Good jobs, bad jobs: what's trade got to do with it?

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Motivation

- Renewed interest in trade and labor market outcomes
- Popular press
 - Rising political & economic clout of China
 - Massive trade deals in the wings (TPP, TTIP)
 - Anti-trade political rhetoric
 - Trump, Clinton, Sanders
- Academia
 - Rising political & economic clout of China

Trade vs technology?

Stylized fact: hourglass economy/job polarization



Figure: The "hourglass economy" (UK Govt report)

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Stylized fact: hourglass economy/job polarization



Figure: Job "polarization" (Boehm, LSE blog)

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Stylized fact: hourglass economy/job polarization



Figure: Job "polarization" (our US Census data)

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Tech change and/or international trade \rightarrow job polarization?

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▶ Focus on US over 1990-2010 period



Data & methodology

Results

Conclusion

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Outline

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Key variables: measuring job polarization

- 1. Job = occupation & industry
 - EX. accountant in manuf., accountant in hospitality, boilermaker in manuf., boilermaker in construction
 - 381 occs \times 8 inds = 3048 possible jobs
 - 2679 observed
- 2. Job "quality" pprox % of workers with lower educ & wage
 - ▶ EX. 40% of workers in jobs with less educ & wage def

- 3. Employment growth of a job
 - Change in $\frac{\text{employment}}{\text{working age population}}$ b/w 1990 and 2010
- 4. US locations = commuting zones (CZs)
 - ▶ 741 CZs

Key variables: trade vs technology

International trade

- Import surge from China since 1990
 - Massive reforms/changes in China
 - IV: Chinese import surge in other rich countries
- Technological change
 - Ignore "skilled biased" technological change...
 - can't explain job/wage polarization
 - Focus on "routine biased" technological change (RBTC)
 - Automation/computerization of "routine tasks"
 - Occupations differ in their "routine task intensity" (RTI)

1980 RTI measure vs 1990-2010 sample

Vulnerable jobs

- 1. RBTC
 - Occ of job has high RTI
 - Secretaries, bank tellers, typists, meter readers, receptionists, butchers, pharmacists, boilermakers, precision grinders & filers, furniture & wood finishers

2. Trade 🕩

- Occ of job tends to be in industries with Chinese import surges
 - Inds: Toys & sporting goods, computers & equip, leather goods, footwear, fabricated textiles, apparel & accessories, furniture & fixtures, h/hold appliances, radio/TV/comm equip
 - Occs: Shoemaking machine operators, cabinetmakers, textile machine operators, furniture & wood finishers, solderers, woodworkers, upholsters, washing machine operators

Jobs vuln to trade (RBTC) aren't vuln to RBTC (trade)

Vulnerable locations (CZs)

1. RBTC • def

Workforce concentrated in occs vulnerable to RBTC

2. Trade Mef

Workforce concentrated in occs vulnerable to trade

- ► Maps ► RBTC ► trade
 - CZs vuln to trade (RBTC) aren't vuln to RBTC (trade)

Methodology in a nutshell

- 1. Comparisons at "national level"
 - Compare jobs with high vs low vuln (trade or RBTC)
- 2. Comparisons at "location level" (CZs)
 - Compare jobs in high vs low vuln (trade or RBTC)
- 3. Hybrid comparisons
 - Compare jobs in high vs low vuln CZs (trade or RBTC)

- ... but, control for occ vuln (trade or RBTC)
- Does vuln of CZ matter beyond vuln of occ?

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Compare jobs with high vs low vuln (trade or RBTC)

$$\begin{split} empGrowth_{j} &= \beta_{1} + \beta_{2}q_{j} + \beta_{3}q_{j}^{2} \\ &+ \theta_{1}\Delta T_{j} + \theta_{2}\Delta T_{j} \cdot q_{j} + \theta_{3}\Delta T_{j} \cdot q_{j}^{2} \\ &+ \gamma_{1}R_{j} + \gamma_{2}R_{j} \cdot q_{j} + \gamma_{3}R_{j} \cdot q_{j}^{2} + \varepsilon_{j} \end{split}$$

• Quadratic interactions with q_j allow ΔT_j , $R_j \rightarrow$ polarization

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• Uninteracted q_i terms \rightarrow "residual" explanations

National level results for job polarization

Compare jobs with high vs low vuln

- Trade: no effects
 - same emp growth for high and low vuln jobs
- RBTC: fully explains polarization
 - relative to low vuln jobs, highly vuln jobs have...
 - \uparrow emp growth for high/low q, \downarrow emp growth for middle q jobs

- Iow vuln jobs: ↑ emp growth for middle q vs low/high q jobs
 - anti-polarization for low vuln jobs!

Location-level (CZ) analysis

Compare jobs in high vuln CZs vs jobs in low vuln CZs

$$empGrowth_{jc} = \beta_1 + \beta_2 q_j + \beta_3 q_j^2 + \theta_1 \Delta T_c + \theta_2 \Delta T_c \cdot q_j + \theta_3 \Delta T_c \cdot q_j^2 + \gamma_1 R_c + \gamma_2 R_c \cdot q_j + \gamma_3 R_c \cdot q_j^2 + x_c \cdot \pi + \delta_{state} + \delta_{ind} + \delta_{occ} + \varepsilon_{jc}$$

▶ Quadratic interactions with q_j allow ΔT_c , $R_c \rightarrow$ polarization

• Uninteracted q_j terms \rightarrow "residual" explanations

Location-level (CZ) results for job polarization

Compare jobs in high vuln CZs vs jobs in low vuln CZs

- Trade: does not explain polarization trade
 - high vuln vs low vuln CZs...
 - 1. high vuln CZs have depressed emp growth for all jobs
 - depressed emp growth ↑ for high/low q jobs → anti-polarization
- RBTC: fully explains polarization **PRETC**
 - high vs low vuln CZs...
 - emp growth \uparrow for high/low q jobs, \downarrow for middle q jobs
 - ▶ low vuln CZs: \uparrow emp growth for middle *q* vs low/high *q* jobs

anti-polarization for low vuln CZs!

Hybrid analysis

Compare jobs in high vuln CZs vs jobs in low vuln CZs ... conditioning on occ vuln...

$$\begin{split} empGrowth_{jc} &= \dots \\ &+ \varphi_1 \Delta T_k \cdot q_j + \theta_2 \Delta T_k \cdot q_j^2 \\ &+ \rho_1 R_k \cdot q_j + \rho_2 R_k \cdot q_j^2 \end{split}$$

Econometrics: add occ vuln to CZ analysis (trade or RBTC)
Does vuln of CZ matter beyond vuln of occ?

Hybrid results

Compare jobs in high vuln CZs vs jobs in low vuln CZs ... conditioning on occ vuln...

- Does CZ vuln matter beyond occ vuln?
 - Compare same occ in high vuln vs low vuln CZ
 - Impact of CZ vuln same as before (trade & RBTC)

- CZ vuln matters beyond occ vuln
- Compare high vs low vuln occ in same high vuln CZ
 - Basically, no difference in emp growth
 - Occ vuln essentially doesn't matter
- CZ vuln, but not occ vuln, drives polarization figure

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Conclusion

► Vulnerability to trade and/or technology → job polarization?

- ► Trade: no
 - But... negative impacts of Chinese import surges
- Technology (RBTC): yes
 - Fully accounts for polarization
- Does CZ vuln matter beyond occ vuln?
 - Yes!
 - Relative to CZ vuln, occ vuln basically irrelevant

- Impact on locations rather than jobs
- Policy implications
 - Retraining programs (e.g. TAA)

Definition of job quality

For each job *j*, compute

- 1. national median wage (w_j) and median education level (e_j)
- 2. share of national labor force in job with lower median wage (ω_j) and median education (ϵ_j)

3.
$$q_j = \frac{1}{2} (\omega_j + \epsilon_j)$$

▶ Go back

What are the good jobs and bad jobs?

Occupation group	Bottom $\frac{1}{3}$	Mid $\frac{1}{3}$	Top $\frac{1}{3}$
Managers, professional, tech	4.04%	21.63%	87.44%
Clerical, retail sales	17.94%	16.70%	1.94%
Production, craft	9.57%	10.22%	2.54%
Machine operators, assemblers	22.87%	13.05%	1.35%
Transp., constr., mechanical, farm	21.23%	31.47%	4.63%
Low skill services	24.36%	6.94%	2.09%
1 digit NAICS industry	Bottom $\frac{1}{3}$	Mid $\frac{1}{3}$	Top $\frac{1}{3}$
Agriculture	16.59%	9.84%	7.62%
Mining, Oil and Gas	6.13%	13.57%	15.40%
Manufacturing	8.52%	14.32%	14.35%
Wholesale/Retail Trade, Transp.	15.10%	12.98%	11.21%
Prof/Business Services	11.96%	14.17%	13.15%
Educ/Health/Social Assist. Services	13.60%	10.89%	15.84%
Arts/Ent/Rec, Accom/Food Service	16.14%	11.56%	7.47%



Vulnerability to trade

Occ vulnerability to trade • Go back

$$\Delta T_k = \sum_i \frac{L_{ik}}{L_k} \Delta T_i$$

CZ vulnerability to trade • Go back

$$\Delta T_c = \sum_k \frac{L_{kc}}{L_c} \Delta T_k$$

CZ vulnerability to RBTC • Go back

$$\Delta T_c = \sum_k \frac{L_{kc}}{L_c} R_k$$

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Locations (CZs) vulnerable to RBTC



Figure: CZ vulnerability to RBTC

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Locations (CZs) vulnerable to trade



Figure: CZ vulnerability to trade

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RBTC and polarization



Figure: RBTC and job polarization



Trade and polarization



Figure: Trade and job polarization



CZ or occupation vulnerability?



Figure: CZ vulnerability to trade



CZ or occupation vulnerability?



Figure: Adding occupation vulnerability to trade

