Impact of the China Trade Shock on U.S. Regional Inequality: A Replication Study

Marlon Morales, Mauricio Vargas, Nikolas Papadatos, Anshruta Thakur

Fall 2024

Overview

Introduction

Data Sources

Methodology

Main Results

Conclusions

Introduction

Research Question

What is the impact of a large international trade shock on inequality across regions in the US?

Methodologic Approach

A composition-adjusting approach is applied to the outcomes using a Two-Stage Least Squares Regression Analysis. Potential changes in the composition of gender, age, education, race, and nativity (US-born) are held constant to assess demographic shifts across industries that may impact inequality.

Key Findings

Larger effects of the China shock on inequality across regions are observed.

Data Sources

- **UN Comtrade Database**: For analyzing trade flows.
- **County Business Patterns Data**: Employment structure within Commuting Zones (CZs).
- **Census Integrated Public Use Micro Samples (IPUMS)**: Detailed demographics of employment, and wage data by education, age, and gender.
- **American Community Survey (ACS)**: Data from the Census, providing recent demographic.
- **Bureau of Economic Analysis**: Data on transfer payments to CZ residents.
- **Social Security Administration**: Federal and state transfer payments to individuals.
- **Data from other high-income countries**: Comparative trade flow data from a group of eight high-income countries.

Methodology

The paper examines how changes in import exposure across industries affect outcomes at the commuting zone level; specifically, unemployment rate, wage and income levels, and labor force participation.

The main estimation is an Instrumental Variables 2 Stage Least Squares:

$$\Delta L_{it}^{m} = \gamma_t + \beta_1 \Delta IPW_{it}^{u} + \boldsymbol{X}_{it}' \boldsymbol{\beta}_2 + \epsilon_{it} \tag{1}$$

Where:

- ΔL_{it}^{m}: Decadal change in the manufacturing employment share of the working-age population in commuting zone *i*.
- γ_t: Time fixed effect.
- ΔIPW_{it}^{u}: Observed change in US imports from China in industry *j*, weighted by the share of region *i* in US employment in industry *j*.
- $\boldsymbol{X}_{it}'$: Includes a set of control variables specific to Commuting Zones.

Composition Adjustment

Original regression coefficients may be influenced by labor mobility between regions; therefore, composition adjustments are applied to address this issue by aggregating the dependent variable data to the commuting zone level (i) by year (t) and group (g). For any left-hand side variable Y, the composition-adjusted measure is the sum over all groups, with each term as the product of a time-invariant weight and employment.

$$L_{it}^{CA} = \sum_{g} \bar{\theta}_{ig} L_{igt} \tag{2}$$

The time-invariant weights $\bar{\theta}_{ig}$ are the average across periods of hours weights:

$$\bar{\theta}_{ig} = \frac{1}{3} \left(\theta_{ig1990} + \theta_{ig2000} + \theta_{ig2008} \right) \tag{3}$$

and

$$\theta_{igt} = hours_{igt} \Big/ \left(\sum_{g} hours_{igt} \right). \tag{4}$$

Note that $\sum_g \bar{\theta}_{ig} = 1$.

Impact of Chinese Imports on Manufacturing Employment Proportion

Coefficient (△ Imports from China to US per Worker)			
Model	**Original**	**Adjusted**	**Description**
1	-0.746	-0.787	Demographic and labor force measures added to the first difference model for the period 1990–2007.
2	-0.610	-0.658	Control for the share of manufacturing in a CZ's start-of-period employment.
3	-0.538	-0.590	Geographic dummies for the nine Census divisions.
4	-0.508	-0.550	Additional controls for education, foreign-born population, and working-age women employment.
5	-0.562	-0.605	Control by % manufacturing employment and variables capturing occupational susceptibility to technology and offshoring.
6	-0.506	-0.640	Fully augmented model.

Table: Comparison of Regression Coefficients and Model Descriptions

The above table displays outcomes from the original paper and those obtained when composition adjusting while we progressively add controls.

Impact of Chinese Imports on Manufacturing Employment Proportion

Interpretation

- Composition Adjusting leaves impact of share of workers largely unchanged.
- In the model with all variables (6), the $\beta = -0.640$ means that an exogenous increase of \$1,000.00 in exposure per worker leads to a predicted decrease of 0.64 percentage points in manufacturing employment per working-age population.
- The coefficients of the models subjected to Composition Adjustment reveal a beta with a higher magnitude, indicating a larger effectthanthe original estimate.

Population and Employment Effects in Local Labor Markets

PANEL 1	100 × log change in pop count	Mfg emp	Non-mfg emp	Unemp	NILF
Original	(Δ imports from China to US)/worker	-4.2305***	-0.2741	4.9213***	2.0583*
Adjusted	(Δ imports from China to US)/worker	-4.8311***	-0.0127	5.8837***	3.2958***

Table: Imports from China and Employment Status of Working-Age Population within CZs, 1990–2007

This model examines the impact of import shocks from China on the local labor markets using 2SLS. The table presents the log changes in the number of non-elderly adults in four distinct categories:

- Manufacturing employment
- Non-manufacturing employment
- Unemployment
- Labor force nonparticipation

Population and Employment Effects in Local Labor Markets

Interpretation

The coefficients tell us the changes in employment in 100 log points for every $1,000 increase in import exposure per worker.

- Composition adjustment exacerbate the impact over: Manufacturing Employment, Unemployment, Labor-force non-participation.
- Non-Manufacturing Employment coefficient is statistically insignificant with and without composition adjustment.

In conclusion, composition adjusting seems to raise the impact of China shock on local labor market. Import shocks from China are associated with job losses in manufacturing but do not necessarily lead to significant job gains in other sectors or labor force participation.

Wage Effects in Local Labor Markets by Gender

Dependent variable: Ten-year equivalent change in average log weekly wage (in log pts)
Regressor coefficient: (Δ imports from China to US) / worker

	All Workers		Males		Females	
	Original	**Adjusted**	**Original**	**Adjusted**	**Original**	**Adjusted**
All education levels	-0.759***	-1.222***	-0.892***	-1.204***	-0.614***	-1.258***
College education	-0.757***	-0.903***	-0.991***	-1.129***	-0.525***	-0.598***
No college education	-0.814***	-1.182***	-0.703***	-1.104***	-1.116***	-1.304***

Table: Ten-year equivalent change in average log weekly wage (in log pts) due to imports from China

Wage Effects in Local Labor Markets by Gender

Interpretation

After Composition Adjustments, A $1,000 increase in import exposure results in:

- All Education Levels: Reduced mean weekly earnings by a larger amount, approximately -1.222 log points for all workers (similar across genders). This suggests that after accounting for compositional changes, the negative effect on earnings is more pronounced.
- College Education: The impact remains negative, with a coefficient of -0.903 log points. Workers still experience a reduction in weekly earnings after composition adjustment, though the effect is slightly smaller.
- Non College Education: The effect is even more pronounced, with a coefficient of -1.1817 log points for all workers. This implies that the impact on earnings is substantial, particularly among those with lower education levels.

Through composition adjustment, it is found that the impact of the China shock on wages is greater than in the original findings.

Conclusion

- As in the original paper, we estimate 2SLS regressions, but with composition adjustment.
- This leads to a more pronounced impact on regional inequality than in the original paper.
  - This is particularly evident when examining wages as an example.
  - The China shock reduces employment, leading to the displacement of low-wage workers into unemployment and non-participation.
  - At first glance, this displacement may appear to increase wages, especially if we do not apply composition adjustments.


UCLA