



NATIONAL SCIENCE BOARD

Science & Engineering Indicators

U.S. S&E Enterprise: How Are We Doing?

Beethika Khan

Director, Science and Engineering Indicators Program

National Center for Science and Engineering Statistics

National Science Foundation

Presentation Overview

- ❖ Brief overview of *Science and Engineering Indicators* report
- ❖ U.S. S&E Enterprise: How are we doing?
- ❖ Coming attractions



Science and Engineering Indicators: Background

- High quality, quantitative data on U.S. and international science and engineering (S&E) enterprise
- Biennial report mandated by Congress
- Factual, policy relevant, and policy neutral
- Produced and published by NSF's National Center for Science and Engineering Statistics (NCSES), under the guidance of the National Science Board (NSB)
- Extensive review: outside experts, federal agencies including NSF, NSB



Science and Engineering Indicators 2016: Digital Report



National Science Board
SCIENCE & ENGINEERING INDICATORS 2016



Report State Indicators Data Figures Topics Digest

Science and Engineering Indicators 2016

A broad base of quantitative information on the U.S. and international science and engineering enterprise



2016 Indicators Report



State Indicators



Data



Figures



2016 Digest

Explore the Full Report

Science and Engineering Indicators is the premier source of information on the U.S. and international science and engineering enterprise. Learn more about important topics, including education; workforce; national and international R&D trends; academic R&D; industry, technology, and the global marketplace; public attitudes and understanding, and state performance.

[Explore the 2016 Report](#)



Science and Engineering Indicators 2016

Science and Engineering Indicators: Suite of Products

- **Wide and diverse audience**
- **Report: seven broad topics**
 - K-12 science and math education and higher education in S&E (chapters 1 and 2); S&E workforce (chapter 3)
 - National and international trends in R&D; academic R&D; knowledge-intensive industries and innovation (chapters 4, 5, 6)
 - Public attitudes and understanding of science and technology (chapter 7)
- **Overview and Digest**
 - Draw connections among the different topics
- **State Indicators Data Tool**
- **NSB: Companion Briefs**

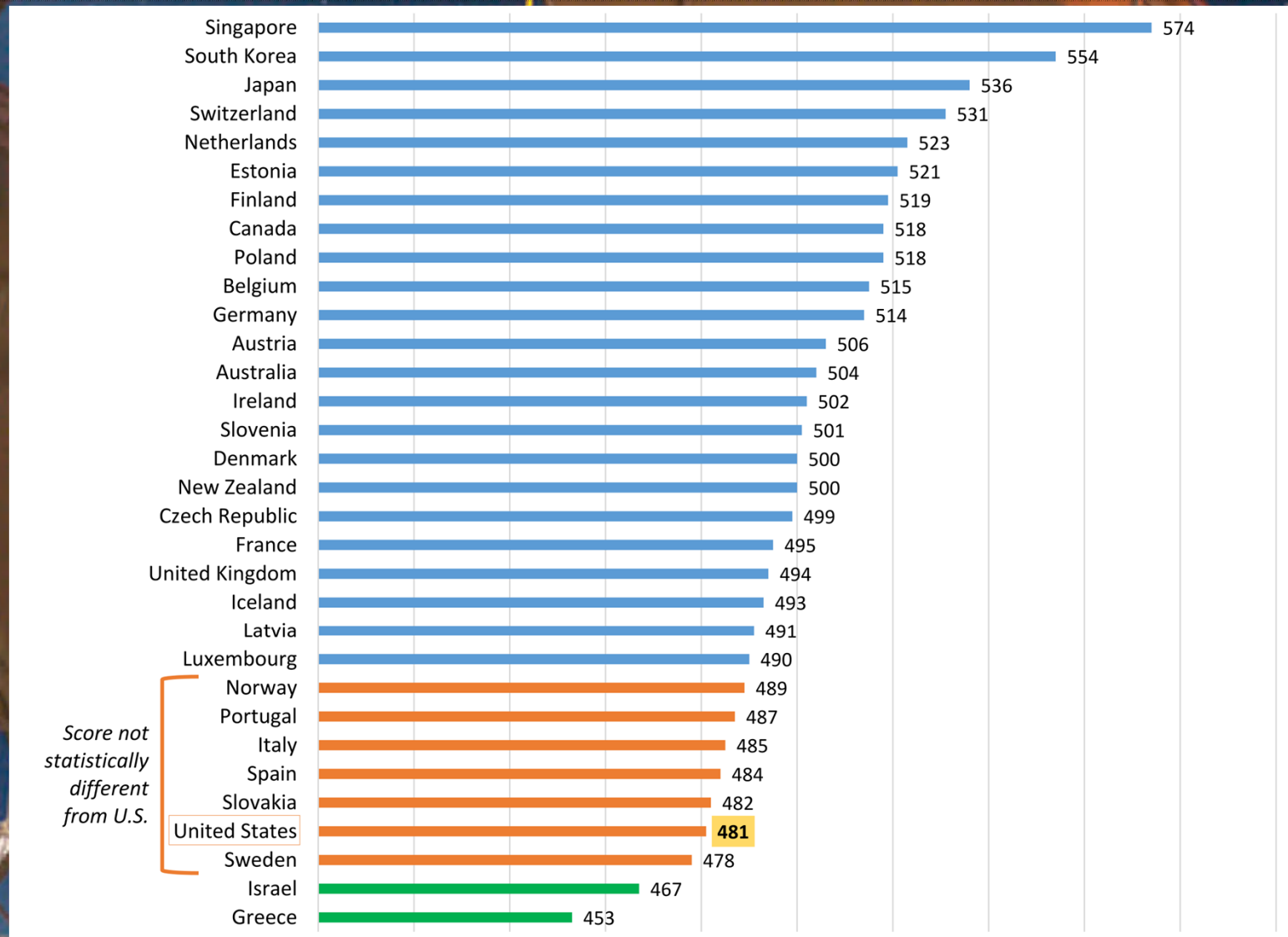


S&E trends in *Science and Engineering Indicators: Context*

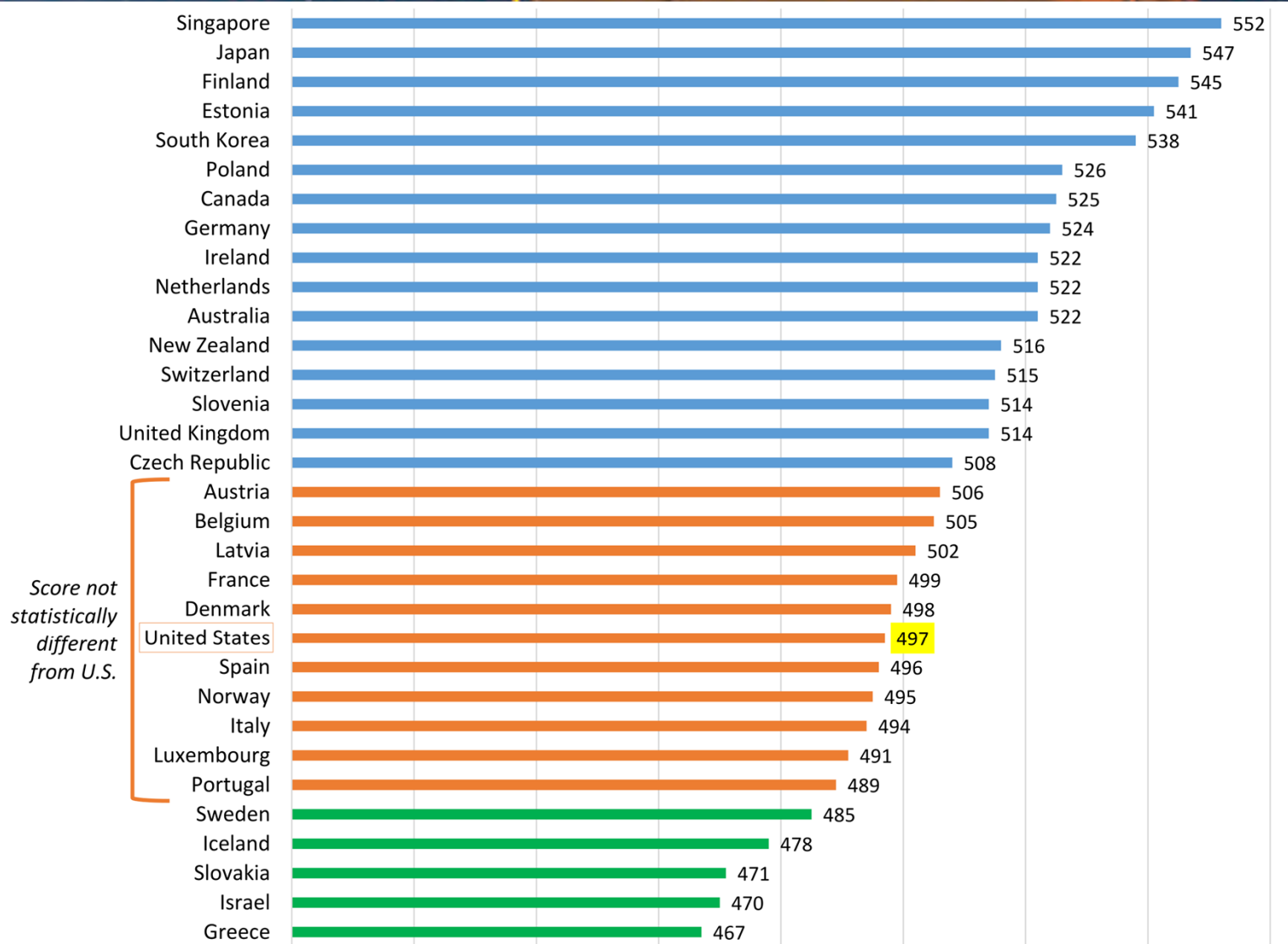
- **Worldwide trend**
 - Knowledge-intensive economies
 - Global collaboration and competition in S&E
- **Education, skilled workforce, R&D → knowledge- and technology-intensive production**
- **International trade, supplier chains, global infrastructure and collaboration, internationally mobile students and workers**



Mean mathematics literacy assessment scores of 15-year-olds in developed countries: 2012



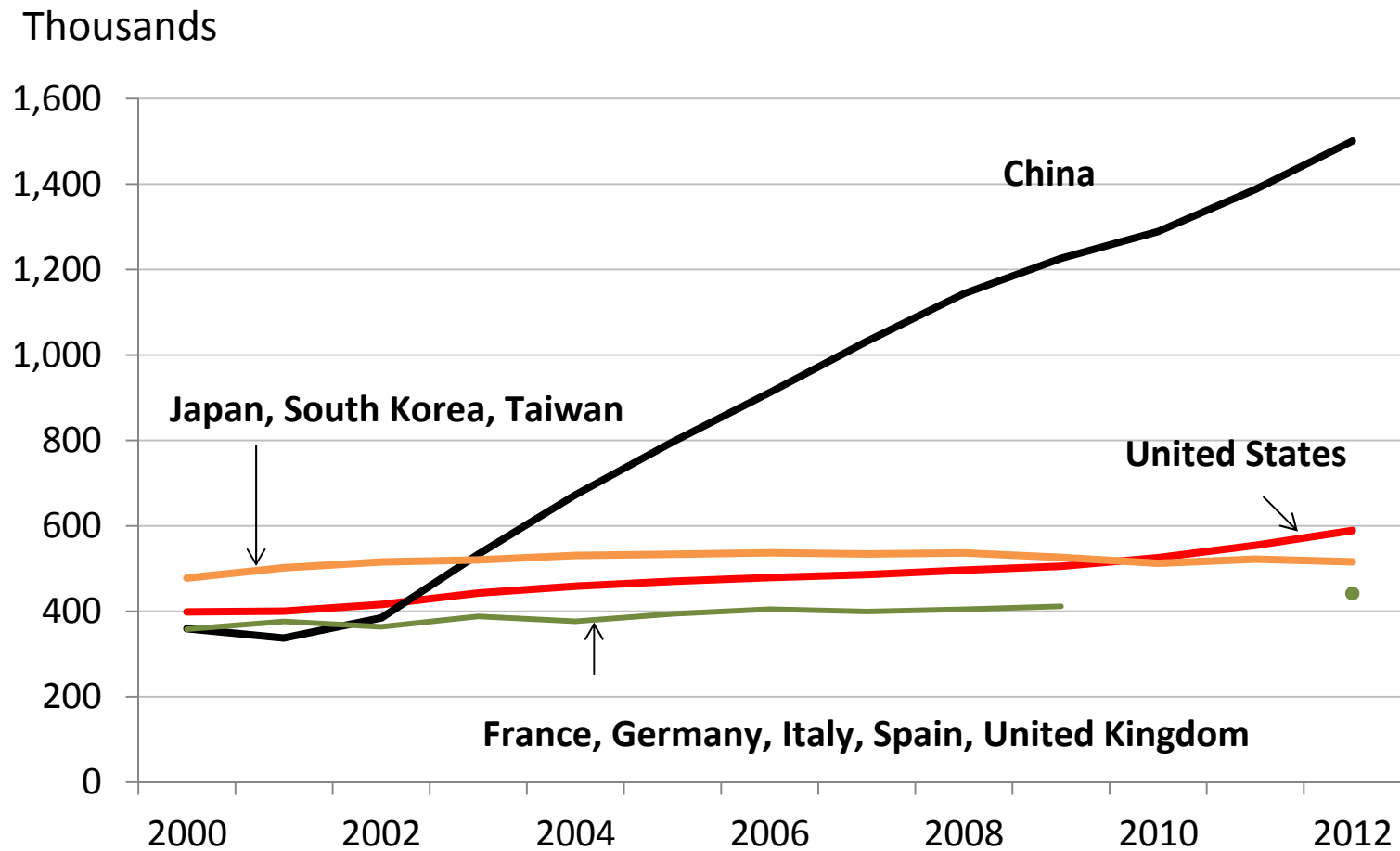
Mean science literacy assessment scores of 15-year-olds in developed countries: 2012



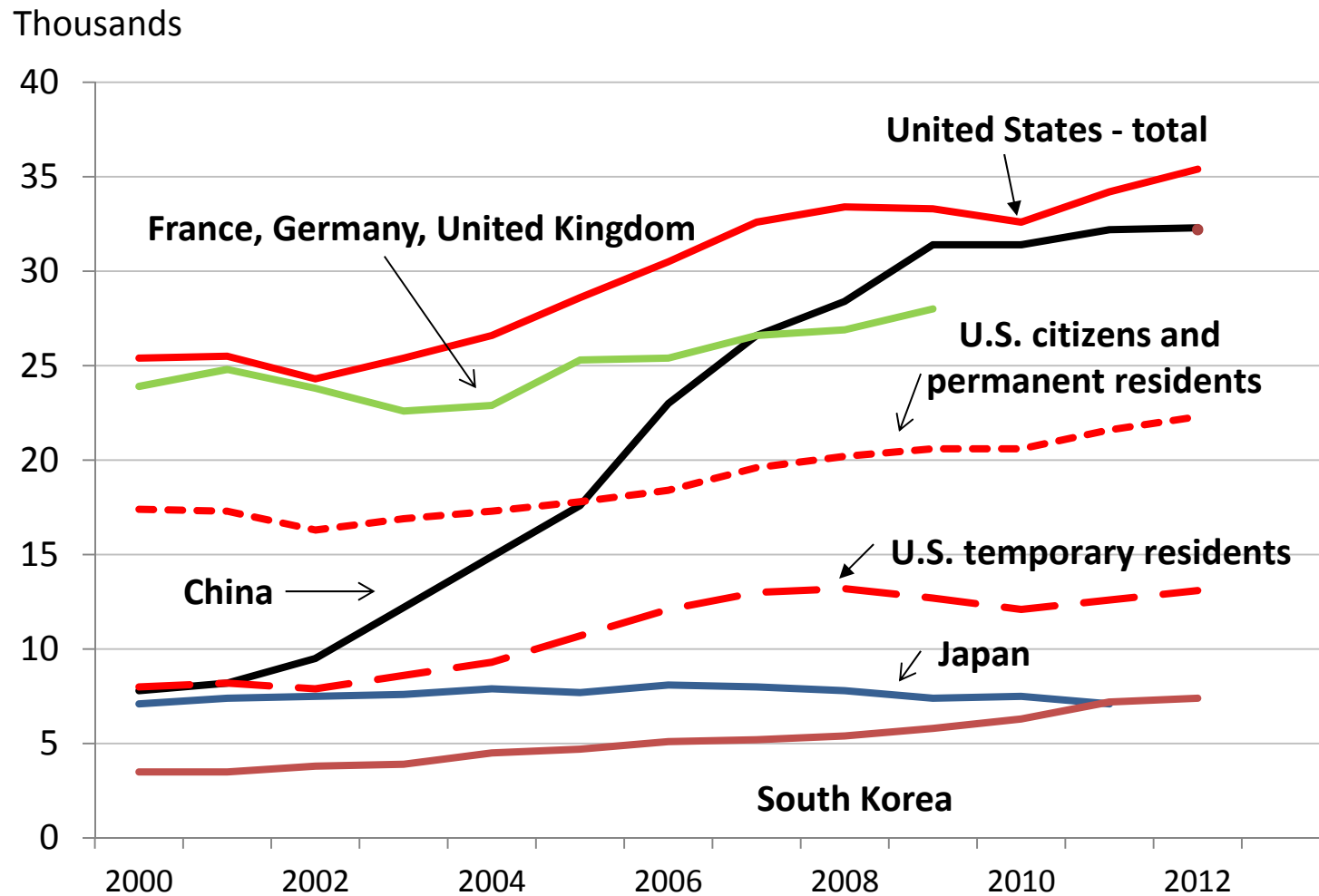
Score not statistically different from U.S.



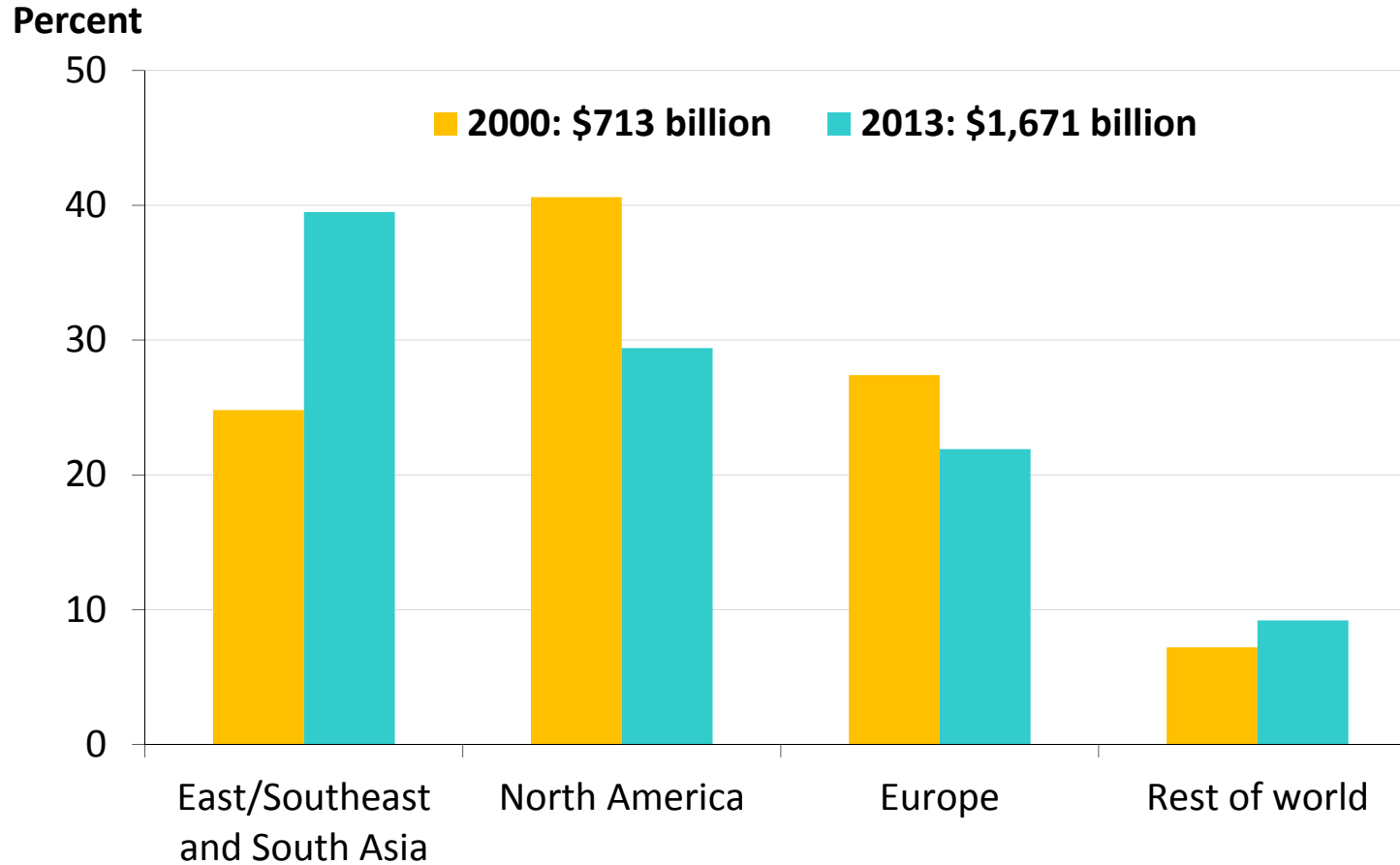
S&E First University Degrees: 2000-12



S&E Doctoral Degrees: 2000-12



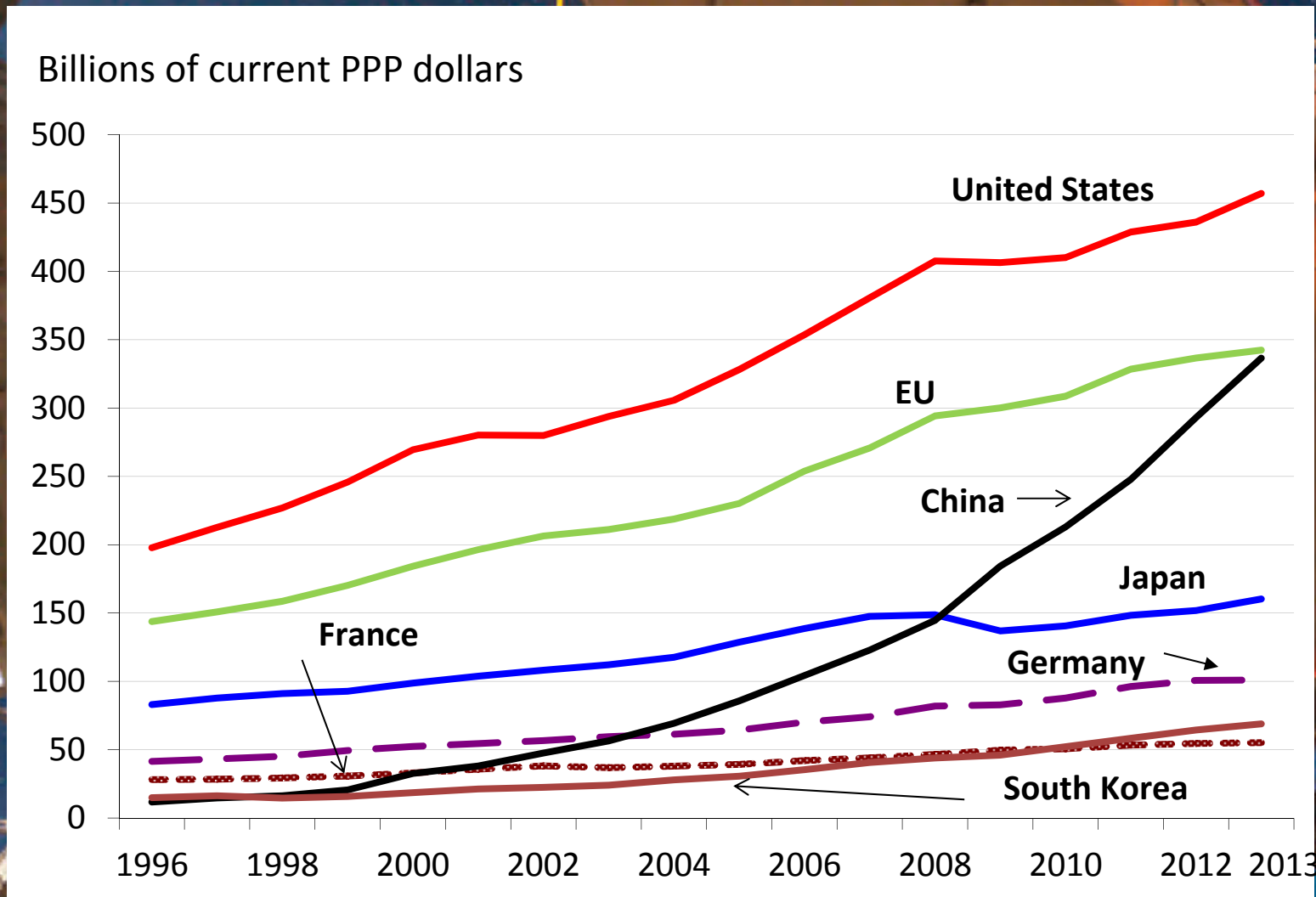
R&D expenditures: global share of selected regions 2000 and 2013



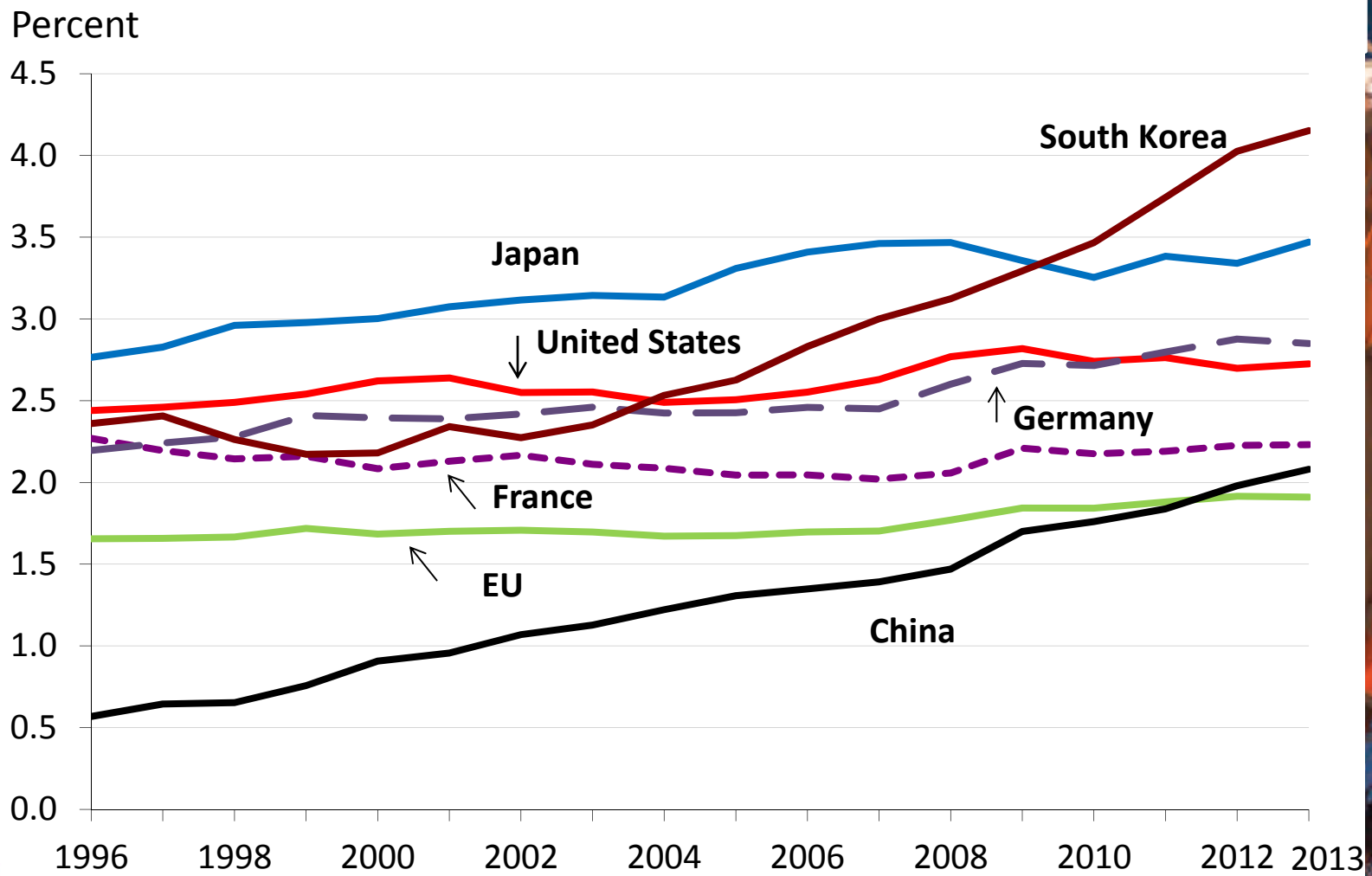
NOTE: East/Southeast and South Asia includes China, Taiwan, Japan, South Korea, Singapore, Malaysia, Thailand, Indonesia, Philippines, Vietnam, India, Pakistan, Nepal, and Sri Lanka.



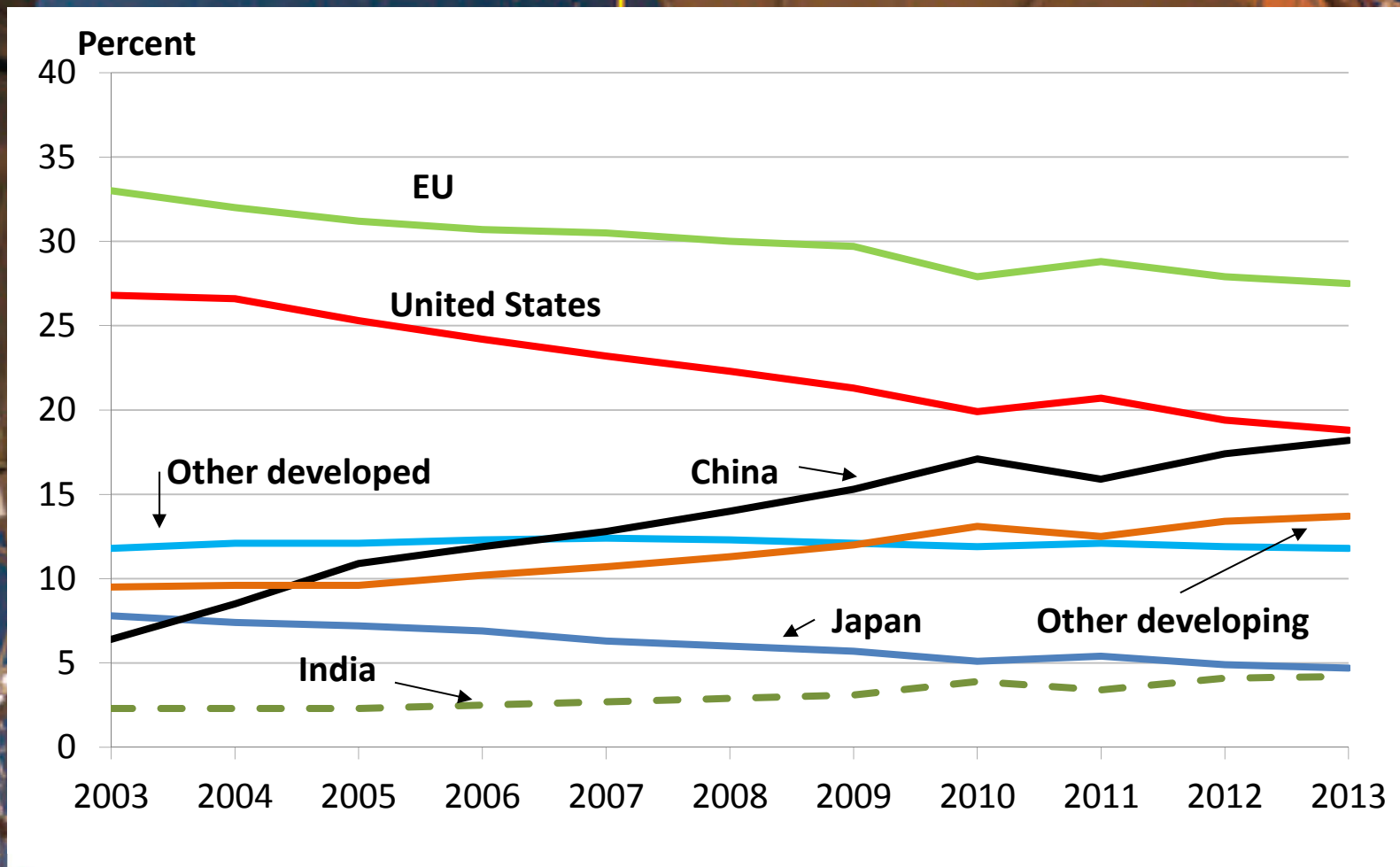
Gross domestic expenditures on R&D: 1996–2013



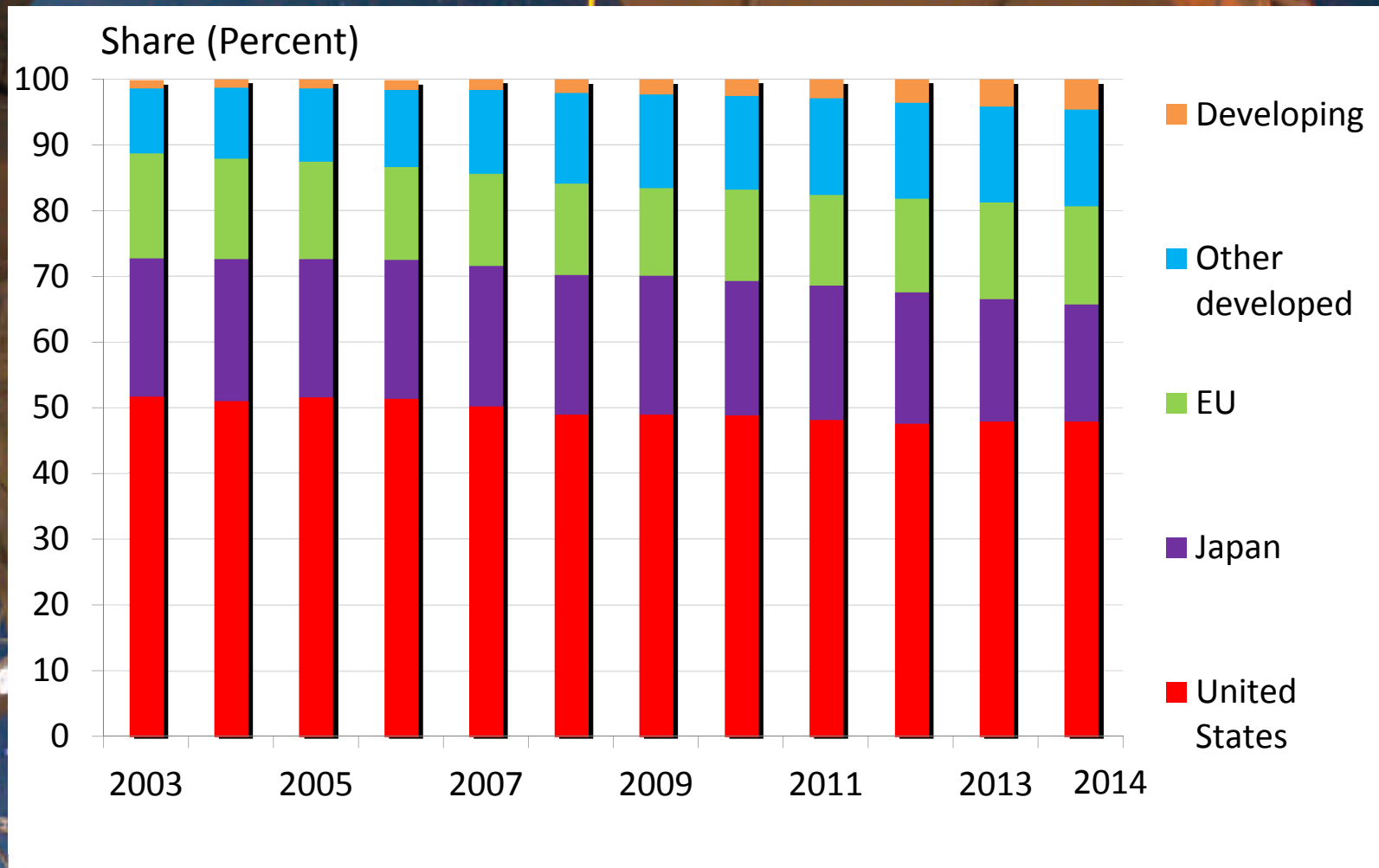
R&D Intensity (R&D/GDP): 1996–2013



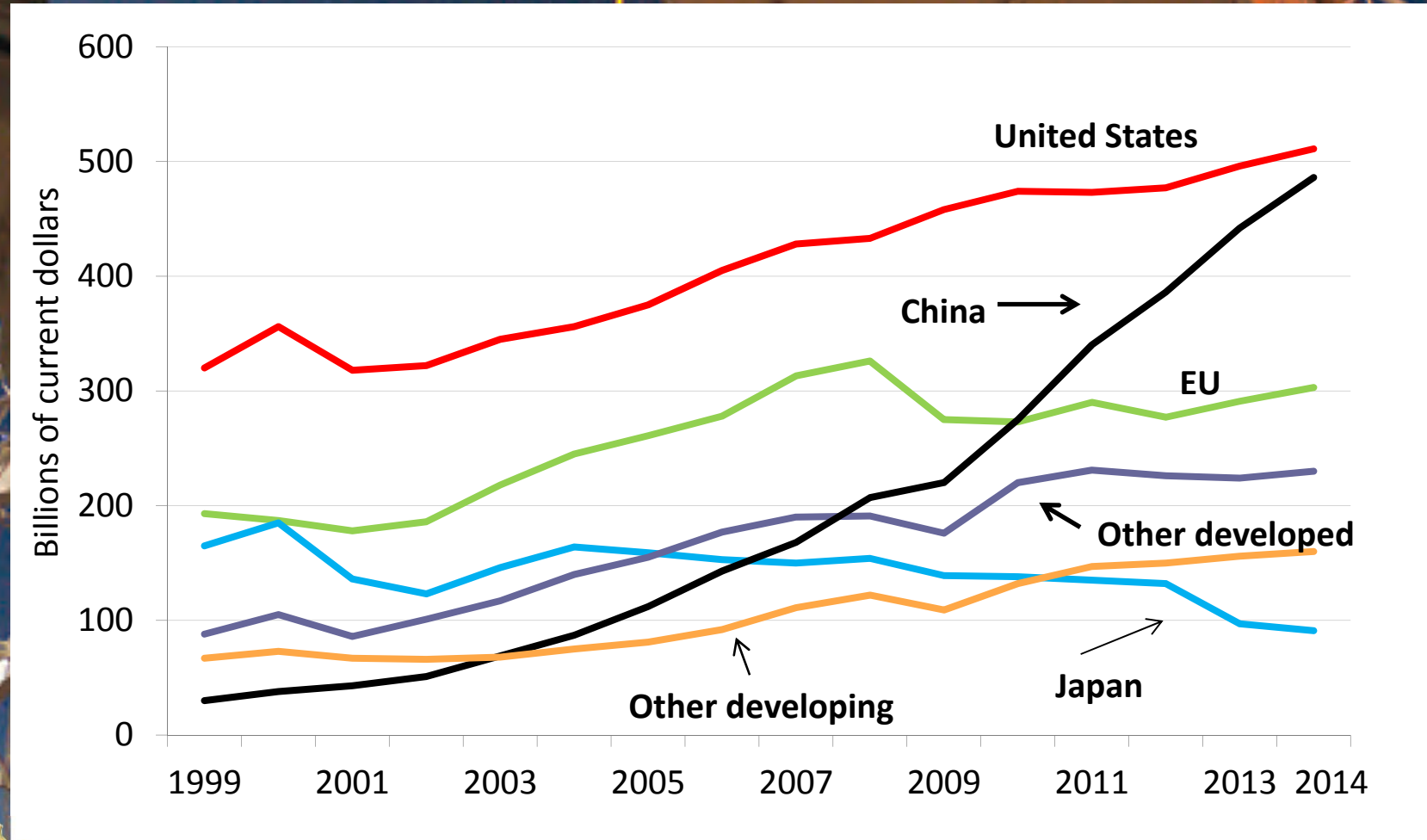
S&E articles: global share of selected region/country/economy, 2003–13



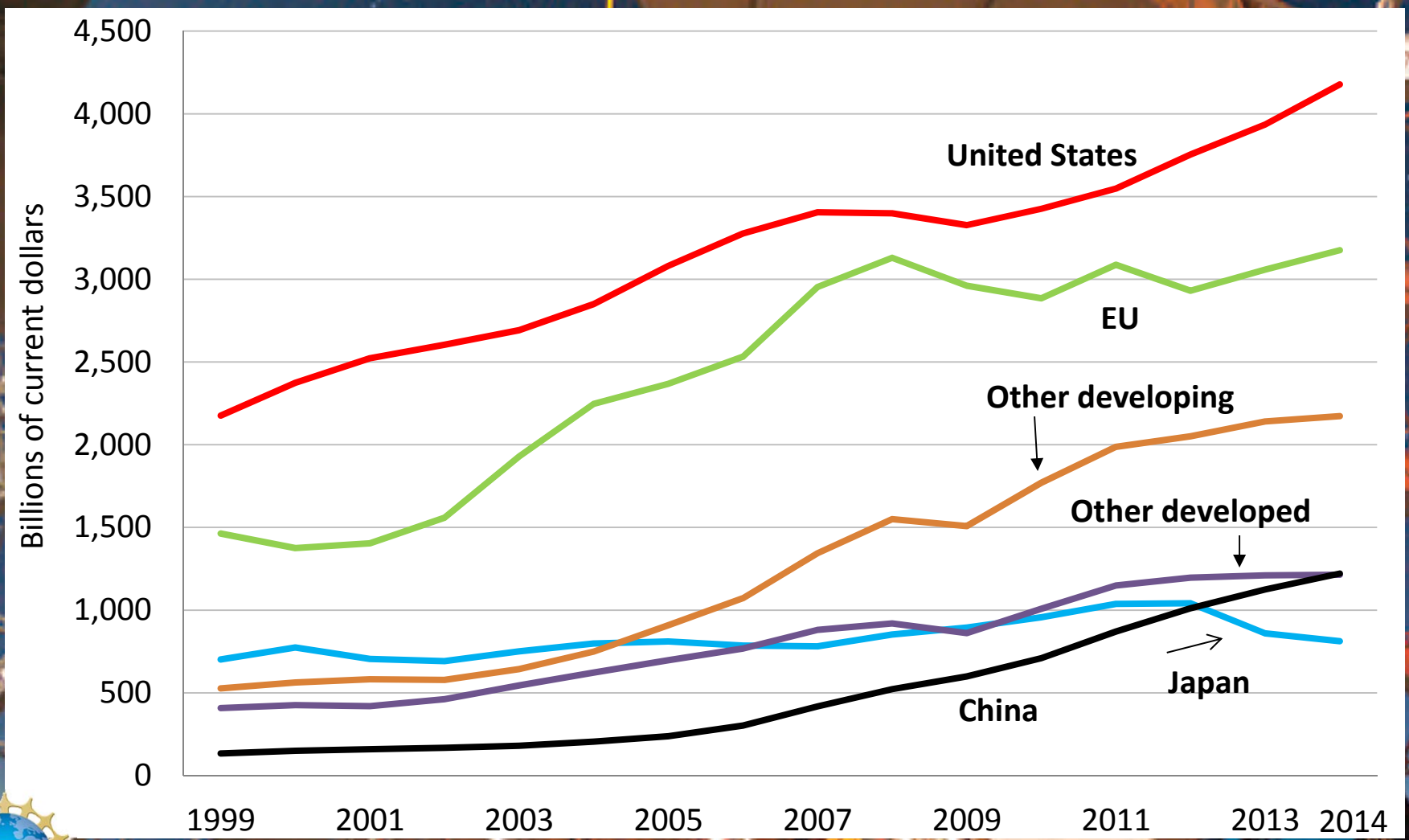
USPTO patents granted, by location of inventor: 2003-14



Value-added output of HT manufacturing industries 1999–2014



Value-added output of commercial KI services 1999–2014



Summary: *How are we doing?*

- **Shift in global landscape**
 - “Catching up” in some indicators of S&E activity in parts of the developing world
 - Specialized concentrations in developed nations
- **Multipolar world for S&E**
 - R&D and high-tech manufacturing increasingly multipolar
- **U.S. still leads in:**
 - Advanced degrees
 - High-impact publications
 - Intellectual property
 - KTI production (with pharmaceuticals and ICT goods concentrated in China and other developing countries)



Coming attractions

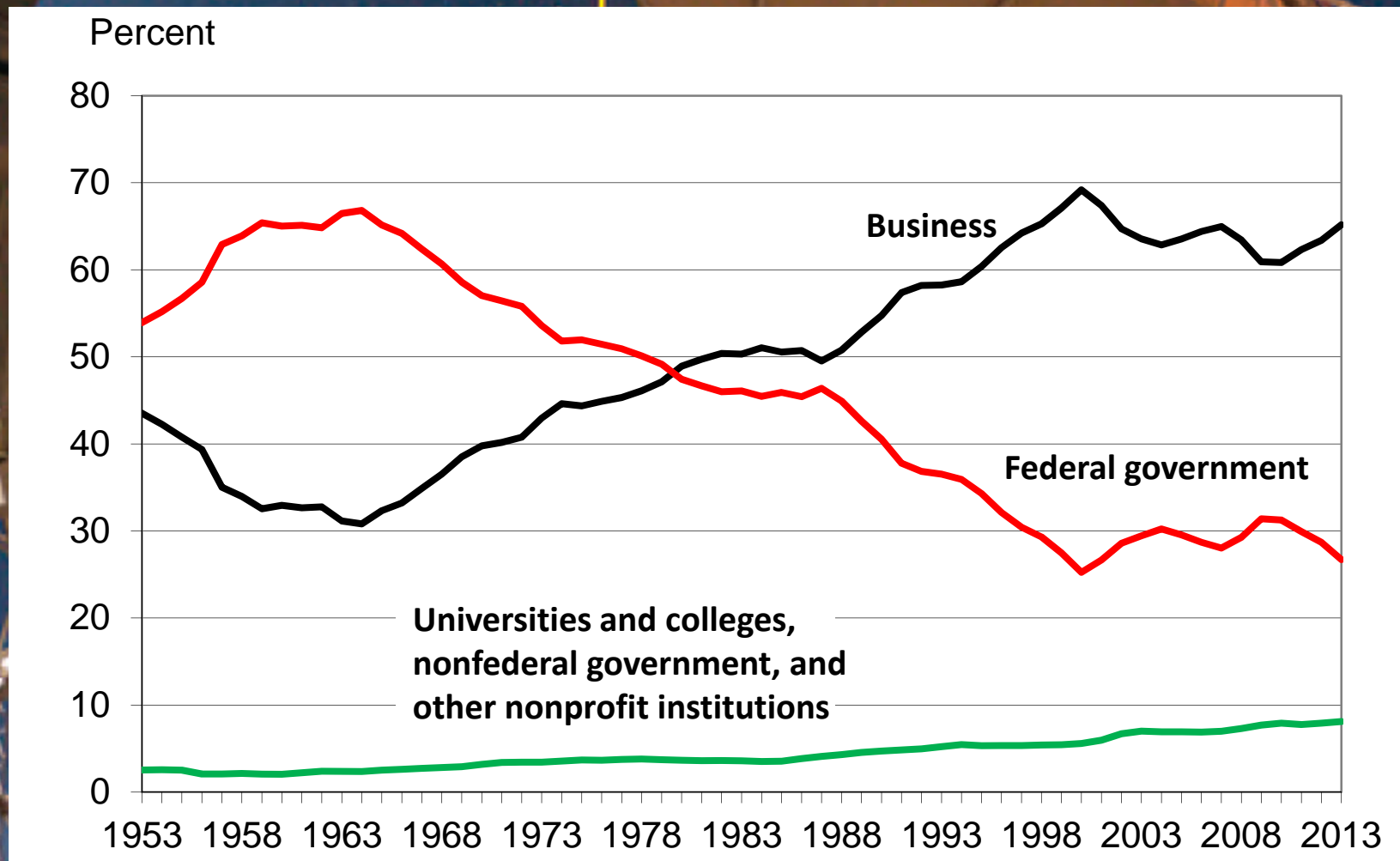
- **NSB's Companion Briefs**
 - Redesigned to be short and timely
- **Workshop: Future of *Indicators***
 - How do we continue to ensure that *Indicators* and its related resources provide maximal value for our stakeholders now and over the long term?
 - Late spring/summer of 2016
- **Infographic**
 - Visual tool for understanding key trends
- ***Women, Minorities, and Persons with Disabilities in Science and Engineering (WMPD) 2017***
 - Congressionally mandated
 - Detailed data on employment and education



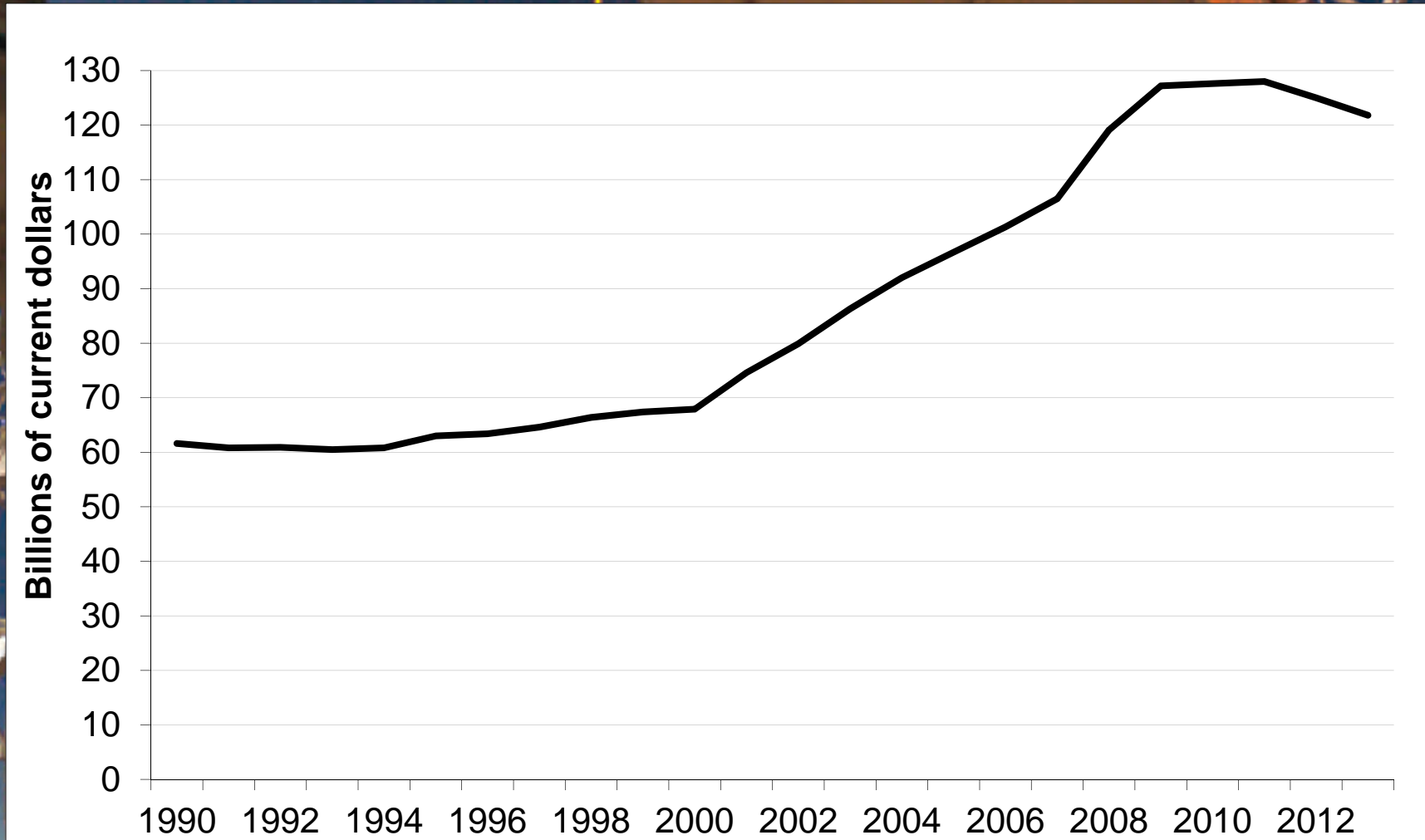


Appendix: Additional slides

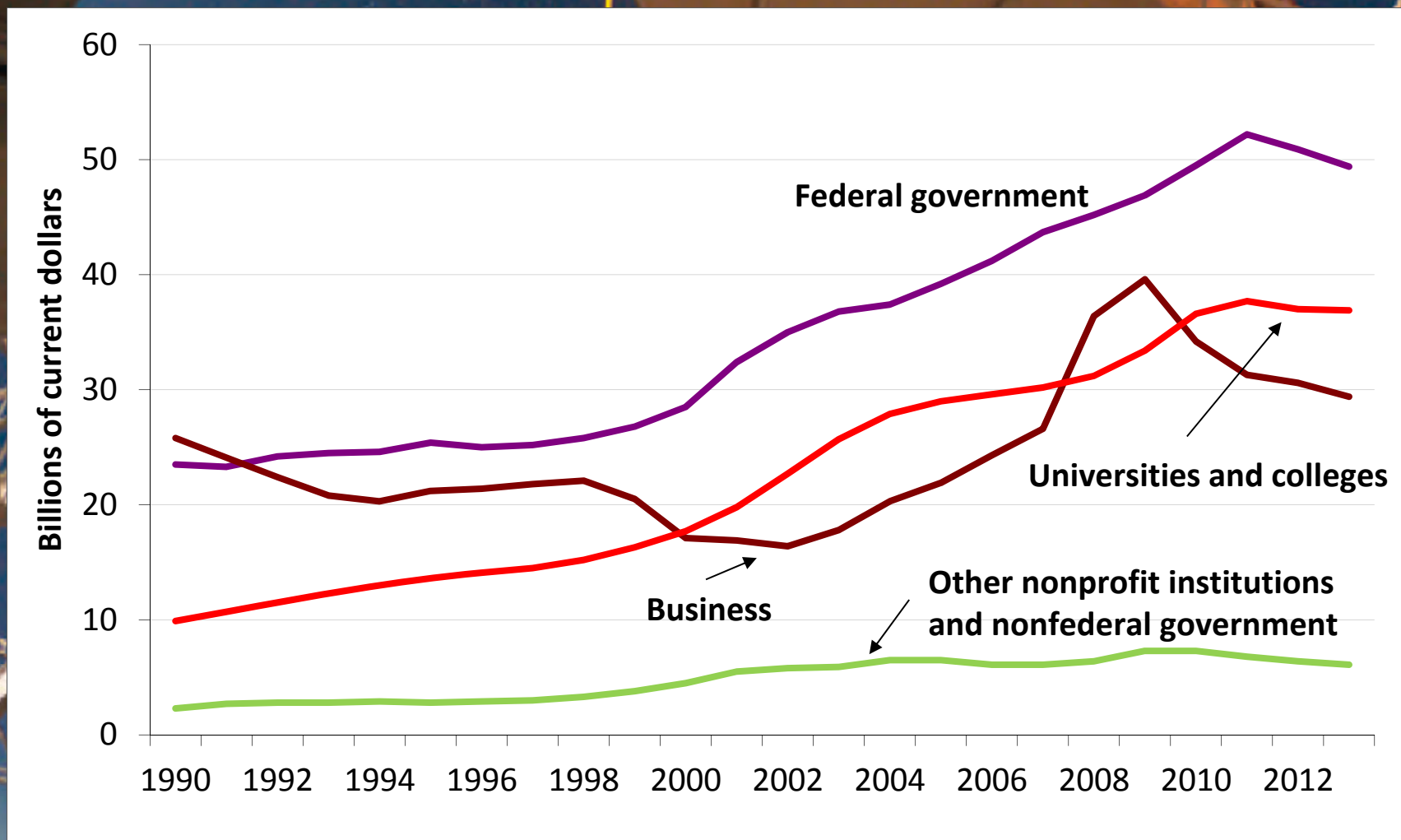
U.S. R&D expenditures: by source of funds 1953–2013



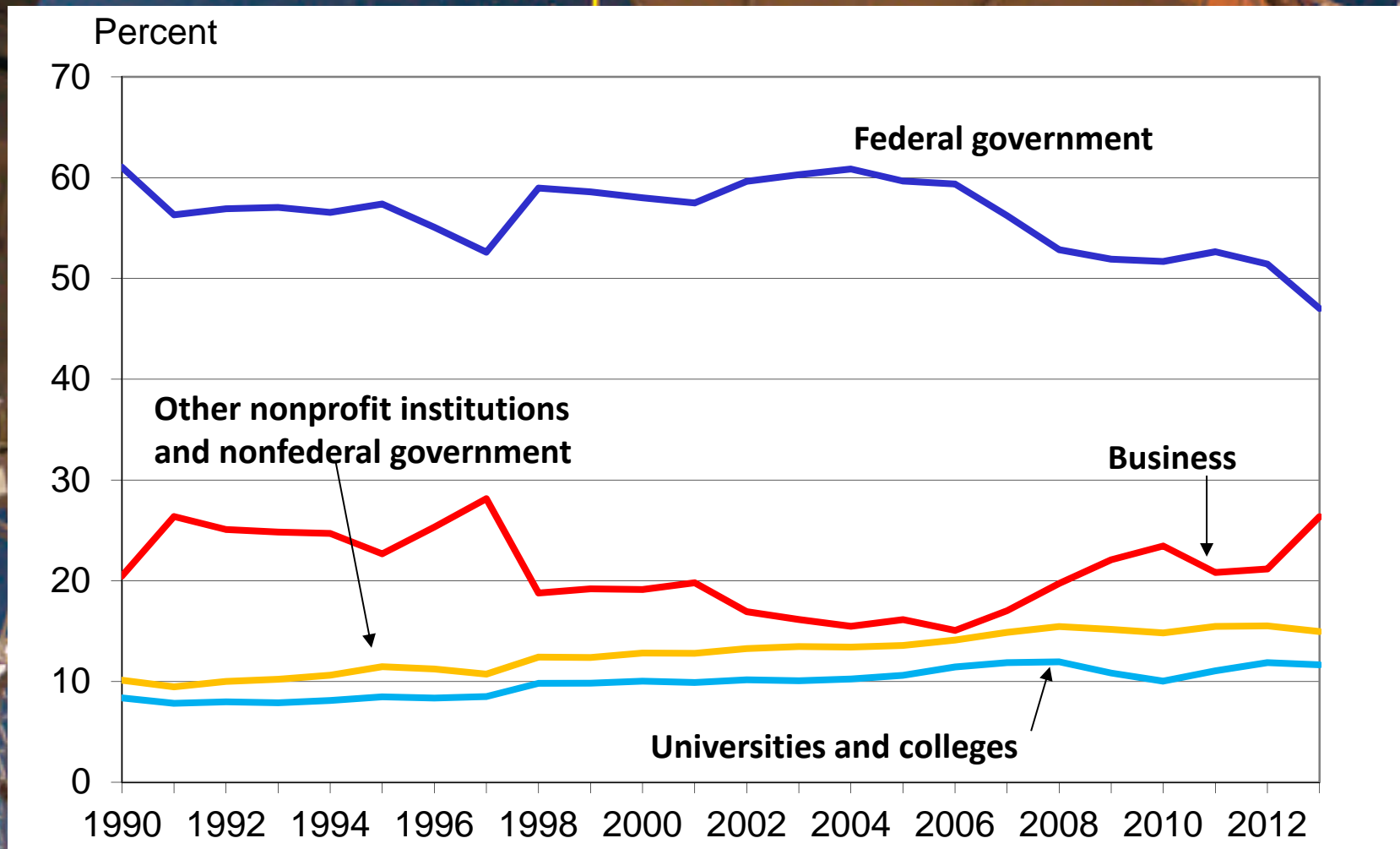
Federal R&D funding 1990–2013



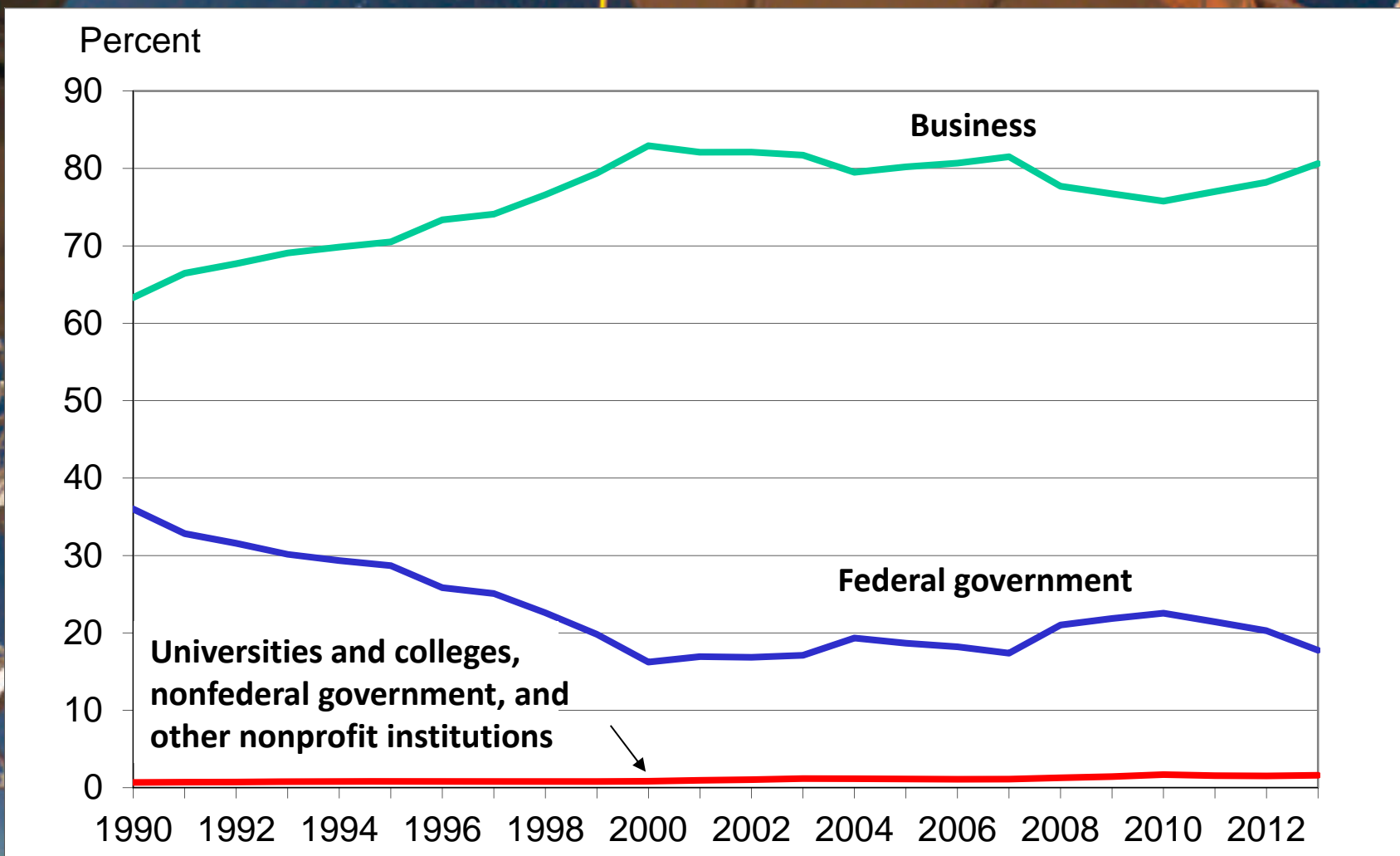
Federal R&D funding, by performing sector 1990–2013



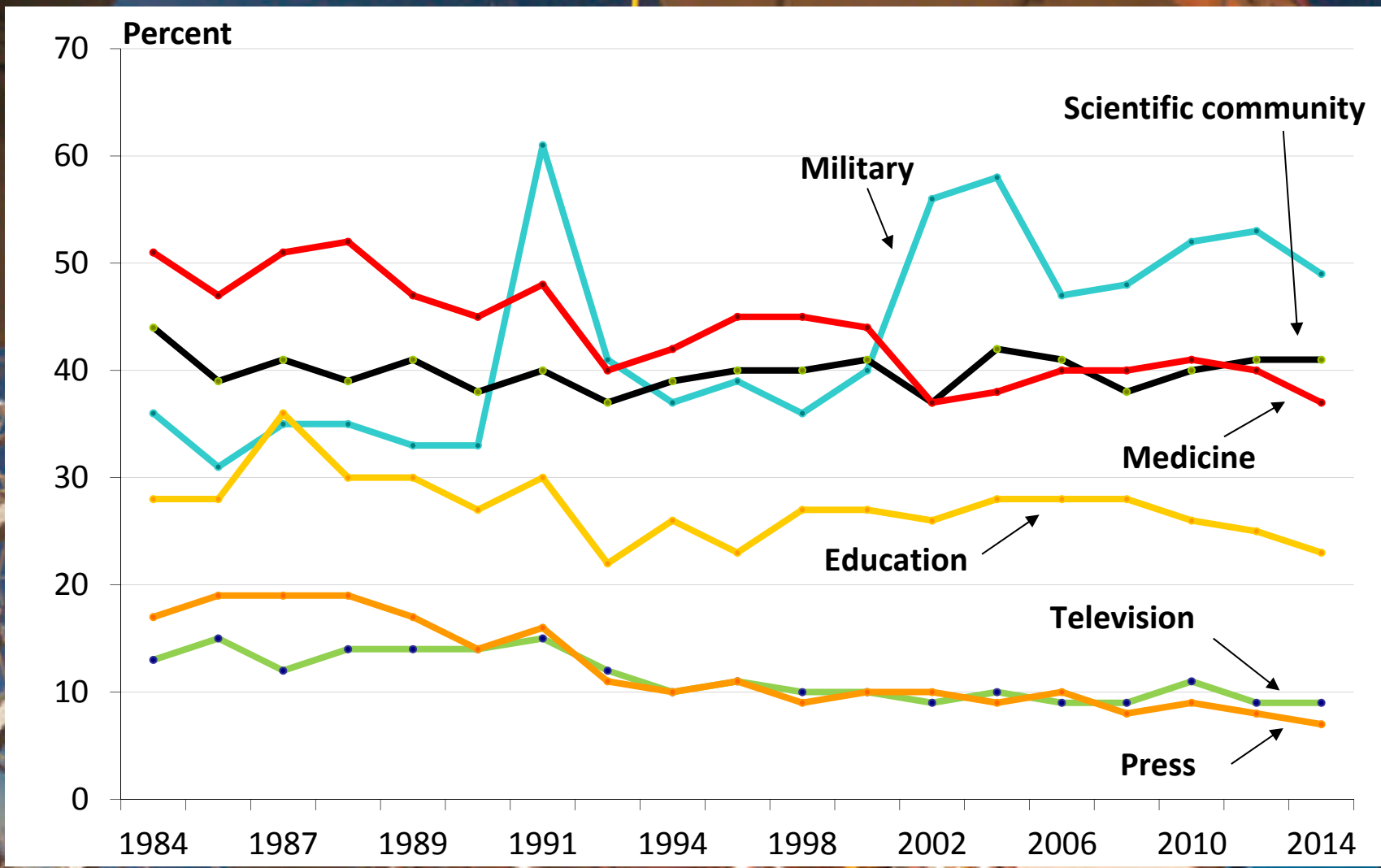
Funding sources for U.S. basic research 1990–2013



Funding sources for U.S. development 1990–2013

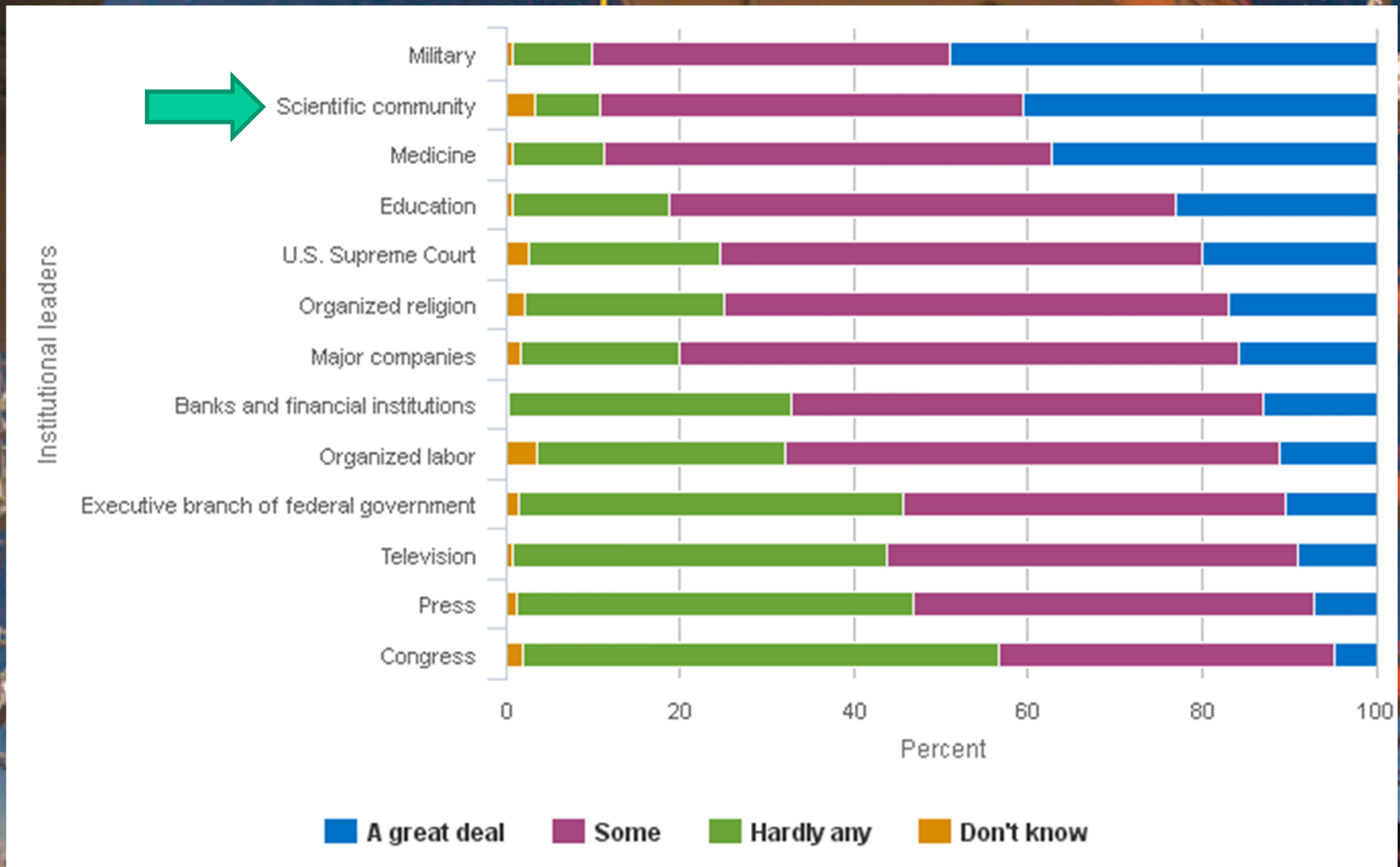


Public confidence in institutional leaders, by type of institution: 1984-2014



Public Views on Science

Confidence in institutional leaders, by type of institution, 2014



Americans' views of science 1985-2014

