

Law, Trade and Development

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Abstract

We use a simple theory to generate predictions about the relationship between the quality of institutions and trade in differentiated (complex) and commoditized (simple) products and use a rich international trade data set for empirical tests. The theory allows us to make a distinction between the role of international transactions costs and domestic production costs in the trade of complex and simple product markets. We find that in countries with poor quality institutions, institutional reform primarily influences transaction costs and has almost no influence on the volume of trade in simple products but has a positive influence on the export of complex products. It does, however, increase the diversity of exports for both simple and complex goods. Conversely, in countries with high quality institutions, institutional reform primarily influences production costs and is associated with additional and more diverse exports of complex goods and additional imports of simple goods. Thus, the path of development through institutional reform starts mainly with marginal increases in the diversity of exports and ends up with substantially increasing both the volume and diversity of complex exports.

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1. Introduction

Intuitively, we would expect that the quality of institutions that protect property rights and enforce contracts should matter for the kinds of products that firms decide to manufacture. When these institutions are effective, firms can be confident that detailed contracts for products that involve multiple suppliers of highly differentiated (complex) products will be enforced and that stealing will be deterred. Under these conditions, firms tend to outsource using multiple input suppliers and can manufacture, relatively cheaply, high value-added complex products. When these institutions are of poor quality, firms expect that input suppliers can easily shirk and breach contracts and buyers and predators can easily steal their shipments. In this case, firms tend to vertically integrate their production processes and specialize in commoditized (simple) products.

In this paper we use a rich international data set to understand how the quality of underdeveloped and developed institutions influences the composition of production within countries.¹ There are three reasons why one might expect different effects of institutions at increasing levels of development. First, countries with underdeveloped institutions such as the Sudan regularly start out with a high share of simple goods in total exports, and countries with well developed institutions such as Switzerland tend to have a high share of complex goods in their export profile. Second, an improvement in institutional quality may affect the intensive margin, here simply the volume, of exports of complex and simple goods differently and thus overall exports. Finally, an improvement in institutions may also affect the extensive margin of complex and simple goods traded differentially: an improvement of the quality of institutions may lead to a higher variety of exports and export partners in complex and simple goods. Changes in the intensive versus extensive margins of exports, however, require different complementary policy decisions like different types of investment in infrastructure, education, as well as trade and

¹ We focus on international trade markets because to our knowledge comparably rich within country data is not readily available.

foreign policy agreements. Sudan and Switzerland differ dramatically on all these issues. Since policy makers have scarce resources, knowing how improvements in the quality of institutions, both of one's own as well as those of competing and cooperating countries, affect future production and export patterns is of paramount importance, and a country like Sudan will arguably suffer harder if resources are misallocated.²

There is no a priori reason why changes in volume or composition of simple and complex goods should vary proportionally with changes in the quality of institutions. On the one hand, one might expect to see decreasing marginal effects of institutional quality, both on the extensive and the intensive margin of trade. On the other hand, it is more difficult to enforce contracts in complex goods because, for example, more competent judges are required to understand the details of a contract when goods are highly differentiated. Bad institutions may not be able to deal with contract enforcement in complex goods at all, and initially, we should thus not expect to see any effect in complex goods exports as a result of incremental improvements. But those improvements may still have a positive effect on simple goods exports. Consequently, whether improvements at any institutional quality level primarily affect volume or variety is an empirical question.

To guide our empirical exercise, we sketch a Ricardian model based on Berkowitz, Moenius and Pistor (2006) and analyze how the level of institutional development influences both a country's comparative advantage and its international transaction costs in both complex and simple product markets. This model delivers three predictions about the impact of institutional reform of interest to us. First, because a country reaps a gain in both comparative advantage and a lowering of its international transaction cost following an institutional reform, it will increase its volume of complex goods exports. Second, it also shifts export volumes from simple to complex products. Finally, the reduction in international transaction costs allows it to export a wider

² In this paper, however, we focus on the effects of institutional change on trade of developed versus less developed countries, and leave the effect of complementary policy decisions for future work.

variety of complex products. We will refer to the first effect as the *volume effect* of institutions, and to the latter two as the *compositional effect* of institutions.

We estimate various specifications implied by the model to learn about the relative strength of those two effects for countries with bad versus good institutions.³ We find that countries' response to institutional reform depends upon the level of institutional development. In countries with under-developed institutions, the only volume effect of institutions is that they export more complex goods. And, this volume increase is small since these countries export small amounts of complex goods. We also find no measurable effect of institutional reform on simple product exports, which represent a large share of developing countries' exports overall. However, we do find a compositional effect of institutional change, somewhat smaller for simple and somewhat larger for complex goods exports. Combining these empirical results with the predictions of the model suggests that institutional reform in countries with bad institutions mainly lowers international transaction costs, while in the more developed countries it reduces production costs. This suggests that the efficacy of institutions-based development strategies depends on the initial quality of institutions.

There is a growing literature analyzing the impact of institutions on international trade. Anderson and Marcoulier (2001) conduct theoretical and empirical work showing how bad institutions in the importer's country can deter trade. Berkowitz, Moenius and Pistor (2006), Levchenko (2007) and Nunn (2005) all analyze the relationship between quality of institutions and international trade flows and trade structures. Svaleryd and Vlachos (2001) show how good financial institutions enable a country to be open to international trade; Subramanian, Rodrik and Trebbi (2002) show that institutions in fact cause trade; recent work by Rauch (1999) and Casella and Rauch (2003) highlights the role of informal networks. Edwards (1993) documents that policy variables affecting international trade costs may vary by level of development, and DeJong

³ GDP per capita is typically used to distinguish between under-developed and developed economies. However, Acemoglu et al. (2001) show that the quality of institutions has a strong causal effect on cross-country GDP per capita.

and Ripoll (2006) show that tariff reductions may actually hamper per capita income growth for poor countries while promoting growth in rich countries. Our paper adds to this literature in two ways: (1) we offer an explanation of the mechanism through which institutions affect export composition (2) we show how initial institutional quality is important for the effectiveness of institutional reform.

In the next section of this paper we provide a description of how institutions influence international transaction costs; in the third section we discuss how institutions influence comparative advantage and summarize the predictions of our theory for different quality levels of institutions. We then provide a description of the data and estimation; the fifth section provides a summary of results; and, section six concludes.

2. Institutions and international transaction costs

Anderson (2001) argues that crossing an international border imposes substantial costs because it generally is the location where formal taxes are imposed and where informal groups extort bribes. Drawing on this idea, Anderson and Marcouiller (2001), for herein denoted A&M, show how high quality importer institutions can limit the expected gains from piracy and bribes and thereby reduce transaction costs. A&M assume that costs imposed by predators do not depend upon product complexity. Incorporating their results in a reduced form, define $s(I^{imp})$ as the expected share of goods that survives predation, where I^{imp} is the quality of importer legal institutions, and $s \in [0,1]$ is increasing in I^{imp} . Let $\tau(\cdot)$ denote the expected share of an order that survives for standard reasons including distance, differences in trading blocs, etc (see Rauch (1999)). Let $r(\cdot)$ denote the expected share of an order that an importer believes will comply with her specifications (after netting out losses from piracy and other transaction costs). Then $\varphi(I^{imp}, \cdot) = r(\cdot)s(I^{imp})\tau(\cdot) \in [0,1]$ is the overall share of products that survives and is received by the importer, and $1 - \varphi(I^{imp}, \cdot)$ denotes international transaction costs.

Now denote $\delta(\cdot)$ as the probability that the importer is satisfied with the shipment, $\pi(\cdot)$ as the probability that the importer is compensated if there is a breach of contract, and ψ denotes legal costs (normalized as the share of the importer's costs of the overall shipment) the importer must pay if she decides to take the exporter to court for breach of contract. Then:

$$r(\cdot) = \delta(\cdot) + (1 - \delta(\cdot))[\pi(\cdot) - (1 - \pi(\cdot))\psi] \quad (1)$$

To see this, consider first how institutions impact the importer's transaction costs. In a trading relation, the importer is at risk of receiving an inadequate shipment. If the exporter does not fulfill the terms of the contract and the importer decides to take the exporter to court, the importer typically must make an advance payment to the court or arbitration tribunal to start the process. If the court or arbitration tribunal rules against the importer, the importer foregoes her advance payment; if the importer wins, then she is reimbursed her pre-payment and is fully compensated for the value of shipment. Then $\pi(\cdot)$ is the importer's expected gain from taking legal action when she wins, $-(1 - \pi(\cdot))\psi$ is the importer's expected loss if she loses.

Therefore, at the time of the order, the importer's expected compensation (as a share of the initial order) if there is a breach of contract is $(1 - \delta(\cdot))[\pi(\cdot) - (1 - \pi(\cdot))\psi]$ and $\delta(\cdot)$ otherwise.

The exporter has a greater incentive to make a good faith effort when she believes the probability she will be punished for breach of contract is high. A good faith effort from the exporter, in turn, increases the probability that the importer is satisfied. As complexity of an order increases, it becomes more difficult to specify every detail and it becomes more likely that the importer will be dissatisfied even when the exporter makes a good faith effort. Therefore, the probability that the importer is satisfied with the shipment, $\delta(\cdot)$, depends upon enforcement, $\pi(\cdot)$, and product complexity, c . In summary,

$$\delta = \delta(\pi, c): \partial\delta/\partial\pi > 0, \partial\delta/\partial c < 0 \text{ for } \delta, \pi \in [0,1] \quad (2)$$

Regarding the role of institutions as a determinant of enforcement, our basic premise is that the institutions in the exporter's country are critical. If there is a breach of contract and the importer takes the exporter to court, then the case can be solved in courts in the importer's country, the exporter's country, or in a third country by court or arbitration tribunal. However, because exporters generally hold the bulk of their immobile assets in their home country and because only the domestic courts can seize these assets in peacetime, then legal institutions (courts and their complementary enforcement agencies) in the exporter's country are the last resort for solving the exporter's disputes with the importer no matter where the hearing is held.

Product complexity also determines the probability of enforcement. Complex products, such as custom-made machines or even mass-produced machines, contain many characteristics. These characteristics are numerous, often subjective (as in the case of user-friendliness of a particular machine) and highly differentiated across otherwise similar products. As the number and subjectivity of these characteristics increases, product complexity increases and it becomes more difficult for the court to verify whether the character of the exporter's shipment fulfills the letter and spirit of the contract. Thus, the probability of enforcement is decreasing in product complexity. Summarizing the discussion, then

$$\pi = \pi(I^{\text{exp}}, c) : \partial\pi / \partial I^{\text{exp}} > 0, \partial\pi / \partial c < 0 \text{ for } \pi \in [0,1] \quad (3)$$

where I^{exp} denotes the quality of exporter institutions.

Substituting equations (2) and (3) into (1) and differentiating, then

$$\partial r / \partial I^{\text{exp}} = (1+\psi) * \partial\pi / \partial I^{\text{exp}} (\partial\delta / \partial\pi * (1-\pi) + (1-\delta)) > 0 \quad (4)$$

$$\partial r / \partial c = (1+\psi) [(1-\pi)(\partial\delta / \partial\pi * \partial\pi / \partial c + \partial\delta / \partial c) + (1-\delta)\partial\pi / \partial c] < 0 \quad (5)$$

Equations (4) and (5) summarize the impact of exporter institutions and product complexity on international transaction costs.⁴ An improvement in institutions in the exporter

⁴ Importer institutions, as previously noted, also are important because of their impact on predation at the importer's border. Importer institutions influence overall transaction costs, but do not influence r , the share of an order that the importer expects to comply with the contract.

country causes π to increase, which then raises the probability that the exporter makes a good faith effort. This raises the probability that the importer is satisfied, and that the importer is compensated if there is a breach of contract, which then leads to an increase in r (a decrease in international transaction costs). An increase in product complexity directly lowers the probability that the importer is satisfied, and also lowers the probability that the importer is compensated if there is a breach of contract. This provides an exporter with a greater incentive to shirk, and consequently lowers the probability that the importer is satisfied. Thus, overall, an increase in product complexity lowers r . Third, better institutions in the exporter country dampen the marginal negative impact of complexity on r : $\partial^2 r / \partial I^{\text{exp}} \partial c > 0$. Finally, the share of surviving products, $\varphi(c, I^{\text{exp}}, I^{\text{imp}}, \cdot) = r(c, I^{\text{exp}}) \cdot s(I^{\text{imp}}) \cdot \tau(\cdot) \in [0, 1]$, has all three of these properties established and, following A&M, is increasing in the quality of institutions in the importer's country. That is, an improvement in importer institutions lowers international transaction costs because it reduces predation at the importer's border.

3 Institutions and Comparative Advantage

In order to generate predictions about the impact of institutions on trade, we incorporate international transaction and domestic production costs into a general equilibrium model based upon the Ricardian model of Dornbusch, Fisher and Samuelson (1977). There are two countries (home and foreign); two simple products denoted S and S^* that can be produced only by the home and foreign country, and a continuum of equally complex products distributed on $z \in [0, 1]$. The labor and institutional endowments in the home and foreign country are (L, I) and (L^*, I^*) . Because competitive outsourcing of parts production on the domestic market requires low domestic transaction costs, high transaction costs enforce potentially inefficient in-house production. Therefore, this is denoted the *production cost effect* of legal institutions. Good domestic institutions discourage predators and also offset domestic suppliers' incentive to shirk. Because the cost of predation does not depend upon product complexity, while shirking is more

lucrative for complex products, an improvement in domestic institutions lowers production costs of complex relative to simple products and, thereby, increases a country's comparative advantage in complex products. To capture this, we assume that producing either simple product requires one labor unit. Furthermore, let $a(z)/I$ and $a^*(z)/I^*$ denote production (unit labor costs) for complex product z in the domestic and foreign country. Thus, better domestic institutions lower the relative production cost of complex products.

Complex products are sorted by comparative advantage and the home country has a falling comparative advantage:

$$\begin{aligned} A(z, I, I^*) &\equiv a^*(z)I / a(z)I^*, \text{ where } \partial A / \partial z < 0; \\ \partial A / \partial I &= A / I; \partial A / \partial I^* = -A / I^* \end{aligned} \quad (6)$$

The representative agents in each country have the same utility function

$$U(S, S^*, x(z)) = (1 - \beta) \ln(S^\rho + S^{*\rho}) + \beta \ln \int_0^1 \ln x(z) dz \quad (7)$$

where $\{\beta, 1 - \beta\} \in (0, 1)$ are shares of income spent on simple and complex products, $\rho = 1 - (1/\sigma)$, σ is the elasticity of substitution within simple products, and the elasticity of substitution across complex products is one. It is assumed that S and S^* are relatively closer substitutes than complex products:

$$\sigma > 1 \quad (8)$$

Thus, in complex product markets consumers buy the entire continuum and spend the same amount of money on each product. However, in simple product markets consumers spend less on S and more on S^* as the price of S relative to S^* increases.

Solving under the standard assumption of full employment, labor-immobility and two-way trade in both product categories, the impact of exporter and importer institutions on trade in simple and complex products can be decomposed into their respective production and international transaction costs effects. Consider first complex products. Following an improvement in exporter institutions, the importer country's comparative advantage in complex

products falls because the exporter can manufacture complex products relatively more cheaply. Furthermore, transaction costs also fall because the importer country's risk of receiving shoddy complex products from an exporter with better institutions is lower. Thus, by both the production and transaction cost effects complex imports increase. Following an improvement in domestic institutions, the importer country's comparative advantage in complex products increases, and its transaction cost fall because better domestic institutions lower its predation risk at its border. Thus, complex goods imports decrease by the production cost effect, but increase by the international transaction cost effect, and the overall impact of an improvement in importer institutions is ambiguous. Furthermore, the overall effect of importer institutions on complex product imports is negative if and only if their production cost effect dominates their trade cost effect. Letting $M^{complex}$, I^{imp} and I^{exp} denote the equilibrium quantity of complex imports, importer and exporter institutions, then the import elasticity of complex products with respect to own institutions and exporter institutions can be decomposed:

$$\begin{aligned} \partial \log M^{complex} / \partial \log I^{imp} &= \partial \log M^{complex} / \partial \log I^{imp}_{production} + \partial \log M^{complex} / \partial \log I^{imp}_{transaction} = ? \\ \text{where} \\ \partial \log M^{complex} / \partial \log I^{imp}_{production} &< 0; \partial \log M^{complex} / \partial \log I^{imp}_{transaction} > 0 \end{aligned} \quad (9)$$

and

$$\begin{aligned} \partial \log M^{complex} / \partial \log I^{exp} &= \partial \log M^{complex} / \partial \log I^{exp}_{production} + \partial \log M^{complex} / \partial \log I^{exp}_{transaction} > 0 \\ \text{where} \\ \partial \log M^{complex} / \partial \log I^{exp}_{production} &> 0; \partial \log M^{complex} / \partial \log I^{exp}_{transaction} > 0 \end{aligned} \quad (10)$$

Because a gain in comparative advantage in the complex goods sector implies growing comparative disadvantage in the simple sector, the production cost effects of exporter and importer institutions for simple products have the opposite sign in their impact on complex product markets. The effect of legal institutions on transaction costs is ambiguous in simple

product markets. However, under general conditions (available upon request), the overall effect of importer institutions on simple product imports is positive, while the overall effect of exporter institutions is ambiguous.

Similar to results derived in other Ricardian models (see Dornbusch et al, 1997; Flam and Helpman, 1987) the model also predicts that the percentage fall in complex imports following a one-percent increase in the quality of its own institutions is entirely offset by the percentage increase in complex goods imports following a one-percent increase in the quality of exporter institutions. A similar result holds in complex product markets:

$$\partial \log M^i / \partial \log I_{production}^{imp} + \partial \log M_*^i / \partial \log I_{production}^{exp} = 0 : \quad (11)$$

$i = simple, complex.$

Combining equations (9)-(11), then the model predicts that the overall elasticity of complex trade with respect to institutions equals the pure impact of institutions on complex trade via their impact on transaction costs:

$$\begin{aligned} \partial \log M^{complex} / \partial \log I^{imp} + \partial \log M^{complex} / \partial \log I^{exp} = \\ \partial \log M^{complex} / \partial \log I_{transaction}^{imp} + \partial \log M^{complex} / \partial \log I_{transaction}^{exp} > 0 \end{aligned} \quad (12)^5$$

⁵ A similar result holds for trade in simple products, but it is not important for the empirical work that follows.

This pure transactions costs effect is strictly positive for two reasons: an improvement in domestic institutions makes importing complex products (as well as simple products) cheaper because it lowers the extent of predation at the domestic border; and, an improvement in institutions in some foreign country also lowers the cost of importing complex products because it lowers the home country's risk of importing shoddy complex products from this foreign country.

The model does not make sharp predictions about how this pure international transactions cost effect depends upon the level of development; nor does it make sharp predictions about the levels of development at which the transactions cost effect or comparative advantage dominate. Clearly, the less-developed economies are more flexible in adjusting their production structure than developed economies. Therefore, one might suspect that the comparative advantage effect should dominate in less-developed countries. However, the international trade cost effect will already benefit existing trading relationships, while the comparative advantage effect requires setting up new trading relations. Setting up these new relations requires a stock of substantial trust that, arguably, is relatively scarce in less-developed economies. For these reasons (which are outside of our model), comparative advantage effects could be stronger in developed economies, despite the lower flexibility in production in these countries. Just which effect dominates in the less developed and the developed economies is, then, an empirical question and will be resolved in the next sections.

4. Estimation

4.1 Data

In order to test the predictions of this model, we collected data from the following sources. The national accounts data is taken from the IMF Financial Statistical Yearbook, and the

gravity controls are the same as in Rauch (1999). We use the 1990 values throughout.⁶ Data on the quality of institutions comes from the International Country Risk Guide, where the quality of institutions is measured using the survey data approach advocated by Knack and Keefer (1994) and Kaufmann et al (1999). This data is constructed as an annual index from a simple average of quality ratings of institutions by country. Each rating ranges from one to ten with ten representing the highest quality. For our purposes, we include in these ratings an average of indices of the rule of law, expropriation risk, corruption in government, and bureaucratic quality.⁷ We do not include repudiation of government contracts and ethnic tensions, since those dimensions do not fit the concept of legal quality we introduced.⁸ Consistent with our model in which institutions are exogenous and GDP per capita is endogenous, we use the quality of these institutions as the metric of development, and define the most underdeveloped countries as the countries in the bottom quartile on this dimension of our sample. Summary statistics for the average index number we used in the estimation are provided in Table 1a. Trade data is obtained from the World Trade Database compiled by Statistics Canada. To categorize the products into different degrees of complexity, we employ the classification developed by Rauch (1999).⁹ Since complexity cannot be determined directly, he sorts four digit SITC industries into trading categories: those goods that are predominantly traded on organized exchanges (metals, pork), those that are reference priced (chemicals, fertilizers) and those that neither have reference prices nor are traded on organized exchanges (e.g., shoes, cars and machinery). We reinterpret this classification in terms of product complexity, where “organized exchange” denotes low

⁶ This only poses a problem for the language variable, since in some countries with large immigration activities, these numbers may not be constant. However, we think the variations are generally small enough to not change the results in any significant way.

⁷ Source is the International Country Risk Guide used by La Porta et al. (1997, 1998) and Kaufmann (1999). We thank Stephen Knack for providing this data. All six of the indices are highly correlated and could also be aggregated using principal components.

⁸ However, it should be noted that all results are robust with the inclusion of these two dimensions.

⁹ In complementary work, Costinot (2006) defines product complexity as the amount of fixed learning costs a firm needs to invest before it is able to produce a certain product.

complexity (simple) and “neither” captures high complexity.¹⁰ In Table 1b, we report summary statistics of the relative importance of simple versus complex products. There are 55 countries (see Table 1c) in the data set, and all variables are either fixed or reported on an annual basis from 1982 to 1992.

4.2 Estimation

As Eaton and Kortum (2002) have shown, the Ricardian Model of Dornbusch et al. (1977) in a multi-country setting leads to a gravity specification of bilateral trade-flows. Our set-up differs from theirs in two important aspects. First, we differentiate by the types of goods, since we introduce both a simple and a complex products sector. We assume that each national economy is fully described by these two sectors: only the complex goods sector is identical to the Dornbusch et al. (1977) specification. Second, we utilize a mechanism that influences both domestic production and international transaction costs.¹¹ We therefore estimate the empirical model:

$$IM_{ijtk} = \alpha_i + \alpha_j + \beta_k X_{ijt} + \gamma_k I_{it} + \delta_k I_{jt} + \varepsilon_{ijtk} \quad (13)$$

where IM_{ijtk} denotes the dollar value of imports originating from country j and shipped to country i in year t and industry group k , where k can only assume two values: complex or simple. Similarly, X_{ijt} contains the standard gravity variables including GDP and GDP per capita for each country¹², distance between the two countries, and whether or not the countries share a common border, have colonial ties, or share languages. The coefficients α_i and α_j are associated with country dummy variables. Whenever a country is part of a bilateral trading relationship, this dummy variable assumes a value of 1; the variable is zero otherwise. This guarantees that

¹⁰ All results for “reference priced”, which one might interpret as mid-complexity, are generally consistent with the model we present and are available upon request.

¹¹ These two differences require changes in the estimation equation relative to theirs, as well as in the interpretation of the coefficients, since changes in the quality of legal institutions cannot be interpreted as being similar to a national technology effect.

¹² It is important to note that GDP and GDP per capita were entered separately in the regression, since the quality of legal institutions is highly correlated with GDP per capita ($\rho=0.82$)

country-specific effects for both exporters and importers, which can be assumed constant over our eleven-year period (such as geography and infrastructure in general), are absorbed.¹³ Our variables of interest are I_{it} and I_{jt} , which denote the quality level of exporter and importer legal institutions, hereafter referred to simply as institutions.¹⁴ To study the effect of institutions at different levels of development, we interact the latter two variables with dummy-variables D_{qm} , D_{qe} that assume the value of one if a country falls into a certain quartile of the quality of legal institutions, where m stands for importer and e for exporter, while q is the quartile of development (quality of institutions). This changes the estimation equation to:

$$IM_{ijk} = \alpha_i + \alpha_j + \beta_k X_{ijt} + \gamma_k I_{it} + \sum_{q=2}^4 \gamma_{qk} D_{qm} \cdot I_{it} + \delta_k I_{jt} + \sum_{q=2}^4 \delta_{qk} D_{qe} \cdot I_{jt} + \varepsilon_{ijk} \quad (14)$$

We also add the D_{qm} and D_{qe} dummy-variables separately to our regressions to control for potential bias in our results. This will allow us to study the volume effects by level of institutions (Table 3a in the appendix). In order to learn about the compositional effects, we repeat the exercise in three different ways: we replace imports on the left hand side with net imports, imports of complex goods relative to simple goods as well as the counts of industries by category, similar to Besedes and Prusa (2006). For example, if Germany has positive imports to France in 150 four-digit SITC industries in the complex goods sector in a particular year, this variable assumes the value 150. As discussed above, this variable allows us to test for the prediction of the DFS-model that a reduction in international trade costs should lead to more types of goods within a category traded.

Finally, a feature of the gravity model regressions, which is problematic for calculating standard errors, is that the same country's characteristics will be represented on the right hand

¹³ For this regression to be identified, we need to assume that multilateral resistance terms as in Anderson and van Wincoop (2003) are constant over time. We relax this assumption below (see Table 5).

¹⁴ This specification simplifies the Eaton and Kortum (2002) specification because it excludes the effect of changes in all other countries' legal qualities on a particular country-pair's bilateral imports. This, however, will only cause omitted variable bias if there is correlation between the importer's quality of legal institutions and all other countries' quality of institutions *corrected by distance and other impediments to trade*. This bias, however, seems negligible.

side repeatedly. Defining these repetitions as groups, error terms within those groups are likely to be correlated with each other, while error terms across groups should not correlate. In order to account for this grouping effect, we replace the traditional Huber-White errors (White, 1980) with robust standard errors that additionally account for within-group correlation. As a result, our standard errors are considerably higher than those normally reported, and this hurts the statistical significance of our estimates. However, we include this adjustment in an effort to produce the most cautious estimates.

5. Results

Table 3a reports results for estimation of the effect of institutions on trade volumes. In the first two columns we present results for the effect of exporter and importer institutions on complex and simple imports when there is no distinction drawn between countries with good and bad institutions. In the case of complex products, all of the predictions of the model are confirmed; the impact of exporter institutions is positive and the effect of importer institutions is negative and exporter institutions have the greatest absolute impact.¹⁵ The negative coefficient on the quality of importer institutions suggests that the production cost effect actually dominates the transaction cost effect. In simple product markets, the results are also consistent with the predictions derived from the model. The overall effect of importer institutions is positive and the effect of exporter institutions is negative. This again suggests that production costs dominate transaction costs.

In columns 3-4, we draw a distinction between the impact of institutions in relatively less-developed and developed countries.¹⁶ The baseline is an estimate of the impact of legal

¹⁵ These results are identical with the first two columns of table 4 in BMP (2006).

¹⁶ We use the quality of institutions rather than GDP per capita as the metric of development following Acemoglu et al (2001), institutions for the most part cause GDP per capita. If, following the World Bank (2001), we were to use GDP per capita as the metric of development, our empirical results would be quite similar in pattern but very different in magnitude than what we present in this paper. For the theoretical implications of measuring development using GDP per capita on trade, see Murphy and Shleifer, 1997.

institutions in countries in the lowest institutions quartile; the coefficients for “separate for second quartile legal quality countries,” “separate for third quartile legal quality countries,” and “separate for fourth quartile legal quality countries,” provides estimates of the incremental impact of an improvement of institution in countries in the second, third and fourth legal quality quartiles relative to the countries in the lowest quartile.

The results can be summarized as follows: with the exception of their effect on complex goods exports, improvements in the quality of legal institutions do not have any measurable effect on trade for the least developed countries. This does not change dramatically in the second quartile of development either, so that one could reasonably argue that improvements of the quality of legal institutions only have a positive effect on complex goods exports for the lower half of the distribution and exhibit rich general equilibrium effects for the upper half of the distribution, and all the measurable effects are stronger for the latter group. The robustness-checks in columns 5 and 6 generally confirm the findings for exporter institutions, while the results for importer institutions are weaker. The overall predictions, however, remain unchanged. In the context of our model, these results can be interpreted as follows: In the least developed countries, an improvement in the quality of legal institutions improves their comparative advantage in producing complex products and at the same time reduces their international transaction costs. However, this latter effect seems to wash out the production cost effect on the importer side: we do not see any effect of importer legal institutions at all. At later stages of development, the production cost effect seems to dominate, and we see general equilibrium effects in both the complex as well as the simple goods markets.

Taking our model literally, one could go one step further: we can calculate the overall transaction cost effect from both exporter and importer institutions, and we can also calculate the range of values for the production cost effect that our estimates support. These calculations are shown in Table 3b and Figure 1: at lower stages of development, legal institutions primarily reduce international transactions costs, while at higher stages, they mostly promote comparative

advantage. While we find this result striking, a few caveats have to be raised: first, we do not want to put too much stress on the absolute size of our coefficients,¹⁷ but maintain that the relative strength of the effects is valid as confirmed by our robustness-checks in consecutive tables. Moreover, these calculations are based on our point-estimates, not taking any confidence-levels into account. Second, the lack of bite of legal institutions for the least developed may result from factors outside of our model: this is a general equilibrium model that assumes full employment and production at the technological frontier enforced by perfect competition, all of which are very likely violated in developing countries. For example, initial production structures and high unemployment may lead to large movements from farm to factory, driving those countries closer to their production possibility frontier and thereby increasing complex exports. Moreover, asymmetric tariffs and non-tariff measures may prevent institutions to take effect: be it import quotas for cars in developing countries or farm subsidies in developed ones.¹⁸

Shifts in comparative advantage by product category should be most easily visible from *net exports*: if our predictions hold, we should see improvements in exporter institutions to be directly linked to increases in net exports of complex versus simple products. We estimate this claim modifying (14) where we replace the left hand side variable with net exports by country and product category. The results can be found in Table 3c. Column 1 and 2 state the baseline results. Again, our findings are consistent with the model's predictions: not only do complex product exports volumes increase following an institutional improvements, they also increase on net. Moreover, we find this net effect to be fairly constant across all levels of development. The general equilibrium effect, which predicts increases in net imports is only present for the more developed economies: less developed countries do not need to fear that they will lose their

¹⁷ This is especially important to note in the light of the criticism raised by Anderson and Van Wincoop (2003). While the country-dummies in our regression take partially care of their concerns, it does not do so in full, since we cannot allow for country-year dummies and still identify our model. However, in our robustness-checks below, we introduce a specification that allows for country-pair-year effects, which fully absorbs the issues of their concern, and our results are robust to that change in specification.

¹⁸ We are able to control for these factors down to a 2-digit industry level by country-pair and year in our robustness-checks in Table 5.

production base in simple products right away by an improvement of the quality of their institutions. These results are again confirmed with our robustness-checks in columns 5 and 6.¹⁹

While net-exports account for changes in comparative advantage relative to other countries within the same sector, relative exports, that is exports in the complex sector relative to the simple sector measure changes in production structure across sectors. We repeat the exercise in equation (14), but now replace the left-hand side variable with relative exports (Table 3d). The effects are again in the predicted directions and strongest for higher levels of development.

The idea that international transaction cost effects may dominate can be tested with an additional feature of our model, since it predicts that lowering international transaction costs increases the number of complex products imported and exported, while changes in comparative advantage result in a shift of the number of products traded in favor of the country that improves its institutions relatively more. In Table 4a, we replace our dependent variable with the number of four digit SITC industries that are imported within each category. In column one, we present the overall effects for complex products. We again see the same pattern established in Table 3a: better exporter institutions lead to an increase in the number of exported complex products, and, better importer institutions lead to a decrease in the number of imported complex products, and the first effect dominates. We repeat the exercise by development quartile and confirm the results from Table 3a again: better institutions increase the number of complex products that a particular country exports, and does so at an increasing rate as its institutions improve. Low institutional quality countries do not import goods from fewer industries, if anything, it is the opposite. This is consistent with the view that international transaction costs effects dominate relative production cost effects in the lowest development quartile. Without any theoretical backup from our model, we repeat the exercise for the simple sector. The striking news here is that there seems to be a *positive* effect on the number of industries that countries export when they improve the quality of

¹⁹ It should be noted that this regression cannot be as easily derived directly from the original gravity specification as the other results in this paper. Consequently, we caution to interpret the absolute size of the coefficients. However, as stated before, we are confident about the relative size of coefficients.

their legal institutions, despite the fact that they reduce the volumes of exports in simple goods, and this effect is roughly equally strong across all development quartiles. Moreover, improvements of the quality of importer institutions do not seem to decrease the numbers of simple goods industries from which a country imports. While our model does not directly predict this result, we think of these results as additional evidence that is consistent with the ideas about the effects of institutions on international transaction costs versus relative production costs.

We repeat the empirical exercise from Table 3d with the number of industry links. As stated before, strictly speaking the model only delivers predictions for the complex sector. However, from an empirical point of view it is interesting at which stage of development the compositional change of industries resulting from a change in institutional quality is the strongest. The results (Table 4b) are as follows: The higher the exporter's quality of institutions, the more complex goods – relative to simple goods – industries a country imports from. The higher the importer country's quality of institutions, the more simple goods industries – relative to complex goods – a country will import from a trading partner. This implies again that relative production cost effects are strong. And again, as column 2 reveals, they are stronger again for the more developed economies.

If our results are correct, then two final predictions from our model can be taken to the data. First, the role of institutions should be more important with increasing complexity of products. Second, the comparative advantage effect of institutions should be stronger for larger countries, since those have more opportunity to outsource within their own borders. Since the former prediction cannot be achieved within the scope of equation (14), we amend (14) in a way that allows us to exploit the full information that is available to us in our dataset, and which also allows us to check the validity of our argument and the robustness of our results. We replace our dependent variable with the four-digit SITC import-volumes and interact our legal variables with dummy-variables for complex products by development, where, for tractability, we analyze only below and above median quality of institutions (development). We therefore introduce the

following dummy variables. The dummy variable for complex goods, D_C , assumes a value of 1 whenever an industry on the left hand side of our regression falls into the complex goods category and zero otherwise. The dummy variable for above median quality of institutions, D_{qm} for the importer and D_{qe} for the exporter, assume a value of one whenever the importer or exporter, respectively, are located in a country whose institutions are above the median quality level and zero otherwise. Our basic regression equation changes to:

$$IM_{ijk} = F_{ijt} + \beta D_C \cdot X_{i,jt} + \gamma_k D_C \cdot I_{it} + \gamma_{qk} D_C \cdot D_{qm} \cdot I_{it} + \delta_k D_C \cdot I_{jt} + \delta_{qk} D_C \cdot D_{qe} \cdot I_{jt} + \varepsilon_{ijk}$$

With this procedure, we are no longer able to distinguish the effects of legal institutions separately for complex versus simple products; all we can do is identifying the relative effect. In all cases, we also include per capita GDP separately for complex goods as well as all relevant direct effects as represented by $X_{i,jt}$. Additional interaction terms are added to this equation to study the two predictions stated above. All results are presented in a two step fashion: First, we present the overall results. Our country-pair-year fixed effects F_{ijt} absorb all country-pair specific effects that vary over time; for example factor endowments, country-specific technology levels, exchange rates and country-pair specific transport costs. They at the same time absorb our direct effects and controls such as GDP and GDP per capita. Second, we present the results by level of development, where we distinguish only two categories: above or below the median level of development. In the second set of regressions we also replace the country-pair-year fixed effects with country-pair-year-two-digit industry effects to control for additional price effects on the industry level. The results with the country-pair year effects are quite similar and are available from the authors on request. The results are presented in Table 5. In column one, we estimate the direct effects of the quality of legal institutions on complex relative to simple goods imports. The results reconfirm our previous findings: exporter institutions have a positive effect on complex relative to simple exports, and this effect is stronger when institutions are developed. On the other

hand, importer institutions have a negative effect on complex relative to simple goods imports, and, consistent with previous results, this effect is increasing in the development level.

As stated before, if our argument is correct, we should see the results to be stronger for "more complex" goods. We employ SITC-one-digit codes as a proxy for complexity (increasing SITC-codes are roughly associated with increases in complexity). We interact this variable with our institutional quality variables. The results of these regressions are presented in column three and four of Table 5. We find a positive interaction effect overall as well as at both levels of development for exporter institutions, and this effect seems to drive most of the increase of the effect of legal institutions in the more developed countries. For importer institutions, we see a negative interaction effect, which is, however, smaller for higher levels of development.²⁰

Finally, good institutions should benefit larger countries more than smaller countries, since they should be able to outsource more internally than smaller countries. We test this hypothesis by interacting our legal variables with the log of GDP for complex goods. The results are presented in column five and six. Despite the fact that the coefficient on the exporter-institutions variable is negative, the overall effect is positive even if the effect is evaluated on the minimum value of the log of GDP, both for the overall effect as well as the effect by level of development. The interaction effect for importer institutions is not as clear-cut: The overall effect is positive, while slightly negative when we distinguish different levels of development.

Overall, the findings are consistent both with our model as well as economic intuition and are robust to various changes in specification. The quality of legal institutions seems to exert strong effects on the trade of large developed countries, while smaller, less developed countries may not be able to draw as much from the benefits as one might hope.

²⁰ In this regression, we were only able to control for country-pair-year effects, since we would not know how to interpret the coefficient on interaction terms if we controlled for variations at the two-digit level while we investigated the effect of a variable on the one-digit level.

6. Conclusions

In this paper we argued that domestic production structure is reflected in a country's international production trade structure. In the absence of trade restrictions, a country's internationally competitive sectors will export and its less competitive sectors will import from other countries. Consequently, the mechanism of change in the production structure of developing economies from improvements in institutions can be uncovered through international trade flows. We argue that institutions lower both domestic as well as international transaction costs. Consequently improvements in the quality of institutions could help the less developed economies (and economies at all levels of development) shift into a more complex-intensive export structure by a national transaction cost effect, which influences relative production costs, and an international trade cost effect. Our empirical findings support this finding; however, our results also show that, in terms of volumes, the less developed economies benefit less from domestic institutional reform than the rest of the world.

References

- Acemoglu, Daron, Simon Johnson and A. James Robinson, 2001. "The Colonial Origins of Comparative Development: An Empirical Investigation," American Economic Review, 91(5): 1369-1401.
- Anderson, James. 2001. Trade and Informal Institutions. Boston University (mimeo) (November).
- Anderson, James, and Eric Van Wincoop, 2003. "Gravity with Gravitas: a Solution to the Border Puzzle", American Economic Review, 93(1): 170-92
- Anderson, James, and Douglas Marcouiller. 2001. "Insecurity and the Pattern of Trade: An Empirical Investigation." Review of Economics and Statistics, 84 (2): 345-52.
- Berkowitz, Daniel, Johannes Moenius and Katharina Pistor, 2006. "Trade, Law and Product Complexity." Review of Economics and Statistics, 88, (2): 363-373.
- Besedes, Tibor and Prusa, Thomas. 2006. "Product Differentiation and Duration of U.S. Import Trade." Journal of International Economics, 70(2): 339-358.
- Costinot, Arnaud, 2006, "On the Origins of Comparative Advantage." September. Unpublished manuscript.
- Dornbusch, Rudiger, Stanley Fisher, and Paul A. Samuelson,. 1977. "Comparative Advantage, Trade, and Payments in a Ricardian Model with a Continuum of Goods." American Economic Review, 67: 823-39.
- Eaton, Jonathan, and Samuel Kortum. 2002. "Technology, Geography and Trade." Econometrica, 70(5): 1741-1779.
- Flam, Harry and Elphanan Helpman. 1987. "Vertical Product Differentiation and North South Trade." American Economic Review, 77: 810-822.
- Kaufmann, Daniel, Aart Kraay, and Pablo Zoido-Lobaton. 1999. Aggregating Governance Indicators. Washington D.C.: The World Bank.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny. 1997. "Legal Determinants of External Finance." Journal of Finance LII (3): 1131-1150.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert W. Vishny. 1998. "Law and Finance." Journal of Political Economy, 106 (6): 1113-1155.
- Levchenko, Andrei. 2007. "Institutional Quality and International Trade." Review of Economic Studies, 74(3): 791-819.
- Mann, Ronald. 2000. "The Role of Letters of Credit in Payment Transactions." University of Michigan Law Review, 98(8): 2494-2536.
- Murphy, Kevin and Andrei Shleifer. 1997. "Quality and Trade." Journal of Development Economics, 53: 1-15.
- Rauch, James E. 1999. "Networks Versus Markets in International Trade." Journal of International Economics, 48(1): 7-35.
- Subramanian, Arvind, Dani Rodrik and Francesco Trebbi. 2002. "Institutions Rule. The Primacy of Institutions over Geography and Integration in Economic Development." October. Unpublished manuscript.
- Svaleryd, Helena and Janos Vlachos. 2001. "Financial Markets, the Pattern of Specialization and Comparative Advantage." Chapter 2 in Jonas Vlachos, Risk Matters: Studies in Finance, Trade and Politics. Doctoral Dissertation, Stockholm School of Economics, EFI, the Economics Research Institute.
- White, Halbert L. 1980. "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity." Econometrica, 48: 817-838.
- World Bank. 2001. "World Development Report 2002: Building Institutions for Markets." Oxford University Press, New York.

Appendix

Table 1a: Summary Statistics Quality of Legal Institutions

	Statistics	Value (Index Number)	Countries close to value
Overall (year = 1990)	Average	4.59	Brazil, Chile, Malaysia
	Min	1	Iran, Bolivia, Indonesia, Nigeria
	Max	7	Switzerland, Belgium, Denmark
	Standard Deviation	1.65	
Change over Estimation Period 1982-1992	Decreasers	-55% -19% -15%	Ethiopia Hong Kong South Africa
	Increasesers	208% 145% 157%	Iran Egypt Morocco

(From Berkowitz et. al 2003)

Table 1b: Complexity Intensiveness of Exports*

	Statistics	Value	Countries close to value
Overall (year = 1990)	Average	10.7	France, Ireland, Spain
	Min	0.02	Iran, Nigeria, Saudi- Arabia
	Max	165	Japan, Hong Kong, Switzerland
	Standard Deviation	24.5	
Change over Estimation Period 1982-1992	Decreasers	-64% -18% -16%	Ghana Hong Kong Paraguay
	Increasesers	1,406% 3,185% 5,375%	Indonesia Mexico Venezuela

(From Berkowitz et. al 2005)

*Ratio (using US dollar values) of Complex Products to Simple Product Exports

Table 2a: Means, Standard Deviations and Frequencies of Export Volumes (in \$ 1,000), 1990

Quartiles: Income per Capita	Quartiles: Quality of Legal Institutions				Total
	1	2	3	4	
1	138,327 (658,198) 553	406,404 (2,442,781) 147	- - 0	- - 0	194,623 (1,265,077) 700
2	245,674 (490,063) 154	235,381 (772,399) 369	267,267 (680,640) 157	- - 0	245,074 (695,743) 680
3	- (-) 0	623,145 (2,569,024) 157	1,250,658 (3,551,869) 377	497,586 (1,528,758) 162	933,823 (2,994,771) 696
4	5,249 (12,554) 43	907,416 (2,149,007) 49	3,501,571 (9,621,991) 270	2,097,532 (7,265,933) 432	2,388,220 (7,828,824) 794
Total	152,739 (609,528) 750	400,131 (1,813,974) 722	1,814,531 (6,211,780) 804	1,661,183 (6,286,041) 594	992,709 (4,521,687) 2870

Table 2b: Means, Standard Deviations and Frequencies of Industry Trading Relations*, 1990

Quartiles: Income per Capita	Quartiles: Quality of Legal Institutions				Total
	1	2	3	4	
1	39.9 (58.3) 553	69.6 (99.9) 147	- (-) 0	- (-) 0	46.1 (70.2) 700
2	66.5 (78.8) 154	66.2 (81.0) 369	96.6 (97.8) 157	- (-) 0	73.3 (85.6) 680
3	- (-) 0	92.4 (94.3) 157	182.2 (136.2) 377	128.2 (110.8) 162	149.4 (127.7) 696
4	4.2 (6.2) 43	35.8 (38.6) 49	240.4 (127.3) 270	187.2 (138.0) 432	186.2 (141.5) 794
Total	43.3 (63.1) 750	70.5 (87.1) 722	185.0 (136.1) 804	173.1 (134.3) 594	118.3 (126.2) 2870

* This is the number of industries that a country exports in to a particular other country

Table 2c: List of countries

Argentina	Ecuador	Indonesia	New Zealand	South Africa
Australia	Egypt	Iran	Nigeria	Spain
Austria	Ethiopia	Ireland	Norway	Sudan
Bel-Lux	Finland	Italy	Pakistan	Sweden
Bolivia	France	Japan	Paraguay	Switzerland
Brazil	Germany, FR	Kenya	Peru	Thailand
Canada	Ghana	Korea, Republic	Philippines	Turkey
Chile	Greece	Malaysia	Poland	United Kingdom
China	Hong Kong	Mexico	Portugal	United States
Colombia	Hungary	Morocco	Saudi Arabia	Uruguay
Denmark	India	Netherlands	Singapore	Venezuela

**Table 3a: Import Regressions (Dollar Values)
Pooled for 1982-1992, Complex vs. Simple Goods**

Regression Column	1	2	3	4	5	6
	Complex	Simple	Complex	Simple	Complex	Simple
GDP importer	0.34 (1.65)	-1.50 (-4.59)	0.13 (0.58)	-1.32 (-3.87)	0.08 (0.37)	-1.27 (-3.61)
GDP exporter	0.58 (2.82)	-1.81 (-5.55)	0.37 (1.66)	-1.65 (-4.84)	0.33 (1.42)	-1.61 (-4.59)
GDP per capita importer	0.77 (3.16)	2.35 (6.05)	1.04 (3.94)	2.01 (4.97)	1.05 (3.83)	1.93 (4.59)
GDP per capita exporter	0.71 (2.92)	2.27 (5.77)	0.88 (3.36)	2.24 (5.49)	0.91 (3.39)	2.25 (5.34)
Distance	-0.98 (-24.90)	-1.26 (-22.76)	-0.98 (-25.00)	-1.27 (-23.17)	-0.98 (-25.07)	1.27 (-23.13)
Adjacent	0.44 (2.62)	0.27 (1.55)	0.43 (2.60)	0.26 (1.51)	0.43 (2.59)	0.26 (1.52)
Links	0.54 (5.11)	0.18 (1.21)	0.54 (5.10)	0.17 (1.16)	0.54 (5.10)	0.17 (1.16)
Language similarities	1.27 (6.73)	0.11 (0.41)	1.27 (6.76)	0.12 (0.46)	1.28 (6.80)	0.12 (0.47)
Quality of importer institutions - (baseline legal quality)	-0.51 (-5.18)	0.66 (4.54)	-0.05 (-0.40)	-0.17 (-0.99)	-0.06 (-0.49)	-0.11 (-0.58)
- separate for second quartile legal quality countries			-0.15 (-3.61)	0.11 (1.61)	-0.63 (-2.40)	0.34 (0.86)
- separate for third quartile legal quality countries			-0.34 (-5.88)	0.57 (6.46)	0.38 (0.12)	1.02 (2.08)
- separate for fourth quartile legal quality countries			-0.36 (-5.70)	0.58 (6.21)	0.11 (0.22)	3.40 (4.76)
Quality of exporter institutions - (baseline legal quality)	0.85 (7.92)	-0.53 (-3.66)	0.51 (3.90)	0.16 (0.87)	0.42 (2.99)	0.26 (1.36)
- separate for second quartile legal quality countries			0.11 (2.54)	-0.07 (-1.05)	1.13 (4.09)	-1.10 (-2.65)
- separate for third quartile legal quality countries			0.23 (3.82)	-0.47 (-5.42)	0.37 (1.14)	-1.47 (-2.96)
- separate for fourth quartile legal quality countries			0.17 (2.63)	-0.50 (-5.25)	1.12 (2.36)	-3.02 (-4.02)
Country-dummies	Yes	Yes	Yes	Yes	Yes	Yes
Quartile dummies*					Yes	Yes
Number of Clusters	2755	2550	2755	2550	2755	2550
adjusted R ²	0.79	0.50	0.80	0.51	0.80	0.51
Observations	22,669	18,948	22,669	18,948	22,669	18,948

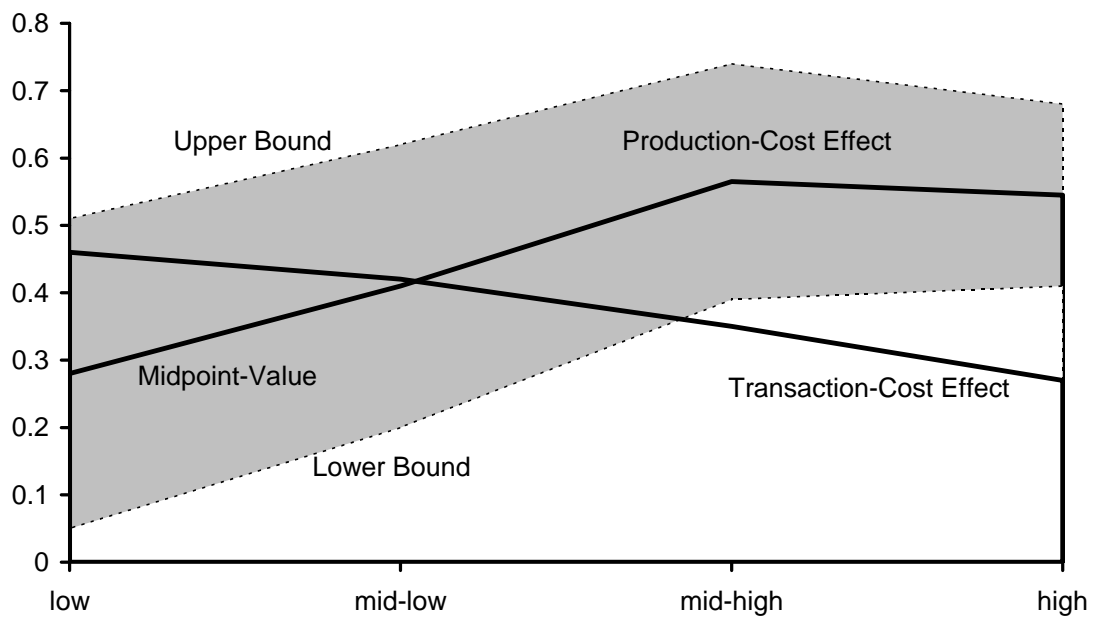
T-statistics reported in parentheses are computed from robust standard errors that account for within-group correlation. Clusters are around country-pairs. * There are six additional dummies for the level of development by importing and exporting country corresponding to the additional quartile-coefficients in columns 3-6

Table 3b: Predicted effect on Production and Transaction Costs based on the Model for Complex Goods

Income Quartile	Total Transaction Costs	Bounds for Production Costs (PC)
Overall	0.34	$0.85 > PC > 0.51$
Low	0.46	$0.51 > PC > 0.05$
Mid-Low	0.42	$0.62 > PC > 0.20$
Mid-High	0.35	$0.74 > PC > 0.39$
High	0.27	$0.68 > PC > 0.41$

Figure 1:

Transaction vs. Production Cost Effect by Quartile
Complex Goods, Trade Volumes



**Table 3c: Net-Export Regressions (Dollar Values)
Pooled for 1982-1992, Complex vs. Simple Goods**

Regression Column	1	2	3	4	5	6
	Complex	Simple	Complex	Simple	Complex	Simple
GDP importer	0.59 (2.08)	-1.25 (-3.04)	0.50 (1.59)	-1.18 (-2.71)	0.29 (0.91)	-1.05 (-2.33)
GDP exporter	0.73 (2.60)	-1.45 (-3.52)	0.64 (2.06)	-1.40 (-3.22)	0.44 (1.37)	-1.27 (-2.82)
GDP per capita importer	0.22 (0.91)	1.84 (3.69)	0.36 (0.96)	1.67 (3.15)	0.60 (1.58)	1.53 (2.76)
GDP per capita exporter	0.31 (0.65)	1.84 (3.70)	0.40 (1.07)	1.86 (3.57)	0.65 (1.69)	1.72 (3.17)
Distance	-0.72 (-14.04)	-0.92 (-14.21)	-0.73 (-14.03)	-0.93 (-14.53)	-0.73 (-14.03)	-0.93 (-14.54)
Adjacent	0.67 (2.85)	0.24 (1.12)	0.67 (2.83)	0.24 (1.12)	0.67 (2.82)	0.23 (1.08)
Links	0.58 (4.66)	0.40 (2.46)	0.58 (4.66)	0.37 (2.32)	0.58 (4.68)	0.37 (2.33)
Language similarities	1.00 (4.58)	0.23 (0.77)	1.02 (4.62)	0.29 (0.99)	1.02 (4.63)	0.30 (1.03)
Quality of importer institutions - (baseline legal quality)	-0.10 (-0.83)	0.54 (2.86)	0.11 (0.79)	0.09 (0.42)	0.09 (0.61)	0.16 (0.67)
- separate for second quartile legal quality countries			-0.07 (-1.59)	0.01 (0.16)	0.12 (0.43)	0.09 (0.18)
- separate for third quartile legal quality countries			-0.17 (-2.29)	0.31 (2.80)	-0.53 (-1.05)	0.25 (0.45)
- separate for fourth quartile legal quality countries			-0.19 (-2.15)	0.31 (2.63)	-0.76 (-1.05)	2.65 (3.06)
Quality of exporter institutions - (baseline legal quality)	0.87 (5.33)	-0.30 (-1.88)	0.59 (2.98)	0.10 (0.54)	0.51 (2.31)	0.16 (0.77)
- separate for second quartile legal quality countries			0.10 (1.51)	-0.05 (-0.83)	1.00 (2.41)	-1.22 (-2.66)
- separate for third quartile legal quality countries			0.16 (1.91)	-0.32 (-3.49)	-0.12 (-0.27)	0.02 (0.04)
- separate for fourth quartile legal quality countries			0.14 (0.79)	-0.33 (-3.07)	-0.03 (-0.04)	-1.07 (-1.19)
Country-dummies	Yes	Yes	Yes	Yes	Yes	Yes
Quartile dummies*					Yes	Yes
Number of Clusters	1993	1960	1993	1960	1993	1960
adjusted R ²	0.74	0.52	0.74	0.52	0.74	0.52
Observations	12,096	10,853	12,096	10,853	12,096	10,853

T-statistics reported in parentheses are computed from robust standard errors that account for within-group correlation. Clusters are around country-pairs. * There are six additional dummies for the level of development by importing and exporting country corresponding to the additional quartile-coefficients in columns 3-6

**Table 3d: Relative-Export Regressions (Dollar Values)
Pooled for 1982-1992, Complex vs. Simple Goods**

Regression Column	1	2	3
	Complex / simple	Complex / simple	Complex / simple
GDP importer	1.53 (3.87)	1.13 (2.65)	0.95 (2.22)
GDP exporter	2.12 (5.33)	1.73 (4.08)	1.57 (3.68)
GDP per capita importer	-1.21 (-2.58)	-0.57 (-1.14)	-0.39 (-0.78)
GDP per capita exporter	-1.23 (-2.54)	-0.99 (-1.95)	-0.88 (-1.71)
Distance	0.36 (5.52)	0.36 (5.69)	0.36 (5.70)
Adjacent	0.20 (0.94)	0.21 (1.00)	0.21 (1.00)
Links	0.38 (2.13)	0.39 (2.22)	0.39 (0.18)
Language similarities	0.88 (2.67)	0.87 (2.70)	0.87 (2.69)
Quality of importer institutions - (baseline legal quality)	-1.30 (-7.15)	0.02 (0.10)	-0.04 (-0.18)
- separate for second quartile legal quality countries		-0.23 (-2.87)	-1.15 (-2.40)
- separate for third quartile legal quality countries		-0.91 (-8.45)	-1.05 (-1.79)
- separate for fourth quartile legal quality countries		-0.94 (-8.16)	-4.10 (-4.57)
Quality of exporter institutions - (baseline legal quality)	1.32 (6.82)	0.24 (1.01)	-0.01 (-0.03)
- separate for second quartile legal quality countries		0.21 (2.69)	2.83 (5.25)
- separate for third quartile legal quality countries		0.72 (6.67)	1.72 (2.86)
- separate for fourth quartile legal quality countries		0.69 (5.84)	4.53 (4.72)
Country-dummies	Yes	Yes	Yes
Quartile dummies*			Yes
Number of Clusters	2492	2492	2492
adjusted R ²	0.37	0.39	0.39
Observations	18,393	18,393	18,393

T-statistics reported in parentheses are computed from robust standard errors that account for within-group correlation. Clusters are around country-pairs. * There are six additional dummies for the level of development by importing and exporting country corresponding to the additional quartile-coefficients in columns 3-6

**Table 4a: Import Regressions (Industry Links)
Pooled for 1982-1992, Complex vs. Simple Goods**

Regression Column	1	2	3	4	5	6
	Complex	Simple	Complex	Simple	Complex	Simple
GDP importer	0.62 (5.50)	-0.14 (-1.69)	0.52 (4.23)	-0.21 (-2.28)	0.49 (3.97)	-0.18 (-1.88)
GDP exporter	0.90 (8.02)	-0.06 (-0.70)	0.80 (6.57)	-0.12 (-1.34)	0.78 (6.33)	-0.09 (-0.98)
GDP per capita importer	-0.41 (-3.07)	0.37 (3.56)	-0.26 (-1.81)	0.43 (3.94)	-0.28 (-1.92)	0.37 (3.25)
GDP per capita exporter	-0.40 (-2.97)	0.30 (2.97)	-0.33 (-2.31)	0.37 (3.49)	-0.31 (-2.14)	0.32 (2.91)
Distance	-0.50 (-17.38)	-0.56 (-28.71)	-0.50 (-17.46)	-0.56 (-28.75)	-0.50 (-17.64)	-0.56 (-28.75)
Adjacent	-0.04 (-0.27)	0.15 (2.11)	-0.04 (-0.28)	0.15 (2.10)	-0.04 (-0.29)	0.15 (2.10)
Links	0.39 (5.75)	0.22 (5.06)	0.39 (5.74)	0.22 (5.05)	0.39 (5.78)	0.22 (5.04)
Language similarities	0.78 (5.68)	0.10 (1.28)	0.79 (5.70)	0.10 (1.30)	0.79 (5.74)	0.11 (1.32)
Quality of importer institutions - (baseline: GDP per capita and legal quality)	-0.27 (-4.83)	0.03 (0.69)	0.08 (1.08)	0.06 (1.07)	0.02 (0.19)	0.03 (0.55)
- separate for second quartile legal quality countries			-0.12 (-5.07)	-0.04 (-1.87)	-0.22 (-1.39)	-0.002 (-0.01)
- separate for second quartile legal quality countries			-0.25 (-7.45)	-0.005 (-0.18)	0.63 (3.45)	0.30 (2.15)
- separate for second quartile legal quality countries			-0.27 (-7.40)	-0.03 (-1.11)	-0.61 (-2.13)	0.50 (2.57)
Quality of exporter institutions - (baseline: GDP per capita and legal quality)	0.79 (13.27)	0.25 (6.15)	0.51 (6.93)	0.29 (5.92)	0.48 (6.12)	0.27 (5.09)
- separate for second quartile legal quality countries			0.07 (2.85)	-0.001 (-0.07)	0.67 (4.48)	0.06 (0.55)
- separate for second quartile legal quality countries			0.18 (5.25)	-0.04 (-1.81)	-0.14 (-0.78)	0.13 (0.91)
- separate for second quartile legal quality countries			0.16 (4.30)	-0.04 (-1.36)	1.34 (4.58)	0.13 (0.64)
Country-dummies	Yes	Yes	Yes	Yes	Yes	Yes
Quartile dummies*					Yes	Yes
Number of Clusters	2755	2550	2755	2550	2755	2550
R ²	0.74	0.73	0.75	0.74	0.75	0.74
Observations	22,669	18,948	22,669	18,948	22,669	18,948

T-statistics reported in parentheses are computed from robust standard errors that account for within-group correlation. Clusters are around country-pairs.

**Table 4b: Relative-Export Regressions (Industry Links)
Pooled for 1982-1992, Complex vs. Simple Goods**

Regression Column	1	2	3
	Complex / simple	Complex / simple	Complex / simple
GDP importer	0.88 (6.52)	0.82 (5.74)	0.73 (4.99)
GDP exporter	1.07 (7.98)	1.01 (7.11)	0.93 (6.38)
GDP per capita importer	-0.90 (-5.62)	-0.80 (-4.75)	-0.74 (-4.26)
GDP per capita exporter	-0.91 (-5.68)	-0.88 (-5.21)	-0.76 (-4.37)
Distance	0.12 (4.83)	0.12 (4.92)	0.13 (5.02)
Adjacent	-0.19 (-1.96)	-0.18 (-1.92)	-0.18 (-1.90)
Links	0.15 (2.18)	0.15 (2.23)	0.15 (2.24)
Language similarities	0.50 (3.91)	0.50 (3.91)	0.50 (3.94)
Quality of importer institutions - (baseline legal quality)	-0.42 (-6.55)	-0.07 (-0.93)	-0.15 (-1.69)
- separate for second quartile legal quality countries		-0.10 (-3.59)	-0.07 (-0.41)
- separate for third quartile legal quality countries		-0.24 (-6.32)	0.53 (2.61)
- separate for fourth quartile legal quality countries		-0.22 (-5.54)	-1.03 (-3.36)
Quality of exporter institutions - (baseline legal quality)	0.60 (9.22)	0.29 (3.56)	0.28 (3.27)
- separate for second quartile legal quality countries		0.10 (3.63)	0.75 (4.28)
- separate for third quartile legal quality countries		0.22 (5.71)	-0.59 (-2.82)
- separate for fourth quartile legal quality countries		0.19 (4.43)	0.91 (2.63)
Country-dummies	Yes	Yes	Yes
Quartile dummies*			Yes
Number of Clusters	2492	2492	2492
adjusted R ²	0.36	0.37	0.39
Observations	18,393	18,393	18,393

T-statistics reported in parentheses are computed from robust standard errors that account for within-group correlation. Clusters are around country-pairs. * There are six additional dummies for the level of development by importing and exporting country corresponding to the additional quartile-coefficients in columns 3-6

**Table 5: Import Regressions (Dollar Values)
Pooled for 1982-1992, Complex Relative to Simple Goods**

Regression Column	1	2	3	4	5	6
	direct	direct	interacted* with SITC one-digit	interacted* with SITC one-digit	interacted with GNP	interacted with GNP
Quality of importer institutions - (baseline legal quality)	-0.25 (-3.46)	-0.07 (-0.86)	0.39 (5.25)	0.71 (9.11)	-0.56 (-4.94)	0.68 (4.14)
- separate for above median		-2.07 (-5.15)		-3.18 (-6.97)		-3.27 (-7.40)
Interaction Effect - (baseline importer leg. x header)			-0.10 (-28.64)	-0.14 (-23.96)	0.03 (4.36)	-0.06 (-5.06)
- separate for above median				0.06 (20.07)		0.03 (2.21)
Quality of exporter institutions - (baseline legal quality)	1.73 (20.65)	0.43 (4.65)	0.59 (7.22)	0.97 (10.91)	-0.26 (-2.35)	-0.63 (-3.51)
- separate for above median		2.85 (7.31)		-2.79 (-6.95)		4.67 (10.67)
Interaction Effect - (baseline exporter leg. x header)			0.18 (53.27)	0.12 (19.21)	0.18 (26.32)	0.08 (6.90)
- separate for above median				0.07 (23.21)		-0.03 (-2.15)
Controls:						
DCG (Dummy complex goods)	-11.12 (-40.21)	-4.26 (-12.41)	-11.29 (-40.36)	-8.77 (-26.14)	-9.46 (-35.76)	-4.27 (-12.36)
DCG x DHI (Dummy high legal quality importer)		-4.74 (-6.80)		-8.16 (-12.06)		-5.05 (-6.97)
DCG x DHE (Dummy high legal quality exporter)		0.45 (0.62)		3.81 (6.04)		1.26 (1.66)
DCG x GNP per capita importer	0.39 (12.02)	0.0 (-0.01)	0.40 (12.20)	0.06 (1.64)	0.36 (11.61)	0.02 (0.55)
DCG x DHI x GNP per capita importer		0.94 (9.80)		1.46 (13.18)		1.13 (9.79)
DCG x GNP per capita exporter	0.67 (20.18)	0.40 (10.84)	0.67 (20.33)	0.67 (18.13)	0.44 (14.03)	0.39 (10.38)
DCG x DHE x GNP per capita exporter		-0.60 (-6.35)		0.07 (0.74)		-0.96 (-8.43)
SITC One-digit-industry code			0.01 (3.31)	0.04 (11.87)		
Country-pair-year dummies	Yes		Yes	Yes	Yes	
Country-pair-year-2digit SITC dummies		Yes				Yes
Number of Clusters	24,470	775,652	24,470	24,470	24,470	775,652
adjusted R ²	0.41	0.60	0.42	0.43	0.42	0.60
Observations	2,991,088	2,991,088	2,991,088	2,991,088	2,991,088	2,991,088

T-statistics reported in parentheses are computed from robust standard errors that account for within-group correlation. Clusters are around the dummy variables in the control sets.