

# Policy Watch

Back to Basic Research: An R&D Investment Plan to Enhance US Competitiveness

November 18, 2021



# Today's Speakers



**Ramon Benet**  
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Officer  
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**Mark Muro**  
Senior Fellow and  
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**Brookings Metropolitan  
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**Elizabeth Crofoot**  
(Moderator)  
Senior Economist  
**Committee for  
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# Some of the critical issues we will be addressing today

- Trends in both the national composition and global structure of R&D expenditure
- The role of public-private partnerships in fostering the creation of new technologies
- How racial and geographic equity can be an integral part of public R&D investment decisions
- Insights and solutions for advancing technological progress and fortifying US competitiveness



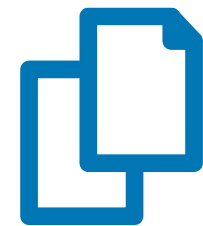
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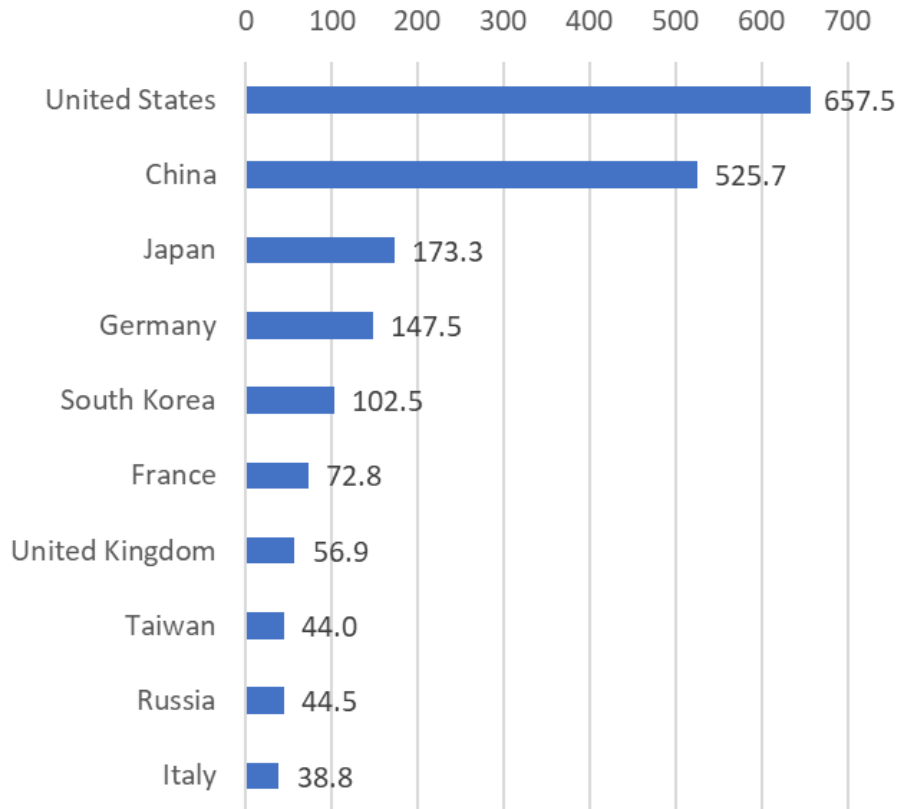
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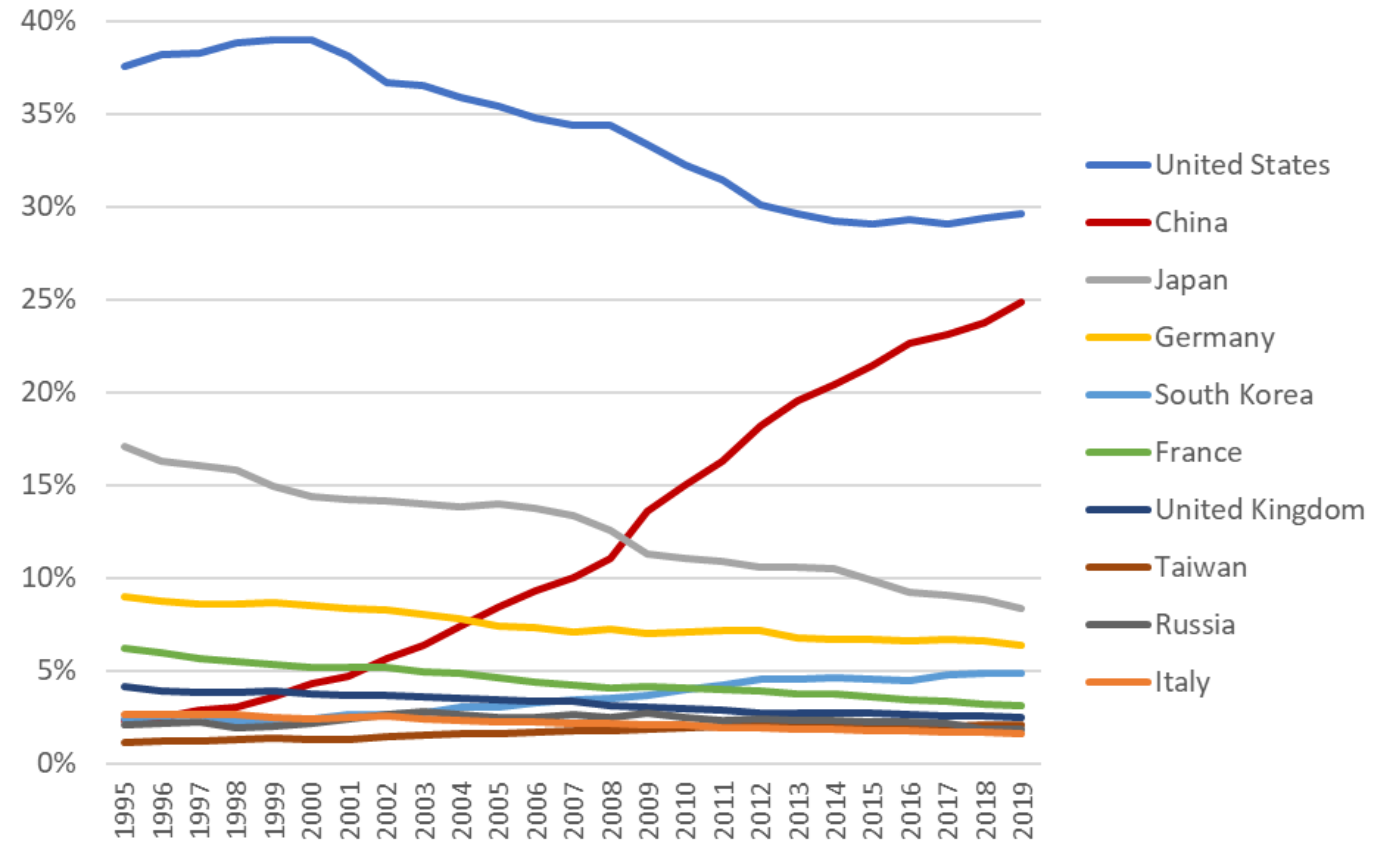
# 1. Total US R&D spending remains the highest in the world, but its global share of R&D expenditure has fallen significantly

**Gross domestic expenditure on R&D**

Billions of current PPP USD, 2019



**Share of global R&D for the 10 countries with highest 2019 R&D expenditures**

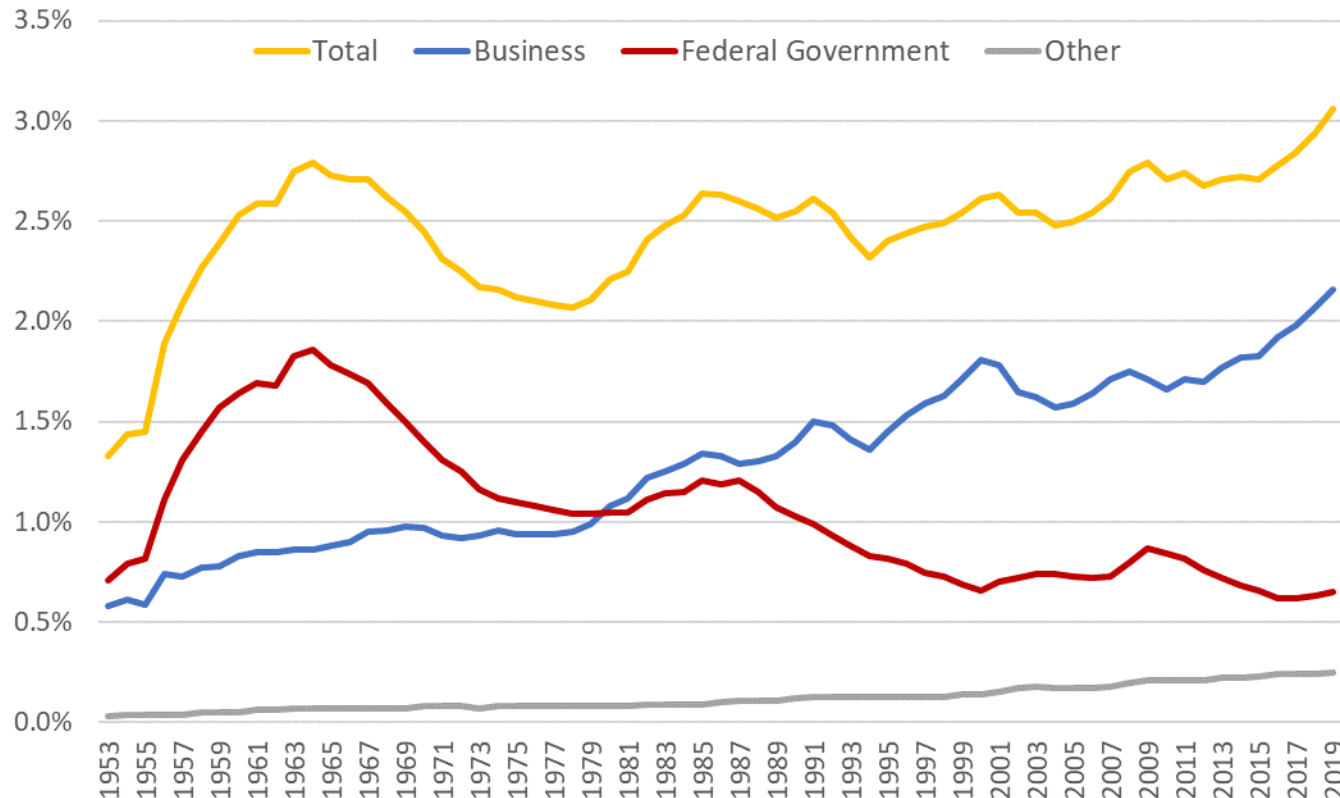


Source: [OECD Research and Development Statistics](#), "Gross domestic expenditure on R&D by sector of performance and source of funds," and calculations by The Conference Board



## 2a. The composition of US R&D has shifted: Business R&D spending has overtaken public R&D

R&D spending as a percentage of GDP, by source of funding



- The role of the federal government in funding science and technology has waned over time
  - ✓ Peaked at 1.9% of GDP in 1964
  - ✓ Fell to 0.6% of GDP in 2016
- The overall rise in US R&D spending has been driven by business
  - ✓ Surpassed 3% of GDP in 2019

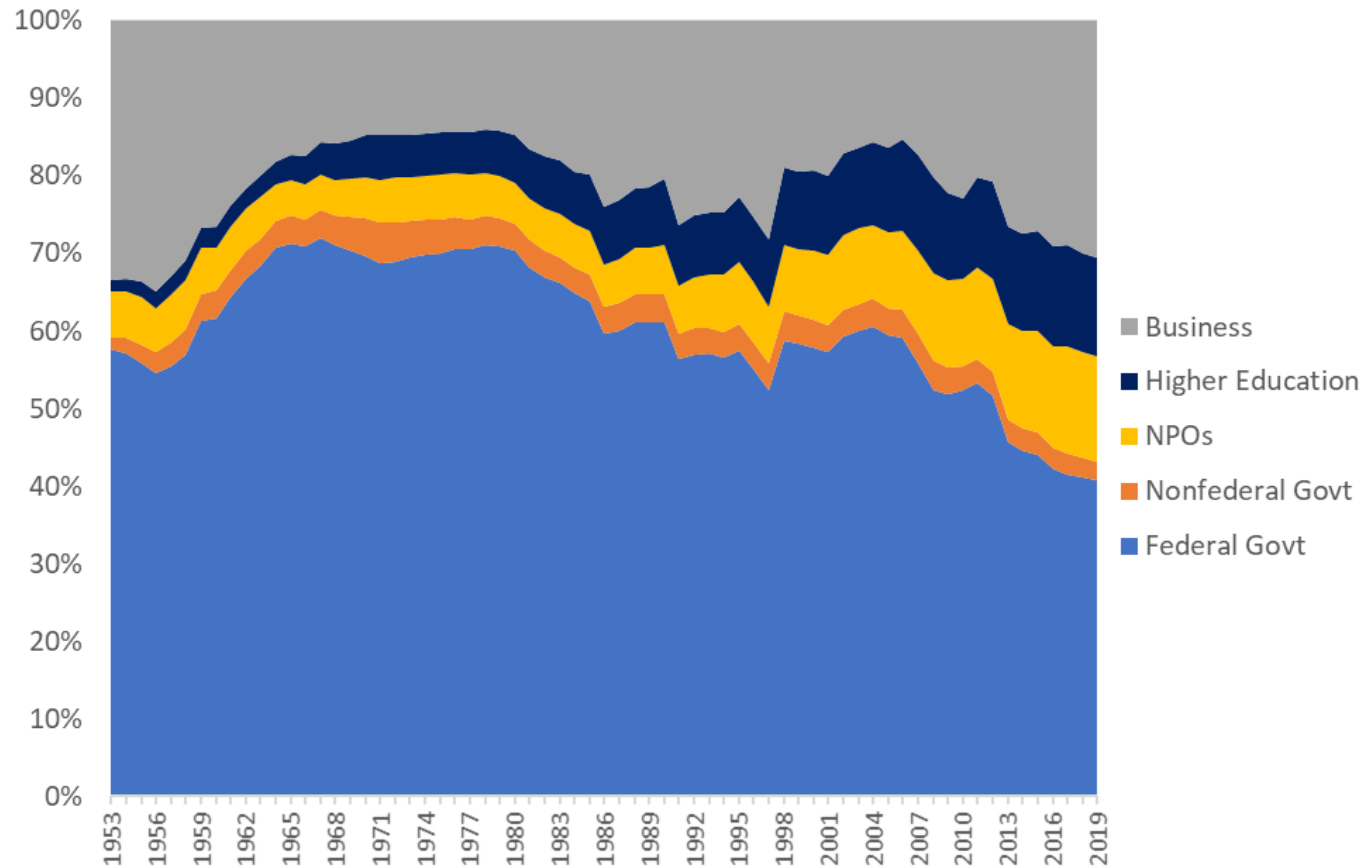
Note: Other includes funding for US R&D by nonfederal government, higher education, and nonprofit organizations.

Source: National Science Foundation, [National Patterns of R&D Resources: 2018–19 Data Update](#), Table 1



## 2b. The composition of US R&D has shifted: Basic research is increasingly funded by business

Share of total US spending on basic research, by source of funding



FEDERAL GOVERNMENT	BUSINESS	OTHER*
72%	16%	12%
41%	31%	28%

Note: Other includes funding for US R&D by nonfederal government, higher education, and nonprofit organizations.

Note: NPOs refer to nonprofit organizations

Source: National Science Foundation, [National Patterns of R&D Resources: 2018–19 Data Update](#), Table 7



### 3. The US workforce is falling behind in STEM skills



Based on international assessments of student achievement, American children are falling behind in STEM subjects

- ✓ Rank 18th in science and 37th in math among 78 industrialized nations
- ✓ China ranks first in both



Learning loss during COVID-19 exacerbated the problem

- ✓ Children fell especially behind in math
- ✓ Represents a step back in adequately preparing K-12 students in STEM subjects



The US talent pool of skilled immigrants in STEM fields has been shrinking in recent years

- ✓ Also aggravated by pandemic-related travel restrictions





# US Competitiveness and Innovation are at Risk

The US must reinvigorate US innovation and competitiveness by reestablishing the nation as a leader in science and technology. Policymakers must take the following steps:

## 1 Increase public investment in basic research

- Consider research proposals that ensure our **national security** and enhance our **economic competitiveness**
- **Evaluate the cost-effectiveness of individual research proposals.** Despite the nation's ongoing budget problem, public R&D investment promises substantial returns and must be budgeted with a correspondingly high priority

## 2 Leverage public private partnerships to prioritize viable research projects & expand the nation's innovation footprint

Collaborate with private industry, local universities, and nonprofits to:

- Pinpoint technological bottlenecks, identify promising ideas across fields and sectors, and **determine the highest priority research projects**
- Strategically assess regional research capabilities, the local STEM workforce, and local firms and industries to more effectively **disperse R&D investments** across geographies and populations (esp. to HBCUs)

## 3 Develop a highly skilled science and engineering workforce

- **Promote pathways to STEM skills and jobs.** Fund K-12 STEM education programs and increase access to internships and apprenticeships in STEM fields
- **Promote immigration policies** that capitalize on the knowledge and innovative capacity of skilled immigrants





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## Back to Basic Research

An R&D Investment Plan to Enhance US Competitiveness

### Overview

The US lead in advancing science and technology is eroding. Though the US has steadily increased its total R&D spending over time, its global share of R&D expenditure has fallen significantly.

The case for increased public spending on basic research has never been stronger. If the US wants to return to being the uncomparsed leader in science and engineering, it will have to sow seeds for innovation. Other countries are making leaps to catch up. The US will not be able to stay ahead without raising its level of investment.

American technological leadership is in jeopardy partly because the composition of US R&D has shifted. Government or public funding of R&D has decreased, and business investment in R&D has become more important. In principle, the government's role is to fund basic, or foundational, research—the type that seeds scientific breakthroughs like the Internet, mRNA vaccines, the Google search engine, and the Human Genome Project. Yet its contribution to basic research has been declining steadily since 1980. The responsibility of increasing the country's stock of available scientific knowledge has increasingly shifted away from the federal government and toward business.

Companies favor research focused on enhancing or commercializing existing technology, more so than discovering new ones. They seek safer, product-centric investments with shorter-term returns, while the government can make bolder, riskier investments that deliver breakthroughs in general purpose science and technologies that, in turn, can spur innovation-driven economic growth across multiple sectors.



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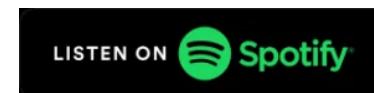
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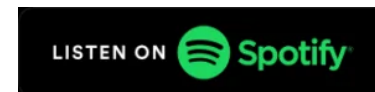
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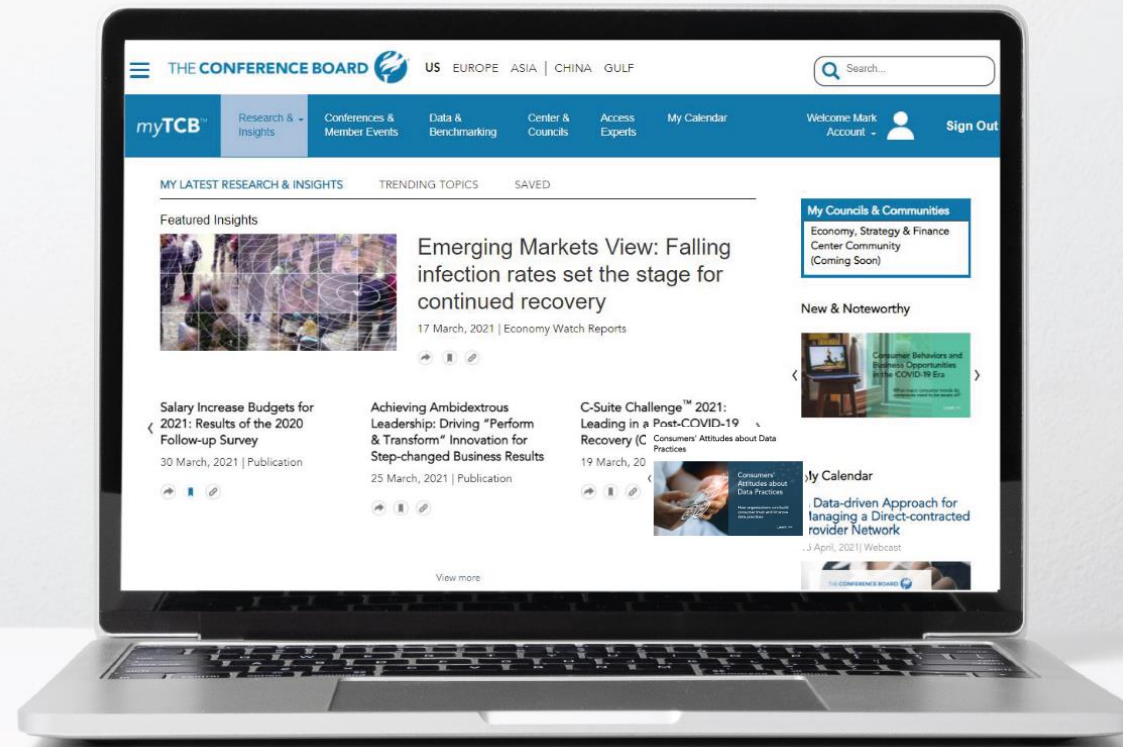
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