures identify shared colonial relations for pairs of countries.

Overview of the variables and their abbreviations

This overview provides a concise summary of all variables used in the analysis, from the dependent variable to the explanatory variables, both country-specific and bilateral. It also presents the abbreviations used in the data set.

Bilateral Trade Flows in 000 dollars for 1998 (WITS)

Information on gross domestic product [WDI]

    Gdp: GDP in 1998 (current dollars)

Institutional proxies for governance [GOV]

Voice&Acc.(VA):	Voice and Accountability
Pol. Stab.(PS):	Political Stability
Gov. Eff.(GE):	Government Effectiveness
Reg. Qual.(RQ):	Regulatory Quality
Rule of Law (RL):	Rule of Law
Contr. of Corr.(CC):	Control of Corruption

Bilateral variables

- distance: distance from home to foreign 'as the bird flies', based on centres of gravity
- comm_border: dummy variable indicating whether a pair of countries shares a common border
- comm_lang: dummy variable indicating whether a pair of countries shares the same primary language
- comm_colony: captures whether a pair of countries has a common colonial history. For this, we consider the British, French and Spanish colonial empires.

- comm_religion: captures whether a pair of countries has the same dominant religion. This indicator was constructed by determining the religion with the maximum share of people in the total population.

- comm_VA, comm_PS, comm_GE, comm_RQ, comm_RL, comm_CC: capture whether a pair of countries has a similar quality of governance, as measured by the corresponding institutional proxies.

Appendix B. Various Specifications for the Basic Gravity Model

In this appendix, we describe some alternative choices of specifying the basic gravity model of bilateral trade that we have considered.

In specifications 4 to 6 of Table 2, we investigate alternative specifications of the basic set-up, replacing either the GDP variables by country-specific dummies, the log of distance by distance itself, or both.

Specifications 4 and 6 have been estimated with a full set of dummies for home and foreign countries, and without constant term. The dummy variables represent all country-specific factors that might be relevant for their propensity to trade, either in the role as exporter or as importing country. In this way, any influence of country-specific factors, including GDP, on the estimated regression coefficients for the bilateral variables is controlled for. The resulting parameter estimates for bilateral variables generally become more precise and do not suffer from omitted variable biases

Following the introduction of country-specific dummies in specification 4, the effect sizes for the bilateral dummy variables rise, and they become statistically more significant. For example, the effect of language commonality becomes more pronounced and statistically significant at the 1%-level. Also, the impact on the effect size for common border is substantial. However, country dummies lower the coefficient (positively defined) for log distance and lower its statistical significance. Apparently, omitted variable biases pronounced the effect size for log distance and improved its statistical significance, in contrast to their effect on the bilateral dummies. One possible explanation may be that geographical distance is positively correlated with the presence of a developed and a less

developed country in the trade flow. Trade flows involving less developed countries are relatively low, but the coefficients for GDP may not fully capture this in estimating the regression function. Some of it then will be captured by the coefficient for log distance. After the introduction of country-specific dummies, the dummies for less developed countries will generally reflect the downward effect of trade between developed and developing countries.

The logic for a gravity equation specified with distance rather than its natural log, as in specifications 5 and 6, lies in the impact on the effect of other variables related to geographical distance. Because of the monotonously increasing, concave form, countries which are relatively close geographically will yield more than proportionate variation in log distance. As a result, the natural logarithm of distance gives more weight to countries that are relatively close, in its partial explanation of trade, compared to the explanatory effect of variation in distance itself. Consequently, log distance may substitute somewhat for the influence of other bilateral explanatory variables that are negatively correlated to distance, such as common border and common trade block. We can assess the proposition through comparison of the results for specification 5, which introduces distance directly as explanatory variable, with those for specification 3. The straightforward use of distance leads to a much higher estimated effect for common border (from 79% trade increase to 371%) and a somewhat less dramatic increase for free trade blocks (still, from 146% to 213%). Also, the statistical significance of these effects improves. A similar change occurs for specification 6, compared to model 4, where distance enters in a specification characterized by country-dummies. The changes in effect size, though, are less remarkable. The expected effect only occurs for common border, which indeed is most closely related to small distance. The impact for the trade blocks variable, if any, is slightly negative.