PubPol 201

Module 3: International Trade Policy

Class 4
China Shock

China Shock

- What is (was) the China Shock?
  - The very rapid growth of China's exports to world markets
    - After they opened their markets in the 1980s
    - And especially after they joined with WTO in 2001
  - This had large effects on the US, which we will study

China Shock

- Why study the China Shock?
  - It's usually hard to study the effects of trade empirically, because so much else happens.
  - The China shock was big enough and special enough to isolate its effects
  - Implications matter for more than just trade with China

Class 4 Outline

China Shock

- China's growth
- The China Shock
- The ADH analysis
- Other sources

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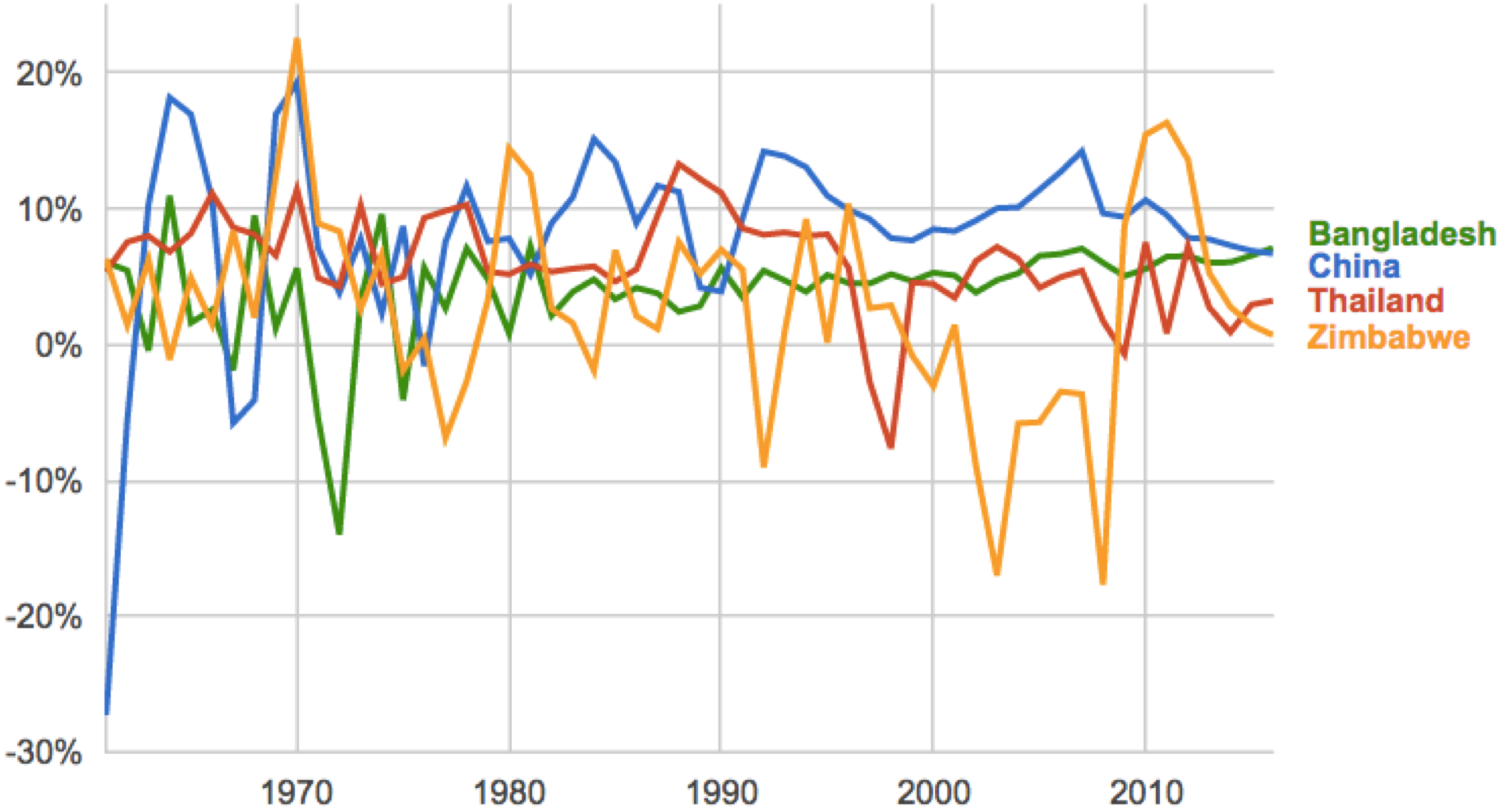
China's Growth

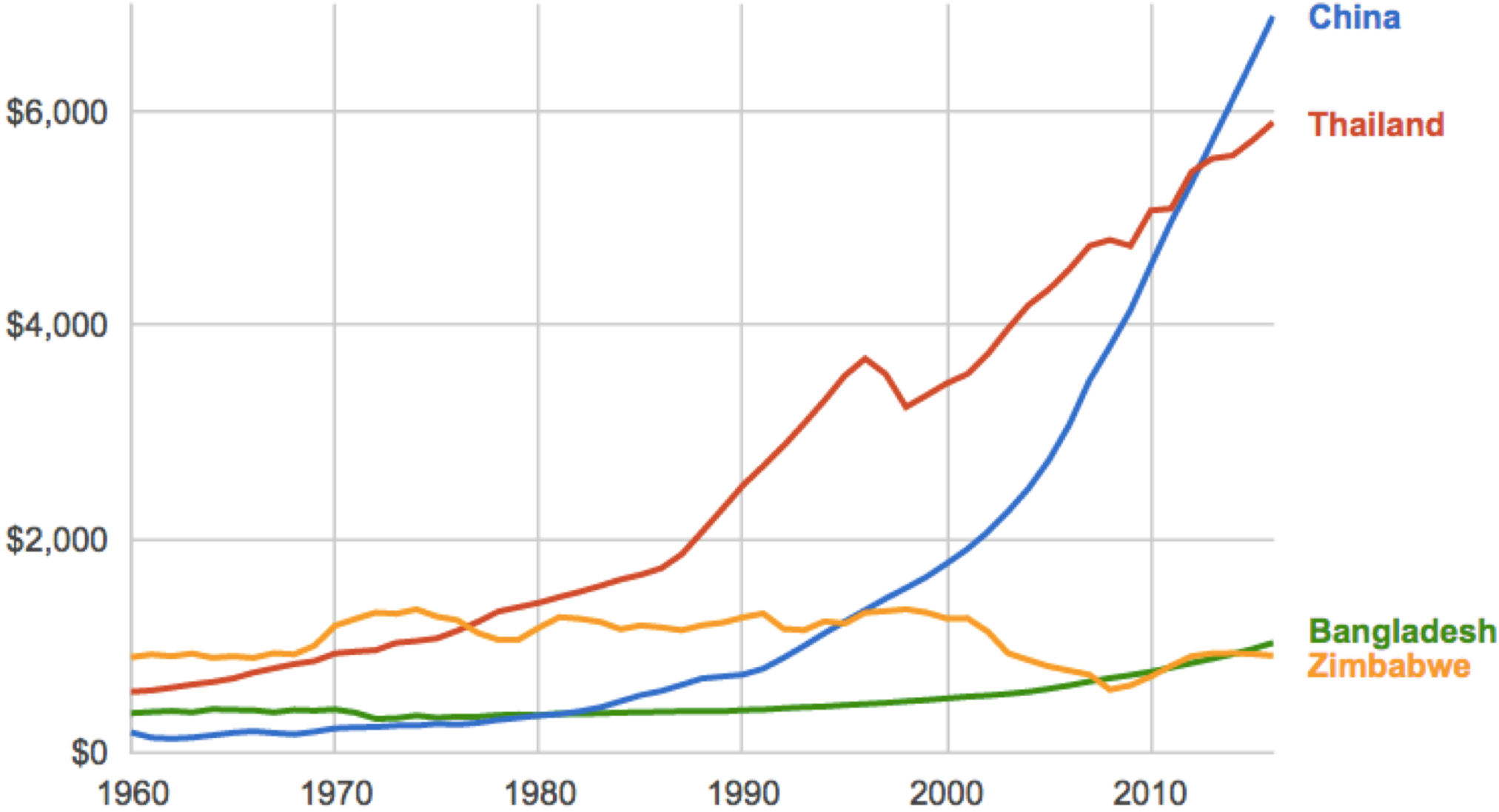
- Was China's growth expected?
  - Not by the Wall Street Journal, June 23, 1989
    - Expected growth leaders:
      - Bangladesh, Thailand, and Zimbabwe
    - Expected laggard: China
      - Due to "the stultifying bureaucracy of hard-line communism"

GDP Growth Rates



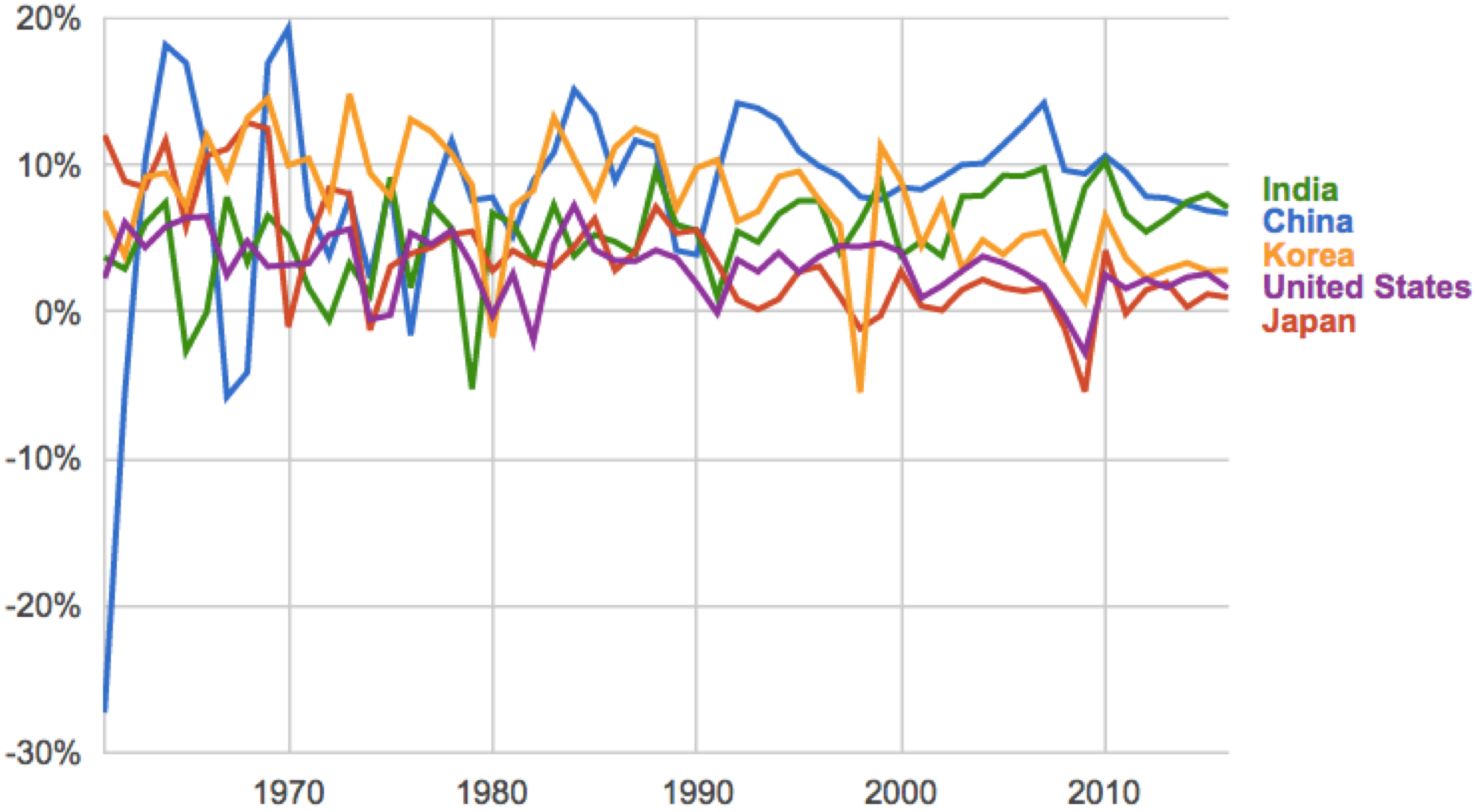
Source: World Bank

GDP per capita (Constant 2000$)



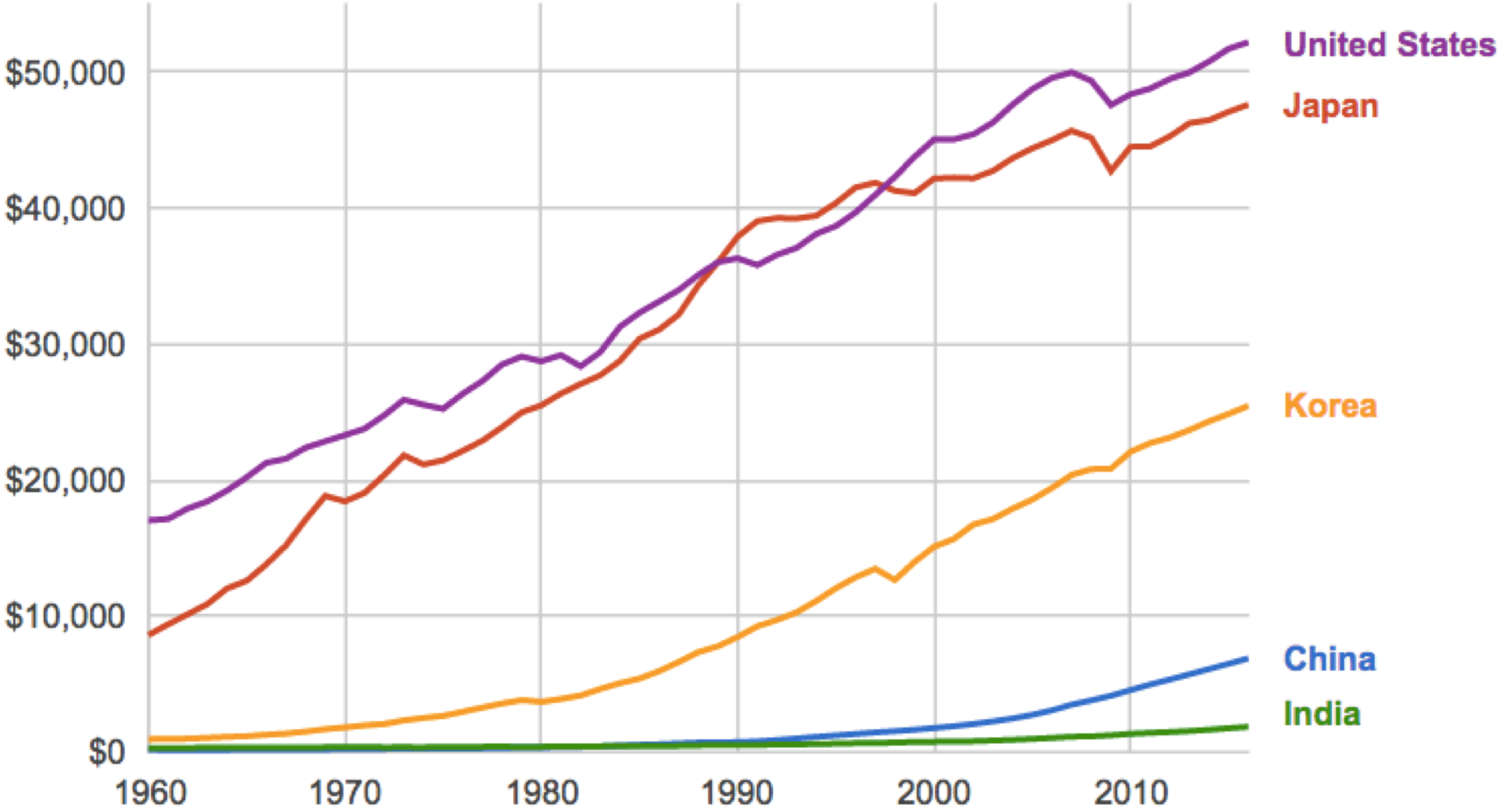
Source: World Bank

GDP Growth Rates



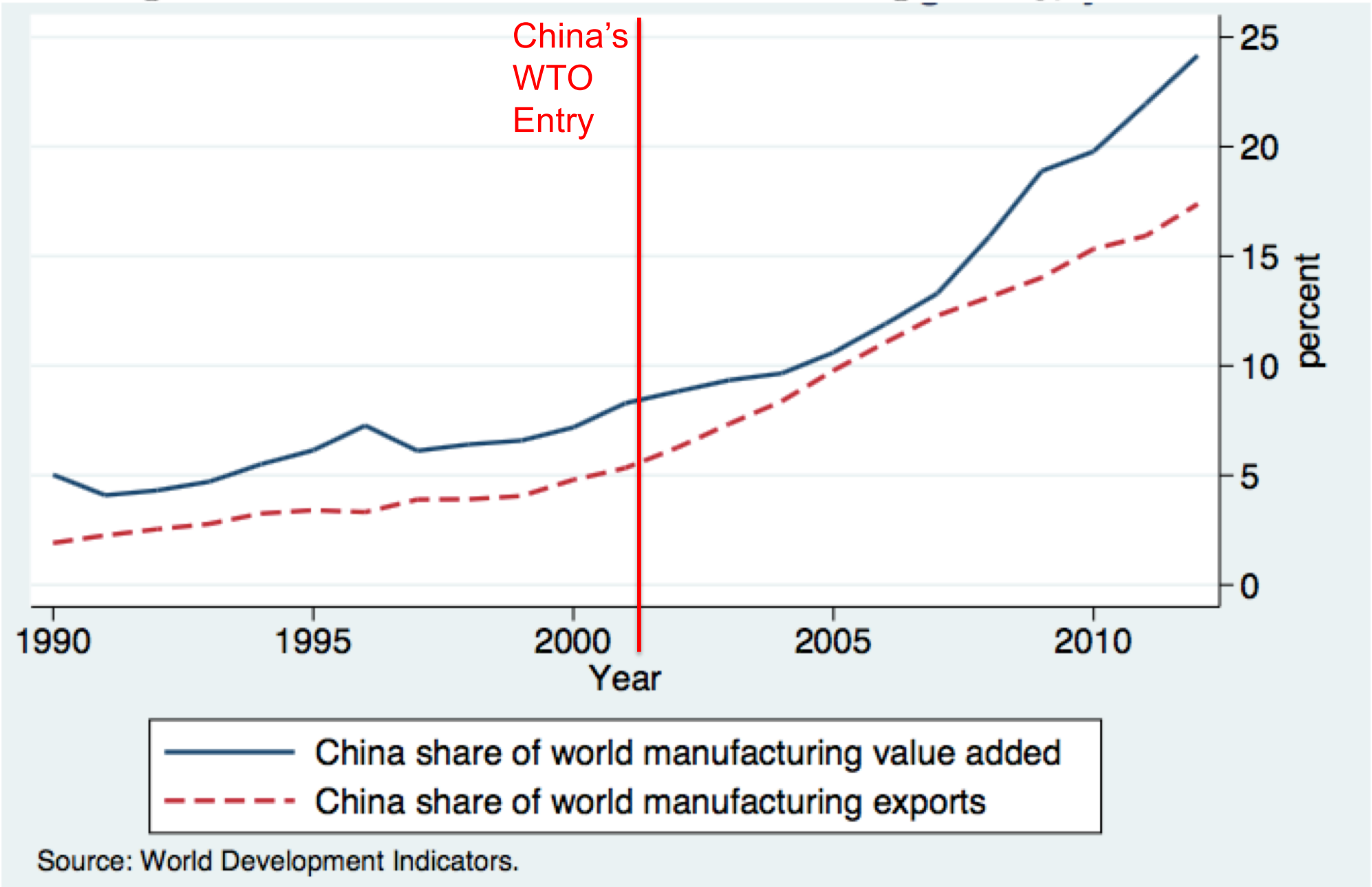
Source: World Bank

GDP per capita (Constant 2000$)



Source: World Bank

Figure 2: China's Share of World Manufacturing Activity, 1990 - 2012



Source: World Development Indicators.

Clicker Question

Imports from China accelerated after it entered the WTO in 2001. When did employment in US manufacturing begin to decline?

✓ a) 1945

b) 1980

c) 2001

d) 2008

Clicker Question

In the most recent data reported here, which country's GDP is growing fastest?

a) China

✓ b) India

c) Japan

d) South Korea

e) United States

China's Growth

- Why China's export growth accelerated after joining WTO in 2001
  - Not because others reduced tariffs on Chinese exports. They didn't.
  - Instead they required China itself to lower tariffs and make other changes

China's Growth

- Why China's export growth accelerated after joining WTO in 2001
  - Privatization of some former SOEs (state-owned enterprises) made them more efficient.
  - Phased out restrictions that had inhibited exports.
  - Lower Chinese tariffs gave industries cheaper imported inputs, making them more productive.
  - Reduced uncertainty about foreign tariffs, unblocking investment.
    - US applied WTO (MFN) tariffs to China's exports
    - But each year US debated whether to continue

Class 4 Outline

China Shock

- China's growth
- The China Shock
- The ADH analysis
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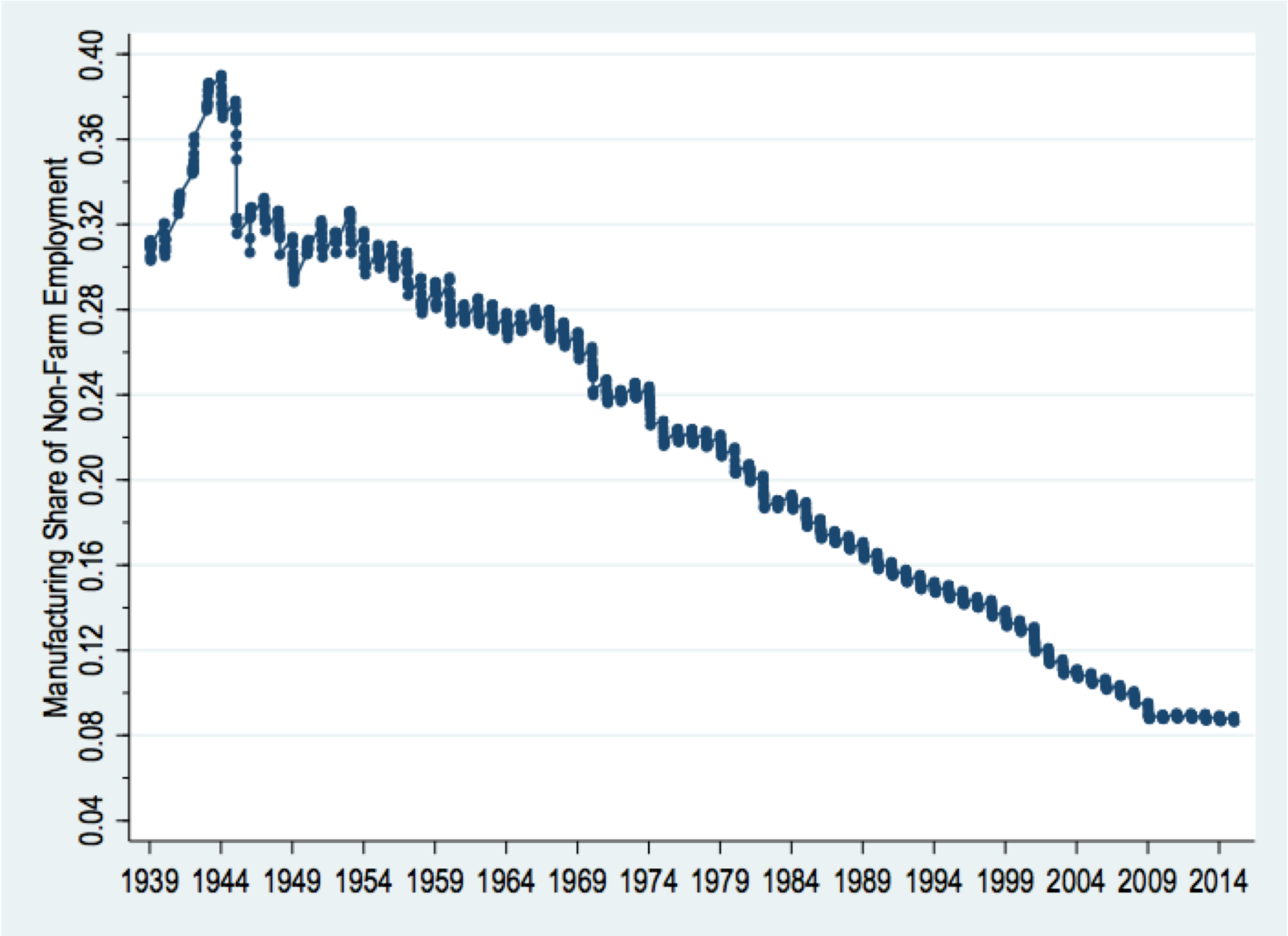
China Shock

- Why study the China Shock?
  - It's important for its own sake
  - Many think it is the cause of the large decline in US manufacturing
    - But look at the data
    - That decline started long before the China Shock

Figure 1: Manufacturing Share of U.S. Nonfarm Employment, 1939 - 2015



Source: FRED Economic Data `https://research.stlouisfed.org/fred2/graph/?g=1Gor`

China Shock

- Why study the China Shock?
  - Also, it's usually hard to find evidence of how trade affects an economy
    - Changes in trade are usually
      - Accompanied by many other changes
      - Caused in part by the economies you want to study
    - Thus causation is hard to figure out
    - But the China Shock was plausibly a "natural experiment"
      - A change in the real world similar to a controlled experiment

China Shock

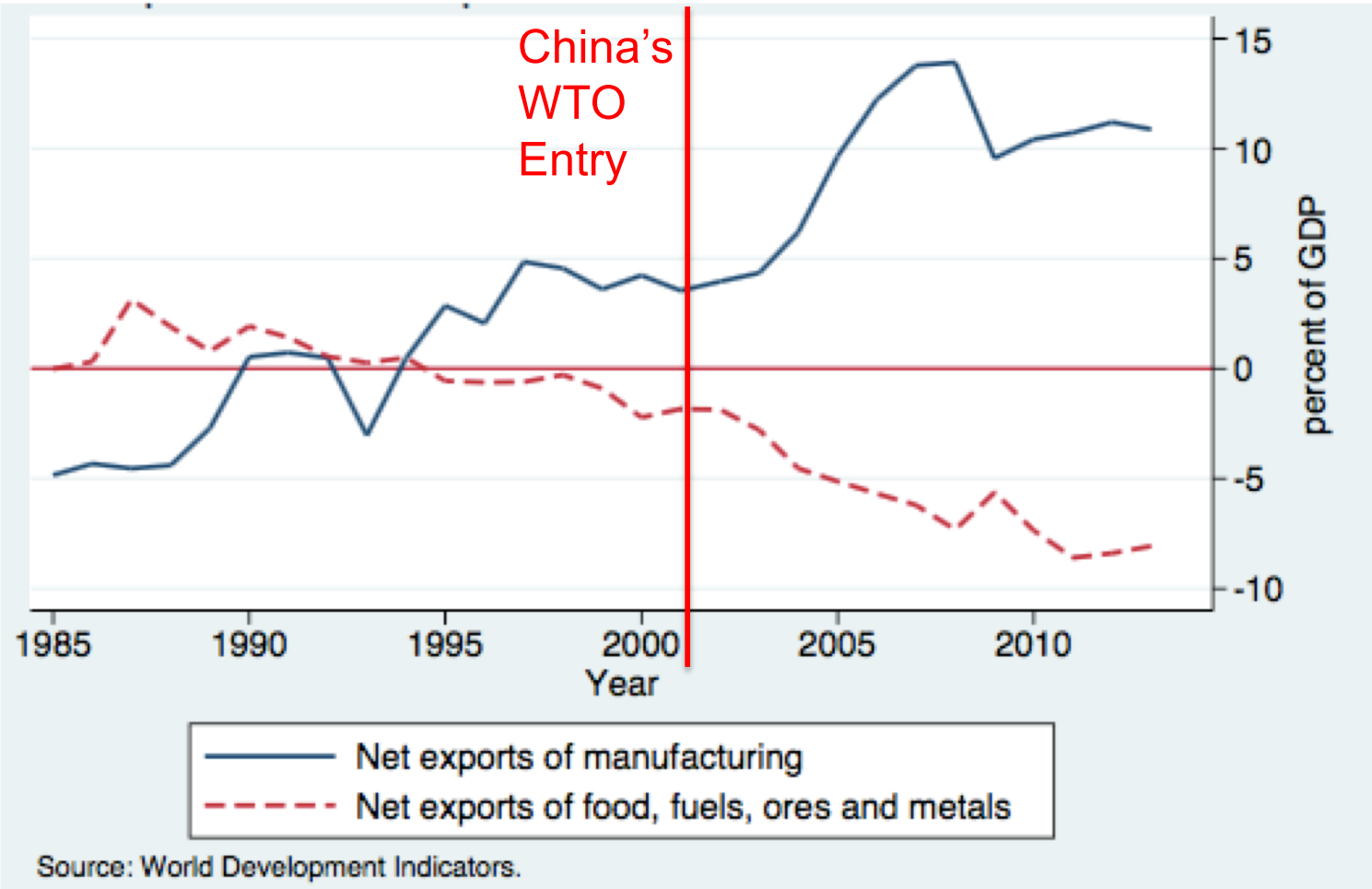
- Why study the China Shock?
  - Whay was the China Shock plausibly a "natural experiment"
    - China's growth, and the growth of its trade, were unexpected
    - Its cause was largely the extreme isolation of China under Mao
    - Its comparative advantage was distinctive: much of manufacturing but not primary products or resources

China Shock

- Why study the China Shock?
  - So the China Shock can give us information about how other changes in trade, including smaller ones, may affect an economy like the US

Figure 3: The Evolution of China's Imports and Exports

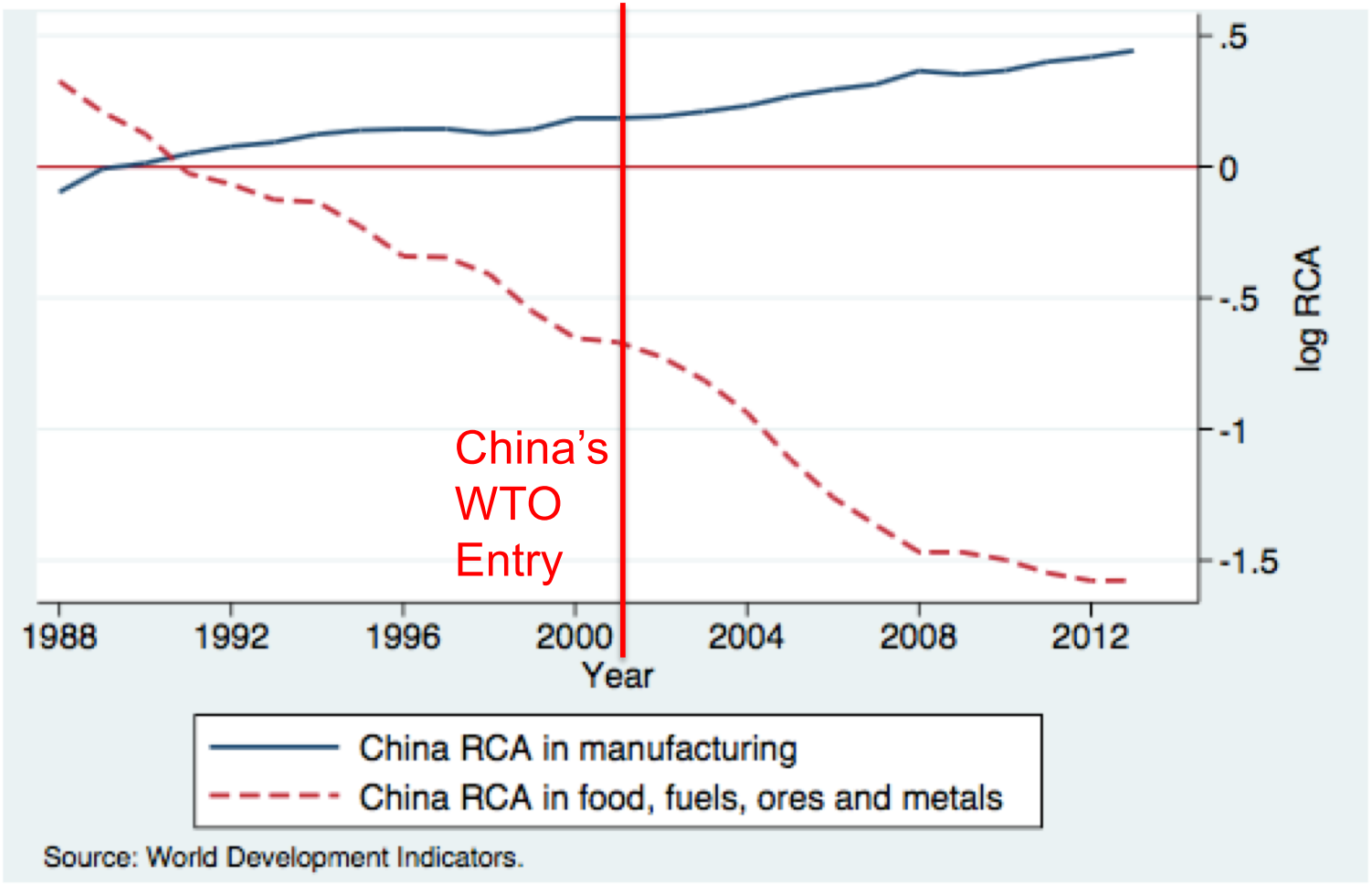
A. Exports Minus Imports as a Share of GDP for China



Source: World Development Indicators.

Figure 3: The Evolution of China's Imports and Exports

B. Revealed Comparative Advantage for China



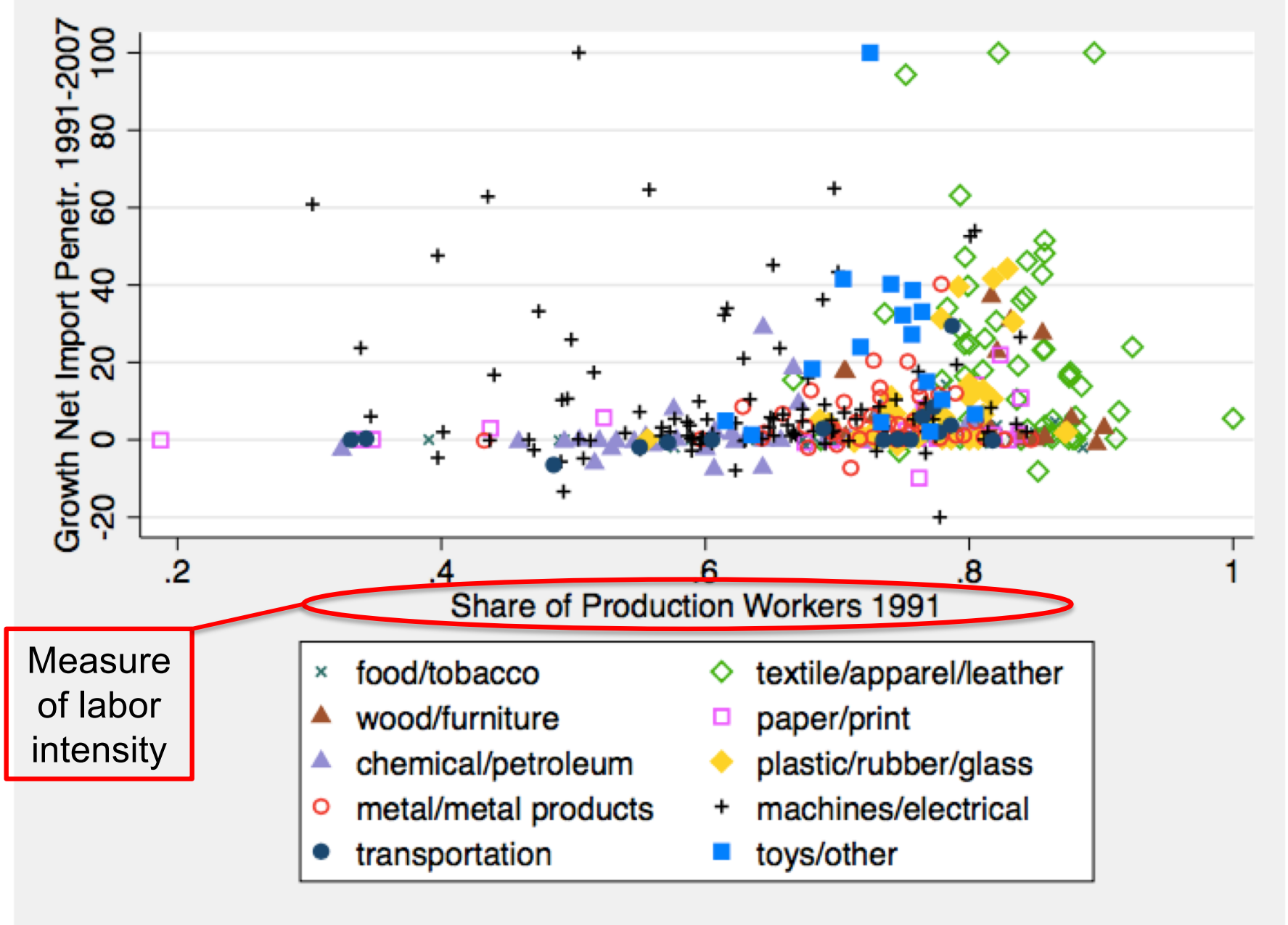
Source: World Development Indicators.

"Revealed comparative advantage" uses a formula to try to infer a country's comparative advantage from data on its, and the world's, trade.

China Shock

- Nature of the China Shock
  - China's growth of exports to the US was broad
    - Covering most of manufacturing
    - Greatest in most labor-intensive sectors
    - Varied in size across products within an industry
  - The variation suggests that effects will differ across localities in US, which specialize in different products
  - So the natural experiment differs across localities, giving multiple observations to study

Figure 4: ΔChina-U.S. Net Import Penetration in Detailed Manufacturing Industry, 1991 - 2007



Clicker Question

Why do economists sometimes use “natural experiments”?

a) Natural experiments do not require funding

b) To avoid being accused of actions that are unnatural

✓ c) Because they cannot themselves control economic conditions

d) Natural experiments are welcomed because they are beneficial to their subjects

Discussion Question

The data show clearly that US imports from China rose at the same time that US manufacturing fell. Why is that, by itself, NOT enough to tell us that imports were harmful to the US?

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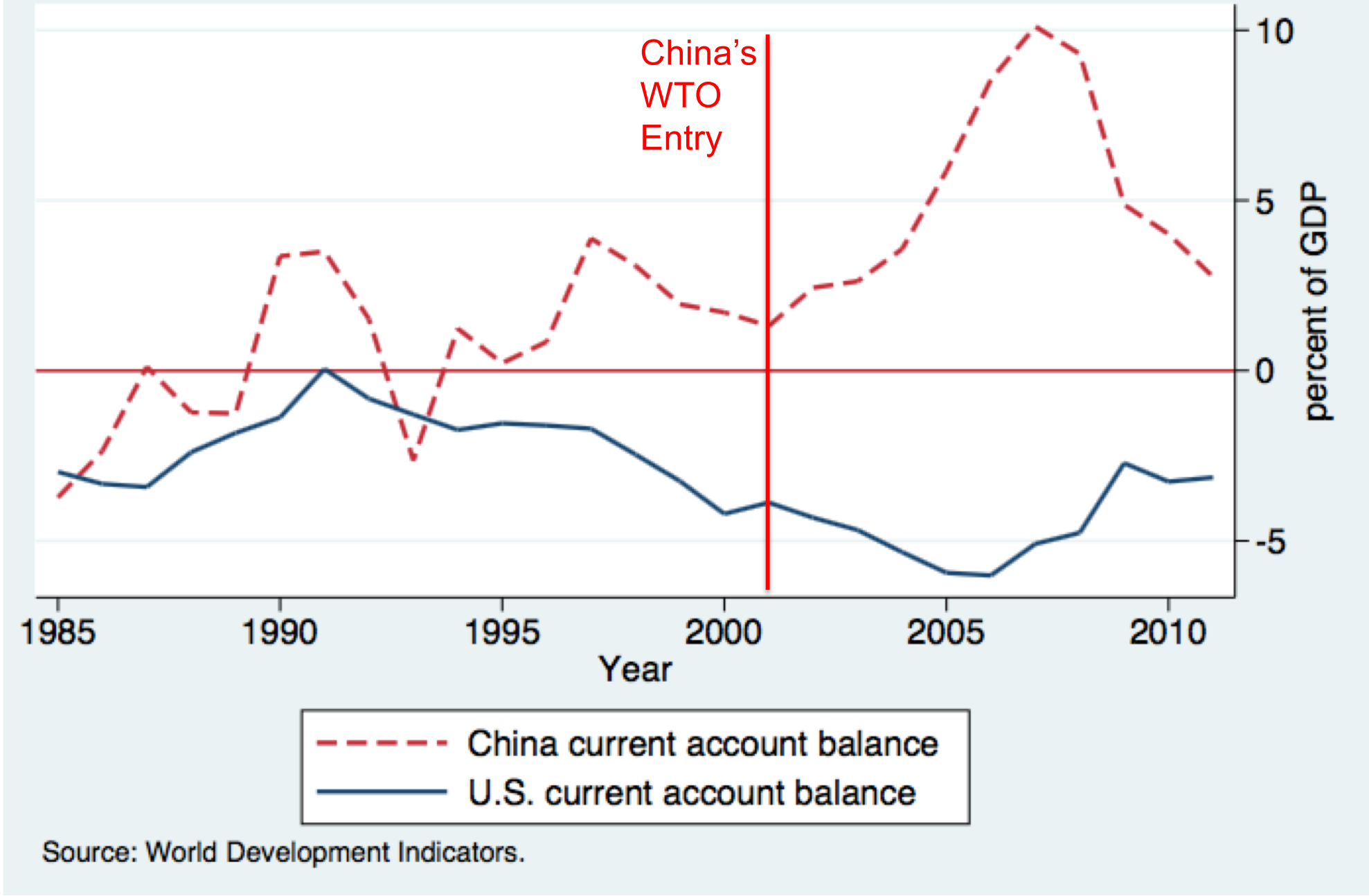
The ADH Analysis

- The data show
  - Simultaneous growth in
    - China's current account surplus
    - US's current account deficit

Figure 5: U.S. and China Current Account Balances (% of GDP) 1985 - 2012



Source: World Development Indicators.

The ADH Analysis

- The data show
  - Simultaneous growth in
    - China's current account surplus
    - US's current account deficit
  - That over the whole period 1991-2011, as well as sub-periods, across industries
    - Imports from China grew
    - Employment fell

Table 2: Industry-Level Changes in Chinese Import Exposure and U.S. Manufacturing Employment, 1991 - 2011

	1991-2011		1991-1999	1999-2011	1999-2007	2007-2011
	Mean/SD	Median	Mean/SD	Mean/SD	Mean/SD	Mean/SD
100 x Annual Δ in U.S. Exposure to Chinese Imports	0.50	0.14	0.27	0.66	0.84	0.30
	(0.94)		(0.75)	(1.33)	(1.61)	(1.68)
100 x Annual Log Δ in Emp. (Manufacturing Industries)	-2.71	-2.05	-0.30	-4.32	-3.62	-5.73
	(3.07)		(3.49)	(3.85)	(4.15)	(5.02)

Statistics are based on 392 4-digit manufacturing industries. The change in U.S. exposure to Chinese imports is computed by dividing 100 x the annualized increase in the value of U.S. imports over the indicated period by 1991 U.S. market volume in that industry. Employment changes are computed in the County Business Patterns. All observations are weighted by 1991 industry employment.

Δ = change

Log Δ = change in the logarithm ≈ percent change

SD = standard deviation (measure of how different observations are)

The ADH Analysis

- The data also show (from the standard deviations)
  - That there was considerable variation across industries in both import penetration and employment loss
    - This indicates that the data may reveal the relationship between them

The ADH Analysis

- And they show that employment declined more in the later years:
  - 0.3 log points (≈ percentage) 1991-1999
  - 3.6 log points 1999-2007
  - 5.7 log point 2007-2011

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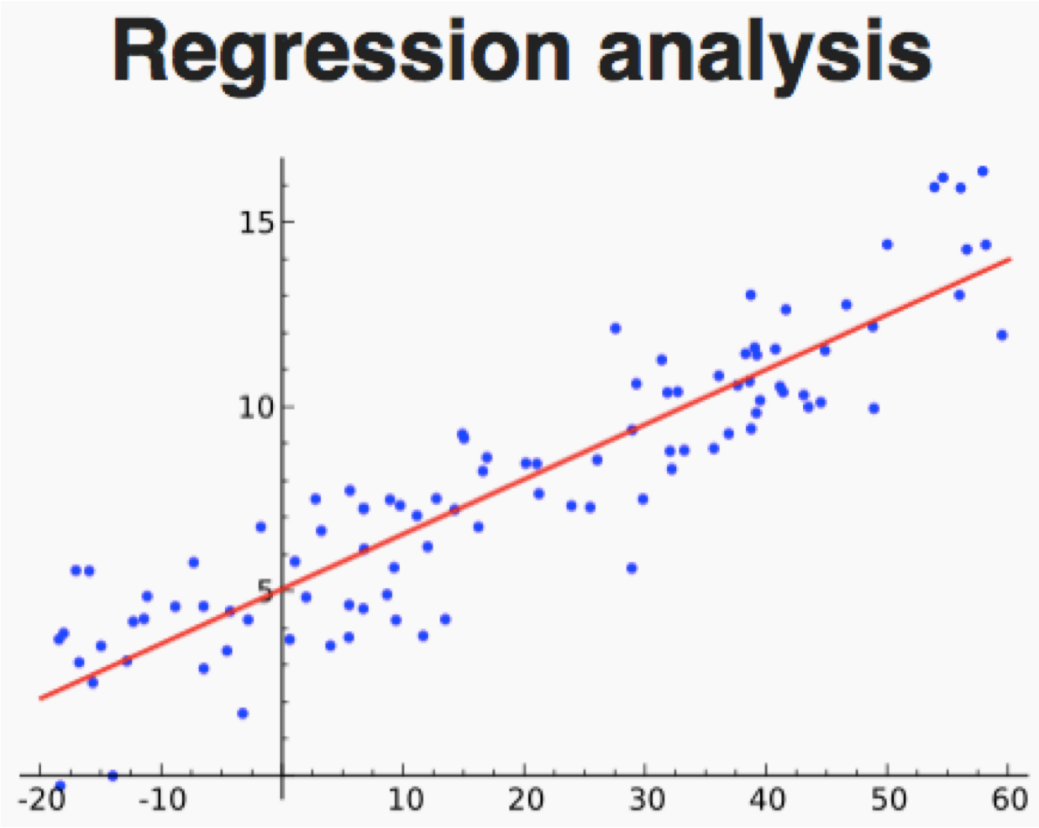
The ADH Analysis

- Regression analysis
  - ADH used standard statistical techniques to estimate the relationship between the two variables.



The ADH Analysis

- Regression analysis
  - ADH used standard statistical techniques to estimate the relationship between the two variables.
  - Table 3 shows results for manufacturing only
    - Col 1: OLS = Ordinary Least Squares
    - Cols 2-3: 2SLS = Two-Stage Least Squares

Table 3: Industry-Level Changes in Chinese Import Exposure and U.S. Manufacturing Employment, 1991 - 2011

	Stacked First Differences		
	1991-2011		1991-2007
	(1)	(2)	(3)
100 x Annual Δ in U.S.	-0.81***	-1.30***	-1.24***
Exposure to Chinese Imports	(0.16)	(0.41)	(0.37)
1{1991-1999}	-0.08	0.05	0.04
	(0.36)	(0.36)	(0.36)
1{1999-2011}	-3.79***	-3.46***	
	(0.33)	(0.33)	
1{1999-2007}			-2.58***
			(0.38)
Estimation Method	OLS	2SLS	2SLS

N = 784 (392 4-digit manufacturing industries x 2 periods 1991-1999 and 1999-2011 or 1999-2007). Employment changes are computed in the County Business Patterns and are expressed as 100 x annual log changes. Observations are weighted by 1991 employment. Standard errors in parentheses are clustered on 135 3-digit industries. * p < 0.10, ** p < 0.05, *** p < 0.01.

Estimated change in employment associated with a 1-percentage point rise in import penetration

"Dummy variables" for time periods: Ignore

Three stars mean probability that true effect is zero is less than 1%.

Thus highly "statistically significant"

The ADH Analysis

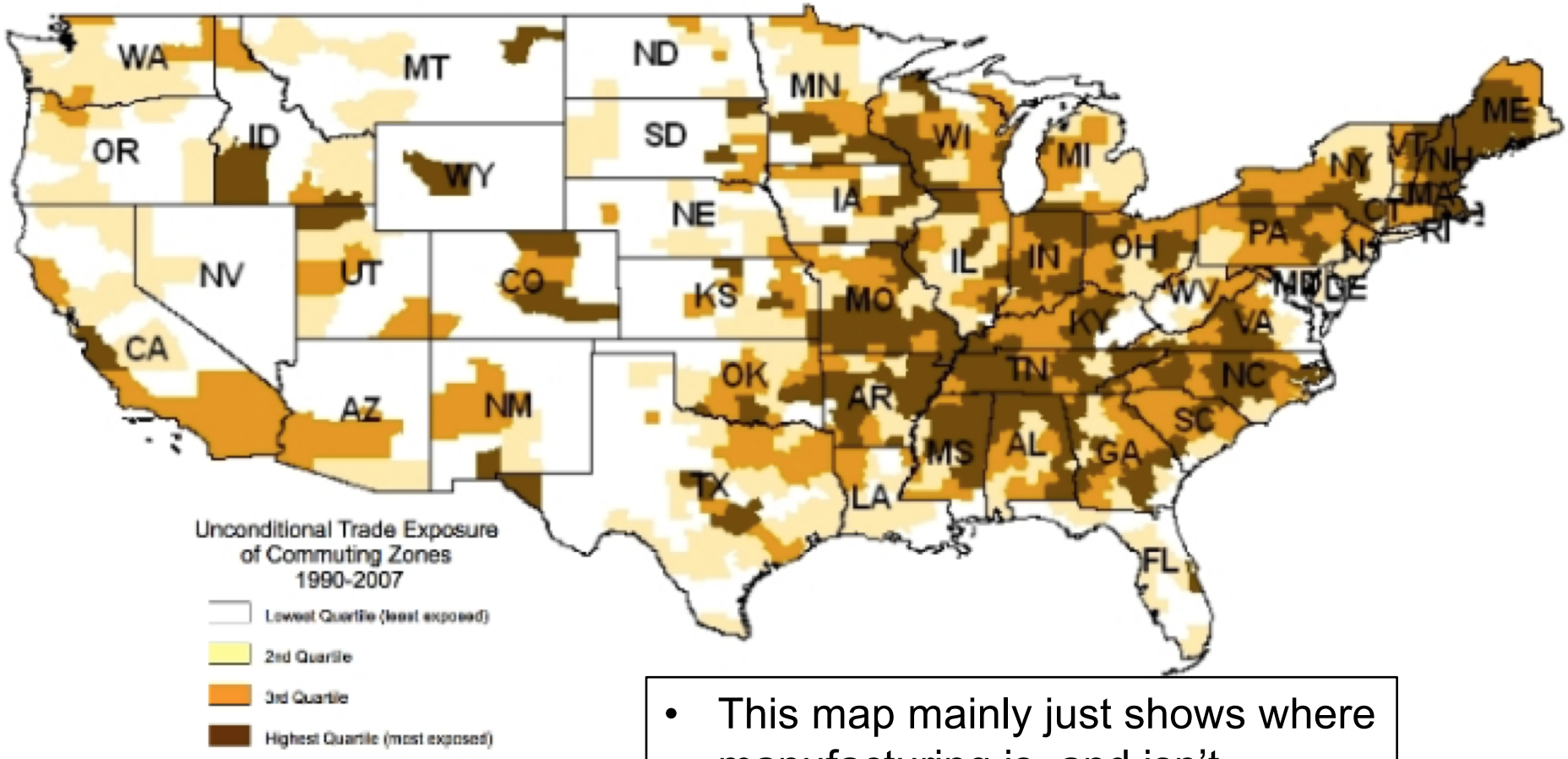
- Why 2SLS?
  - OLS results “could be biased because growth in import penetration is driven partly by domestic shocks.”
    - ”Correlation is not causation”
  - 2SLS avoids this bias by using “instrumental variables”
    - Here these are import penetration from China in countries other than the US

The ADH Analysis

- Regression analysis
  - ADH used standard statistical techniques to estimate the relationship between the two variables.
  - Table 3 shows results for manufacturing only
    - Col 1: OLS = Ordinary Least Squares
    - Cols 2-3: 2SLS = Two-Stage Least Squares
  - These estimates can be used to plot maps of how parts of the US have been affected

Figure 6: Geographic Exposure to Trade Shocks at the Commuting Zone (CZ) Level

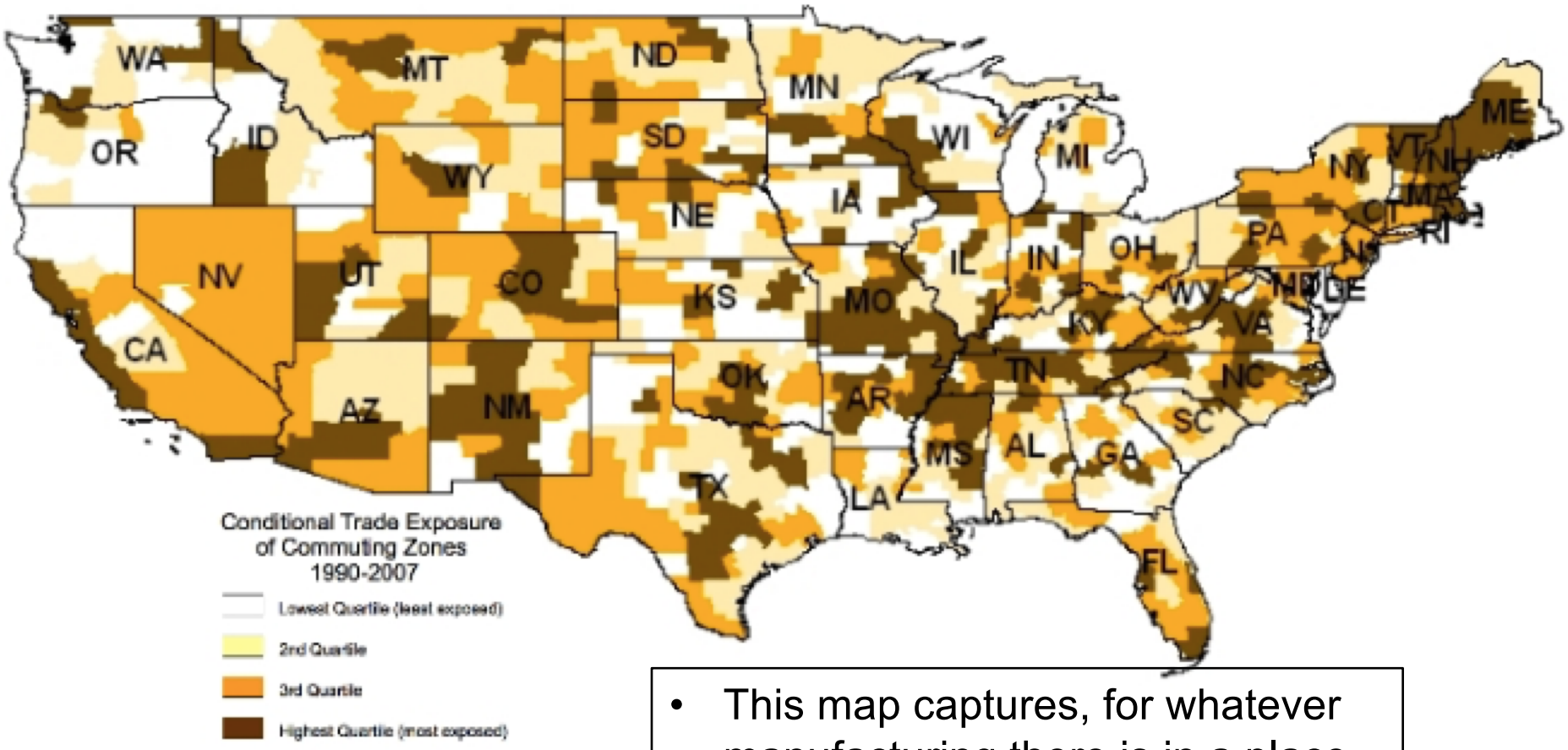
A. Quartiles of Unconditional Exposure



- This map mainly just shows where manufacturing is, and isn't
- Next map controls for this

Figure 6: Geographic Exposure to Trade Shocks at the Commuting Zone (CZ) Level

B. Quartiles of Exposure Conditional on Manufacturing Employment Share



- This map captures, for whatever manufacturing there is in a place, the extent to which it competes with imports from China

Clicker Question

Why is SE Michigan a lighter shade in the second map than the first?

a) The second shows that population has moved away from Michigan

b) The auto sector was not impacted by imports from China

c) Michigan does most of its trade with Canada

✓ d) More manufacturing is concentrated here than in much of the country

The ADH Analysis

- Effects on other things
  - Table 4A shows that import penetration causes
    - Fall in employment in non-manufacturing
    - Rise in unemployment
    - Rise in “not in labor force”
  - Table 4B shows that it also causes
    - Fall in population
    - Fall in wage
    - Rise in transfers (from government)

Table 4: Import Competition and Outcomes in U.S. Local Labor Markets, 1990 - 2007

A. Δ Fraction of Working Age Population in Manufacturing, Unemployment, NILF

Employed in Manufacturing (1)	Employed in Non-Manufacturing (2)	Unemployed (3)	Not in Labor Force (4)
-0.60***	-0.18	0.22***	0.55***
(0.10)	(0.14)	(0.06)	(0.15)

B. Δ Log Population, Log Wages, Annual Wage and Transfer Income

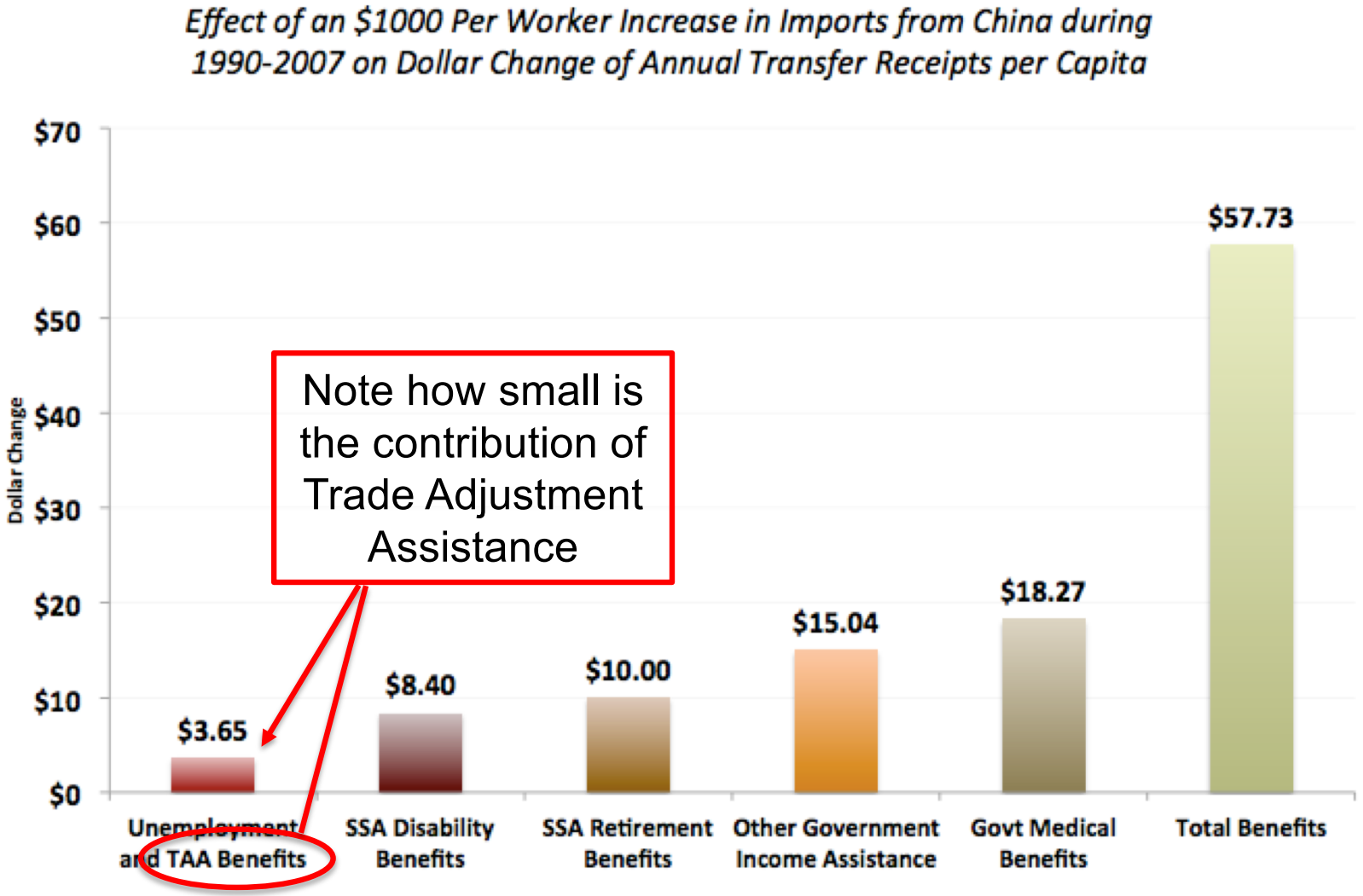
Δ Log CZ Population (log pts) (5)	Δ Avg Log Weekly Wage (log pts) (6)	Δ Annual Wage/Salary Inc per Adult (US$) (7)	Δ Transfers per Capita (US$) (8)
-0.05	-0.76***	-549.3***	57.7***
(0.75)	(0.25)	(169.4)	(18.4)

Discussion Question

Why would the China Shock cause each of these effects in localities with increased imports?

- Fall in employment in non-manufacturing
- Rise in unemployment
- Rise in “not in labor force”
- Fall in population
- Fall in wage
- Rise in transfers (from government)

Figure 7: Imports from China and Induced Government Transfer Receipts in Commuting Zones, 1990 - 2007



The ADH Analysis

- Persistence
  - Another finding of ADH (I won't show the graph) is that displaced workers tend either to remain in their same trade-impacted industry or move to another that is also vulnerable.
  - "Labor-market adjustment to trade shocks is stunningly slow"

The ADH Analysis

- The China Shock: ADH Concluding Comments
  - "Employment has certainly fallen in U.S. industries more exposed to import competition."
  - "so too has overall employment in the local labor markets in which these industries were concentrated"
  - "Offsetting employment gains … have, for the most part, failed to materialize."
    - I question this, though, since US unemployment is so low
  - But: "The great China trade experiment may soon be over, if it is not already."

Clicker Question

Why do ADH suggest that the China Shock "may soon be over, if it is not already"?

✓ a) Wages are rising in China

b) President Trump is discouraging imports from China and may raise tariffs

c) US manufacturing is so low, it cannot fall any further

d) It will be replaced by an Africa Shock: a large increase in imports from Africa

Class 4 Outline

China Shock

- China's growth
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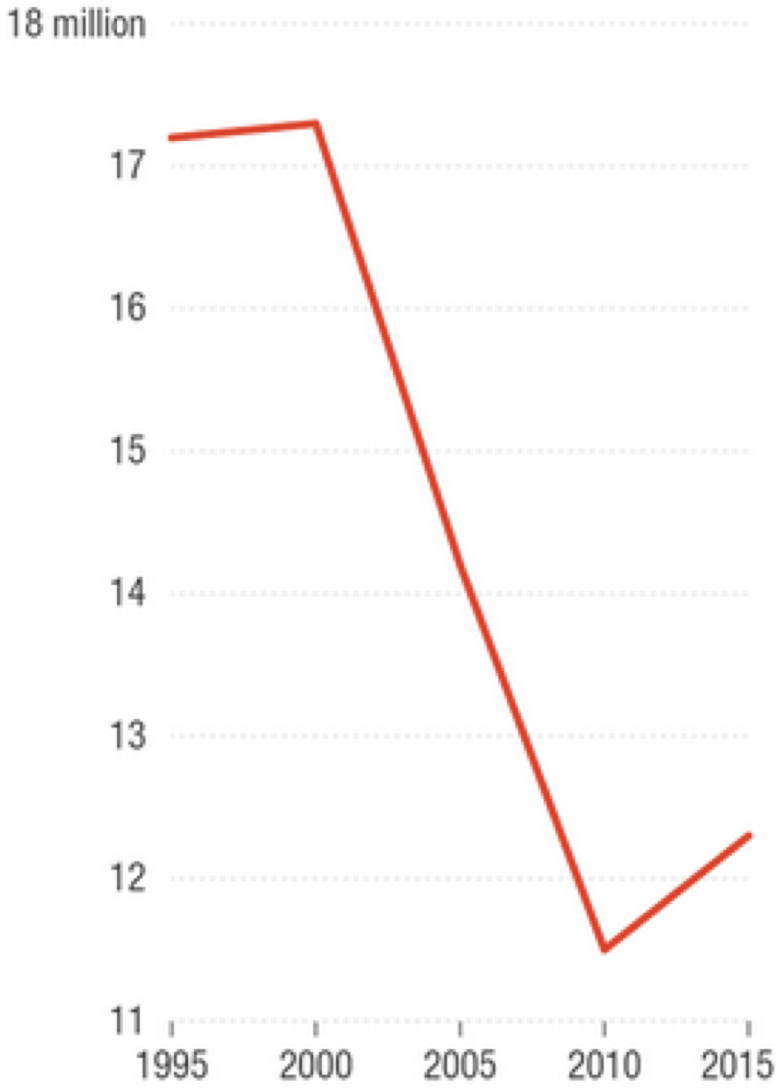
- Other sources

Other Sources

- Arnold, in a reading from NPR, says
  - (Not really another source, since he's quoting David Autor, the A of ADH.)
  - "from 2000 to 2007, trade with China destroyed nearly 1 million U.S. manufacturing jobs."
  - But the graph there shows jobs falling by about 6 million. So China trade was only a small part of the drop.

U.S. Manufacturing Jobs, 1995-2015



Over the past few decades, factory jobs have dropped amid technological advances and increased global competition.

NPR/Bureau of Labor Statistics

Other Sources

- Davis & Hilsenrath:
  - Again not really a different source. This quotes Gordon Hanson, the H of ADH
  - China was important even for jobs lost to Mexico: "Many U.S. factories that moved to Mexico did so to match prices from China."
  - "'If we encouraged China to trade, we needed domestic policies in place that would minimize the impact that would follow." We didn't have those.

Clicker Question

Why has the China Shock been worse than the rise of imports from Japan in the 1980s?

a) Japan exported goods that the US did not make.

b) Japan was a political ally of the US, but China is not.

✓ c) Japan's exports were concentrated in a few industries, unlike China's.

d) Japan is a much smaller country than China.

Other Sources

- Economist, “Economists Argue about the Impact of Chinese Imports on America”
  - Work by Rothwell criticizes the results of ADH
    - For using import data from Europe rather than the US
    - For the timing of the ADH data
    - For the way that the ADH results have been interpreted by the public, not recognizing that there were large consumer gains from the China Shock, as well as losses

Other Sources

- Krugman
  - Argues that it has not been trade itself that caused the costs observed by ADH, but rather its rapid rate of change
  - This is relevant because a reversal of policy to reduce trade (by Trump?) would be equally damaging

Discussion Question

What should the United States have done differently with regard to trade with China?