Heterogeneous Districts, Interests, and Trade Policy

Kishore Gawande
University of Texas at Austin

Pablo M. Pinto
University of Houston

Santiago M. Pinto*
Federal Reserve Bank of Richmond

CLACS Legacy and the Real Development Challenges for Latin American Regional Economics

Urbana-Champaign, IL
November 11, 2024

*The views expressed herein are those of the author and are not necessarily those of the Federal Reserve Bank of Richmond, or the Federal Reserve System.

Motivation and Our Contribution

Motivation: develop a (more) general political economy of trade protection

- Examines influence of industries, voters, and interest groups on trade policy
- Limitations in previous research:
  - Grossman & Helpman (1994): centralized decision-maker maximizes welfare $\Omega = a\,W + C$, W: agg. welfare, C: campaign contributions, a: weight on W
  - Trade policy made by district representatives, not a central planner
  - Uneven geographic distribution of manufacturing and sector concentration map
  - Lack of explanation for observed trends, e.g., tariff declines, mismatched voting patterns, and backlash from "China shock"

Our Contribution: add a regional focus, include exporters interests

- **Theory:** model trade policy by district representatives, include interests of specific factors in import and export sectors
- **Empirics:** estimate structural parameters, *implicit welfare weights*, reflect district and sectoral influence
- **Implications:**
  - Identifies regional winners and losers in trade policy
  - Highlights unmet demand for protection in districts
  - Results: smaller influence of specific factors in import-competing sectors, higher influence of specific factors in exporting sectors and consumers
  - Explains low U.S. trade protection despite anti-globalization sentiment

General model

- Region-sector specific-factor model
- Sector 0, non-tradable (numeraire); sectors $j = 1, \ldots, J$, tradable goods (e.g., NAICS 3-digit industries)
- $r = 1, \ldots, R$: districts (e.g., $R = 435$, Congressional districts (CDs))
- $m = \{L, K\}$: agent types
  - K specific factor, immobile across regions
  - L non-sector specific factor, mobile across sectors within the region
- Quasilinear preferences (identical across groups)
- Production: $q_{0r} = w_{0r}\ell_{0r}$, $q_{jr} = F_{jr}(k_{jr}, \ell_{jr}) = f_{jr}(\ell_{jr})$, *CRS*
- Indirect utility: *factor income* $+$ *tariff revenue* (T) $+$ *consumer surplus* (Φ^m)
  - Non-specific factor:

$$W_{jr}^L(p) = w_{jr}\ell_{jr} + n_{jr}^L \frac{T(\overset{+}{p})}{n} + n_{jr}^L \frac{\Phi^L(\overline{p})}{n^L}$$

  - Specific factor:

$$W_{jr}^K(p) = \pi_{jr}(\overset{+}{p}) + n_{jr}^K \frac{T(\overset{+}{p})}{n} + n_{jr}^K \frac{\Phi^K(\overline{p})}{n^K}$$

n_{jr}^m: type-m agents in sector j, region r; $\overline{p}_j$: international price; $p_j = \overline{p}_j + t_j$: domestic price; Φ^m: total consumer surplus of type-m agent; T: tariff revenue; π_{jr}: return to fixed factor in sector-region $\{jr\}$

District preferred tariffs

- Suppose district r could choose its most preferred "national" tariffs: choose $\{t_{1r}, \ldots, t_{Jr}\} \geq 0$ that maximize district r's welfare Ω_r

$$\max_{\{t_{1r},\ldots,t_{Jr}\}} \Omega_r \quad = \quad \sum_j \Lambda_{jr}^L W_{jr}^L + \sum_j \Lambda_{jr}^K W_{jr}^K$$

  Λ_{jr}^m: weight district r places on the welfare of type-m agent, residing in district r, employed in industry j

- Preferred ad-valorem tariff for good j by district r (not observed!)

$$\frac{\tau_{jr}}{1+\tau_{jr}} = -\frac{n}{M_j \epsilon_j} \left[\underbrace{\frac{\Lambda_{jr}^K n_{jr}^K}{\lambda_r} \left(\frac{q_{jr}}{n_{jr}^K} \right)}_{\text{prod.}} - \underbrace{\frac{Q_j}{n}}_{\text{cons.}} \right], \quad \lambda_r^m = \sum_j \Lambda_{jr}^m n_{jr}^m, \lambda_r = \lambda_r^L + \lambda_r^K$$

Q_j: aggregate production; M_j: imports; $\epsilon_j = M_j'(p_j/M_j) < 0$: import elasticity

District preferred tariffs: Counterfactual exercise

- Assume $\Lambda_{jr}^K = \Lambda_{jr}^L$ and predict tariffs τ_{jr}, for each district r

$$\frac{\tau_{jr}}{1+\tau_{jr}} = -\frac{n}{M_j \epsilon_j}\left(\frac{q_{jr}}{n_r} - \frac{Q_j}{n}\right), \quad j = 1, \ldots, J, \quad r = 1, \ldots, R,$$

- Compare to actual national tariffs: measure of local unmet demand for protection
- From this analysis: tariff data map map 335
  - District-level productive structure cannot by itself explain observed tariffs (actual tariffs far from district preferred tariffs)
  - Individual districts struggle to have their specific factors heard in national tariff decisions, often not receiving their preferred tariffs

National sectoral tariffs – Small country case

- Institutionally in the US, sectoral tariffs are the result of a political negotiation among representatives from different districts in Congress and the President
- Consider a model with only importable sectors, given international prices
- Tariffs $\{t_1, \ldots, t_J\}$ that maximize weighted national welfare Ω

$$\max_{\{t_1,\ldots,t_J\}} \Omega = \sum_r \sum_j \Gamma_{jr}^K W_{jr}^K + \sum_r \sum_j \Gamma_{jr}^L W_{jr}^L$$

Γ_{jr}^m: weight placed on the welfare of an agent of type m, residing in district r, working in industry j

- National ad-valorem tariffs (identical preferences):

$$\frac{\tau_j}{(1+\tau_j)} = -\frac{n}{M_j \epsilon_j} \left[\sum_r \frac{\Gamma_{jr}^K n_{jr}^K}{\gamma} \frac{q_{jr}}{n_{jr}^K} - \frac{Q_j}{n} \right], \quad \gamma = \gamma^L + \gamma^K, \gamma^m = \sum_j \Gamma_{jr}^m n_{jr}^m$$

- Generalizes the Grossman-Helpman (1994) model
- **Goal: estimate these weights based on observed data**

How can we interpret the weights Γ_{jr}?

- Baron & Ferejohn model of legislative bargaining
- Districts cannot implement their preferred tariffs: form coalitions to garner a majority and implement national tariffs as close as possible to their respective preferred tariffs
- The weights reflect the relative influence of industries and districts in the winning coalition

National sectoral tariffs – Large country case

- Account for the influence of exporting interests and terms of trade
  - Trade liberalization from reciprocal tariff concessions;
- *US* imports *J* goods from *RoW*, exports *G* goods to *RoW*
  - Tariffs: *US*, $\boldsymbol{\tau} = (\tau_1, \ldots, \tau_j, \ldots, \tau_J)$; *RoW*, $\boldsymbol{\tau}^* = (\tau_1^*, \ldots, \tau_g^*, \ldots, \tau_G^*)$ (no export subsidies)
  - Domestic prices: *US*, $p_j = (1+\tau_j)\overline{p}_j$; *RoW*, $p_g^* = (1+\tau_g^*)\overline{p}_g$
- Tariffs determined in a Nash bargaining game between *US* and *RoW*:

$$\max_{\{\boldsymbol{\tau},\boldsymbol{\tau}^*\}} \left(\Omega^{US} - \overline{\Omega}^{US}\right)^{\sigma} \left(\Omega^{RoW} - \overline{\Omega}^{RoW}\right)^{(1-\sigma)}$$

- Tariff protection in sector *j*

$$\begin{aligned}
\frac{\tau_j^M}{(1+\tau_j^M)} \quad = \quad & -\frac{1}{\delta_j M_j} \sum_r \frac{\Gamma_r^{K^M} n_r^{K^M}}{\gamma} \frac{q_{jr}^M}{n_r^{K^M}} && \text{prod. importable goods} \\
& -\frac{1}{\delta_j} \sum_r \frac{\Gamma_r^{K^X} n_r^{K^X}}{\gamma} \mu_j \sum_g \theta_{jg} \frac{q_{gr}^X}{n_r^{K^X}} && \text{prod. exportable goods} \\
& +\frac{n}{\delta_j} \left(\frac{\epsilon_j^M}{\epsilon_{X^*}} \frac{M_j}{n} + \frac{Q_j^M}{n} + \mu_j \sum_g \theta_{jg} \frac{D_g^X}{n} \right) && \text{cons. importables + cons. exportables}
\end{aligned}$$

$$\delta_j = \epsilon_j^M \frac{(1+\epsilon_j^{X^*})}{\epsilon_j^{X^*}} < 0, \quad \theta_{jg} = \frac{\partial \overline{p}_g^X / \partial \tau_g^{X^*}}{\partial p_j^M / \partial \tau_j^M} < 0, \quad \mu_j = -\frac{d\Omega^{RoW}/d\tau_j^M}{\sum_g d\Omega / d\tau_g^{X^*}} > 0$$

RoW: Rest of the World; δ_j: generalization of import elasticity ; θ_{jg}: captures tot effects; μ_j: *US* bargaining strength with respect to τ_j

National sectoral tariffs – Large country case

- Export interests will bring influence to bear on domestic tariffs
- Welfare weights Γ_{jr}^{m} will be different than the small country case
- Why is this model relevant?
  - Highlights overlooked influence of exporters on the determination of domestic tariffs (market access in global markets)
  - Exporters' influence dates back to the Kennedy rounds
  - The President, as the *agenda setter*, formed a coalition in Congress with exporting districts favoring low tariffs
  - Could explain rising tariffs today: reduced manufacturing export interests by decades of competition from China

ESTIMATION

- Estimate model parameters (weights) structurally data assumptions

Small Country Case

$$\frac{\tau_j}{1+\tau_j} = \sum_{r=1}^{R} \beta_r \frac{n_r}{n_r^K} \left(\frac{q_{jr}/M_{jr}}{-\epsilon_j} \right) + \alpha \left(\frac{Q_j/M_j}{-\epsilon_j} \right) + u_j, \quad \beta_r = \frac{\Gamma_r^K n_r^K}{(\sum_r \Gamma_r^K n_r^K + \sum_r \Gamma_r^L n_r^L)}$$

Large Country Case

$$\frac{\tau_j}{1+\tau_j} = \sum_{r=1}^{R} \beta_r \left(\frac{q_{jr}/M_{jr}}{-\delta_j} \right) + \beta^X \left(\frac{\mu_j \theta_{jg} Q_g/M_j}{-\delta_j} \right) + \alpha \left(\frac{Q_j/M_j}{-\delta_j} - \frac{1}{1+\epsilon_j^{X*}} + \mu_j \theta_{jg} \frac{D_g/M_j}{-\delta_j} \right) + u_j$$

$$\beta_r = \frac{\Gamma_r^{KM} n_r^{KM}}{\gamma} \frac{n_r}{n_r^{KM}} > 0, \quad \beta^X = \frac{\Gamma^{KX} n}{\gamma}, \quad \alpha = -1$$

- Estimate welfare weights for clusters of districts that are natural coalitions during legislative bargaining

  (1) **Geography-based coalitions:** 9 geographic subdivisions, U.S. Census [TODAY]

  (2) **Coalitions based on electoral dynamics:** Competitiveness of State and CDs, 9 regions based on battleground state in 2000 Presidential election and competitiveness of Congressional seat

CASE 1: BY GEOGRAPHY - ESTIMATES AND WEIGHTS

2SLS estimates. DV: *Applied Tariff, 2002*

	Small Country	Large Country
β_1: New England	0.067 (0.027)	0
β_2: Mid-Atlantic	0.163 (0.012)	0
β_3: East North Central	0.216 (0.025)	0
β_4: West North Central	0.063 (0.009)	0.292 (0.017)
β_5: South Atlantic	0.140 (0.008)	0.264 (0.020)
β_6: East South Central	0.089 (0.020)	0
β_7: West South Central	0.073 (0.010)	0.060 (0.017)
β_8: Mountain	0	0
β_9: Pacific	0.214 (0.019)	0
β^X: $\mu_j \theta_{jg} \frac{Q_g/M_j}{-\delta_j}$		3.243 (0.359)
α: $\frac{Q_j/M_j}{-\epsilon_j}$	-1	
α: $\frac{Q_j/M_j}{-\delta_j} - \frac{1}{1+\epsilon_j^{X*}} + \mu_j \theta_{jg} \frac{D_g/M_j}{-\delta_j}$		-1
N	9454	8735
First Stage Statistics		
Anderson-Rubin χ^2(10 df)	2949.0	2010.0
Anderson-Rubin *p*-value	0.00	0.00
Kleibergen-Paap weak IV	102.5	937.5

Weights on Specific Factors

	Small Country		Large Country			
Region	K_r-share	$\frac{\Gamma_r^K}{\Gamma^L}$	K_r^M-share	$\frac{\Gamma_r^{K^M}}{\Gamma^L}$	K^X-share	$\frac{\Gamma^{K^X}}{\Gamma^L}$
1. New England	0.023	1.136	0	0		
2. Mid-Atlantic	0.051	1.314	0	0		
3. East North Central	0.063	0.899	0	0		
4. West North Central	0.019	0.941	0.075	4.646		
5. South Atlantic	0.040	1.019	0.063	2.036		
6. East South Central	0.024	1.493	0	0		
7. West South Central	0.023	0.766	0.016	0.675		
8. Mountain	0	0	0	0		
9. Pacific	0.073	1.300	0	0		
Agg./Rel. Weights	0.316		0.154		0.204	3.485

Case 1: By Geography - Main Takeaways

- **Small country case**
  - Legislative bargain favors mobile factor owners (68.4% of aggregate welfare); owners of sector-specific capital get remainder (31.6%)
  - Winners: Pacific (7.3%), E N Central: (6.3%), Mid-Atlantic (5.1%)
- **Large country case**
  - Legislative bargain favors mobile (64.2%) and X-specific factors (20.4%); M-specific factors M get 15.4%
  - Winners: W N Central (7.5%), S Atlantic (6.3%), W S Central (1.6%); regions with a higher share of specific factors in X-sector (New England, Mountain, Pacific)

How is this analysis relevant to LAC countries?

- **Regional economic diversity and trade policy preferences**
  - LAC countries' diverse economies result in varied regional trade policy preferences
  - National tariff-setting models for LAC countries, different regional focus: agriculture vs. manufacturing or services
- **Representation of regional interests**
  - How are regional disparities, local interests reflected in national policymaking in LAC countries?
- **Political consequences of trade policies**
  - By identifying winners and losers of trade policy (districts, industries), understand political consequences and potential backlash against globalization in LAC
  - Compensation of districts/industries adversely affected by globalization crucial for maintaining economic, social, and political stability
  - However, limited ability to efficiently and effectively compensate "losers"
- **Barriers to compensating losers**
  - Political power: winners (large businesses) lobby against redistribution
  - Credibility: promises to compensate are often not credible, causing skepticism
  - Disorganization: losers (consumers, small-scale producers) lack political power and organization
  - Implementation issues: compensation mechanisms may be inefficient or corrupted
- **Export interests and protectionism**
  - Model accounts for export interests as a counterforce to protectionism
  - Major LAC commodity exporters balance protectionism and export interests

CONCLUDING REMARKS

1. Develop a general version of a political economy of trade model which includes fixed factors from importing and exporting sectors

2. Advance empirical contributions of the PE of trade
   - Assess how far actual tariffs are from tariff preferences of districts (unmet demand for protection)
   - Exporter influence into domestic import-tariff determination
   - Help understand the political fallout from the China shock

3. Estimate implied weights on districts and industries retrieved from observed pattern of protection (around 2000)

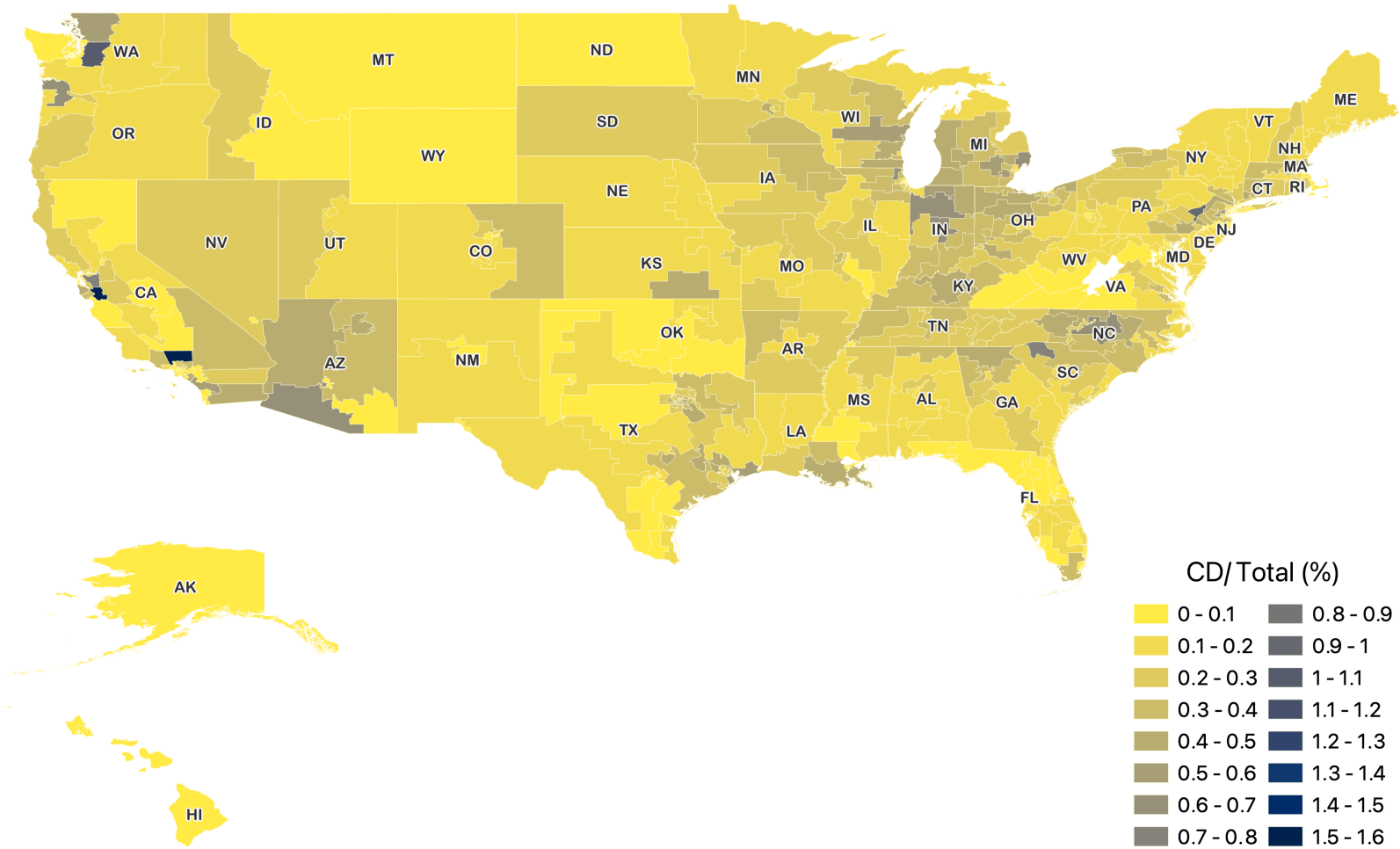
4. Interests of fixed factors still play an important role in determining US trade policy
   - The structure of trade tariffs reveals an aggregate weight on special interests that is approximately 35% of the aggregate welfare weight
   - Interests of specific factors in exporting sectors obtain about 60% of the total weight on fixed factors (20% of the aggregate welfare weight)

5. U.S. exporters ARE highly effective in countervailing the demand for protection by domestic interests in import-competing industries
   - They do so because of the threat of retaliation, internalized by trade policy-making coalitions
   - Also explains why U.S. trade protection is low on average and concentrated in a few industries

ADDITIONAL SLIDES

MANUFACTURING ACTIVITY IS UNEVENLY DISTRIBUTED ACROSS SPACE

Congressional District Share of Total Manufacturing Output (percentage)



back

DATA

- Data available from different sources, and levels of aggregation (geography, industry) for 2002 (107^{th} Congress)
- Tariffs and imports, M_j: USITC Dataweb; R. Feenstra's site
- NTMs: ad-valorem equivalents of core NTMs at the 6-digit HS level; Kee, Nicita & Olarreaga (2009)
- Import demand elasticities, ϵ_j: Kee, Nicita and Olarreaga (2008)
- Output, q_{jr}, and consumption, D_j^m: County Business Patterns (2002)
  - Data from CBP converted to NAICS 3-digit level and mapped from MSAs and Counties onto the Congressional districts (CDs) for the 107th Congress (2002) for which data is available (433 CDs)
- Employment by type of economic agent, sector, region, n_{jr}^m: County Business Patterns (2002); NBER manufacturing database
- For n_r^K / n_r: compensation of white collar (non-production) and blue-collar (production) workers

back

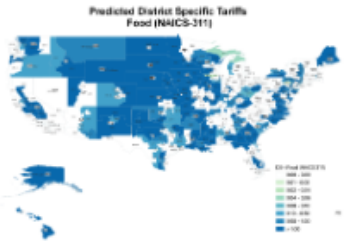
TARIFF DATA

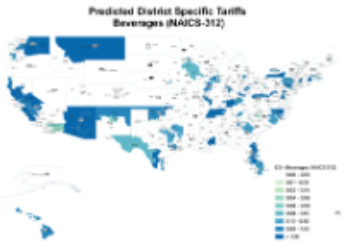
Average Ad Valorem 2002 Tariffs and NTMs, 3-Digit NAICS

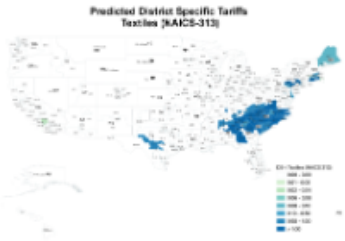
NAICS-3 Industry No. & Label	Number of lines	Tariffs Average	Core NTMs Average
311 - Foods	966	0.058	0.411
312 - Beverages	74	0.018	0.094
313 - Textiles	606	0.078	0.181
314 - Text. Prods.	211	0.047	0.234
315 - Apparel	584	0.091	0.353
316 - Leather	196	0.115	0.109
321 - Wood	143	0.011	0.172
322 - Paper	139	0.006	0.000
324 - Petroleum	19	0.004	0.000
325 - Chemicals	1,553	0.027	0.051
326 - Plastic	175	0.022	0.005
327 - Non-metal	292	0.039	0.001
331 - Prim. Metal	449	0.019	0.000
332 - Fab. Metal	389	0.025	0.031
333 - Machinery	819	0.011	0.041
334 - Computers	535	0.020	0.061
335 - Elec. Eq.	278	0.016	0.163
336 - Transp.	229	0.013	0.161
337 - Furniture	54	0.004	0.055
339 - Miscellaneous	499	0.024	0.029
Total	8,210	0.037	0.131

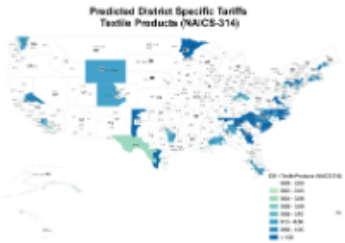
back

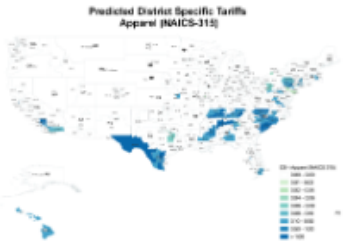
PREDICTED CD-LEVEL TARIFFS BY NAICS AND CDS

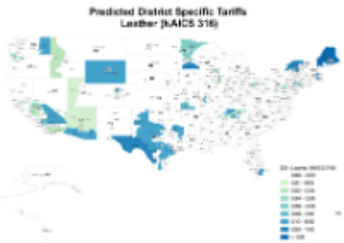


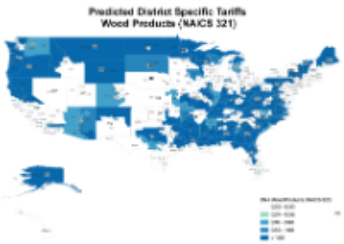


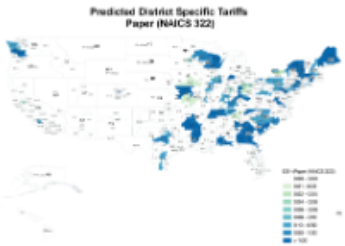


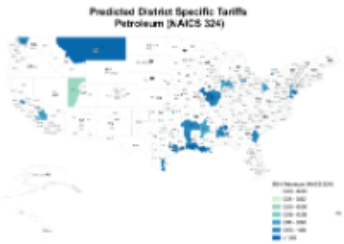


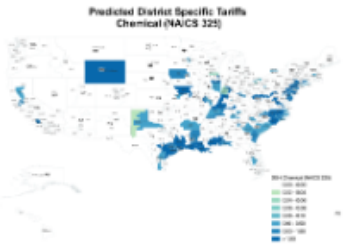


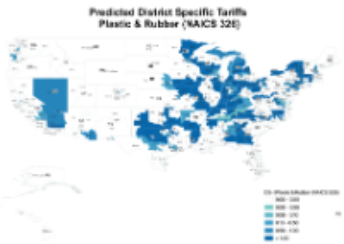


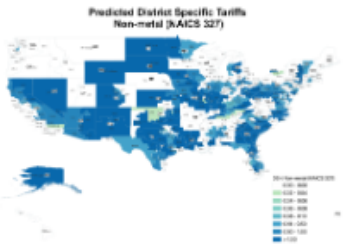


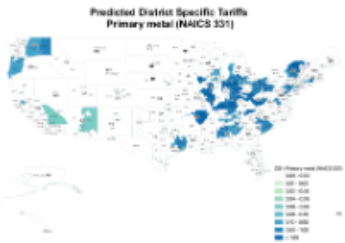


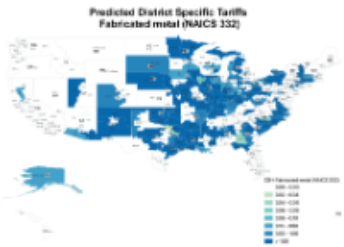


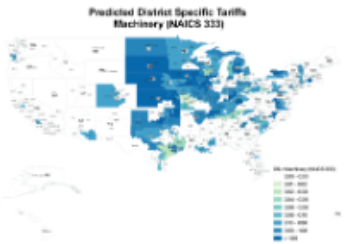


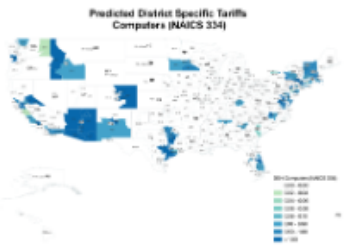


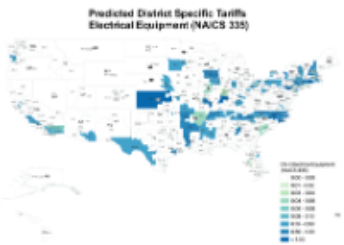


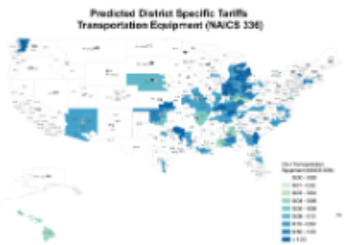


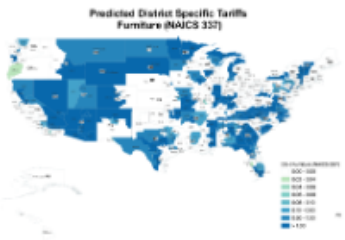


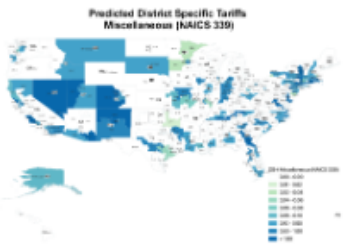








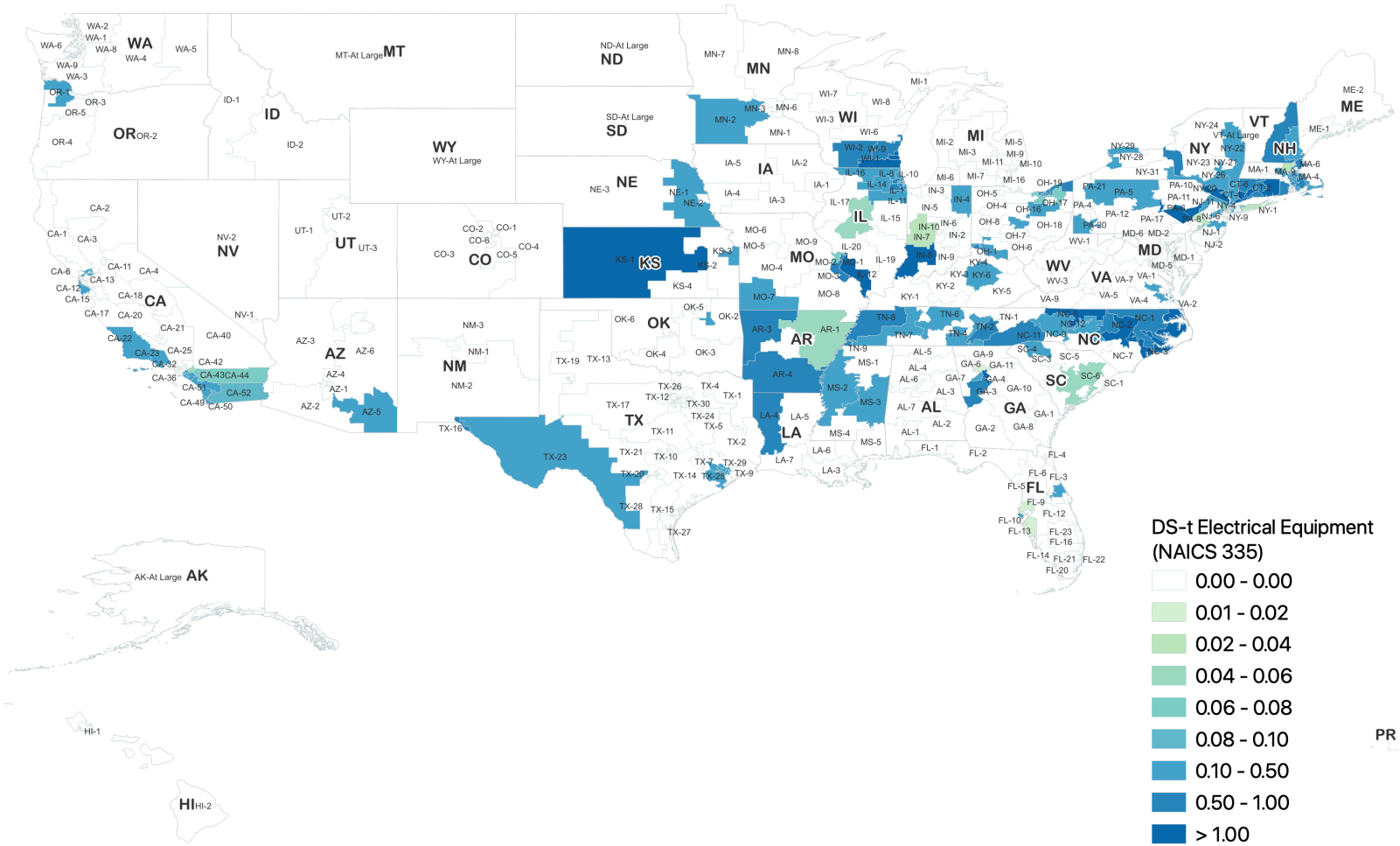




back

PREDICTED CD-LEVEL TARIFFS BY NAICS AND CDS

Predicted District Specific Tariffs
Electrical Equipment (NAICS 335)



back

ASSUMPTIONS

1. $M_{jr} = M_j \times (n_r/n)$
2. **Small country case**
   - $\{\Gamma_{jr}^m\}$, $r = 1, \ldots, R, j = 1, \ldots, J$, $m = \{L, K\}$ is excessive
   - Equal weights across sectors j within region r: $\Gamma_{jr}^m = \Gamma_r^m$
3. **Large country case**
   - *RoW* targets its retaliation at a single industry, g: computers (NAICS 334), largest *US* exports in 2002
   - Equal weights on exporters across regions: $\Gamma_r^{KX} = \Gamma^{KX}$
   - Consider different values of μ_j (robustness)
4. Identification strategy: use Bartik-like instruments to address the endogeneity of $\frac{q_{jr}/M_{jr}}{-\epsilon_j}$
5. Aggregate districts into R "regions" or coalitions

back

CASE 2: BY ELECTORAL OUTCOMES

Distribution of CD seats, employment, and export output

State-wide vote in Presidential election	**House election in CD** Competitive	Safe Dem	Safe Rep	**Total**
Competitive	17 [0.03] (0.09)	72 [0.16] (0.09)	83[0.22] (0.09)	172
Safe Dem	8 [0.02] (0.12)	75 [0.16] (0.27)	42 [0.09] (0.15)	125
Safe Rep	5 [0.02] (0.05)	51 [0.11] (0.12)	80 [0.20] (0.06)	136
	30	198	205	433 [1.00] (0.11)

Notes: Each cell in the 3 $\times$ 3 represents "coalition" r.
Each cell shows:
(i) The number of districts in the coalition;
(ii) The proportion of manufacturing workforce in brackets;
(iii) The proportion of export industry (NAICS-334 Computers) output in parentheses.

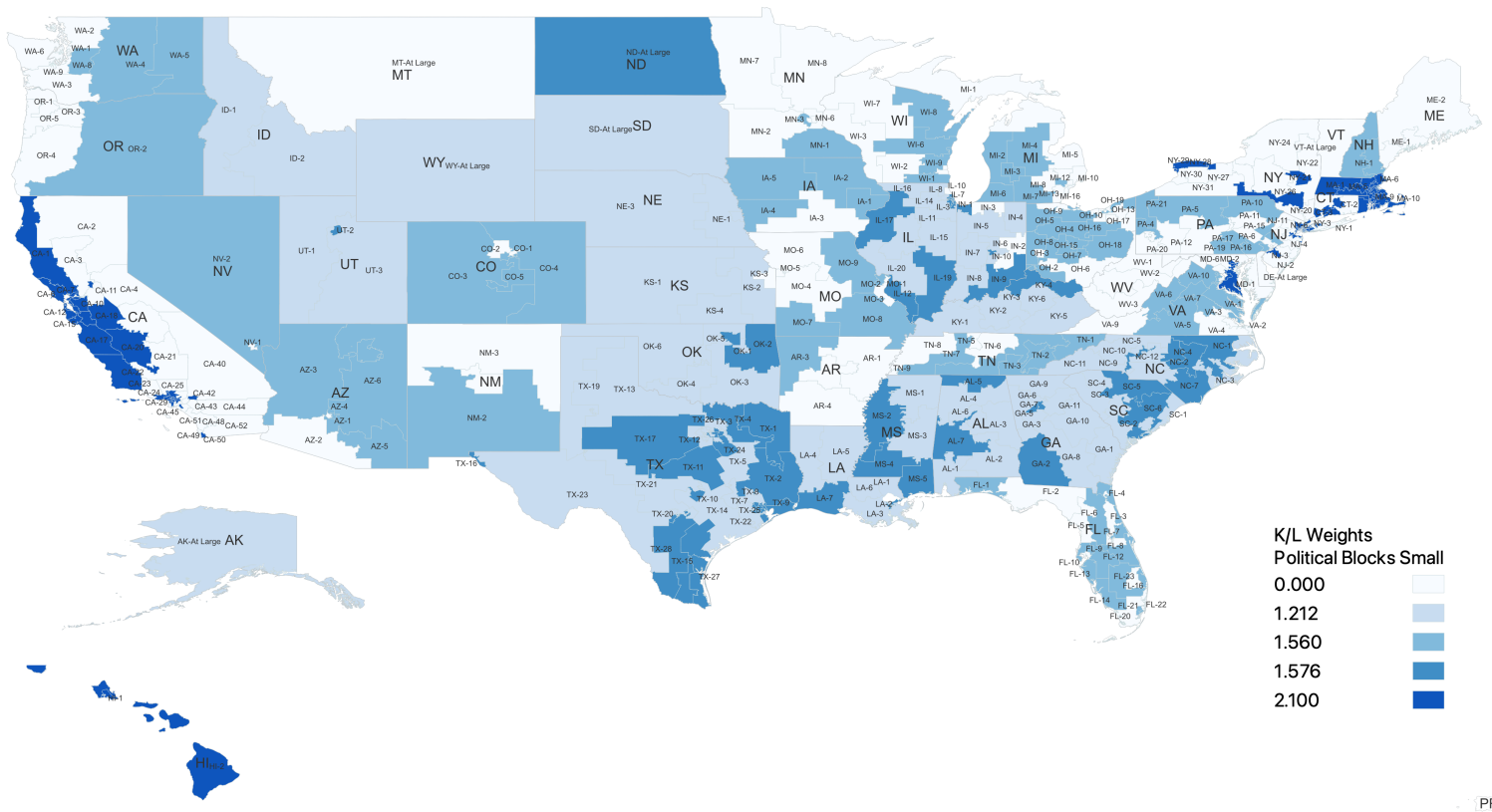
CASE 2: BY ELECTORAL OUTCOMES – SMALL COUNTRY

K_r^M Weight Shares (from 2SLS estimates): Small Country model. DV: *Applied Tariffs + NTMs, 2002*

State-wide Vote in Presid. Election	Districts in House elections: Competitive	Safe Dem	Safe Rep	Total
Competitive	0 [0]	0 [0]	0.104 [1.560]	0.104
Safe Dem	0 [0]	0.093 [2.100]	0 [0]	0.093
Safe Rep	0 [0]	0.047 [1.576]	0.073 [1.212]	0.120
Total K_r share	0	0.140	0.177	0.317

Notes: (1) $N = 8210$. (2) Each cell (coalition r) reports: (i) K_r-share of total welfare weights; (ii) individual Γ_r^K / Γ_r^L ratio in square brackets.

Geographical distribution of Γ_r^K / Γ_r^L weights



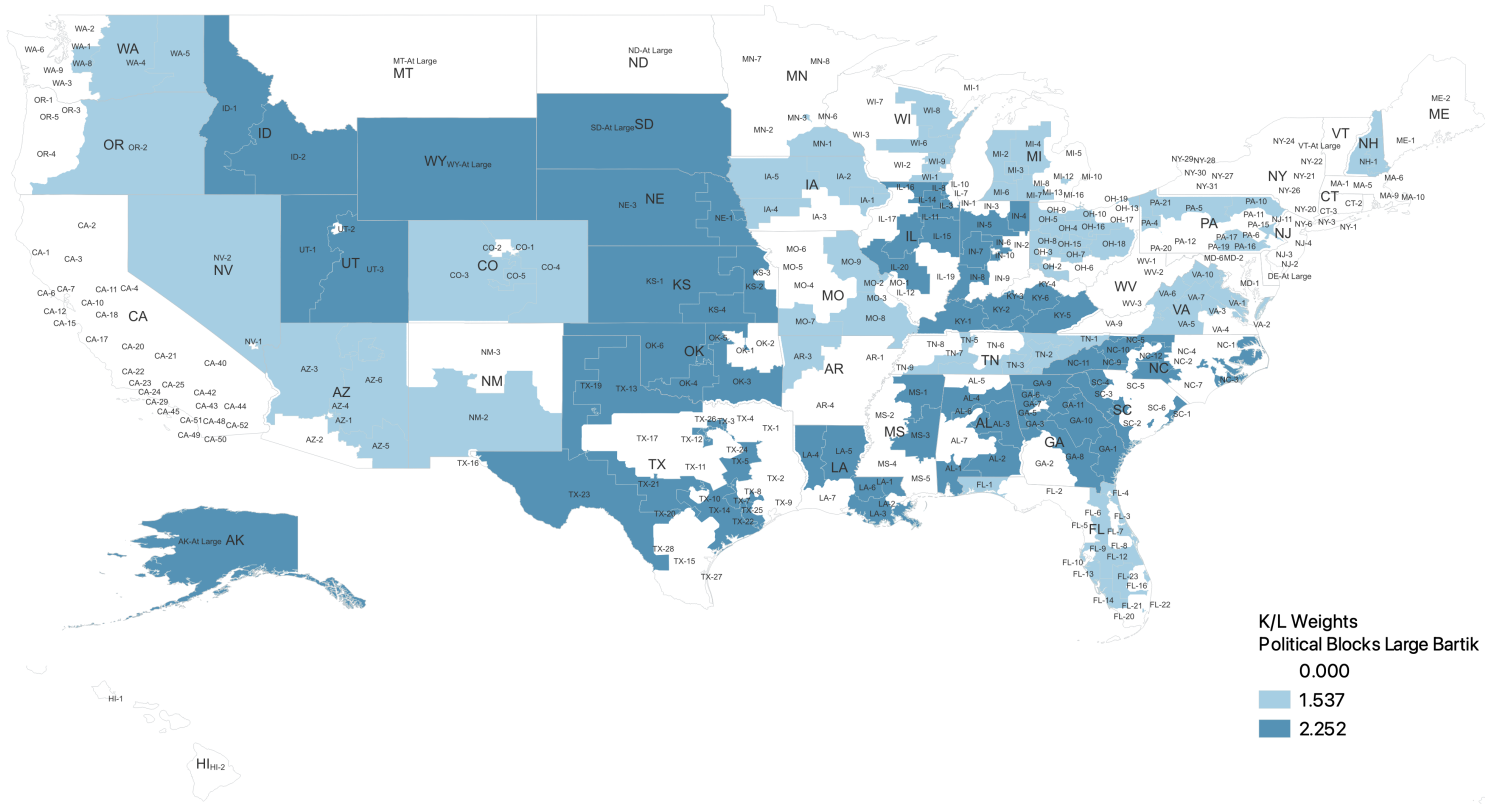
CASE 2: BY ELECTORAL OUTCOMES – LARGE COUNTRY

K_r^M and K^X weight shares (from 2SLS estimates). DV: *Applied Tariffs + NTMs, 2002*

State-wide Vote in Presid. Election	Districts in House elections: Competitive	Safe Dem	Safe Rep	Total
Competitive	0 [0]	0 [0]	0.081 [1.537]	0.081
Safe Dem	0 [0]	0 [0]	0 [0]	0
Safe Rep	0 [0]	0 [0]	0.113 [2.252]	0.113
Total K_r^M share	0	0	0.194	0.194
Total K^X share				0.166 [2.906]

Notes: (1) $N = 7675$. (2) Cells in **black**: (i) share of welfare weights on import-competing interests K_r^M; (ii) individual $\Gamma^{K_r^M}/\Gamma^L$ ratio in brackets. (3) Total K^X share: (i) aggregate share of welfare weights on export sector interests; (ii) individual Γ^{K^X}/Γ^L ratio in brackets.

Geographical distribution of Γ_r^K/Γ_r^L weights



CASE 2: BY ELECTORAL OUTCOMES – MAIN TAKEAWAYS

- **Small country case**
  - Suppose Representative Cliff Stearns is the agenda setter (Chairman of the Commerce, Trade, and Consumer Protection Subcommittee of the powerful Ways and Means Committee, 107th Congress); Stearns represents 6th CD in Florida, a Safe Rep District in the most competitive State for the Presidency in the 2000 election
  - Agenda setter proposes an overall level of protection (tariffs + NTMs) that would be approved by: *Safe Rep States + Safe Rep District (80); Safe Dem State + Safe Dem District (75); Safe Rep State + Safe Dem District (51); Competitive State + Safe Rep District (83) (Stearns' own group)*
  - For these groupings of CDs, $(\Gamma_r^{K^M}/\Gamma_r^L) > 1$: enough support of a super-majority in Congress (289 districts), making it Presidential veto-proof
- **Large country case**
  - Same agenda setter: *Competitive State + Safe Rep District (83) (Stearns' own group); and Safe Rep State + Safe Rep District (80)*
  - Need additional 55 representatives for legislative majority: from CDs with a large presence of specific factor owners in the export industry
  - Winning coalition biased towards export interests (producers of computers)

CASE 2: COMPUTERS (NAICS 334) OUTPUT SHARE BY POLITICAL COALITIONS