Law, Trade and Development

Johannes Moenius* Daniel Berkowitz**

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Abstract

This paper uses a Ricardian model to generate predictions about the influence of institutions on trade in differentiated (complex) and commoditized (simple) products and then uses a rich international trade data set for empirical tests. The model draws the distinction between the role of international transactions costs and domestic production costs in the trade of complex and simple products. The effects of institutions predicted by the model are identified with a three step estimation procedure. We find that when countries have low quality institutions, institutional reform primarily influences production costs and has little influence on the volume of trade. Institutional reform, however, increases the diversity of exports in complex goods markets. Conversely, in countries with more developed institutions, institutional reform primarily influences transaction costs and is associated with gains in the volume and the diversity of complex exports.

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* Corresponding author; School of Business, University of Redlands, Redlands, CA, 92373-3080 johannes_moenius@redlands.edu; Tel: +1 (909) 748-8779; Fax: +1 (909) 335-5125.
**Department of Economics, University of Pittsburgh, Pittsburgh, PA, 15260, dmberk+@pitt.edu.
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1. Introduction

Intuitively, we expect that the quality of institutions that protect property rights and enforce contracts matters 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 can outsource using multiple input suppliers and can efficiently manufacture high value-added complex products. When these institutions are of poor quality, firms expect that input suppliers can shirk and breach contracts and buyers and predators can steal their shipments. In this case, firms tend to vertically integrate their production processes and specialize in commoditized (simple) products, which tend to carry lower profit margins.[1]

In this paper we analyze how the quality of institutions influences the composition of production within and trade across countries.[2] The share of complex goods in overall exports is generally low in countries with underdeveloped institutions such as the Sudan, while this share is much higher in countries with developed institutions such as Switzerland. Good institutions are important for complex exports because competent judges are required to understand the details of a disputed trade contract and good legal infrastructure is needed to enforce these intricate court rulings (Berkowitz, Moenius and Pistor, 2006). This raises the following question: if a country has bad institutions, how large an improvement in institutions is necessary for it to be able to export more complex goods? More generally, how institutional reform at different levels of institutional quality affects complex and simple goods exports – either in volume or in variety – informs public policy when deciding on investments in institutional infrastructure.

[1] Complex good exports are typically much more profitable than simple goods such as food and many raw materials. For this reason, Grossman and Helpman (1991) argue that the export of complex goods generates rents that can spur growth if re-invested.

[2] We focus on international trade because to our knowledge comparably rich within country data is not as readily available.

To guide our empirical analysis, we sketch a Ricardian model based on Berkowitz, Moenius and Pistor (2006) that delivers three predictions about the impact of institutional reform. First, because a country reaps a gain in both comparative advantage and a lowering of its international transaction costs following an institutional reform, it increases 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 a country to export a wider variety of complex products. We will refer to the first effect as the *volume effect*, to the second as the *compositional effect* and to the third as the *scope effect* of institutions. The model thus considers a world where the level of institutional quality matters, and, as we will argue throughout the paper, serves as a useful benchmark for our empirical work.

We estimate various specifications implied by the model to learn about the relative strength of those three effects for countries with bad versus good institutions. We find that a country's response to a marginal improvement in institutions depends upon its initial level of institutional quality. In countries with under-developed institutions, institutional reform has no influence on the volume of complex exports. Moreover, institutional reform has a negative impact on simple product exports, which represent a large share of overall exports in developing countries. Our interpretation of this finding is that there are institutional thresholds below which marginal improvements in institutions have no positive impact on export volumes. However, even below these thresholds we do find a scope effect where institutional reform leads to exporting a larger variety of complex goods. Combining these empirical results with the predictions of the model suggests that institutional reform in countries with bad institutions mainly lowers domestic production costs, while in the more developed countries it reduces international transaction costs. This suggests that the effectiveness 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 Marcouiller (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 (2007) 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 (2004) show that institutions in fact cause trade; Rauch (1999) and Casella and Rauch (2003) highlight the role of informal networks. Costinot (2009) models how institutions and human capital work as complements in determining comparative advantage. Our paper adds to this literature since it offers an explanation of the mechanism through which institutions affect export composition. It also documents that initial institutional quality determines the effectiveness of institutional reform.

The next section sketches a model of how institutions influence international transaction costs; section three shows how the model can be extended to incorporate the influence of institutions on comparative advantage, and then summarizes the predictions of the model. Section four includes a description of the data and of our estimation strategy. The fifth section provides a summary of results; section six concludes.

2. Institutions and international transaction costs

Anderson (2001) argues that crossing an international border imposes substantial costs because it is the location where formal taxes are imposed and where informal groups extort bribes. Drawing on this idea, Anderson and Marcouiller (2001), henceforth 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 eventually comply with her specifications after possible legal proceedings. 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.

Let $\delta(\cdot)$ denote the probability that the importer is satisfied with the shipment, and let $\pi(\cdot)$ denote the probability that the importer is compensated if there is a breach of contract. If the importer is dissatisfied and seeks compensation in court, she typically makes an advance payment to start the process. If the importer loses, she foregoes the advance payment and also bears the time costs of going to court. If the importer wins she is typically compensated for the value of shipment but may still bear the costs of legal fees and time away from work. The importer's legal costs when she wins, ψ_W, or loses, ψ_L, are represented as output shares: $1 > \psi_W > 0$ and $1 > \psi_L > 0$. Then $\pi(\cdot)(1 - \psi_W) > 0$ and $-(1 - \pi(\cdot))\psi_L < 0$ are the expected gains and losses from going to court. Thus, an importer who is dissatisfied goes to court when expected gains exceed expected losses:

$$\pi(\cdot) > \psi_L/(1 - \psi_W + \psi_L) \qquad \text{(A1)}$$

Thus, if (A1) holds, an importer expects to receive the share of her shipment, $r(\cdot)$:

$$r(\cdot) = \delta(\cdot) + (1 - \delta(\cdot))[\pi(\cdot)(1 - \psi_W) - (1 - \pi(\cdot))\psi_L] \qquad (1)^3$$

Using equation (1) we consider how institutions impact the importer's transaction costs. In a trading relation, the importer is at risk of receiving an inadequate shipment. The exporter has a greater incentive to make a good faith effort when she believes the probability that she will be punished for breach of contract is high. A good faith effort from the exporter in turn increases the

[3] In this model a satisfied importer will never pursue a frivolous lawsuit. This is because the benefit of accepting a satisfactory shipment, 1, exceeds the expected benefit of seeking compensation in court, $(\pi(1 - \psi_W) - (1 - \pi)\psi_L)$.

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,

$$\delta = \delta(\pi, c): \ \partial\delta/\partial\pi > 0, \ \partial\delta/\partial c < 0 \ for \ \delta, \pi \in [0,1) \qquad (2)$$

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, 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 only the domestic courts can seize these assets in peacetime, 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 or even mass-produced machines, contain many characteristics. These characteristics are 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 increase, 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

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

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

For notational simplicity, let $A = (1+\psi_L)(1-\pi)+\pi\psi_w > 0$ and

$B = (1+\psi_L-\psi_w) > 0$

Differentiating (1) using equations (2) and (3) and plugging in the expressions for A and B, then

$$\partial r/\partial I^{\exp} = \partial\pi/\partial I^{\exp}[(\partial\delta/\partial\pi)*A + (1-\delta)*B] > 0 \quad (4)$$

$$\partial r/\partial c = \partial\pi/\partial I^{\exp}/(\partial\delta/\partial\pi*A + (1-\delta)*B] > 0 \quad (5)$$

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 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* (and 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. An increase in product complexity thus lowers *r*. Third, better institutions in the exporter country dampen the marginal negative impact of complexity on *r*: $\partial^2 r/\partial I^{\exp}\partial c > 0$. Finally, the share of surviving products, $\varphi(c, I^{\exp}, I^{imp}, \cdot) = r(c, I^{\exp})\cdot s(I^{imp})\cdot\tau(\cdot) \in [0,1)$, 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.

[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.

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, Fischer and Samuelson (1977). There are two countries (home and foreign); two simple products denoted *S* and *S** that are imperfect substitutes for each other and 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:

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

The representative agents in each country have the same utility function

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

where $\{\beta, 1-\beta\} \in (0, 1)$ are the constant shares of income spent on simple and complex products. The parameter $\rho = 1-(1/\sigma)$, where 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:

$$\sigma > 1 \tag{8}$$

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 assumptions 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 costs 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. Let $M^{complex}$, I^{imp} and I^{exp} denote the equilibrium quantity of complex imports, importer and exporter institutions, and let η^{P}_{imp} and η^{P}_{exp} denote the import elasticity of product type *p*

(simple or complex) with respect to importer and exporter institution. Then, these elasticities can be decomposed as follows:

$$\eta^{complex}{}_{imp} = \eta^{complex}{}_{imp\,production} + \eta^{complex}{}_{imp\,transaction} = ?$$
$$where$$
$$\eta^{complex}{}_{imp\,production} < 0;\ \eta^{complex}{}_{imp\,transaction} > 0 \qquad (9)$$

$$\eta^{complex}{}_{\exp} = \eta^{complex}{}_{\exp\,production} + \eta^{complex}{}_{\exp\,transaction} > 0$$
$$where$$
$$\eta^{complex}{}_{\exp\,production} > 0;\ \eta^{complex}{}_{\exp\,transaction} > 0 \qquad (10)$$

Because a gain in comparative advantage in the complex goods sector implies a loss in comparative advantage in the simple goods 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 positive in simple product markets. Consequently, 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, 1977; 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 simple product markets:

$$\eta^{complex}{}_{imp\,production} + \eta^{complex}{}_{\exp\,production} = 0$$
$$where \qquad (11)$$
$$\eta^{simple}{}_{imp\,production} + \eta^{simple}{}_{\exp\,production} = 0$$

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

$$\eta^{complex}{}_{imp} + \eta^{complex}{}_{\exp} = \eta^{complex}{}_{imp_{transaction}} + \eta^{complex}{}_{\exp_{transaction}} > 0 \quad (12)^5$$

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 foreign institutions also lowers the cost of importing complex products because it lowers the home country's risk of importing shoddy complex products.

The model also predicts that reductions in international transaction costs will increase the variety of complex exports (scope effect).[6] However, 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, 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 is arguably 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

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

[6] See Dornbusch, Fischer, and Samuelson (1977). A derivation of this result in the context of our model is available upon request.

countries. Just which effect dominates in the less developed and the developed economies is thus 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.[7] 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.[8] We do not include repudiation of government contracts and ethnic tensions, since those dimensions do not fit the concept of legal quality we introduced.[9] Consistent with our model in which institutions are exogenous and GDP per capita is endogenous, we use the quality of 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 1, column 1 and 2. Four digit SITC trade data is

[7] 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.
[8] 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.
[9] However, all results are robust to the inclusion of these two dimensions.

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).[10] 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 complexity (simple) and "neither" captures high complexity.[11] In order to avoid bias in our results from "corner solutions", we only include observations where a country exports both complex and simple goods in a given year to a particular trading partner.[12] In Table 1 column 3 and 4 , we report summary statistics of the relative importance of simple versus complex products. There are 55 countries (see Table 2) 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 allow institutions to influence domestic

[10] In complementary work, Costinot (2009) defines product complexity as the amount of fixed learning costs a firm needs to invest before it is able to produce a certain product. Levchenko (2007) defines complexity as the variety or range of inputs in production and Nunn (2007) measures complexity as the share of inputs in a product that require relationship-specific investments.
[11] 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.
[12] We would like to thank an anonymous referee for this suggestion. This reduces the number of observations by roughly one quarter for complex goods and 15% for simple goods.

production costs and international transaction costs.[13] This has important implications for multilateral resistance (henceforth MLR), which – in a gravity framework – controls for alternative trading opportunities each country may have (Anderson and van Wincoop (2003), and henceforth AvW). In AvW's model, each country's MLR is a function of all country's GDP shares and trade costs between them. Both importer and exporter MLR need to be included in the estimation to avoid omitted variable bias.

Our model emphasizes that institutions may affect each country's exports and imports differentially; they may also differentially affect complex and simple goods. Moreover, institutions influence international as well as domestic transaction costs and are thus determinants of MLR. This has three implications for our estimation strategy. First, MLR varies across complex and simple goods markets, and equations for these markets should therefore be estimated separately. Second, estimation equations need to include separate MLR for exporters and importers. Third, because determinants of MLR – including legal institutions – vary over time, MLR should be allowed to vary over time.

We develop the following three-step estimation method to account for these issues. In a modified version of Feenstra (2004, p.161)[14] we first regress annual bilateral imports by product group (complex, simple) on standard bilateral gravity flow variables between country pairs (distance, whether a pair of countries shares a border, a common language and a colonial past) and dummy variables that are exporter-year specific as well as dummy variables that are importer-year specific. In order to obtain estimates for all dummy variables, we suppress the constant. Thus, we estimate the following equation by product group:

$$IM_{ijtk} = \alpha_{ikt} D_{xit} + \alpha_{jkt} D_{mjt} + \mathrm{T}_t + \beta_k X_{ijt} + \varepsilon_{ijtk}, \qquad (13)$$

[13] 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.

[14] Our approach differs from Feenstra (2004) in two ways. First, we allow exporter and importer GDP to be absorbed by our dummy variables instead of dividing the left hand side variable by them. And, we also include additional measures of trade costs on the right hand side. Both are necessary to improve the quality of our estimates in the second step.

where IM_{ijtk} denotes the dollar value of imports originating from country i and shipped to country j in year t and product group k, where k is either complex or simple. Similarly, X_{ijt} contains the standard bilateral gravity variables for all pairs of countries. The coefficients for the exporter dummies D_x and importer dummies D_m are α_{itk} and α_{jtk}, which vary by year and product group. An exporter-year specific dummy variable equals one if, in a bilateral trading relationship, a country is an exporter in a given year; this variable equals zero otherwise. The same holds for importer-year specific dummy variables. These dummy variables absorb all country-year-specific effects for exporters and importers respectively, such as infrastructure, geography, and GDP. They also absorb our variables of interest I_{it} and I_{jt}, which denote the quality level of exporter and importer legal institutions, hereafter referred to simply as institutions. Finally, we additionally control for time-specific effects with dummies T_t.

In the second step[15], we implement a variant of the method developed by Plümper and Troeger (2007) to identify the influence of exporter and importer legal institutions. In order to construct two new variables, which we refer to as exporter- and importer-controls, we stack the coefficient estimates of the exporter and importer dummy variables. In each row, the first variable contains the value of the estimated coefficient of the exporter-year dummy; the second variable contains the value of the estimated coefficient of the importer-year dummy.

The exporter-controls are regressed on all exporter-year specific variables, including the exporter's quality of legal institutions. The same procedure is employed for the importer regression and the estimating equations are:

$$EC_{itk} = \alpha + \beta_k X_{it} + \mathrm{T}_t + \hat{\varepsilon}_{xitk} \tag{14}$$

$$IC_{jtk} = \alpha + \beta_k X_{jt} + \mathrm{T}_t + \hat{\varepsilon}_{mjtk} \tag{15}$$

where IC_{jtk} and EC_{itk} denote the exporter- and importer-controls, X_{jt} and X_{it} denote the vector of country-year specific variables, namely the quality of legal institutions, GDP, and GDP

[15] We would like to thank an anonymous referee for pointing us in this direction.

per capita[16]. In the exporter equation (14), only the exporter-specific variables are included, since all importer-specific variables have been controlled for through the importer-year dummies in the first step regression, and time-specific effects are controlled through time-dummies T_t. The left hand side of equations (14) and (15) consists of the effects of all country-year-specific factors (both measurable and unobservable) on bilateral trade, including MLR. The right hand side of equations (14) and (15) covers all the observable country-year specific effects included in the X_{it} and X_{jt} matrices, respectively. The residuals of these two regressions, $\hat{\varepsilon}_{xitk}$ and $\hat{\varepsilon}_{mjtk}$, contain all other country-year specific effects not accounted for by the country-year-specific variables in X_{it}, including possible additional determinants of MLR.[17] As long as all relevant variables are included in the first and second step, this procedure correctly identifies all regression parameters. The point estimates for the bilateral gravity flow variables such as distance are correctly identified in the first step; and the point estimates for country-specific variables such as legal institutions are correctly identified in the second step regression.

Obtaining correct standard errors requires a third step where the country-year-dummies in the first step regressions are replaced with all country specific variables as well as the residuals from the second step regressions. Thus, the following equation is estimated:

$$IM_{ijtk} = \alpha + \beta_k X_{ijt} + \gamma_k I_{it} + \delta_k I_{jt} + \hat{\varepsilon}_{xitk} + \hat{\varepsilon}_{mjtk} + \mathrm{T}_t + \varepsilon_{ijtk} \qquad (16)$$

The matrix X_{ijt} includes now all bilateral (gravity flow) and country-year-specific variables except for our institutional variables I_{it} and I_{jt}, which we listed separately to highlight their importance. The right hand side also includes the residuals $\hat{\varepsilon}_{xitk}$ and $\hat{\varepsilon}_{mjtk}$ derived from the second step as controls. Note that the coefficients on these variables are supposed to be equal to one. The standard errors from this regression, however, are still downward biased since there are

[16] 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 (ρ=0.82)

[17] Plümper and Troeger (2007) advocate as an advantage of their method that it generally outperforms other methods of estimating the equivalent of our country-year specific effects when omitted variable bias may be present.

more coefficients in the first than in the third step regression (Davidson and MacKinnon 1993, p.69). Thus, in the final regressions our standard errors are adjusted using a correction factor.[18]

To study the effect of institutions at different levels of development, the two institutional variables are interacted 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* and *x* stand for importer and exporter, and *q* denotes the quartile of institutional quality (development). As in equation (16), the institutional variables are extracted from the matrix X_{ijt} and included separately in equation (17) below:

$$IM_{ijtk} = \alpha + \beta_k X_{ijt} + \gamma_k I_{it} + \sum_{q=2}^{4} \gamma_{qk} D_{qm} \cdot I_{it} + \delta_k I_{jt} + \sum_{q=2}^{4} \delta_{qk} D_{qx} \cdot I_{jt} + \hat{\varepsilon}_{xit} + \hat{\varepsilon}_{mjt} + \mathrm{T}_t + \varepsilon_{ijtk} \quad (17)$$

In order to learn about compositional and scope effects, two alternative dependent (left hand side) variables are used in equation (17), namely relative exports and the counts of industries by category (see Besedes and Prusa (2006)). For example, counts from Germany to France in complex goods equal 150 if Germany has positive exports to France in 150 four-digit SITC industries in the complex goods sector in a particular year. As discussed above, this variable allows for testing the prediction of the Dornbusch et. al (1977) model that a reduction in international trade costs through institutional reform should lead to an increase in exports of complex goods varieties (the scope effect); a change in relative productivity through institutional reform should advance the more productive country to export more varieties of complex goods relative to the less productive country (the compositional effect).

Finally, a feature of the gravity model regressions that is problematic for calculating standard errors is that the same country's characteristics will be represented on the right hand side repeatedly. Defining these repetitions as groups, error terms within those groups are likely to be

[18] The standard errors in (16) are calculated based on the number of parameters estimated in the third step. The sum of squared residuals in (16), however, arise from the first step regression with a larger set of parameters. We therefore multiply our standard errors with $[(n-m_3)/(n-m_1)]^{1/2}$, where m_1 and m_3 are the number of parameters estimated in the first and third step respectively, and *n* is the number of observations.

correlated with each other, while error terms across groups should not be correlated. 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. Consequently, our standard errors are considerably higher than without this correction. This hurts the statistical significance of our estimates, but increases our confidence in our results.

5. Results

Table 3 reports results for estimation of the effect of institutions on trade volumes. All the standard gravity variables have the expected signs and are of reasonable order of magnitude. All regressions include exporter and importer MLR controls, which are highly statistically significant and – by construction – have an estimated coefficient equal to one. The first two columns 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, both exporter and importer institutions are positively associated with complex goods exports, and exporter institutions have the larger absolute impact. The positive coefficient on importer institutions implies that the international transaction cost effect dominate the domestic production cost effect.[19] In simple product markets, the effect of importer institutions is positive and the effect of exporter institutions is negative. This implies that the (negative) production cost effect dominates the (positive) transaction cost effect.

Columns 3-4 contain our major results since they draw a distinction between the impact of institutions in countries with under-developed and relatively developed institutions.[20] The baseline is an estimate of the impact of legal institutions in countries in the lowest institutions quartile; the coefficients for "separate for second quartile legal quality countries," and

[19] These results differ from the estimates in table 4 in BMP (2006) where production costs dominate transaction costs. This difference is due to the change in the sample and in the estimation method.
[20] We use the quality of institutions as the metric of development. If we were to use GDP per capita instead, our empirical results would be similar in pattern but different in magnitude. For the theoretical implications on trade of using GDP per capita to measure development, see Murphy and Shleifer (1997).

analogously for the third and fourth quartile, provide estimates for the impact of institutions in countries in the second, third and fourth legal quality quartiles relative to the lowest quartile.

These results offer a more nuanced picture. In complex markets, a marginal increase in the quality of exporter institutions is positively associated with exports in quartiles two, three and four; in the bottom quartile exporter institutions have no impact. As the model predicts, an increase in the quality of exporter institutions is negatively associated with simple exports.[21] Importer institutions are negatively associated with complex imports in the bottom two quartiles, and marginally positively associated with complex imports in the top two quartiles. They are also negatively associated with simple imports for countries in the bottom two quartiles and have no influence in the top two quartiles. This last result is inconsistent with our model, which predicts that a marginal increase in importer institutions should lead to an overall increase in simple goods imports. We therefore discuss these results in the context of our model next.

An improvement in importer institutions increases a country's comparative advantage in complex products and also reduces its international transaction costs. However, international transaction costs for complex goods seem to remain prohibitively high in the least developed countries. The production cost effect in those countries may lower complex imports while having no influence on complex exports. Thus a threshold effect may be at work. As institutional quality improves further, both the production cost effect and the transaction cost effect unfold their power. General equilibrium production cost effects dominate transaction cost effects for simple goods exports, and they do so at an increasing rate as institutions develop. The model predicts a positive effect of importer institutions both by the production as well as the transaction cost effect on simple goods imports, which we do not observe. The strong simplifying assumptions of our model (especially full employment, competitive labor markets, and no productivity increase in

[21] The coefficients in column 3 or 4 are not the same as the average coefficient in column 1 or 2. Possible causes are, for example, that relative outliers are likely smaller by quartile since each coefficient only has to capture a quarter of the observations, and coefficient estimates for GDP per capita –highly correlated with the quality of legal institutions – differ for aggregate versus per quartile estimates. We believe the more completely specified and conservative estimates in column 3 and 4 are closer to the true parameters.

simple goods production due to a shift into complex goods production) are most likely violated in countries with low quality institutions, and thus forces outside of our model may drive these results. Nevertheless they suggest caution to rely on institutional reform alone to fuel trade with a shift into complex goods production and are therefore presented here.

Taking our model literally, from the point estimates in column 3 of Table 3 we calculate the overall transaction cost effect from both exporter and importer institutions. We also calculate the range of values for the production cost effect that our estimates support.[22] These calculations are shown in Figure 1: at lower stages of development, legal institutions primarily promote comparative advantage, while at higher stages they mostly reduce international transactions costs. This result is based on a literal interpretation of our model under the assumptions of perfect competition and market efficiency, both likely violated in countries with under-developed institutions. Nevertheless, as indicated in subsequent tables, this result is robust to employing alternative measures of trade.[23]

Comparing the size of the coefficients exposes the compositional effect of institutions: subtracting coefficient values for simple goods from those for complex goods reveals relative effects of institutions on complex versus simple goods. These indicate changes in production and export structure across sectors within countries: even countries with the lowest quality institutions experience shifts into complex goods exports driven by improvements in the quality of exporter and importer institutions.[24] For countries with higher quality institutions, this shift can only be observed for exporter institutions.

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[22] Recall from equations (9) to (12) that the production (P) and transaction (T) cost effects for complex goods of exporters (E) and importers (M) are $-P_M + T_M + P_E + T_E$. Since $-P_M + P_E = 0$, the total measured transaction cost effect is either the sum of the coefficients on exporter and importer institutions or equal to zero if transaction costs are prohibitively high. The production cost effect lies somewhere between those two coefficient estimates, since transaction costs cannot be negative in our model. In the graph, we also include the midpoint between the two values.

[23] Additional robustness checks with alternative measures of trade like next exports and complex relative to simple exports are available online at the authors' webpages.

[24] For importer institutions in the lowest quartile, the coefficient values on importer institutions are (-0.35) – (-0.72) = 0.47. The coefficient values for exporter institutions they are (-0.05) – (-0.45) = 0.40. The

The compositional effect documented in Table 3 does not differentiate between shifts within industry-sector from simple to complex goods (e.g. from iron to parts made from iron) and across sector shifts (from iron to machinery).[25] To see whether institutions have an effect on the former, we combine our separate regressions for complex and simple goods into one regression with complex relative to simple goods exports as the left hand side variable by industry for SITC 1 digit industries sectors. We find simple as well as complex goods in all SITC 1 digit industries except for SITC 7 (machinery and transport equipment) and 8 (miscellaneous manufactured articles). As previously explained in the discussion of Table 3, the coefficients on institutions document the shift in production structure from simple to complex goods. The results are reported in Table 4. We find no effect of institutional reform on food and live animal exports (SITC 0), but strong effects consistent with our model (exporter institution effects positive and larger than importer institution effects) for all other industries. We also find substantially stronger effects for SITC industries 5 and 6 than for all others, arguably because of the higher degree of complexity for differentiated goods in these industries as compared to all others. We conclude that both within sector as well as across sector adjustments take place simultaneously due to the change in institutional quality.

In terms of diversity of complex goods traded, the scope effect predicts that lowering international transaction costs increases the number of complex products imported and exported while the compositional effect predicts that changes in comparative advantage result in a shift of the number of products traded in favor of the country that improves its institutions. In Table 5, 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 see a similar pattern established as in Table 3: better exporter institutions lead to an increase in the number of exported complex products; better importer institutions have no effect on the number

negative individual coefficients indicate a reduction in each category. However, the positive combined coefficients indicate relative shifts into complex goods.

[25] We would like to thank an anonymous referee for this observation.

of imported complex products – suggesting that (compositional) comparative advantage and trade cost (scope) effects cancel each other out – and the effect of exporter institutions dominates.

We repeat the exercise by development quartile and confirm the general patterns of results from Table 3 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. However, we find one striking difference: even low institutional quality countries do increase their number of exporter links in complex goods. This is striking, since it suggests that while export volumes may not increase in the least developed countries, institutional improvements are associated with increased diversification in trading relationships, which should be welcomed as a sign and prerequisite for further trade integration. At the same time, they import fewer varieties of complex products, which is again consistent with the view that relative production cost effects dominate international transaction costs effects in the lowest development quartile.

Our model predicts that importance of institutional quality in exporting countries increases with product complexity. Since this prediction cannot be achieved within the scope of equations (13) to (17), we amend equation (13) 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 estimate effects only for below and above the median quality of 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_{qx} 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:

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

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 identify 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_{ijt}. Additional interaction terms are added to this equation to study the prediction stated above. We present the overall results first. Our country-pair-year fixed effects F_{ijt} absorb all country-pair specific effects that vary over time such as 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, GDP per capita, MLR, and the direct effect of institutions. Next, we present the results by level of development, where we distinguish only two categories: above or below the median level of development. As an additional robustness check we replace the country-pair-year fixed effects with country-pair-year-two-digit industry effects to control for additional effects – like price or technology levels – by 2 digit industry.

The results are presented in Table 6. In column 1, 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 (column 2). 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.

Based on our model, we expect the effect of exporter institutions 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 3 and 4 of Table 6. 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.[26]

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

6. Conclusions

In this paper we argued that domestic production structure is reflected in a country's international trade structure. Using a simple theoretical model, we have argued that institutions lower both domestic (production) 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 domestic transaction cost effect, which influences relative production costs, and an international trade cost effect. Our empirical work supports this theoretical argument; however, our results also show that, in terms of volumes, under-developed economies benefit less from domestic institutional reform than more developed economies.

[26] 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.

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Appendix

Table 1: Summary Statistics Quality of Legal Institutions and Complexity Intensiveness of Exports*

		Quality of legal institutions		Complexity intensiveness	
	Statistics	Value (Index)	Countries close to value	Value	Countries close to value
Overall (year = 1988)	Average	4.62	Hungary, Thailand, Greece	10.96	USA, Ireland, Finland
	Min	1.5	Indonesia, Philippines, Sudan,	0.07	Venezuela, Nigeria, Iran
	Max	7	Switzerland, Sweden, New Zealand	240	Japan, Hong Kong, Korea
	Standard Deviation	1.68		33.2	
Change over Estimation Period 1982-1992	Decreasers	-19% -15% -14%	Hong Kong South Africa Malaysia	-79% -28% 13%	Ghana Peru Nigeria
	Increasers	208% 157% 145%	Iran Morocco Egypt	19,404% 4,165% 4,128%	Turkey Kenya Brazil

*Ratio (using US dollar values) of complex to simple product exports by country

Table 2: List of Countries

Argentina	Ecuador	Indonesia	New Zealand	South Africa
Australia	Egypt	Iran	Nigeria	Spain
Austria	Ethiopia	Ireland	Norway	Sudan
Belgium-Luxembourg	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 3: Import Regressions (Dollar Values)
Pooled for 1982-1992, Complex vs. Simple Goods

Regression Column	1	2	3	4
	Complex	Simple	Complex	Simple
GDP importer	0.67*** (42.6)	0.96*** (41.2)	0.66*** (41.1)	0.95*** (39.1)
GDP exporter	0.90*** (65.3)	0.65*** (28.4)	0.90*** (62.7)	0.63*** (26.4)
GDP per capita importer	0.78*** (20.1)	0.40*** (6.87)	0.65*** (16.0)	0.25*** (3.95)
GDP per capita exporter	0.65*** (16.0)	0.27*** (4.55)	0.43*** (9.84)	0.31*** (4.98)
Distance	-0.90*** (-37.5)	-1.46*** (-40.2)	-0.90*** (-37.6)	-1.46*** (-40.3)
Adjacent	0.38*** (3.08)	0.017 (0.11)	0.38*** (3.08)	0.017 (0.11)
Links	0.63*** (9.31)	0.19* (1.89)	0.63*** (9.28)	0.19* (1.86)
Language similarities	0.80*** (6.57)	0.41** (1.98)	0.80*** (6.46)	0.41** (2.00)
Quality of importer institutions - (baseline legal quality)	0.26*** (2.92)	0.44*** (3.29)	-0.35*** (-3.01)	-0.72*** (-4.37)
- separate for second quartile legal quality countries			0.18*** (4.69)	0.49*** (8.29)
- separate for third quartile legal quality countries			0.49*** (10.2)	0.79*** (10.6)
- separate for fourth quartile legal quality countries			0.39*** (7.60)	0.69*** (8.79)
Quality of exporter institutions - (baseline legal quality)	1.74*** (17.0)	-0.75*** (-5.23)	-0.053 (-0.39)	-0.45** (-2.40)
- separate for second quartile legal quality countries			0.76*** (17.1)	-0.035 (-0.59)
- separate for third quartile legal quality countries			1.17*** (20.2)	-0.11 (-1.37)
- separate for fourth quartile legal quality countries			1.10*** (17.5)	-0.27*** (-3.14)
Exporter MLR control	1.00*** (49.3)	1.00*** (48.4)	1.00*** (49.1)	1.00*** (48.4)
Importer MLR control	1.00*** (29.4)	1.00*** (29.7)	1.00*** (29.8)	1.00*** (28.8)
R^2	0.867	0.687	0.867	0.687

T-statistics reported in parentheses are computed from robust standard errors that account for within-group correlation and are adjusted for actual degrees of freedom used in the regression. 16,464 observations were clustered around 2,352 country-pairs. * indicates statistical significance at 10%, ** at 5% and *** at 1% level.

Table 4: Relative-Export Regressions (Dollar Values) by One Digit SITC Pooled for 1982-1992, Complex vs. Simple Goods

Regression Column	SITC 0	SITC 1	SITC 2	SITC 3	SITC 4	SITC 5	SITC 6	SITC 9
Quality of importer institutions	-0.026 (-0.018)	-2.35*** (-4.26)	5.93*** (3.53)	3.49*** (3.27)	-1.71** (-2.26)	-3.91*** (-2.74)	8.72 (1.53)	0.61 (0.85)
Quality of exporter institutions	-0.23 (-0.15)	3.49*** (5.03)	14.2*** (8.80)	10.3*** (5.21)	3.49*** (3.83)	43.3*** (21.0)	86.7*** (12.4)	1.68* (1.85)
Number of Clusters	1990	624	1755	748	938	1185	1738	681
R^2	0.486	0.657	0.847	0.603	0.626	0.914	0.927	0.790
Observations	12902	2693	10172	3784	5183	6580	10260	3153

T-statistics reported in parentheses are computed from robust standard errors that account for within-group correlation and are adjusted for actual degrees of freedom used in the regression. Clusters are around country-pairs. 5 and 6. * indicates statistical significance at 10%, ** at 5% and *** at 1% level. Standard controls (GDP and GDP per capita for the importer and exporter, distance between countries pairs, whether countries are adjacent, share colonial links and have similar languages as well as the MLR corrections discussed in section 4.2) are included but not reported.

Table 5: Complex Goods Export Regressions (Industry Links) Pooled for 1982-1992

Regression Column	1	2
	Complex	Complex
GDP importer	0.16*** (15.5)	0.16*** (14.8)
GDP exporter	0.41*** (44.8)	0.41*** (44.7)
GDP per capita importer	0.32*** (13.9)	0.26*** (10.8)
GDP per capita exporter	0.25*** (11.0)	0.19*** (7.77)
Distance	-0.38*** (-23.5)	-0.38*** (-23.7)
Adjacent	-0.047 (-0.54)	-0.047 (-0.54)
Links	0.38*** (9.25)	0.38*** (9.21)
Language similarities	0.33*** (4.01)	0.33*** (3.90)
Quality of importer institutions - (baseline legal quality)	0.077 (1.39)	-0.19** (-2.51)
- separate for second quartile legal quality countries		0.082*** (3.34)
- separate for second quartile legal quality countries		0.22*** (6.94)
- separate for second quartile legal quality countries		0.17*** (5.00)
Quality of exporter institutions - (baseline legal quality)	1.34*** (22.8)	0.52*** (6.83)
- separate for second quartile legal quality countries		0.40*** (15.0)
- separate for second quartile legal quality countries		0.44*** (12.5)
- separate for second quartile legal quality countries		0.51*** (13.2)
Exporter MLR control	1.00*** (23.4)	1.00*** (23.9)
Importer MLR control	1.00*** (45.4)	1.00*** (46.1)
R^2	0.814	0.814

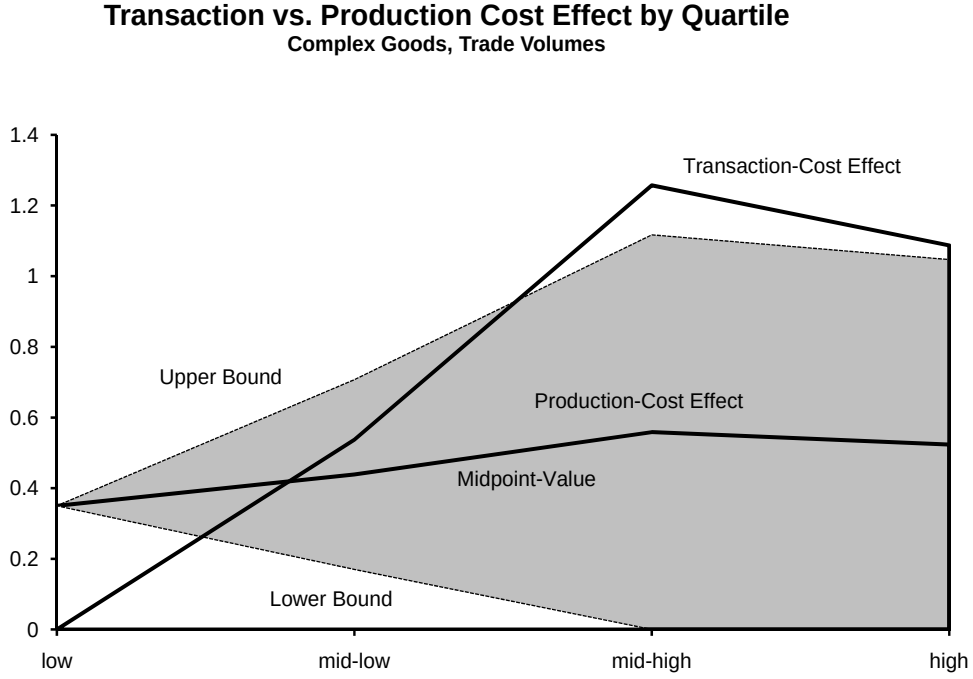
T-statistics reported in parentheses are computed from robust standard errors that account for within-group correlation and are adjusted for actual degrees of freedom used in the regression. 16,464 observations were clustered around 2,352 country-pairs. * indicates statistical significance at 10%, ** at 5% and *** at 1% level.

Table 6: Import Regressions (Dollar Values)
Pooled for 1982-1992, Complex Relative to Simple Goods

Regression Column	1	2	3	4
	direct	direct	interacted* with SITC one-digit	interacted* with SITC one-digit
Quality of importer institutions - (baseline legal quality)	-0.25*** (-3.46)	-0.07 (-0.86)	0.39*** (5.25)	0.71*** (9.11)
- separate for above median		-2.07*** (-5.15)		-3.18*** (-6.97)
Interaction Effect - (baseline importer leg. x 1-dgit SITC)			-0.10*** (-28.64)	-0.14*** (-23.96)
- separate for above median				0.06*** (20.07)
Quality of exporter institutions - (baseline legal quality)	1.73*** (20.65)	0.43*** (4.65)	0.59*** (7.22)	0.97*** (10.91)
- separate for above median		2.85*** (7.31)		-2.79*** (-6.95)
Interaction Effect - (baseline exporter leg. x 1-dgit SITC)			0.18*** (53.27)	0.12*** (19.21)
- separate for above median				0.07*** (23.21)
Controls:				
DCG (Dummy complex goods)	-11.12*** (-40.21)	-4.26*** (-12.41)	-11.29*** (-40.36)	-8.77*** (-26.14)
DCG x DHI (Dummy high legal quality importer)		-4.74*** (-6.80)		-8.16*** (-12.06)
DCG x DHE (Dummy high legal quality exporter)		0.45 (0.62)		3.81*** (6.04)
DCG x GNP per capita importer	0.39*** (12.02)	0.0 (-0.01)	0.40*** (12.20)	0.06* (1.64)
DCG x DHI x GNP per capita importer		0.94*** (9.80)		1.46*** (13.18)
DCG x GNP per capita exporter	0.67*** (20.18)	0.40*** (10.84)	0.67*** (20.33)	0.67*** (18.13)
DCG x DHE x GNP per capita exporter		-0.60*** (-6.35)		0.07 (0.74)
SITC One-digit-industry code			0.01*** (3.31)	0.04*** (11.87)
Country-pair-year dummies	Yes		Yes	Yes
Country-pair-year-2digit SITC dummies		Yes		
Number of Clusters	24,470	775,652	24,470	24,470
adjusted R^2	0.41	0.60	0.42	0.43
Observations	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. * indicates statistical significance at 10%, ** at 5% and *** at 1% level.

Figure 1:


Transaction vs. Production Cost Effect by Quartile
Complex Goods, Trade Volumes
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Transaction-Cost Effect
Upper Bound
Production-Cost Effect
Midpoint-Value
Lower Bound
low
mid-low
mid-high
high