Import Competition and Internal Migration

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Welfare Gains and Costs

- Costs: highly concentrated
  - Among low education / low wages
    - Lower wages, labor force participation, higher unemployment (Autor et al, 2013; Greenland and Lopresti, 2016)
    - Worse physical health, mental health (McManus and Schaur, 2016; Lang, McManus and Schaur, 2016)
    - Increased mortality risk (Pierce and Schott, 2016)
  - Geographically
    - GE Losses in income (Acemoglu et al, 2016)
    - Lower tax base, less funding for public goods (Feler and Senses, 2017)
- No documented migration.
What are we interested in?

- Is there a migratory response to the “China Shock?”
- If so, who is moving?
- How quickly are people responding?

How do we answer it?

- Both Pierce and Schott (2016) and Autor et al. (2013) treatments of "China Shock"
- Local population changes 1990-2010
  ⇒ Census/IPUMS
- Transitions from childhood to adult locations
  ⇒ NELS:88, ELS:2002
- Distributed lag model of population dynamics
  ⇒ IRS Migration Data
Preview of Findings

• **Overview:**
  - Population reductions 1.7%-3.2%
  - Largest response among young, less educated, & men
  - Leaving shocked areas and avoiding them
  - Bulk of response > 7 years.
  - Trends in population growth mask response

• **Important for realizing welfare gains from trade.**

• **Alter interpretation of “China Shock” results.**
  - Existing literature evaluates changes in average outcomes
    - e.g. average wage, mortality rate, injury rate, graduation rate
  - Average is also affected by compositional shifts from migration
    - e.g. Low-skill workers leave, then average wages rise in the face of import competition.
    - e.g. Healthier people leave, average health declines without any direct treatment effect.
Basic Strategy

Exploit differences in labor market exposure to "China Shock" before and after WTO Entry

- China Shock: Pierce and Schott, (2016)
  - 1980 Normal Trade Relations: Uncertain but low tariffs
  - 2001 Permanent Normal Trade Relations
    - No uncertainty over tariffs
    - Export growth (Handley and Limão, 2016)
- Labor Markets differ in industrial composition and exposure

- Labor Markets: Commuting Zones
  - National coverage in 722 labor markets
  - Boundaries based on home-work commuting patterns
Normal Trade Relations Gap

For industry $j$ and commuting zone $c$, let:

$$NTRGap_j \equiv \text{NonNTRTariff}_j - \text{NTRTariff}_j$$

(1)

$$NTRGap_c \equiv \sum_j \frac{L_{cj1990}}{L_{c1990}} \times NTRGap_j$$

(2)

IQR : 5.8 percentage points.
NTR Exposure Map
Population Changes:


\[
\Delta \ln(Population_{ct}) = \beta_0 + \beta_1 NTR \text{ Gap}_c \times Post2001_t + \beta_2 X_c \times Post2001_t \\
+ \beta_3 \Delta \ln(Population_{ct-10}) + \delta_{rt} + \epsilon_{ct}
\]

\(X_c\) Includes Controls For:

- **Demographics:**
  - Hispanic
  - Asian
  - Black
  - American Indian
  - Under 25

- **Production:**
  - Outsource
  - Routine
  - K:L
  - College Ed.
  - Fem. Labor
  - Skill Int.

- **Confounding:**
  - Neighbor NTR
  - Debt:Income
  - HPI Break
Population Changes Results

### ΔLog(Population\(_{ct}\)), Census

<table>
<thead>
<tr>
<th></th>
<th>Persons Ages 15-64</th>
<th></th>
<th>Persons Ages 15-34</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td><strong>NTR Gap x Post 2001</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.079)</td>
<td>(0.070)</td>
<td>(0.117)</td>
<td>(0.114)</td>
</tr>
<tr>
<td>Δ ln(Population(_{t-10}))</td>
<td>0.565***</td>
<td>0.558***</td>
<td>0.541***</td>
<td>0.529***</td>
</tr>
<tr>
<td></td>
<td>(0.032)</td>
<td>(0.031)</td>
<td>(0.033)</td>
<td>(0.034)</td>
</tr>
<tr>
<td><strong>Implied IQR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Region-Year FE</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Demographic</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Production</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Confounding</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>N</td>
<td>1444</td>
<td>1444</td>
<td>1444</td>
<td>1322</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.714</td>
<td>0.725</td>
<td>0.739</td>
<td>0.743</td>
</tr>
</tbody>
</table>
## Population Changes Results

\[
\Delta \log(\text{Population}_{ct}), \text{ Census}
\]

<table>
<thead>
<tr>
<th></th>
<th>(1) Ages 15-64</th>
<th>(2) Ages 15-34</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTR Gap</td>
<td>-0.283**</td>
<td>-0.543***</td>
</tr>
<tr>
<td></td>
<td>(0.117)</td>
<td>(0.174)</td>
</tr>
<tr>
<td>Lagged Population Change</td>
<td>0.541***</td>
<td>0.349***</td>
</tr>
<tr>
<td></td>
<td>(0.033)</td>
<td>(0.048)</td>
</tr>
<tr>
<td><strong>Implied IQR</strong></td>
<td>-1.7%</td>
<td>-3.2%</td>
</tr>
<tr>
<td>Region-Year FE</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Demographic</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Production</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Confounding</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Observations</td>
<td>1444</td>
<td>1444</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.739</td>
<td>0.643</td>
</tr>
</tbody>
</table>
## Population Changes by Demographic Group

### $\Delta \log(\text{Population}_{ct})$ by Demographics, IPUMS

<table>
<thead>
<tr>
<th></th>
<th>Male (1)</th>
<th>Female (2)</th>
<th>Hispanic (3)</th>
<th>Black (4)</th>
<th>White (5)</th>
<th>Asian (6)</th>
<th>Less Than High School (7)</th>
<th>High School-Some College (8)</th>
<th>College Graduate (9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTR Gap Post 2001</td>
<td>-0.329**</td>
<td>-0.141</td>
<td>-0.431</td>
<td>0.0534</td>
<td>-0.166</td>
<td>-1.495***</td>
<td>-0.422***</td>
<td>-0.223**</td>
<td>-0.164</td>
</tr>
<tr>
<td></td>
<td>(0.128)</td>
<td>(0.114)</td>
<td>(0.316)</td>
<td>(0.319)</td>
<td>(0.121)</td>
<td>(0.437)</td>
<td>(0.155)</td>
<td>(0.0911)</td>
<td>(0.190)</td>
</tr>
<tr>
<td>Region-Year FE</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>$\Delta \ln(\text{Population}_{t-1})$</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Demographic Production</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>N</td>
<td>1444</td>
<td>1444</td>
<td>1444</td>
<td>1426</td>
<td>1444</td>
<td>1444</td>
<td>1444</td>
<td>1444</td>
<td>1444</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.6675</td>
<td>0.7591</td>
<td>0.4586</td>
<td>0.4207</td>
<td>0.7130</td>
<td>0.4659</td>
<td>0.7069</td>
<td>0.7314</td>
<td>0.5186</td>
</tr>
</tbody>
</table>
Individual Data on Migratory Decisions

Longitudinal Microdata
- Longitudinal survey 10th grade to age 26
- NELS:88: 1988-2000 (n=9,900)
- ELS:2002 : 2001-2013 (n=12,280)
- Restricted Access ⇒ zip-codes
- Add controls for individual characteristics

Findings:
- IQR ⇒ 5% increase in outmigration
- IQR ⇒ 7.6% reduction in probability of choosing location
Dynamics of Adjustment

- Distributed Lag Model
- Annual IRS 1040 Filing Data 1990 - 2013
- Returns & Exemptions

\[
\Delta \ln(\text{Population}_{ct}) = \eta_0 + \sum_{l=0}^{T} \tau_l \Delta t - l \text{NTR Gap}_c \times \text{Post2001}_t \\
+ \eta_1 X_c \times \text{Post2001}_t + \kappa_c + \mu_t + \omega_{ct}
\]

- Constrain Lag Structure to Cubic Function
Constrained Distributed Lag Exemptions

Marginal Effect: IRS

Cumulative Effect: IRS

Implied IQR population reduction (in 12 years) \( \approx 3.1\% \)
Alternative Measure of China Shock

Autor, Dorn, & Hanson (2013) Exploit differences in labor market exposure to supply driven export growth.

\[
\Delta L_{it} = \gamma_t + \beta_1 \Delta IPW_{uit} + X'_{it} \beta_2 + e_{ct}.
\]

Where:

\[
\Delta IPW_{uit} = \sum_j \frac{L_{ijt}}{L_{it}} \frac{\Delta M_{ucjt}}{L_{ujt}}
\]

and:

\[
\Delta IPW_{oit} = \sum_j \frac{L_{ijt-10}}{L_{it-10}} \frac{\Delta M_{ocjt}}{L_{ujt-10}}
\]
## Table: Import Competition and Changes in Log CZ Population, Autor, Dorn, and Hanson (2013)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15-64</td>
<td>College</td>
<td>Non-College</td>
<td>15-34</td>
<td>35-49</td>
<td>50-64</td>
</tr>
<tr>
<td>$\Delta IPW_{uit}$</td>
<td>-0.050</td>
<td>-0.026</td>
<td>-0.048</td>
<td>-0.138</td>
<td>0.367</td>
<td>-0.138</td>
</tr>
<tr>
<td></td>
<td>(0.746)</td>
<td>(0.685)</td>
<td>(0.823)</td>
<td>(1.190)</td>
<td>(0.560)</td>
<td>(0.651)</td>
</tr>
<tr>
<td></td>
<td>1990-2007</td>
<td><em>Autor et al. (2013)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta IPW_{uit}$</td>
<td>-0.709</td>
<td>-0.592</td>
<td>-0.710</td>
<td>-1.039</td>
<td>-0.194</td>
<td>-0.530</td>
</tr>
<tr>
<td></td>
<td>(0.485)</td>
<td>(0.582)</td>
<td>(0.483)</td>
<td>(1.037)</td>
<td>(0.329)</td>
<td>(0.527)</td>
</tr>
<tr>
<td></td>
<td>1990-2007</td>
<td><em>Autor et al. (2013)</em> with $\Delta \ln(population_{t-10})$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta IPW_{uit}$</td>
<td>-0.806*</td>
<td>-0.558</td>
<td>-1.041**</td>
<td>-1.491**</td>
<td>-0.060</td>
<td>-0.475</td>
</tr>
<tr>
<td></td>
<td>(0.426)</td>
<td>(0.551)</td>
<td>(0.453)</td>
<td>(0.731)</td>
<td>(0.443)</td>
<td>(0.611)</td>
</tr>
<tr>
<td>IRQ (1.92)</td>
<td>-1.5%</td>
<td>-2.0%</td>
<td>-2.8%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1990-2010</td>
<td><em>Autor et al. (2013)</em> with $\Delta \ln(population_{t-10})$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Conclusions

- Migratory response among working age adults
- Strongest among: men, under 35, & non-college
- Pierce and Schott (2016)
- Autor, Dorn, Hanson (2013)
- Existing results on “China Shock” reflect compositional changes in labor force
HPI Index Structural Break Estimation

- Charles, Hurst, Notowidigdo (2016)
- Housing boom masked decline in labor market opportunities
- Federal Housing Agency, zip-code Housing Price Index
- 656 CZ’s
- Estimate "Break" in trend of housing prices
- For each CZ and year in 2001-2006

\[
\ln(HPI_{ct}) = \alpha_c + \zeta_c \times Year + \lambda_c \times (Year - Year^*) \times I(Year \geq Year^*) + \epsilon_{ct}
\]
Figure: CZ Housing Price Break Estimates

RETURN TO CENSUS BASELINE
Table: Changes in Log CZ Population by Age and Education

<table>
<thead>
<tr>
<th></th>
<th>All Persons Ages 25-34</th>
<th>All Persons Ages 35-44</th>
<th>All Persons Ages 45-54</th>
<th>All Persons Ages 55-64</th>
</tr>
</thead>
<tbody>
<tr>
<td>NTR Gap × Post 2001</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than High School</td>
<td>-0.926***</td>
<td>-0.681***</td>
<td>-0.327</td>
<td>0.00765</td>
</tr>
<tr>
<td>High School - Some College</td>
<td>-1.032***</td>
<td>-0.117</td>
<td>0.177</td>
<td>-0.271**</td>
</tr>
<tr>
<td>College Graduate</td>
<td></td>
<td>-0.156</td>
<td>(0.149)</td>
<td>(0.217)</td>
</tr>
</tbody>
</table>

R-squared: All: 0.06, (1) 0.06, (2) 0.06, (3) 0.06
Distributed Lag Details: Rewrite Model in Cubic Form

\[ \tau_l = \pi_0 + \pi_1 l + \pi_2 l^2 + \pi_3 l^3 \]

Then,

\[ \Delta \ln(\text{population}_{it}) = \eta_0 + \pi_0 z_{0,t} + \pi_1 z_{1,t} + \pi_2 z_{2,t} + \pi_3 z_{3,t} \]

\[ + \eta_1 X_c \times \text{Post2001} + \kappa c + \mu_t + \omega_{ct} \]

\[ z_{0,ct} \equiv \sum_{l=0}^{T} \Delta_{t-l}(NTRGap_c \times \text{Post2001}_t) \] (3)

\[ z_{1,ct} \equiv \sum_{l=0}^{T} l \Delta_{t-l}(NTRGap_c \times \text{Post2001}_t) \]

\[ z_{2,ct} \equiv \sum_{l=0}^{T} l^2 \Delta_{t-l}(NTRGap_c \times \text{Post2001}_t) \]

\[ z_{3,ct} \equiv \sum_{l=0}^{T} l^3 \Delta_{t-l}(NTRGap_c \times \text{Post2001}_t). \] (4)

(5)

Return To Distributed Lag