

Institutional Quality and International Trade

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- Institutions: Contract enforcement, property rights, investor protection, political system etc.
- 1. Institutions matter greatly for economic performance.
- 2. developed countries (North) enjoy much better institutions than developing ones (South).
- Institutions a source of comparative advantage in North-South trade?
- Some sectors rely more on institutions than others.
- Dependence on institutions (enforcement) is a technological feature of the production process in some industries.
- Example: if production required establishing complex relationships between the factors.

Introduction

Comparative Advantage

- Better institutions in North suggest pattern of "institutional comparative advantage".
- Background: Incomplete contract literature by Williamson (1985) and Grossman and Hart (1986).
- Institutions matter because they allow agents to overcome frictions that arise when two parties enter a production relationship.
- A commonly used source of frictions: parties must make relationship-specific investments leading to holdup problems.
- This makes quality of contract enforcement and property rights especially important.
- In countries with worse institutions, contracts are more incomplete.

- While the North is certain to gain from institutional comparative advantage driven trade, the South may lose.
- Factor rewards may diverge as a result of trade opening.
- North: labor gains the most from trade.
- South: capital gains, while labor is likely to suffer losses.
- Results regarding how institutional quality affects gains from trade:
- Improving institutions in the North increases the South's gains from trade, but may lower gains to the North itself.

Introduction

Intuition

- 1. contracting imperfections lead to factor market distortions: even under perfect mobility, factor rewards differ across industries.
- One factor (labor here) is compensated more in the institutionally dependent sector: these are the "good jobs" that earn rents.
- 2. institutional differences are a source of comparative advantage: because Northern institutions are better, only the North will produce the institutionally dependent good under trade.
- After trade opening good jobs disappear in the South and wages decrease as a result.
- High-paying sector in the North expands to accommodate the entire world demand, resulting in gains from trade.
- North's superior institutions allow it to specialize in the more desirable industries.

- Combine insights from two literatures:
- 1. When contracts are incomplete, the economy exhibits inefficiencies: Factor markets are segmented (Caballero and Hammour, 1998), i.e. some factors' rewards differ across sectors.
- 2. Gains from trade in the presence of distortions (Haberler, 1950; Hagen, 1958; Bhagwati and Ramaswami, 1963): when factor rewards are not the same across sectors, gains and losses from trade come from a resulting expansion or contraction in the sector with higher factor reward.
- Here contract incompleteness leads to segmented factor markets and comparative advantage comes from institutional differences.

Introduction

Alternative Frameworks

- Ricardian view: better institutions in the North simply mean that the North is relatively more productive in the institutionally dependent sectors.
- 1. all countries gain from trade.
- 2. South gains more because it stops producing the institutionally dependent goods, and thus no longer suffers the cost of its weak institutions.
- The second is opposite to results obtained in the incomplete contract approach. Why?
- Poor quality of institutions may manifest itself in lower measured productivity in the institutionally intensive sectors.
- Evidence however shows that lack of proper contract enforcement also leads to significant distortions.
- Ricardian view ignores important insights from incomplete contract literature and may miss part of the story.

Introduction

Empirical Exercise on the Main Insight

- Institutional differences across countries are an important determinant of trade patterns.
- Data: US imports disaggregated by 4 digit SIC industry and country
- Using factor content of trade methodology developed by Romalis (2004): whether countries that are abundant in a factor of production capture larger US import shares in industries relative in that factor.
- Here: factor content specification augmented with variation in industry institutional dependence and country institutional quality.
- Test: whether countries with better institutions capture higher US import shares in more institutionally dependent sectors.
- Finding: institutional differences are a significant determinant of trade flows.

- Grossman and Helpman (2002, 2003, 2005) and Antràs (2003, 2005): model North-South differences in terms of technology or factor endowment, not institutions.
- They do not address the consequences of institutional differences acting as a source of comparative advantage.
- Costinot (2005) and Acemoglu, Antràs and Helpman (2007): how institutional differences generate comparative advantage in an environment with imperfectly enforced contracts.
- Nunn (2007) tests for institutional comparative advantage using a new measure of industry-level institutional intensity reaching similar conclusions.

The Model

Consumption

- Standard Heckscher-Ohlin with two factors, K and L , and three goods.
- Two goods are produced using only one factor (K -good and L -good), while the mixed good (M) uses both factors.
- Cobb-Douglas utility function:

$$U(C_K, C_L, C_M) = C_K^\alpha C_L^\beta C_M^\gamma,$$

where exponents are all positive and $\alpha + \beta + \gamma = 1$.

- Given good prices p_K, p_L, p_M , the numeraire is the ideal price associated with Cobb-Douglas utility:

$$P \equiv \left(\frac{p_K}{\alpha}\right)^\alpha \left(\frac{p_L}{\beta}\right)^\beta \left(\frac{p_M}{\gamma}\right)^\gamma = 1.$$

- Consumer Utility maximization leads to the following FOC:

$$p_K = \alpha \frac{C_K^\alpha C_L^\beta C_M^\gamma}{C_K}, p_L = \beta \frac{C_K^\alpha C_L^\beta C_M^\gamma}{C_L}, p_M = \gamma \frac{C_K^\alpha C_L^\beta C_M^\gamma}{C_M}.$$

The Model

Production

- Production technology of the K -good and L -good is linear in K and L .
- Suppose one unit of capital produces a units of the K -good and one unit of labor produces b units of the L -good.
- Profit maximization in the two industries implies that

$$p_K a = r, p_L b = w,$$

where r and w are returns to capital and labor, respectively.

- M -good is produced with a Leontief technology that combines one unit of L and x units of K to produce y units of the M -good.
- Institutions matter because they facilitate transactions between self-interested economic parties. Only the M -good requires joining of 2 factors and is therefore institutionally dependent.

The Model

Incomplete Contracts and Institutional Differences

- Friction that can be alleviated by appropriately designed contracts and property rights.
- When two distinct parties invest in joint production, some fraction of their investment becomes specific to the production relationship.
- Investment irreversibility makes the parties more reluctant to enter, introducing inefficiency, i.e. holdup.
- One way to reduce inefficiency is to write binding long-term contracts.
- Another is to assign property rights in a way that distributes the residual rights of control to moderate the holdup problem.

The Model

Transaction Cost vs. Property Rights Approach

- Transaction cost: contracts are incomplete because it is prohibitive to set up contracts specifying all parties' pay-offs in every possible state of the world. Enforcement is costly.
- Quality of contract enforcement therefore matters for how well contracts can succeed in resolving the holdup problem.
- Poor institutional quality implies that fewer contracts can be written and enforced; distortions created by relationship specificity will be greater.
- Property rights: when contracts alone cannot solve the holdup problem, the production relationship will adjust to assign the residual rights of control to the party making specific investment.
- Solution lies on the existence of secure and transferable property rights, but assigning property rights optimally does not always fully eliminate inefficiency.
- In countries with bad institutions, the absence of secure property rights implies that the holdup problem will be much more severe.

The Model

Relation-Specific Investments and Institutional Quality I

- Parties to the production are K and L .
- Relation-specific investments occur in production of the M -good.
- A fraction ϕ of capital's investment in the M -good becomes specific to the relationship.
- Parameter ϕ is meant to capture quality of contract enforcement and property rights, which differs across countries.
- Countries are assumed to have the same underlying production technology that requires K to make specific investments.
- What induces differences in ϕ across countries is the degree to which K can avoid specificity by writing enforceable contracts, i.e. a country's institutional quality.

The Model

Relation-Specific Investments and Institutional Quality II

- Better institutions thus correspond to lower values of ϕ .
- In other words, if contracts and property rights are well-enforced, each agent will be able to recoup its *ex ante* investment to a greater degree.
- This way of formalizing institutional differences leads to a concrete interpretation of institutional quality: contracts are less complete in countries with better institutions.
- When $\phi = 0$, institutions are perfect and we are back to the standard frictionless setting.

The Model

Incomplete Contracts

- K can only recover a fraction $(1 - \phi)$ of the investment.
- In order to induce K to form the production unit, it must be compensated with a share of surplus which is given by the revenues minus the *ex post* opportunity costs of the factors:

$$s = p_M y - w - r(1 - \phi)x.$$

- Assume that *ex post* the parties reach a Nash bargaining solution and each receive one half of the surplus.
- Thus, K will only enter the M -good production if its individual rationality constraint is satisfied:

$$r(1 - \phi)x + \frac{1}{2}s \geq rx.$$

- This can be rearranged to yield:

$$p_M y \geq w + (1 + \phi)rx. \quad (1)$$

The Model

Autarky Equilibrium

- General equilibrium, where prices and resource allocation is endogenously determined.
- Condition (1) is a joint restriction on w , r , and p_M , and will hold with equality.
- Market clearing: E is the share of labor employed in the M -sector and characterizes resource allocation in the economy.
- Given E and relevant endowments of K and L , production is:

$$M\text{-good} : yEL, \quad L\text{-good} : b(1 - E)L, \quad K\text{-good} : a\left(\frac{K}{L} - xE\right)L.$$

- Goods market clearing then requires:

$$C_M = yEL, \quad C_L = b(1 - E)L, \quad C_K = a\left(\frac{K}{L} - xE\right)L.$$

- Equilibrium: $\{p_M, p_L, p_K, r, w, E\}$

The Model

Institutional Imperfections

- Consequence 1: L is segmented meaning rewards differ across sectors.
- Use (1) to calculate reward to a unit of labor in the M -sector:

$$w + \frac{1}{2}[p_M - w - (1 - \phi)rx] = w + \phi rx. \quad (2)$$

- Each L employed in the M -sector earns rents of size ϕrx .
- Consequence 2: outcome is inefficient: there is underinvestment in the M -good production and w and r are lower than the efficient case.
- Imperfect institutions imply that it is harder to induce capital to enter the M -sector so w and r must be pushed down and p_M pushed up to satisfy individual rationality condition for capital in (1).
- This is achieved by reducing the size of the M -sector, pushing factors into the K - and the L -sectors, lowering w and r and raising p_M .
- Higher values of ϕ lead to lower E , w , and r (note that for a given ϕ expanding M -sector raises both w and r).

Trade and Institutional Comparative Advantage

Introducing Trade

- Trade setting with both factor endowment and institutional differences.
- Two countries: North (N) and South (S), trade costlessly.
- Vector of world factor endowments: $\bar{V} = (\bar{K}, \bar{L})$ with a partition $(V^N, V^S) = [(K^N, L^N), (K^S, L^S)]$ into the two countries so that $\bar{K} = K^N + K^S$ and $\bar{L} = L^N + L^S$.
- Assume institutions in North are better so that $\phi^N < \phi^S$: In the North a lower fraction of K becomes specific to the M -sector production unit, i.e. contracts are less incomplete there.
- Differences in institutional quality act similar to a Ricardian productivity difference in the M -sector to generate comparative advantage and trade.
- Trade equilibrium analyzed by Davis (1995) Heckscher-Ohlin-Ricardo model.

Trade and Institutional Comparative Advantage

The Heckscher-Ohlin-Ricardo Model

- Starting point is the integrated equilibrium, which is the resource allocation that results under perfect factor mobility.
- It is obtained by solving for the equilibrium of a closed economy characterized by the world factor endowment \bar{V} .
- Key insight: if one country can produce one of the goods more cheaply than the other at a common set of factor prices, in the integrated equilibrium only that country's production process used to produce that good.
- In Davis (1995) countries differ in Ricardian productivity.
- Here it arises because the North's less incomplete contracts allow it to sell the M -good at a strictly lower price.

Trade and Institutional Comparative Advantage

Factor Price Equalization 1

- This is immediate from equation (1): the price at which the M -good can be produced under the Northern institutions is strictly less than the price when the Southern institutions are used as $\phi^N < \phi^S$:

$$p_{MY} = w + (1 + \phi^N)rx < w + (1 + \phi^S)rx.$$

- In the integrated equilibrium, only the North's institutions will be used to produce the M -good.
- Denote the integrated equilibrium factor allocations in industry $i = K, L, M$ by $\bar{V}(i) = [\bar{L}(i), \bar{K}(i)]$.

Trade and Institutional Comparative Advantage

Factor Price Equalization 2

- Factor price equalization (FPE) set as a set of partitions of the world factor endowment into countries is defined by

$$FPE = \left\{ \begin{array}{l} (V^N, V^S) \exists \eta_{K,N}, \eta_{L,N}, \eta_{K,S}, \eta_{L,S} \geq 0, \text{ such that} \\ \eta_{K,N} + \eta_{K,S} = 1, \eta_{L,N} + \eta_{L,S} = 1, \eta_{M,N} = 1, \eta_{M,S} = 0 \\ V^j = \sum_i \bar{V}(i) \text{ for } j = N, S \end{array} \right\},$$

where $\eta_{i,j}$ denotes the share of the integrated equilibrium production of good i that comes from country j .

Trade and Institutional Comparative Advantage

Proposition 1

- The two countries' factor endowments belong to the FPE set when (i) the North has enough of both factors to produce the entire integrated equilibrium world quantity of the M -good; and (ii) the integrated equilibrium production of the K - and L -goods can be allocated between the two countries while keeping all factors fully employed.
- When country endowments belong to the FPE set, the integrated equilibrium world resource allocations and prices are replicated purely through trade:
- *When the North has superior institutions, $\phi^N < \phi^S$ and $(V^N, V^S) \in FPE$, the trade equilibrium world resource allocation, factor prices, and goods prices replicate those of the integrated equilibrium. Therefore, in the trade equilibrium, only the North produces the M -good.*

Trade and Institutional Comparative Advantage

Gains from Trade

- Let $\{p_K^N, p_L^N, p_M^N, r^N, w^N, E^N\}$ and $\{p_K^S, p_L^S, p_M^S, r^S, w^S, E^S\}$ denote autarky equilibria for North and South, and $\{p_K^T, p_L^T, p_M^T, r^T, w^T, E^T\}$ the trade equilibrium.
- Trade equilibrium is the integrated one and thus E^T is the fraction of the *worldwide* labor force employed in the M -sector, located entirely in the North.
- Assumptions made on utility function imply that welfare is proportional to real income. Since price of optimal consumption basket is numeraire, prices in autarky and trade equilibria are real. Gains from trade thus expressed as difference in factor rewards between trade and autarky.
- In autarky, welfare of K in country i is $r^i K^i$. Welfare of L is sum of rewards to labor in L - (w^i) and M -sector (2). Together they give:

$$w^i L^i + \phi^i r^i x E^i L^i$$

Trade and Institutional Comparative Advantage

Proposition 2: The South

- South's total welfare in autarky and trade are

$$\text{Autarky} : r^S K^S + w^S L^S + \phi^S r^S x E^S L^S,$$

$$\text{Trade} : r^T K^S + w^T L^S.$$

- Gains from trade are the latter minus the former:

$$r^T K^S + w^T L^S - (r^S K^S + w^S L^S + \phi^S r^S x E^S L^S)$$

- *Suppose trade takes place between N and S, whose factor endowments $(V^N, V^S) \in FPE$ and factor proportions are identical, $K^N/L^N = K^S/L^S$. The South's institutional comparative advantage driven gains are given by*

$$[(r^T - r^S)K^S + (w^T - w^S)L^S] - \phi^S r^S x E^S L^S.$$

1st term positive as $r^T > r^S$ and $w^T > w^S$. It is decreasing in ϕ^N and increasing in ϕ^S . Also its $\lim_{\phi^N \rightarrow \phi^S} (\cdot) = 0$.

2nd term positive and does not depend on ϕ^N . It is increasing in ϕ^S for low enough $\phi^S \geq 0$.

Trade and Institutional Comparative Advantage

Intuition 1

- The first term $[(r^T - r^S)K^S + (w^T - w^S)L^S]$ represents the efficiency gains to the South from no longer using its institutions to produce the M -good.
- Recall under incomplete contracts, in general equilibrium unresolved specificity in the M -sector depresses w and r in order to generate sufficient surplus in production and induces the expropriated factor to enter the M -sector, see (1).
- The second term $\phi^S r^S x E^S L^S$ represents loss of rents that occurs because the M -sector disappears in the South.
- Recall when factor rewards differ across sectors, there are gains (losses) from trade from expansion (contraction) of sectors with higher factor rewards.
- Here it is demonstrated that such outcome arises when contract incompleteness leads to segmented factor markets and comparative advantage comes from institutional differences.

Trade and Institutional Comparative Advantage

Intuition 2

- A country no longer indifferent on which sectors are active under trade. Better institutions allows N to capture the more desirable sector which disappears in S.
- Proposition 2 states that gains from trade to South always increase in quality of North's institutions.
- South's own institutions have an ambiguous effect on its gains from trade:
 - (i) worse institutions in South imply that efficiency gains from trade with North $[(r^T - r^S)K^S + (w^T - w^S)L^S]$ is greater for a given ϕ^N .
 - (ii) a higher ϕ^S may also increase the amount of autarky rents that the South stands to lose due to trade opening.
- We can see circumstances under which South's net gains from institutional comparative advantage driven trade are positive and negative.

Trade and Institutional Comparative Advantage

Southern Welfare 1

- Note first that the positive term in gains from trade expression vanishes as institutions in two countries converge ($\phi^N \rightarrow \phi^S$). This is intuitive: first term is efficiency gain from using North's institutions to produce M -good under trade. Naturally it will be lower if North's institutions are not much different from South's and will disappear in the limit.
- Then, second term is always strictly different from 0 as long as $\phi^S > 0$. Thus when both countries' institutions are imperfect and North's are better by an exceedingly small ε : $\phi^S = \phi^N + \varepsilon$, in the South net gains will be negative.

Trade and Institutional Comparative Advantage

Southern Welfare 2

- Suppose North achieved perfect institutions: $\phi^N = 0$. Under trade there is no longer market segmentation, first-best levels of factor prices achieved in all countries and sectors. In this case first-term dominates and net welfare gains are positive. Opening to trade implies South reaches first-best level of aggregate welfare, entirely escaping costs of its weak institutions.
- So better institutions in North make it more likely that the South's net gains are positive.

Trade and Institutional Comparative Advantage

Gains to Individual Factors

- Capital wins unambiguously because $r^T > r^S$.
- Labor experiences conflicting effects: though $w^T > w^S$, it is also the factor losing rents. As long as institutional comparative advantage-based gains from trade are negative, L loses for sure from trade. When they are positive, it is still possible for L to lose.
- For instance when $\phi^N = 0$ and the aggregate welfare is at the first-best level, L may still lose from opening to trade, as it can no longer earn rents in the M -sector.

Trade and Institutional Comparative Advantage

Proposition 3: The North

- North's total welfare in autarky and trade are

$$\text{Autarky: } r^N K^N + w^N L^N + \phi^N r^N x E^N L^N,$$

$$\text{Trade: } r^T K^N + w^T L^N + \phi^N r^T x E^T \bar{L}.$$

- To focus solely on effect of institutions, suppose again $K^N/L^N = K^S/L^S$ and that after opening to trade we are in the FPE set:
- *Suppose trade takes place between North and South, whose factor endowments $(V^N, V^S) \in \text{FPE}$ and factor proportions are identical, $K^N/L^N = K^S/L^S$. The North's institutional comparative advantage driven gains are given by*

$$\phi^N r^N x E^N (\bar{L} - L^S).$$

The North's gains from trade are always positive and do not depend on ϕ^S . They increase in ϕ^N for low enough values of ϕ^N .

Trade and Institutional Comparative Advantage

Intuition

- North gains purely through expansion of the high-paying M -sector. Expression for gains is simple because absent factor proportions differences, factor prices are same under trade as in autarky for North ($w^T = w^N$ and $r^T = r^N$). Nonetheless, North gains from trade even if factor rewards unchanged.
- What is interesting is that North's gains from trade *increase* in ϕ^N .
- Worse institutions in North can lead to larger gains from trade!
- This statement is distinct from and consistent with the result that better institutions improve both autarky and trade welfare in the North.
- The key intuition is that gains from trade in North come from an increase in rents L is earning in the M -sector. For low enough ϕ^N , it is shown that those rents are increasing in ϕ^N .

Trade and Institutional Comparative Advantage

Discussion 1

- The analysis can incorporate factor endowment differences between countries.
- This introduces an extra term in the expression of gains from trade.
- Let us separate gains that come from differences in factor abundance and those from institutional differences.
- Define \tilde{w} and \tilde{r} to be factor prices that obtain under autarky in a hypothetical country characterized by the South's factor endowment (L^S, K^S) and North's institutions ϕ^N . The gains from trade to South are:

$$\underbrace{(r^T K^S - \tilde{r} K^S) + (w^T L^S - \tilde{w} L^S)}_{\text{Factor proportions-based gains}} + \underbrace{(\tilde{r} K^S + \tilde{w} L^S - (r^S K^S + w^S L^S + \phi^S r^S x E^S L^S))}_{\text{Institutional comparative advantage-based gains}}.$$

Trade and Institutional Comparative Advantage

Discussion 2

- When $K^N/L^N = K^S/L^S$, factor prices are same in autarky and trade ($\tilde{r} = r^T$ and $\tilde{w} = w^T$), and first term disappears.
- The second term is the gains from Proposition 2, so for South factor proportions-based gains are combined with institutions-based gains in a straightforward way.
- We can contrast predictions of factor proportions theory and institutional comparative advantage regarding how factor rewards change as a result of trade opening between North and South.

Trade and Institutional Comparative Advantage

Discussion 3

- Usually one assumes developed country is relatively capital abundant. This paper suggests another empirically relevant way: developed country has better institutions which allow factors to be allocated more efficiently.
- In capital-scarce South, factor proportion model predicts returns to capital (labor) decrease (increase) when opening to trade with capital-abundant North. In North opposite occurs: wages go down, rent goes up.
- Effects of institutional difference go in the opposite direction: In South, relatively abundant labor's gains are eroded by loss of *M*-sector, while Southern capital benefits from opening to trade. Returns to capital in North remains unchanged, whereas rewards to labor increases.

Trade and Institutional Comparative Advantage

Comparing with the H-O Model

- Thus institutional differences could be a countervailing force to the standard factor proportions driven price changes that result from trade.
- Note also in pure H-O world, factor rewards converge perfectly by being in FPE set. Here rewards to capital are equalized.
- Trade effect on rewards to labor: (i) in South base wage w pulled up to the North's level, a force towards convergence. But higher share of Northern labor employed in high-paying M -sector, while in South it goes to 0.
- Comparing mean wages under autarky and trade, average wage goes up in North while it may go up or down in South.
- Same forces that erode gains from trade in South can produce factor price divergence resulting from trade.

Trade and Institutional Comparative Advantage

Equilibrium Outside the FPE Set 1

- Key simplifying feature is that two goods are produced with only one of the factors, making it easy to study outside the FPE set.
- Thus, rewards that factors can earn in the L - and K -sectors, w and r , are equalized under trade for any set of endowments:

$$\begin{aligned}w_N^T &= bp_L^T = w_S^T, \\r_N^T &= ap_K^T = r_S^T.\end{aligned}$$

- Relative factor endowments are such that North can produce a quantity of the M -good sufficiently close to the integrated equilibrium quantity, the South does not produce the M -good.
- This is because as $\phi^N < \phi^S$ and individual rationality condition for K in North holds with $p_M^T y = w^T + (1 + \phi^N)xr^T$, the South cannot produce M : $p_M^T y < w^T + (1 + \phi^S)xr^T$.

Trade and Institutional Comparative Advantage

Equilibrium Outside the FPE Set 2

- In this case North produces only K and M , and entire labor force is employed in the M -sector, earning rents.
- Production of the M -good is lower than under FPE, and thus its relative price is higher.
- Nevertheless, South cannot start its own M -sector industry, and its entire endowment is dedicated to producing the K and the L -goods.
- If factor endowments sufficiently dissimilar, or North sufficiently smaller than South, some production of the M -good is possible in South under trade.
- Outside FPE most important effect of the model mostly still there: compared to autarky, the high-paying M -sector shrinks in the South.

Trade and Institutional Comparative Advantage

Equilibrium Outside the FPE Set 3 and Main Message

- Note however that a variety of outcomes are possible outside FPE; for instance, in a richer model where K - and L - goods use both factors with some factor substitution in production, it is possible that large enough differences in factor endowments can reverse institutional comparative advantage.
- For example, if South is sufficiently labor abundant, its wage will be lower than Northern wage. This may more than offset North's institutional comparative advantage and enable the South to specialize in M -good.
- Key insights however continues to apply: incomplete contracts create segmented markets, and segmentation generates its own source of gains and losses from trade. One would only need to determine whether the high-paying sectors expand or contract as a result of trade opening.

Empirical Evidence

Testable Prediction

- The institutionally superior country will export the institutionally dependent good.
- Exploit variation in institutional quality across countries and dependence on institutions across industries.
- Data: U.S. imports disaggregated by industry and country.
- Result: countries with better institutions capture larger import shares in more institutionally dependent industries.

Empirical Evidence

Variations to the Model

- J countries.
- Each country produces its own unique variety of the M -good. Varieties of the M -good produced in each country are imperfect substitutes. C_M a CES aggregate of the M -good varieties.
- Proxy for institutional dependence with measures of product complexity based on intermediate good use: institutions more important to industries that require joining of a relatively large number of parties to production.
- Production of M -good therefore includes multiple $(n - 1)$ intermediates.
- Each intermediate good producer's outside option is 0.

Empirical Evidence

The Complexity of the Relationship

- Producer of first intermediate joins with x units of K to produce one unit of intermediate 1, and due to contract imperfection a share ϕ of K 's investment becomes specific.
- Once that unit is produced, the first producer joins with a second intermediate producer and again a fraction ϕ of the value of the first intermediate becomes specific to producer 2, ...
- The $(n - 1)$ th intermediate producer joins with L to produce the final M -good, again becoming partly specific to the relationship. Price becomes:

$$p_M = w + (1 + \phi)^n rx$$

- With incomplete contracts, price of final good increasing in product complexity n .
- Given level of institutional quality, M -good produced in equilibrium lower, the higher is the M -good's complexity.
- Given complexity, a country with better institutions enjoys higher level of M -good production.

- Relationship between country k 's share of imports to country l :

$$\ln(s_{Mk}^l) \approx (1 - \sigma)n \ln(1 + \phi^k) + D_{lk}.$$

- Countries with inferior institutions (higher ϕ) will have lower import shares in the institutionally intensive sector (M).
- This effect is stronger the more institutionally intensive is the M -sector (higher n).
- D_{lk} captures features of the trading countries as well as characteristics of the M -sector, such as factor intensity.
- Interested in institutions interaction term (positive means countries with better institutions capture higher trade shares in institutionally intensive sectors:

$$\text{rel_share}_{ic} = \alpha + \beta_1 \text{inst_dep}_i * \text{inst}_c + \beta_2 \text{skint}_i * \text{skill}_c + \beta_3 \text{capint}_i * \text{capital}_c + \gamma_c + \delta_i + \varepsilon_{ic}.$$

Empirical Evidence

Data Source and Result

- 1998 U.S. imports classified by four-digit SIC industry and country of origin (NBER).
- Trade data for 177 countries (final sample 116) and 389 industries.
- Measure of product complexity: Herfindahl index of intermediate input use, computed from U.S. Input-Output Use Table for 1992.
- Quality of contracting institutions: index of rule of law developed by Kaufmann, Kraay and Mastruzzi (2005): average of indicator over 1996, 1998, and 2000.
- Coefficient of interest positive and significant. In a country that moves from the 25th to the 75th percentile in institutional quality, the predicted relative import share in the good occupying the 25th percentile in institutional intensity decreases by 0.07, and the predicted relative import share in the good corresponding to the 75th percentile in institutional intensity increases by 0.23.