# Import Competition and Internal Migration

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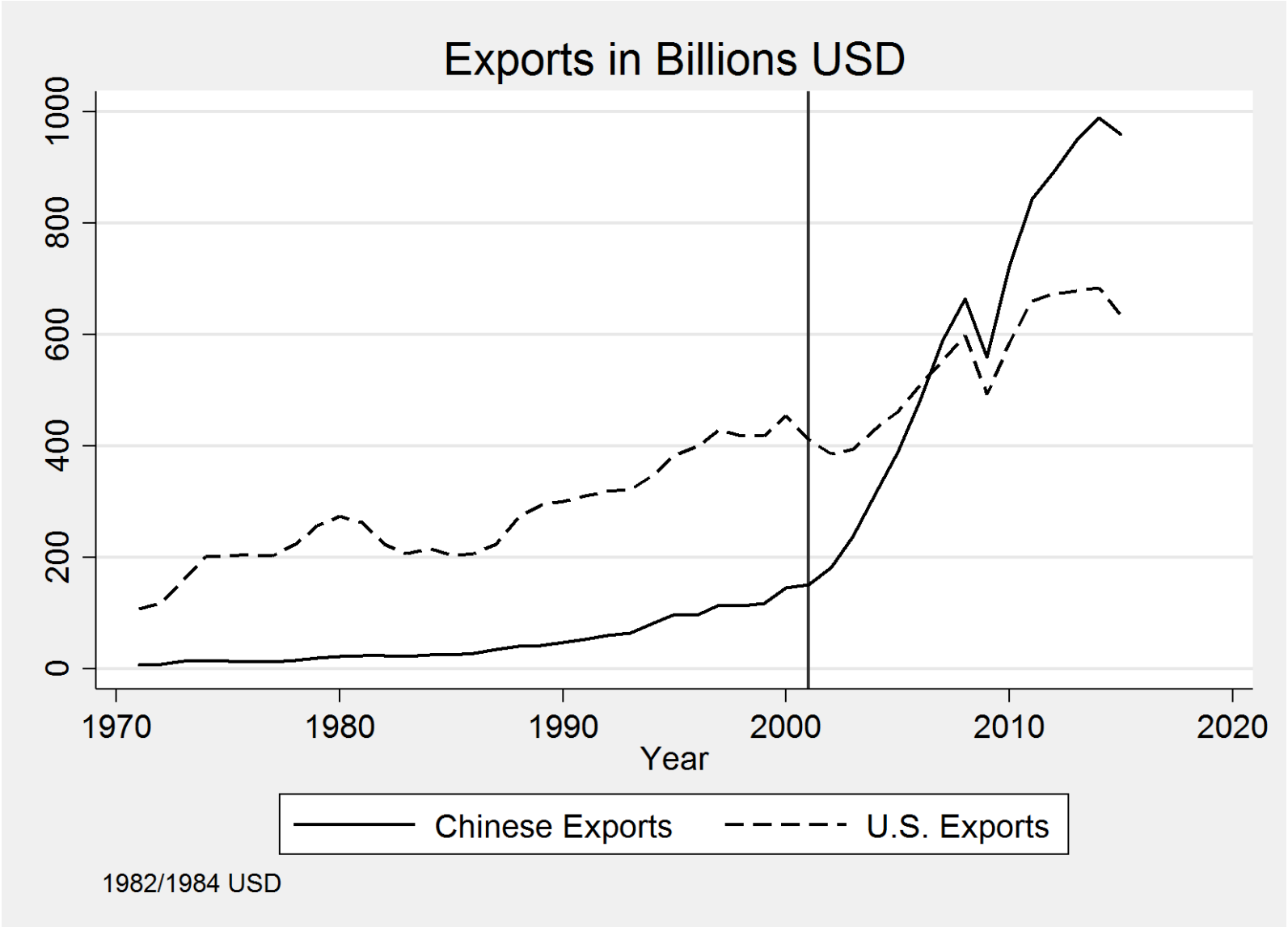
# Chinese Export Growth



# Welfare Gains and Costs

- Gains: spread throughout economy (Amiti, M., M. Dai, R. Feenstra, and J. Romalis, 2017; Galle, S., A. Rodriguez-Clare, and M. Yi, 2017)
- 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
  $\Rightarrow$ Census/IPUMS
- Transitions from childhood to adult locations
  $\Rightarrow$ NELS:88, ELS:2002
- Distributed lag model of population dynamics
  $\Rightarrow$ 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

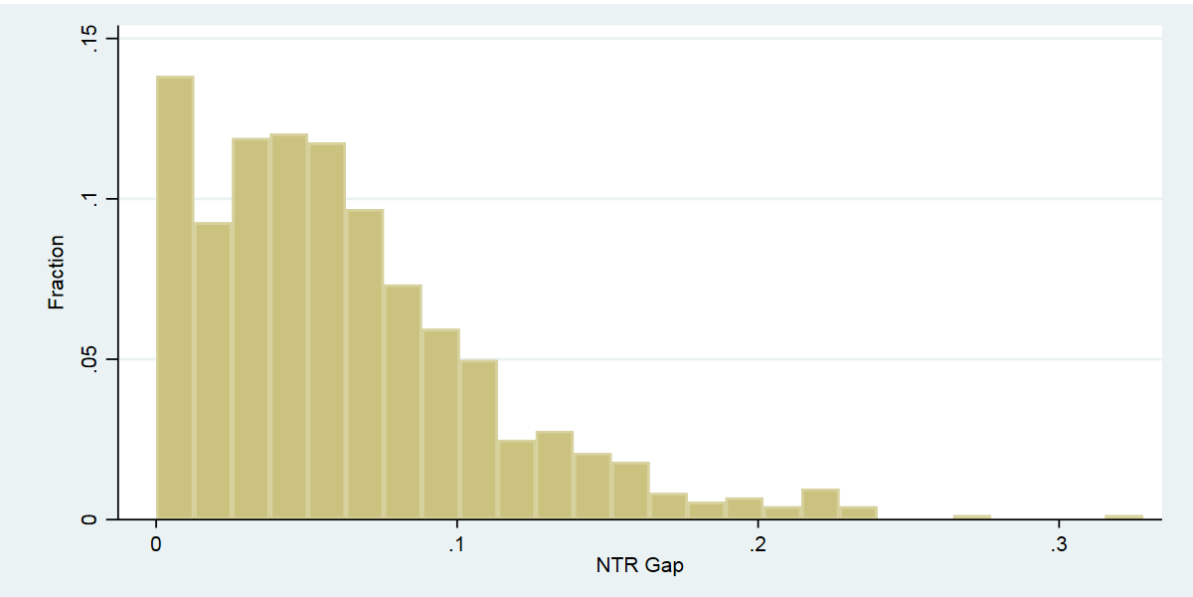
# Normal Trade Relations Gap

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

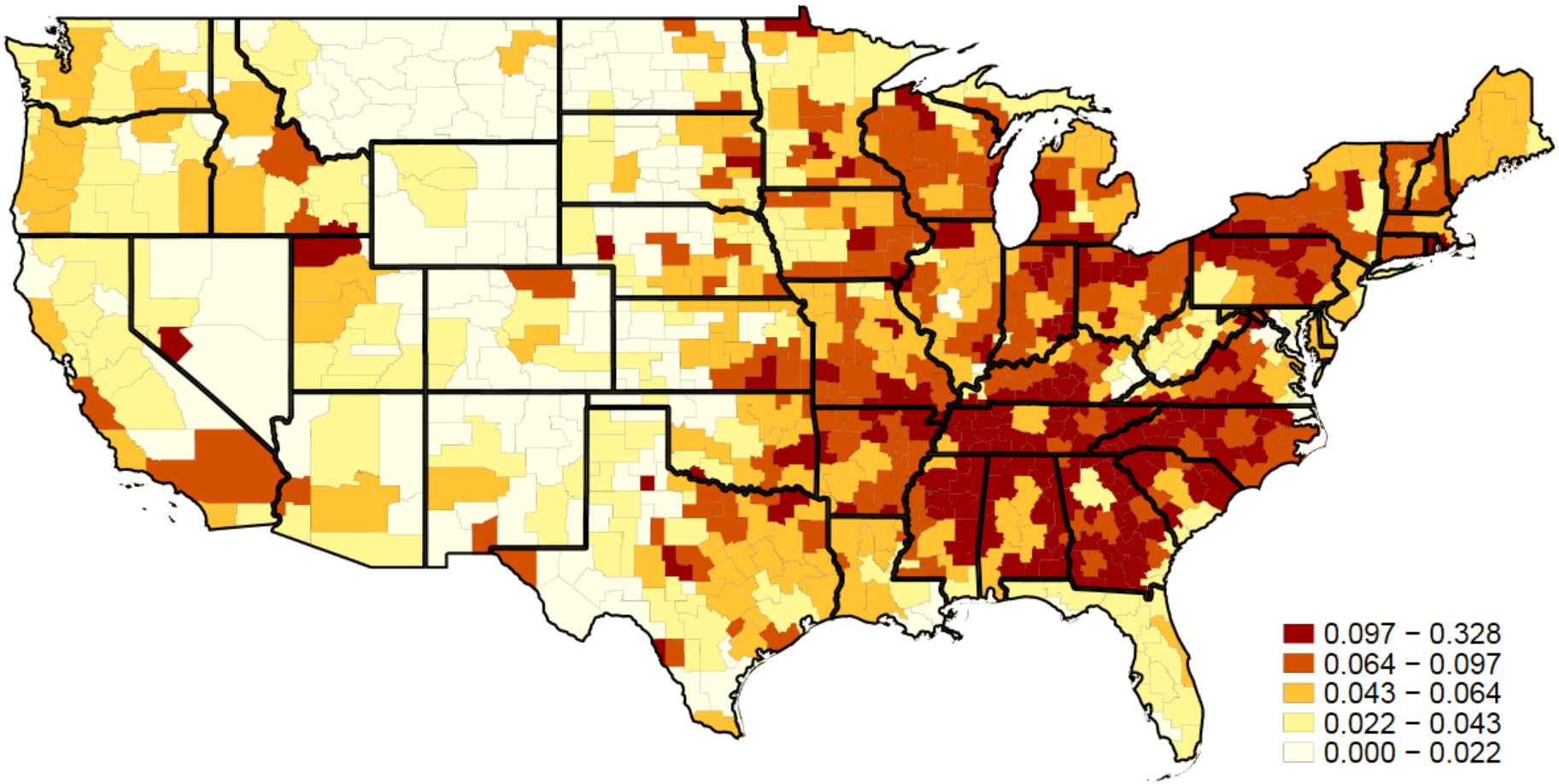
$$\text{NTRGap}_j \equiv \text{NonNTRTariff}_j - \text{NTRTariff}_j \quad (1)$$

$$\text{NTRGap}_c \equiv \sum_j \frac{L_{cj1990}}{L_{c1990}} \times \text{NTRGap}_j \quad (2)$$

IQR : 5.8 percentage points.



# NTR Exposure Map



# Population Changes:

U.S. Census & IPUMS: 1990-2000, 2000-2010

$$\Delta ln(Population_{ct}) = \beta_0 + \beta_1 NTR\ Gap_c \times Post2001_t + \beta_2 X_c \times Post2001_t + \beta_3 \Delta ln(population_{ct-10}) + \delta_{rt} + \epsilon_{ct}$$

**$X_c$ 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

## $\Delta$Log(Population$_{ct}$), Census

| | Persons Ages 15-64 | | | | Persons Ages 15-34 | | | |
|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| NTR Gap | -0.253*** | -0.307*** | -0.283** | -0.264** | -0.634*** | -0.731*** | -0.543*** | -0.503*** |
| x Post 2001 | (0.079) | (0.070) | (0.117) | (0.114) | (0.108) | (0.096) | (0.174) | (0.170) |
| $\Delta$ ln(Population$_{t-10}$) | 0.565*** | 0.558*** | 0.541*** | 0.529*** | 0.368*** | 0.360*** | 0.349*** | 0.338*** |
| | (0.032) | (0.031) | (0.033) | (0.034) | (0.044) | (0.044) | (0.048) | (0.047) |
| **Implied IQR** | -1.5% | -1.8% | -1.7% | -1.6% | -3.73% | -4.3% | -3.2% | -3.0% |
| Region-Year FE | Y | Y | Y | Y | Y | Y | Y | Y |
| Demographic | N | Y | Y | Y | N | Y | Y | Y |
| Production | N | N | Y | Y | N | N | Y | Y |
| Confounding | N | N | N | Y | N | N | N | Y |
| N | 1444 | 1444 | 1444 | 1322 | 1444 | 1444 | 1444 | 1322 |
| $R^2$ | 0.714 | 0.725 | 0.739 | 0.743 | 0.621 | 0.630 | 0.643 | 0.653 |

# Population Changes Results

$\Delta$Log(Population$_{ct}$), Census

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|---|---|---|
| NTR Gap | -0.283** | -0.543*** |
| | (0.117) | (0.174) |
| Lagged Population Change | 0.541*** | 0.349*** |
| | (0.033) | (0.048) |
| **Implied IQR** | -1.7% | -3.2% |
| Region-Year FE | Y | Y |
| Demographic | Y | Y |
| Production | Y | Y |
| Confounding | N | N |
| Observations | 1444 | 1444 |
| $R^2$ | 0.739 | 0.643 |

# Population Changes by Demographic Group

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

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

# Individual Data on Migratory Decisions

**Longitudinal Microdata**

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

**Findings:**

- IQR $\Rightarrow$ 5% increase in outmigration
- IQR $\Rightarrow$ 7.6% reduction in probability of choosing location

# Dynamics of Adjustment

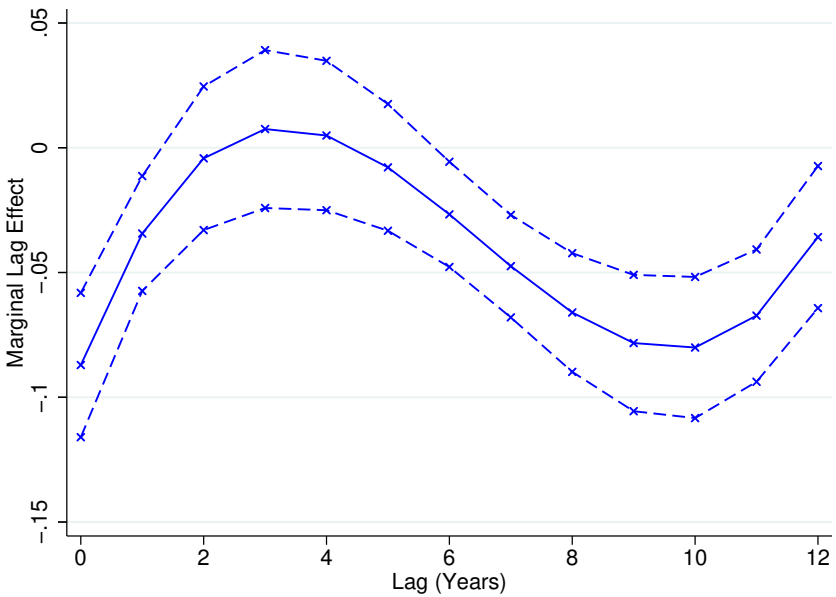
- Distributed Lag Model
- Annual IRS 1040 Filing Data 1990 - 2013
- Returns & Exemptions

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

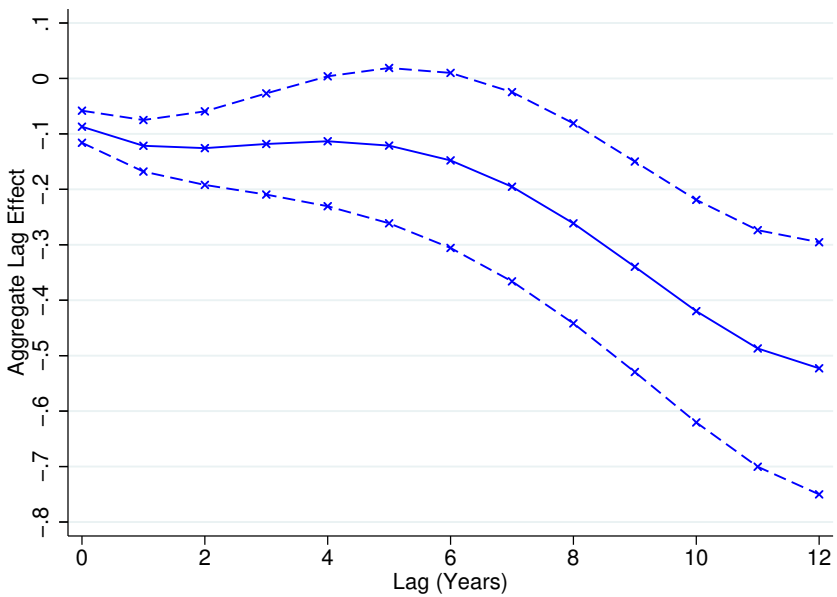
- Constrain Lag Structure to Cubic Function

# 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)

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

# 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

| | (1) Less than High School | (2) High School - Some College | (3) College Graduate |
|---|---|---|---|
| | | *All Persons Ages 25-34* | |
| NTR Gap | -0.926*** | -0.681*** | -1.032*** |
| × Post 2001 | (0.274) | (0.156) | (0.340) |
| | | *All Persons Ages 35-44* | |
| NTR Gap | -0.778*** | -0.117 | -0.156 |
| × Post 2001 | (0.260) | (0.133) | (0.184) |
| | | *All Persons Ages 45-54* | |
| NTR Gap | -0.327 | -0.0225 | 0.177 |
| × Post 2001 | (0.204) | (0.149) | (0.202) |
| | | *All Persons Ages 55-64* | |
| NTR Gap | 0.00765 | -0.271** | -0.411** |
| × Post 2001 | (0.217) | (0.114) | (0.177) |

# Distributed Lag Details: Rewrite Model in Cubic Form

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

**Then,**

$$\begin{aligned}\Delta ln(population_{it}) &= \eta_0 + \pi_0 z_{0,t} + \pi_1 z_{1,t} + \pi_2 z_{2,t} + \pi_3 z_{3,t} \\ &\quad + \eta_1 X_c \times Post2001 + \kappa_c + \mu_t + \omega_{ct}\end{aligned}$$

$$z_{0,ct} \equiv \sum_{l=0}^{T} \Delta_{t-l}(NTRGap_c \times Post2001_t) \tag{3}$$

$$z_{1,ct} \equiv \sum_{l=0}^{T} l\Delta_{t-l}(NTRGap_c \times Post2001_t)$$

$$z_{2,ct} \equiv \sum_{l=0}^{T} l^2\Delta_{t-l}(NTRGap_c \times Post2001_t)$$

$$z_{3,ct} \equiv \sum_{l=0}^{T} l^3\Delta_{t-l}(NTRGap_c \times Post2001_t). \tag{4}$$

(5)

Return To Distributed Lag