Slicing the Pie: Quantifying the Aggregate and Distributional Effects of Trade

Simon Galle[1] Andrés Rodríguez-Clare[2] Moises Yi[3]

[1]BI Norwegian Business School

[2]University of California, Berkeley

[3]U.S. Census Bureau

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Motivation

- Gravity models → quantify aggregate welfare effects of trade
- Empirical research → large distributional effects of trade
- This paper: bridge two literatures and quantify aggregate and distributional effects of trade

Gravity and Welfare

- Armington, Eaton and Kortum, Krugman, Melitz-Pareto are all *gravity models*
- For gravity models:
  - Trade openness + trade elasticity → gains from trade
  - Trade data + trade elasticity → counterfactual analysis
- Gains from trade:
  - 2-8% for USA (Costinot and Rodriguez-Clare)
  - 5-36% for CR (Alfaro)
- Caliendo, Feenstra, Romalis and Taylor (2017) (next two slides)

Figure 13: Welfare effects from tariff changes, world, detail, 1990–2010 change

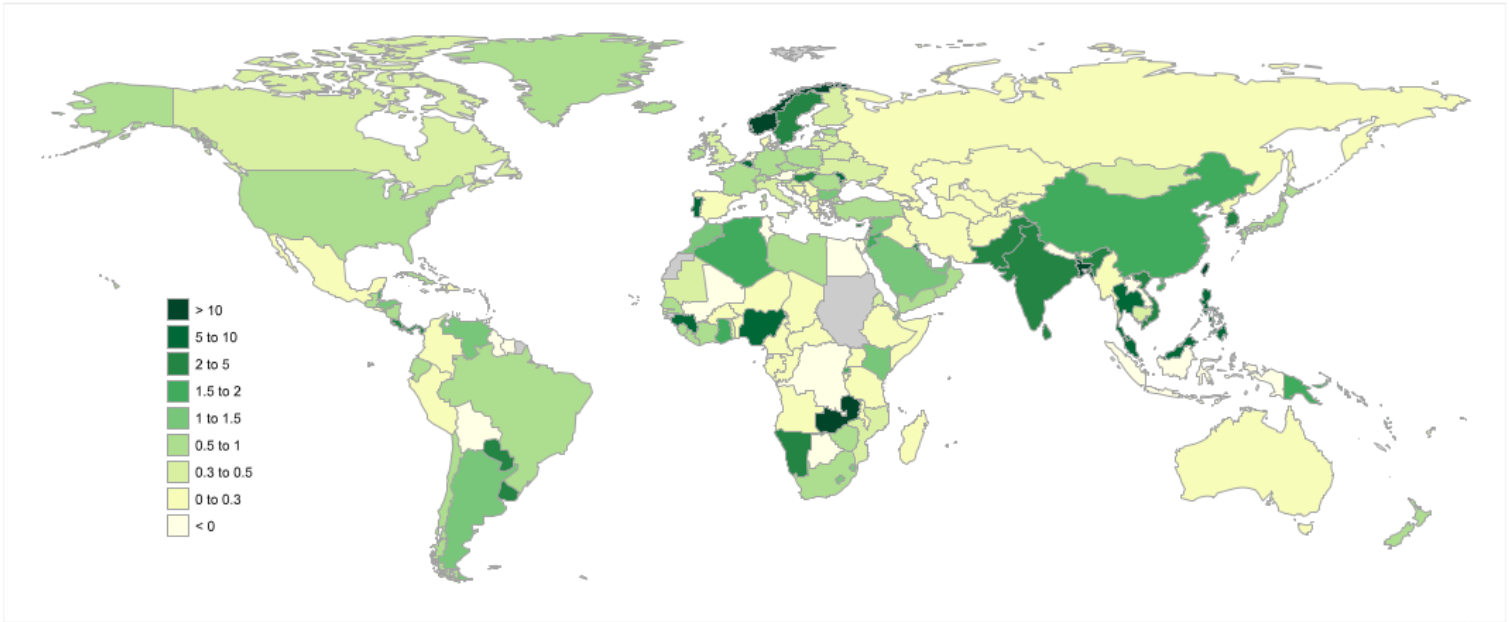
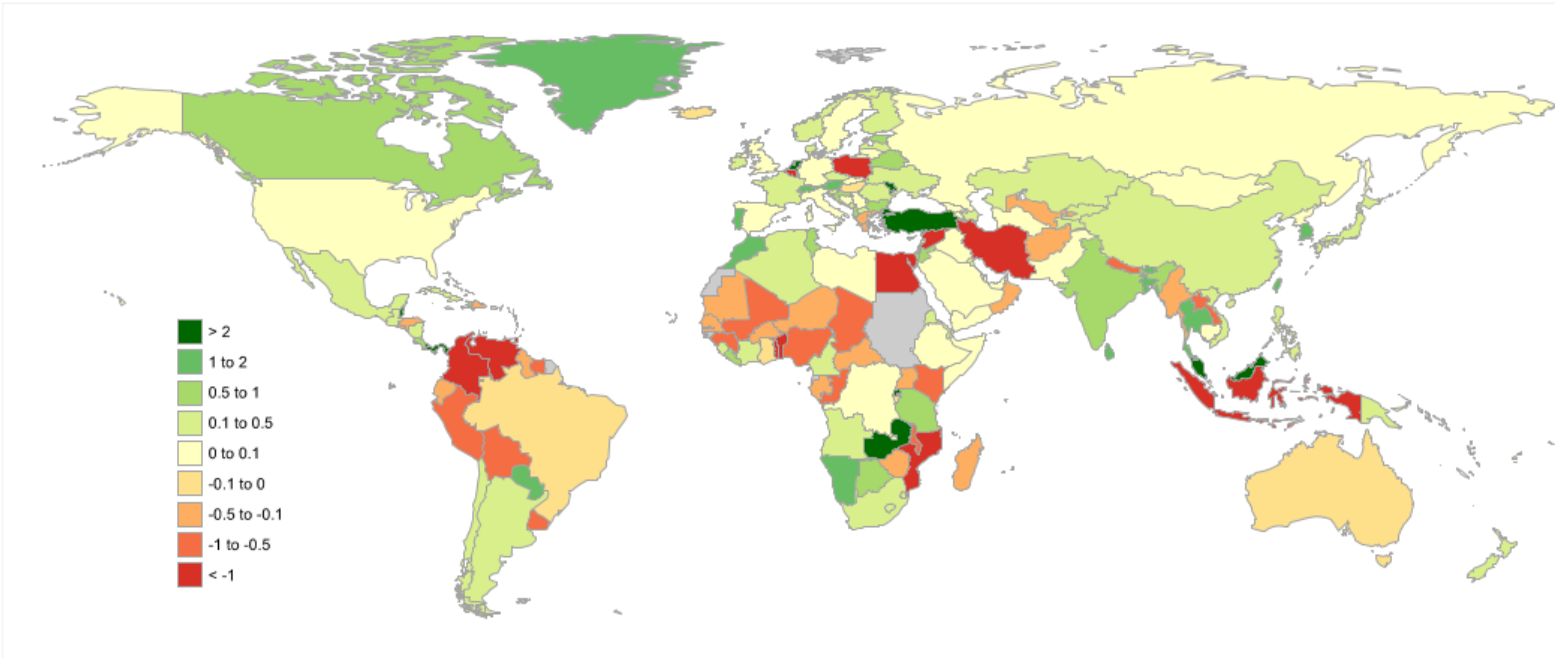


Figure 14: Welfare effects from actual 2010 tariffs to Free Trade - Percen



The China Syndrome

- Autor, Dorn and Hanson's paper in the AER 2013
- 1096 Google Scholar citations
- Almost daily mention in major newspapers and magazines
- Focus on *local labor markets*... commuting zones
- Major finding: decline in wages and employment for CZs most exposed to competition from ↑ US imports from China
- Other findings: ↑ federal transfers, ↓ marriage, ↑ suicide and drug overdose, electoral polarization... and Trump

What about welfare?

- Empirical methodology can only identify relative effects...
- But ↑ imports also imply gains via lower prices... not captured
- So absolute effects? Are groups better or worse off?
- Specific factors + intra-industry trade: ↓ in relative wage for workers in import competing industries, but may still gain
- Need general equilibrium model... back to gravity

Gravity + Roy-Frechet

- Standard multi-sector gravity: workers are perfectly mobile
- Other extreme: workers are stuck in their sector
- Roy-Frechet: parameter $\kappa \in [1, \infty]$ determines where we are
- High $\kappa \rightarrow$ small distributive effects

Estimation

- Key challenge: estimate κ
- Our approach: use China shock for estimation
- Combine empirical and theoretical elements:
  1. Empirical: higher exposure to China shock $\rightarrow \downarrow$ in manufacturing employment
  2. Theoretical: $\downarrow$ manufacturing employment $\rightarrow \downarrow$ relative income depending on κ

Table 2: Estimation of κ

	Dependent variable: $\ln \hat{y}_g$		
	(1)	(2)	(3)
Definition of π_{gs}	Workers	Hours	Earnings
$\ln \hat{\pi}_{gNM}$	-0.466	-0.494	-0.512
	(0.161)	(0.166)	(0.181)
Implied κ	2.147	2.024	1.952
	(0.743)	(0.682)	(0.689)
First-stage F-Statistic	23.19	20.43	9.902
Observations	1444	1444	1444

Table 3: The Welfare Effects of the China Shock on the US

κ	$\widehat{W}_{US}$	Mean	CV	Min.	Max.	$\prod_s \widehat{\lambda}_s^{-\beta_s/\theta_s}$
$\to 1$	0.29	0.38	0.87	-2.24	2.56	0.20
2	0.25	0.32	0.56	-1.64	1.34	0.20
4	0.23	0.28	0.36	-1.01	0.76	0.21
$\to \infty$	0.24	0.24	0.00	0.24	0.24	0.24

Figure: Geographical distribution of the welfare gains from the rise of China

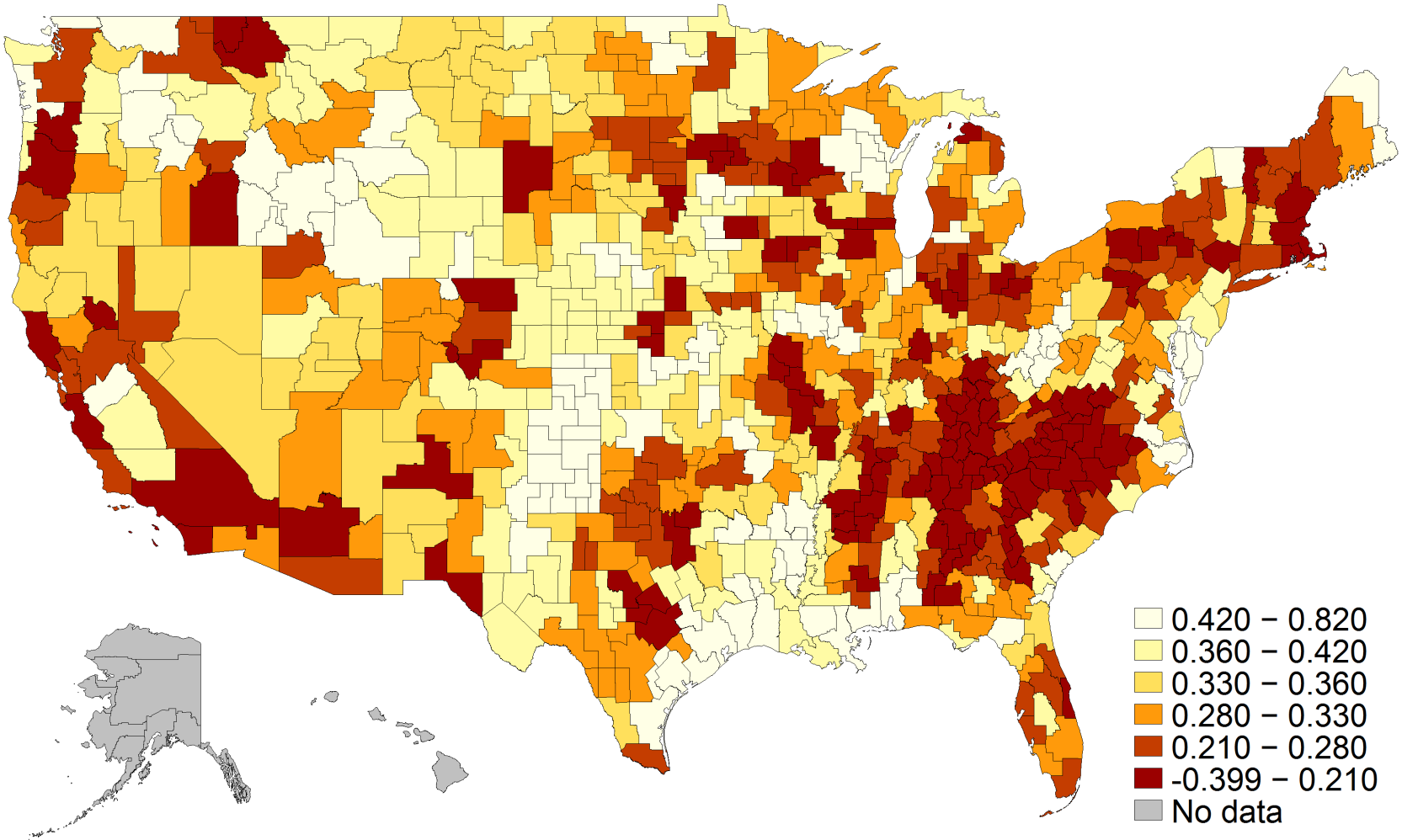


Figure: Low-educated workers

Figure: Inequality-Adjusted welfare-effects from the China shock

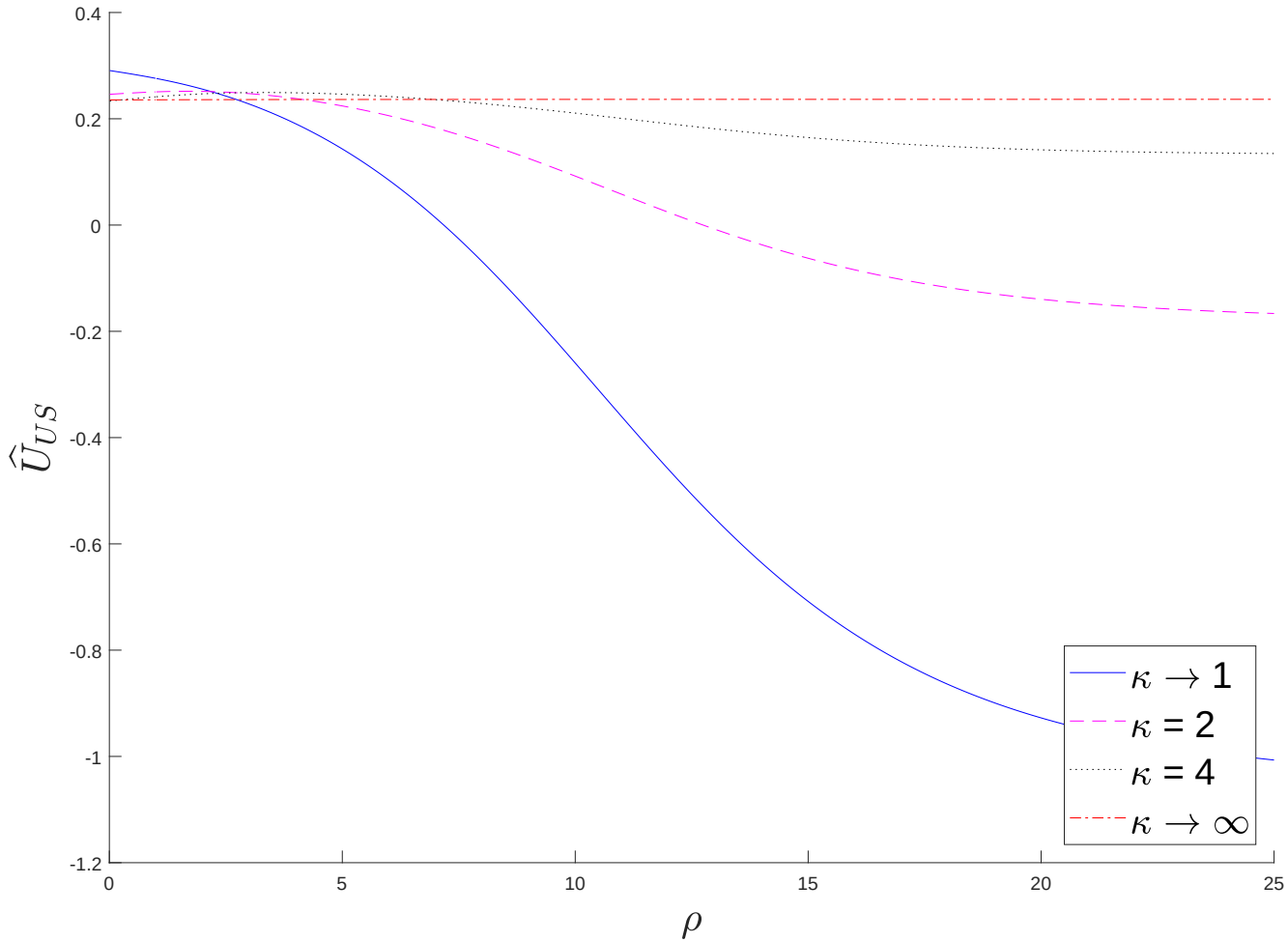


Figure: Initial group-level income and our Bartik measure of import competition

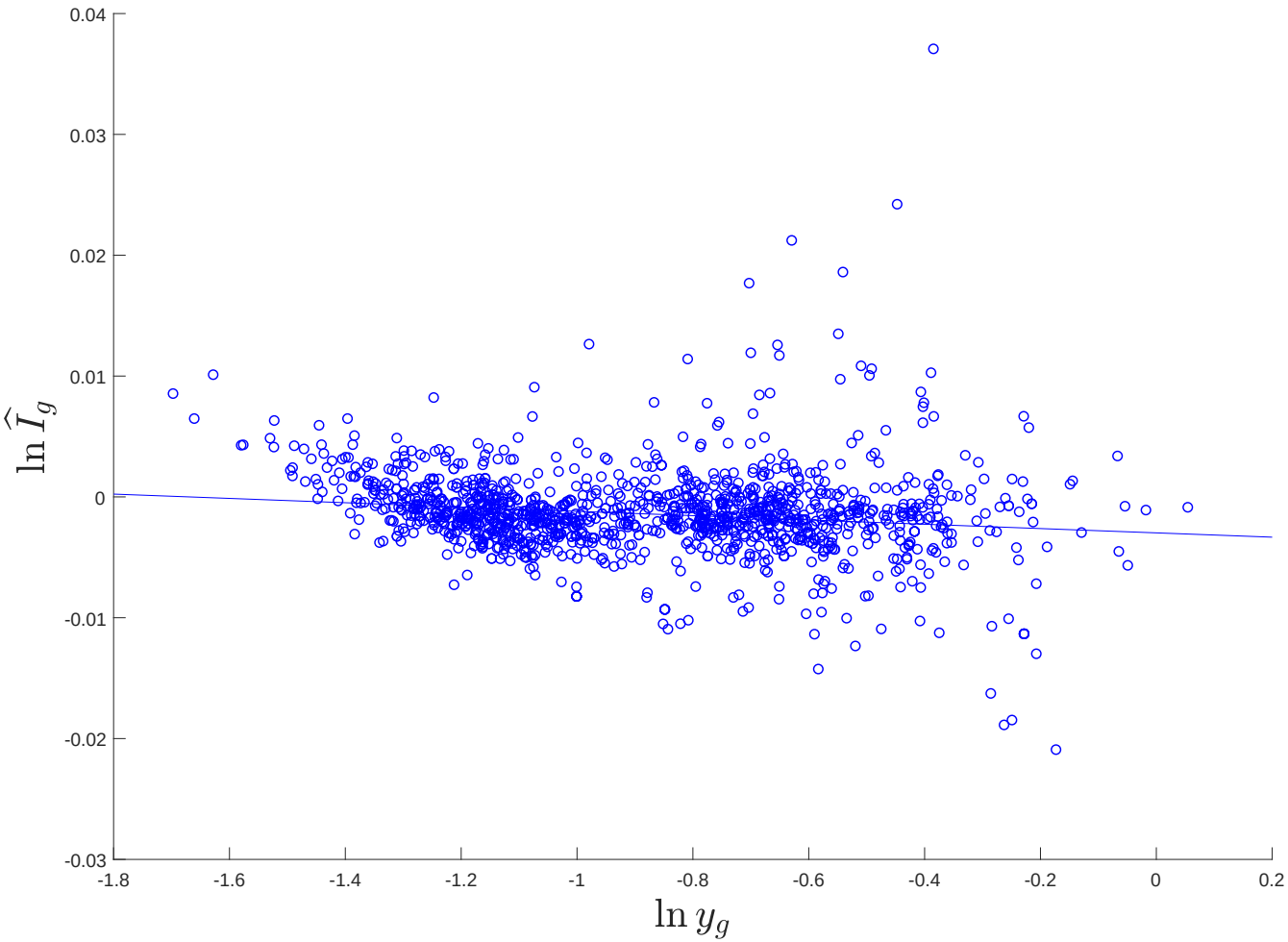


Table 5: Aggregate and Group-level Gains from Trade

κ	$\widehat{W}_{US}$	Mean	CV	Min.	Max.	$\prod_s \widehat{\lambda}_s^{-\beta_s/\theta_s}$
$\to 1$	1.60	1.80	0.59	-7.86	3.36	1.45
2	1.52	1.63	0.33	-3.19	2.41	1.45
4	1.48	1.54	0.18	-0.87	1.93	1.45
$\to \infty$	1.45	1.45	0.00	1.45	1.45	1.45

Figure 5: Inequality-adjusted Gains from Trade

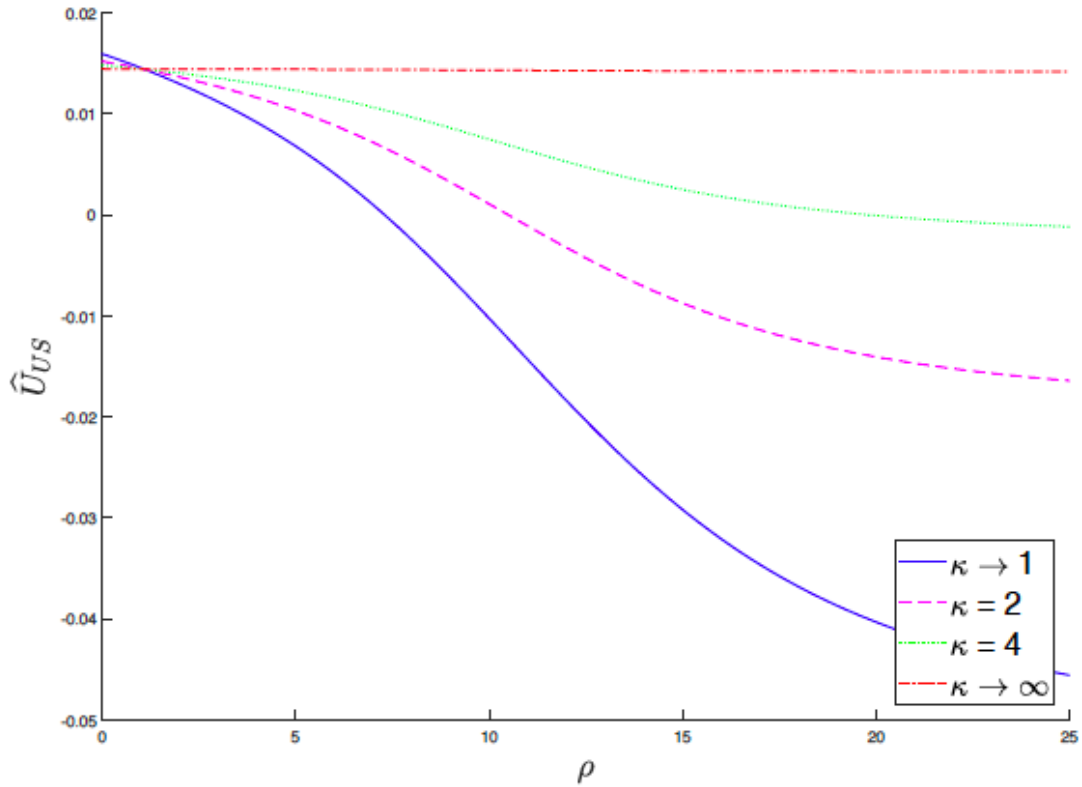


Figure 6: Group-level Import Competition and Income