

Introduction to the U.S. Federal Budget Process and R&D Investment

Patrick J Clemins

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for EEP's How Government Works

AAAS R&D Budget and Policy Program
<http://www.aaas.org/spp/rd>

See the "Seminars and Presentations"
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Federal Policy

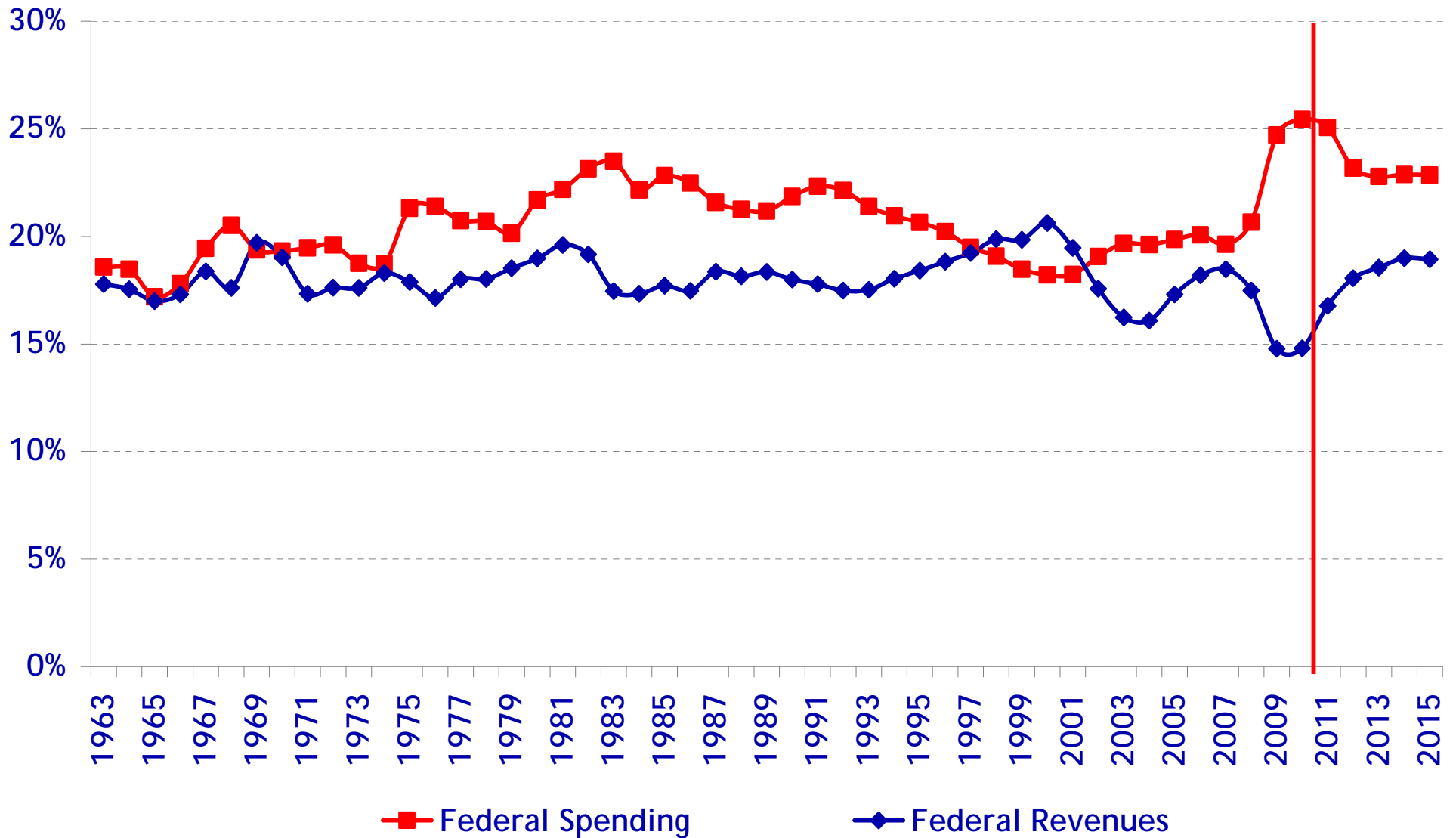
- How does the federal government implement policy?
- The budget is the primary way Congress directs U.S. policy and priorities
 - Almost all policy involves money, directly or indirectly
 - The budget cycle drives decision-making
 - Affects the health of U.S. science and engineering
 - \$148.1b on research and development
 - Over 60% of all university R&D is federally funded
 - Education and workforce training

The U.S. Federal Budget in FY 2011

- Total Budget: \$3.8t
 - Over 1/5 of the total U.S. economy
- Total Receipts: \$2.6t
 - Mostly from income and payroll taxes
- Deficit: \$1.3t
 - \$96b borrowed from Social Security

Federal Spending and Revenues

(percent of GDP)



Source: *Budget of the United States Government, FY 2011.*

FY 2010 data are estimates. FY 2011-2015 data are budget projections.

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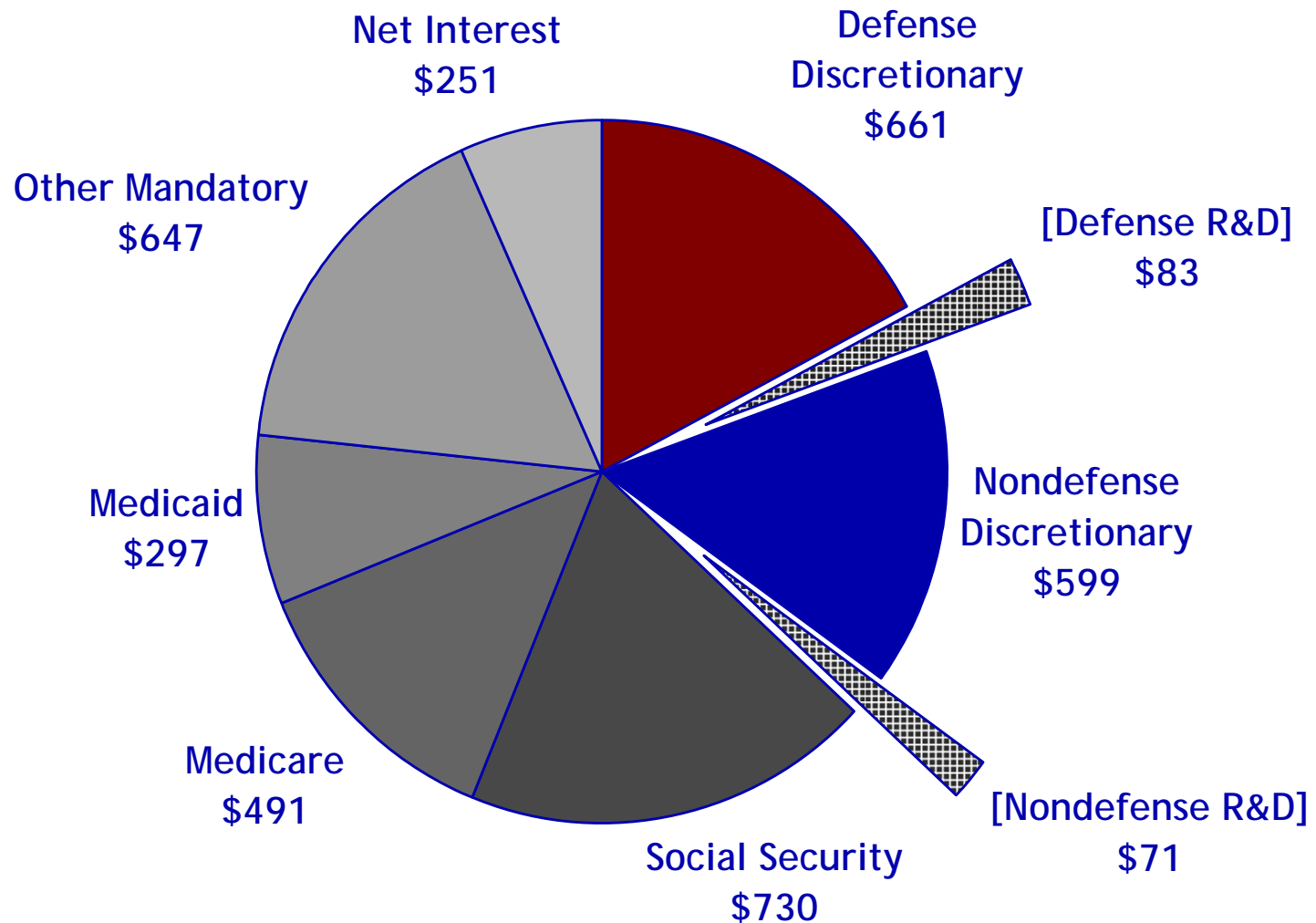
Discretionary vs Mandatory

- Mandatory Spending (Entitlements)
 - Social Security, Interest on the debt, Medicare, etc.
 - Only adjusted by act of Congress
- Discretionary Spending
 - Military, salaries, construction, domestic programs, R&D, etc.
 - Appropriated to each agency in yearly budget
- FY 2011
 - \$1.3t discretionary budget (+0.3%)
 - \$532b nondefense spending (+1.4%)

Composition of the Proposed FY 2011 Budget

Total Outlays = \$3.8 trillion

outlays in billions of dollars



Source: *Budget of the United States Government FY 2011.*

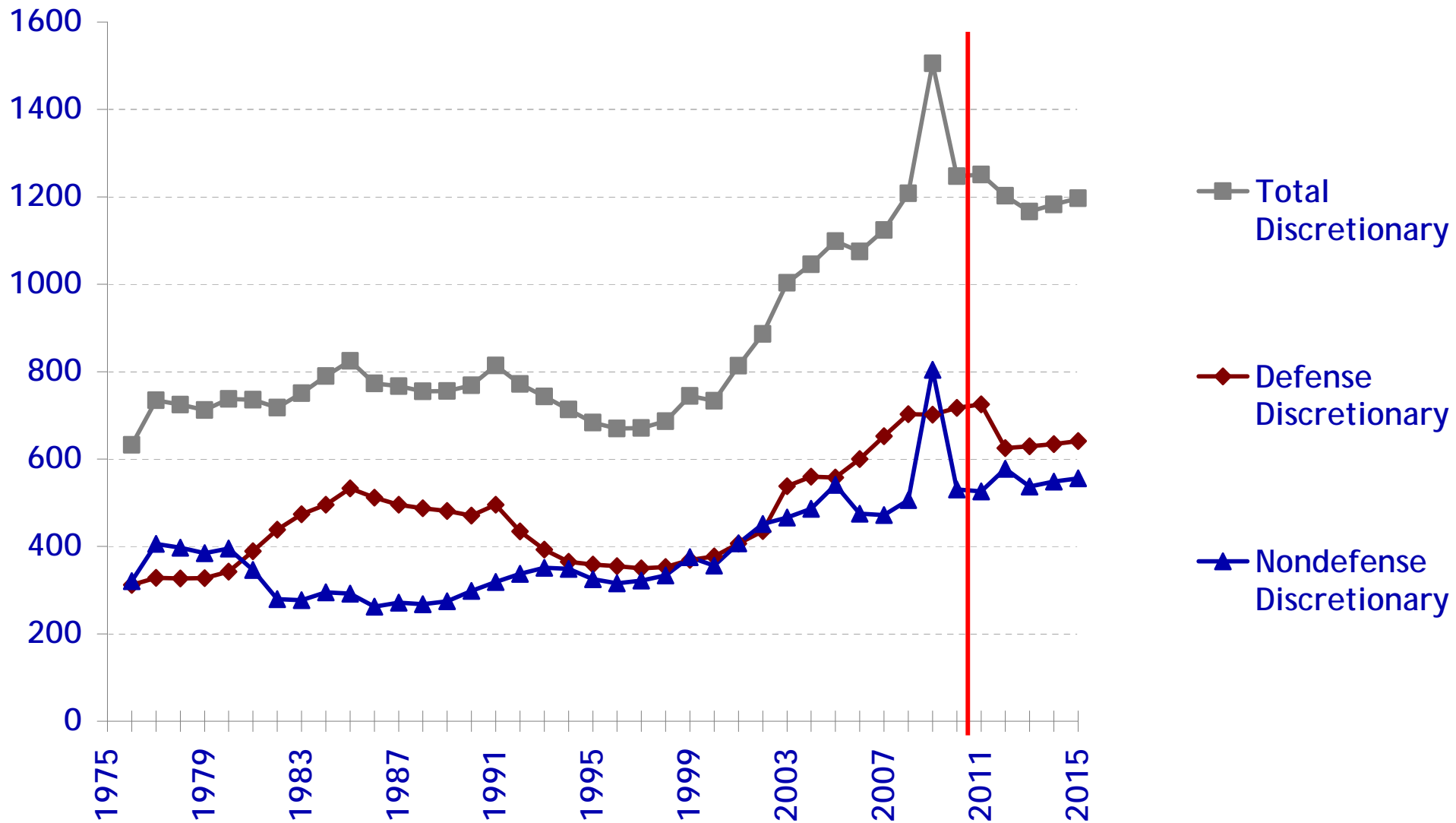
Projected unified deficit is \$1.3 trillion.

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Trends in Discretionary Spending

budget authority in billions of constant FY 2010 dollars



Source: *Budget of the United States Government, FY 2011.*

FY 2010-2015 data are budget projections.

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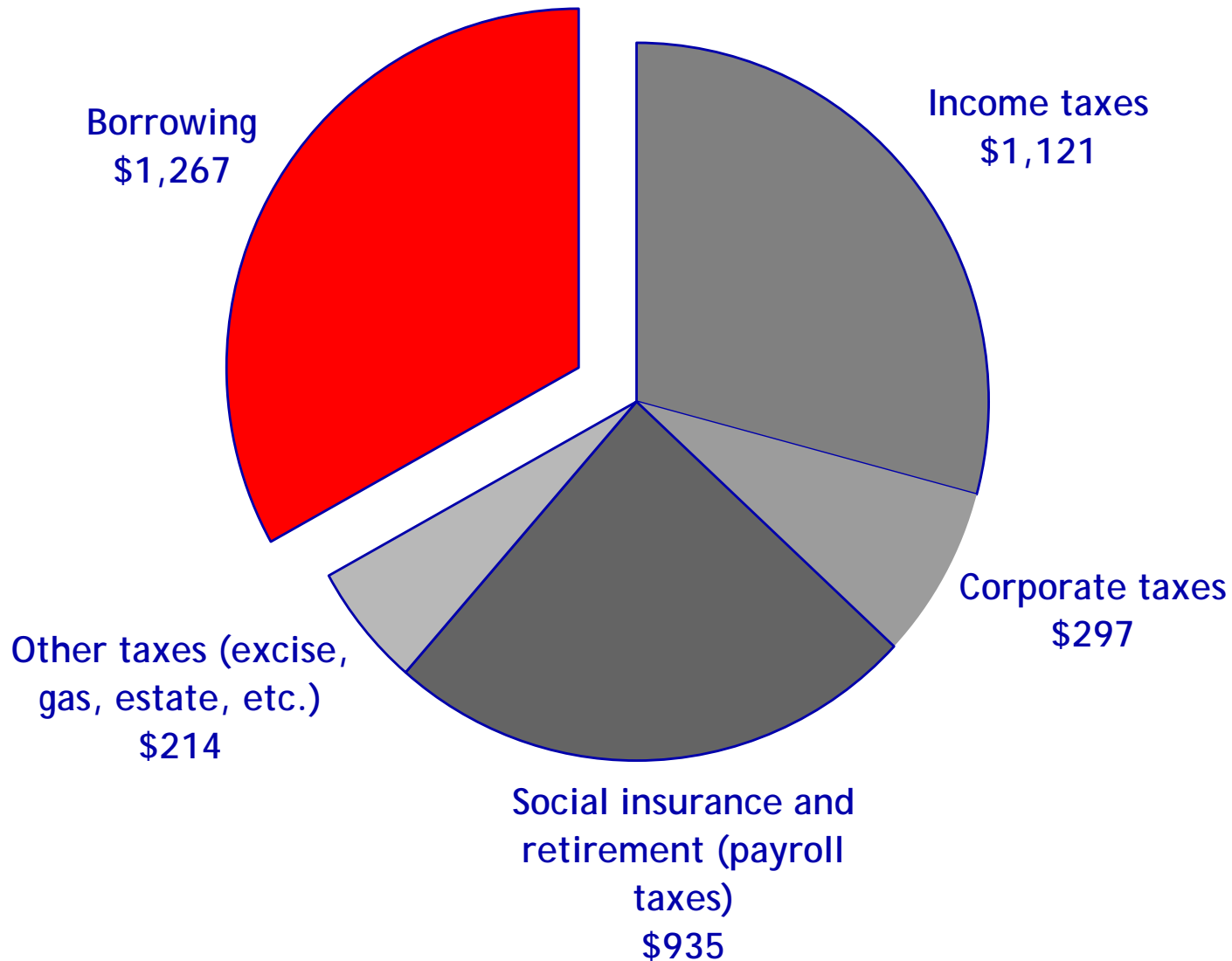
Deficit Spending

- The U.S. national debt dates back to our inception
 - Was zero briefly in 1835
 - Tends to expand quickly during wartime
- 33 percent of the FY 2011 budget is funded by loans
 - Government Bonds
 - Auctioned internationally - China, Japan, and UK are major lenders
- Debt limit is raised regularly
 - Currently at \$14.3t (set in February 2010)

FY 2011 Budget by Source of Funds

Total Outlays = \$3.8 trillion

Total Receipts (without borrowing) = \$2.6 trillion



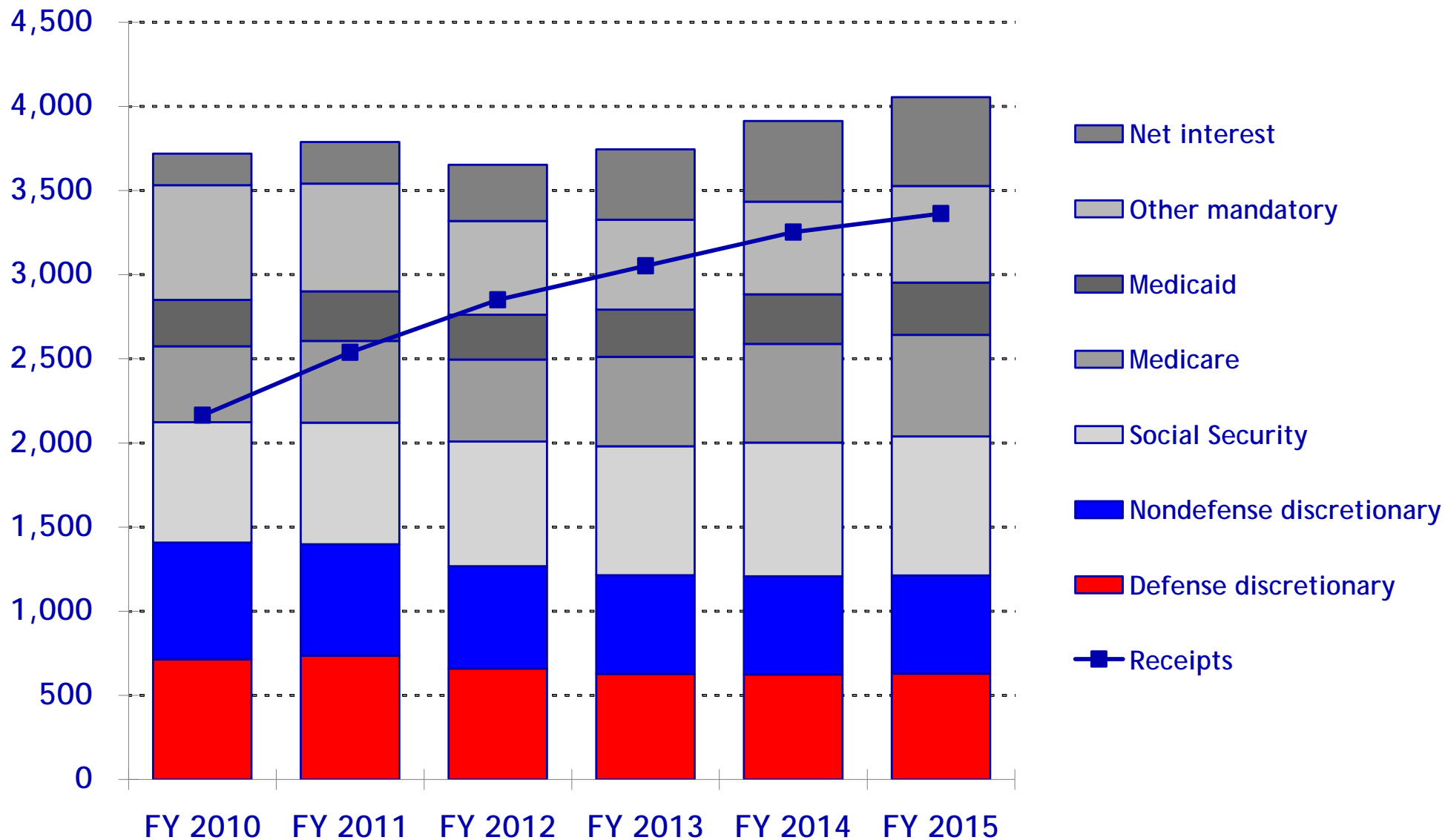
Source: *Budget of the United States Government FY 2011.*

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FY 2011 Budget Projections

outlays in billions of constant FY 2010 dollars

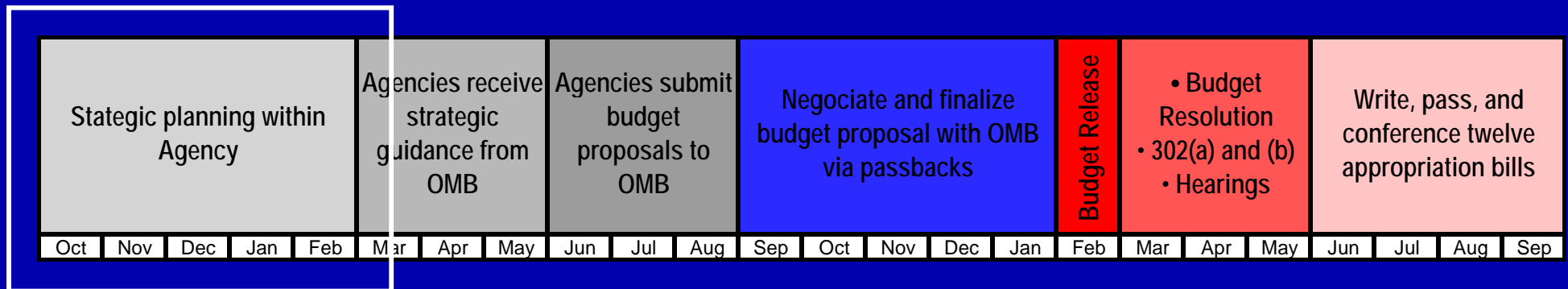


Source: *Budget of the United States Government FY 2011.*

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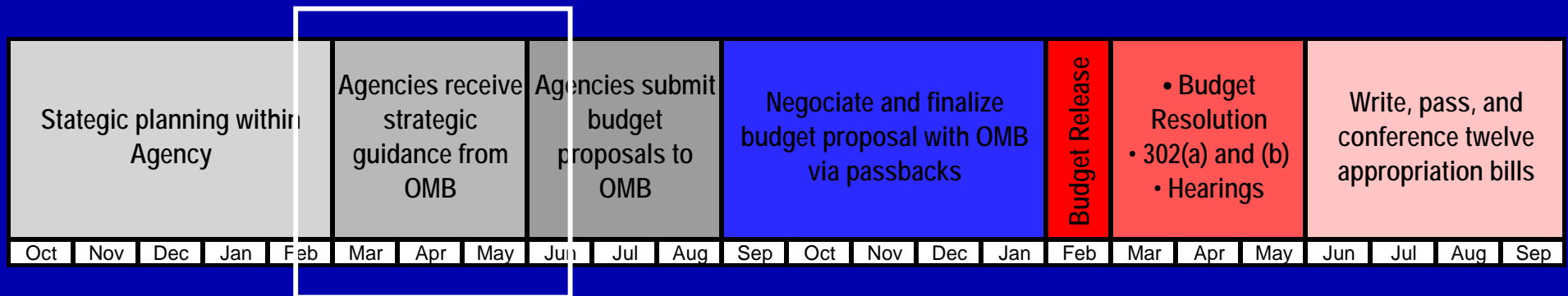


The Federal Budget Cycle



- Discussions within agencies among upper management about possible priorities and initiatives

The Federal Budget Cycle

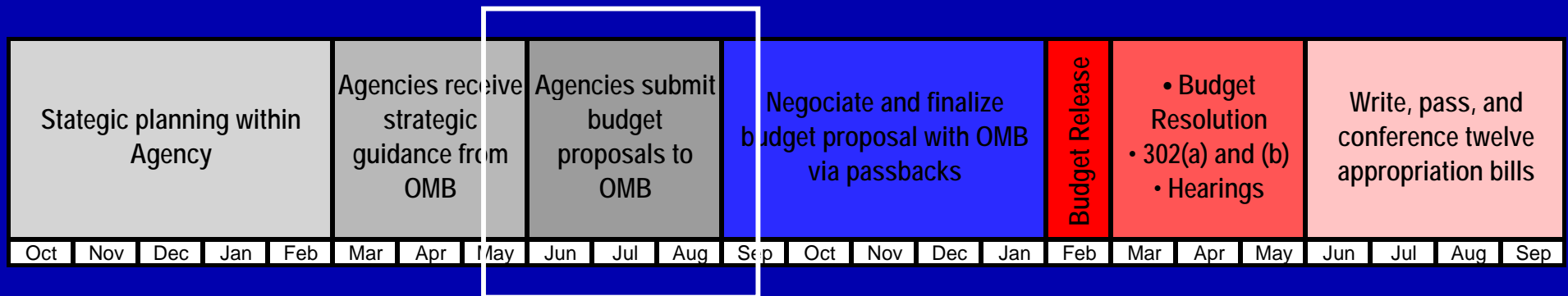


- Joint memorandum from Office of Management and Budget (OMB) and the Office of Science and Technology Policy (OSTP) lays out Presidential priorities and provides broad guidance

FY 2011 R&D Practical Challenges

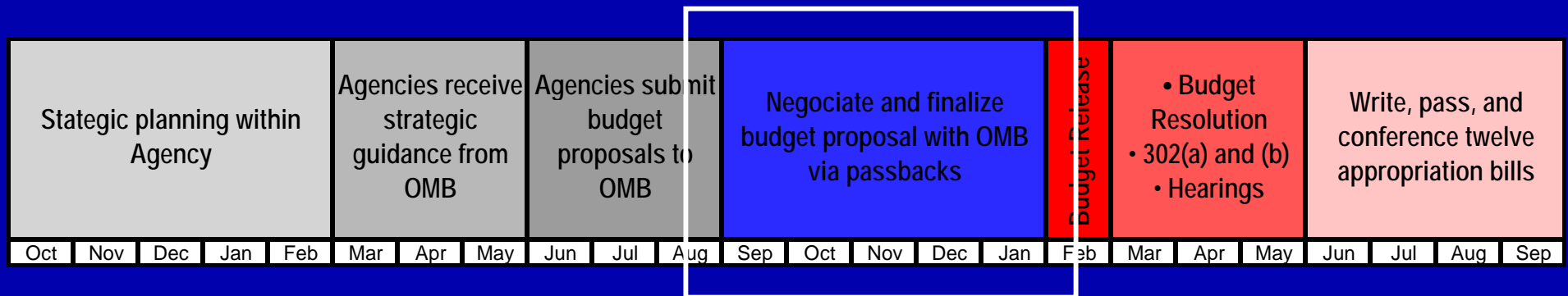
- Apply S&T to drive economic recovery, job creation, and economic growth
- Promote energy technologies to reduce energy imports and create green jobs and business
- Apply biomedical science and information to help Americans live longer and healthier lives while reducing health care costs
- Assert that we have the technology to protect our troops, citizens, and national interests

The Federal Budget Cycle



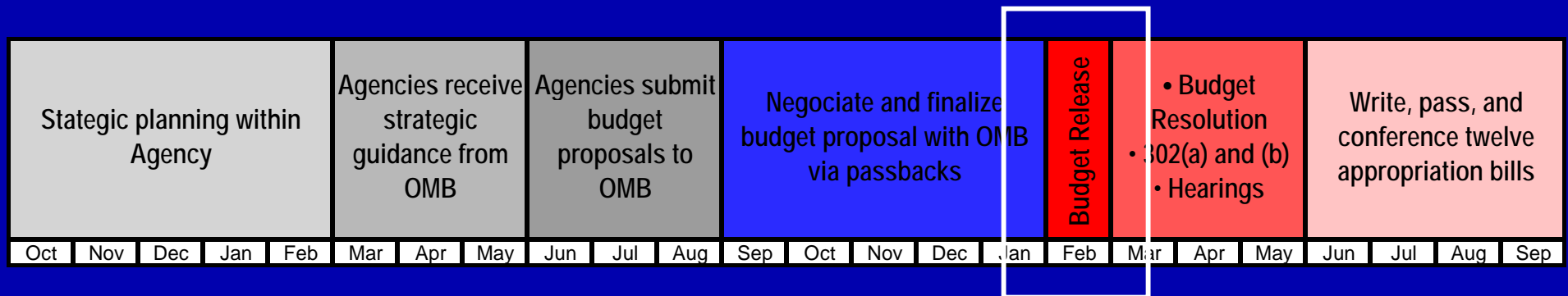
- Agencies deliver budget justifications to OMB

The Federal Budget Cycle



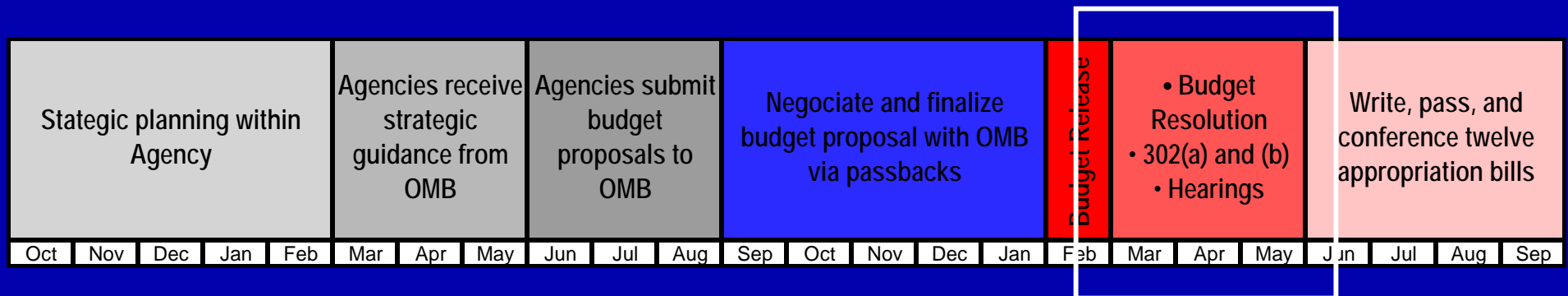
- Agencies negotiate with OMB over their budget proposals with OSTP serving an advisory role
- Budget proposals are finalized in January

The Federal Budget Cycle



- President presents the proposed budget to Congress on the first Monday of February

The Federal Budget Cycle

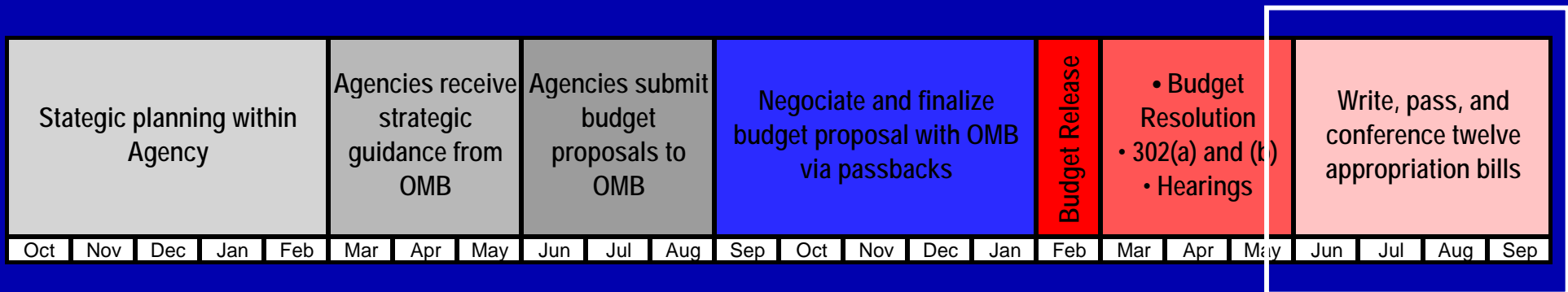


- Congress holds hearings on agency budgets and initiatives
- Authorizing committees create authorizations for agencies
- Congress approves budget resolution, the big-picture spending plan
- Appropriations committees receive 302(a) allocations and determine 302(b) allocations for each appropriations bill
- Determine need to allow for reconciliation bill

Reconciliation Bill

- A special bill which modifies tax law or mandatory programs to reconcile with the budget resolution
- Reconciliation is optional, and not always necessary
- Reconciliation bills have special procedural rules
 - Can not filibuster, so the Senate only needs 51 votes to pass a reconciliation bill
- In FY 2010, both health care and education are subject to reconciliation

The Federal Budget Cycle



- Appropriation committees write and approve appropriations bills
- Bills have to pass the full chamber by majority vote
- The different versions passed by both chambers are conferenced
- Each chamber then has to agree to the conference report before President can sign
- The fiscal year ends on Sept 30, any unfunded agency must shutdown unless a continuing resolution (CR) is passed
- Omnibus bill is created to pass remaining appropriations bills



The Federal Budget Cycle

FY 2010	----- Spend Fiscal Year Budget -----																				
FY 2011	Budget Release	Budget Resolution 302(a) and (b) Hearings	Write, pass, and conference twelve appropriation bills			----- Spend Fiscal Year Budget -----															
FY 2012	Planning within Agency	Agencies receive strategic guidance from OMB	Agencies submit budget proposals to OMB	Negotiate and finalize budget proposal with OMB via passbacks				Budget Release	• Budget Resolution • 302(a) and (b) • Hearings	Write, pass, and conference twelve appropriation bills											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep

- Agencies are working on 3 budgets at any given time

Supplemental Appropriations

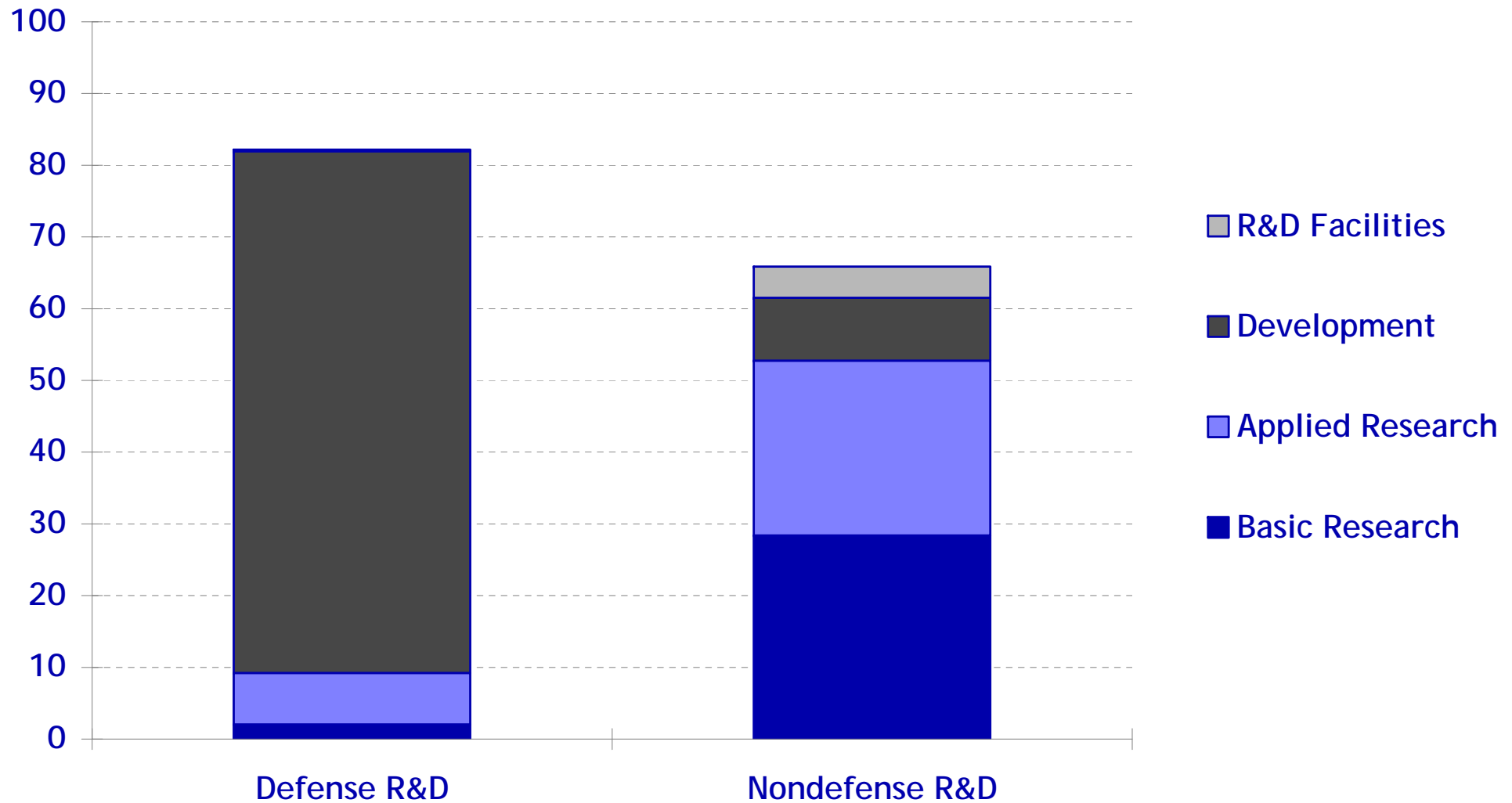
- Throughout the year, as necessary, Congress can introduce a supplemental appropriation bill
 - Usually for natural disasters or emergencies
- Examples
 - February 2009 - The American Recovery and Reinvestment Act (ARRA) - \$787b for economic recovery
 - June 2009 - \$106b for war operations and flu preparations
 - August 2009 - \$2b to extend “cash for clunkers” program

Federal R&D in Context

- The federal R&D investment is spread across over two dozen departments and agencies
 - Only two manage more than 10% of the investment
 - Department of Defense (52.7%)
 - Department of Health and Human Services (21.7%)
- Role of federal R&D
 - Supports federal missions
 - Drives U.S. innovation

Character of R&D, FY 2011

budget authority in billions of dollars



Source: OMB R&D data, agency budget justifications, and agency budget documents.

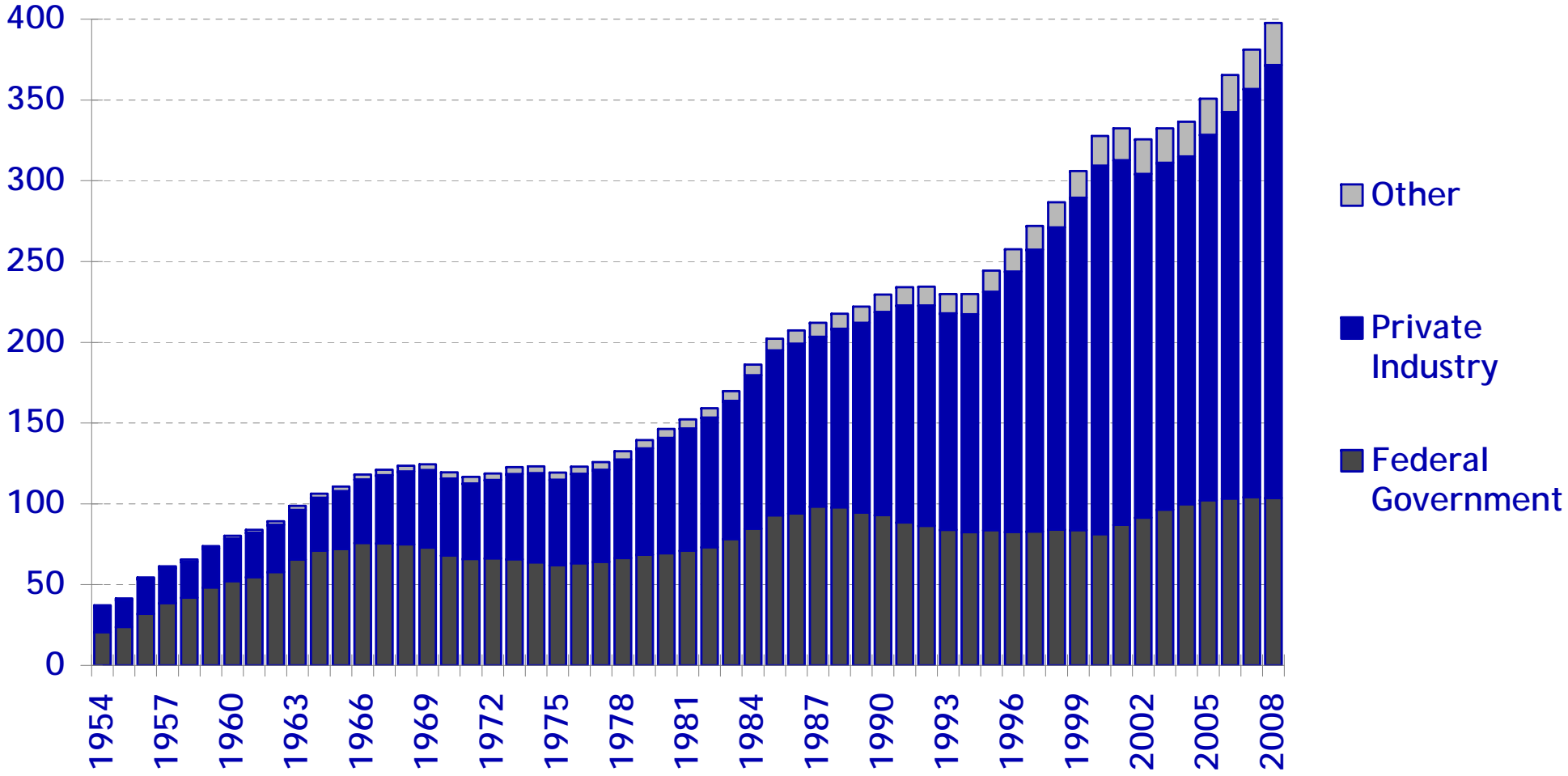
Defense R&D = DOD + DOE defense.

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Federal R&D Funding by Source

outlays in billions of constant 2008 dollars



Source: NSF, Division of Science Resources Statistics, National Patterns of R&D Resources (NSF 08-318)

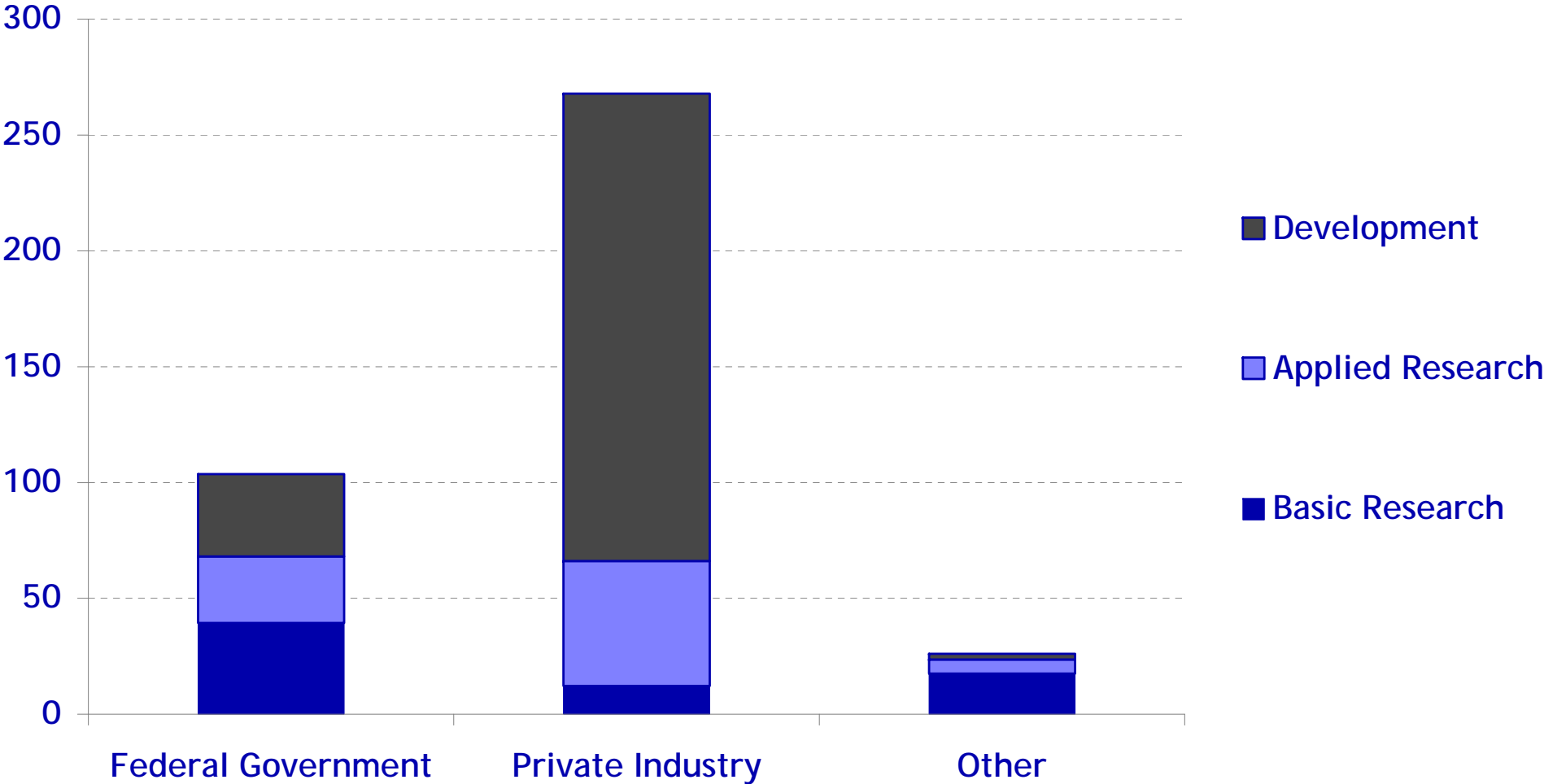
2008 figures are preliminary.

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Character of R&D, 2008

outlays in billions of dollars



Source: NSF, Division of Science Resources Statistics,
National Patterns of R&D Resources (NSF 08-318)

Figures are preliminary.

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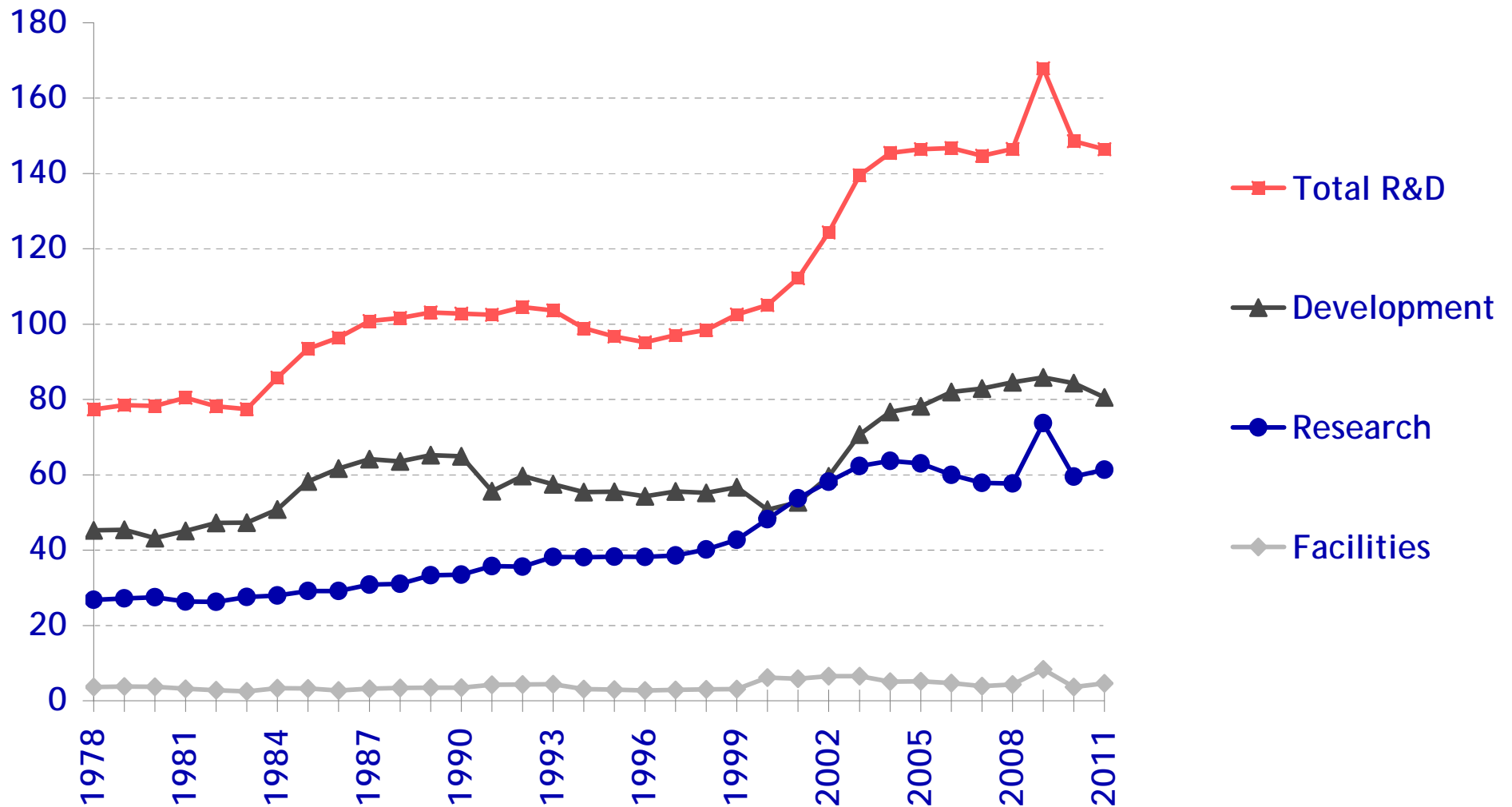


The FY 2011 Federal R&D Investment

- Total R&D: \$148.1b, -0.3% from FY 2010
 - Basic Research: \$30.4b, +4.3%
 - Applied Research: \$31.6b, +2.1%
 - Development: \$81.5b, -2.9%
 - Equipment and Facilities: \$4.6b, +1.3%
- \$82.2b for defense R&D, -4.8%
- \$65.9b for non-defense R&D, +5.9%
- -1.4% in constant dollars from FY 2010
- +0.7% in constant dollars since FY 2004
 - Peak in FY 2009

Trends in Federal R&D

in billions of constant FY 2010 dollars



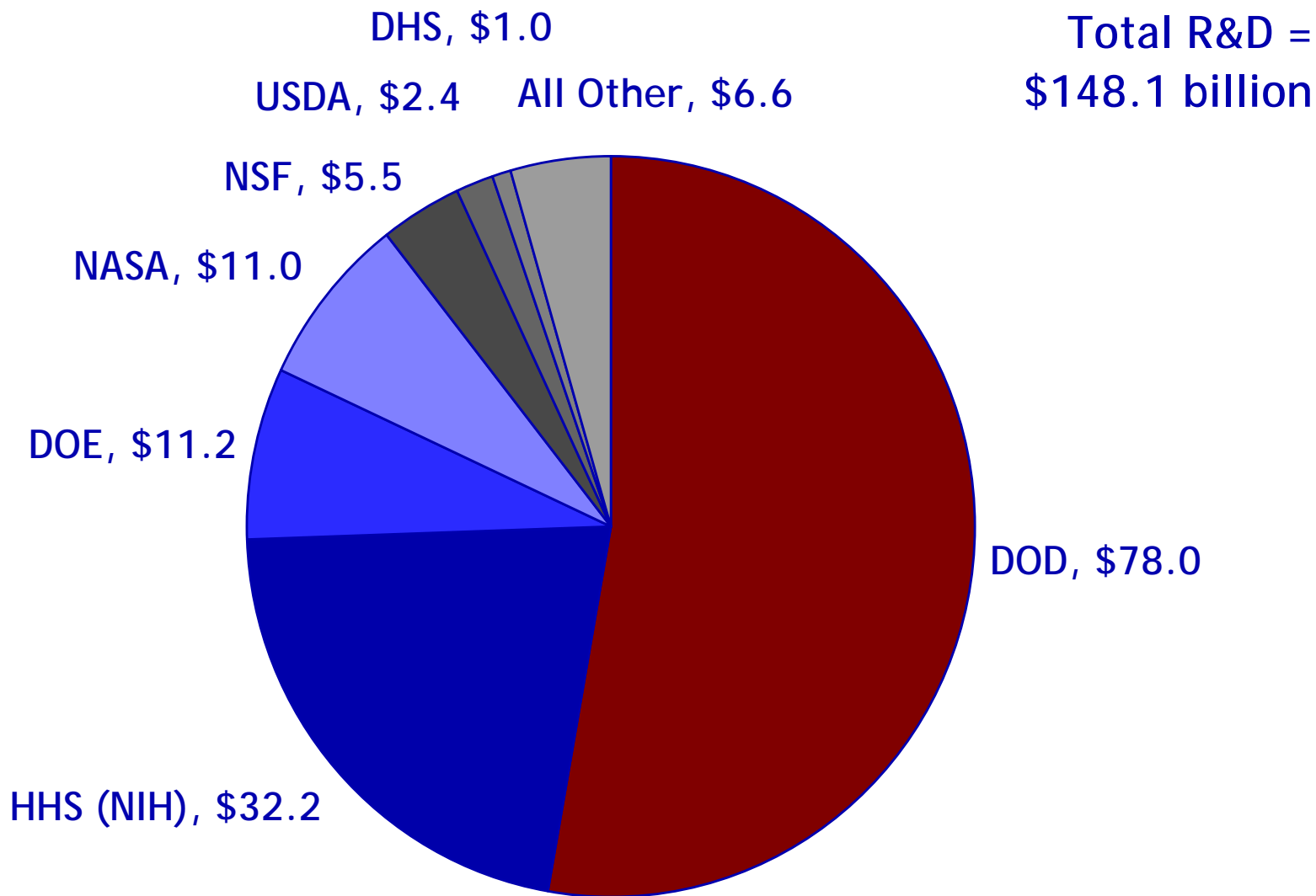
Source: AAAS analyses of R&D in annual AAAS R&D reports.
FY 2011 figures are latest AAAS estimates of FY 2011 request.
R&D includes conduct of R&D and R&D facilities.
1976-1994 figures are NSF data on obligations in the Federal Funds survey.

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Total R&D by Agency, FY 2011

budget authority in billions of dollars



Source: OMB R&D budget data, agency budget justifications, and other agency documents.

R&D includes conduct of R&D and R&D facilities.

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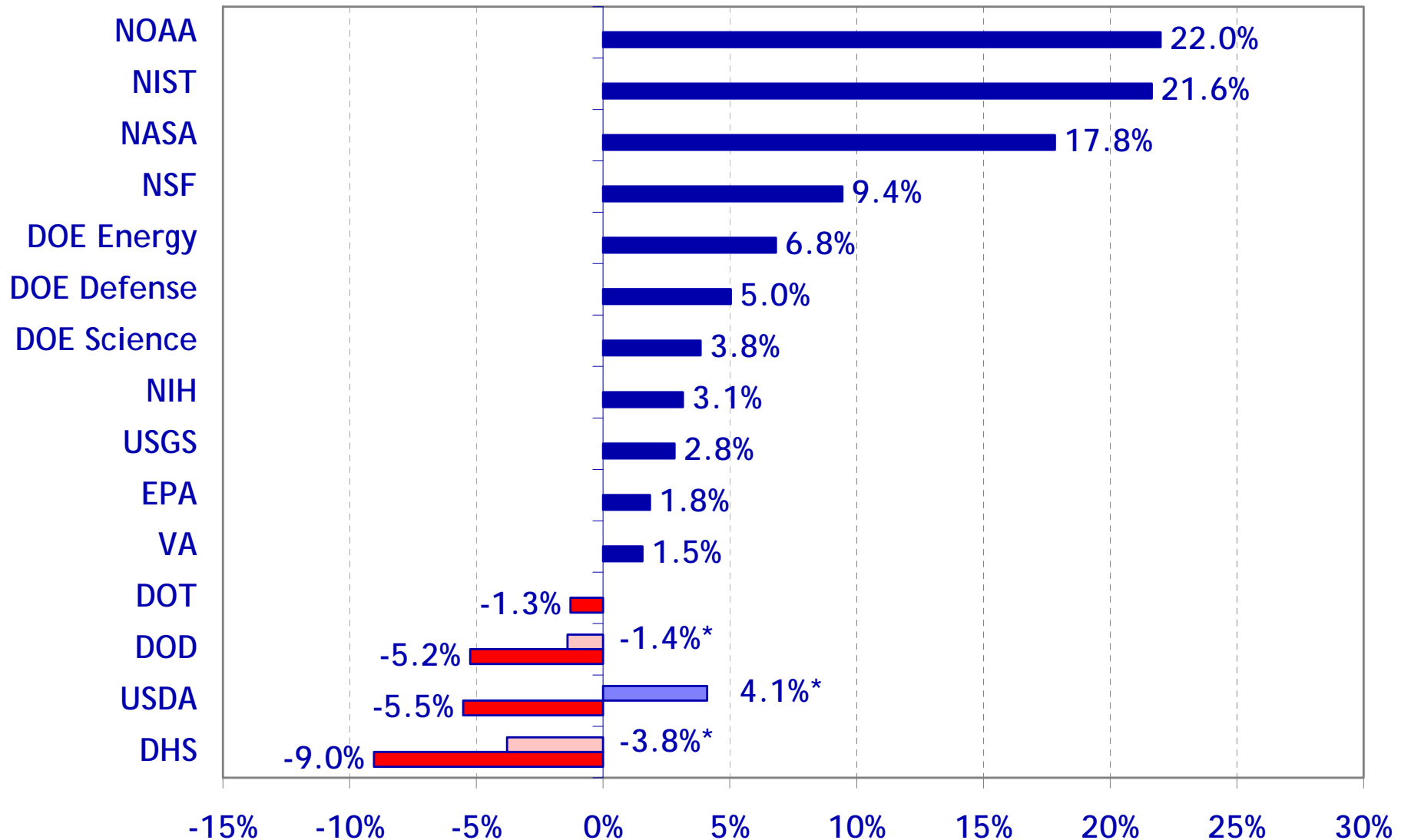


FY 2011 R&D Investment Priorities

- New Industries and Jobs
 - Advanced materials and manufacturing methods
 - \$6.1b over 5 years for commercial earth orbit
- Cleaner Energy
 - +\$155m (+6.8%) for DOE Energy R&D
- Healthier America
 - +\$956m (+3.1%) for National Institutes of Health R&D
- Enhanced Security
 - DOD Basic Research: +6.7% to \$2.0b

R&D in the FY 2011 Budget Request

percent change from FY 2010



Source: OMB R&D budget data, agency budget justifications, and other agency documents.

* - Lighter colored bars indicate percent change with projected FY 2011 earmarks.

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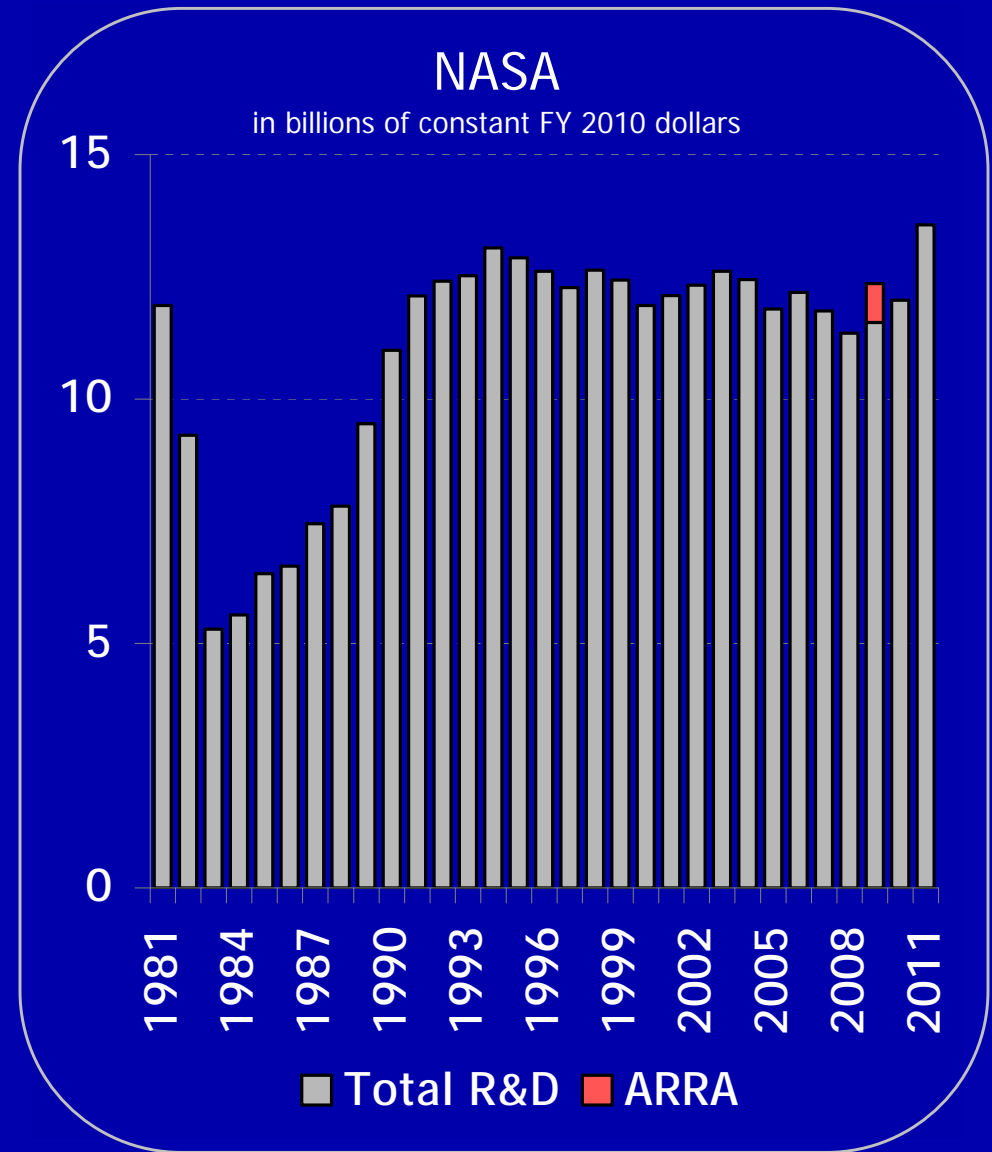


Earmarks

- Early February - Senate Republicans introduce amendment to make earmarks a point of order requiring 60 votes to overcome
- March 9/10 - House Democrat leaders announce ban on earmarks to for-profit entities
- March 10/11 - House Republicans vote in closed-door session to ban all earmarks
- March 17 - Senate amendment fails
- Early April - Three House Republicans break rank and request earmarks

NASA

- Retire space shuttle and cancel Constellation Program
- Frees \$6.5b over 2 yrs to...
- Near-earth orbit through private industry
 - +\$6.1b over 5 yrs
- Heavy Lift and Propulsion
 - +\$559m
- International Space Station
 - +\$905m to \$3.2b over 4 yrs



NASA Update

- Congressional Concerns
 - U.S. space leadership
 - Reliance on industry/Russia for near-earth orbit
 - Jobs
- Hutchison (R-TX) Bill - Extends Space Shuttle & Space Station
- Administration Response
 - Use Orion technology for Space Station rescue vehicle
 - Heavy lift and propulsion: \$3b over next few years
 - Final design by 2015
 - Job assistance: \$40m

Funding Shifts

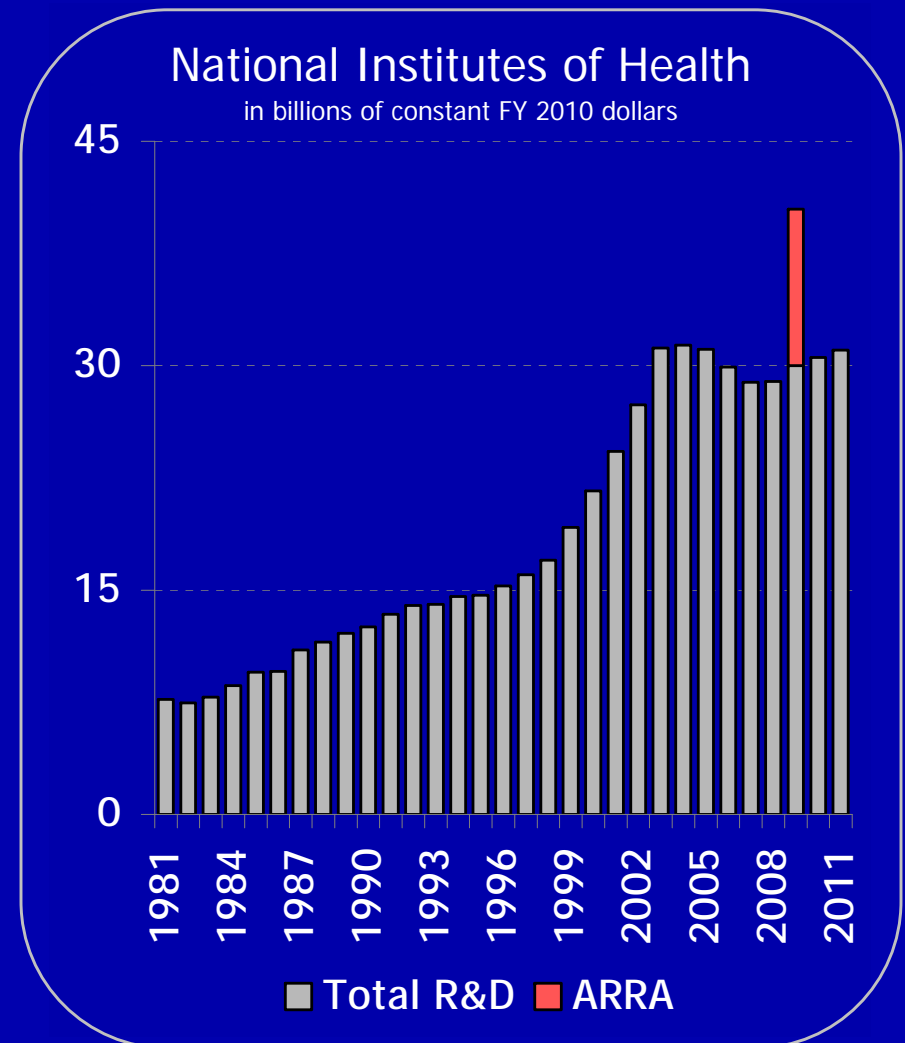
- Department of Defense
 - Basic Research: +6.7% to \$2.0b
 - Development: -5.0% to \$71.0b
 - DARPA: +3.7% to \$3.1b
- US Dept of Agriculture
 - Buildings and Facilities: -\$147m decrease in R&D after rescissions
 - Agriculture and Food Research Initiative (AFRI)
 - +\$166m (63.4%) to \$429m in total budget
- Dept of Energy
 - Decreases: Fossil (-\$53m), Nuclear (-\$122m)
 - Increases: Off of Sci (+\$172m), EERE (+\$35m), Electric Grid (+\$22m)
 - ARPA-E: \$300m (R&D, \$273m)

Funding Doubling for Basic Research

- DOE Office of Science
 - Total Budget: +4.4% to \$5.1b
 - R&D: +3.8% to \$4.6b
 - New Energy Innovation Hub - Batteries and Energy Storage
- National Institute of Standards and Technology
 - Total Budget: +7.3% to \$919m
 - R&D: +21.7% to \$706m
 - NIST Labs (STRS): +13.5% to \$585m
- National Science Foundation
 - Total Budget: +8.0% to \$7.4b
 - R&D: +9.4% to \$5.5b
 - National Innovation Strategy

National Institutes of Health

- Total Budget: +2.8% to \$32.2b
- R&D: +2.8% to \$31.4b
- Cancer and autism spectrum disorders
- AIDS research - Global Fund
- National Nanotechnology Initiative: +6.0% to \$382m
- Therapeutics for Rare and Neglected Diseases (TRND)
 - +\$26m to \$50m
- National Synchrotron Light Source-II (NSLS-II): \$33m



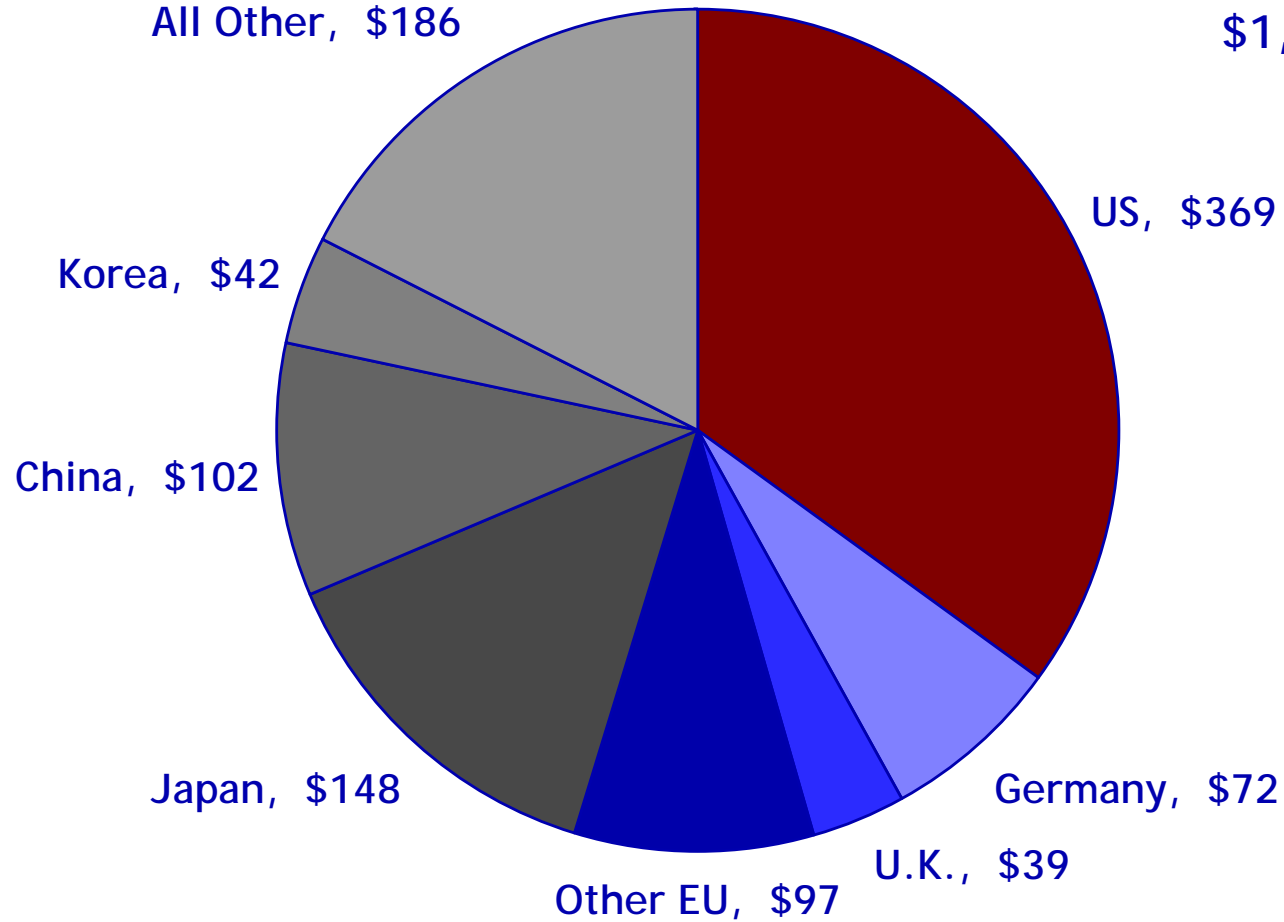
International R&D Investment

- The United States leads the world in R&D investment
 - \$369b PPP, 35.7% of world R&D investment
- But, others are quickly increasing their investment
 - Over 1997 - 2007,
 - South Korea, +0.99% of GDP to 3.47%
 - China, +0.85% of GDP to 1.49%
 - Taiwan, +0.81% of GDP to 2.63%
 - Japan, +0.57% of GDP to 3.44%
 - United States, +0.10% of GDP to 2.68%
- President Obama set goal of 3.0% of GDP investment in R&D

Total World R&D, 2007

in billions of PPP \$

Total World R&D =
\$1,054 billion



Source: OECD, Main Science and Technology Indicators, May 2009.

World = OECD members plus Argentina, China, Israel, Romania,
Russian Federation, Singapore, Slovenia, South Africa, Taiwan.

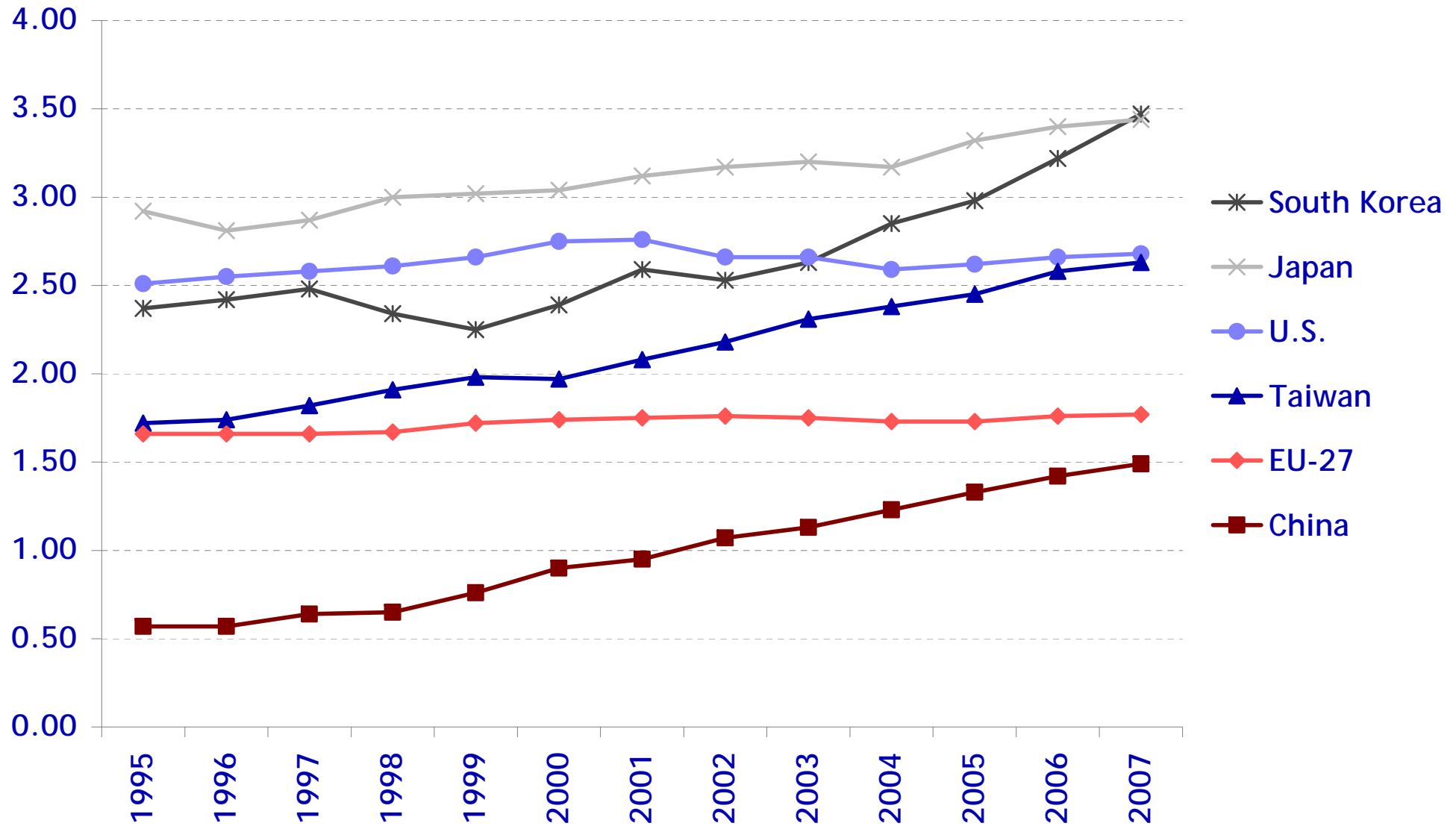
Calculated using purchasing power parities.

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National R&D Investment

percent of GDP



Source: OECD, Main Science and Technology Indicators, May 2009.

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The AAAS R&D web site is
<http://www.aaas.org/spp/rd/>

The AAAS Forum on
Science and Technology Policy
is May 13-14, 2010
in Washington, DC

AAAS REPORT XXXV Research & Development FY 2011

Intersociety Working Group

