Natural Barriers and Policy Barriers

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Introduction

- Policy barriers are man-made barriers, e.g. tariffs on imports

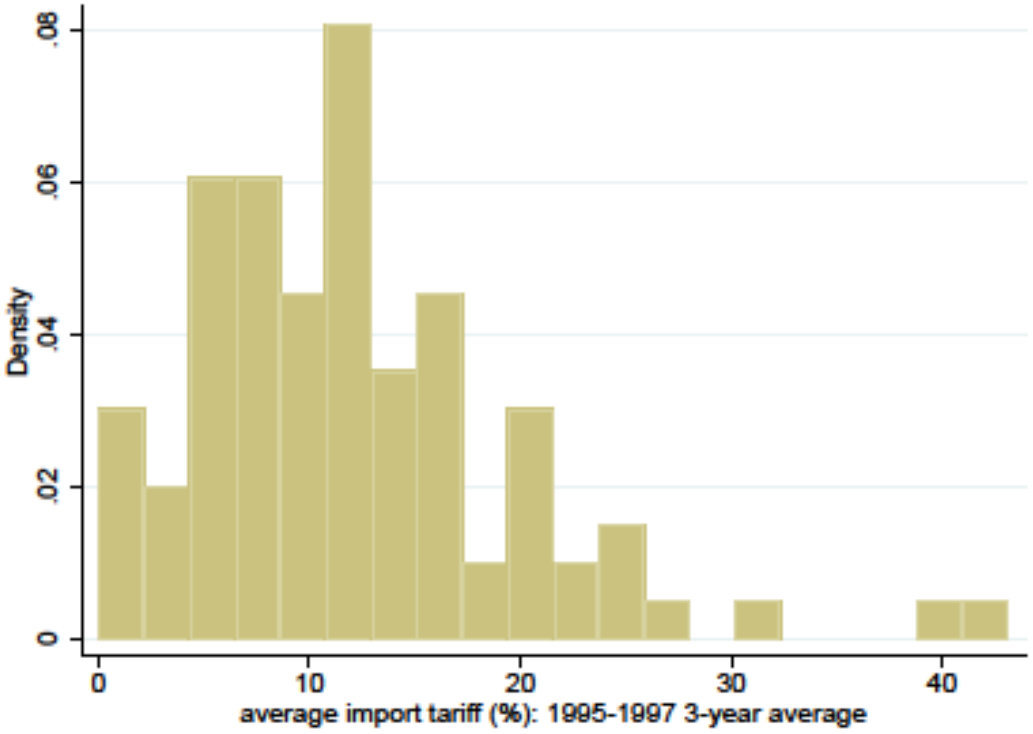
- Natural trade barriers are taken as given by a home country:

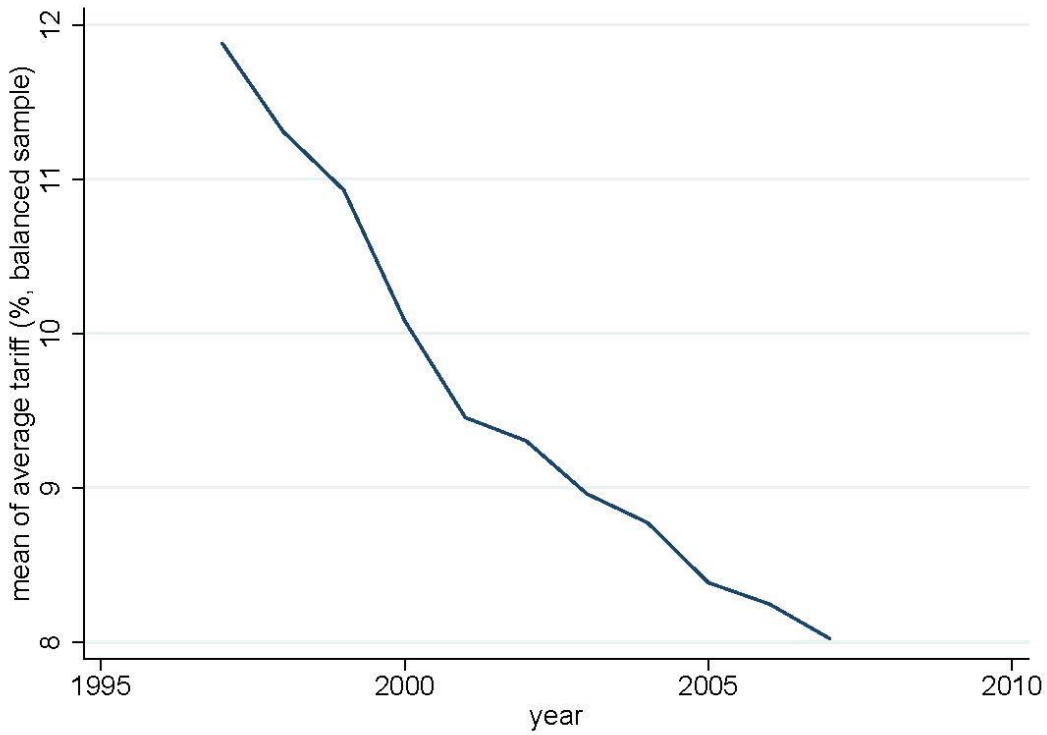
  (1) **geography**: lack of coast and sea harbor, distance from major international markets, and coastline length/area, etc.

  (2) **foreign trade policy**

- Do we see fewer policy barriers (through stronger policy reforms) in places with greater natural barriers (substitutes), or do we see more policy barriers (complements)?

Trade Tariffs across Countries and over Time (1997-2007)





the total tariff variation (123.5) = Within-Country Variation (61.8) + Between-Country Variation (61.7).

Research Contributions

- What determines trade policy?
  - Political economy / protection for sale
  - Optimal tariff theory
  - **Our theoretical contributions: natural barriers -> policy barriers**
    - natural barriers →endogenous institutions
    - good institutions →constrain politicians' rent seeking in setting trade policy
    - **political structure and tariff are jointly determined**
- **Our empirical contributions: the connection between natural and policy barriers**
  - Geographic features
  - Trade policy of other economies

- Not necessarily a pessimistic story: liberalization can also beget liberalization (reciprocated unilateralism?)

Related Literature

- Endogenous trade policy
  - Grossman and Helpman (1994), Goldberg and Maggi (1999), Mitra, Thomakos and Ulubasoglu (2002): protection for sales
  - Edgeworth (1894), Bagwell and Staiger (1999), Broda, Limao and Weinstein (2008): market power

- Reciprocated unilateralism
  - Krishna and Mitra (2005): endogenous organized interest group

- Trade and endogenous institutions
  - Ades Di Tella (1999), Acemoglu, Johnson and Robinson (2005), Levchenko (2012), Puga and Trefler (2014), Jiao and Wei (2020)

Roadmap

- Model (2-stage Stackelberg, with Grossman-Helpman in the 2nd stage)
  - Stage 2: equilibrium tariff – bribe matching via GH (1994)
  - Stage 1: institutional quality chosen by median voter / social planner
- **Evidence – across countries -**
  - **Do natural barriers beget policy barriers?**
  - controlling for market power
  - design features of world trade system
- **Evidence 2&3 – change in tariff over 1997-2007, and across products**
  - **Do liberalization beget liberalization?** The case of the China liberalization shock
  - **Do opportunities in "contacting intensive" products matter more?**

Model Setup

- Home country with population L (each provides c units of effective labor), 3 industries
  - homogeneous good industry 0 (numeraire); import-competing industry 1; exportable industry 2
- Representative consumer

$$u = x_0 + u(x_1) + \int_0^1 \xi(x_{2i})di.$$

- Competitive continuum of domestic producers in importable industry 1
  - combine the specific factor and labor in CRS fashion
  - domestic price

$$p_1 = p_1^*(1+t),$$

  where t is import tariff rate
- Producers using labor in exportable industry 2 with linear production technology
  - a continuum of producers i ∈ [0,1]
  - each producer supplies one variety

The Import-competing Industry 1

- Domestic consumer demand for industry 1 good

$$u'(x_1) = p_1,$$

- Denote domestic producers' per capita profit $\lambda_1(p_1)$
  - it increases with tariff rate t

- Per capita tariff revenue

$$r(p_1) = \frac{R(p_1)}{L} = p_1^* t(x_1 - y(p_1)).$$

The Export Industry 2

- Domestic consumer demand for industry 2 good

$$\xi'(x_{2i}) = p_{2i}.$$

- Foreign demand similarly

$$\xi'(x^*_{2i}) = p^*_{2i}.$$

- Assume constant demand elasticity $\sigma \geq 1$

- When export, ex ante relationship specific investment can raise firm productivity (isomorphic if raise demand) and benefit both sides (d is iceberg cost, t* is foreign trade policy: both natural barriers taken as exogenous)

$$\frac{1}{\sigma-1}\left(\frac{\sigma}{\sigma-1}d(1+t^*)c\right)^{1-\sigma}(G^{\sigma-1}-1)-I_s>0,$$

$$\frac{1}{\sigma-1}\left(\frac{\sigma}{\sigma-1}d(1+t^*)c\right)^{1-\sigma}(G^{\sigma-1}-1)-I_b>0.$$

where G>1

The Export Industry 2

- Without bilateral commitments, no investment (more parameter restrictions)
- Enforcible contract can solve the commitment problem
- $\mu(q)$ denotes probability that contracts will be respected by private agents, q is institutional quality
- $\mu'(q) > 0$ so that better institutional quality raises contract enforcement
- Firms' profit

$$\frac{1}{\sigma-1}L^*\left(\frac{\sigma}{\sigma-1}d(1+t^*)c\right)^{1-\sigma}G^{\sigma-1}\mu(q)+\frac{1}{\sigma-1}L^*\left(\frac{\sigma}{\sigma-1}d(1+t^*)c\right)^{1-\sigma}[1-\mu(q)]$$

$$-L^*\mu(q)I_s=\frac{1}{\sigma-1}L^*\left(\frac{\sigma}{\sigma-1}d(1+t^*)c\right)^{1-\sigma}\left\{\mu(q)G^{\sigma-1}+[1-\mu(q)]\right\}-L^*\mu(q)I_s>0.$$

Denote $h(q)=\left\{\mu(q)G^{\sigma-1}+[1-\mu(q)]\right\}^{\frac{1}{1-\sigma}}$

Social Welfare

- Denote $\lambda_2(q)$ industry 2 per capita profit and $s_2(q)$ consumer surplus from industry 2
- The social welfare after institutional cost

$$
\begin{aligned}
v &= v_b - \phi(q) \\
&= \underbrace{c}_{\text{labor income}} + \underbrace{\lambda_1(p_1) + s_1(p_1) + r(p_1)}_{\text{import-competing industry related welfare}} + \underbrace{\lambda_2(q) + s_2(q)}_{\text{exportable industry related welfare}} - \underbrace{\phi(q)}_{\text{institutional cost}} .
\end{aligned}
$$

- Plug in industry 2 related functional forms

$$
\begin{aligned}
v &= c + \lambda_1(p_1) + r(p_1) + s_1(p_1) + \lambda_2(q) + s_2(q) - \phi(q) \\
&= c + \lambda_1(p_1) + r(p_1) + s_1(p_1) - \phi(q) \\
&+ \frac{1}{\sigma - 1}\left[\left(\frac{\sigma}{\sigma - 1}c\right)^{1-\sigma} + \frac{L^*}{L}\left(\frac{\sigma}{\sigma - 1}d(1+t^*)h(q)c\right)^{1-\sigma} - (\sigma - 1)I_s\mu(q)\right] + \frac{1}{\sigma - 1}\left(\frac{\sigma}{\sigma - 1}c\right)^{1-\sigma}
\end{aligned}
$$

Politicians' Choice of Tariffs

- Stackelberg game
  - Period 1: median voter selects institutional quality q
  - Period 2: politicians offer trade policy t (or p1)
- Given institution q, politicians' objective

$$[1-\psi(q)]b+\underline{a}v(p_1)$$

where $\psi'(q)>0$ such that better institutions impose larger cost to bribery taking.

$v(p_1)$ is social welfare

- Denote $a(q)=\frac{\underline{a}}{1-\psi(q)}$. Equilibrium tariff using Grossman and Helpman (1994) result

$$t=\frac{I-\alpha_1}{a(q)+\alpha_1}\frac{y(p_1)/[m(p_1)/(1+t)]}{-p_1m'(p_1)/m(p_1)}=\frac{I-\alpha_1}{a(q)+\alpha_1}\frac{\text{output-import ratio}}{\text{import demand elasticity}}$$

Median Voters' Choice of Institutional Quality

- Assume that tariff t decreasing in weight a (calibrated exercise confirm) and a downward sloping import demand function m(p_1)
- For expositional convenience, assume the median voter owns average specific factor (if smaller, all propositions go through)
- Denote $\Theta(q) = \lambda_1(p_1(q)) + r(p_1(q)) + s_1(p_1(q))$, then $\Theta'(q) > 0.$

- The median voter's problem

$$v(q) = c + \Theta(q) + \lambda_2(q) + s_2(q) - \phi(q).$$

where $s_2(q) + \lambda_2(q) =$

$$\frac{1}{\sigma-1}\left[\left(\frac{\sigma}{\sigma-1}c\right)^{1-\sigma} + \frac{L^*}{L}\left(\frac{\sigma}{\sigma-1}d(1+t^*)h(q)c\right)^{1-\sigma} - (\sigma-1)\frac{L^*}{L}I_s\mu(q)\right] + \frac{1}{\sigma-1}\left(\frac{\sigma}{\sigma-1}\right)^{1-\sigma}$$

Propositions

- (Effect of market size) A smaller population L leads to better institutional quality and a lower import tariff.

- (Effect of geography) Smaller natural barrier due to favorable geographic features (smaller d) also leads to better institutional quality and a lower import tariff.

- (Effect of foreign trade reforms) A decrease in a country's natural barrier due to foreign trade liberalization (a reduction in t^*) triggers an improvement in institutional quality and a reduction in import tariff in home country.

Empirical evidence

- **Do natural barriers beget policy barriers?**
  - Patterns in tariffs and institutional quality across countries
  - Controlling for optimal tariffs
  - Considering non-tariff barriers

- **Do policy reforms beget policy reforms?**
  - The China shock and policy reforms in other countries

- **Does product level heterogeneity matter?**
  - Do trading opportunities in “contract-intensive” products matter more?

Cross-country patterns: Do natural barriers beget policy barriers?

- Run the following regression (1995-1997 average)

$$\text{average tariff}_i = \alpha + \beta * \{\text{Market Size, Geography}\}_i + \epsilon_i,$$

where market size is log(population), and geography includes a landlock dummy, remoteness and coastline length/area

$$remoteness_i = \sum_{j \neq i} w_j \log(d_{ij})$$

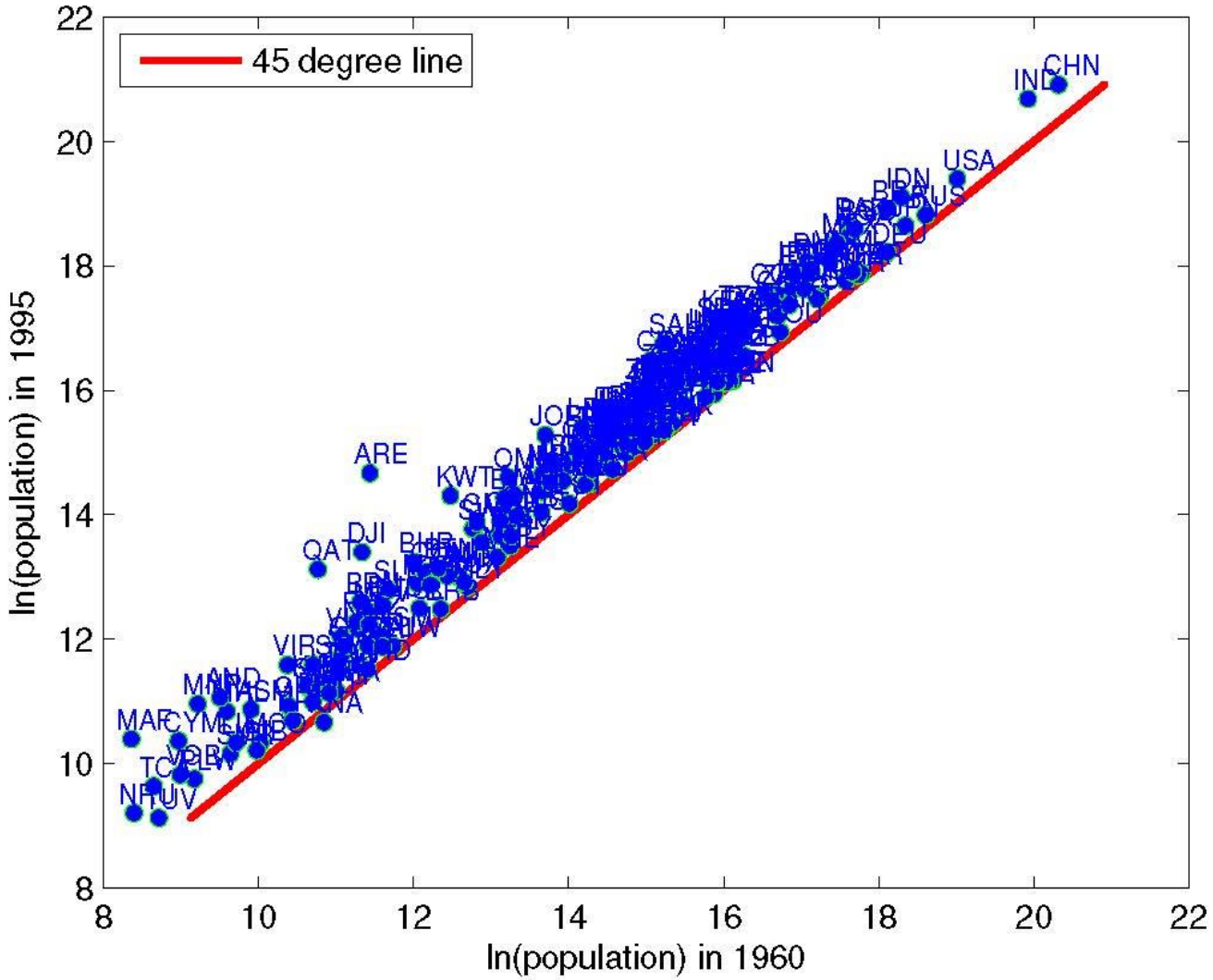
- Market power estimation using a method by Feenstra-Broda-Weinstein
- Institutional quality measured by the sum of investment profile (expropriation risk, contract viability etc.), corruption control index and law and order from Political Risk Group

Comment on natural features

- Geography
  - Can change due to wars and other events
  - We will in addition check the set of countries that have experienced no major changes in boundaries over 40 years or more

- Market size (population)
  - Can change every minute due to births, deaths, and immigration
  - But the relative population size over time for most countries is very stable

Relative Population Rank is Very Sticky



Market Size, Geography and Import Tariff

	(1)	(2)	(3)	(4)	(5)
Dependent Variable: average import tariff					
log(population)	1.63**	1.48**	1.56**	1.43***	1.62***
	(0.62)	(0.62)	(0.62)	(0.53)	(0.59)
remoteness	5.15***	5.21***	5.32***	5.60***	5.07**
	(1.71)	(1.73)	(1.78)	(1.39)	(2.03)
coastline length/area		-13.49***	-12.62 ***	-15.01***	-14.55***
		(4.29)	(4.21)	(4.08)	(4.24)
landlock dummy			1.07		
			(1.63)		
log(population)*OECD dummy					-1.26**
					(0.66)
remoteness*OECD dummy					-2.10
					(1.97)
coastline/area * OECD dummy					13.06*
					(7.23)
OECD dummy					34.81*
					(20.45)
log(GDP per capita)*				-2.40***	-1.92***
				(0.52)	(0.64)
Observations	92	92	92	91	91
R^2	0.146	0.179	0.182	0.320	0.337

Robust standard errors in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

Optimal tariffs

- Optimal tariff: market power

- Market power can correlate with market size and geography

Controlling for Market Power (HS4 Product Level)

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable: import tariff						
log(population)	1.68***	1.69***	1.39***	1.67***	1.66***	1.42***
	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)
remoteness	4.70***	4.68***	5.05***	3.98***	3.95***	5.40***
	(0.08)	(0.08)	(0.09)	(0.12)	(0.12)	(0.12)
coastline length/area	-12.16***	-12.14***	-12.20***	-12.30***	-12.31***	-15.34***
	(0.18)	(0.20)	(0.20)	(0.20)	(0.20)	(0.20)
landlock dummy	1.62***	1.65***	1.30***	0.46***	0.40***	0.25**
	(0.09)	(0.08)	(0.12)	(0.13)	(0.13)	(0.13)
log(1/export elasticity)			0.12***		0.12***	0.11***
			(0.01)		(0.01)	(0.01)
log(population)*OECD				-2.77***	-2.76***	-1.70***
				(0.07)	(0.07)	(0.07)
remoteness*OECD				-5.26***	-5.23***	-3.36***
				(0.19)	(0.19)	(0.19)
coastline length/area*OECD				-22.29***	-22.26***	-0.78
				(1.60)	(1.60)	(1.71)
landlock dummy*OECD				-7.99***	-7.98***	-1.81***
				(0.36)	(0.36)	(0.38)
log(1/export elasticity)*OECD					-0.12***	-0.10***
					(0.02)	(0.02)
OECD dummy				85.97***	85.72***	54.80***
				(2.51)	(2.51)	(2.57)
log(GDP per capita)*						-1.99***
						(0.04)
Industry Fixed Effect	N	Y	Y	Y	Y	Y
Observations	87364	87364	50123	50123	50123	50123
R^2	0.091	0.158	0.182	0.240	0.241	0.275

Robust standard errors in parentheses. Industry is defined as the section classification of HS code.

Considering Output-Import Ratio/Demand Elasticity

$$t = \omega + \frac{I-\alpha_1}{a+\alpha_1} \frac{\text{output-import ratio}}{\text{import demand elasticity}}$$

$\frac{z}{e}$

where weight **a is a function of natural barrier measures**.
Do a first-order expansion

$$t = \omega + (I - \alpha_1)(\gamma_1 * \textbf{natural barrier} * \frac{z}{e} + \gamma_2 * \frac{z}{e})$$

where $\gamma_1 > 0$

- UNIDO data on domestic output at 4-digit ISIC (combined) level

Considering Output-Import Ratio/Demand Elasticity

Dependent variable: tariff				
log(population)*$\frac{\text{output-import ratio}}{\text{demand elasticity}}$	0.69***	0.54***	0.52***	0.62***
	(0.05)	(0.04)	(0.04)	(0.04)
remoteness*$\frac{\text{output-import ratio}}{\text{demand elasticity}}$	1.68***	1.92***	1.82***	0.74***
	(0.19)	(0.16)	(0.15)	(0.21)
coastline/area*$\frac{\text{output-import ratio}}{\text{demand elasticity}}$	-6.85***	-4.28***	-3.59**	-3.24**
	(1.79)	(1.49)	(1.41)	(1.51)
$\frac{\text{output-import ratio}}{\text{demand elasticity}}$	-25.51***	-24.91***	-23.80***	-15.76***
	(1.95)	(1.75)	(1.72)	(1.92)
log(1/export elasticity)		0.15***	0.20***	0.20***
		(0.05)	(0.05)	(0.06)
log(population)*$\frac{\text{output-import ratio}}{\text{demand elasticity}}$*OECD				-0.43***
				(0.07)
remoteness*$\frac{\text{output-import ratio}}{\text{demand elasticity}}$*OECD				0.70***
				(0.14)
coastline/area*$\frac{\text{output-import ratio}}{\text{demand elasticity}}$*OECD				10.04**
				(4.64)
$\frac{\text{output-import ratio}}{\text{demand elasticity}}$*OECD				-0.02**
				(0.01)
log(1/export elasticity)*OECD				-0.27***
				(0.09)
OECD dummy				-1.41***
				(0.43)
log(GDP per capita)*		-2.85***	-2.86***	-2.21***
		(0.13)	(0.12)	(0.14)
Industry FE	N	N	Y	Y
No. of countries	59	59	59	59
Observations	4323	4306	4306	4306
R^2	0.128	0.236	0.290	0.310

Robust standard errors in parentheses. Industry is 2-digit ISIC revision 3 code.

Considering Non-tariff Barriers (NTB) and Subsidies

- Trade protection is beyond import tariff, e.g.
  - import quota
  - agricultural subsidies to farmers

- Our theory in principle applies to these non-tariff barriers

- Kee, Nitica and Olarreaga (2009): ad-valorem equivalent estimates at country-product level
  - core NTM: price control, quantity restriction, technical regulations and monopolistic measures
  - domestic support

Tariff + Ad-valerom Equivalent of NTB

	(1)	(2)	(3)	(4)
Dependent variable: Tariff plus the Ad-valorem Equivalent of Non-Tariff Barriers				
log(population)	2.01***	2.06***	2.06***	1.37***
	(0.18)	(0.19)	(0.19)	(0.19)
remoteness	6.87***	5.20***	5.19***	11.96***
	(0.61)	(0.72)	(0.72)	(0.78)
coastline length/area	-22.13***	-21.80***	-21.79***	-22.92***
	(2.03)	(2.06)	(2.06)	(2.05)
landlock dummy	0.37	0.32	0.27	3.83***
	(1.02)	(1.05)	(1.05)	(1.05)
log(1/export elasticity)	0.14**		0.12*	0.11
	(0.07)		(0.07)	(0.07)
log(population)*OECD		-2.31**	-2.32**	0.42
		(0.98)	(0.98)	(0.98)
remoteness*OECD		-3.80*	-3.85*	-2.97
		(2.30)	(2.32)	(2.31)
coastline length/area*OECD		6.14	6.06	55.83**
		(22.50)	(22.50)	(22.67)
landlock dummy*OECD		-16.12***	-16.29***	-5.12
		(4.86)	(4.88)	(4.90)
log(1/export elasticity)*OECD			-0.04	-0.08
			(0.23)	(0.23)
OECD dummy		64.16*	64.95*	18.25
		(35.43)	(35.57)	(35.59)
log(GDP per capita)*				-4.53***
				(0.23)
Industry FE	Y	Y	Y	Y
No. of countries	69	69	69	69
Observations	11715	11715	11715	11715
R^2	0.092	0.102	0.102	0.135

Robust standard errors in parentheses. Industry is defined as the section classification of HS code.

Excluding Countries with Border Change after 1960

Dependent Variable: import tariff	(1)	(2)	(3)	(4)
log(population)	0.74***	0.75***	0.86***	1.04***
	(0.03)	(0.03)	(0.04)	(0.04)
remoteness	2.01***	1.98***	3.10***	1.05***
	(0.10)	(0.10)	(0.11)	(0.14)
coastline length/area	-11.13***	-11.12***	-11.76***	-15.18***
	(0.20)	(0.21)	(0.21)	(0.24)
landlock dummy	1.70***	1.73***	0.02	
	(0.10)	(0.09)	(0.14)	
log(1/export elasticity)			0.14***	0.07***
			(0.01)	(0.01)
log(population)*OECD				-1.23***
				(0.06)
remoteness*OECD				1.01***
				(0.18)
coastline length/area*OECD				1.37
				(1.37)
log(1/export elasticity)*OECD				-0.07***
				(0.02)
OECD dummy				6.96***
				(2.10)
log(GDP per capita)*				-1.78***
				(0.04)
Industry Fixed Effect	N	Y	Y	Y
No. of countries	70	70	66	66
Observations	65980	65980	37248	37248
R^2	0.040	0.116	0.144	0.297

Industry is defined as the section classification of HS code.

Export/GDP and Institutional Quality

	(1)	(2)	(3)	(4)
Panel A Dependent Variable: log(export/GDP)	full sample		subsample with tariff data available	
log(population)	-0.17***	-0.17***	-0.21***	-0.21***
	(0.03)	(0.03)	(0.04)	(0.04)
remoteness	-0.23**	-0.24**	-0.26**	-0.27**
	(0.10)	(0.11)	(0.13)	(0.13)
coastline/area	1.73***	1.76***	1.79***	1.83***
	(0.39)	(0.35)	(0.47)	(0.46)
landlock dummy	-0.04	-0.05	-0.15	-0.14
	(0.12)	(0.11)	(0.14)	(0.14)
log(GDP per capita)*		0.08**		0.04
		(0.04)		(0.05)
Observations	130	128	90	90
R^2	0.310	0.339	0.383	0.388
Panel B Dependent Variable: institutional quality	full sample		subsample with tariff data available	
log(population)	-0.55***	-0.49***	-0.59**	-0.42**
	(0.20)	(0.16)	(0.23)	(0.18)
remoteness	-4.21***	-4.12***	-3.57***	-3.74***
	(1.00)	(0.72)	(1.15)	(0.80)
coastline/area	9.51***	10.19***	9.26**	10.75***
	(3.32)	(1.50)	(3.61)	(1.97)
landlock dummy	-0.31	-0.65	-0.85	-0.71
	(0.90)	(0.84)	(1.10)	(1.12)
log(GDP per capita)*		1.74***		1.59***
		(0.22)		(0.28)
Observations	114	110	85	84
R^2	0.294	0.595	0.262	0.516
Robust standard errors in parentheses				

Time Series Variations

- Difference out time-invariant country characteristics
- Consequences of other countries' trade liberalization
- Does liberalization beget liberalization?

Change from 1997 to 2007: Long Difference Evidence

- Big economies (j denotes G7 and China) tariff change alters small and medium-sized economies' export opportunities

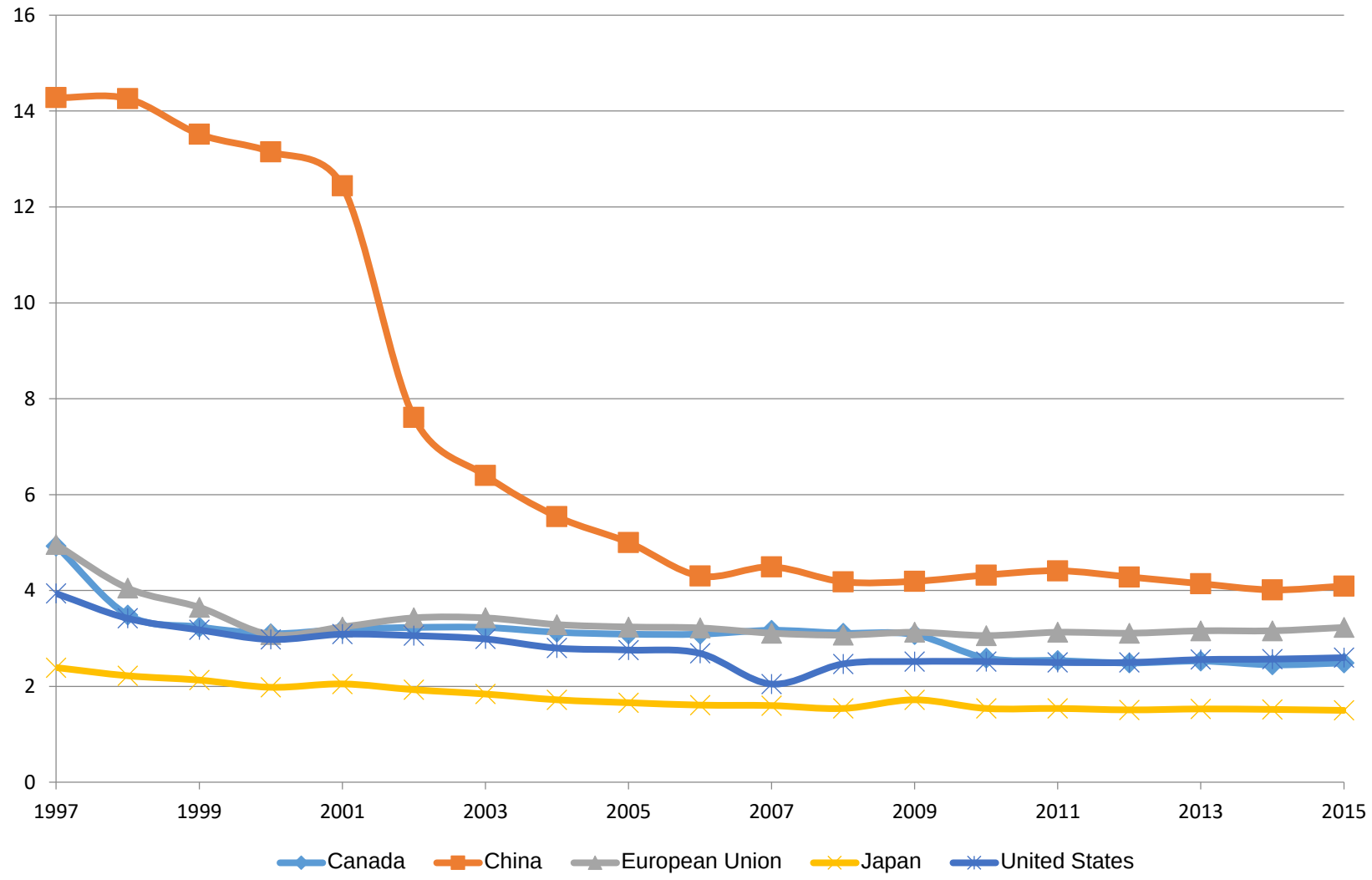
$$composite\ natural\ barriers_{it} = \frac{\sum_{j,k} export_{ijk} \log(1 + tariff_{jkt}/100) * 100}{\sum_{j,k} export_{ijk}}$$

where k is HS4 product and i denotes a small and medium sized economy .

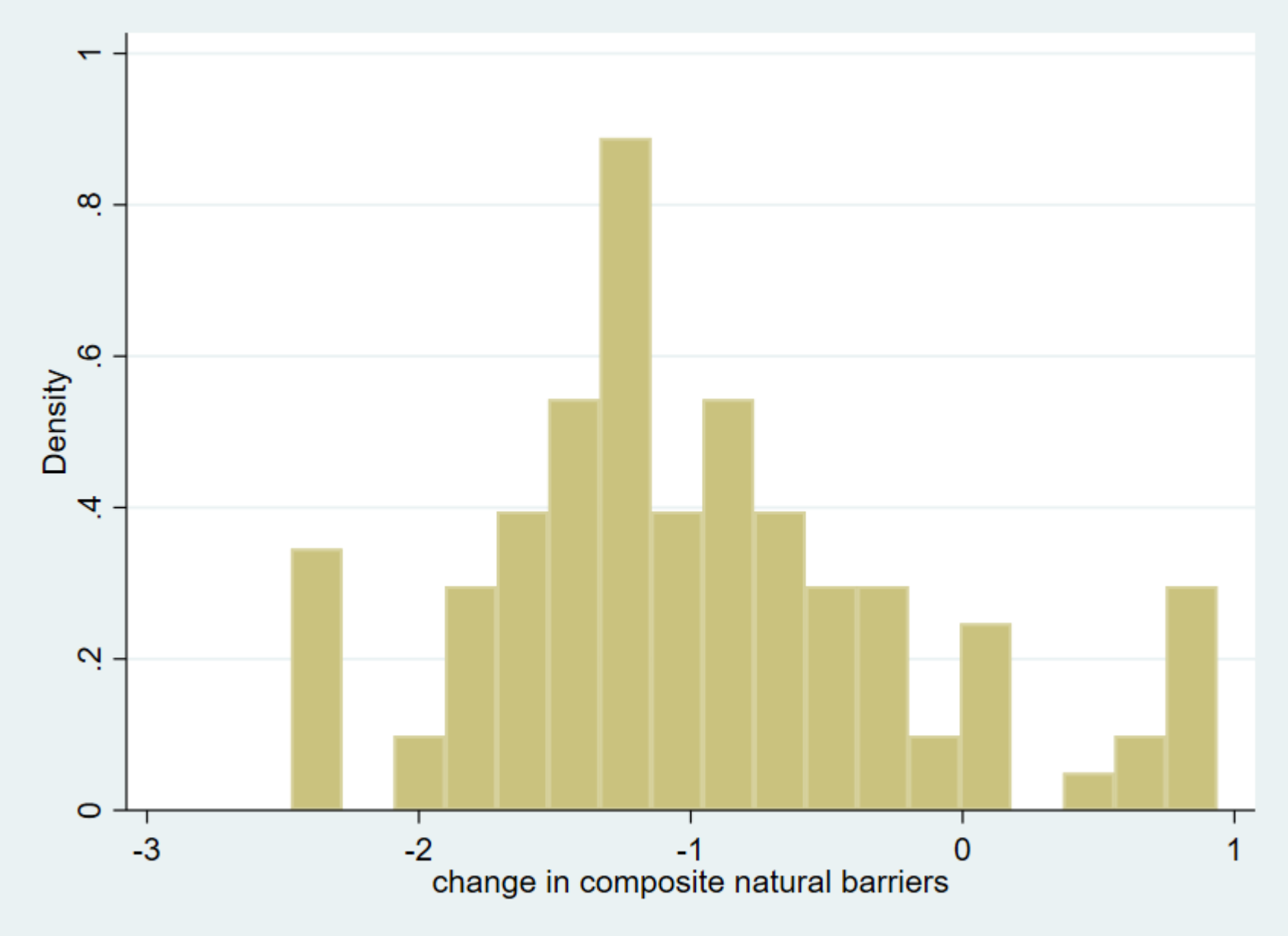
- We pursue the following long-difference regression between (1997-2007)

$$\Delta\ average\ import\ tariff_i = \beta_0 + \beta_1 \Delta \text{composite natural barriers}_i + \gamma X' + \epsilon_i,$$

Changes in tariffs by large economies over 1997-2007



Distribution of Change in Composite Natural Barriers



Additional Controls: China Export Shock and Share of Organized Industries

- Rise of China's export at the same time
- (1) Controlling for China export growth shock:

$$\sum_j s_{ij,0} China\_export\_growth_j$$

where $s_{ij,0}$ is the share of country i's import in HS 4-digit product j in the initial year

- Krishna and Mitra (2005) theory on reciprocated unilateralism
- (2) Controlling for export sales' share of organized industries
  - organized or not for an industry not available for every countries
  - use Goldberg and Maggi (1999) on U.S. industries

Changes in small countries' tariffs in response to changes by large countries

	(1)	(2)	(3)	(4)	(5)
Dependent variable: change in average import tariff					
				× OECD/Late WTO member	
Δ composite natural barriers	1.124*	1.116***	1.593***	1.866***	2.051***
	(0.580)	(0.392)	(0.424)	(0.590)	(0.618)
average import tariff 1997		-0.615***	-0.692***	-0.698***	-0.703***
		(0.065)	(0.068)	(0.068)	(0.071)
Δ composite natural barriers× OECD/Late WTO members			-1.687***	-1.643***	-1.648***
			(0.596)	(0.576)	(0.574)
OECD/Late WTO members			-4.205***	-4.339***	-4.291***
			(0.993)	(1.016)	(0.991)
Δ composite natural barriers×organized fraction				4.299	5.552
				(5.618)	(5.381)
organized fraction				3.517	6.734
				(8.307)	(8.182)
Δ log(GDP per capita)*					-2.860
					(3.055)
China export growth shock					-0.943
					(1.141)
Observations	79	79	79	79	76
R^2	0.030	0.601	0.641	0.643	0.652

Change in Exports and Institutions

	(1)	(2)
Panel A Dependent variable: Increase in log(exports to China & G7) from 1997-2007		
Δ Composite natural barriers	-0.227*	-0.213*
	(0.132)	(0.126)
Initial log(export to G7 and China/GDP)	-0.182**	-0.179*
	(0.075)	(0.093)
Δ log(GDP per capita)*		1.437**
		(0.624)
Observations	104	101
R^2	0.104	0.127
Panel B Dependent variable: Improvement in institutional quality from 1997 to 2007		
Δ composite natural barriers	-0.582*	-0.581*
	(0.330)	(0.337)
Initial institutional quality	0.002	0.014
	(0.107)	(0.107)
Δ log(GDP per capita)*		1.461
		(1.259)
Observations	82	82
R^2	0.029	0.037

Robust standard errors in parentheses

- **Exploring cross-product (and cross-country and time) heterogeneity**

Product Heterogeneity

- Nunn (2007) constructs contract intensity (institutional sensitivity) at product level
- Contract-intensive goods = those with share of heterogeneous inputs > median
- Compute the initial share of export of contract intensive good κ for each country i

$$\Delta \, average \; import \; tariff_i = \beta_0 + \beta_1 \Delta \text{ci-natural barrier}_i + \beta_2 \Delta \text{nci-natural barrier}_i + \epsilon_i.$$

where $\text{ci-natural barrier}_i$ is κ multiplied by weighted tariff in the contract intensive group

$\text{nci-natural barrier}_i$ is $1 - \kappa$ multiplied by weighted tariff in the non-contract intensive group

Product Heterogeneity and Import Tariff

	(1)	(2)	(3)	(4)
Dependent variable: change in average import tariff				
				× OECD/Late WTO member
Δ ci-natural barriers	2.260**	2.424***	2.857***	2.994***
	(1.017)	(0.611)	(0.673)	(0.662)
Δ nci-natural barriers	-0.064	-0.092	0.206	0.082
	(0.839)	(0.601)	(0.663)	(0.627)
average import tariff 1997		-0.620***	-0.682***	-0.680***
		(0.061)	(0.063)	(0.065)
Δ ci-composite natural barriers× OECD/Late WTO member			-4.169***	-3.889***
			(1.076)	(1.063)
Δ nci-composite natural barriers× OECD/Late WTO member			0.309	0.577
			(0.845)	(0.856)
OECD/Late WTO member			-5.453***	-5.399***
			(1.170)	(1.213)
Δ log(GDP per capita)*				-4.662
				(3.089)
China export growth shock				-1.020
				(1.111)
Observations	79	79	79	76
R^2	0.052	0.631	0.672	0.691

Product Heterogeneity and Institutions

	(1)	(2)	(3)
Dependent variable: Improvement in institutional quality from 1997 to 2007			
Δ ci-composite natural barriers	-1.455***	-1.444***	-1.444***
	(0.482)	(0.504)	(0.506)
Δ nci-composite natural barriers	0.027	0.015	0.011
	(0.503)	(0.511)	(0.504)
Δ log(GDP per capita)*		1.466	1.486
		(1.319)	(1.318)
Initial institutional quality			0.008
			(0.106)
Observations	82	82	82
R^2	0.068	0.077	0.077

Conclusion

- Propose a theory from “natural”/exogenous features -> endogenous trade policy
  - Geography, market size and other countries’ trade policy shock

- Natural barriers beget policy barriers - Patterns across Countries
  - market size and geography
  - global trade architecture and market power
- Liberalization begets liberalization: Changes over Time
  - big economies’ trade policy change
  - product heterogeneity
- Implications
  - trade liberalization’s positive feedback

Appendix

Results for 2001-2003 Import Tariff

	(1)	(2)	(3)	(4)
Dependent variable: import tariff				
log(population)	0.752***	0.750***	0.996***	0.884***
	(0.018)	(0.017)	(0.025)	(0.024)
remoteness	3.067***	3.047***	3.896***	4.581***
	(0.058)	(0.056)	(0.079)	(0.074)
coastline length/area	-14.539***	-14.554***	-12.080***	-14.816***
	(0.179)	(0.188)	(0.194)	(0.179)
landlock dummy	0.077	0.089*	1.006***	0.493***
	(0.055)	(0.052)	(0.094)	(0.095)
log(1/export elasticity)			0.089***	0.071***
			(0.011)	(0.010)
e_log(GDP per capita)				-1.808***
				(0.025)
Industry Fixed Effects	N	Y	Y	Y
Observations	129430	129430	50578	50578
R^2	0.058	0.139	0.181	0.243

Robust standard errors in parentheses. Industry is defined as the section classification of HS code.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$