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2006

Trade, Law and Product Complexity

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TRADE, LAW, AND PRODUCT COMPLEXITY

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Abstract—How does the quality of national institutions that enforce the rule of law influence international trade? Anderson and Marcouiller argue that bad institutions located in the importer's country deter international trade because they enable economic predators to steal and extort rents at the importer's border. We complement this research and show how good institutions located in the exporter's country enhance international trade, in particular, trade in complex products whose characteristics are difficult to fully specify in a contract. We argue that both exporter and importer institutions affect international as well as domestic transaction costs in complex and simple product markets. International transaction costs are a part of the costs of trade. Domestic transaction costs affect complex and simple products differently, thereby changing a country's comparative advantage in producing such goods. We find ample empirical evidence for these predictions: countries that have good institutions tend to export more complex products and import more simple products. Furthermore, institutions have a stronger influence on trade via production costs (comparative advantage) than through international transactions costs. International institutions seem to operate as substitutes for domestic institutions, because good domestic institutions are less important for promoting exports in those countries that have signed the New York Convention.

I. Introduction

BEFORE entering into international trade agreements, exporters must believe they will receive timely and appropriate payment with sufficiently high probability, and importers must believe they will receive timely shipment of appropriate products with sufficiently high probability. In this paper we focus on the ways in which formal national institutions such as courts and bailiffs that enforce contracts and protect property rights can provide appropriate assurance to exporters and importers, and thereby foster mutually beneficial trade.[1] Anderson and Marcouiller (2002) show that when law enforcement institutions are ineffective, corrupt government officials and other predators are able to steal and to collect bribes from traders at the importer's border. Their empirical work shows that bad institutions located in the importer's country raise international transaction costs and deter international trade. We complement this research: we show how good institutions located in the exporter's country can enhance international trade, in particular trade in complex products that are highly differentiated and contain many characteristics that are difficult to fully stipulate in a contract.

When rule of law within the importer's country breaks down, economic predators can hold up shipments at the importer's border. This, in turn, increases both the exporter's risk of not receiving payment and the importer's risk of receiving an inappropriate shipment. However, as noted by Marin and Schnitzer (1995), efficient international trade agreements also break down when it is lucrative for the importer to withhold payment from the exporter, and when it is also profitable for the exporter to produce a substandard product. We focus on the role that institutions located in the exporter's domicile play in offsetting the importer's risk of receiving a substandard shipment. Specifically, contracts negotiated between exporters and importers—including letters of credit, counter-trade agreements, and prepayment—are broadly and effectively used in international trade to offset the exporter's risk of not getting paid. However, similar devices are unavailable to offset the importer's risk. For example, although importers can use a letter of acceptance to withhold payment until the state of the goods received is verified, the acceptance periods are short, and defects that are difficult to verify may become apparent only later.[2] Therefore, it is primarily importers that rely on formal institutions such as courts and arbitration tribunals for seeking compensation.

The quality and impartiality of legal institutions in the exporter's domicile are critical for offsetting importer risk because these institutions are the last fallback for resolving disputes over the quality and assortment of shipments. Parties can agree in their contract to resolve the dispute in the importer's court, the exporter's court, or a court in a third country, or they can use an international arbitration tribunal (such as the International Court of Arbitration attached to the International Chamber of Commerce, the Arbitration Institute of the Stockholm Chamber of Commerce, or the Hong Kong International Arbitration Centre), or an arbitration board at a trade association, or agree to ad hoc arbitration. In international transactions, arbitration clauses are common because arbitration is less formal, is often quicker, and ensures greater expertise of those hearing and deciding the case than ordinary domestic courts.

However, courts and arbitration tribunals have similar problems compensating the winning party if the losing party refuses to comply voluntarily with the court's or tribunal's verdict. In general, the plaintiff—be she exporter or importer—must cover the fees of the court proceedings as well as her own attorney fees up front. If the plaintiff loses, she will not be compensated for these costs, and no further action must be taken. If the plaintiff wins, however, the

[1] For the literature on the incentives of individual exporters and importers to enforce trade agreements when these modern institutions are weak or even absent, see Milgrom, North, and Weingast (1990), Greif (1992, 1993), Greif, Milgrom, and Weingast (1994), and Anderson and Young (2000).

[2] Under the Convention of the International Sale of Goods (CISG), for example, the importer is obliged to examine the goods for defects "within as short a period as is practicable" after delivery. See Art. 38 CISG.

verdict stipulates that she is eligible for compensation from the defendant to cover the losses associated with nonpayment or improper shipments. In addition, the winning plaintiff may be eligible for compensation of court fees and, in some jurisdictions, for her attorney fees. If the losing defendant does not live up to his obligations even after a court ruling, the winning plaintiff will have to mobilize courts and bailiffs in a jurisdiction where the defendant has assets and ask them to enforce against such assets, for example, by seizing bank accounts or confiscating assets.

These rules apply irrespective of whether the plaintiff is an importer or an exporter. The importer, however, is more likely to find herself in the position of the plaintiff, because, as already noted there are effective commercial practices (such as letters of credit) that protect exporters when importers do not pay, whereas there are no comparably effective mechanisms that protect importers when exporters deliver defective products. Thus, when the importer is the winning plaintiff and must deal with a defiant export partner, the court system in the exporter's country becomes the last resort for enforcing a ruling.

We develop a theory of legal institutions and international trade that draws upon the following ideas [for a formal model, see Berkowitz, Moenius, and Pistor (2004)]. First, the exporter's risk of nonpayment is effectively offset by contractual means. Second, good institutions in the exporter's domicile are critical for offsetting the importer's risk of receiving an inappropriate shipment, because contractual methods for offsetting this risk are ineffective. Third, it is more difficult for institutions in the exporter's country to enforce trade contracts for complex products than for simple products. Complex products are differentiated and have many characteristics, including size, design, material, and other specifications; thus, it is impossible to fully stipulate an order for these products in a formal contract, rendering these contracts highly incomplete.[3] Because contracts are less complete for complex than for simple products, it is more difficult for institutions to determine whether a contract for complex products has been breached or fulfilled. Fourth, firms that want to buy inputs and outsource on the domestic markets also depend upon their domestic institutions to limit stealing and corruption and to enforce contracts.

The theory generates testable predictions regarding the effect of exporter and importer institutions on world trade in complex and simple products, and we find strong empirical evidence supporting these predictions. Most importantly, countries that have high-quality institutions tend to export more complex products and import more simple products. Also, we can decompose the influence of institutions on trade via production costs (comparative advantage) and international transaction costs, and in so doing we find

production costs have a stronger influence. Furthermore, international institutions seem to operate as substitutes for domestic institutions, in that good domestic institutions are less important for promoting exports in those countries that have signed a convention that facilitates the enforcement of foreign and international arbitral awards, namely the New York Convention. Finally, the effect of institutions on trade is comparable to other standard determinants such as GNP per capita, distance between countries, and language differences. The results imply that policies that increase the quality of legal institutions will have a substantial effect on trade by deterring predators in both the importer's and the exporter's country, by encouraging exporters to make a good-faith effort to fulfill their contractual obligations, and by enabling producers to outsource cheaply within their domestic markets, thus influencing comparative advantage.

Our paper contributes to a growing literature on the relationship between institutions and trade. Anderson and Marcouiller (2002) establish that high-quality importer institutions reduce predation at the border. Svaleryd and Vlachos (2001) show that strong financial institutions encourage countries to be more open to aggregate trade. Rodrik, Subramanian, and Trebbi (2004) show that institutions cause trade; our paper analyzes how exporter and importer institutions influence trade in simple and complex product markets.

Sections II and III below draw a distinction between trade patterns in countries with good and bad institutions, with an emphasis placed on the quality of formal legal institutions such as courts. We draw a distinction between the effect of institutional quality on trade in what we call simple versus complex product markets, and we also distinguish between the effects of these institutions from the exporter's side and the importer's side. Section III differentiates between the *transaction* and the *production* cost effect of institutions and derives a set of testable predictions. Sections IV and V describe the data and the procedure for testing our predictions. Section VI reports empirical results, and section VII concludes.

II. Institutions, Complexity, and Transaction Costs

Consider how institutions affect trade of two fictitious countries, called Upper and Lower Slobodia.[4] Upper and Lower Slobodia have roughly the same GDPs, the same distances from all other countries in the world, the same technologies, the same populations, the same natural resources, and so on. Thus, ignoring any differences in quality of institutions, we would predict that these two countries would have very similar bilateral trade patterns with all other countries in the world.

Suppose, additionally, institutions are the only difference between these two countries, and it is Upper Slobodia that

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[3] Ongoing work in contract theory argues that it is impossible to specify a complete contract for even the simplest products. See Grossman and Hart (1986) and Hart and Moore (1999).

[4] We are grateful to a referee for providing this example, which we use throughout sections II and III.

has the higher-quality institutions. We are interested in determining how institutional quality on the one hand, and product complexity on the other, influence the risk of importing from Upper versus Lower Slobodia. Regarding the quality of institutions, an exporter with domicile in either country has strong incentives to make a good-faith effort when she believes that 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. Therefore, the probability that an importer is satisfied with an export partner is increasing in the probability that contracts are enforced.

It follows that high-quality institutions in the exporter's country, such as courts and agencies capable of enforcing court rulings, are critical for contract enforcement when the exporter has breached her contract. Though the parties may try to opt out of bad domestic institutions in the exporter's home country, the importer ultimately depends on the quality of local institutions in the exporting country should the exporter refuse to comply with a ruling from an arbitration tribunal or court obtained outside the country. The reason is that the exporter generally holds the bulk of her assets in her home jurisdiction, and any attempt to seize these assets in order to satisfy the importer's enforceable claim must be made in her country with the help of local courts and bailiffs. Put differently, enforcement institutions in the exporter's home country are the importer's last resort for ensuring that she is effectively compensated for breach of contract.

The probability of enforcement increases when courts exercise impartiality in their proceedings and rulings, and when they are sufficiently competent to handle cases involving complex goods. Impartiality refers to the absence of corruption and to the lack of any home bias that may influence the court's verdict. International treaties, in particular the New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards, have been negotiated in order to mitigate home bias. The treaties commit countries that have ratified the convention to enforcing foreign arbitral awards without a review of the substantive law. Domestic courts may, however, review whether procedural requirements established in the Convention have been observed, and whether the award is consistent with fundamental principles of public interest (*ordre public*). One hundred thirty-four countries have ratified the convention to date. Still, a number of countries have not done so, and even some of those that have tend to use ambiguous terms or exemptions in the treaty to subject the findings of the foreign arbitration bodies to a full review by domestic courts and refuse to execute their rulings.[5]

To demonstrate the uncertainties trading partners face when enforcement of foreign arbitration awards cannot be ensured, consider Brazil, which ratified the New York Convention only in 2002. Until 1990, when the Supreme Court of Brazil changed its previous standard of review, there was substantial uncertainty about the ability of parties to enforce arbitration awards against Brazilian exporters (Samtleben, 1994). In one case, the plaintiff, a Dutch company, had ordered 500 tons of peanut oil from a Brazilian exporter.[6] The oil that was delivered turned out to be defective. The parties had agreed on arbitration by a third party (FOSFA), which awarded the Dutch company U.S. $220,000 in damages. The British High Court confirmed the award. Nevertheless, the Supreme Court of Brazil refused to recognize the award, on the grounds that the Brazilian exporter had not been formally notified about the arbitration proceedings in accordance with the law of Brazil. In many cases prior to 1990, Brazilian courts effectively set aside arbitration decisions against Brazilian exporters by invoking procedural requirements unknown outside Brazil (see Samtleben, 1989, 1994). Thus, if there was a breach of contract by a Brazilian exporter, importers were uncertain whether an arbitration decision would be enforced. As a result, importers were often forced to resort to using costly and highly idiosyncratic adjudication in Brazilian courts.

In 1990, the Supreme Court of Brazil held that in cases (such as the above) where both parties had participated in arbitration and had not challenged the procedural rules on the grounds that they violated domestic law, no party could invoke these arguments at the recognition stage. In 1996, Brazil adopted a new arbitration law that confirms this new case law, and in 2002 it adopted the New York Convention. Still, these actions may not guarantee that future arbitral awards will be enforced without attempts to review their substance. In fact, the 1996 law is currently under review for its constitutionality. Recent evidence from Russia, Indonesia, and Pakistan suggests that domestic courts are frequently tempted to put aside foreign arbitration awards to protect domestic companies (Isaacson, 2002).

Product complexity also influences contract enforcement. Complex products, such as machines and even mass-produced clothing, have many characteristics. These characteristics—for example, whether T-shirts should conform with Italian, French, or U.S. standards for size, material, and colors, whether a user's manual for a complex machine is user-friendly, whether a belt loop for a particular skirt is fashionable, and so on—are numerous, subjective (as in the case of fashion or user-friendliness), and highly differentiated across otherwise similar products. The probability that shipments received by an importer don't conform to her expectations increases with a good's complexity. This follows from the notion that contracts are incomplete and that

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[5] Note that Van den Berg, writing in 1981, found that of 140 published decisions only 5 refused enforcement on the basis of violation of the ordre public. See Van den Berg (1981, p. 366). However, complaints about this practice have become more frequent in recent years since more countries joined the convention. See Isaacson (2002).

[6] See Sup. Trib. Fed., 4 June 1980, Naamloze Vennotschap Bunge v. Industria de Oleos Paceambu S.A. (original decision printed in Rev. TimrJur. 95, 1001).

the more complex a good, the more incomplete a contract involving it. As a result, the probability that a dispute arises, and thus the dependence of a contract on effective enforcement institutions, including the exporter's home institutions, increases when product complexity increases. By implication, in the eyes of the importer, the probability of effective enforcement increases in the quality of exporter institutions and decreases in product complexity. It follows that the probability of an order that an importer expects to be in compliance with the contract is determined by the quality of exporter institutions and product complexity. Because noncompliance requires costly legal action after delivery, expected international transaction costs, therefore, jointly depend on the quality of exporter institutions and product complexity.

Returning to our two-country example, firms importing from Upper Slobodia with its superior institutions have a greater probability of being compensated for breach of contract than firms importing from Lower Slobodia. Given that contracts involving complex goods are more likely to be disputed, firms are particularly more likely to import complex goods from Upper than from Lower Slobodia. Firms in Upper Slobodia also have a higher incentive to exert a good-faith effort in that they are less likely to get away with delivering substandard products. Lower Slobodia, as argued above, can mitigate the effect of the lower quality of its legal institutions on international transaction costs by committing itself to international treaties that limit their effect on contract enforcement. The New York Convention on the Recognition and Enforcement of International Arbitral Awards is such an instrument, for it forbids domestic courts to substantially review the awards, and thereby circumvents the low-quality domestic institutions. This reduces the likelihood of no compensation for firms importing from Lower Slobodia, consequently reducing their expected international transaction costs.

III. Institutions and Transaction and Production Costs

Upper Slobodia's superior institutions may influence not only exports, but also domestic production and trade. The production of complex goods in particular involves some degree of outsourcing, making virtually any production process dependent on contracts, and therefore on contract-enforcing institutions. In the remainder of the paper, we will refer to the combined domestic transaction and production costs simply as production costs. Upper Slobodia's better institutions then cause production costs for complex goods to be lower than those in Lower Slobodia. Because Upper

and Lower Slobodia are differentiated only by the quality of their institutions, this implies that Upper Slobodia has a comparative advantage in complex products and will therefore export more complex goods than Lower Slobodia.

Our concepts of how institutions are related to transaction costs and production costs can be used to make predictions about the effects of institutions on trade in complex and simple product markets. First, consider institutions in complex markets. Because Upper Slobodia has better institutions, its production costs are lower and the transactions costs of its potential import partners are lower. Therefore, we would expect that Upper Slobodia would export more (herein, more in total value) complex products than Lower Slobodia. Regarding complex imports, Upper Slobodia will import less than Lower Slobodia because it has lower production costs. By contrast, following the argument in Anderson and Marcouiller (2002), higher-quality institutions in Upper Slobodia mean that there will be less holdup of imports at Upper Slobodia's border because of piracy and corrupt bureaucrats, so Upper Slobodia's transaction costs as an importer from any other country in the world are lower. Thus, in Upper Slobodia complex imports are lower by the production cost effect and higher by the transaction cost effect, and the overall effect of better institutions in Upper Slobodia than in Lower Slobodia is ambiguous and depends upon the relative magnitudes of these two effects.

Regarding simple products, the production cost effect of institutions in Upper Slobodia as exporter and Upper Slobodia as importer have the opposite signs to their effects in complex-product markets. Because Upper Slobodia has a comparative advantage in complex products, it exports more and imports less complex products than Lower Slobodia. Under balanced trade, it consequently exports less and imports more simple products than Lower Slobodia. Thus, Upper Slobodia imports relatively more simple products because of the production cost and transaction cost effects; however, the overall effect of institutions on Upper Slobodia's simple exports is ambiguous and depends upon the relative magnitudes of the negative production cost effect and the positive transaction cost effect.

The following table summarizes the argument by indicating the direction of the effects for the empirical analysis. For example, an improvement in the quality of institutions in the exporting country increases complex-goods exports overall, by both the production and the transaction cost effect. The overall effect is ambiguous for simple goods exports, because the production cost effect is negative and the transaction cost effect is positive.

PRODUCTION AND TRANSACTION COST EFFECTS OF INSTITUTIONS

Products	Importer Institutions			Exporter Institutions		
	Production Costs	Transaction Costs	Overall	Production Costs	Transaction Costs	Overall
Complex	−	+	?	+	+	+
Simple	+	+	+	−	+	?

In Berkowitz, Moenius, and Pistor (2004), we build a two-country general equilibrium model and analyze two-way trade in complex and simple products (this accounts for 81% of all the nonmissing cases in our data set). The model provides a simple decomposition of export and import elasticities with respect to institutions into production and transaction cost components. The elasticities with respect to the production and transaction cost effects are additive: for example, the overall effect of exporter institutions on exports is the sum of the production and transaction cost effects. The model also delivers the familiar result that the production cost effects for exports and imports in both simple- and complex-goods markets cancel out (for example, see Flam & Helpman, 1987, section IV). Thus, ignoring the transaction cost effects of institutions, a 1% increase in the quality of legal institutions leads to an x% increase in complex-product exports, and it also leads to an x% reduction in complex-product imports in Upper Slobodia. The same holds true for simple goods, yet with opposite signs. Under the assumption that production cost effects cancel out, we can compute transaction cost effects for both complex and simple goods: for each product category, we can simply add the elasticity of imports with respect to exporter institutions and the elasticity of imports with respect to importer institutions, and the sum is then equal to the total transaction cost effect of exporter and importer institutions.

Our theory therefore delivers several testable implications. First, we expect that in complex-goods markets the coefficient for exporter institutions is positive, and the coefficient for importer institutions is ambiguous. If the overall effect of importer institutions on complex imports is negative (positive), this would indicate that the production cost effect dominates (is dominated by) the transaction cost effect. Second, in simple-goods markets our theory generates the same predictions for production cost effects, but with opposite signs. Because transaction cost effects are positive under general conditions, we expect that an improvement in importer institutions would always increase spending on simple imports, whereas an improvement in exporter institutions would decrease spending on simple imports if and only if production cost effects dominate transaction cost effects. Third, because production cost effects for exporter and importer institutions add up to 0 in both complex- and simple-goods markets, the sum of the coefficients for the overall effect of exporter and importer institutions amounts to the sum of transaction cost effects. These should be positive, for each transaction cost effect of institutions is positive under general conditions. Finally, signing the New York Convention as an international institutional arrangement that facilitates enforcement of international arbitration awards and that can, therefore, partially substitute for bad domestic legal institutions should reduce expected international transaction costs. In the context of our example, Lower Slobodia can mitigate the effect of the lower quality of its legal institutions on international transaction costs by signing such an international agreement.

In the remainder of this paper, we take these predictions to the data.

IV. Data

The data come from a variety of sources. Annual national accounts data are from the IMF Financial Statistical Yearbook. The gravity controls are from Rauch (1999), for which we use the 1990 values throughout.[7] Data on quality of institutions come from the International Country Risk Guide and are reduced to an annual index from a simple average by country. Each rating ranges from 1 to 10, with 10 representing the highest quality. For our purposes, we include in these ratings an average of indexes of rule of law, expropriation risk, corruption in government, and bureaucratic quality.[8] We do not include the risk of repudiation of government contracts and ethnic tensions in the averages we use for our econometric exercise, because those dimensions do not fit the concept of legal quality for enforcing private contracts.[9] Summary statistics for the average index number we used in the estimation can be found in table 1A.

Trade data are 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). Because 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 (for example, shoes, cars, and machinery). We reinterpret this classification in terms of product complexity, so that "organized exchange" denotes low 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.

V. Estimation

In this section, we describe our econometric strategy and the estimation equation that results from this strategy. We also discuss some additional econometric issues.

[7] This only poses a problem for the language variable because, in some countries with large immigration activities, its values may not be constant. However, we think the variations are generally small enough not to change the results in any significant way.

[8] The source is the International Country Risk Guide used by La Porta et al. (1997, 1998) and Kaufmann (1999). We thank Stephen Knack for providing these data.

[9] However, it should be noted that all results are robust to the inclusion of these two dimensions.

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

TABLE 1.—A. 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%	Ethiopia
		−19%	Hong Kong
		−15%	South Africa
	Increasers	208%	Iran
		145%	Egypt
		157%	Morocco

B. 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%	Ghana
		−18%	Hong Kong
		−16%	Paraguay
	Increasers	1,406%	Indonesia
		3,185%	Mexico
		5,375%	Venezuela

C. 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, F.R.	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

*Ratio (using U.S. dollar values) of complex-product to simple-product exports.

Based on Anderson and van Wincoop (2003), Feenstra (2004) suggests a gravity equation to estimate a model similar to the one proposed in Berkowitz, Moenius, and Pistor (2004). However, because our interest is not overall border effects, but the differential influence of exporter and importer institutions, our setup differs from his in two important aspects. First, we differentiate by the types of goods, in that we introduce both a simple- and a complex-product sector. We assume that each national economy is fully described by these two sectors. Second, we utilize a mechanism that influences both domestic production and international transaction costs.[11] We therefore estimate the empirical model

$$IM_{ijtk} = \alpha_{ik} + \alpha_{jk} + \beta_{ijk} X_{ijt} + \gamma_{ik} I_{it} + \delta_{jk} I_{jt} + \varepsilon_{ijtk}, \qquad (1)$$

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: $k \in (simple, complex)$. Similarly, X_{ijt} contains the standard gravity variables, including GDP and GDP per capita for each country,[12] distance between the two countries, and whether or not the countries share a common border, have colonial ties, share languages, or are remote. The coefficients α_{ik} and α_{jk} are associated with country dummy variables. Whenever a country is part of a bilateral trading relationship, this dummy variable assumes a value of 1; otherwise it is 0. This guarantees that country-specific effects for both exporters and importers, which can be assumed constant over our eleven-year period (such as

[11] These two differences require changes in the estimation equation relative to theirs, as well as in the interpretation of the coefficients, because the products in our model are produced with different technologies and are subject to different international transaction costs.

[12] It is important to note that GDP and GDP per capita were entered separately in the regression, for the quality of legal institutions is highly correlated with GDP per capita ($\rho = 0.82$) Furthermore, GDP and GDP per capita are reported on a yearly basis.

TABLE 2.—IMPORT REGRESSIONS POOLED FOR 1982–1992 OVERALL TRADE

Regression column	1	2	3	4^t
GDP importer	0.81	0.81	−0.10	−0.15
	(39.07)	(38.53)	(−0.43)	(−0.52)
GDP exporter	0.77	0.76	−0.13	−0.19
	(39.78)	(39.13)	(−0.60)	(−0.65)
GDP per capita importer	0.72	0.53	1.00	1.18
	(23.30)	(11.16)	(3.80)	(4.00)
GDP per capita exporter	1.04	0.74	1.20	1.39
	(32.09)	(13.96)	(4.50)	(4.63)
Distance	−1.12	−1.16	−1.02	−1.03
	(−27.30)	(−27.97)	(−27.09)	(−27.11)
Adjacent	0.31	0.35	0.40	0.40
	(2.33)	(2.43)	(2.64)	(2.65)
Links	0.51	0.42	0.45	0.45
	(4.91)	(4.07)	(4.42)	(4.40)
Language similarities	−0.09	0.09	0.99	1.00
	(−0.54)	(0.51)	(5.72)	(5.74)
Remoteness	0.37	0.58	1.46	1.79
	(3.79)	(6.04)	(2.21)	(2.31)
Quality of importer legal institutions		0.61	0.17	0.05
		(5.41)	(0.18)	(0.51)
Quality of exporter legal institutions		0.91	0.32	0.36
		(7.12)	(3.07)	(3.26)
Probability that the quality-of-legal-institution coefficients are the same		0.076	0.035	0.035
Country dummies			Yes	Yes
Time dummies				Yes
Constant	−20.04	−21.45		
	(−12.13)	(−13.16)		
Number of clusters (country pairs)	2792	2792	2792	2792
R^2	0.69	0.70	0.77	0.77
Observations	26,577	23,564	23,564	23,564

t-statistics reported in parentheses are computed from robust standard errors that allow for within-group correlation.

geography and infrastructure in general), are absorbed.[13] Our variables of interest are I_{it} and I_{jt}, which denote the quality level of the exporter's and importer's legal institutions, hereafter referred to simply as institutions. We estimate equation (1) both for imports overall and separately for simple and complex goods.

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 side repeatedly. Error terms within the resulting groups of repetitions are likely to correlate with each other, whereas error terms across groups should not correlate. In order to allow for this grouping effect, we replace the traditional Huber-White errors (White, 1980) with robust standard errors that additionally allow 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.

[13] Feenstra (2004, p. 161) suggests country dummies to capture the multilateral resistance terms of Anderson and van Wincoop (2003). In order to identify our coefficients of interest, we need to assume these multilateral resistance term to be constant during our sample period. We will relax this assumption in the next section.

VI. Results

In order to test these predictions, we proceed in four steps. First, to best compare our results with Anderson and Marcouiller (2002) (henceforth abbreviated A&M), we estimate the effect of institutions on overall imports. Next, we repeat this exercise for simple and complex imports separately. Then we particularly test for the influence of the New York Convention on trade in simple and complex goods. Finally, we use disaggregated data on all 471 SITC industries in our panel which allows us to control for a larger number of influences.

Table 2 reports results for the estimation of the effect of institutions on imports. In the first column, we present the results of our estimates when institutions are excluded. We note that all variables have the expected sign and are of a reasonable order of magnitude.[14] In column 2, we include importer and exporter institutions. We confirm A&M's result that importer institutions have a positive effect on imports. However, we also find that exporter institutions matter more than importer institutions: the hypothesis that exporter and importer institutions have the same effect can be rejected at the 10% level. To check the robustness of our

[14] Language is an exception; however, it is statistically insignificant.

TABLE 3.—IMPORT REGRESSIONS POOLED FOR 1982–1992, COMPLEX VERSUS SIMPLE GOODS

Regression column	1	2	3	4
Goods	Complex	Simple	Complex	Simple
	0.34	−1.50	0.08	−1.06
GDP importer	(1.65)	(−4.59)	(0.27)	(−2.52)
	0.58	−1.81	0.32	−1.38
GDP exporter	(2.82)	(−5.55)	(1.08)	(−3.26)
	0.77	2.35	1.17	2.03
GDP per capita importer	(3.16)	(6.05)	(4.05)	(4.70)
	0.71	2.27	1.10	1.95
GDP per capita exporter	(2.92)	(5.77)	(3.86)	(4.48)
	−0.98	−1.26	−0.98	−1.26
Distance	(−24.90)	(−22.76)	(−24.98)	(−22.72)
	0.44	0.27	0.44	0.27
Adjacent	(2.62)	(1.55)	(2.62)	(1.54)
	0.54	0.18	0.54	0.18
Links	(5.11)	(1.21)	(5.09)	(1.22)
	1.27	0.11	1.28	0.11
Language similarities	(6.73)	(0.41)	(6.77)	(0.40)
	−0.81	7.83	0.74	6.69
Remoteness	(−1.30)	(7.91)	(0.96)	(5.50)
	−0.51	0.66	−0.44	0.66
Quality of importer institutions	(−5.18)	(4.54)	(−4.24)	(4.42)
	0.85	−0.53	0.93	−0.53
Quality of exporter institutions	(7.92)	(−3.66)	(8.41)	(−3.45)
Probability that the absolute value of the quality of institutions coefficients are the same	0.02	0.54	0.00	0.53
Country dummies	Yes	Yes	Yes	Yes
Time dummies			Yes	Yes
Number of clusters (country pairs)	2755	2550	2755	2550
R^2	0.79	0.50	0.79	0.38
Observations	22,669	18,948	22,669	18,948

t-statistics reported in parentheses are computed from robust standard errors that allow for within-group correlation.

results, we first include country dummies to control for country-specific effects (for example, geography) and then add year dummies to control for overall time effects (for example, average growth or technology effects). Both sets of dummies erase the effects of GDP. They also render the effect of importer institutions on trade insignificant. However, the effect of exporter institutions on trade survives these robustness checks, and we are able to reject, at the 5% level, the hypothesis that importer and exporter legal institutions have the same effect.

In the second step, we reestimate equation (1) for complex and simple imports separately. The results are reported in table 3. Regarding complex products, recall that we expect that the effect of exporter institutions is always positive and the effect of importer institutions is ambiguous. A negative coefficient on importer institutions suggests that the production cost effect of importer institutions dominates their transaction cost effects, which implies that the overall effect of exporter institutions is greater in absolute terms than the overall effect of importer institutions in complex-goods markets.[15] All of the estimated coefficients match

these predictions, and the hypothesis that the values of the coefficients on exporter and importer institutions in complex-goods markets are equal in absolute terms is rejected at the 5% level when country dummies are included, and at the 1% level when both country and time dummies are included. Finally, recall that the sum of coefficients for exporter and importer institutions equals the sum of their transaction cost effects, and that we expect this sum to be strictly positive under general conditions. The estimates are consistent with this prediction: they are $0.85 − 0.51 = 0.34$ and $0.93 − 0.44 = 0.49$ when country dummies or both country and time dummies are included.

Regarding simple products, our theory predicts that the effect of importer institutions is always positive. Furthermore, when the production cost effect of exporter institutions dominates. better exporter institutions lower simple-product imports. The coefficient estimates for importer and exporter institutions reported in columns 2 and 4 support

[15] Recall from the above that in complex-goods markets the absolute value of the coefficient on exporter institutions is the sum of the production and transaction cost effects, because both effects are positive; and the absolute value of the coefficient on importer institutions is minus the sum of these two effects, because the negative production cost effect dominates

the positive transaction cost effect. Thus, the absolute value of the coefficient on exporter institutions minus the absolute value of the coefficient on importer institutions equals the sum of exporter and importer transaction cost effects and exporter and importer production cost effects. Because exporter and importer production cost effects sum to 0, the difference between the absolute values for the exporter and importer institutions is the sum of exporter and importer transaction cost effects, which is positive.

TABLE 4.—IMPORT REGRESSIONS POOLED FOR 1982–1992. COMPLEX VERSUS SIMPLE GOODS (INCLUDING EFFECTS OF NEW YORK CONVENTION)

Regression column	1	2	3	4
Goods	Complex	Simple	Complex	Simple
GDP importer	0.17	−1.51	−0.02	−1.22
	(0.77)	(−4.29)	(−0.05)	(−2.73)
GDP exporter	0.41	−1.83	0.22	−1.54
	(1.86)	(−5.21)	(0.71)	(−3.45)
GDP per capita importer	0.94	2.32	1.29	2.06
	(3.63)	(5.62)	(4.18)	(4.49)
GDP per capita exporter	0.90	2.36	1.25	2.10
	(3.52)	(5.64)	(4.09)	(4.55)
Distance	−0.98	−1.28	−0.99	−1.28
	(−24.53)	(−22.91)	(−24.61)	(−22.87)
Adjacent	0.43	0.22	0.43	0.22
	(2.55)	(1.28)	(2.56)	(1.28)
Links	0.54	0.17	0.54	0.17
	(5.08)	(1.13)	(5.06)	(1.14)
Language similarities	1.29	0.14	1.29	0.13
	(6.78)	(0.52)	(6.83)	(0.51)
Remoteness	−0.21	7.82	1.13	7.05
	(−0.32)	(7.29)	(1.37)	(5.42)
New York Convention signed by importer (NYC-I)	0.16	−0.70	0.21	−0.72
	(0.70)	(−2.02)	(0.88)	(−2.06)
New York Convention signed by exporter (NYC-E)	0.73	0.34	0.77	0.31
	(3.00)	(0.97)	(3.16)	(0.88)
Quality of importer institutions	−0.36	−0.005	−0.27	−0.01
	(−2.64)	(−0.02)	(−1.97)	(−0.04)
Quality of exporter institutions	1.07	−0.03	1.17	−0.03
	(7.47)	(−0.13)	(7.99)	(−0.14)
NYC-I × quality of importer institutions	−0.08	0.83	−0.11	0.85
	(−0.55)	(3.63)	(−0.75)	(3.65)
NYC-E × quality of exporter institutions	−0.36	−0.56	−0.39	−0.54
	(−2.29)	(−2.45)	(−2.48)	(−2.35)
Country dummies	Yes	Yes	Yes	Yes
Time dummies			Yes	Yes
Number of clusters (country pairs)	2653	2462	2653	2462
R^2	0.80	0.51	0.80	0.51
Observations	21,850	18,393	21,850	18,393

t-statistics reported in parentheses are computed from robust standard errors that allow for within-group correlation.

these predictions, and suggest that the production cost effect of exporter institutions dominates. Again, the sum of exporter and importer institution coefficients equals the corresponding sum of transaction cost effects. In both estimates the sum of transaction cost effects is 0.66 − 0.53 = 0.13, which is marginally positive and always less than the corresponding sum of transaction costs for complex imports. However, we cannot reject the hypothesis that the two coefficients are the same at any reasonable level of significance. Thus, the model provides evidence that general equilibrium transaction costs are greater in complex markets.

All estimated coefficients can be interpreted as in the following example: A 10% increase in the legal quality of an exporting country will—on average—lead to approximately a 9% increase in complex-goods exports of that country. This means—again on average—that an increase in rating value from 6.5 to 7.15 in 1990 for the United States would have led to an increase in exports of approximately $30 billion worth of complex goods.

Recall that in section II we argued that ratifying the New York Convention can substitute for bad domestic institu-

tions, because it reduces the function of national courts in trade disputes (almost exclusively, to enforce arbitral awards); thus signing the Convention should improve the quality of courts by lowering their bias against foreigners.[16] This reduces importers' risk of not getting compensated for shoddy shipments. It also likely increases good-faith efforts by exporters. We therefore expect that domestic exporter institutions in ratifying countries will become less important, because international transaction costs are lowered for both simple and complex goods.

In table 4 we extend the analysis of table 3 to study whether these predictions hold. We include variables indicating whether a country has ratified the New York Convention. The variable NYC-I equals 1 if the importing country has done so in or before a particular year, and equals 0 otherwise. The variable NYC-E is constructed analogously for the exporting country. Each of these dummy variables is interacted with both the importer and the exporter institutions' variables. Thus, the coefficient on

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[16] We are indebted to an anonymous referee for recommending this test.

TABLE 5.—IMPORT REGRESSIONS POOLED FOR 1982–1992, ALL 471 INDUSTRIES

Regression column	1	2	3	4
Lagged dependent variable		0.86 (1.159)		0.80 (1.187)
Quality of importer institutions interacted with complexity dummy	−1.01 (−34.97)	−0.79* (−12.41)	−0.44 (−15.61)	−0.45* (−5.46)
Quality of exporter institutions interacted with complexity dummy	1.58 (56.70)	1.65* (26.46)	0.62 (22.62)	0.76* (9.27)
Probability that the absolute values of the quality-of-institution coefficients are the same	0.00	0.00	0.00	0.00
Country-pair–year dummies	Yes	Yes		
Country-pair–year–two-digit-industry dummies			Yes	Yes
Number of clusters	29,938†	26,504†	884,644‡	793,468‡
R^2	0.41	0.84	0.60	0.85
Observations	3,354,262	3,062,340	3,354,262	3,062,340

t-statistics reported in parentheses are computed from robust standard errors that allow for within-group correlation.
*Coefficients transformed: $\beta/(1 - \rho)$.
*Regression coefficients are divided through by $(1 - \rho)$, where ρ is the estimated coefficient for the lagged dependent variable.
†Country-year pairs.
‡Country–year–two-digit-industry pairs.

exporter institutions measures the elasticity of imports with respect to exporter institutions for countries that have not ratified the New York Convention. The interaction term measures the differential effect of the quality of exporter institutions if an exporting country has ratified the New York Convention. If domestic and international institutions are substitutes, the interaction term for NYC-E with the quality of exporter institutions should be negative. This coefficient plus the coefficient assigned to exporter institutions measures the import elasticity with respect to exporter institutions for those countries that have signed.

Consider imports of complex goods. In this case, the quality of exporter institutions matters more for the importers when the export partner has *not* yet signed the New York Convention. For example, in column 1, the import elasticity of complex goods with respect to exporter institutions is 1.07 when the exporter has not signed the New York Convention. This elasticity falls to $1.07 - 0.36 = 0.81$ when the exporter has signed. On the other hand, the effect of ratifying the New York Convention is highest for countries with bad legal institutions and almost 0 for those with the very best legal institutions (for example, $0.73 - 0.36 \times 1.95 = 0.03$, where 1.95 is the maximum value of the quality of legal institutions).[17]

For simple-goods imports, we obtain the following striking result: the predicted effects of institutions that we find in table 3 are present only in those countries that have ratified the New York Convention, whereas the quality of importer and exporter institutions does *not* matter for countries that have not signed. This is consistent with the view that international competition only leads to adjustments in domestic markets when costs of trade are sufficiently low. Overall, we take these results as evidence that international

institutions can lower international transaction costs when they operate as substitutes for domestic institutions.

In our fourth and last step, we subject the findings of table 3 to a robustness check and modify equation (1):

$$IM_{ijtk} = F_{ijt} + \gamma DI_{it} + \delta DI_{jt} + \varepsilon_{ijtk}, \qquad (2)$$

where k now represents all 471 SITC industries in our sample, and F_{ijt} are fixed effects that absorb country-pair–year effects. This specification sweeps away all standard gravity variables, and therefore X_{ijt} is no longer included in the regression. Regarding product groups, D is a dummy variable that is equal to 1 if the industry falls into the complex-products category, and equal to 0 if it is in the simple-products category.[18] In our case, we cannot estimate the effect of importer or exporter institutions per se. All we can estimate is the differential effect of these institutions on industries in the complex-goods sector relative to the simple-goods sector. Because we eliminate all other effects, we are left solely with the differential effect of institutions on complex relative to simple products.

Table 5 reports the results of this estimation. The first column refers just to the specification in equation (2). Regarding complex relative to simple products, we find that exporter institutions have a positive effect and importer institutions have a negative effect. Comparing the coefficient sizes with table 4, columns 1 and 2, we should have expected a coefficient of around 1.36 for exporter institutions ($0.85 + 0.51$, because this time we measure *relative* to simple products), and around -1.2 for importer institutions ($-0.53 - 0.66$). The actual estimates we get are quite close (1.58 for exporter institutions and -1.01 for importer institutions). As another robustness check, we include a

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[17] Recall that our estimation is in logs. Therefore, the minimum, maximum, and median values of the quality of legal institutions are 0, 1.95, and 1.49, respectively.

[18] We dropped all goods industries that were reference-priced. Again, however, our results are robust to these exclusions, and are available from the authors upon request.

lagged dependent variable as a regressor. The results (reported in column 2) are robust regarding these inclusions. Columns 3 and 4 in table 5 replace the country-pair–year dummies with a substantially larger set of country–year–two-digit-industry dummies with and without a lagged dependent variable. In both cases, exporter institutions have a positive effect on complex-goods imports relative to simple-goods imports, whereas importer institutions have a negative effect. Table 5 thus confirms that the results reported in table 3 are strongly robust.

VII. Conclusion

Drawing on the theory of incomplete contracts, we have argued that good legal institutions located in an exporter's domicile are critical for trade in complex products because they offset the exporter's incentive to breach contract. The analysis has shown that these institutions affect the exporter's ability to outsource on the domestic market and to sell on world markets. The effect of institutions on national transaction costs should influence comparative advantage in complex products, whereas their effect on international transaction costs should influence the costs of exporting complex products. Furthermore, drawing on the work of A&M, we have noted that good institutions located in an importer's country influence trade by lowering predation risk. Consequently, strong legal institutions in the exporter's domicile should increase its comparative advantage in complex-goods production and lower its comparative advantage in simple-goods production. Furthermore, good legal institutions in an importer's country should lead to a shift away from complex-goods imports into simple-goods imports.

We took these claims to the data and found that domestic legal institutions have a major effect on trade patterns: strong legal institutions in the exporter's country favor complex-goods exports through a domestic as well as an international transaction cost effect, where the former dominates the latter, thus influencing comparative advantage. Domestic and international legal institutions are partial substitutes for each other, and the substitutability is especially strong for countries with comparatively low-quality legal institutions.

These findings have important implications: political actors can change institutions and, thereby, indirectly influence the industrial structure in their countries. These issues are particularly important for developing countries. We will explore the effect of legal institutions on developing countries in future research.

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