

Lecture 8a: 2SLS and the US Employment Effect of Chinese Import Competition

Import competition

In the period 1991-2007 the US imports of Chinese goods increased dramatically. At the same time US employment in manufacturing decreased. Is there a causal relation? See Figure 1 and Table 1.

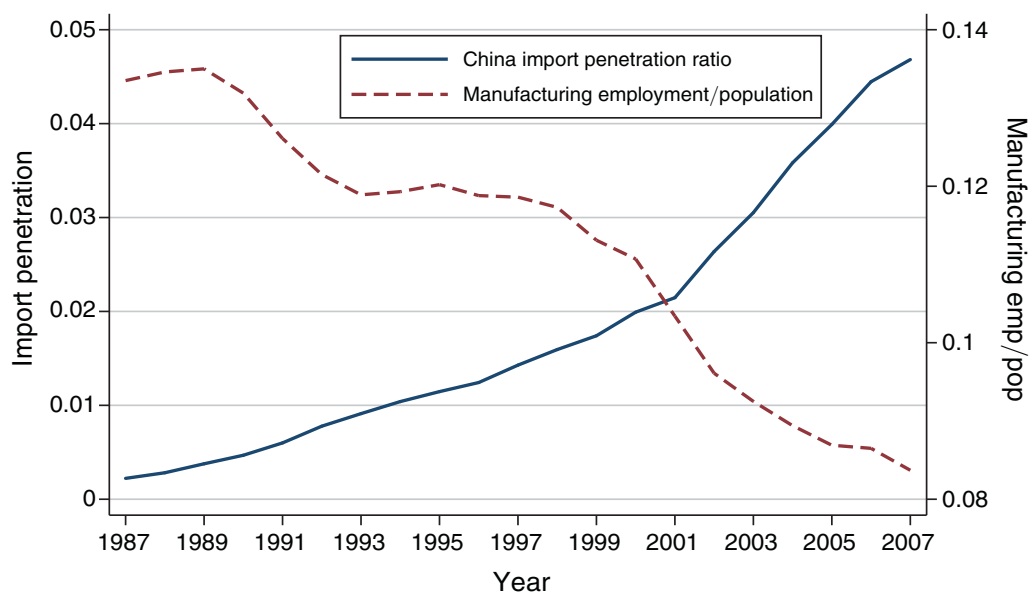


FIGURE 1. IMPORT PENETRATION RATIO FOR US IMPORTS FROM CHINA (*left scale*), AND SHARE OF US WORKING-AGE POPULATION EMPLOYED IN MANUFACTURING (*right scale*)

Hard to answer on the basis of time-series data as in Figure 1, because it is hard to account for all things that also changed e.g. automation of production. There is in equilibrium also feedback from employment to imports.

We discuss a very influential paper 'The China Syndrome: Local Labor Market Effects of Income Competition in the United States' by David Autor, David Dorn and Gordon Hanson (ADH), AER, 2013, p. 2121-2168.

TABLE 1—VALUE OF TRADE WITH CHINA FOR THE US AND OTHER SELECTED HIGH-INCOME COUNTRIES
AND VALUE OF IMPORTS FROM ALL OTHER SOURCE COUNTRIES, 1991/1992–2007

	I. Trade with China (in billions 2007 US\$)		II. Imports from other countries (in billions 2007 US\$)		
	Imports from China (1)	Exports to China (2)	Imports from other low-inc. (3)	Imports from Mexico/ CAFTA (4)	Imports from rest of world (5)
<i>Panel A. United States</i>					
1991/1992	26.3	10.3	7.7	38.5	322.4
2000	121.6	23.0	22.8	151.6	650.0
2007	330.0	57.4	45.4	183.0	763.1
Growth 1991–2007	1,156%	456%	491%	375%	137%
<i>Panel B. Eight other developed countries</i>					
1991/1992	28.2	26.6	9.2	2.8	723.6
2000	94.3	68.2	13.7	5.3	822.6
2007	262.8	196.9	31.0	11.6	1329.8
Growth 1991–2007	832%	639%	236%	316%	84%

Notes: Trade data is reported for the years 1991, 2000, and 2007, except for exports to China which are first available in 1992. The set of “other developed countries” in panel B comprises Australia, Denmark, Finland, Germany, Japan, New Zealand, Spain, and Switzerland. Column 3 covers imports from all countries that have been classified as low income by the World Bank in 1989, except for China. Column 4 covers imports from Mexico and the Central American and Caribbean countries covered by the CAFTA-DR. Column 5 covers imports from all other countries (primarily from developed countries).

ADH use variation in changes in the ratio of manufacturing employment to the size of the working age population and exposure to import competition by Chinese goods in a cross-section of local labor markets.

Even in such a cross-section of local labor markets the measure of import competition is likely to be endogenous, but they find an instrument that is strongly correlated with the endogenous variable to deal with the endogeneity.

Trade theory

ADH consider commuting zones (CZ) i , industry j and market k . They distinguish traded (T) and non-traded (N) goods.

The key relations from trade theory are

$$\begin{aligned}\frac{dL_{Ti}}{L_{Ti}} &= \rho_i \sum_j c_{ij} \frac{L_{ij}}{L_{Ti}} \left[\theta_{ijC} \frac{dE_{Cj}}{E_{Cj}} - \sum_k \theta_{ijk} \phi_{Cjk} \frac{dA_{Cj}}{A_{Cj}} \right] \\ \frac{dL_{Ni}}{L_{Ni}} &= \rho_i \sum_j c_{ij} \frac{L_{ij}}{L_{Ti}} \left[-\theta_{ijC} \frac{dE_{Cj}}{E_{Cj}} + \sum_k \theta_{ijk} \phi_{Cjk} \frac{dA_{Cj}}{A_{Cj}} \right]\end{aligned}$$

$\frac{dA_{Cj}}{A_{Cj}}$ is an exogenous shock to the export capacity of China in industry j . This shock is due to the transformation of the Chinese economy that became much more productive and to lower trade costs because China joined the WTO in 2001.

There is also additional exports to China E_{Cj} that with a flexible would offset employment effects by increasing the employment in the non-traded sector.

Because imports grew much more than exports ADH ignore the latter and start from the relation

$$\frac{dL_{Ti}}{L_{Ti}} = -\alpha \sum_j \frac{L_{ij}}{L_{uj}} \frac{M_{Cju} \frac{dA_{Cj}}{A_{Cj}}}{L_{Ti}}$$

This gives a measure of the change in income competition in region i in year t

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

2SLS estimation of employment effects

The regression model is

$$\Delta L_{it}^m = \gamma_t + \beta_1 \Delta IPW_{uit} + x'_{it} \beta_2 + \varepsilon_{it}$$

with Δ change over 10-year period.

Variables that affect both the change in manufacturing employment and imports from China can make the import competition variable endogenous. Example is a demand shock in an industry with imports from China that will increase both imports from China and employment.

If β_1 is negative the bias will be towards 0: the estimated effect is less negative than the true partial effect.

Use IV/2SLS with as instrumental variable the import competition in other high-income countries

$$\Delta IPW_{oit} = \sum_j \frac{L_{ij,t-1}}{L_{uj,t-1}} \frac{\Delta M_{ucjt}}{L_{i,t-1}}$$

$t - 1$ refers to the previous decade to avoid the effect of anticipated imports.

The first stage regression is in Figure 2

Data on 722 commuting zones. Results in Table 3

OLS for model in column 6: import competition effect is $-.171$ ($.028$). See paper for more comparisons.

For specification in column 6 we have that \$ 1000 in additional imports reduces the fraction in manufacturing employment by $.596$. Chinese imports rose by \$ 1140 in 1990-2000 and by \$ 1839 in 2000-2007. This reduced the fraction in manufacturing employment by $.68$ and 1.10 . US fraction in manufacturing decreased by 2.07 and 2 .

ADH also isolate the part of import growth that is exogenous and not driven by demand. Using this smaller number they find a reduction in manufacturing employment of 548,000 workers in 1990-2000 and of 982,000 workers in 2000-2007.

In the rest of their paper ADH also consider the effect on government transfer payments and find that they are substantial, indicating that the effects are not short-run.

Panel A. 2SLS first stage regression, full sample

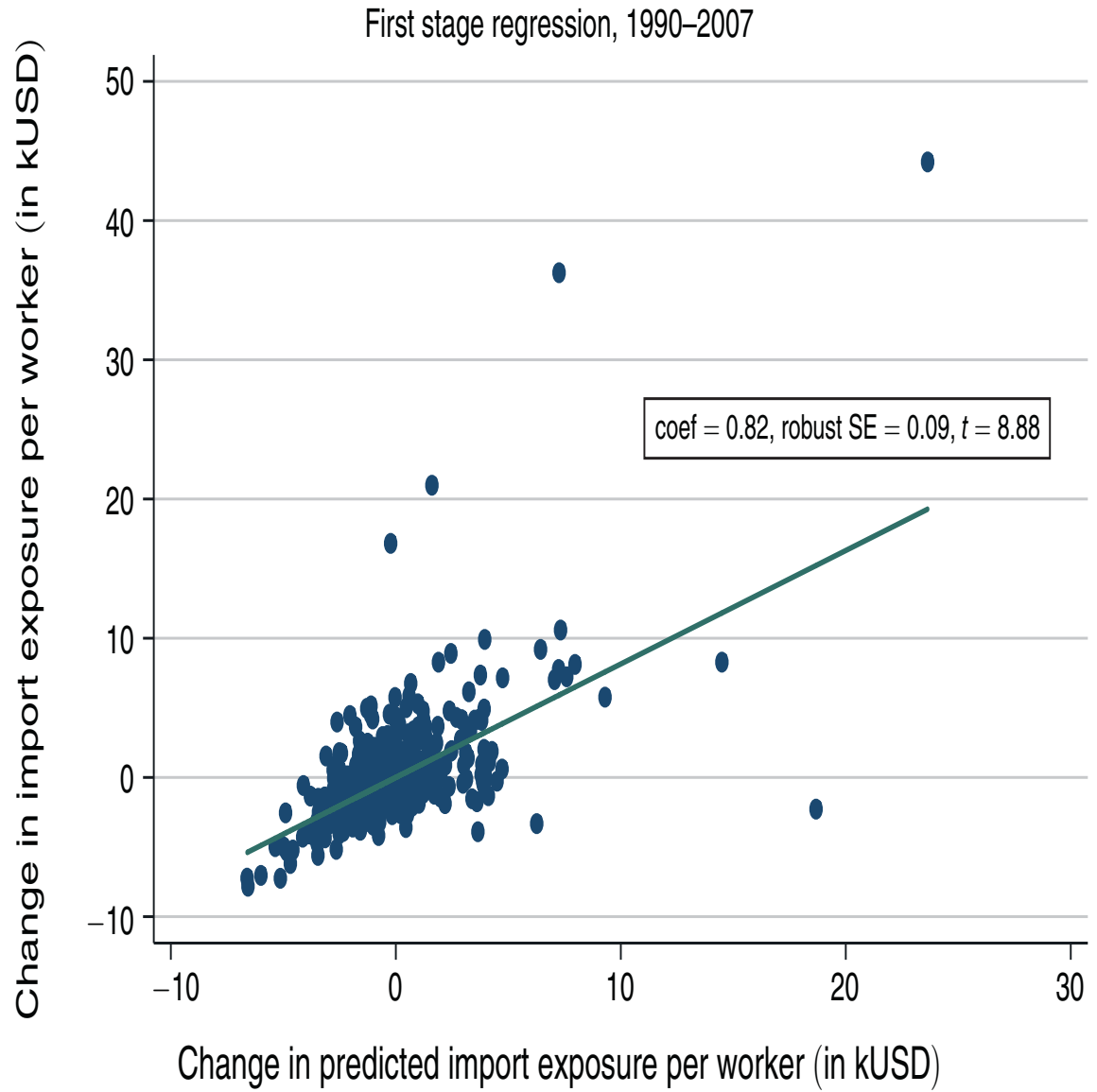


TABLE 3—IMPORTS FROM CHINA AND CHANGE OF MANUFACTURING EMPLOYMENT
IN CZs, 1990–2007: 2SLS ESTIMATES
Dependent variable: $10 \times$ annual change in manufacturing emp/working-age pop (in % pts)

	I. 1990–2007 stacked first differences					
	(1)	(2)	(3)	(4)	(5)	(6)
(Δ imports from China to US)/ worker	−0.746*** (0.068)	−0.610*** (0.094)	−0.538*** (0.091)	−0.508*** (0.081)	−0.562*** (0.096)	−0.596*** (0.099)
Percentage of employment in manufacturing _{−1}		−0.035 (0.022)	−0.052*** (0.020)	−0.061*** (0.017)	−0.056*** (0.016)	−0.040*** (0.013)
Percentage of college-educated population _{−1}				−0.008 (0.016)		0.013 (0.012)
Percentage of foreign-born population _{−1}				−0.007 (0.008)		0.030*** (0.011)
Percentage of employment among women _{−1}				−0.054** (0.025)		−0.006 (0.024)
Percentage of employment in routine occupations _{−1}					−0.230*** (0.063)	−0.245*** (0.064)
Average offshorability index of occupations _{−1}					0.244 (0.252)	−0.059 (0.237)
Census division dummies	No	No	Yes	Yes	Yes	Yes
	II. 2SLS first stage estimates					
(Δ imports from China to OTH)/ worker	0.792*** (0.079)	0.664*** (0.086)	0.652*** (0.090)	0.635*** (0.090)	0.638*** (0.087)	0.631*** (0.087)
R^2	0.54	0.57	0.58	0.58	0.58	0.58

Notes: $N = 1,444$ (722 commuting zones \times 2 time periods). All regressions include a constant and a dummy for the 2000–2007 period. First stage estimates in panel II also include the control variables that are indicated in the corresponding columns of panel I. Routine occupations are defined such that they account for 1/3 of US employment in 1980. The offshorability index variable is standardized to mean of 0 and standard deviation of 10 in 1980. Robust standard errors in parentheses are clustered on state. Models are weighted by start of period CZ share of national population.

***Significant at the 1 percent level.
**Significant at the 5 percent level.
*Significant at the 10 percent level.