Manufacturing's Future:

America's Manufacturing Crisis and the Prospects for Revitalization

Presentation to

Industrial College of the Armed Forces
National Defense University

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Manufacturing Debate Redux

- **Why manufacturing is important**
  - Jobs, R&D, innovation, national security, and trade balance
- **Erosion trends over past three decades**
  - Employment, establishment numbers, value-added, industrial capacity, trade deficits (including advanced technology products)
  - Causes: technology/productivity, foreign import competition and offshoring, other nations' industrial policies?
  - Reshoring trend—too little, too late?
- **Pillars of manufacturing revitalization**
  - Innovation
  - Skilled, well-trained workforce
  - Business environment: taxes, trade, regulations, energy
  - Demand creation: public investments for national needs; Buy America policies

Manufacturing Insecurity:

America's Manufacturing Crisis and the Erosion of the U.S. Defense Industrial Base

download the report at:

www.highroadstrategies.com
or
www.aflcio.org/manufacturing

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Globalizing the Defense Industrial Base

- Pentagon policies to globalize defense procurement in 2000s
  - Supported by major contractors
  - Opposition to "Buy American" provision
  - Argues U.S. defense industrial base is robust, yet acknowledges domestic capacity is insufficient
- Others concerned about growing reliance on foreign sourcing and eroding defense industrial base
  - Narrow focus on handful of highly specialized defense critical items (i.e., "trusted" programs) not adequate
  - A strong defense industrial base depends on a healthy *civilian industrial base*
  - Globalizing policies reflect inability of domestic base to meet national security needs, and contributes to its "unraveling"

The US Industrial "Tapestry"

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Main Elements & Conclusions

Key Economic Indicators

- Value-added, industrial capacity, capacity utilization, employment, establishments
- Trade balance, advanced technology products trade, import penetration

Trend: *Sustained erosion across manufacturing sector*

Critical Industry Profiles

- Semiconductors
- Printed Circuit Boards
- Advanced Materials
- Machine Tools
- Aerospace
- Bearings; Optoelectronics

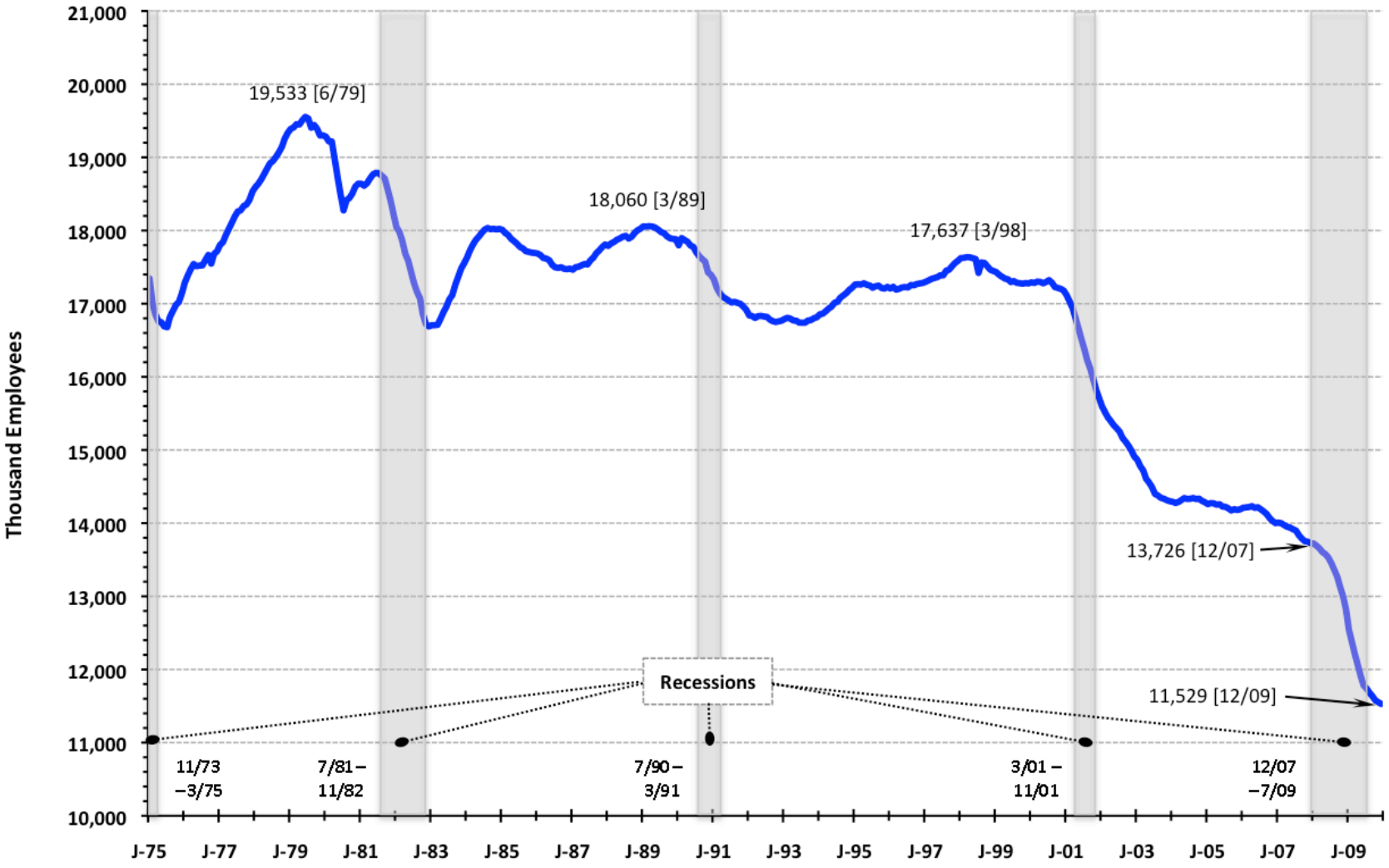
Trend: *Erosion of industries weakens defense capabilities*

Main Elements & Conclusions

Technological Leadership and Innovation

- Migration of manufacturing and R&D/innovation capacity linked
- Loss of know-how, skilled workers throughout industrial value-chain
- Transfer of cutting-edge technology and know-how overseas
- Decline in technological leadership in the world to potential economic/military competitors

10 years 6 Million Manufacturing Jobs Lost



Source: Bureau of Labor Statistics

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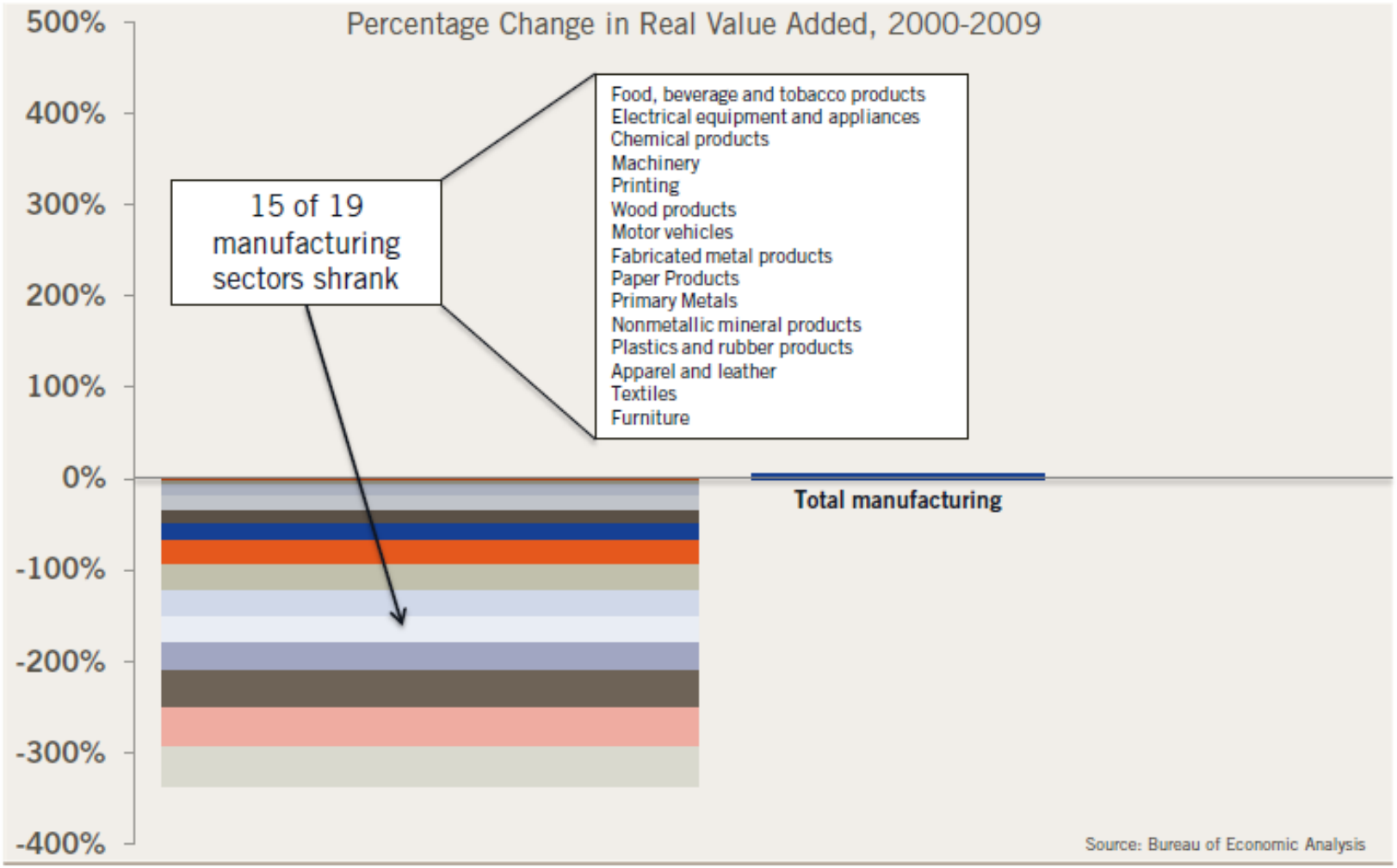
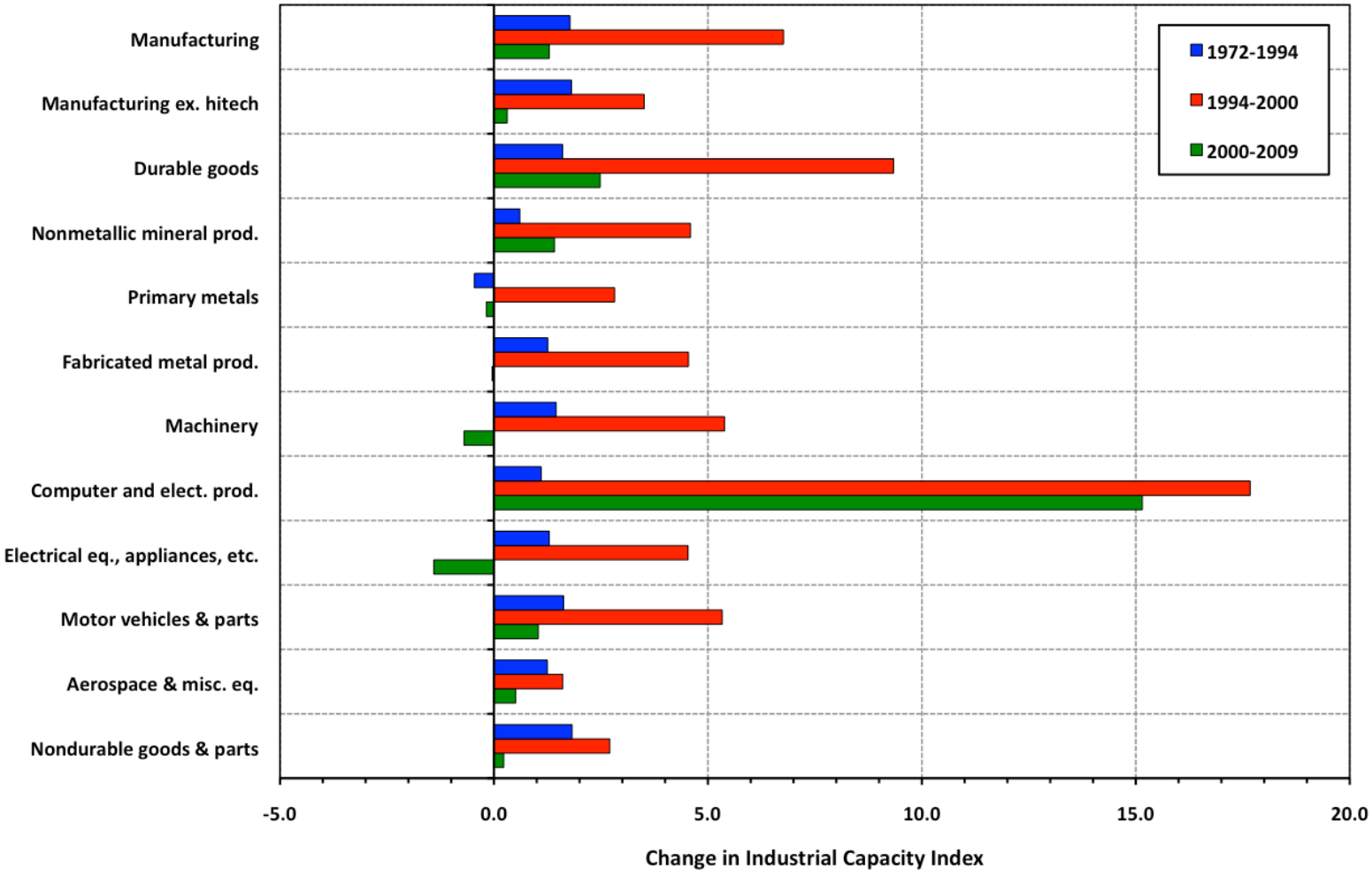
And Most Manufacturing Sectors Shrank



THE INFORMATION TECHNOLOGY & INNOVATION FOUNDATION

Weak Industrial Capacity Growth

2000s Saw First Decline (exc. High-tech) in 70 Years



Source: Federal Reserve Board

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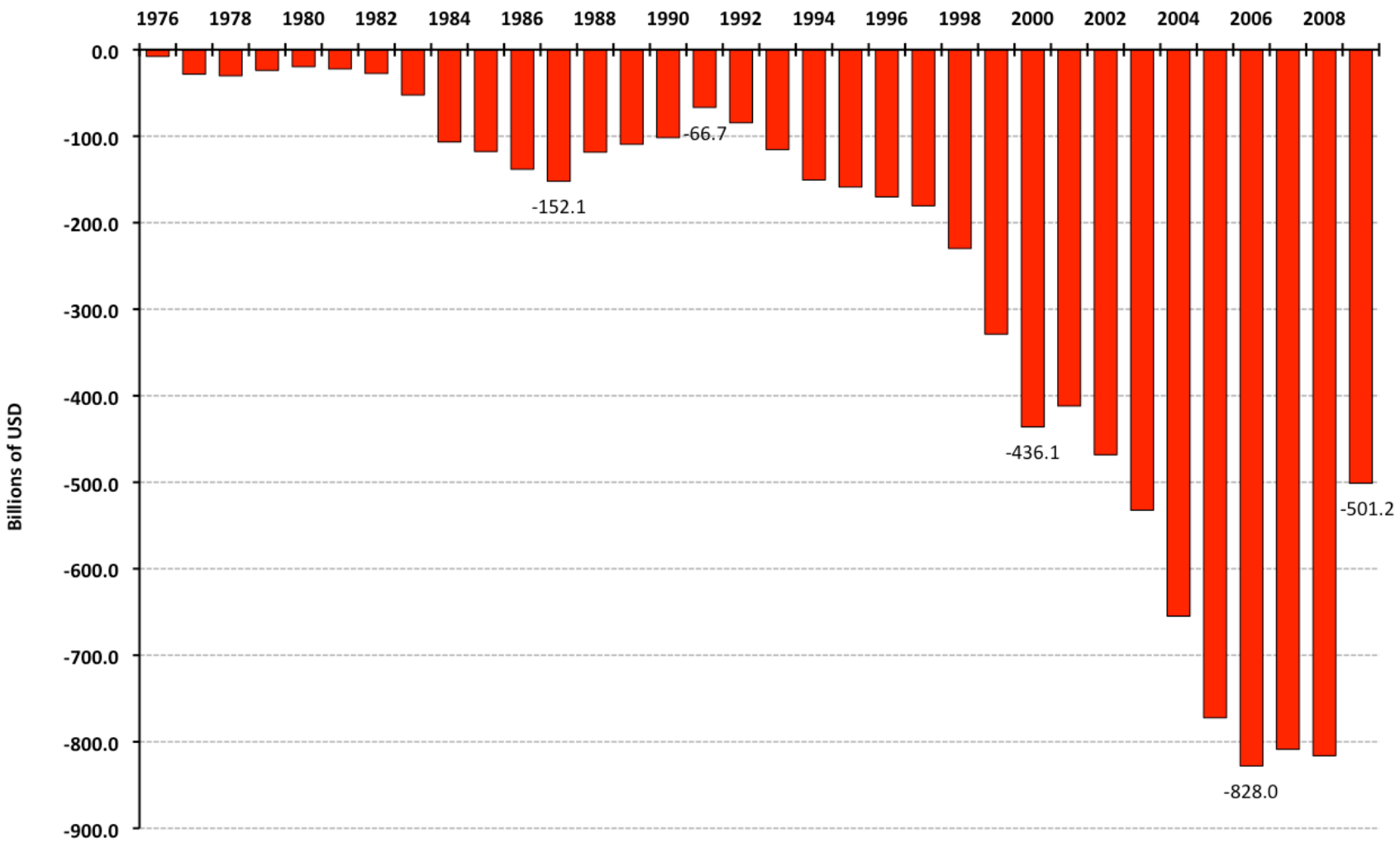
Domestic Performance Indicators

- Manufacturing share of GDP falling since 1960s, at 2x rate 2000-2008
- Value-added growth rate substantially slower than prior decades
- Industrial capacity and capacity utilization lower since 2000
- Employment declined by 6 million jobs, 1/3 of U.S. manufacturing workforce since 1998
- Number of establishments fell 57,000, 1999-2009
  - Plants of 500 employees+ declined by 1,600, or 1/3 since 1998

Global Competitiveness Indicators

- Annual U.S. trade deficit has risen steadily since 1979
  - Especially rapid growth since 1998
  - Record levels 2006-2008, >$800 billion
- ATP trade balance shifts from surplus to large deficits after 2001
- IPRs—across-the-board aggregate increase of 61 percent by 114 industries, 1997-2007

U.S. Goods Trade Deficit 1976-2009



Source: Census Bureau

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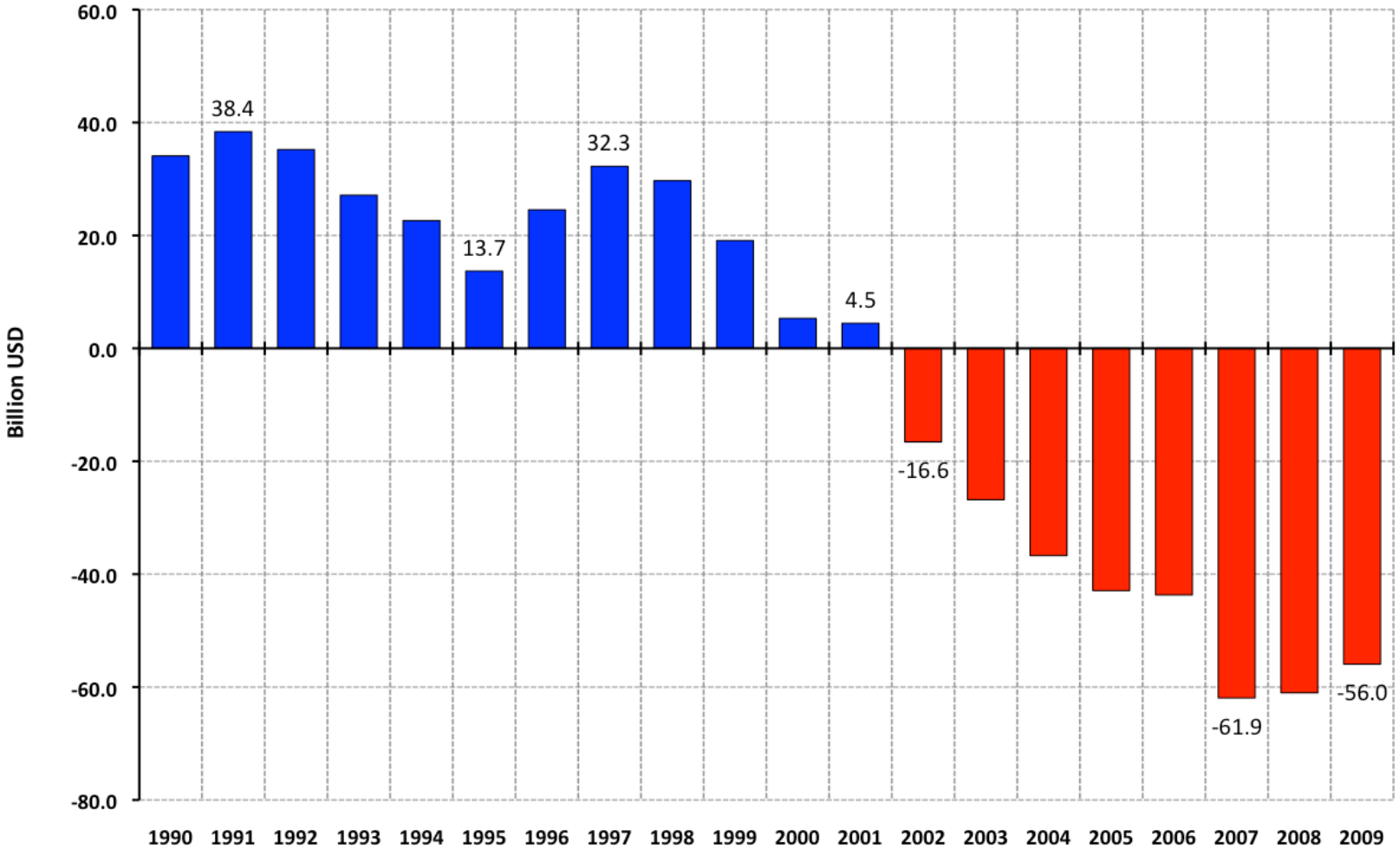
U.S. Trade Balance in Advanced Technology Products, 1990-2009



Source: Census Bureau

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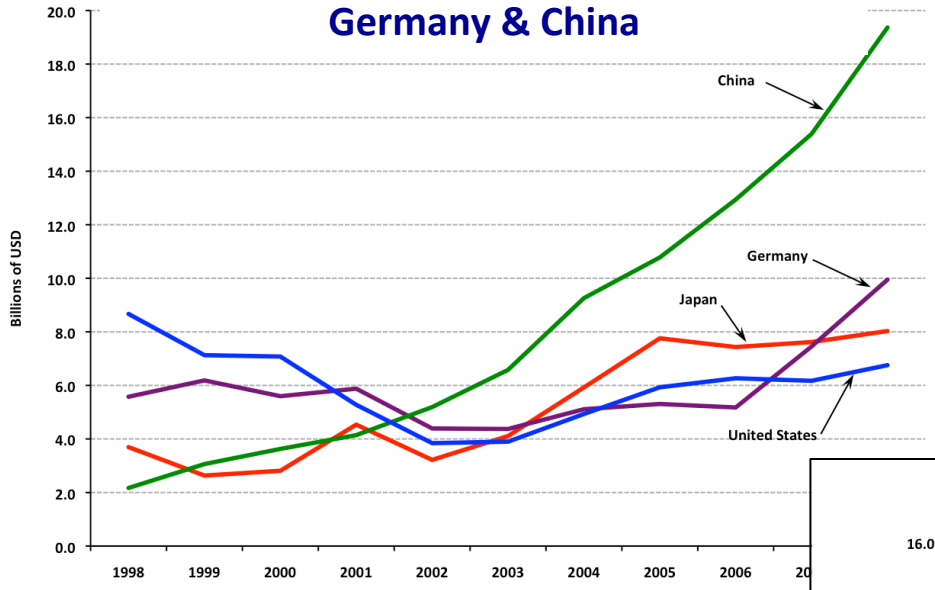
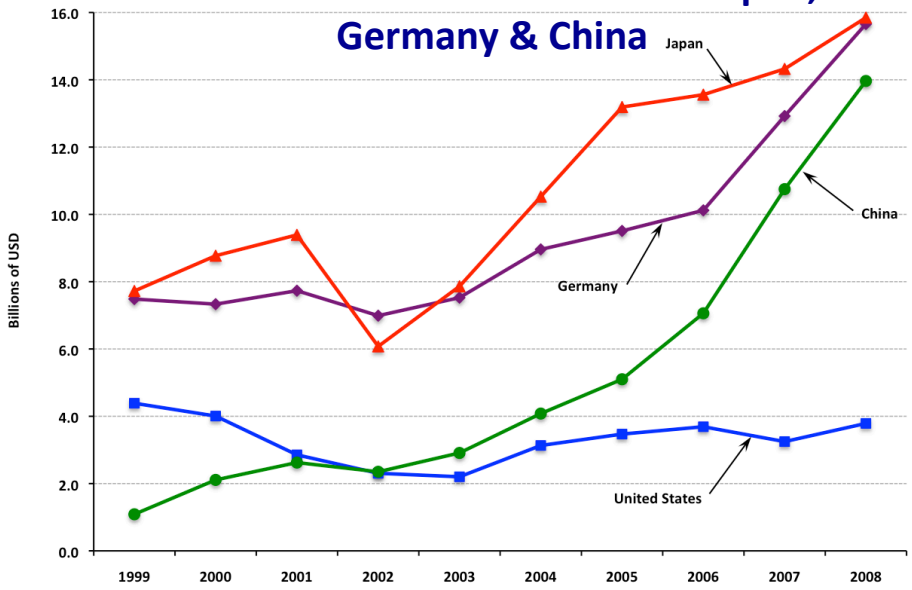
Machine Tools

Machine Tool Consumption-U.S. Japan, Germany & China



Machine Tool Production-U.S. Japan, Germany & China



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Laboratories of Production

"[T]echnology development travels with the manufacturing process. Our plants in the specialty metal industry are our laboratories."

—Dr. Jack Schilling, Chairman, Specialty Steel Industry of North America, 2005

"[T]he structure of the U.S. high-tech industry is coming unglued with innovation and design losing their tie to prototype fabrication and manufacturing." [Inventions would be "left on the cutting room floor because they cannot be manufactured."

—Thomas Hartwick, AGED Chairman, 2003

"Semiconductor technology and manufacturing leadership is a national priority that must be maintained. . ." [Key to maintaining this leadership is preserving the] "close coupling of manufacturing with the development of advanced technology and the design of leading-edge integrated circuits."

—Defense Science Board, 2005 report

Migrating R&D and Loss of Global Leadership

- R&D migrating with manufacturing: semiconductors, PCBs, advanced materials, aerospace
- US corporate R&D investments and technology transfer in China and India
  - India and China favored destinations for global R&D with top MNCs
  - Major US corporate R&D investors in China and India: GE, General Motors, Lucent Technologies (now Alcatel), Motorola, Intel, Cummins
  - Intel unveiled its first microprocessor designed entirely in India, 2008: first 45-nanometer technology designed outside the United States
- Strong evidence US is losing world leadership in technology and innovation
  - Task force on the Future of American Innovation (2005); Information Technology and Innovation Foundation (2009), Boston Consultant Group (2009), Georgia Institute of Technology (2007)

Offshoring Skills & Know-How

- Large reductions in American high-skilled production and S&E workforces leads to loss of technological know-how critical to US leadership in critical technologies
- Erosion in US manufacturing base and technology leadership creating barriers to sustaining high-skilled workforce
- *Rising Above the Gathering Storm* (2005):
  - although US remained the undisputed leader in basic and applied research, it was "*deeply concerned that the scientific and technological building blocks critical to our economic leadership are eroding at at time when many other nations are gathering strength.*"

Policy Update

- PCAST proposal for a National Manufacturing Strategy
- President's proposal for a National Network for Manufacturing Innovation (3/9/12)
  - $1 billion for up to 15 Institutes for Manufacturing Innovation around country
  - Regional hubs of manufacturing excellence
  - Collaboration between NIST, NSF, DOD, DOE
- Toward a smart, free and fair trade policy
  - National Trade Strategy (CPA) principles: net exports, state owned enterprises, reciprocity, currency, domestic supply chain, rules of origin, government procurement, temporary vs. permanent agreements
  - Currency manipulation legislation (HR 639)
  - Enforce antidumping & countervailing duty orders (S. 1133; HR 3057)
  - Value Added Tax
- Infrastructure and energy investments
  - Roads, transit, bridges, rail, water, ports, alternative energy (S. 1813)
  - Buy American requirements for transportation and infrastructure funding;
  - 21st Century Energy Infrastructure—renewable energy, advanced vehicle technology (advanced energy storage, biofuels, EVs, hybrids, etc.), energy efficiency, smart grid, etc.
- Workforce development policies
  - STEM
  - Retraining and incumbent worker training investments (WIA reauthorization, reform)
  - Manufacturing skill standards (e.g., MSSC)
  - Labor-management and employer skills and training networks

Sensitive Policy Issues

- Industrial policy by another name
- Tax and investment incentives
  - picking winners and losers?
  - Reducing incentives to invest offshore and return profits to US?
- Regulatory reform—which regulations need reforming?
- Energy is the new frontier!?