

# Trade Reforms, Foreign Competition, and Labor Market Adjustments in the U.S.

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These views are those of the author and not necessarily those of the Board of Governors or the Federal Reserve System.

# This paper

## Theory

- Segmented labor markets and head-to-head competition
- Uneven effects of an unexpected trade reform across locations

locations with lower productivity lose more existing jobs and create fewer new jobs in the medium run

## Data

- Novel dataset on trade-induced job displacements in the U.S.
- Foreign competition affects job flows

reduced job creation and increased job destruction while population adjustments are sluggish

# Mechanism: a simple illustration

- Suppose workers remain in their labor market after trade reform
  - Labor markets are **local**, say a labor market is a plant-town pair
  - Plants vary in **productivity** so towns vary in foreign competition
  - When trade barriers fall bilaterally
    - + More productive plants outcompete foreign rivals and expand
    - Less productive plants shutdown due to **foreign competition**
- ⇒  $\Delta \text{Employment} > \Delta \text{trade-induced job losses}$
- Local nonemployment rises with import competition
  - Cross-sectional heterogeneity in productivity is key

# Trade Adjustment Assistance (TAA) petitions data

- Federal programs administered by the U.S. Dept. of Labor
  - To assist workers who lost or may lose their jobs due to foreign trade
- Receive plant-level petitions on layoffs due to import competition
  - Petitions typically cover a subset of workers at a given establishment
- Investigate these petitions submitted on behalf of the workers
  - Federal investigators may subpoena for confidential data if needed
- Certify whether workers are adversely affected by foreign trade
  - Certified workers eligible for extended UI, training benefits, etc.

# A direct measure of foreign competition by location

Using all plant-level petitions for Trade Adjustment Assistance (TAA)

∀ state  $j$  in the U.S.

∀ year  $t = 1983 \dots 2009$

$$\text{TAA foreign competition}_{j,t} \equiv \frac{\sum_{\text{plants } i \in j} \text{TAA certified workers}_{j,t}^i}{\underbrace{\text{working age population}_{j,t}}_{\text{share of workers newly certified as adversely affected}}}$$

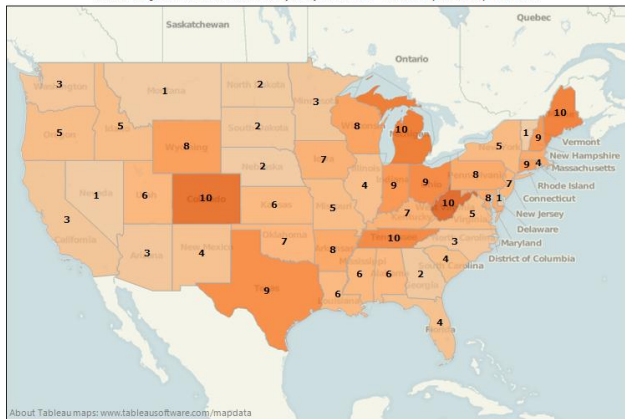
In contrast, proxies such as import penetration (in \$ per worker) would infer the same value for “GM-town” and “Ford-town”, unless plant-worker data available

▶ Maps

▶ Example of import penetration proxy in Autor et al.

# TAA across locations in 1987

Trade Adjustment Assistance (TAA) certified workers per w.a.p in 1987



About Tableau maps: [www.tableausoftware.com/mapdata](http://www.tableausoftware.com/mapdata)

Color shows import competition as measured by using the Trade Adjustment Assistance (TAA) certifications. The numbers show the corresponding deciles of the import competition.



▶ 1987

▶ 1994

▶ 1998

▶ 2003

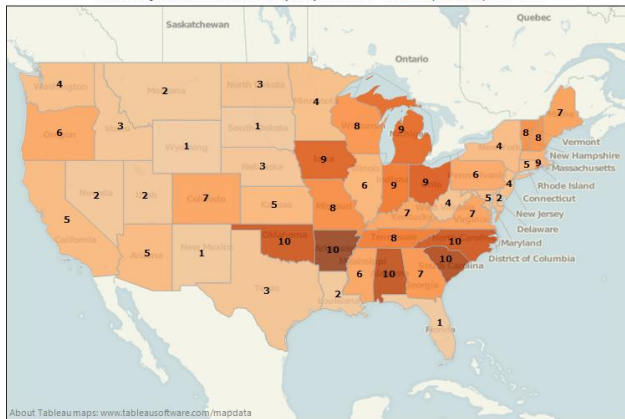
▶ 2006

▶ 2008

▶ TAA measure

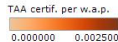
# TAA across locations in 2006

Trade Adjustment Assistance (TAA) certified workers per w.a.p in 2006



About Tableau maps: [www.tableausoftware.com/mapdata](http://www.tableausoftware.com/mapdata)

Color shows import competition as measured by using the Trade Adjustment Assistance (TAA) certifications. The numbers show the corresponding deciles of the import competition.



▶ 1987

▶ 1994

▶ 1998

▶ 2003

▶ 2006

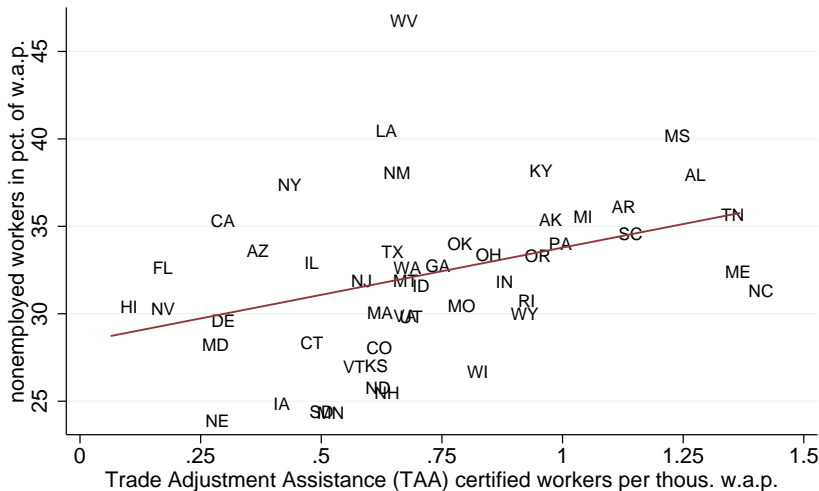
▶ 2008

▶ TAA measure

# Nonemployment rises with import competition

## Import competition and nonemployment across states

1983 – 2009

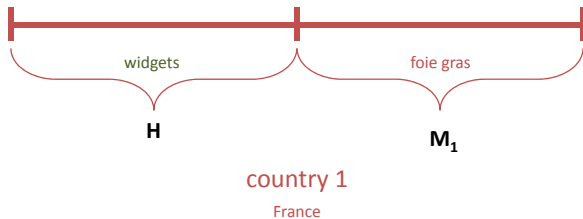
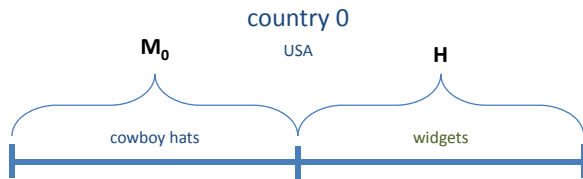




# Key ingredients

- Hybrid trade model
  - Baseline monopolistic competition trade model akin to Dixit-Stiglitz (1977)
  - Head-to-head foreign competition trade model akin to Dornbush et al. (1977), Bernard et al. (2003)
- Unemployment across segmented heterogeneous labor markets
- Workers are mobile across locations ex ante

# Head-to-head and monopolistic competition



# Labor markets, bargaining, and wages

- Labor market frictions in the local labor markets
  - Random (Leontieff) matching with workers
  - Workers collectively bargain with bargaining power  $\lambda$
  - The firm pays  $\gamma$  to contact a worker who has home production  $b$

⇒ Workers and firms share net surplus since there are no fixed cost

$$\begin{aligned}(1 - \lambda) \cdot \text{union surplus} &= \lambda \cdot \text{firm profits} \\ \text{union surplus} &= \lambda \cdot \text{net surplus}\end{aligned}$$

# Problem of a head-to-head ('widget') firm

An  $H_j$ -firm  $z$  outcompetes a foreign rival  $\tilde{z} < \frac{\tau_i^{1-j}}{\tau_i^j} z$  and chooses:

- price = variable markup

$$p_i^j(z, \tilde{z}) = \min \{ \text{competitor's unit cost, monop. price} \}$$

- size increases with competition

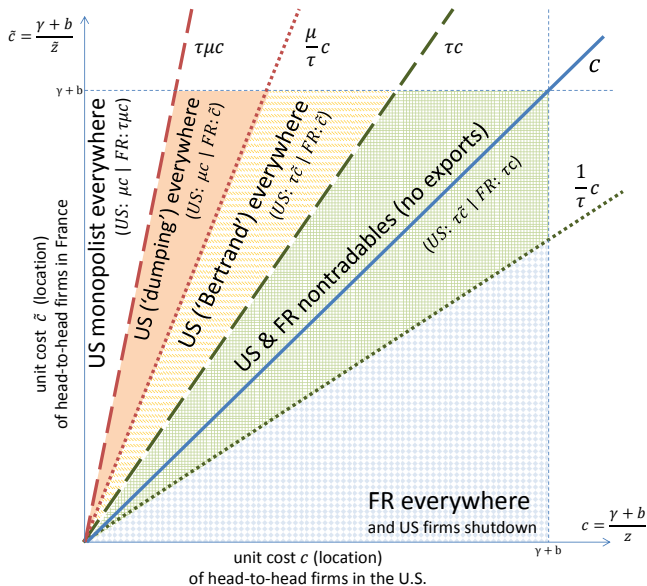
$$\ell_i^j(z, \tilde{z}) = Q_i^{-\frac{\rho-\eta}{1-\rho}} \left[ \mu_i^j(z, \tilde{z}) (\gamma + b) \right]^{-\sigma} \left( \frac{z}{\tau_i^j} \right)^{\sigma-1}$$

- wage decreases with competition due to variable markup

$$\omega_i^j(z, \tilde{z}) - b = \lambda \left( \mu_i^j(z, \tilde{z}) - 1 \right) (\gamma + b)$$

where  $\gamma$  is the hiring cost,  $b$  is the workers' home production,  $c = \frac{b+\gamma}{z}$

# Variables markups across U.S. firms and locations



# Symmetric equilibrium

A symmetric equilibrium is:

- prices  $\{p(\nu), \omega(\nu)\}$  and quantities  $\{q(\nu)\}$
- population  $L_M(z)$ ,  $L_H(z)$ , and  $L_0$

such that

- agents (households and firms) optimize
- labor markets “clear”
- goods markets clear
- workers are indifferent across labor markets

# Trade reform: effects of across locations

Consider

- 1 Unexpected trade liberalization  
bilateral iceberg transportation cost fall
- 2 Population does not move across labor markets  
to capture limited relocation in response to trade shocks
- 3 But all other decisions are optimal  
that is an equilibrium without relocation of workers

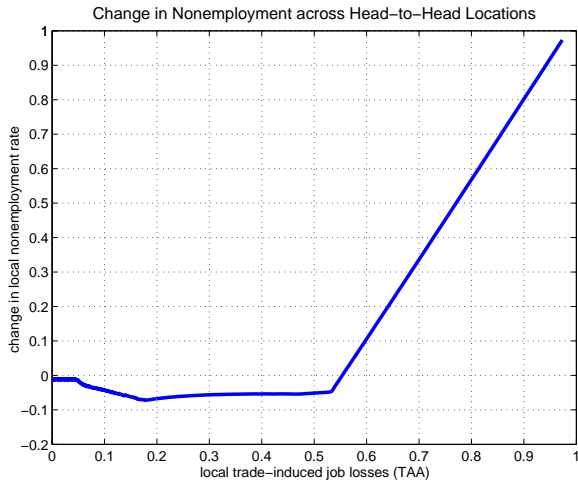
What are the effects across local labor markets?

# Calibration

	Description	Value	
H	fraction of head-to-head firms	0.01	average TAA certified workers
$\eta$	marginal utility of diff. good	0.25	Helpman and Itskhoki (2010)
$\sigma$	Armington elasticity	2.01	Ruhl (2009)
$s$	Pareto shape for productivity	2.05	Helpman and Itskhoki (2010)
$\lambda$	Workers' bargaining power	0.50	equal bargaining power with firm
$b$	Wage rigidity	1.00	all locations are initially populated
$\gamma$	Hiring cost	0.02	free trade non employment rate
L	Population	1.00	
$\tau_{\text{initial}}$	initial iceberg transportation cost	1.11	Anderson and van Wincoop (2004)
$\tau_{\text{final}}$	final iceberg transportation cost	1.00	



# Trade-induced job losses and nonemployment



slope ( $\sim 2$ ) across worse hit locations

*M*-type locations are degenerate at TAA = 0 point

# Aggregate welfare effects

Trade barriers fall from  $\tau = 1.11$  to  $\tau = 1.0$

Workers do not move in the medium run but can get new jobs locally

	Trade job losses per thousand	% $\Delta Q$ diff. good
Pre-reform	0.00	-
Medium run	0.70	+7.02
Long run	0.00	+7.03

assuming transfers across locations

- A tractable trade model with
  - + Segmented local labor markets within an economy
  - + Varying degrees of foreign competition and productivity
- Distributional effects of trade reforms across locations
  - + Large elasticity of unemployment to trade-induced job losses
  - + Some locations are literally wiped out, of jobs first then people
- Future work
  - + Decomposition of trade-induced losses: location v. industry
  - + Optimal medium run policies when markets are incomplete