Lecture 2: Distributional Effects of Trade

Andres Rodriguez-Clare

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Motivation

- Gravity models $\rightarrow$ quantify *aggregate* welfare effects of trade

- Empirical research $\rightarrow$ large *distributional* effects of trade

- This paper bridges the two literatures, and quantifies the aggregate and distributional effects of the "China Shock" for the US

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Gravity and Welfare

- Gravity model: tractable structural framework to predict trade flows
    - Ricardian comparative advantage (e.g. Eaton & Kortum 2002)
    - or monopolistic competition (Krugman 1980, Melitz-Pareto)

- Stylized model with reasonable empirical performance (e.g. Donaldson 2018)

- Trade data + trade elasticity $\rightarrow$ counterfactual analysis
    - Gains from trade
    - Aggregate gains from China shock,...

The China Syndrome

- Autor, Dorn and Hanson (2013)

- Focus on local labor markets (commuting zones - CZs)

- Major finding: relative decline in earnings 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 maybe even Trump

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What about welfare?

- Empirical methodology can only identify relative effects

- But ↑ imports also imply gains via lower prices

- What are the absolute effects? Are groups better or worse off?

What about welfare?

- Empirical methodology can only identify relative effects

- But $\uparrow$ imports also imply gains via lower prices

- What are the absolute effects? Are groups better or worse off?

- Specific factors intuition:
  - $\downarrow$ in relative wage for workers in import competing industries
  - But such workers may still gain due to lower consumption prices

- Need general equilibrium model... back to gravity

Gravity + Roy-Fréchet

- Standard multi-sector gravity: workers are perfectly mobile

- Other extreme: workers are stuck in their sector (specific factors)

- Our Roy-Fréchet model nests these two extremes

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Gravity + Roy-Fréchet

- Standard multi-sector gravity: workers are perfectly mobile

- Other extreme: workers are stuck in their sector (specific factors)

- Our Roy-Fréchet model nests these two extremes

  ▶ Roy model: workers select sectors based on comparative advantage

  ▶ Fréchet parameter κ determines scope for reallocation

    • $\kappa \to \infty$: perfectly mobile workers
    • $\kappa \to 1$: specific factors

Gravity + Roy-Fréchet

- Standard multi-sector gravity: workers are perfectly mobile

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- Our Roy-Fréchet model nests these two extremes

  ▶ Roy model: workers select sectors based on comparative advantage

  ▶ Fréchet parameter κ determines scope for reallocation

    - $\kappa \to \infty$: perfectly mobile workers
    - $\kappa \to 1$: specific factors

- We estimate κ building on ADH's empirical results

- Examine *between-group* distributional effects of trade

Extensions and limitations of baseline model

- Extensions

    1. Intermediate goods - *fairly straightforward*

    2. Mobility across groups - *strong data requirements*

    3. For tradable goods, no costs of trade across groups - *data restriction*

- Limitations:

    1. Strong parametric assumptions - *can relax*

    2. No implications for within-group inequality

    3. No dynamics

Literature

- Aggregate gains from trade, with gravity: Costinot et al. (2012 - CDK)
  - ▶ Eaton & Kortum (2002 - EK), Arkolakis et al. (2012 - ACR), ...

- Distributional consequences of trade:
  - ▶ With gravity: Burstein & Vogel (2016), Fajgelbaum & Khandelwal (2016)
  - ▶ Between regions: Autor et al. (2013), Dauth et al. (2014), Dix-Carneiro & Kovak (2016), Hakobyan & McLaren (2016), Kovak (2013), Topalova (2010),...

- Trade and sectoral reallocation:
  - ▶ Adao (2016), Adao et al. (2018 - AAE), Artuç et al. (2010), Caliendo et al. (2016 - CDP), Coşar (2013), Dix-Carneiro (2014), Goldberg & Pavcnik (2007), Lee (2018), Menezes-Filho & Muendler (2011), Wacziarg & Seddon-Wallack (2004),...

- Roy-type labor markets:
  - ▶ Burstein et al. (2018 - BMV), He (2018), Hsieh et al. (2019), Lagakos & Waugh (2013 - LW), Young (2014)

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Model

- N countries, index i, j

- S sectors, index s, k

- G_i groups, index ig

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Model: Trade Side

- Each sector is modeled as in Eaton & Kortum (2002):

- Preferences across sectors are Cobb-Douglas with shares β_{is}

- Trade shares take on gravity form (origin i, destination j):

$$\lambda_{ijs} = \frac{T_{is} \left(\tau_{ijs} w_{is} \right)^{-\theta_s}}{\gamma^{-\theta_s} P_{js}^{-\theta_s}}$$

where $\gamma^{-\theta_s} P_{js}^{-\theta_s} = \sum_l T_{ls} \left(\tau_{ljs} w_{ls} \right)^{-\theta_s}$

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Model: Labor Side

- Exogeneous mass L_{ig} of workers of type g in country i

- A worker from g has efficiency units z_s drawn iid from a Fréchet dist. with $\kappa > 1$ and A_{igs}

- Workers maximize earnings (efficiency units multiplied by wage w_{is})

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Model: Labor Side

- Exogenous mass L_{ig} of workers of type g in country i

- A worker from g has efficiency units z_s drawn iid from a Fréchet dist. with $\kappa > 1$ and A_{igs}

- Workers maximize earnings (efficiency units multiplied by wage w_{is})

- Share of workers in group g who choose to work in sector s is

$$\pi_{igs} = \frac{A_{igs} w_{is}^{\kappa}}{\Phi_{ig}^{\kappa}} \text{ with } \Phi_{ig} \equiv \left(\sum_k A_{igk} w_{ik}^{\kappa} \right)^{1/\kappa}$$

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Labor Market Equilibrium

- Demand for efficiency units in sector s in country i is (cfr. EK)

$$\frac{1}{w_{is}} \sum_j \lambda_{ijs} \beta_{js} Y_j,$$

Labor Market Equilibrium

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  ▸ Effective labor units: $E_{igs} = \eta_{ig} \frac{\Phi_{ig}}{w_{is}} \pi_{igs} L_{ig}$

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- Equilibrium: find w_{is} that equalize demand and supply of efficiency units. ▶ Equations ▶ Graphically

Labor Market Equilibrium

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  ▸ Effective labor units: $E_{igs} = \eta_{ig} \frac{\Phi_{ig}}{w_{is}} \pi_{igs} L_{ig}$

- Equilibrium: find w_{is} that equalize demand and supply of efficiency units. ▸ Equations ▸ Graphically

- Comparative statics: "exact hat algebra" (DEK) to compute counterfactual $\hat{\lambda}_{iis}$ and $\hat{\pi}_{igs}$

Comparative Statics: Real Income

- Define $y_{ig} = \frac{Y_{ig}}{L_{ig}}$. Given all $\widehat{w}_{is}$ we can get $\widehat{\lambda}_{iis}$ and $\widehat{\pi}_{igs}$ and then

$$\widehat{y}_{ig}/\widehat{P}_i = \widehat{\Phi}_{ig}/\widehat{P}_i \text{ (from } y_{ig} = \eta\Phi_{ig} \text{)}$$

$$= \widehat{\Phi}_{ig}/\prod_s \widehat{P}_{is}^{\beta_{is}} \text{ (Cobb-Douglas preferences)}$$

Comparative Statics: Real Income

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$$

$$
= \widehat{\Phi}_{ig}/\prod_s \widehat{P}_{is}^{\beta_{is}} \text{ (Cobb-Douglas preferences)}
$$

from $\lambda_{iis} = \dfrac{T_{is}w_{is}^{-\theta_s}}{\eta^{\theta_s}P_{is}^{-\theta_s}}$ and $\pi_{igs} = \dfrac{A_{igs}w_{is}^{\kappa}}{\Phi_{ig}^{\kappa}}$:

$$
= \underbrace{\prod_s \widehat{\lambda}_{iis}^{-\beta_{is}/\theta_s}}_{Country-level\ ACR\ gains} \cdot \underbrace{\prod_s \widehat{\pi}_{igs}^{-\beta_{is}/\kappa}}_{New\ group-level\ ``Roy"\ term}
$$

Comparative Statics: Real Income

$$
\frac{\widehat{y}_{ig}}{\widehat{P}_i} = \underbrace{\prod_s \widehat{\lambda}_{iis}^{-\beta_{is}/\theta_s}}_{A\ country's\ consumer\ gains} \cdot \underbrace{\prod_s \widehat{\pi}_{igs}^{-\beta_{is}/\kappa}}_{A\ group's\ labor-income\ gains}
$$

- Consumer gains measure gains from specialization at the country level
    - valid for a broad class of gravity models (ACR)

- Workers in group g gain less if sectors of their comparative advantage need to shrink

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Empirical Analysis

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Data

- For $i =$ US, sector s

- Estimation follows ADH very closely:
  - $G = 722$ Commuting Zones (CZs)
  - Time period: 1990-2007
  - Labor income data from the American Community Survey (ACS)
  - Employment data from County Business Patterns (CBP)
  - Trade data from UN Comtrade at the six-digit product level

- Simulations:
  - Trade data from WIOD
  - $S = 14$, with 13 manufacturing sectors and 1 non-manufacturing sector
  - Labor data: Census and American Community Survey
  - Time period: 2000 - 2007

Estimation

- Two key elasticities: θ and κ

    ‣ Estimation of θ is standard in the literature - gravity equation

    ‣ Key challenge here is estimation of κ

- Combine empirical and theoretical elements to estimate κ

    ‣ Empirical: higher exposure to China shock $\rightarrow\downarrow$ manuf. employment

    ‣ Theoretical: $\downarrow$ manuf. employment $\rightarrow\downarrow$ relative income depending on κ

Estimation

- Formally, for $i = US$ and supressing subindex, model implies

$$\ln \hat{y}_g = \ln \hat{w}_{NM} - \frac{1}{\kappa} \ln \hat{\pi}_{gNM} + \varepsilon_{gNM},$$

where $\varepsilon_{gNM} = (1/\kappa) \ln \hat{A}_{gNM}$. `Derivation and discussion`

- Use China shock

$$Z_{gt} \equiv \sum_{s \in M} \pi_{gst} \Delta IP_{st}^{China \rightarrow Other}$$

as instrument for $\ln \hat{\pi}_{gNM}$ building on ADH.

- Exclusion restriction: $E(Z_g \varepsilon_{gNM}) = 0$ `Discussion`

- Identical set of control variables as ADH

Table: IV estimation of κ

	(1)	(2)	(3)	(4)
	$\ln \hat{y}_g$	$\ln \hat{y}_g$	$\ln \hat{y}_g$	$\ln \hat{y}_g$
$\ln \hat{\pi}_{NM}$	-0.358*	-0.639**	-0.704**	-0.487**
	(0.211)	(0.303)	(0.295)	(0.183)
Implied κ	2.79	1.56	1.42	2.05
F-First Stage	58.46	24.02	29.52	67.87
Observations	1444	1444	1444	1444
R^2	0.683	0.667	0.662	0.677
Import Penetration	Other (π_{gst-10})	Other	US	US Bartik

Variable y_g is average earnings per worker, and π_{gNM} is the labor share employed in non-manufacturing. The columns differ in the construction of the instrument: column (1) uses $Z_{gt} \equiv \sum_{s \in M} \pi_{gst-10} \Delta IP_{st}^{China \to Other}$, column (2) uses $Z_{gt} \equiv \sum_{s \in M} \pi_{gst} \Delta IP_{st}^{China \to Other}$, column (3) uses $Z_{gt} \equiv \sum_{s \in M} \pi_{gst} \Delta IP_{st}^{China \to US}$, and column (4) uses our Bartik measure for the US: $Z_{gt} \equiv \ln \sum_s \pi_{gst} \hat{r}_{st}$. Standard errors are clustered at the state level and reported in parentheses.

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China-shock calibration

- China shock = sector-level productivity shocks in the model, $\widehat{T}_{China,s}$

- Calibration of $\widehat{T}_{China,s}$
    - Inspired by Caliendo, Dvorkin & Parro (2016)

- Run a variation on ADH's first-stage regression for our data

$$\hat{\lambda}_{China,US,s} = \alpha + \beta\hat{\lambda}_{China,Other,s} + \varepsilon_s$$

- Obtain $\widehat{\hat{\lambda}_{China,US,s}} \equiv \hat{\beta}\hat{\lambda}_{China,Other,s}$

- Calibrate $\widehat{T}_{China,s}$ to fit the simulated $\hat{\lambda}_{China,US,s}$ to $\widehat{\hat{\lambda}_{China,US,s}}$

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Simulated China shock and groups' income changes

κ	Aggregate	Mean	CV	Min.	Max.	ACR
$\rightarrow 1$	0.24	0.30	1.40	-1.73	2.32	0.14
1.5	0.22	0.27	1.16	-1.42	1.64	0.15
3	0.20	0.24	0.80	-0.90	0.97	0.16
$\rightarrow \infty$	0.20	0.20	0	0.20	0.20	0.20

The first column displays the aggregate welfare effect of the China shock for the US, in percentage terms $100(\widehat{W}_{US} - 1)$, and the second column shows the mean welfare effect: $100(\frac{1}{G} \sum_g \widehat{W}_{US,g} - 1)$. The third column shows the coefficient of variation (CV), and for the fourth and fifth column we have Min.$\equiv \min_g 100(\widehat{W}_{US,g} - 1)$ and Max.$\equiv \max_g 100(\widehat{W}_{US,g} - 1)$, respectively. The final column displays the multi-sector ACR term $100\left(\prod_s \widehat{\lambda}_{US,US,s}^{-\beta_{US,s}/\theta_s} - 1\right)$. The values for $\hat{T}_{China,s}$ are calibrated for $\kappa = 1.5$.

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

Legend:
- 0.47 − 1.64
- 0.42 − 0.47
- 0.34 − 0.42
- 0.23 − 0.34
- 0.03 − 0.23
- -1.42 − 0.03
- No data
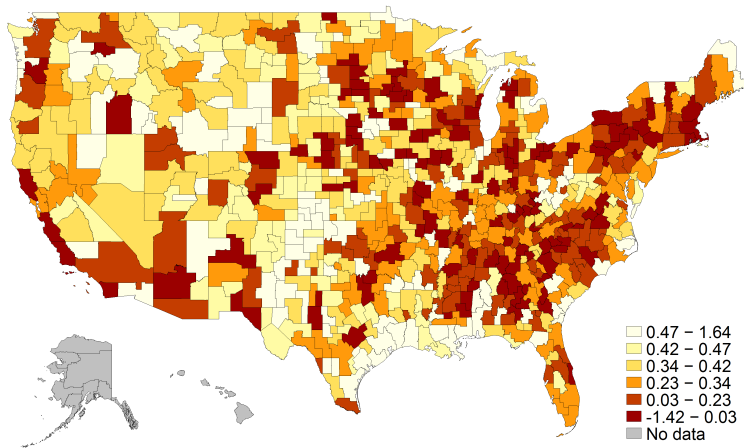
This figure plots the geographic distribution of $100(\hat{W}_g - 1)$, where $\hat{W}_g$ are the welfare effects for group g in the US from the counterfactual rise of China, for our preferred value of $\kappa = 1.5$.

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Theory: Inequality-Adjusted Welfare Effects

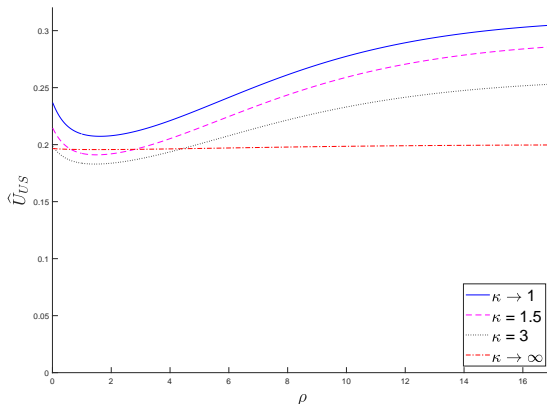- Let $W_g \equiv Y_g / P$. Utility for agent behind the veil of ignorance

$$U \equiv \left(\sum_g \frac{L_g}{L} W_g^{1-\rho} \right)^{1/(1-\rho)}$$

- The higher ρ, the more risk (or inequality) averse

  ▸ For $\rho = 0$, $U = W$, with $W \equiv \sum_g \frac{L_g}{L} W_g$

- Inequality-adjusted welfare effects:

$$\widehat{U} = \left(\sum_g \omega_g \hat{W}_g^{1-\rho} \right)^{\frac{1}{1-\rho}} \quad \text{with} \quad \omega_g \equiv \frac{L_g (Y_g / L_g)^{1-\rho}}{\sum_h L_h (Y_h / L_h)^{1-\rho}}$$

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Inequality-adjusted welfare effects

The figure plots the relationship between $\hat{U}$, the inequality-adjusted welfare effects of the rise of China, with $U \equiv \left(\sum_g l_g W_g^{1-\rho} \right)^{1/(1-\rho)}$, and ρ which is the coefficient of relative risk aversion for the agent behind the veil of ignorance.

Initial income and changes in import competition

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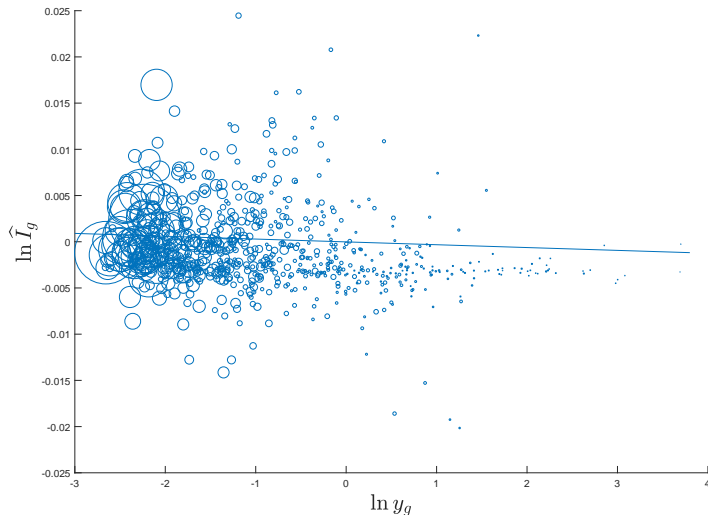
Counterfactual return to autarky

- The gains from trade are 1.56% for the US, with a CV of 58%.

- Losses from trade are particularly concentrated in Central and Southern Appalachia

- The inequality-adjusted gains from trade are higher than the standard gains from trade

Full results

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Unemployment (in progress)

Matching and employment rate (Kim and Vogel 2018)

- Workers get matched to a vacancy with endogenous probability E_{ig}

- Employers' cost of posting a vacancy V_{igs} is $C_{ig}P_i$, so their ZPC entails

$$\psi_{igs} = \frac{(1 - v_{ig})}{C_{ig}} \eta E_{ig} \frac{\Phi_{ig}}{P_i},$$

with labor market tightness $\psi_{igs} \equiv \frac{V_{igs}}{\pi_{igs} L_{ig}}$.

- Since $\psi_{igs} = \psi_{ig}$, and with a matching function $E_{ig} = A_{ig}^M \psi_{ig}^\alpha$:

$$E_{ig} = \left(A_{ig}^M\right)^{\frac{1}{1-\alpha}} \left(\frac{\eta(1 - v_{ig})}{C_{ig}}\right)^{\frac{\alpha}{1-\alpha}} \left(\frac{\Phi_{ig}}{P_i}\right)^{\frac{\alpha}{1-\alpha}}$$

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Updated welfare expression

$$
\widehat{W}_{ig} = \left(\underbrace{\prod_s \widehat{\lambda}_{iis}^{-\beta_{is}/\theta_s}}_{A\ country's\ consumer\ gains} \cdot \underbrace{\prod_s \widehat{\pi}_{igs}^{-\beta_{is}/\kappa}}_{A\ group's\ labor-income\ gains} \right)^{\frac{1}{1-\alpha}}
$$

- The change in the employment rate amplifies the change in real income.

- The larger α - the elasticity of the employment rate to labor market tightness - the stronger the amplification.

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Amplification effect of α on the welfare changes
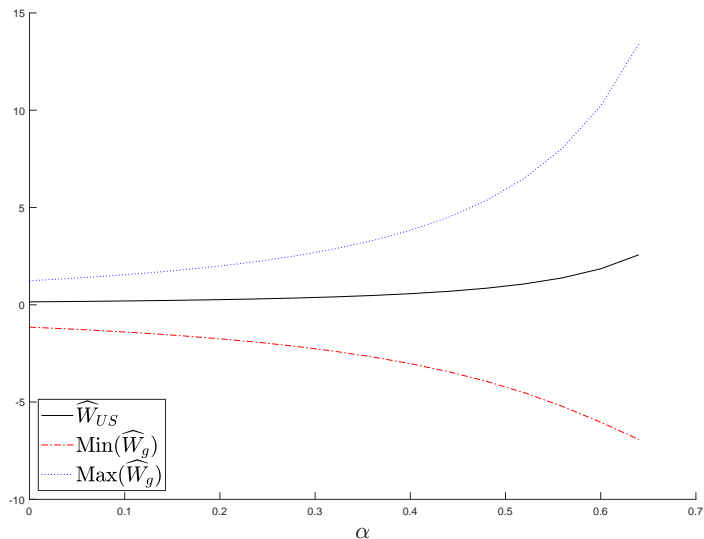
Approximate sufficient statistic for income changes

- A Bartik-style approximation of relative income changes, for any trade shock

$$\ln \widehat{Y}_g / \widehat{Y} \approx \frac{1}{\kappa(1-\alpha)} \ln \sum_s \pi_{gs} \widehat{r}_s$$

  ▸ $r_s \equiv \sum_g \pi_{gs} Y_g / Y$

  ▸ This approximate sufficient statistic is exact for $\kappa(1-\alpha) = 1$, and almost exact in our simulations.

- In the data, we (i) test the validity of this import-competition measure and (ii) estimate α indirectly, assuming $\kappa = 1.5$.

Table: Empirical analysis of the Bartik measure as sufficient statistic

	(1)	(2)	(3)
	$\ln \hat{y}_g$	$\ln \hat{y}_g$	$\ln \hat{y}_g$
$\ln \sum_s \pi_{gs} \hat{r}_{s,US}$	1.230^*	1.735^{**}	1.845^{**}
	(0.727)	(0.824)	(0.787)
Implied α	0.458	0.614	0.637
F First Stage	42.66	18.80	16.35
Observations	1444	1444	1444
R^2	0.677	0.664	0.660
Instrument	IP to other (lagged)	IP to other (no lag)	IP to the US

Variable y_g is measured as average earnings per worker. Labor shares π_{gs} are measured as the share of workers using the CBP data in 1990 and 2000. We aggregate the shares at the 2 digit-ISIC industry level. Column (1) reports the second stage coefficient in which imports to other HI countries and lagged employment shares are used when constructing the instrument, column (2) is analogous to column (1) but does not employ lagged shares. Column (3) reports the second stage coefficient in the case in which US imports is used as an instrument (without lagged employment shares). Standard errors (in parentheses) are clustered at the state level, with * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$. All specifications include the same set of controls employed in our baseline κ estimation.

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Conclusion

- Framework to study aggregate and distributional effects of trade

- Welfare effects are summarized in a parsimonious equation that nests the multi-sector ACR result

- Key additional parameter κ governs strength of distributional effects

- Estimate κ combining ADH Bartik strategy with structural equation from model, $\kappa \approx 1.5$

- Counterfactual analysis reveals that China shock increases average welfare, but some groups experience losses more than six times the average gain

- Adjusted for plausible measures of inequality aversion, gains in social welfare remain positive, and deviate only slightly from the standard aggregation.

Background

Equilibrium

- Excess demand for efficiency units in sector s of country i is

$$ELD_{is} \equiv \frac{1}{w_{is}} \sum_j \lambda_{ijs} \beta_{js} Y_j - \sum_g E_{igs}$$

- λ_{ijs}, Y_j and E_{igs} are functions of the whole matrix of wages $\boldsymbol{w} \equiv \{w_{is}\}$, so system $ELD_{is} = 0$ for all i, s determines all wages $\boldsymbol{w}$

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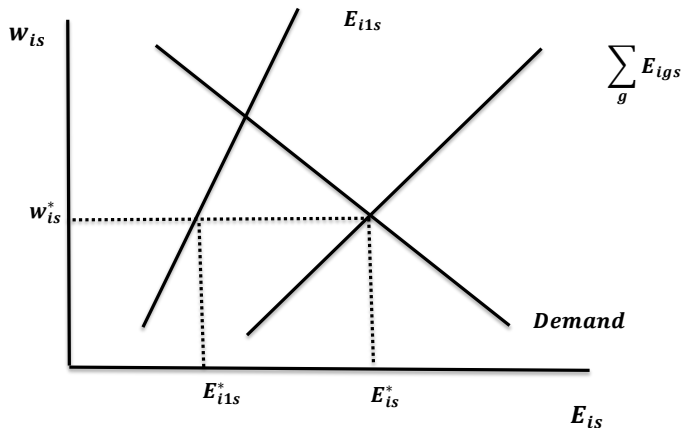
Comparative Statics: Wages

- Foreign shock: $\widehat{T}_{is}$, $\widehat{\tau}_{ijs} \neq 1$ for $i \neq j$ ($\widehat{x} \equiv x'/x$)

- Using $ELD_{is} = 0$, we can write $ELD'_{is} = 0$ as

$$\sum_g \widehat{\pi}_{igs} \widehat{\Phi}_{ig} \pi_{igs} Y_{ig} = \sum_j \widehat{\lambda}_{ijs} \lambda_{ijs} \beta_{js} \sum_g \widehat{\Phi}_{jg} Y_{jg}$$

with

$$\widehat{\Phi}_{ig} = \left(\sum_k \pi_{igk} \widehat{w}_{ik}^{\kappa} \right)^{1/\kappa},$$

$$\widehat{\lambda}_{ijs} = \frac{\widehat{T}_{is} \left(\widehat{\tau}_{ijs} \widehat{w}_{is} \right)^{-\theta_s}}{\sum_k \lambda_{kjs} \widehat{T}_{ks} \left(\widehat{\tau}_{kjs} \widehat{w}_{ks} \right)^{-\theta_s}},$$

$$\widehat{\pi}_{igs} = \frac{\widehat{w}_{is}^{\kappa}}{\sum_k \pi_{igk} \widehat{w}_{ik}^{\kappa}}$$

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Supply and Demand of E_{is}

Derivation of estimation equation

- Labor Share: $\pi_{gs} = \frac{A_{gs} w_s^\kappa}{\Phi_g^\kappa}$

- Hat algebra and rearranging: $\hat{\Phi}_g^\kappa = \frac{\hat{A}_{gs} \hat{w}_s^\kappa}{\hat{\pi}_{gs}}$

- Intuition: conditional on $\hat{w}_s^\kappa$, $\hat{\pi}_{gs}$ acts as a sufficient statistic for a group's degree of specialization

- Taking logs, noting that $\hat{y}_g = \hat{\Phi}_g$ and applying to sector *NM*:

$$\ln \hat{y}_g = \ln \hat{w}_{NM} - \frac{1}{\kappa} \ln \hat{\pi}_{gNM} + \varepsilon_{gNM},$$

- Focus on non-manufacturing since it is the largest sector, and only sector with sufficiently strong first stage

Back

Exclusion restriction

- Control for observables X_{gt}: $\varepsilon_{gt} = X_{gt}'\Theta + \epsilon_{gt}$

- Updated exclusion restriction: Turning to the second condition, on instrument validity, note that

$$cov(Z_{gt}, \epsilon_{gt}) = \sum_{s \in M} \Delta IP_{st}^{China \to Other} \mathbb{E}\left[\pi_{gst-10}\mathbb{E}[\epsilon_{gt}|\boldsymbol{\pi_{gt-10}}]\right] = 0,$$

- Two ways of satisfying this restriction:

  ▸ $\mathbb{E}\left[\pi_{gst-10}\mathbb{E}[\epsilon_{gt}|\boldsymbol{\pi_{gt-10}}]\right] = 0$ for all s (Goldsmith-Pinkham et al. 2018)

  ▸ $cov(Z_{gt}, \epsilon_{gt}) = \sum_{s \in M} \Delta IP_{st}^{China \to Other} \mathbb{E}\left[\pi_{gst-10}\epsilon_{gt}\right] \to 0$ (Borusyak et al. 2018)

   - This restriction relates to the ADH argument on the exogeneity of the China shock

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Counterfactual return to autarky

Table: Aggregate and Group-level Gains from Trade

| κ	Aggregate	Mean	CV	Min.	Max.	ACR
$\rightarrow 1$	1.61	1.65	0.82	-6.98	3.72	1.45
1.5	1.56	1.59	0.58	-4.19	2.97	1.45
3	1.51	1.52	0.31	-1.38	2.22	1.45
$\rightarrow \infty$	1.45	1.45	0	1.45	1.45	1.45

The first column displays the aggregate gains from trade for the US, in percentage terms ($100(1 - \widehat{W}_{US})$) and the second column shows the mean welfare effect: $100(\frac{1}{G} \sum_g 1 - \widehat{W}_{US,g})$. Here, $\widehat{W}_{US}$ and $\widehat{W}_{US,g}$ are the aggregate and group-level welfare change from a return to autarky for the US. The third column shows the coefficient of variation (CV), and for the fourth and fifth column we have Min.$= \min_g 100(1 - \widehat{W}_{US,g})$ and Max.$= \max_g 100(1 - \widehat{W}_{US,g})$, respectively. The final column displays the multi-sector ACR term $100 \left(1 - \prod_s \widehat{\lambda}_{US,US,s}^{-\beta_{US,s}/\theta_s}\right)$. Back

Figure: Geographical distribution of the gains from trade

Legend:
2.36 − 2.97
2.08 − 2.36
1.78 − 2.08
1.45 − 1.78
0.94 − 1.45
-4.19 − 0.94
No data
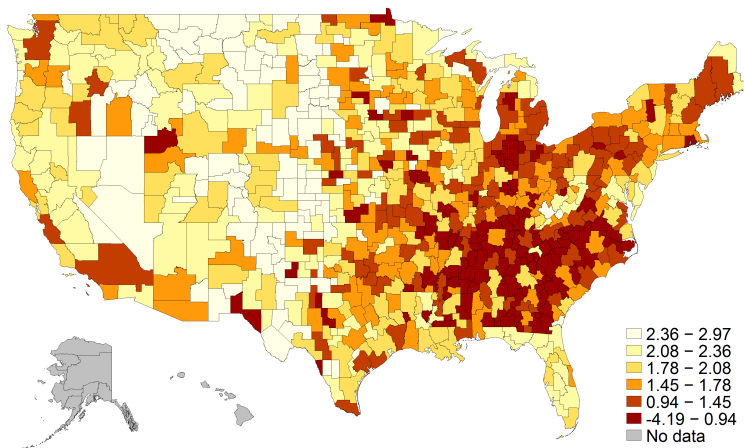
This figure plots the geographic distribution of $100(1 - \hat{W}_g)$, where $\hat{W}_g$ are the welfare effects for group g in the US from a return to autarky for our preferred value of $\kappa = 1.5$. Back

Inequality-adjusted Gains from Trade
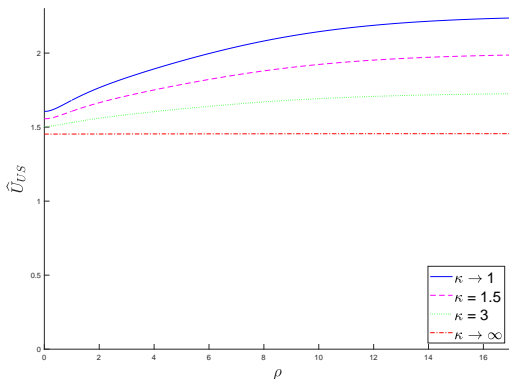
The figure plots the relationship between the inequality-adjusted gains from trade $\hat{U}_{US} \equiv \left(\sum_g \omega_g \hat{W}_g^{1-\rho} \right)^{\frac{1}{1-\rho}}$ and ρ. Here, ρ is the coefficient of relative risk aversion for the agent behind the veil of ignorance and $\omega_g \equiv \frac{l_g (Y_g / L_g)^{1-\rho}}{\sum_h l_h (Y_h / L_h)^{1-\rho}}$ a modified weight for group g. The vertical axis displays $100(1 - \hat{U}_{US})$. Back

Income and import competition