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Abstract:

In earlier work, James Anderson and I estimated a structural model of trade when shipments are insecure and showed that trade is constrained by insecurity as much as by tariffs (forthcoming, *Review of Economics and Statistics*).

The present paper shows that different dimensions of insecurity discourage different sorts of trade. The absence of enforceable contracts primarily constrains trade in differentiated products, while exposure to hijacking or theft primarily constrains trade in homogeneous products.

The result matches intuition. The value of a differentiated product is relationship-specific. Once such a good has been produced, the client has an incentive to renege on the contract and renegotiate the terms of sale. The absence of enforceable contracts exposes producers to the hold-up problem and reduces trade. The value of a homogeneous product, on the other hand, is not relationship-specific. Its production includes no sunk design costs, and hold-up is not a problem. However, the multiplicity of potential buyers of a homogeneous product attracts hijackers, who can easily resell such goods on the black market. One would expect, therefore, that contract enforceability would be especially important for trade in differentiated products, while protection from hijacking and theft would be especially important for trade in homogeneous products.

Estimation of the model required development of a new data set linking tariffs to bilateral trade volumes at the four-digit SITC level. This new data set is described in an appendix to the paper.

JEL Codes F1, D23, O17

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Insecurity impedes trade. Using a variant of the gravity model – the workhorse of empirical international economics – Anderson and Marcouiller (*forthcoming*) showed that transparent government policies and enforceable commercial contracts significantly reduce trade costs and increase trade volume. This paper asks two further questions: Does insecurity impede some types of trade more than others? Do different types of insecurity affect different types of trade differently?

Unenforceable commercial contracts generate one type of insecurity. Fixed costs are associated with design of a product to meet the needs of a particular client (Rauch and Casella 1998, Anderson and Young 1999). In the absence of enforceable contracts, producers can be forced to renegotiate the terms of exchange after the up-front costs have been sunk. This "hold-up" problem may discourage or even eliminate trade when fixed costs are high are contracts are unenforceable.

The possibility of hijacking exposes goods to a different form of insecurity. *The New York Times* recently reported "the revival of piracy" by "bandits in the global shipping lanes" (Hitt 2000). Even more common is the hijacking of containers hauled by truck. Nearly one thousand hijackings were reported in Mexico alone in 1996, spurring the formation of cargo-escorting companies and driving insurance premiums dramatically upward (Hecht 2000). The loss of a shipment imposes uninsurable costs beyond the loss of the stolen goods, as a Salvadoran businessperson explained, because the loot is resold at a price which undercuts legitimate suppliers.

This paper argues that, although insecurity impedes all sorts of trade, exposure to hijacking primarily affects trade in homogeneous, easily resold products, while the lack of contractual defense against the hold-up problem primarily affects trade in differentiated, client-specific products.

The paper extends the Anderson and Marcouiller structural model of aggregate bilateral trade to a setting in which each country produces different types of traded commodities as well as a nontraded good. The paper applies James Rauch's classification of sectors according to whether their output is primarily homogeneous, reference-priced, or differentiated (Rauch 1999). The paper uses a new data set matching 1995 and 1996 average MFN tariffs, commodity by commodity, with the bilateral trade flows reported by Feenstra (2000). Data on institutional quality are drawn from surveys undertaken by the World Economic Forum (1997) and the World Bank (1997).

With allowance for left-censoring of import data and correlation of residuals among observations for a single importing country, estimation of the model supports the following contentions: multidimensional insecurity impedes trade of all types, contractual insecurity strongly impedes trade in differentiated commodities but has little or no effect on trade in homogeneous products, and exposure to theft impedes trade in homogeneous products but has little or no effect on trade in differentiated products.

Research on insecurity and trade has some of the aura of a child's adventure story about pirates, bandits, and thieves. Like most children's stories, however, the tale teaches lessons for adults. The evidence presented here suggests that, if contracts in Latin America were to be as easily enforced as they are in the European Union, Latin American trade in differentiated products could rise by 40%.[1] This effect may work through fixed costs and the hold-up problem, as argued here, or perhaps enforceable contracts reduce the need to accumulate costly information about potential partners. Either way, the estimated effect is very large. Moreover, since the quality of institutions is empirically correlated with GDP per capita, gravity models which include GDP and population but exclude institutional quality will give misleading results.

1. The Model

The empirical claims of this paper are based on a gravity model in which exposure to hold-up or hijacking discourages trade by raising the prices of traded goods. The model includes a nontradable good and two classes of tradable goods. The non-linear traded goods price index required by the model is

[1] Based on the coefficients presented in Table 8. The difference in the average relative enforceability measure between the EU and LA countries in the data set is slightly over .5. Multiplying by the coefficient on enforceability (.9 in the conservative classification, .8 in the liberal) gives a difference in log imports of .40 or .45.

approximated by a Törnqvist index, and imports are estimated relative to those of a base country.

Traded goods fall into two classes, homogeneous products and differentiated products ($C = H, D$).[2] I assume production to be internationally specialized in such a way that each country produces a nontraded good and a unique tradable good of each class.

Expenditure is allocated through two-stage budgeting. Agents first determine the share of total expenditure to devote to each class of tradable goods and the share to be devoted to the nontraded good. Models with a single class of traded goods often postulate the traded goods expenditure share for consumers in country *i* to be a reduced form function of GDP, GDP per capita, and the traded goods price index (Anderson 1979; Bergstrand 1985 and 1989). Here I postulate the share of total expenditure devoted by consumers in country *i* to each class of tradable good *C*, T_i^C, to be a reduced form function of GDP (y_i), GDP per capita (y_i / n_i), and the traded goods price indices (P_i^H and P_i^D):

$$(1.1) \quad T_i^C\left(y_i, n_i, P_i^H, P_i^D\right) = \tau_0 \; y_i^{\tau_1^C} \left(y_i / n_i\right)^{\tau_2^C} \left(P_i^H\right)^{\tau_h^C} \left(P_i^D\right)^{\tau_d^C} \quad \forall \quad C = H, D \; .$$

This general form is conveniently log-linear, but it also allows a change in the price index for one type of traded good to affect expenditure of all types. Lacking theory about preferences across classes of products, it seems unjustifiable to restrict them beyond quasi-concavity; homotheticity, in particular, seems too strong a restriction. (The notation in Equation 1.1 may be confusing. τ_h^H represents the reduced form elasticity of the homogeneous goods expenditure share with respect to the price index for homogeneous goods, while τ_d^H is the elasticity of the homogeneous goods expenditure share with respect to the differentiated goods price index. The differentiated goods expenditure share elasticities are denoted τ_h^D and τ_d^D.)

Within each class of goods, preferences are modeled as CES. Therefore, country *i*'s expenditure on country *j*'s export of type *C* will be:

[2] In fact, the model I estimated allows for three traded goods, following Rauch (1999): homogeneous (traded on an organized exchange), reference-priced (prices can be quoted without mentioning the name of the manufacturer), and differentiated (all other goods). The extension of

(1.2) $$m_{ij}^C = \alpha_j^C \left(p_{ij}^C / P_i^C \right)^{-\sigma_C} \left(P_i^C \right)^{-1} T_i^C y_i \quad \forall \quad C = H, D$$

where

(1.3) $$P_i^C = \left[\sum_j \alpha_j^C \left(p_{ij}^C \right)^{1-\sigma_C} \right]^{1/(1-\sigma_C)}$$

is the CES price index for goods of type *C* in country *i*. It is useful to eliminate the α_j parameters by considering demand by country *i* for the product produced by *j* relative to the demand by a base country *k* for the same product:

(1.4) $$\begin{aligned} \frac{m_{ij}^C}{m_{kj}^C} &= \left(\frac{p_{ij}^C / P_i^C}{p_{kj}^C / P_k^C} \right)^{-\sigma_C} \left(\frac{P_i^C}{P_k^C} \right)^{-1} \left(\frac{T_i^C y_i}{T_k^C y_k} \right) \\ &= \left(\frac{p_{ij}^C}{p_{kj}^C} \right)^{-\sigma_C} \left(\frac{P_i^C}{P_k^C} \right)^{\sigma_C - 1} \left(\frac{y_i}{y_k} \right)^{1+\tau_1^C} \left(\frac{y_i / n_i}{y_k / n_k} \right)^{\tau_2^C} \left(\frac{P_i^H}{P_k^H} \right)^{\tau_h^C} \left(\frac{P_i^D}{P_k^D} \right)^{\tau_d^C} \forall\, C = H, D . \end{aligned}$$

To model the price of traded goods, this paper simply extends the model developed at length by Anderson and Marcouiller. Prices of tradable goods sold at home are normalized to one.[3] The price in country *i* of country *j* 's product of type *C*, p_{ij}^C, will be marked up above its price in *j* to reflect trade costs. Let S_i index "security," based on the quality of institutions supporting trade in country *i*. Let b_{ij} be a dummy which takes the value 1 if *i* and *j* share a common land border and let l_{ij} take the value 1 if the countries speak a common language, characteristics which may affect a shipper's expertise in using the importing country's institutions for the defense of trade. Let d_{ij} be the distance between the two partners, capturing transport and other distance-related trade costs. Finally, if a_{ij} takes the value 1 when the countries are associated in a free trade agreement and t_i^C is country *i*'s ad valorem tariff on imports of type *C*, then $\left(1 + \left(1 - a_{ij}\right) t_i^C\right)$ represents the applicable tariff. Putting these trade costs together, let:

(1.5) $$p_{ij}^C = \rho \left(S_i \right)^{\gamma^C} \left(d_{ij} \right)^{\delta_1^C} \left(1 + b_{ij} \right)^{\delta_2^C} \left(1 + l_{ij} \right)^{\delta_3^C} \left(1 + \left(1 - a_{ij} \right) t_i^C \right) \quad \forall \quad C = H, D .$$

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the model from two goods to three is straightforward but notationally cumbersome, so I present only the two-good version here.

[3] This assumes domestic exchange is free from trade costs: transport costs, tariffs, and insecurity-related costs. Anderson and Marcouiller show that extending a similar model to allow for domestic insecurity is a relatively small matter.

Of course, the maintained hypothesis of this paper is that different types of insecurity constrain trade in different types of goods differently. This is modeled below by decomposing S_i into two dimensions, one representing contractual insecurity and the other representing exposure to theft. In that case we have:

$$(1.5') \quad p_{ij}^C = \rho(S_{1i})^{\gamma_1^C}(S_{2i})^{\gamma_2^C}(d_{ij})^{\delta_1^C}(1+b_{ij})^{\delta_2^C}(1+l_{ij})^{\delta_3^C}\left(1+(1-a_{ij})t_i^C\right) \quad \forall \quad C = H, D \; .$$

The non-linear CES price indices are a continuing issue in the gravity literature (Bergstrand 1985 and 1989, Gould 1994, Thursby and Thursby 1987). Again extending Anderson and Marcouiller, this paper approximates each of the true CES price indices by a Törnqvist index,

$$(1.6) \quad ln\left(\frac{P_i^C}{P_k^C}\right) = \sum_j w_j^C \, ln\left(\frac{p_{ij}^C}{p_{kj}^C}\right) \forall \; C = H, D.$$

where w_j^C represents the ratio of expenditure on traded good j of type C to total expenditure on all traded goods of type C (including the one produced at home). We cannot back out from the data an estimate of a country's expenditure on its own tradable goods. However, it can be shown that:

$$(1.7) \quad w_{ij}^C = \frac{p_{ij}^C m_{ij}^C}{\sum_{j, j \neq i} p_{ij}^C m_{ij}^C}\left(1 - w_{ii}^C\right).$$

This allows construction of a set of weights w_j^C which sum to one and which are identical across importers. The weights are interpreted as exogenous parameters reflecting identical CES tastes (within group C) across countries. Somewhat surprisingly, these weights prove in our data to be highly correlated across commodity groups. The model is therefore simplified by the assumption that:

$$(1.8) \quad w_{ij}^H = w_{ij}^D = w_{ij} = \frac{\sum_C p_{ij}^C m_{ij}^C}{\sum_C \sum_{j, j \neq i} p_{ij}^C m_{ij}^C}\left(1 - \sum_C w_{ii}^C\right).$$

Because S_i / S_k does not vary across exporters j:

$$(1.9) \quad \sum_j w_j \, ln\left(\frac{S_i}{S_k}\right) = ln\left(\frac{S_i}{S_k}\right).$$

Finally, since there is very little variation across *j* in the relative tariff term, assume that:

$$\text{(1.10)}\quad \sum_j w_j\, ln\left(\frac{1+\left(1-a_{ij}\right)t_i^C}{1+\left(1-a_{kj}\right)t_k^C}\right) = ln\left(\frac{1+\left(1-a_{ij}\right)t_i^C}{1+\left(1-a_{kj}\right)t_k^C}\right).$$

Something very much like the standard gravity equation results from taking log of (1.4) and making the appropriate substitutions. The log of imports by country *i* of the *homogeneous* good exported by *j*, relative to the imports of that good by country *k*, are given by:

$$\begin{aligned}
ln\frac{m_{ij}^H}{m_{kj}^H} &= \left(1+\tau_1^H\right)ln\left(\frac{y_i}{y_k}\right) + \tau_2^H\, ln\left(\frac{y_i/n_i}{y_k/n_k}\right) + \left(\tau_d^H+\tau_h^H-1\right)\gamma^H ln\left(\frac{S_i}{S_k}\right) - \sigma_H\delta_1^H ln\left(\frac{d_{ij}}{d_{kj}}\right) \\
&\quad -\sigma_H\delta_2^H ln\left(\frac{1+b_{ij}}{1+b_{kj}}\right) - \sigma_H\delta_3^H ln\left(\frac{1+l_{ij}}{1+l_{kj}}\right) + \left(\tau_d^H+\tau_h^H-1\right)ln\left(\frac{1+\left(1-a_{ij}\right)t_i^H}{1+\left(1-a_{kj}\right)t_k^H}\right) \\
\text{(1.11)}\qquad &\quad +\left(\tau_d^H\delta_1^D+\tau_h^H\delta_1^H\left[\sigma_H-1\right]\right)\sum_j w_j\, ln\left(\frac{d_{ij}}{d_{kj}}\right) \\
&\quad +\left(\tau_d^H\delta_2^D+\tau_h^H\delta_2^H\left[\sigma_H-1\right]\right)\sum_j w_j\, ln\left(\frac{1+b_{ij}}{1+b_{kj}}\right) \\
&\quad +\left(\tau_d^H\delta_3^D+\tau_h^H\delta_3^H\left[\sigma_H-1\right]\right)\sum_j w_j\, ln\left(\frac{1+l_{ij}}{1+l_{kj}}\right)
\end{aligned}$$

The coefficients are easily interpreted as reduced form elasticities. Consider the coefficient on relative security, $ln(S_i / S_k)$. Differences in institutional quality affect relative trade costs and therefore the price of *j*'s homogeneous export in *i* and *k*, $\partial ln\left(p_{ij}^H / p_{kj}^H\right) / \partial ln(S_i / S_k) = \gamma^H$. The impact of the change in price works through three channels. Since the prices of all traded homogeneous products are affected symmetrically by the change in institutional quality, the change in price does *not* induce substitution among homogeneous traded goods. However, changing the relevant traded goods price index, P_i^H / P_k^H, both generates a real income effect and also changes the share of total expenditure devoted to homogeneous goods as a group, with net elasticity $\tau_h^H - 1$. Finally, differences in relative institutional quality also affect the price index for differentiated products, P_i^D / P_k^D, and we allow differentiated product prices to affect the share of expenditure on homogeneous goods with elasticity given by τ_d^H.

Note that the model allows the coefficients for trade in homogeneous goods to differ from the coefficients for trade in differentiated products. Relative imports of *differentiated* products are given by:

$$\begin{aligned} ln\frac{m_{ij}^D}{m_{kj}^D} = & \left(1+\tau_1^D\right)ln\left(\frac{y_i}{y_k}\right)+\tau_2^D\, ln\left(\frac{y_i/n_i}{y_k/n_k}\right)+\left(\tau_d^D+\tau_h^D-1\right)\gamma^D\, ln\left(\frac{S_i}{S_k}\right)-\sigma_D\delta_1^D\, ln\left(\frac{d_{ij}}{d_{kj}}\right) \\ & -\sigma_D\delta_2^D\, ln\left(\frac{1+b_{ij}}{1+b_{kj}}\right)-\sigma_D\delta_3^D\, ln\left(\frac{1+l_{ij}}{1+l_{kj}}\right)+\left(\tau_d^D+\tau_h^D-1\right)ln\left(\frac{1+\left(1-a_{ij}\right)t_i^D}{1+\left(1-a_{kj}\right)t_k^D}\right) \\ & +\left(\tau_d^D\delta_1^D\left[\sigma_D-1\right]+\tau_h^D\delta_1^H\right)\sum_j w_j\, ln\left(\frac{d_{ij}}{d_{kj}}\right) \\ & +\left(\tau_d^D\delta_2^D\left[\sigma_D-1\right]+\tau_h^D\delta_2^H\right)\sum_j w_j\, ln\left(\frac{1+b_{ij}}{1+b_{kj}}\right) \\ & +\left(\tau_d^D\delta_3^D\left[\sigma_D-1\right]+\tau_h^D\delta_3^H\right)\sum_j w_j\, ln\left(\frac{1+l_{ij}}{1+l_{kj}}\right) \end{aligned} \quad (1.11')$$

We end up, as promised, with a gravity model in which exposure to hold-up or hijacking may raise the prices of traded goods and discourage trade. The model includes a nontraded good, imports are estimated relative to those of a base country, and the non-linear traded goods price indices are dealt with through a Törnqvist approximation.

2. The Data

The model developed in the previous section provides a framework for answering the two empirical questions of this paper:

- Does insecurity constrain trade in both homogeneous and differentiated products?
- Do different dimensions of insecurity – lack of contract enforcement and exposure to theft -- affect trade in homogeneous and differentiated products differently?

Of course, the estimation requires an operational definition of homogeneous and differentiated products. The paper applies the classification developed by James Rauch (1999). Rauch classifies industries, using SITC Revision 2 at the four-digit level, according to whether their products are primarily homogeneous (traded on an organized exchange), reference-priced (prices can be quoted without mentioning the name of the producing firm), or differentiated (other products). Since the appropriate classification of an industry is not always clear, Rauch provides both a conservative classification, which maximizes the number of commodities classified as differentiated, and a liberal classification, which maximizes the number of commodities associated with organized exchanges or reference prices.

Estimation of the model also requires construction of a data set linking tariffs to trade flows, commodity by commodity, a data set which may also be of use to other researchers. The source for bilateral trade flows disaggregated by commodity is Feenstra (2000), which in turn is based on Statistics Canada's reworking of data collected by the United Nations Statistical Office. This data set is referred to as the World Trade Analyzer (or WTA).

UNCTAD's Trade Analysis and Information System (TRAINS) provided 1995 and 1996 average MFN tariffs at the six-digit level of the Harmonized System (HS) of commodity classification (UNCTAD, 2000). TRAINS also reports the number of national tariff lines underlying each of the six-digit HS tariff averages. As shown in Table 1, these tariff data are available for 40 "countries" in 1995, counting the European Union as a single country, and for 27 "countries" in 1996, again counting the EU as one. (As noted in the footnotes to Table 1, not all of these countries appear in the WTA data.)

Matching the tariff data to the trade data requires matching the HS industrial classification to the WTA. A detailed description of this rather painstaking process is given in the Appendix to this paper. The TRAINS administrator provided a concordance between the 1992 and 1996 HS classifications and Revision 3 of the Standard International Trade Classification (SITC). Robert E. Lipsey composed the concordance between SITC Revision 3 and SITC Revision 2 (available at the website of the Center for International Data at the University of California, Davis). Following Feenstra (2000), the four-digit

SITC Revision 2 codes were rolled-up into the four-digit WTA codes. Tariffs for each four-digit WTA category were constructed by averaging the corresponding six-digit HS averages in the TRAINS data, weighting by the appropriate number of lines (not by trade volumes). Details are provided in the Appendix. The resulting data set provides, at a highly disaggregated level, the WTA import values and the TRAINS MFN tariff averages for 1995 and 1996.

The WTA codes were matched to Rauch's goods classification. It was then straightforward to calculate bilateral trade flows for each class of goods, homogeneous, reference-priced, and differentiated. This paper uses 1996 trade data. It uses 1996 tariff data where available; otherwise we use 1995 tariff data.

Table 2 presents descriptive statistics about the average tariffs of the importing countries used in this paper. Both the mean tariffs and the standard deviation across importers decline as one moves from homogeneous through reference-priced to differentiated goods. Table 3 provides summary statistics on trade and tariffs by type of good, averaging over the 1597 observations used in the estimations to be presented in Sections 4 and 5.

The security indices used in this paper – indices of the quality of institutional support to protect trade from predation through hijacking or hold-up – have two basic sources. The first is a survey of business executives undertaken by the World Economic Forum in early 1997 (WEF, 1997). Respondents were asked to register on a scale from one to seven their agreement with each of the following statements (among others):

- Government economic policies are impartial and transparent;
- Government regulations are precise and fully enforced;
- Tax evasion is minimal;
- Irregular additional payments are not common in business and official transactions;
- The legal system is effective in enforcing commercial contracts ;
- Agreements and contracts with the government are not often modified due to budget cutbacks, changes in government or changes in government priorities;
- Private businesses can readily file lawsuits at independent and impartial courts if there is a breach of trust on the part of the government;

- New governments in your country honor the commitments and obligations of previous regimes;
- Citizens of your country are willing to adjudicate disputes rather than depending on physical force or illegal means;
- Your country's police are effective in safeguarding personal security so that this is not an important consideration in business activity;
- Organized crime does not impose significant costs on business in your country.

Anderson and Marcouiller composed a broadly-based composite security index by extracting the first principal factor of the country mean responses to these questions. That index, reported in Table 4, is used again here. This paper also uses directly the WEF's country mean responses to the assertions that "the legal system is effective in enforcing commercial contracts" and that "organized crime does not impose significant costs on business" (both rescaled to run between zero and one).

The second source of security information is data collected by the World Bank in the preparation of the *World Development Report 1997* (World Bank 1997). In this survey of 3685 firms in 69 countries, respondents were asked among other things to judge on a scale from 1 to 6 how problematic crime and theft are for doing business.

The rest of the data come from standard sources. GDP and population come from the World Bank's *World Development Indicators*. We calculated the great circle distance between the capital cities of trade partners using geographic coordinates found in Fitzpatrick and Modlin (1986). We used an electronic atlas to identify adjacent countries. We coded trading partners as speaking a common language if both listed among their official languages Arabic, Chinese, English, French, German, Malay, Portuguese, Spanish, or Swedish, and we created a dummy variable to indicate common membership in ASEAN, the EU, Mercosur, or NAFTA.

3. Estimation

The first section of this paper developed a model of trade in homogeneous and differentiated products. The extension to three classes of traded goods (homogeneous, reference-priced, and differentiated) is straightforward. The model implies a log-linear gravity equation estimating imports by country *i* of goods of class *C* from exporting country *j* relative to imports by a base country *k* of the same type of good from the same source. The non-linear CES price indices required by the theory enter the model through Törnqvist approximation; this is the source of the weighted distance, language and adjacency terms (note the formal justification of something like a "remoteness" index).

The model to be estimated is given in Equation 3.1:

$$
\begin{aligned}
ln\left(\frac{m_{ij}^C}{m_{kj}^C}\right) &= \beta_0^C + \beta_1^C\, ln\left(\frac{y_i}{y_k}\right) + \beta_2^C\, ln\left(\frac{y_i / n_i}{y_k / n_k}\right) + \beta_3^C\, ln\left(\frac{S_i}{S_k}\right) + \beta_4^C\, ln\left(\frac{d_{ij}}{d_{kj}}\right) \\
&+ \beta_5^C\, ln\left(\frac{1+b_{ij}}{1+b_{kj}}\right) + \beta_6^C\, ln\left(\frac{1+l_{ij}}{1+l_{kj}}\right) + \beta_7\, ln\left(\frac{1+\left(1-a_{ij}\right)t_i^C}{1+\left(1-a_{kj}\right)t_k^C}\right) \\
&+ \beta_8^C \sum_j w_j\, ln\left(\frac{d_{ij}}{d_{kj}}\right) + \beta_9^C \sum_j w_j\, ln\left(\frac{1+b_{ij}}{1+b_{kj}}\right) + \beta_{10}^C \sum_j w_j\, ln\left(\frac{1+l_{ij}}{1+l_{kj}}\right) + \eta_i + \upsilon_{ij}
\end{aligned}
\tag{3.1}
$$

The equation is estimated separately over commodity classes $C = H, R, D$; the model does not imply that any of the coefficients should be equal across commodity groups (compare Equations 1.11 and 1.11′).

Focusing on the variable of immediate interest, we expect the coefficient β_3^C to be positive. An enhancement of security is expected to lower the prices of all traded goods (symmetrically within a class, perhaps asymmetrically across classes). Then a sufficient although not necessary condition for the expectation of a positive β_3^C is that the net effect of the fall in the traded goods price indices be to increase the share of expenditure devoted to each class of traded good at the expense of the non-traded good.

The stochastic element of Equation 3.1 has two parts. The first, η_i, represents that portion of the error which is common to *i*'s imports from all exporters j. The second element, υ_{ij}, represents a disturbance specific to the trading pair. The possibility of heteroskedasticity suggests use of the White method for calculating robust standard errors, while the two-part error term requires that the calculation of variance be "clustered" by importer. The clustering option roughly doubles the estimated standard errors, indicating that there is in fact substantial importer-specific correlation of residuals.

The dependent variable is censored. The lowest trade value reported at the four-digit commodity classification level in the WTA is 5000 dollars. If country *i*'s imports from country *j* fall short of $5000 in each of the WTA categories in one of the commodity classes $C = H, R, D$, then no imports by *i* from *j* will be reported for that class. Stata's procedure for interval regression permits tobit-like estimation with non-constant censoring points, while also allowing calculation of robust standard errors with clustering by importer.

4. Does insecurity affect all trade?

Working with aggregate bilateral imports, Anderson and Marcouiller showed that insecurity dramatically impedes trade and that the exclusion of security variables biases upward the estimated coefficient on income per capita in gravity models which do not take institutional quality into account. The first question asked by this paper is whether the Anderson and Marcouiller result is driven primarily by the effect of insecurity on imports of just one of the three types of good, $C = H, R, D$, or whether, in fact, all sorts of trade are discouraged by transactions costs related to insecurity.

To answer this question, one would like to stay as close to the original data set as possible. Anderson and Marcouiller used trade data from the IMF's *Direction of Trade Statistics*. Switching to the commodity-specific trade data of the WTA eliminates the Czech Republic, the Slovak Republic, Russia, and Ukraine. All four countries were in the lowest third of the distribution of the composite security index, and Russia and Ukraine were the least secure countries in the sample. Elimination of trade involving these four (possibly influential) countries leaves us with 44 importers. Matching importers with their 43 possible partners gives a total of 1892 possible import observations for each class of good $C = H, R, D$.

However, we lose an additional six importers when shifting from the aggregate average MFN tariffs used by Anderson and Marcouiller to the disaggregated tariffs drawn from TRAINS. This is true even if we use 1995 tariffs when 1996 tariffs are unavailable. The countries lost are India, Jordan, Peru, South Africa, Switzerland, and Zimbabwe. (Of course, Equation 3.1 does not require tariff information from the exporting country, and we can use imports by the other 38 countries from these six.)

Finally, we have no data on the base country *k*'s purchases of its own tradable goods. In terms of Equation 3.1, we lack a measure of m_{kk}^{C}. Lacking the denominator of the dependent variable $ln\left(m_{ik}^{C} / m_{kk}^{C}\right)$, we are unable to use any of the observations of m_{ik}^{C}. This excludes a further 37 observations.

Table 5 shows the result of estimating Equation 3.1 over the 1597 available observations, using the USA as a convenient base country *k*. As described in the previous section, the estimation technique allows for censoring, for heteroskedasticity, and for importer-specific correlation of residuals. For the sake of comparison, Table 6 shows the results with the simple White calculation of robust standard errors, *without* clustering by importer. As can be seen from a comparison of the two tables, the clustering roughly doubles the standard errors, evidence of significant correlation of residuals within importer-specific groups.

What does Table 5 show? In spite of having lost the least secure countries from the original Anderson and Marcouiller sample, the claim that insecurity discourages trade is confirmed for all three types of trade. In each case the coefficient on the composite security index is positive and significant at the 5% level; in the case of trade in differentiated products, the coefficient is significant at the 1% level.

The point estimate of the coefficient in the case of conservatively classified differentiated goods is .29. This implies that a hypothetical country whose composite security factor rose from the average of the Latin American countries in the sample (-.82) to the average of the members of the EU (.53) would could expect to see its imports of differentiated products rise by some 40%, other things equal (the predicted change in the log of imports would be .29*(.82+.53)=.39).

The answer to the first question of this paper is, "Yes." Insecurity impedes trade of all types. The result holds not only for total bilateral trade but for each type of good in Rauch's classification.

5. Do different types of insecurity affect trade differently?

Suppose that a differentiated product is so client-specific that it has no value to anyone other than the client for whom it was designed. Although the good could possibly be stolen in the hope of extracting a ransom from the original client, its low resale value on the black market would make it a relatively unattractive target for hijackers. On the other hand, the client-specificity of such a product would expose its producer to the hold-up problem in a particularly dramatic fashion. In the absence of enforceable contracts, sunk costs of product design might never be recoverable.

Producers of homogeneous products face the opposite set of difficulties. They are not likely to be held-up by clients. They have sunk no product design costs, and they have multiple outside options. On the other hand, the multiplicity of outside options it precisely what attracts hijackers to such a product: it is readily resold on the black market. Therefore, one would expect producers of homogeneous products to be more concerned about hijacking than about the enforceability of contracts.

As set out in Equation 1.5′, both types of insecurity could affect the prices of traded goods. Hypothetically, enhancement of the security of contracts in the importing country i, S_{1i}, should lower the price of tradable differentiated goods without greatly affecting the prices of tradable homogeneous goods. Conversely, enhanced protection from theft, S_{2i}, should lower the prices of homogeneous goods but not significantly affect the prices of differentiated products. The effect on the intermediate "reference-priced" category should hypothetically be intermediate in magnitude.

One finds whether the data are consistent with this hypothesis by estimating a modified form of Equation 3.1:

$$ln\left(\frac{m_{ij}^C}{m_{kj}^C}\right) = \beta_0^C + \beta_1^C\, ln\left(\frac{y_i}{y_k}\right) + \beta_2^C\, ln\left(\frac{y_i / n_i}{y_k / n_k}\right) + \beta_{3_1}^C\, ln\left(\frac{S_{1i}}{S_{1k}}\right) + \beta_{3_2}^C\, ln\left(\frac{S_{2i}}{S_{2k}}\right) + \beta_4^C\, ln\left(\frac{d_{ij}}{d_{kj}}\right)$$

$$(5.1) \qquad +\beta_5^C\, ln\left(\frac{1+b_{ij}}{1+b_{kj}}\right) + \beta_6^C\, ln\left(\frac{1+l_{ij}}{1+l_{kj}}\right) + \beta_7\, ln\left(\frac{1+\left(1-a_{ij}\right)t_i^C}{1+\left(1-a_{kj}\right)t_k^C}\right)$$

$$+\beta_8^C \sum_j w_j\, ln\left(\frac{d_{ij}}{d_{kj}}\right) + \beta_9^C \sum_j w_j\, ln\left(\frac{1+b_{ij}}{1+b_{kj}}\right) + \beta_{10}^C \sum_j w_j\, ln\left(\frac{1+l_{ij}}{1+l_{kj}}\right) + \eta_i + \upsilon_{ij}$$

One of the WEF survey questions directly addresses contracts and, implicitly, the hold up problem. Respondents were asked to rate their agreement with the statement, "The legal system is effective in enforcing commercial contracts." Country mean scores on this question, rescaled to run from zero to one, are used to index contract enforceability.

None of the WEF questions directly addressed the issue of hijacking. As a first cut at the issue, in order to stay within the data set and maintain the full number of observations, one can use as an index of exposure to theft the country mean response to the assertion, "Organized crime does not impose significant costs on business in your country." This is an imperfect but not entirely implausible index of exposure to theft, if extensive networks of hijackers and black marketeers are classified as "organized crime."

Figure 1 plots each importer's score on contract enforceability (a higher score means better enforcement) against its score on organized crime (a higher score means that organized crime imposes *lower* costs on business). The scores are positively correlated but far from perfectly so (the correlation coefficient for the 1597 cases is .63). Colombia and Egypt have similar 1996 scores on contract enforceability but very different scores on organized crime. Argentina and Ireland have similar scores on organized crime but very different scores on contract enforceability.

Using these separate indices of different elements of security, Equation 5.1 was estimated using the corrections for left-censoring, for unknown heteroskedasticity and for importer-specific correlation of residuals which were described in Section 3.

The results are shown in Table 7. The positive coefficient on contract enforceability increases dramatically in significance as one moves from homogeneous products to differentiated products; the coefficient for homogeneous goods in the liberal classification is not significant at all. Conversely, the positive coefficient on absence of organized crime moves from significance at the 10% level for homogeneous goods to no significance at all for differentiated products.

These encouraging results motivated the search for a more focused index of exposure to hijacking. One was found in the survey data compiled by the World Bank in the preparation of *World Development Report 1997*. In that survey, businesspeople were asked to judge on a scale from 1 to 6 the importance of "crime and theft" as an obstacle to doing business. Those scores were rescaled to run between 0 and 1, with 1 representing the highest level of security against theft. Figure 2 plots this "crime and theft" index against the World Economic Forum's index of contract enforceability. Using this index drives down the number of possible observations, since it is unavailable for 16 of the 38 importers with which we have been working.

The results are most striking in the case of the liberal classification of goods. The measure of contract enforceability there has no effect on imports of homogeneous products, but a very large and significant effect on imports of differentiated products. Conversely, freedom from exposure to crime and theft has a very strong and significant effect on imports of homogeneous goods but no significant effect on imports of differentiated products. The same pattern is present although less pronounced when goods are aggregated according to the Rauch's conservative classification.

6. Conclusion

This paper began with two questions: Does insecurity reduce all types of trade? Do different dimensions of security affect different types of trade differently? The working hypothesis has been that, although insecurity impedes all sorts of trade, exposure to hijacking primarily affects trade in homogeneous, easily resold products, while the lack of contractual protection against the hold-up problem primarily impedes trade in differentiated, client-specific products.

The paper extended the Anderson and Marcouiller model (*forthcoming*) to allow each country to produce traded goods of different types. The extended model was then estimated, using available data on institutional quality and a new data set linking tariffs to trade volume (described in the Appendix), allowing for censoring of the trade variable and for possible correlation of residuals within importer-specific groups.

The results show that increases in the composite security index do lead to increases in import levels, other things equal; insecurity hampers all types of trade. Contractual insecurity dramatically hinders trade in differentiated commodities but has little or no effect on trade in homogeneous products, while exposure to theft impedes trade in homogeneous products but has little or no effect on trade in differentiated products.

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Appendix: Disaggregated Trade and Tariff Data

Trade data for 1995 and 1996 come from Feenstra (2000).

TRAINS provided 1995 and 1996 average MFN ad valorem tariff rates at the six-digit HS level, along with the number of national tariff lines underlying each six-digit aggregate. Some of the data were reported using what TRAINS refers to as 1992 HS codes, other data according to the 1996 HS codes. TRAINS also provided concordances between the HS (92 and 96) and revision 3 of the SITC.

A few details should be mentioned:

- The 1992 concordance links both HS 151920 and 151930 with both SITC 43131 and 51217. We link 151920 to 43131 and 151930 to 51217. By 1996, neither HS code was used.
- In the 1996 concordance, HS 710820 is identified simply as "I. Gold, Monetary" and 711890 is "II. Gold coin and other current coin." We have assigned both the SITC number 95000.
- The 1996 concordance links HS 090190 with two SITC codes: 07132 and 07133. We have linked 090190 to 07132.
- The 1992 file links the single HS code 271000 with eight distinct SITC revision 3 codes in the 334 group. The 1996 file links 271000 only with 33400, a 3-digit aggregate. We adopt the latter correspondence, although this introduces ambiguities which require careful handling.
- Nine of the five-digit SITC revision 3 codes appearing in the TRAINS concordances are actually aggregates rather than true five-digit SITC codes: 27410, 33400, 67300, 67600, 67610, 67620, 67810, 75990, and 89860. These, too, require careful handling.
- In general, where an HS code appears in both the 92 and 96 concordances, both concordances map the HS code into the same SITC code.

Robert E. Lipsey of the NBER developed a concordance between Revision 3 of the SITC and Revision 2 of the SITC. The file is available at the website of the Center for International Data at UC Davis. We used this file to associate five-digit SITC Revision 2 codes with the TRAINS HS codes, then turned the five-digit SITC revision 2 codes into 4-digit codes. Questions arise in the nine cases in which TRAINS uses a code which is actually an aggregate code: 27410, 33400, 67300, 67600, 67610, 67620, 67810, 75990, and 89860. In five cases the problem is easily resolved because the aggregate code maps into a single four-digit code anyway:

- 27410 maps to 2741,
- 67610 maps to 6731,
- 67620 maps to 6732,
- 67810 maps to 6770,
- 89860 maps to 8983.

The other four cases are more complex:

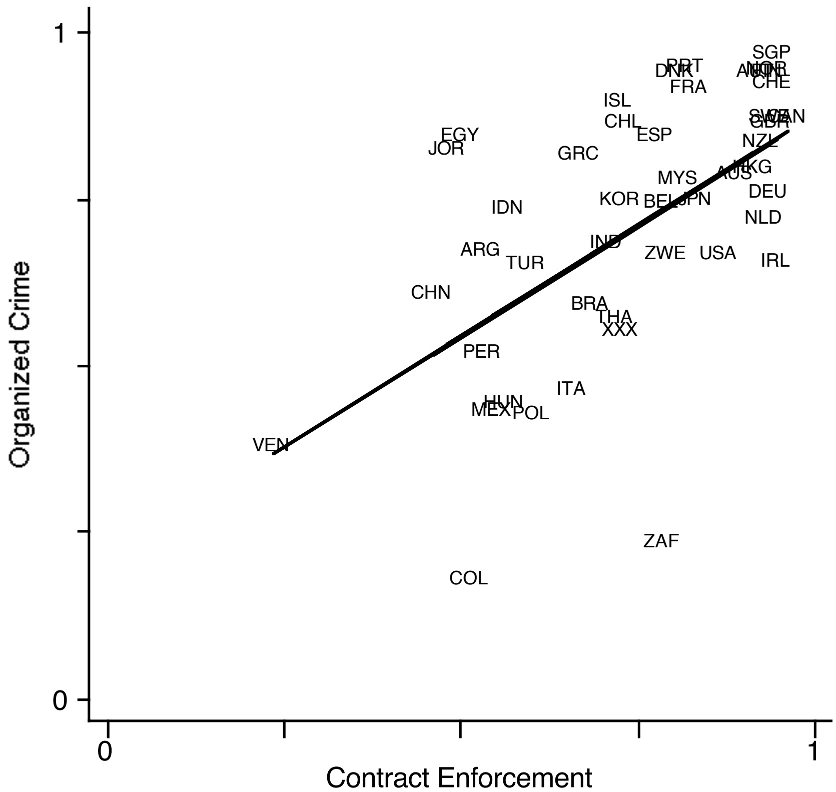
- 33400 maps to 3341, 3342, 3343, 3344, and 3345.
- 67300 maps to 6727, 6744, 6745, 6746, and 6749.
- 67600 maps to 6731, 6732, and 6733.
- 75990 maps to 7591 and 7599.

Our solution was this: if in the TRAINS data a country reports, say, 20 national tariff lines in the 67300 group, we associated 4 of those lines with 6727, four with 6744, four with 6745, four with 6746, and four with 6749.

The four-digit SITC revision codes do not correspond exactly to the WTA codes, for reasons spelled out in Feenstra (2000). Appendix C of Feenstra's paper gives the roll-ups to be applied particularly where WTA uses an aggregate code (ending in A) or assigns trade to a residual category (ending in X). Note that the codes 515A, 655A, and 726A actually appear in the WTA data in place of the codes 515X, 655X, and 726X which appear in Feenstra's Appendix C. (When all trade within a 3-digit group is assigned to an X category, the corresponding A notation is used.)

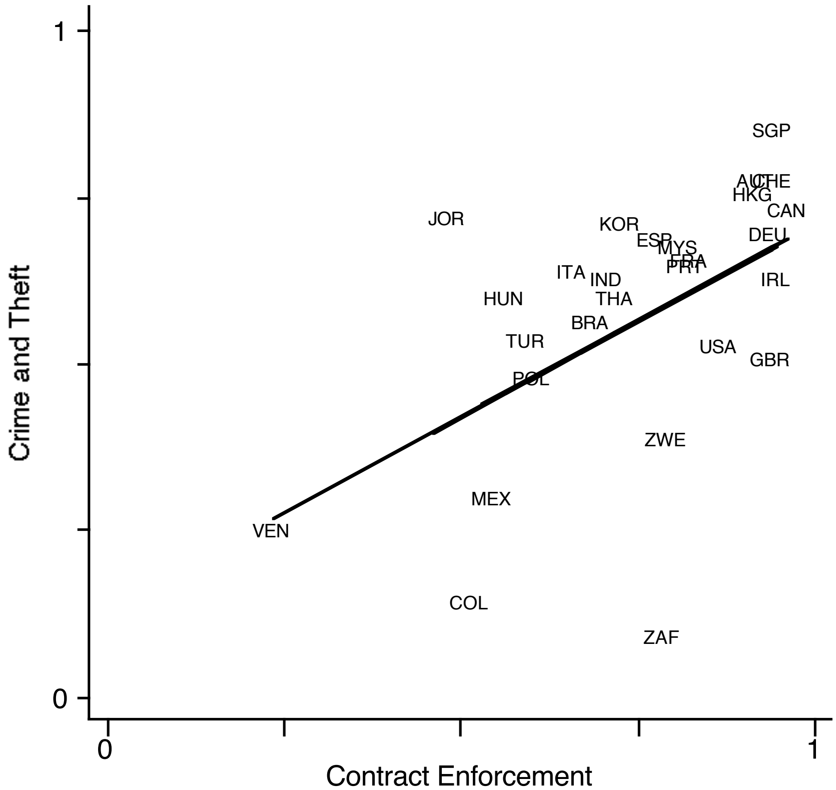
The goal of this process is to associate an average ad valorem MFN tariff with each four-digit SITC group in the WTA data. Having associated each HS code with a WTA code, we "collapsed" the TRAINS data by WTA code. For each importing country, we averaged the TRAINS average MFN tariffs over all HS codes within a WTA group, weighting each TRAINS observation by the appropriate number of lines. Where a residual category not in Feenstra's Appendix C appears in the WTA, we assign to that category the average MFN tariff of the next highest level of aggregation. In other words, where the WTA code is NNNX, representing trade within the NNN group which cannot be allocated to a specific four-digit subgroup, we assign the average tariff corresponding to the NNN group. Associating these tariffs with the WTA trade values is then straightforward.

Figure 1. World Economic Forum Scores:
Contract Enforceability and "Organized Crime"



Higher scores indicate greater security: contracts are *more* enforceable; organized crime imposes *lower* costs on business.

Figure 2. WEF and World Bank Scores:
Contract Enforceability and "Crime and Theft"



Again, higher scores indicate greater security: contracts are *more* enforceable; crime and theft are *less* of an obstacle to business.

Table 1. Importers with TRAINS Tariff Data

Importer	1995	1996	Importer	1995	1996	Importer	1995	1996
Argentina	x	x	Estonia	x	.	Morocco	x	.
Australia	.	x	European Union	x	x	New Zealand	x	x
Belize	.	x	Gabon	x	.	Nicaragua	x	.
Bhutan	.	x	Guatemala	x	.	Norway	x	x
Bolivia	x	.	Hong Kong	x	.	Paraguay	x	x
Brazil	x	x	Hungary	x	x	Philippines	x	.
Cameroon	x	.	Iceland	.	x	Poland	x	x
Canada	x	x	Indonesia	.	x	Singapore	x	.
Central Afr. Rep.	x	.	Jamaica	.	x	Taiwan	.	x
Chile	x	.	Japan	x	x	Thailand	x	.
China	x	x	Korea, Rep.	x	x	Trinidad-Tobago	x	x
Colombia	x	.	Kyrgyzstan	x	.	Tunisia	x	.
Costa Rica	x	.	Latvia	.	x	Turkey	x	.
Czech Republic	.	x	Lithuania	x	.	United States	x	x
Dominica	.	x	Madagascar	x	.	Uruguay	x	x
Ecuador	x	.	Malaysia	.	x	Venezuela	x	.
El Salvador	x	.	Mexico	x	.			
Egypt	x	.	Moldova	.	x			

Source: UNCTAD, 2000.

Note: Czech Republic, Dominica, Estonia, Kyrgyzstan, Latvia, Lithuania and Moldova are available in TRAINS but not available in the WTA trade data, in which they appear in combination with other members of the former Czechoslovakia and the former USSR or, in the case of Dominica, in combination with several other Caribbean nations.

Table 2. Average Overall MFN Tariffs and Tariffs by Commodity Type

	Mean	Std.Dev.	Min.	Max
Overall Average MFN Tariff (%)	10.19	6.16	0.00	28.10
Conservative Classification:				
Average Tariff, Homogeneous Goods	12.43	8.96	0.00	38.71
Average Tariff, Reference-Priced	10.88	7.31	0.00	41.61
Average Tariff, Differentiated	9.86	6.47	0.00	32.36
Liberal Classification				
Average Tariff, Homogeneous Goods	11.60	10.41	0.00	53.30
Average Tariff, Reference-Priced	10.80	6.48	0.00	34.80
Average Tariff, Differentiated	9.80	6.62	0.00	32.77

Notes: Average percentage ad valorem tariff.
Based on TRAINS data and classification from Rauch (1999).
Averages taken over the importers used in this paper.

Table 3. Summary Statistics on Trade and Tariffs

	Observations	Mean	Std. Deviation
Conservative Classification			
Homogeneous imports (000)	1454	214552	901146
Reference-priced imports (000)	1555	432452	1567949
Differentiated imports (000)	1571	1609194	5965466
Homogeneous tariff factor	1597	1.124	0.088
Reference-priced tariff factor	1597	1.109	0.072
Differentiated tariff factor	1597	1.099	0.064
Liberal Classification			
Homogeneous imports (000)	1504	267371	1042241
Reference-priced imports (000)	1552	435138	1547965
Differentiated imports (000)	1569	1551948	5796691
Homogeneous tariff factor	1597	1.116	0.103
Reference-priced tariff factor	1597	1.108	0.064
Differentiated tariff factor	1597	1.098	0.065

Note: Summary over the 1597 cases underlying Tables 5, 6, and 7.

Table 4. Composite Security index

IMPORTER	Score	IMPORTER	Score	IMPORTER	Score
Russia	-2.614	Italy	-0.362	France	0.689
Ukraine	-2.377	Indonesia	-0.284	Australia	0.704
Venezuela	-2.218	India	-0.264	Sweden	0.779
Colombia	-2.098	Zimbabwe	-0.240	Austria	0.807
Greece	-1.195	Peru	-0.235	Denmark	0.857
Poland	-0.858	Korea	-0.217	Ireland	0.864
Thailand	-0.796	China	-0.184	Germany	0.931
Jordan	-0.794	Belgium-Luxembourg	0.055	New Zealand	0.997
Hungary	-0.791	Egypt	0.227	United Kingdom	1.034
Mexico	-0.749	Spain	0.382	Netherlands	1.036
South Africa	-0.602	Portugal	0.391	Canada	1.050
Argentina	-0.579	Iceland	0.451	China: Hong Kong	1.134
Turkey	-0.539	Malaysia	0.499	Norway	1.142
Slovak Republic	-0.524	Japan	0.562	Switzerland	1.159
Brazil	-0.521	United States	0.651	Finland	1.173
Czech Republic	-0.452	Chile	0.680	Singapore	1.241

Source: Anderson and Marcouiller, forthcoming.

Based on survey data from World Economic Forum 1997.

Table 5. Imports and the Composite Security Index

Standard Errors *with* Clustering by Importer

	Conservative Classification			Liberal Classification		
	Homog.	Ref. Price	Diff.	Homog.	Ref. Price	Diff.
GDP	1.315	1.052	0.901	1.265	1.015	0.898
	(0.111)	(0.085)	(0.065)	(0.112)	(0.083)	(0.059)
GDP Per Capita	-0.191	-0.300	-0.260	-0.278	-0.265	-0.254
	(0.182)	(0.132)	(0.152)	(0.148)	(0.141)	(0.145)
Security	0.390	0.271	0.294	0.339	0.271	0.279
	(0.191)	(0.121)	(0.103)	(0.166)	(0.130)	(0.101)
Common Border	-0.914	-0.236	0.560	-0.909	-0.060	0.449
	(0.408)	(0.184)	(0.256)	(0.333)	(0.217)	(0.268)
Com. Language	-0.266	0.929	0.427	-0.166	0.908	0.446
	(0.204)	(0.106)	(0.134)	(0.167)	(0.115)	(0.131)
Distance	-2.013	-1.226	-1.147	-1.765	-1.279	-1.208
	(0.128)	(0.079)	(0.098)	(0.112)	(0.084)	(0.104)
Tariffs	-0.731	-3.505	-5.862	-1.724	-3.144	-5.612
	(2.192)	(1.552)	(2.395)	(1.503)	(1.640)	(2.383)
Weighted Border	-1.499	-0.276	-0.130	-0.677	-0.364	-0.089
	(0.857)	(0.643)	(0.364)	(0.832)	(0.532)	(0.374)
Weighted Lang.	0.564	0.210	0.228	0.462	0.244	0.300
	(0.434)	(0.287)	(0.200)	(0.415)	(0.269)	(0.200)
Weighted Distance	0.053	0.032	0.119	0.079	0.043	0.139
	(0.090)	(0.054)	(0.039)	(0.080)	(0.050)	(0.040)
Constant	0.395	0.349	-0.231	0.492	0.291	-0.242
	(0.440)	(0.322)	(0.221)	(0.424)	(0.316)	(0.210)
Obs	1597	1597	1597	1597	1597	1597
Left-censored	143	42	26	93	45	28
Log Likelihood	-3605	-3016	-2781	-3537	-2979	-2787

Notes:

Robust standard errors (Huber-White) with clustering by importer in parentheses. Observations on m_{ij}^{G} are left-censored at 5000; the dependent variable $ln\left(m_{ij}^{G} / m_{kj}^{G}\right)$ is left-censored with cut-off depending on the value of m_{kj}^{G}. Estimated as a simple interval regression.

Table 6. Imports and the Composite Security Index

Standard Errors *without* Clustering by Importer

	Conservative Classification			Liberal Classification		
	Homog.	Ref. Price	Diff.	Homog.	Ref. Price	Diff.
GDP	1.315	1.052	0.901	1.265	1.015	0.898
	(0.051)	(0.035)	(0.032)	(0.047)	(0.035)	(0.032)
GDP Per Capita	-0.191	-0.300	-0.260	-0.278	-0.265	-0.254
	(0.113)	(0.068)	(0.081)	(0.094)	(0.069)	(0.082)
Security	0.390	0.271	0.294	0.339	0.271	0.279
	(0.119)	(0.073)	(0.063)	(0.108)	(0.071)	(0.063)
Common Border	-0.914	-0.236	0.560	-0.909	-0.060	0.449
	(0.393)	(0.229)	(0.230)	(0.346)	(0.228)	(0.232)
Com. Language	-0.266	0.929	0.427	-0.166	0.908	0.446
	(0.207)	(0.134)	(0.108)	(0.188)	(0.134)	(0.108)
Distance	-2.013	-1.226	-1.147	-1.765	-1.279	-1.208
	(0.099)	(0.056)	(0.054)	(0.089)	(0.057)	(0.054)
Tariffs	-0.731	-3.505	-5.862	-1.724	-3.144	-5.612
	(1.032)	(0.741)	(1.117)	(0.730)	(0.847)	(1.125)
Weighted Border	-1.499	-0.276	-0.130	-0.677	-0.364	-0.089
	(0.388)	(0.228)	(0.180)	(0.356)	(0.220)	(0.180)
Weighted Lang.	0.564	0.210	0.228	0.462	0.244	0.300
	(0.196)	(0.118)	(0.108)	(0.175)	(0.118)	(0.108)
Weighted Distance	0.053	0.032	0.119	0.079	0.043	0.139
	(0.049)	(0.029)	(0.025)	(0.043)	(0.029)	(0.025)
Constant	0.395	0.349	-0.231	0.492	0.291	-0.242
	(0.198)	(0.129)	(0.114)	(0.182)	(0.127)	(0.113)
Obs	1597	1597	1597	1597	1597	1597
Left-censored	143	42	26	93	45	28
Log Likelihood	-3605	-3016	-2781	-3537	-2979	-2787

Notes:

Robust standard errors (Huber-White) without clustering by importer in parentheses. Observations on m_{ij}^{G} are left-censored at 5000; the dependent variable $ln\left(m_{ij}^{G} / m_{kj}^{G}\right)$ is left-censored with cut-off depending on the value of m_{kj}^{G}. Estimated as a simple interval regression.

Table 7. Trade, Contracts, and Organized Crime

Standard Errors with Clustering

	Conservative Classification			Liberal Classification		
	Homog.	Ref. Price	Diff.	Homog.	Ref. Price	Diff.
GDP	1.309	1.040	0.888	1.262	1.001	0.886
	(0.103)	(0.076)	(0.057)	(0.105)	(0.072)	(0.053)
GDP Per Capita	-0.345	-0.436	-0.329	-0.393	-0.419	-0.313
	(0.179)	(0.128)	(0.118)	(0.173)	(0.122)	(0.112)
Contract Enforce.	1.378	1.310	1.178	1.019	1.489	1.103
	(0.633)	(0.497)	(0.362)	(0.765)	(0.432)	(0.343)
Organized Crime	0.641	0.172	0.149	0.594	0.102	0.124
	(0.352)	(0.247)	(0.190)	(0.338)	(0.225)	(0.188)
Common Border	-0.916	-0.260	0.572	-0.911	-0.089	0.461
	(0.402)	(0.184)	(0.241)	(0.329)	(0.216)	(0.253)
Com. Language	-0.242	0.945	0.439	-0.150	0.925	0.456
	(0.201)	(0.105)	(0.132)	(0.164)	(0.115)	(0.129)
Distance	-2.019	-1.227	-1.156	-1.767	-1.280	-1.216
	(0.129)	(0.079)	(0.099)	(0.112)	(0.085)	(0.106)
Tariffs	-0.568	-3.691	-5.305	-1.675	-3.349	-5.067
	(1.944)	(1.436)	(2.128)	(1.429)	(1.458)	(2.136)
Weighted Border	-1.283	-0.155	-0.052	-0.505	-0.243	-0.023
	(0.841)	(0.646)	(0.370)	(0.819)	(0.542)	(0.381)
Weighted Lang.	0.583	0.180	0.246	0.502	0.188	0.321
	(0.410)	(0.285)	(0.193)	(0.394)	(0.265)	(0.196)
Weighted Distance	0.071	0.041	0.126	0.090	0.054	0.144
	(0.086)	(0.053)	(0.040)	(0.076)	(0.048)	(0.041)
Constant	0.520	0.436	-0.090	0.610	0.369	-0.103
	(0.375)	(0.282)	(0.182)	(0.372)	(0.263)	(0.173)
Obs	1597	1597	1597	1597	1597	1597
Left-censored	143	42	26	93	45	28
Log Likelihood	-3597	-3004	-2773	-3531	-2963	-2780

Notes:

Robust standard errors (Huber-White) with clustering by importer in parentheses. Observations on m_{ij}^{G} are left-censored at 5000; the dependent variable $ln\left(m_{ij}^{G} / m_{kj}^{G}\right)$ is left-censored with cut-off depending on the value of m_{kj}^{G}. Estimated as a simple interval regression.

Table 8. Trade, Contracts, and "Crime and Theft"

Standard Errors with Clustering

	Conservative Classification			Liberal Classification		
	Homog.	Ref. Price	Diff.	Homog.	Ref. Price	Diff.
GDP	1.123	0.906	0.849	1.082	0.883	0.848
	(0.146)	(0.101)	(0.066)	(0.134)	(0.098)	(0.069)
GDP Per Capita	0.263	0.020	-0.008	0.165	0.020	0.029
	(0.289)	(0.236)	(0.199)	(0.258)	(0.230)	(0.218)
Contract Enforce.	0.781	0.949	0.902	0.435	1.218	0.838
	(0.341)	(0.273)	(0.190)	(0.384)	(0.260)	(0.203)
Crime and Theft	1.268	0.629	0.346	1.210	0.432	0.303
	(0.331)	(0.248)	(0.179)	(0.302)	(0.247)	(0.192)
Common Border	-0.671	-0.133	0.612	-0.724	0.003	0.574
	(0.567)	(0.197)	(0.293)	(0.412)	(0.262)	(0.296)
Com. Language	-0.115	1.138	0.532	-0.010	1.098	0.538
	(0.250)	(0.105)	(0.204)	(0.235)	(0.142)	(0.201)
Distance	-1.996	-1.237	-1.147	-1.777	-1.272	-1.193
	(0.161)	(0.083)	(0.119)	(0.136)	(0.099)	(0.125)
Tariffs	-0.018	-2.344	-3.310	-0.968	-2.207	-2.913
	(1.408)	(1.167)	(3.080)	(1.258)	(1.103)	(3.223)
Weighted Border	-2.461	-1.276	-0.885	-1.712	-1.308	-0.874
	(0.800)	(0.551)	(0.356)	(0.741)	(0.533)	(0.375)
Weighted Lang.	-0.171	-0.344	0.009	-0.165	-0.352	0.074
	(0.338)	(0.295)	(0.217)	(0.323)	(0.296)	(0.253)
Weighted Distance	0.262	0.189	0.184	0.312	0.161	0.194
	(0.093)	(0.066)	(0.047)	(0.107)	(0.063)	(0.048)
Constant	0.431	0.425	0.080	0.566	0.362	0.067
	(0.396)	(0.314)	(0.172)	(0.443)	(0.288)	(0.175)
Obs	925	925	925	925	925	925
Left-censored	72	18	13	42	19	13
Log Likelihood	-2023	-1664	-1514	-1988	-1657	-1521

Notes:

Robust standard errors (Huber-White) with clustering by importer in parentheses. Observations on m_{ij}^{G} are left-censored at 5000; the dependent variable $ln\left(m_{ij}^{G} / m_{kj}^{G}\right)$ is left-censored with cut-off depending on the value of m_{kj}^{G}. Estimated as a simple interval regression.