# US Exports and Employment

Robert C. Feenstra
University of California, Davis
and NBER

National Press Club, Washington, D.C., October 4, 2018

# Global Decline in Manufacturing

Employment in manufacturing (1980=100)
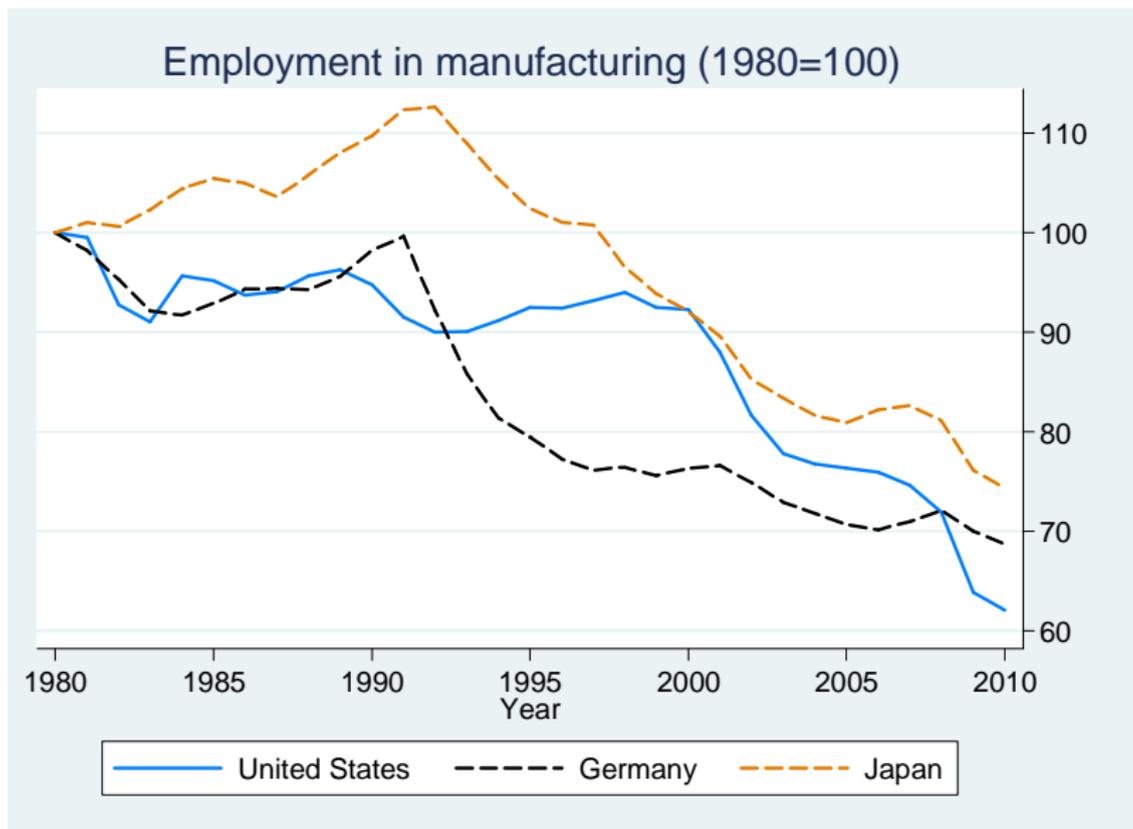
Share of World Merchandise Exports
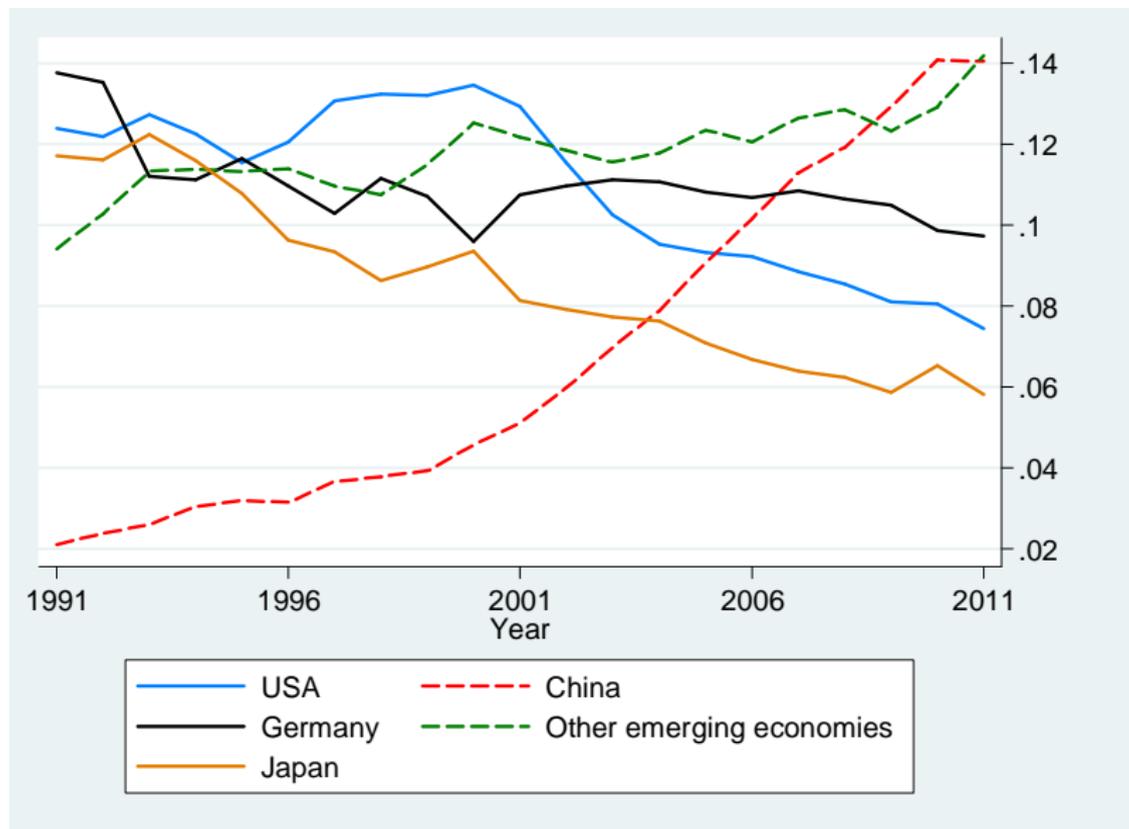
Ratio of Chinese imports to U.S. domestic consumption

Defining Local Labor Markets: "Commuting Zones"

**Based on commuting patterns among countries in 1990**

- Cluster all mainland U.S. counties in 722 commuting zones (CZ), characterized by strong commuting ties within a CZ and weak commuting across CZs
- Can map Census Public Use Micro Areas to CZs
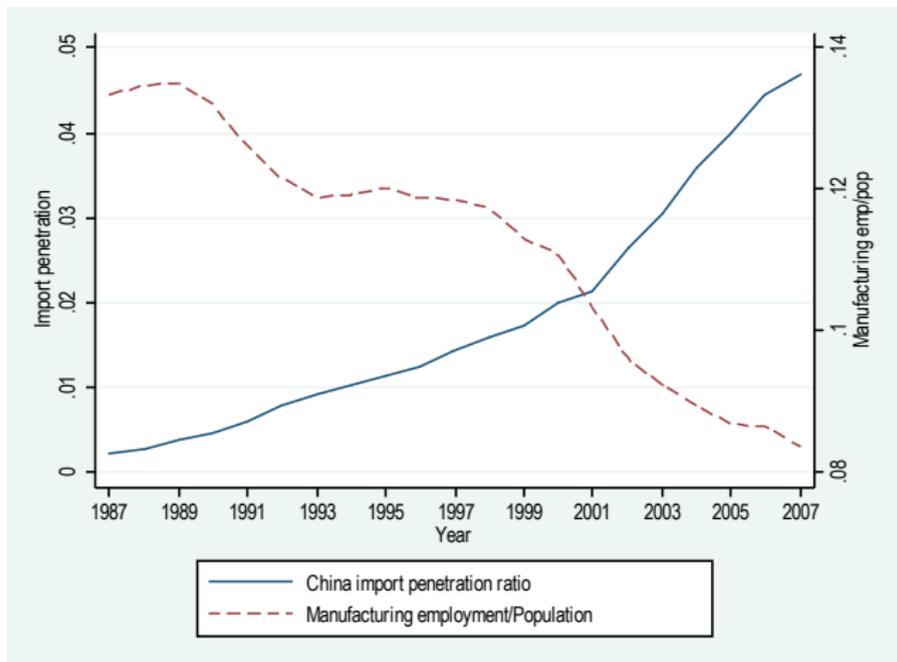
Impacts on Manufacturing Employment

Imports From China and Change of Manufacturing Employment in Commuting Zones, 1970-2007

Effect of an $1000 Per Worker Increase in Imports from China during 1990-2007 on the Change in Manufacturing Employment as a Percentage of the Working age Population


Chart showing "Percentage Points" on the y-axis ranging from -1.00% to 0.60%, with four time periods on the x-axis:

1970-1980	1980-1990	1990-2000	2000-2007
0.4 %	-0.1 %	-0.9 %	-0.7 %
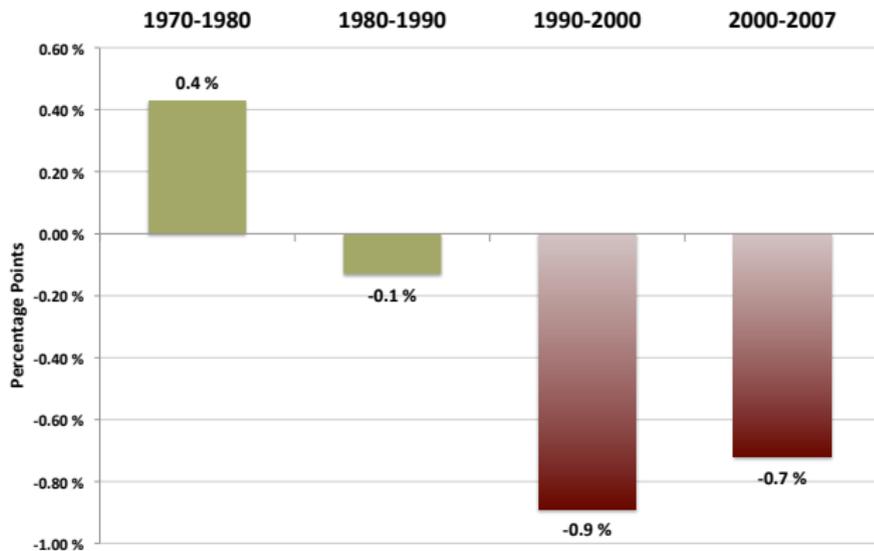
Imports from China and Employment Status of Working Age Population within Commuting Zones (1990-2007)

*Effect of an $1000 Per Worker Increase in Imports from China during 1990-2007 on Share of Population in Employment Categories*
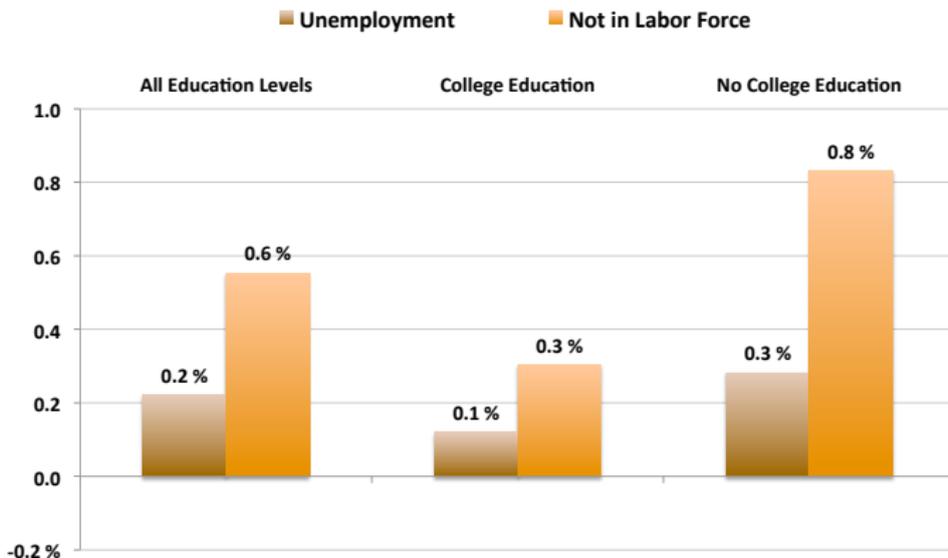
**Imports from China and Wage Changes within Commuting Zones
(1990-2007)**

*Effect of an $1000 Per Worker Increase in Imports from China during 1990-2007 on
Percent Change in Weekly Wages*
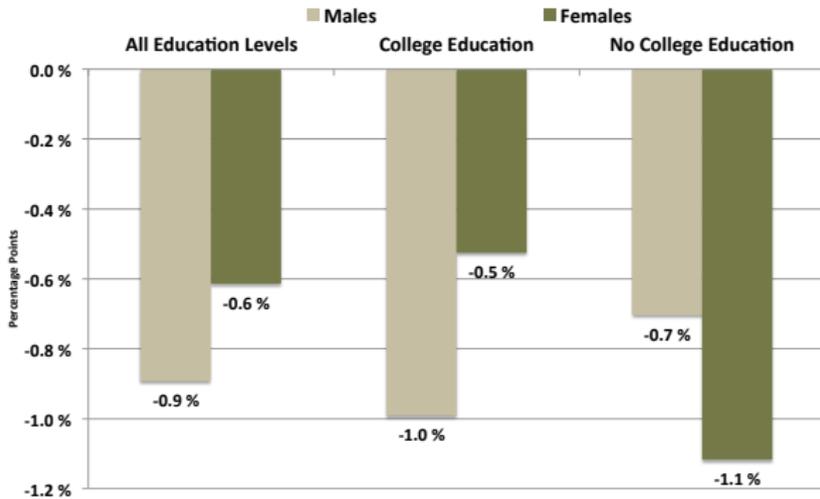
Research on the 'China Shock':

"The China Syndrome," *American Economic Review,* 2012, David Autor, David Dorn, Gordon Hanson (ADH)

Response: What about job gains due to US exports or other gains for consumers?

1) "US Exports and Employment", Robert Feenstra, Hong Ma and Yuan Xu, NBER w24056, 2017

2) "The 'China Shock', Exports and US Employment: A Global Input-Output Analysis" Robert Feenstra and Akira Sasahara, NBER w24022, 2017

3) What about consumer gains due to lower prices from Chinese imports to the US?

Accounting for US global export expansion

- Prior to the global financial crisis, US exports grew strongly.
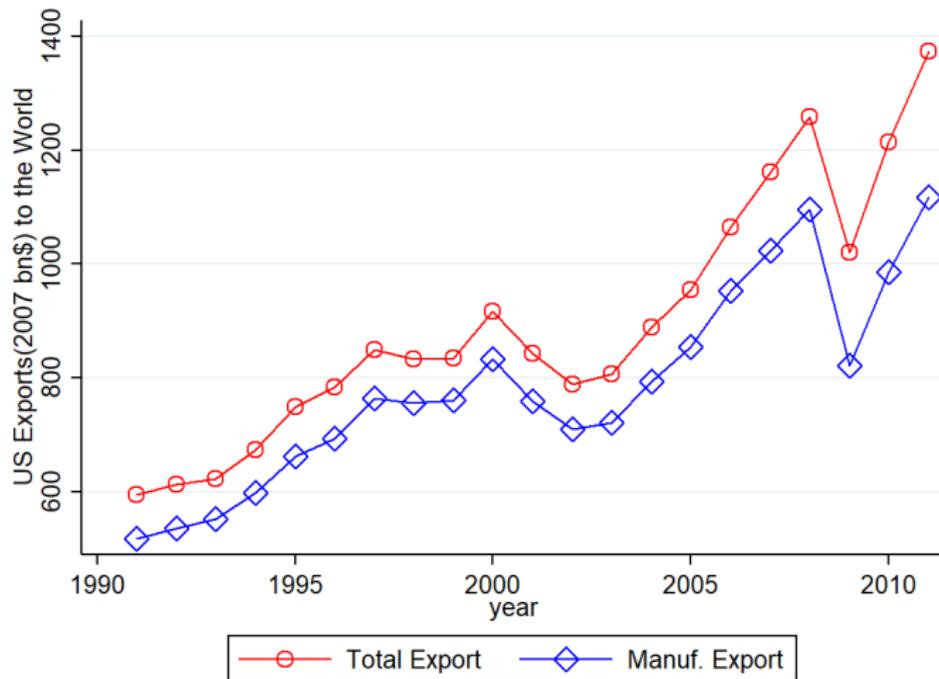
- Comparison:2007 US total imports: 2,017 Bn$; imports from China: 340 Bn$

# Regions subject to import penetration also experienced export expansion

Changes in Import and Export Exposure

1999-2011 Import

(.139799,.6910058]
(.08615,.139799]
(.0483483,.08615]
[-.0002186,.0483483]
No data

1999-2011 Export

(.161196,2.301507]
(.1008045,.161196]
(.0451127,.1008045]
[-.5013863,.0451127]
No data
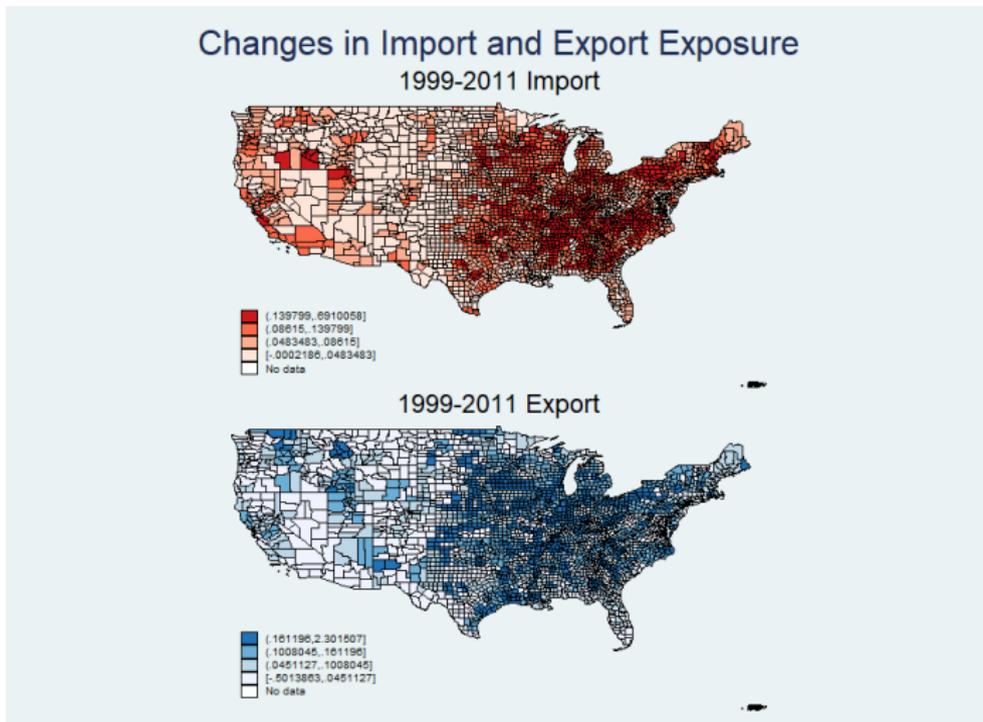
Export Expansion on Local Manufacturing Employment

$$\Delta L_{it}^m = \beta_t + \beta_1 \Delta IP_{it}^{CZ} + \beta_2 \Delta EP_{it}^{CZ} + \gamma X_{it_0}^{CZ} + \gamma_r + e_{it},$$

Dep. var: changes in mfg employment-workingage population ratio				
	(1)	(2)	(3)	(4)
	1991-2007		1991-2011	
Δ Imports	-1.955***	-1.243***	-2.270***	-1.292***
	(0.172)	(0.208)	(0.255)	(0.267)
Δ Exports	0.313*	0.790***	0.333*	0.916***
	(0.180)	(0.279)	(0.193)	(0.275)
share of mfg employment t-1		-1.130***		-1.218***
		(0.287)		(0.235)
Observations	1444	1444	1444	1444
Kleibergen-Paap rk Wald F stat	24.03	13.25	17.06	10.57

▶ Also control for *start of period* commuting zone level demographic and economic conditions.

Quantify the results

- illustate the quantitative results:

Commuting Zone Level

Job Gain

2.01

1.34

1.91

0.97

2.58

3.21

1991-1999 1999-2007 1999-2011
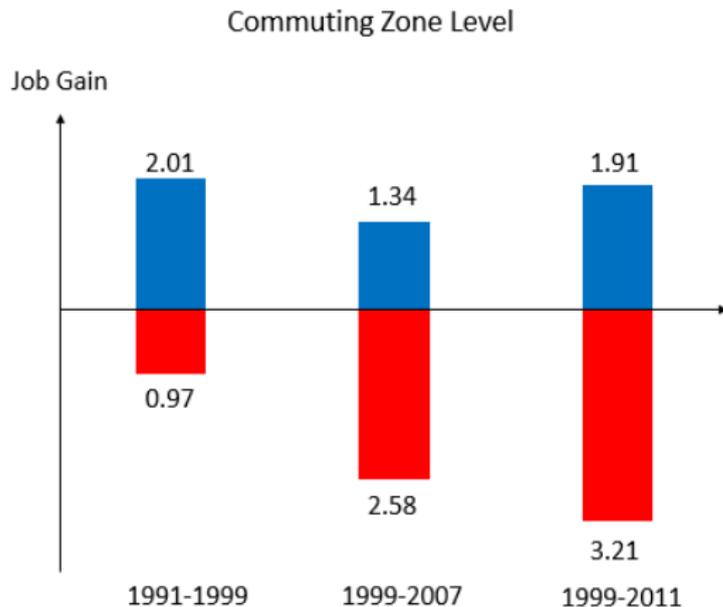
Quantify the results

▶ Industry employment changes due to trade shocks (1991-1999).

Job Change (Unit:1000)

Year: 1991-1999

Quantify the results

▶ Industry employment changes due to trade shocks (1999-2011).

Job Change (Unit:1000)

Year: 1999-2011
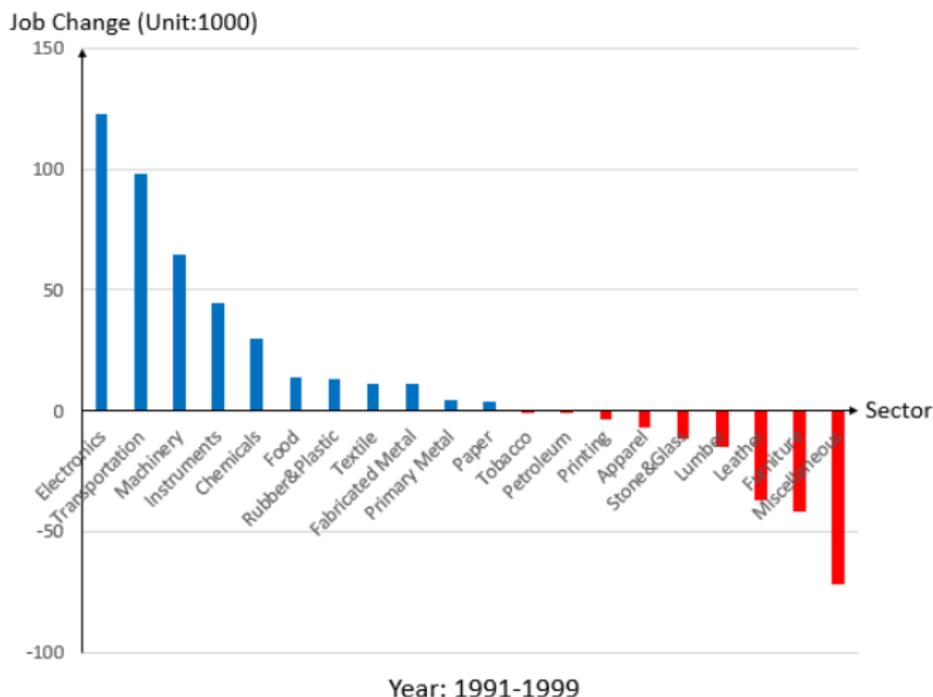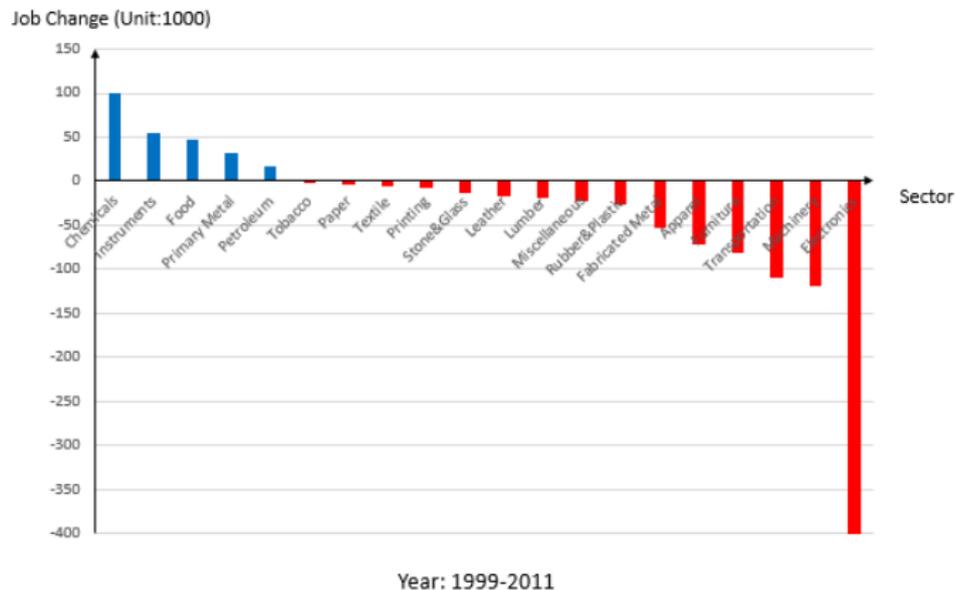
Quantify the results

Percentage Change (%) in Jobs Due to Imports & Exports
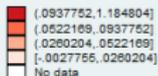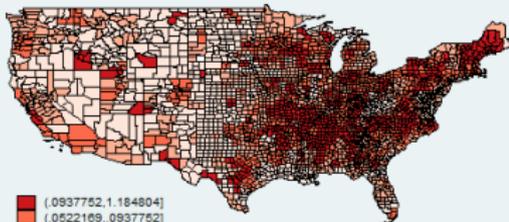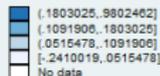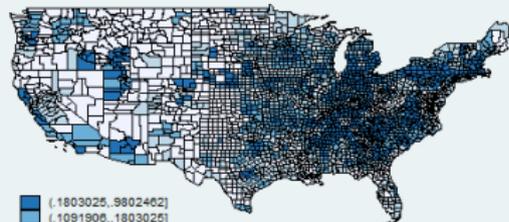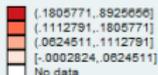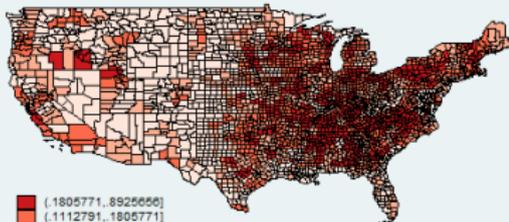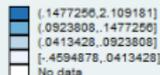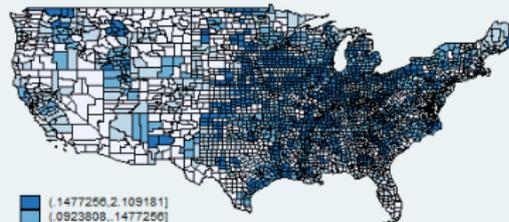
1) US Exports and Employment

US Exports and Employment", Robert Feenstra, Hong Ma and Yuan Xu, NBER w24056, 2017

Findings:

- About *0.3 million net jobs lost* comparing US imports from China with US global exports, over 1991-2011

- But *1.3 million net losses* in recent years 1999-2011!

- Key industries (electronics, machinery, transport, etc.) impacted during the later period

- Correlation between job gains and losses within CZ has fallen from 0.5 (1991-1999) to 0.2 (1999-2011)

2) Using a global input-output analysis

"The 'China Shock', Exports and US Employment: A Global Input-Output Analysis" Robert Feenstra and Akira Sasahara, NBER w24022, 2017

Findings:

- Confirm the *2 million job gains within manufacturing* due to US global exports over 1995-2011, and about *2 million job losses* due to imports from China

- But there are a further *4 million job gains in services* due to US global exports (services & manufacturing), within small job losses due to service imports

- There are *4 million more jobs* created by US exports than by US imports, once we account for services!

Figure 1: The Structure of the Global Input-Output Table – A Three Country Case

Source \ Destination		Country A Sectors 1, 2, …, 26	Country B Sectors 1, 2, …, 26	China Sectors 1, 2, …, 26	Country A 6 final demand categories	Country B 6 final demand categories	China 6 final demand categories
Country A	Sector 1 Sector 2 ⋮ Sector 26	Intermediate goods produced and used by Country A	Intermediate goods produced by Country A and used by Country B	Intermediate goods produced by Country A and used by China	Final goods produced and consumed by Country A	Final goods produced by Country A and consumed by Country B	Final goods produced by Country A and consumed by China
Country B	Sector 1 Sector 2 ⋮ Sector 26	Intermediate goods produced by Country B and used by Country A	Intermediate goods produced and used by Country B	Intermediate goods produced by Country B and used by China	Final goods produced by Country B and consumed by Country A	Final goods produced and consumed by Country B	Final goods produced by Country B and consumed by China
China	Sector 1 Sector 2 ⋮ Sector 26	Intermediate goods produced by China and used by Country A	Intermediate goods produced by China and used by Country B	Intermediate goods produced and used by China	Final goods produced by China and consumed by Country A	Final goods produced by China and consumed by Country B	Final goods produced and consumed by China

Matrix *T*　　　　　　　　Matrix *F*

Notes: The Global Input-Output Table comes from the EORA database. The original EORA table includes 189 countries. However, we re-construct the table with 52 countries including the rest of the world as one country. See the Appendix for the list of the countries. This figure shows the case with four countries for simplicity. Also, there are 26 sectors and six final demand categories. A big sub-matrix in the left indicated by a red box (denoted as matrix *T*) is the matrix for intermediate good flows and. Another big sub-matrix in the right (denoted as matrix *F*) is the matrix for final good flows. Diagonal boxes in matrices *T* and *F* indicate domestic transactions within each country while the rest of the boxes are international transactions. See Lenzen et al. (2012) and Lenzen et al. (2013) for further details.

Quantifying the Employment Effect of Export Expansion

Table 3: **Employment Effect of U.S. Merchandise versus Service Exports, 1995-2011 (million workers)**

| | The impact of final and intermediate good exports from *all* sectors | Decomposition | |
		The impact of final and intermediate good exports from *merchandise* sectors	The impact of final and intermediate good exports from *service* sectors
Manufacturing	1.99	1.94	0.053
Resource	0.46	0.45	0.015
Services	4.11	1.34	2.78
All Sectors	6.57	3.73	2.85

Notes: Numbers reported are the employment effect measured in million workers. Positive numbers mean increased labor demand while negative numbers indicate reduced labor demand.

Summary of the Results

Table 1: **Summary of the Results, 1995-2011**

	Export expansion to all countries	Import penetration		Net effects	
		Merchandise import penetration from China, OLS	Merchandise import penetration from China, IV	Exports to all countries versus imports from China, OLS	Exports to all countries versus imports from China, IV
	(1)	(2)	(3)	(1)+(2)	(1)+(3)
Manufacturing	**1.99**	-1.43	-1.24	0.56	0.75
Resource	0.46	-0.053	-0.050	0.407	0.41
Services	4.11	-0.56	-0.47	3.55	3.64
Total	6.57	**-2.04**	**-1.76**	4.53	4.81

Previous estimates

- Export expansion added 1.9 million manufacturing jobs during 1991-2007 (Feenstra, Ma and Xu, 2017)

- Import penetration from China led to 2.0 million job losses during 1999-2011 (AADHP, 2016)

3a) Consumer Gains for the US

"How Did China's WTO Entry Benefit US Consumers?,"
Mary Amiti, Mi Dai, Robert Feenstra, John Romalis,
NBER w23487, 2017

Findings:

- An important part of China's boost in exports since 2001 was rising productivity of its firms due to its own tariff cuts on intermediate imports (and WTO entry)

- This boost in productivity explains a 1 percentage point drop in US price index over 7 years, 2000-2007

- The boost in productivity and lower prices for inputs both led to declines in Chinese export prices, which were magnified in the US by the drop in other prices.

3b) Consumer Gains for the US

"Trade and Labor Market Dynamics," Lorenzo Caliendo, Maxim. Dvorkin, Fernando Parro, NBER w21149, 2015

Findings:

- About 0.8 million manufacturing jobs lost due to the doubling of Chinese imports over 2000-2007 (modeled as due to the productivity increase)

- Despite these job losses, positive gains in welfare: aggregate gains of 0.6% of GDP in the long run

- The transition costs of unemployment *subtract one-quarter from the long-run gains*

- Effects are very dispersed across industries/regions

Manufacturing Employment Effects

Figure: Sectoral contribution to the change in manuf. employment
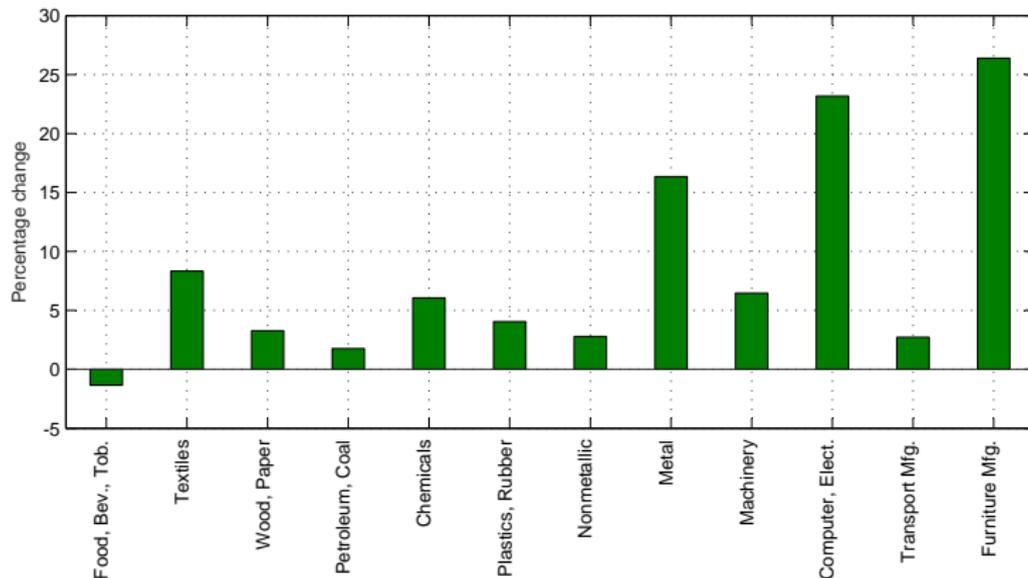
Manufacturing Employment Effects

Figure: Regional contribution to the change in manuf. employment
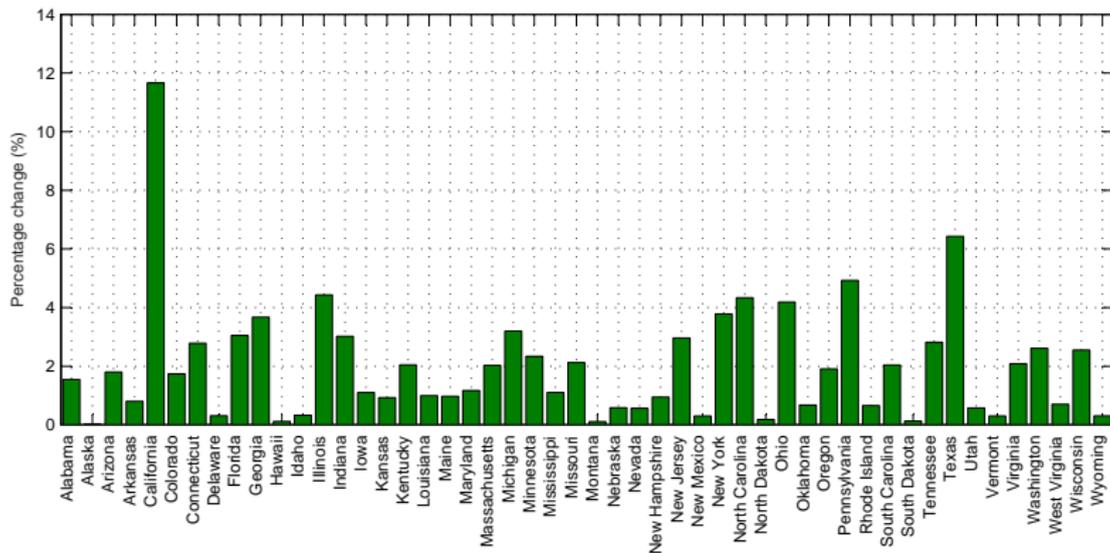
Welfare Effects Across Labor Markets

Figure: Welfare changes across labor markets

Note: Largest and smallest 5 percentile are excluded
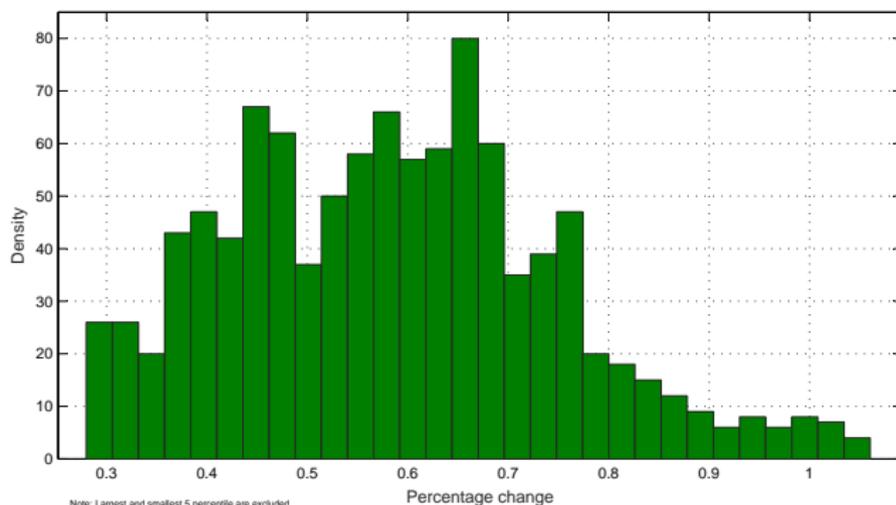
- Very heterogeneous response to the same aggregate shock
  - ▸ Loses are concentrated in a few labor markets, but most labor markets gain as a consequence of cheaper imports from China

Conclusions:

- A number of studies have confirmed job losses in due to US *manufacturing* imports from China ranging from 2-4 million, depending on the time period

- But US *manufacturing* exports have also added 2-4 million job, while US *service* exports added 4 million!

- So job gains due to US exports substantially offset the losses due to imports from China, *until recently.*

- US global imports and exports, including the 'China shock', leads to *consumer gains* that can be shown to offset the (frictional) losses due to unemployment.