Manufacturing Insecurity:

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

Sponsored by:

AFL-CIO Industrial Union Council
Coalition for a Prosperous America
AFL-CIO Metal Trades Department
Alliance for American Manufacturing

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"

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

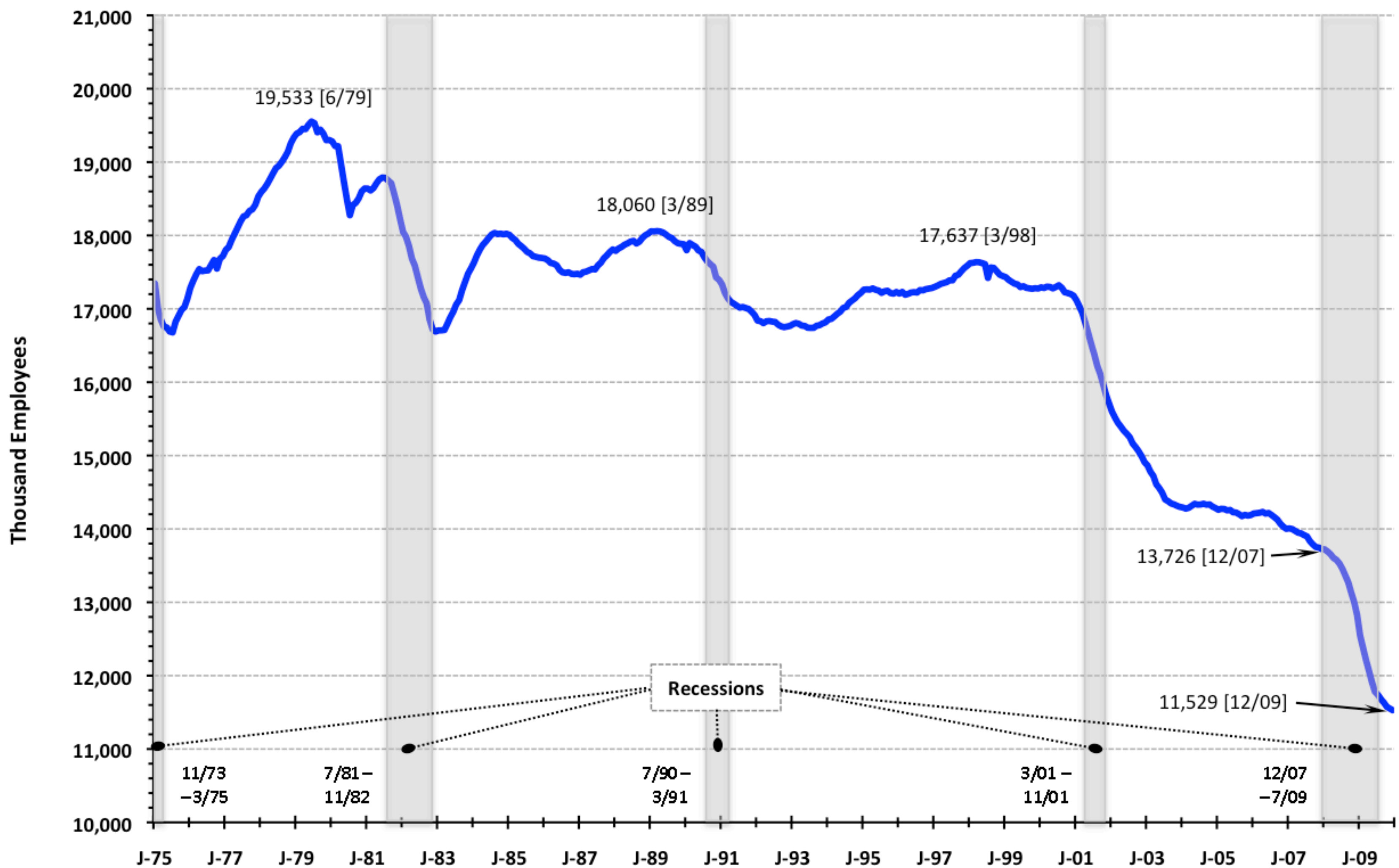
***Trend:** Erosion of industries weakens defense capabilities*

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

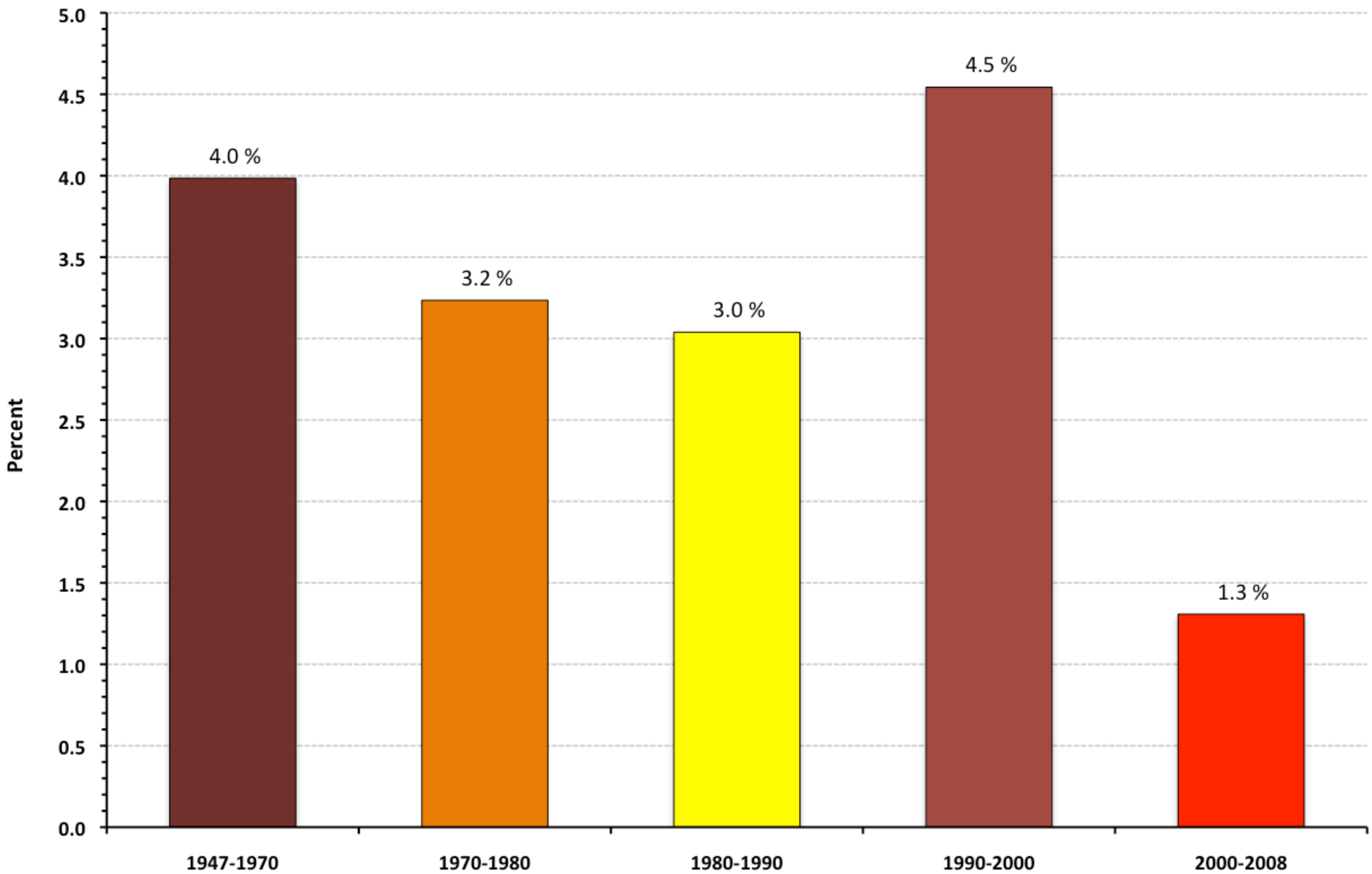
10 years 6 Million Manufacturing Jobs Lost



Source: Bureau of Labor Statistics *High Road Strategies*

Manufacturing Value-Added

Real Average Annual Growth Rate



Source: Bureau of Economic Analysis

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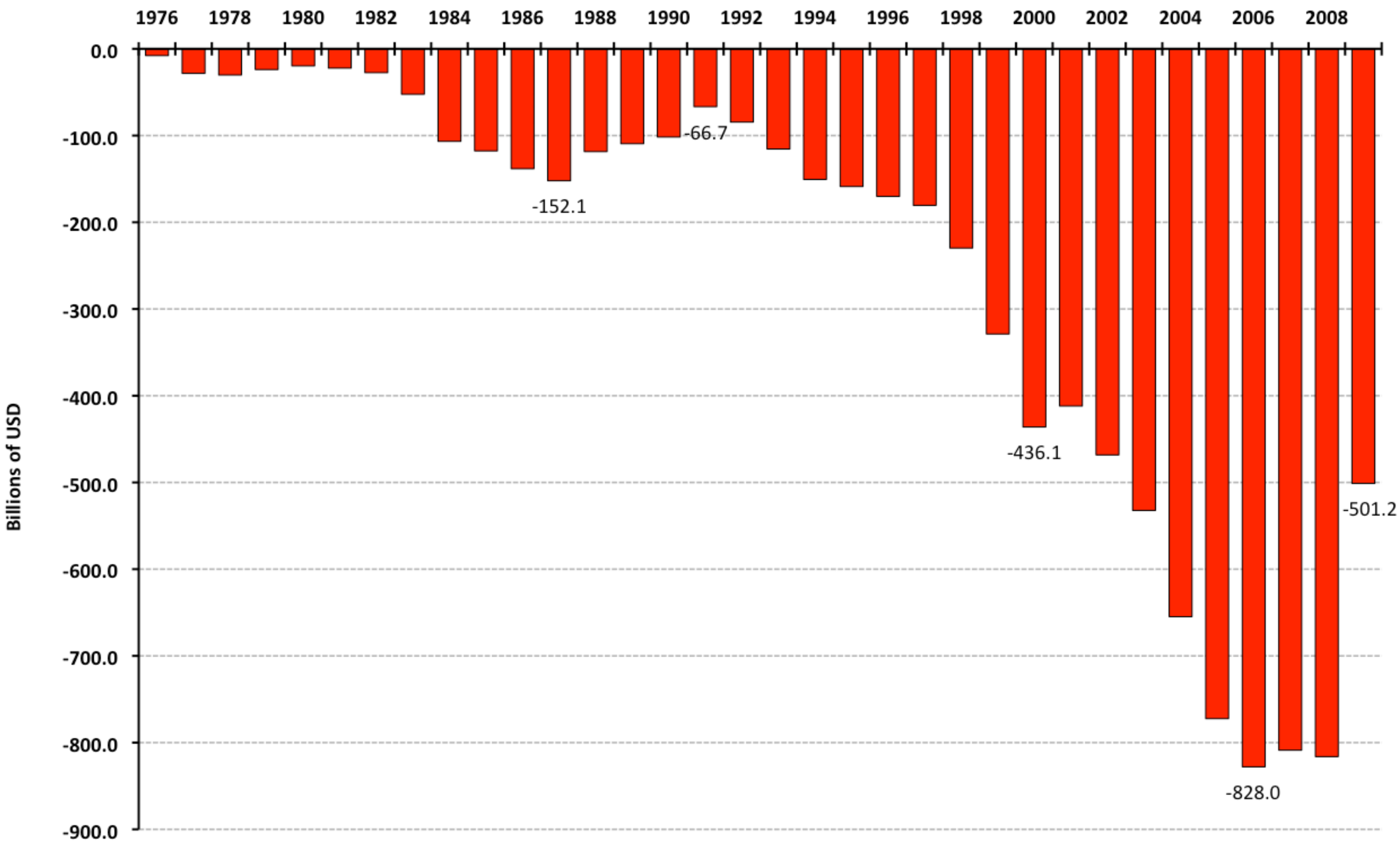
Domestic Performance Indicators

- 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

U.S. Goods Trade Deficit 1976-2009



Source: Census Bureau

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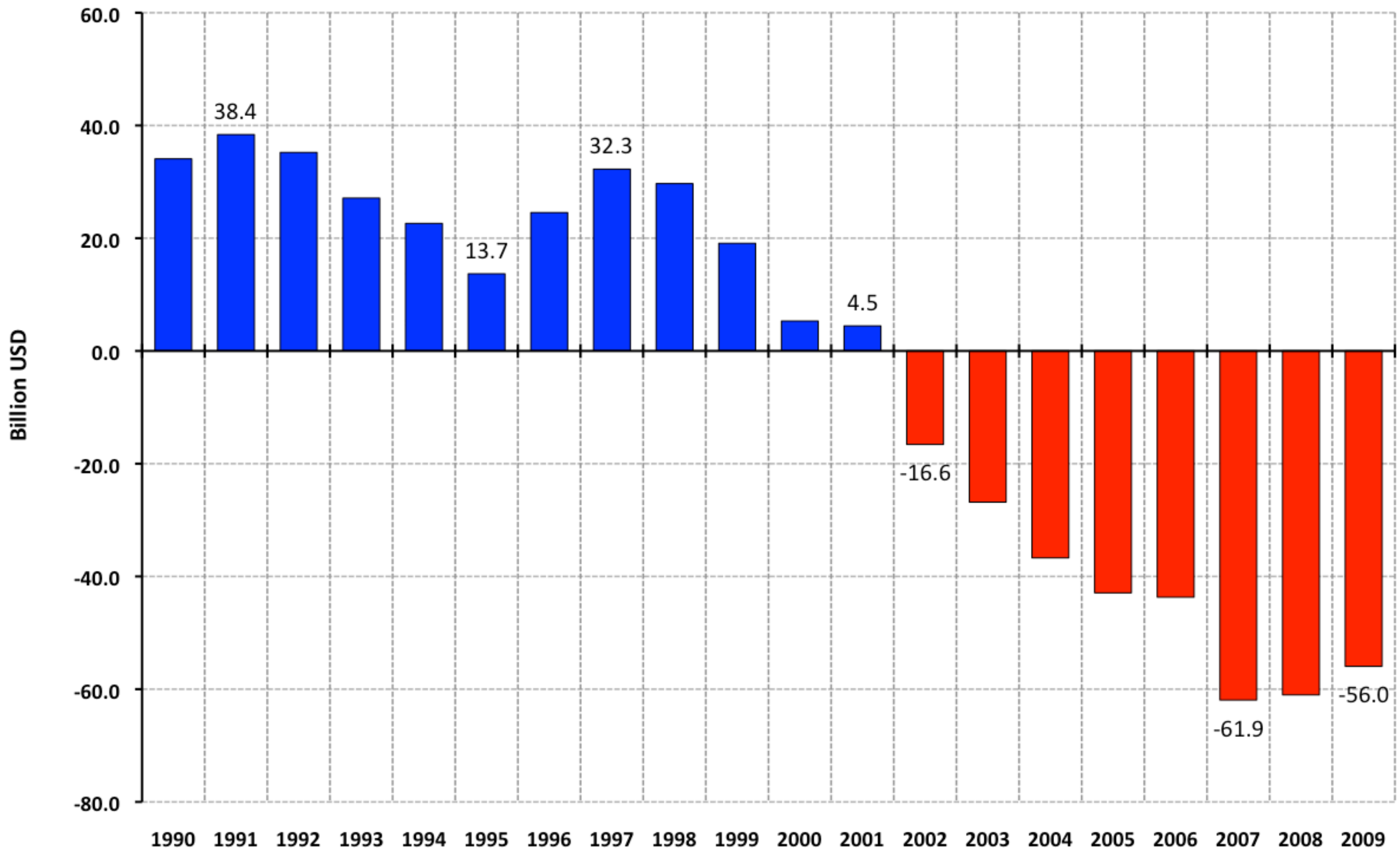
U.S. Trade Balance in Advanced Technology Products, 1990-2009



Source: Census Bureau

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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

Webber: Erosion of Selected Defense Industrial Support Sectors

Three Indicators of Erosion

- Forging & Stamping
- Industrial Pattern Manufacturing
- Industrial Mold Manufacturing
- Machine Tools (metal cutting)
- Machine Tools (metal forming)
- Special Die & Tools, Die, Set, Jig
- Bare Printing Circuit Boards
- Battery Manufacturing

Two Indicators of Erosion

- Foundries
- Metal Heat Treating
- Optical Instrument and Lens
- Semiconductor & Related
- Printed Circuit Assemblies

Indicators

- Employment
- Economic Activity
- Establishments

Source: Michael Webber, "Erosion of the U.S. Defense Industrial Support Base." In Richard McCormack (ed.), *Manufacturing A Better Future for America*, Washington, DC: Alliance for American Manufacturing (2009), 245-280: 274, Figure 2.

Critical Industries

Semiconductors

- Loss of establishments, jobs
- High IPR—44.5%, 2007
- US share of world capital expenditures falling (2004)
- US share of global capacity descent—14%, 2009; 4th place in world
- US leads world in fab closures
- Growing migration of operations offshore, moving up the value chain.
- China's emergence, making progress

Printed Circuit Boards

- Dramatic erosion in domestic production capacity, loss of mid-sized and large establishments, jobs
- Large migration of PCB orders migrated offshore (40-50%)
- 35% IPR
- Sharp decline of US world share of sales, production, global position
  - US share of global PCB revenues fell from 30%, 1998 to 8%, 2008
  - in 2007 It was a distant fifth in PCB output, behind China/Hong Kong, Japan, Taiwan and Korea

Critical Industries

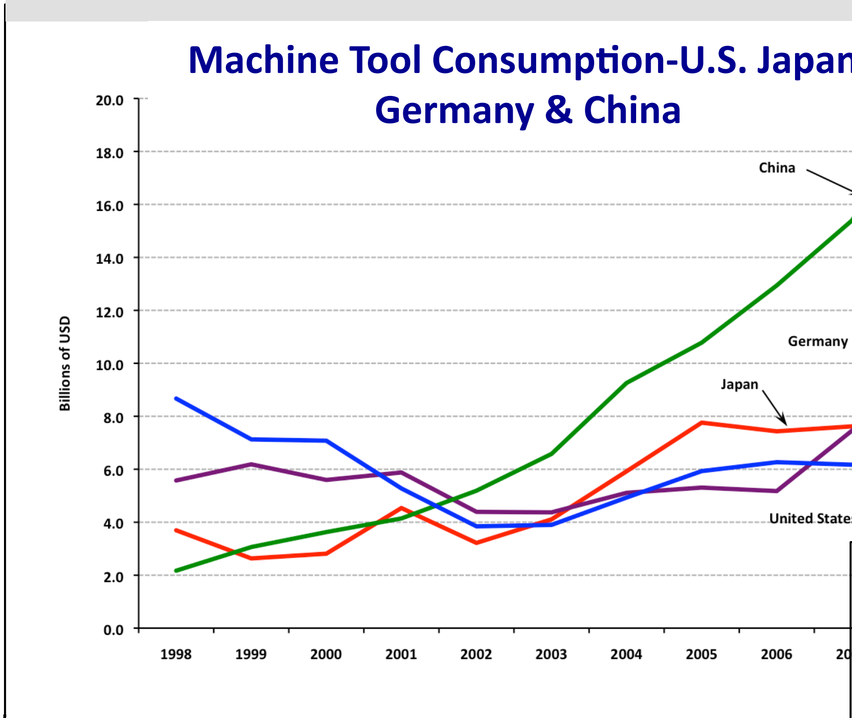
Advanced Materials

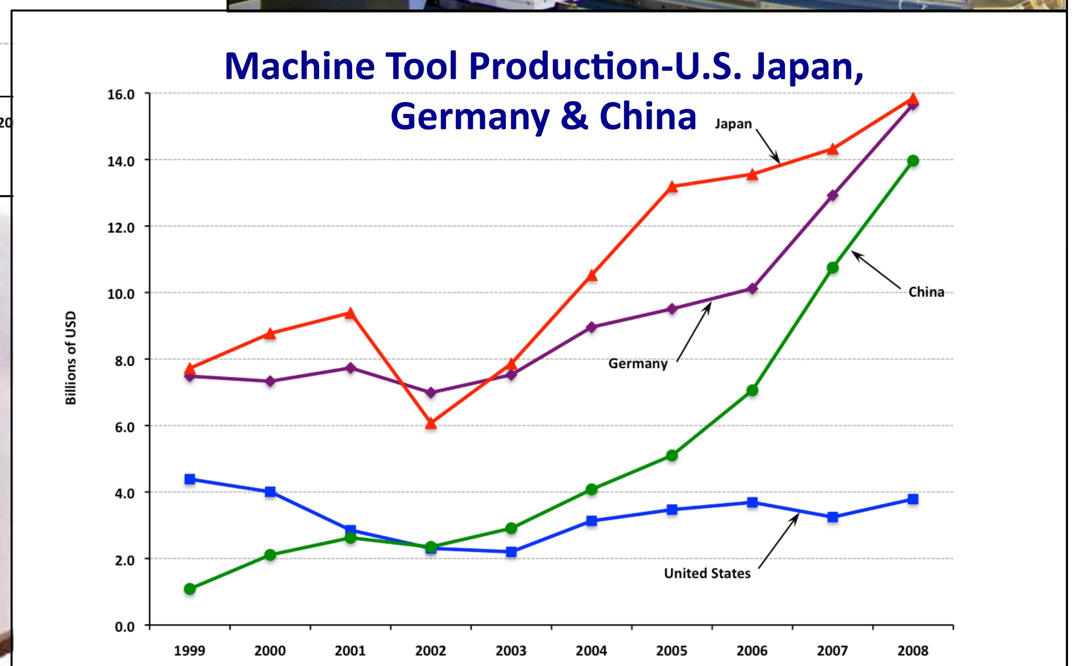
- Domestic materials production disappearing, moving offshore
- R&D in following manufacturing offshore:
  - Night-vision systems, rare-earth metals, specialty metals
- Margin of U.S. leadership in advanced materials R&D eroding and challenged by other nations
  - Japan, Germany, China, Korea, India

Magnaquench Story

- 1995, 2 Chinese firms, US investors purchased IN-based Magnaquench
  - One of few remaining US rare earth magnet producers
  - Rare earth magnets and magnet powders used in hard drives, consumer electronics, guidance systems
  - Magnaquench only US maker of rare-earth "neo" magnets, a critical guidance component
  - Approved by CFIUS, concern about military uses, condition that plant remained in US
- Investors backed out, plant went to China
  - U.S. military has to buy "neo" magnets from China
  - China now controls rare-earth market

Machine Tools





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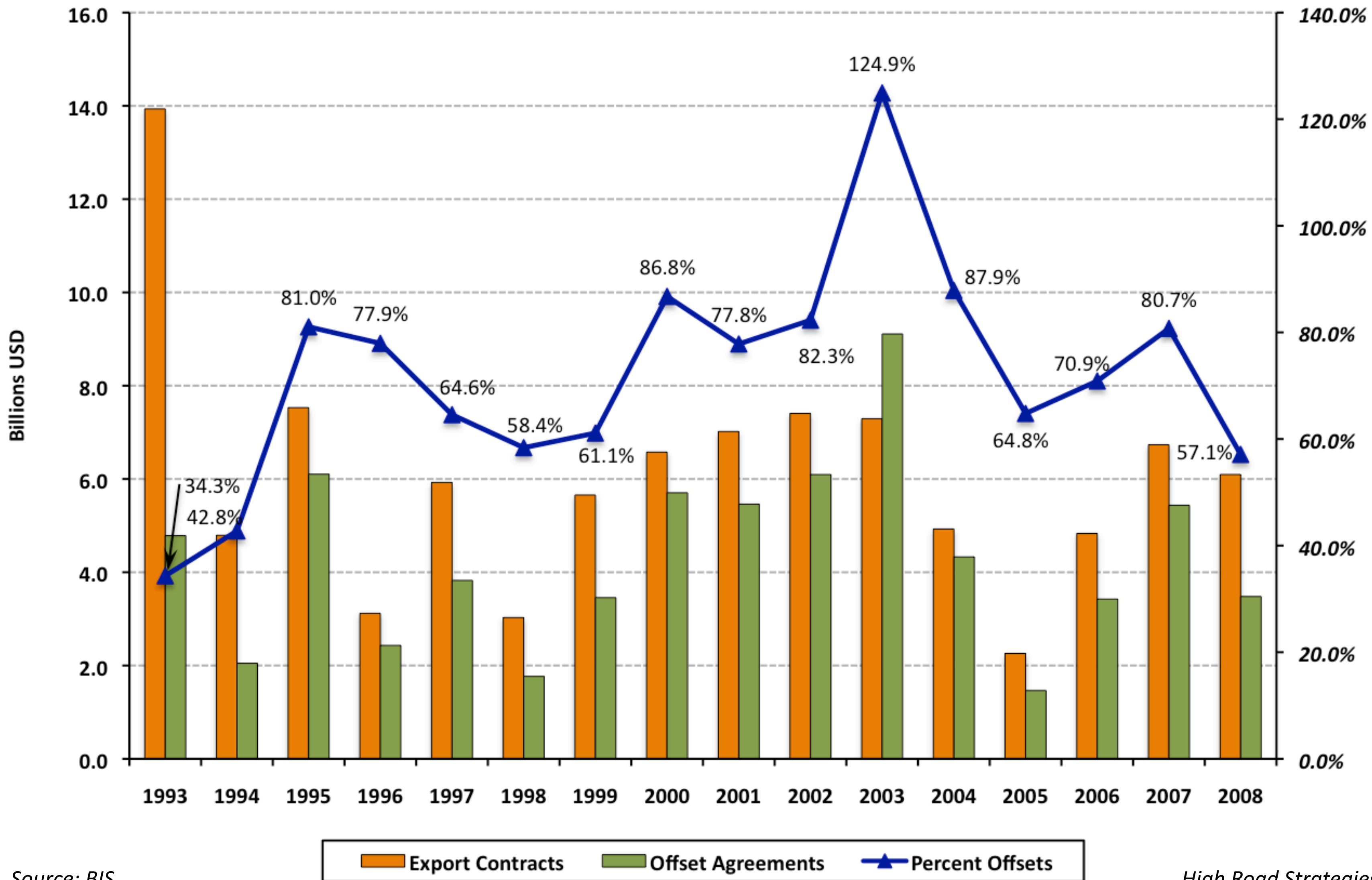
Defense Export Contracts & Offset Agreements



Source: BIS

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Impacts of Offsets

- Increases pressure on US firms to offshore
- Offsets and outsourcing by large US contractors could hurt small and mid-sized contractors
- Growing foreign demand for offsets making US more reliant on foreign firms
- Transfers technological and production capabilities to foreign governments and companies

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

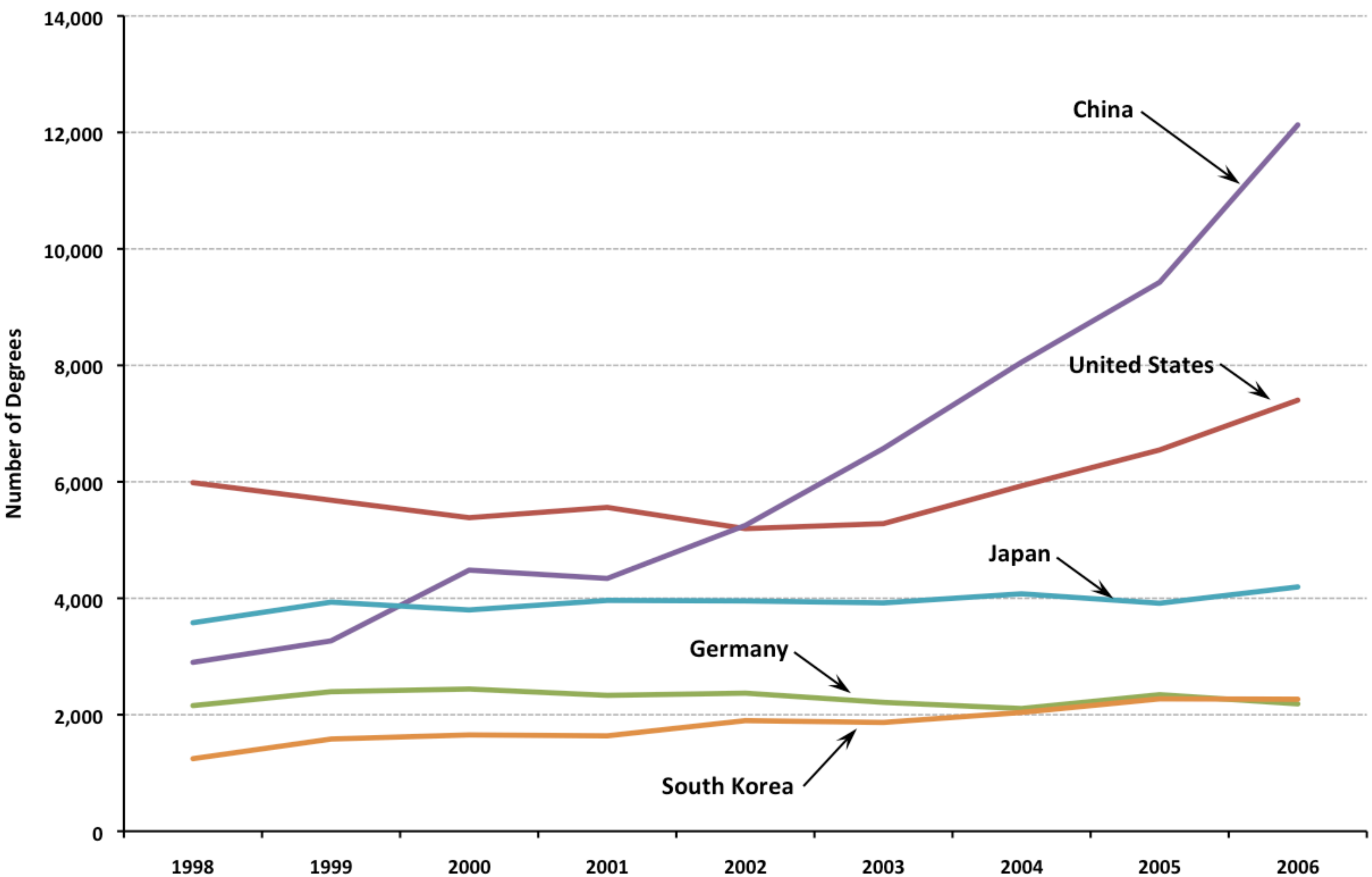
Migrating R&D and Loss of Global Leadership

- 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.*"

Engineering Doctorates Awarded, 1998-2006



Source: National Science Board

High Road Strategies

Conclusions

- Implications of foreign dependency
  - Availability of vital components at risk during political, military crises; natural disasters
  - Potential of "trojan horses" in foreign purchased IT products
  - More fundamental: loss of innovation capacity critical to economic and national security
- Policy Options:
  - "Trusted" programs, Buy America important, but not sufficient
  - Need a *National Manufacturing Strategy* (trade, currency, tax, investment, technical assistance, workforce development, etc.)
  - DOD should partner with other federal agencies, private sector in pursuing, supporting this strategy.
- For more information: **www.highroadstrategies.com**

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www.aflcio.org/manufacturing