



UNITED STATES INTERNATIONAL TRADE COMMISSION

# Manufacturing Trade: Can the Past Inform the Future?

Transportation Research Board  
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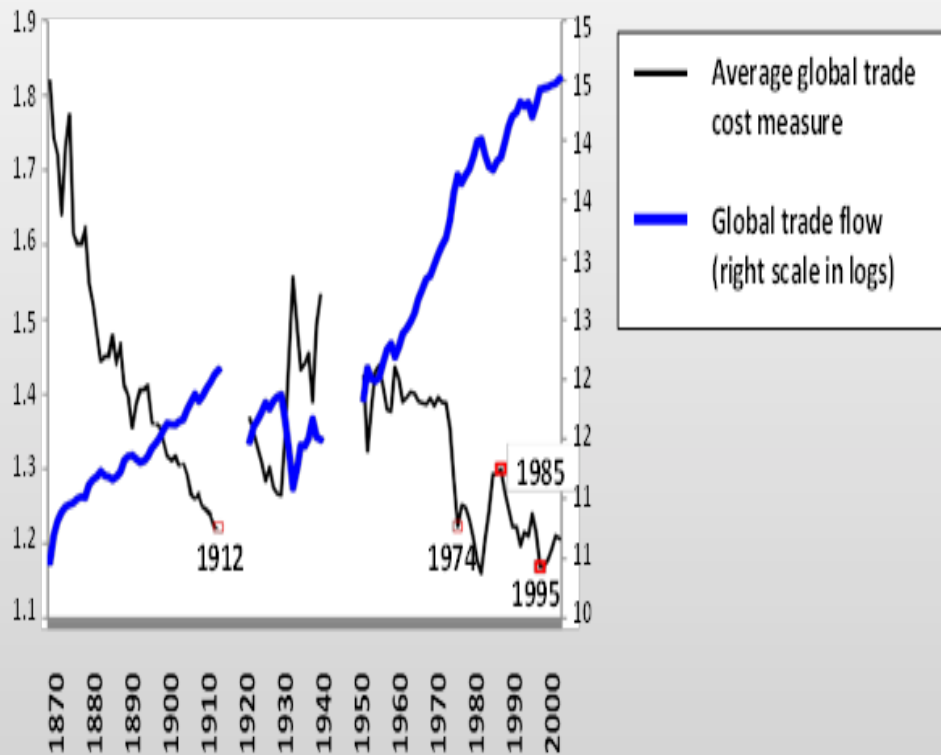


## What changes the dynamics of manufacturing trade?

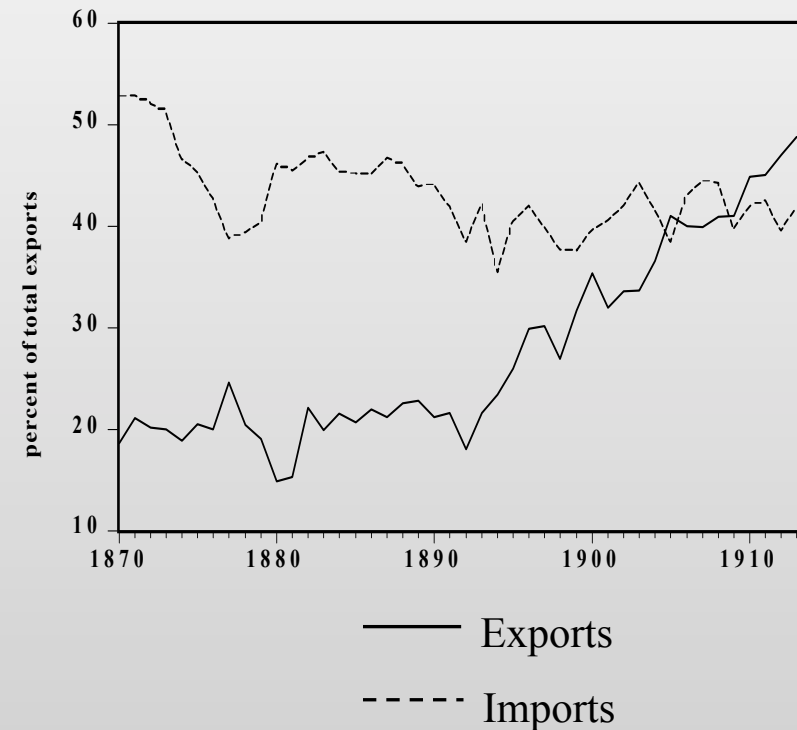
- Liberalization of tariffs and non-tariff measures (NTMs)
  - Trade facilitation (customs and infrastructure)
  - Standards
  - Export, import controls
  - Regulations
- Technological change
  - Transportation technologies
  - Information and communication technologies (ICT)
- Changes in relative costs of inputs
  - Raw materials, energy
  - Labor
  - Capital



## Technological change: Transportation



U.S. Trade in Manufactured Goods, 1870-1913

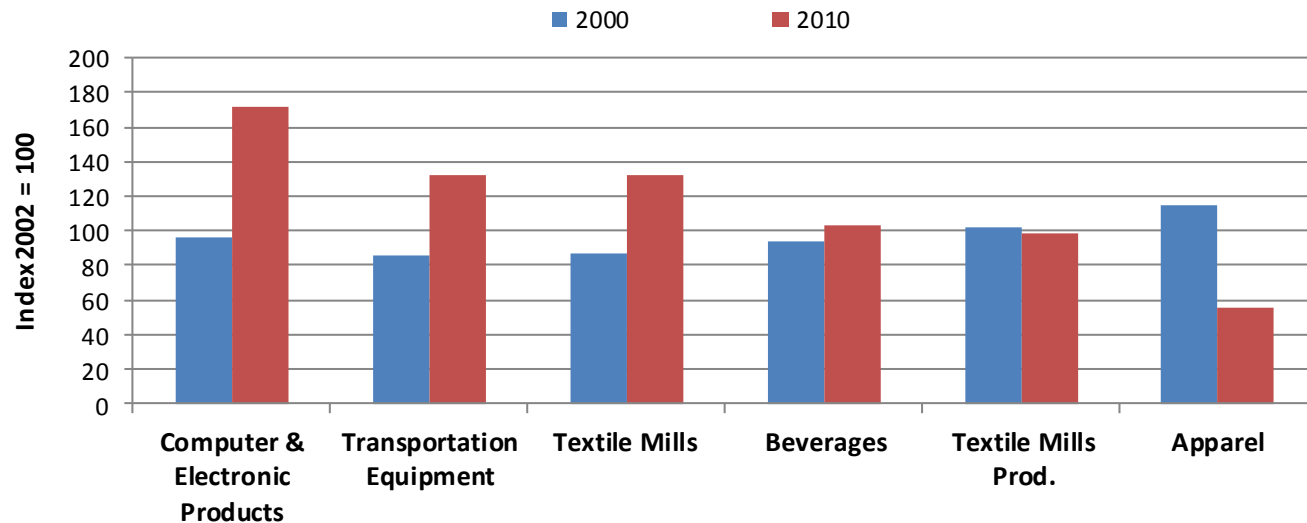


**Value of Manufactured Exports More Than Doubled in 5 years from \$205 million to \$485 Million (1895-1900)**



## Technological Change: Applied ICT improved productivity for many sectors

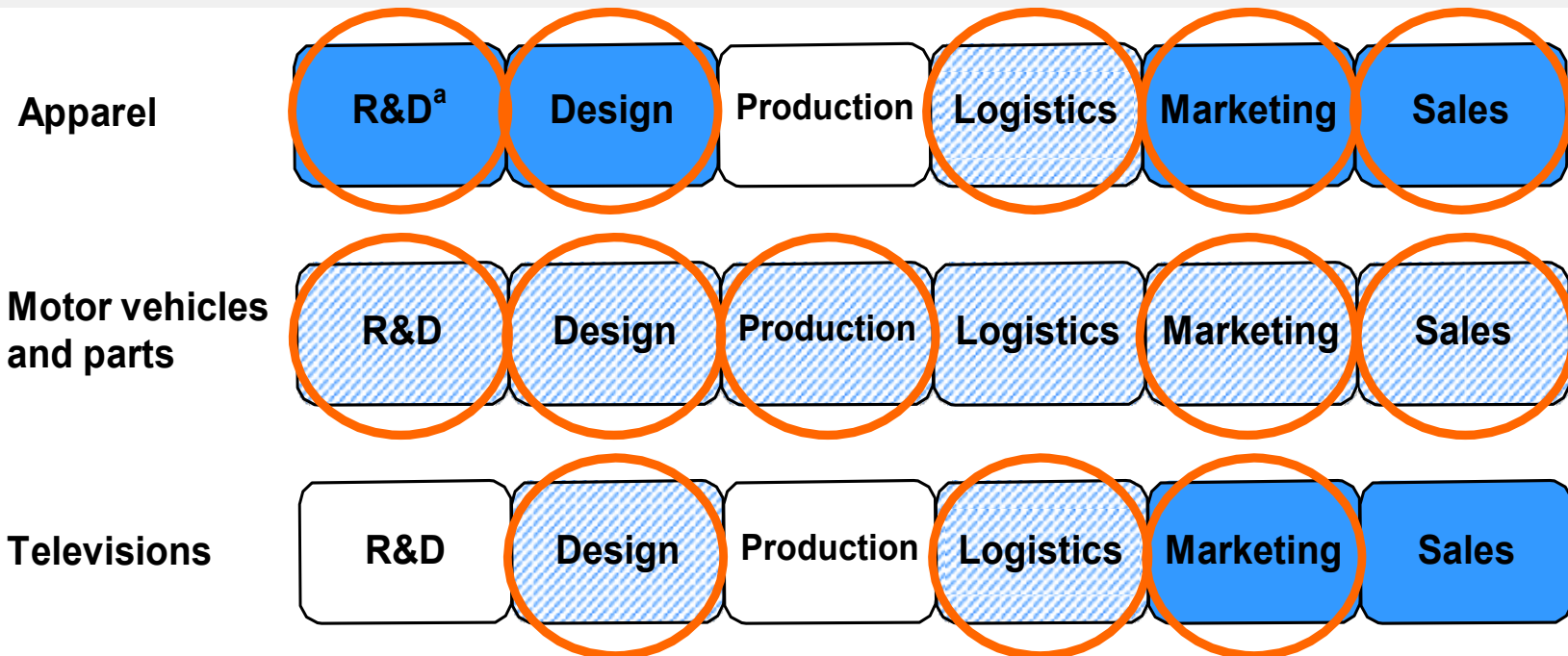
Labor productivity for select U.S. manufacturing sectors, 2000 and 2010




Source: BLS, Industry Productivity and Costs



## ICT Expanded the GVC Business Model



 Activity of U.S. lead firm in specified industry:



Performed in U.S.



Performed abroad



Performed in U.S. and abroad

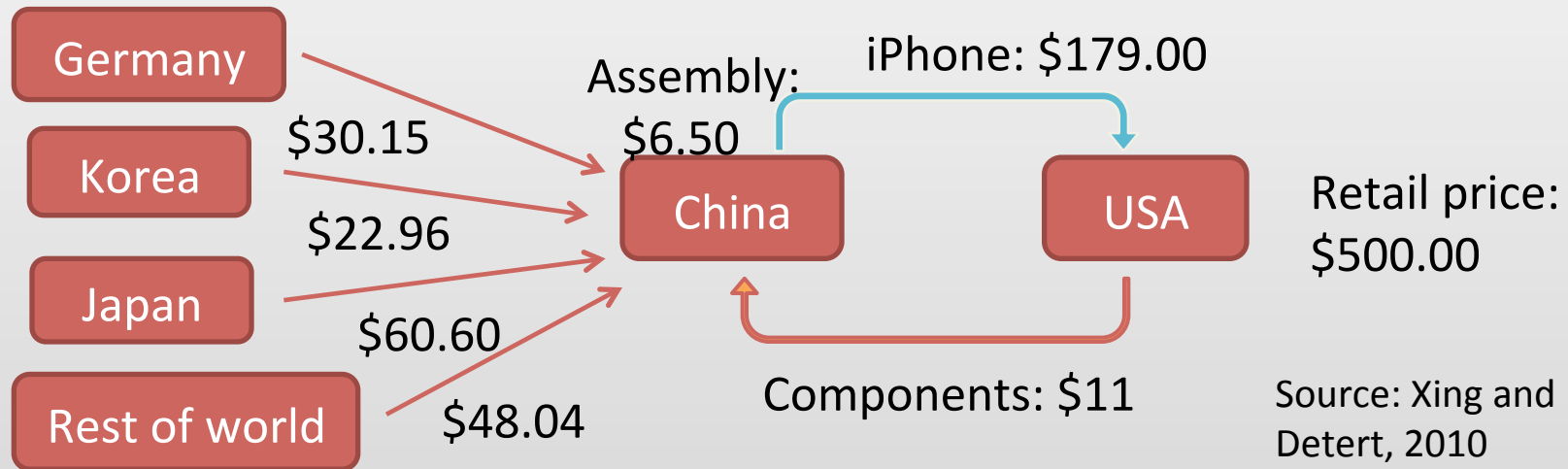
Source: Commission compilations; apparel based on Gereffi and Frederick, "The Global Apparel Value Chain, Trade, and the Crisis," 2010.



## Global value chain

### The Iphone: “Made In China” ?

Components:



- Only \$6.50 of the \$179 value of each iPhone exported to the US is added in Chinese assembly.



## Global Value Chains

Sources of value in U.S. **imports**, 2007

	U.S.	China	Japan	East Asia	Canada	Mexico	Europe	Others	Total
Total	7.8	15.9	11.1	14.1	7.8	7.3	23.2	12.8	100.0
Apparel	6.0	21.4	2.1	26.3	1.8	3.2	9.4	29.9	100.0
Motor vehicles	15.4	1.9	25.5	6.2	16.9	7.5	21.3	5.3	100.0
Electronics	7.8	23.2	12.0	27.8	1.7	14.6	7.3	5.6	100.0
Machinery	6.7	13.7	13.8	11.2	5.8	9.6	29.9	9.2	100.0
Business services	1.5	2.7	4.0	13.0	8.3	0.9	43.1	26.6	100.0



## Global Value Chains

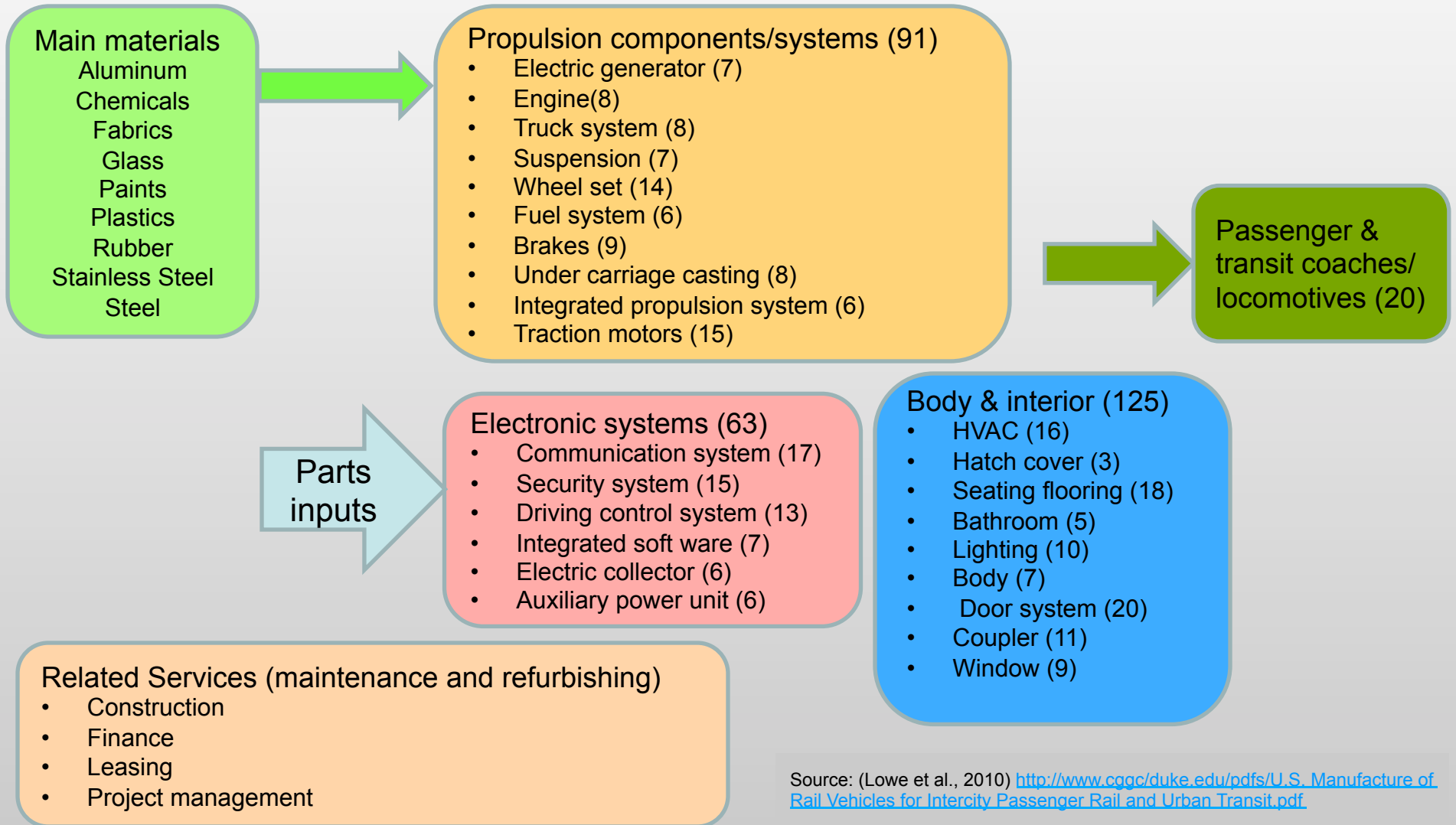
Sources of value in U.S. **production**, 2007

	U.S.	China	Japan	East Asia	Canada	Mexico	Europe	Others	Total
Total	92.9	0.4	0.5	0.7	1.0	0.4	1.9	2.3	100.0
Apparel	87.3	1.4	0.7	1.6	1.3	0.7	3.3	3.7	100.0
Motor vehicles	79.2	1.6	2.5	2.1	3.0	2.4	4.9	4.2	100.0
Electronics	78.0	2.7	2.4	5.1	1.8	1.6	4.5	3.9	100.0
Machinery	87.7	1.1	1.1	1.4	1.5	1.3	3.0	2.9	100.0
Business services	95.2	0.3	0.4	0.8	0.5	0.2	1.4	1.2	100.0





## U.S. Value Chain for Passenger and Transit Rail Vehicles



Source: (Lowe et al., 2010) [http://www.cqgc/duke.edu/pdfs/U.S\\_Manufacture\\_of\\_Rail\\_Vehicles\\_for\\_Intercity\\_Passenger\\_Rail\\_and\\_Urban\\_Transit.pdf](http://www.cqgc/duke.edu/pdfs/U.S_Manufacture_of_Rail_Vehicles_for_Intercity_Passenger_Rail_and_Urban_Transit.pdf)



## Considerations for Location of Production and Assembly

- Proximity to demand
- Government regulations
- Importance of R&D and IPR protection
- Access to supply chains: raw materials & infrastructure
- Cost and availability of energy and labor
- Capital cost
  
- Examples:
  - Local, regional production: Autos & transport equipment, chemicals
  - “Dispersed” production: Apparel, toys, furniture



# “On-shoring” Increases

Outsourcing is “quickly becoming mostly outdated as a business model”

(Jeffrey Immelt, CEO GE: Harvard Business Review, Mar.2012)

## Factors:

- Overseas costs (37%)
- Logistics (19%)
- Other reasons (36%)



- Overseas costs
- Logistics
- Other reasons

85% of manufacturing executives expect some operations to return to the U.S.

Cook Associates survey of 3000 mfg executives, Oct-Nov, 2011

<http://www.cookassociates.com/media-center/press-releases/2011-press-releases--/bid/79967/SURVEY-85-of-manufacturing-executives>



# GE's "On-shoring" Investment

## Appliance Park, Louisville, KY

Employees in 1973 = 23,000  
2011 = 2,000

Total investment of \$800 million:

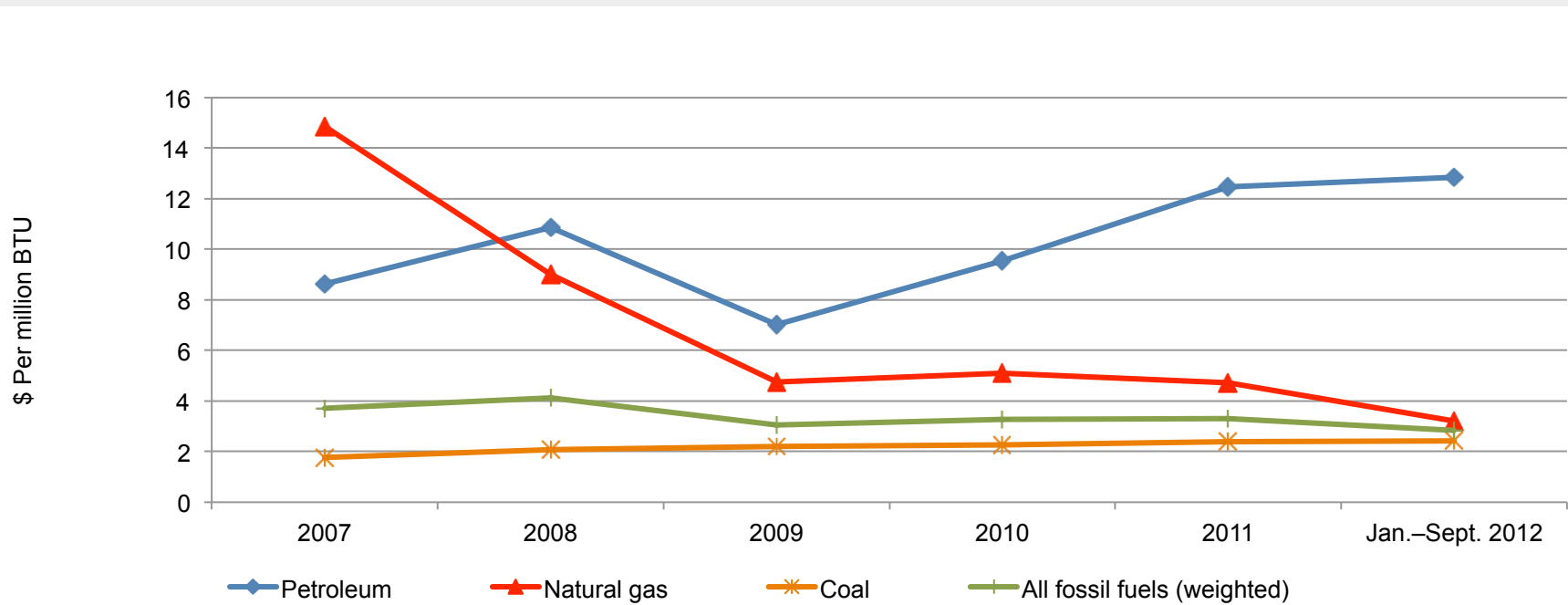
- Cutting-edge, low-energy water heaters (previously made in China)
- High-tech French-door refrigerators (Mexico)
- Stainless-steel dishwashers, front-loading washers and dryers

Factors of change:

- Rising oil prices, dramatically increasing cargo-ship fuel/transport costs
- Declining U.S. natural gas prices (4x more in Asia)
- Rising Chinese wages (5x more than in 2000, and rising)
- New business engineering processes improve labor productivity



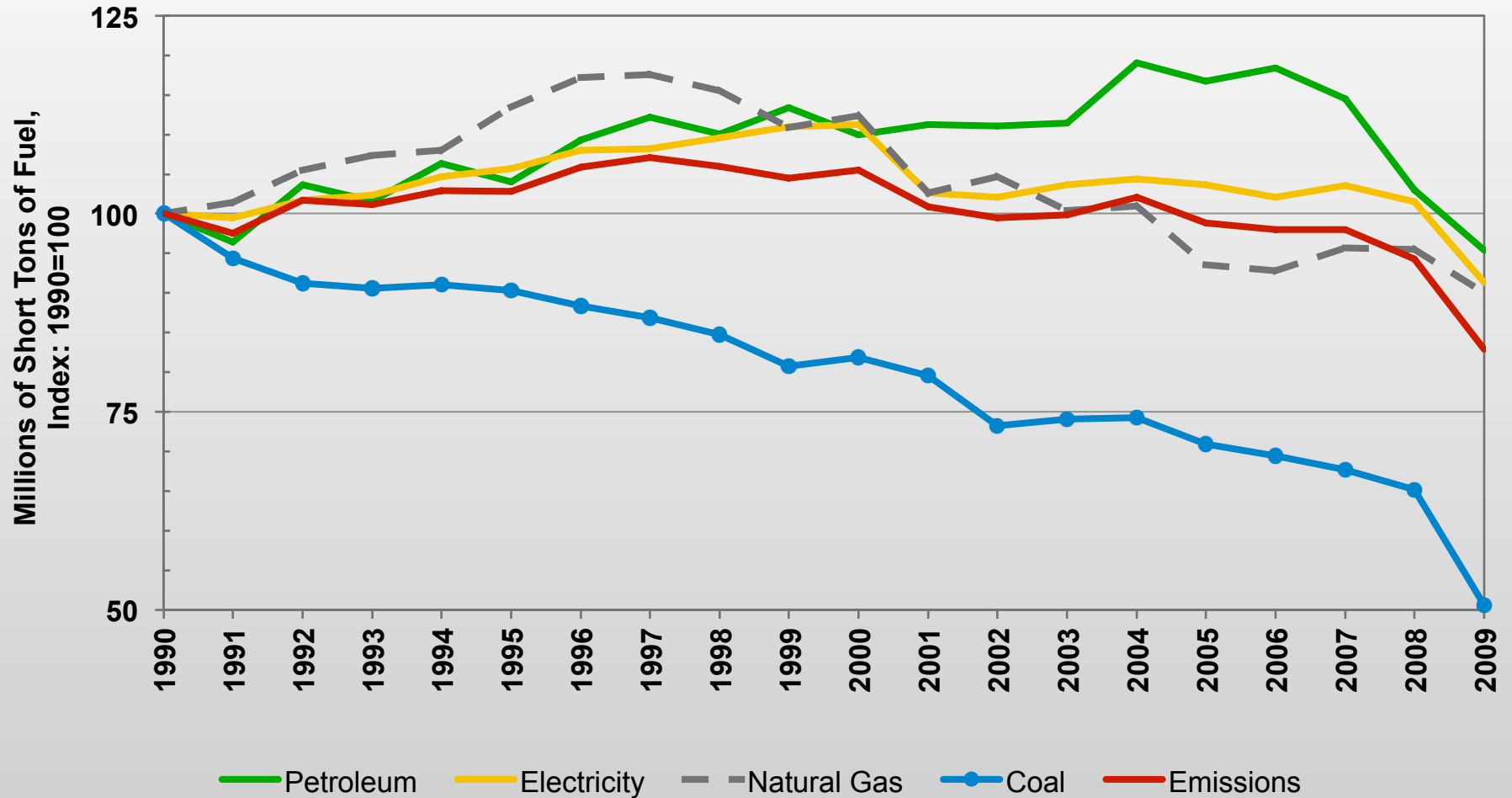
## Cost of Fossil Fuels used at U.S. Electricity Generating Plants



Source: Official statistics of the U.S. Department of Energy.



## Manufacturing Energy Use and Emissions Have Declined

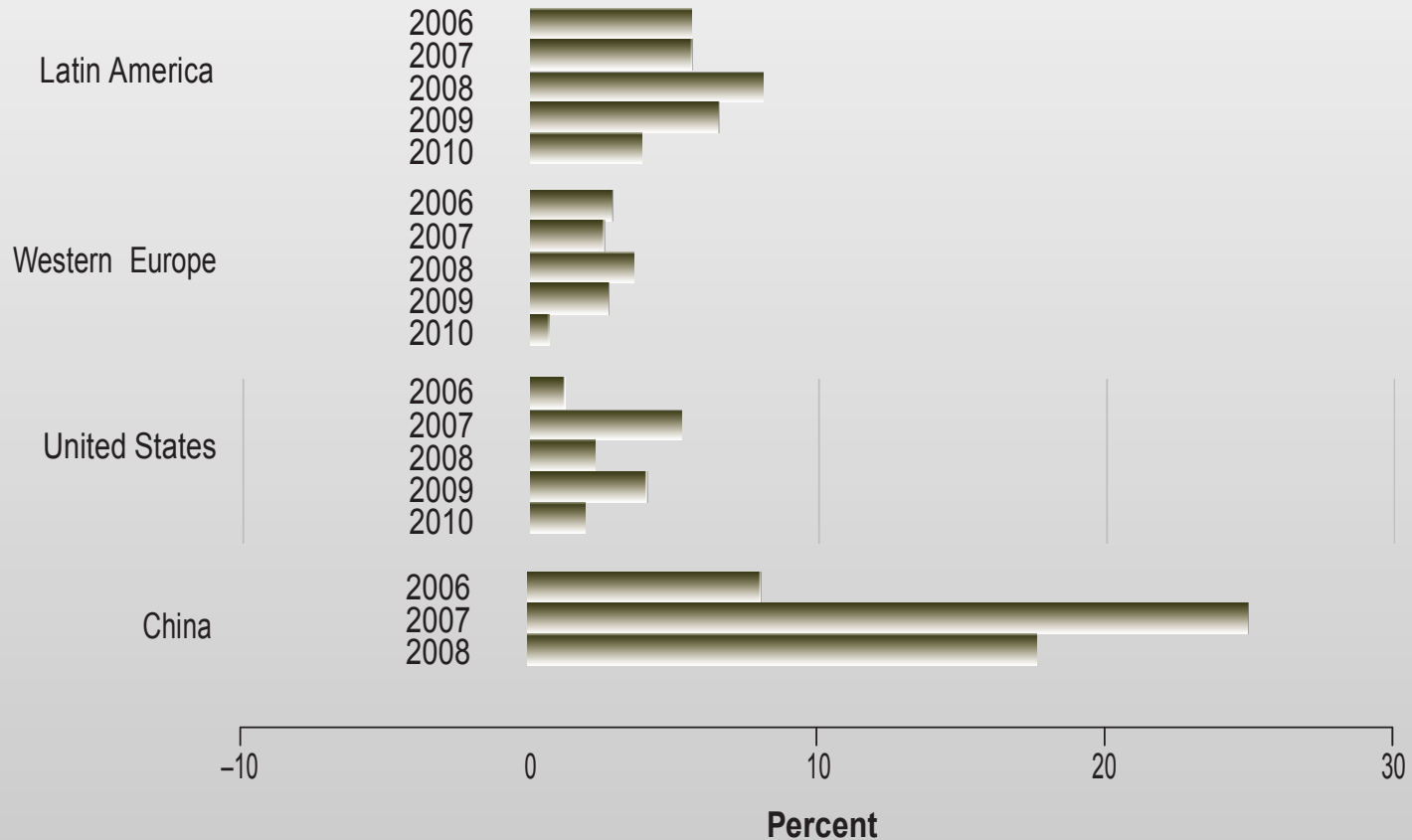


Source(s): U.S. Energy Information Administration



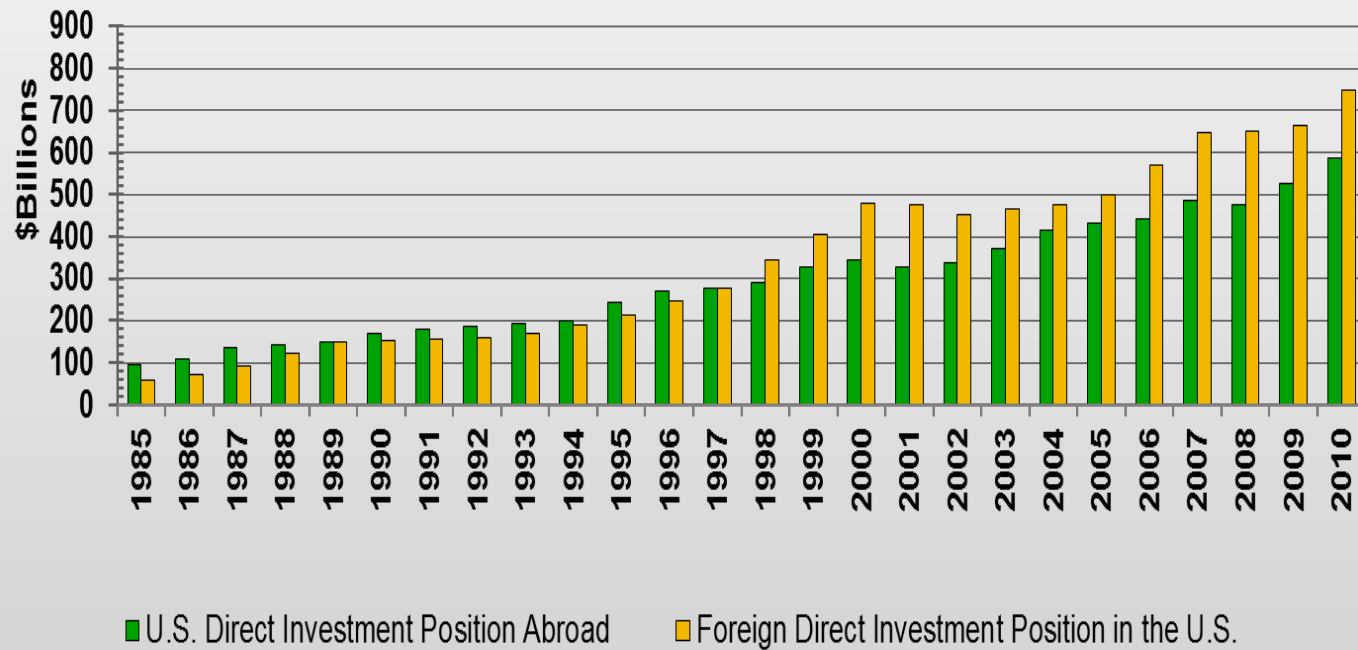
## Labor: Relative Wage Rates are Changing and Skills are Critical

Annual change in hourly compensation costs in manufacturing





# Foreign Direct Investment in the U.S. Increases







## Chinese FDI in the United States, 2000-Q3 2012

Total Deals: 593

Total Value: \$22.6 Billion

### Investment (\$ millions)

### Investment by Industry (\$millions)

(Service sectors in red)

- Greenfield: 389 deals / \$3,575
- Acquisition: 204 deals / \$19,050
  
- Gov.: 149 deals / \$12,609
- Private: 444 deals / \$10,016

- Aero, Auto & Transport: 60 deals / \$1,541
- Consumer Products: 80 deals / \$441
- Electronics and IT: 142 deals / \$3,357
- **Finance & Bus. Serv.:** 55 deals / \$348
- Fossil Fuels & Chem.: 45 deals / \$8,277
- **Health, Bio & Pharma:** 38 deals / \$591
- **Hospitality & Real Estate:** 21 deals / \$3,849
- Industrial Machinery: 67 deals / \$3,051
- **Logistics:** 18 deals / \$23
- Metals and Minerals: 22 deals / \$419
- Renewable Energy: 45 deals / \$729

Note: Unclear whether electronics & IT is services or manufacturing.

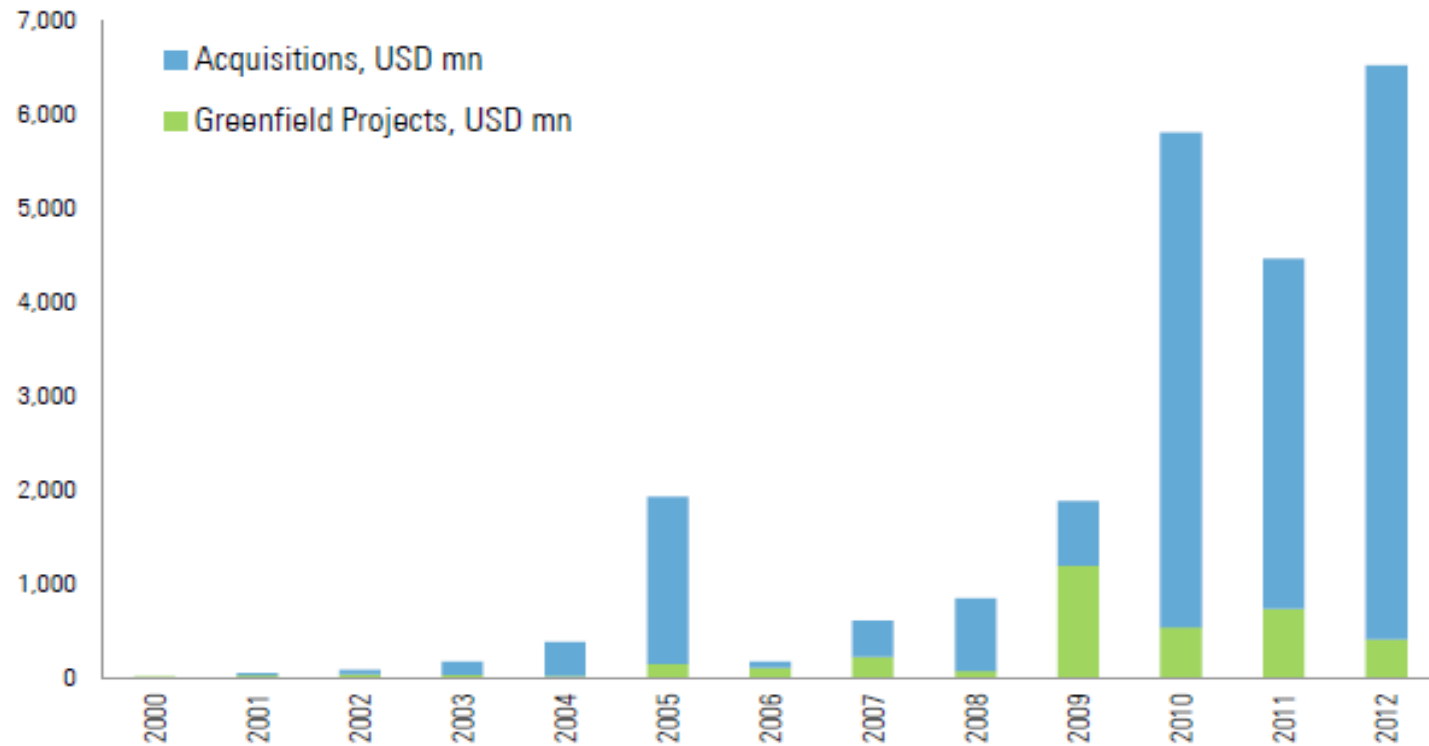
Source: Rhodium Group, China Investment Monitor, <http://rhgroup.net/interactive/china-investment-monitor>



# Growing Chinese Investment in the U.S.

**Figure I: Chinese Direct Investment in the United States, 2000-2012\***

USD million



Source: Rhodium Group. A detailed explanation of sources and methodology can be found at: <http://rhgroup.net/interactive/china-investment-monitor>

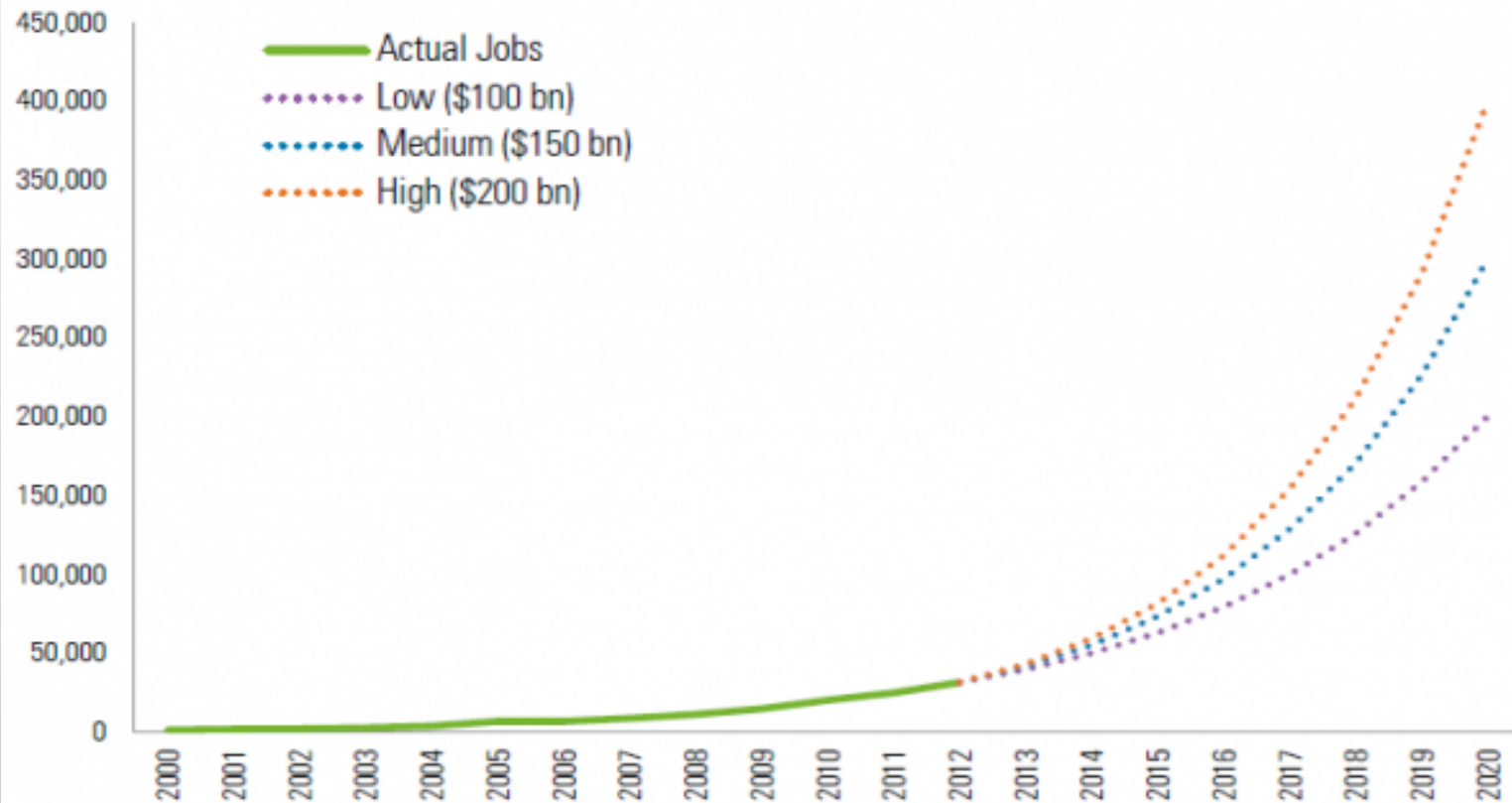


# U.S. Employment by Chinese-Owned Firms

## Projections to 2020

**Figure 3: Employment at Majority Chinese-Owned U.S. Affiliates, 2000-2020**

Total Employees



Source: Rhodium Group.



# Black Swans??

## ✓ Technological Change

- Shortening Life Cycles and New, Merged ICT Products
- New Process Technologies (biotech, energy/environmental conservation)
- Advanced Manufacturing (self-assembly/nanotechnology, new materials, 3-D prototype printing)

## ✓ Changing demographics

Thank you.