Introduction to the Federal Budget

Patrick J Clemins
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for the AAAS Leadership Seminar

AAAS R&D Budget and Policy Program
http://www.aaas.org/spp/rd
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
  - One quarter (25.1%) of the total U.S. economy
- Total Receipts: $2.4t
  - Mostly from income and payroll taxes
- Deficit: $1.4t
  - $79b borrowed from Social Security and Postal Service
Federal Spending and Revenues
(percentage of GDP)

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 (+1.1%)
  - $441b nonsecurity budget (-1.0%)
Composition of the Proposed FY 2011 Budget

Total Outlays = $3.8 trillion

outlays in billions of dollars

Net Interest $251
[Defense R&D] $83
Nondefense Discretionary $599
[Nondefense R&D] $71
Social Security $730
Medicare $491
Medicaid $297
Other Mandatory $647

Defense Discretionary $661

Source: Budget of the United States Government FY 2011.
Projected unified deficit is $1.3 trillion.
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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 ($799b as of Jan 2010), Japan ($751b), and UK ($249b) 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

- Borrowing $1,267
- Income taxes $1,121
- Corporate taxes $297
- Other taxes (excise, gas, estate, etc.) $214
- Social insurance and retirement (payroll taxes) $935

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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INTRODUCTION TO THE FEDERAL BUDGET

The Federal Budget Cycle

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<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
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<th>May</th>
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- Discussions within agencies among upper management about possible priorities and initiatives
The Federal Budget Cycle

- Strategic 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

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 2012 R&D Challenges

- Promoting sustainable economic growth and job creation
- Defeating the most dangerous diseases and achieving better health outcomes for all while reducing health care costs
- Moving toward a clean energy future to reduce dependence on energy imports while curbing greenhouse gas emissions
- Understanding, adapting to, and mitigating the impacts of global climate change
- Managing the competing demands on land, fresh water, and the oceans for the production of food, fiber, biofuels, and ecosystem services based on sustainability and biodiversity
- Developing the technologies 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
Budget Authority, Obligations and Outlays

- **Budget Authority (BA)**
  - The legal authority to enter into financial contracts

- **Obligations**
  - Funds that have been committed to a vendor via financial contract

- **Outlays**
  - Funds that have been expended in accordance with the financial contract

- Lag from assignment of budget authority to outlays can be 5 years or more, depending on the contract.
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 were subject to reconciliation
- No traditional budget resolution for FY 2011
Authorizations vs. Appropriations

- **Authorization**
  - Authorization bills guide policy within the agencies including establishing and modifying programs.
  - Usually include authorization of appropriations provisions, establishing funding ceilings for programs.
  - Under the jurisdiction of the topical legislative committees such as Science and Technology and Armed Services.

- **Appropriations**
  - Under the jurisdiction of the Appropriations Committee
  - Appropriators do not have to follow authorized program funding levels
INTRODUCTION TO THE FEDERAL BUDGET

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
Appropriations Subcommittees

- The 12 subcommittees are generally separated by related topical area and agency, but there are a number of exceptions
  - Forest Service is part of USDA, but appropriated in Interior bill
- Subcommittees cannot negotiate between each other after 302(b)s are set
  - Therefore, NIH funding is not directly negotiated with other science agencies

- FY 2011
  - Biggest - Defense (> $500b)
  - Smallest - Legislative (< $5b)
Earmarks

- Funds for a specific project or tax/fee exemptions directed to specific performers
  - Hard Earmarks - Contained in legislative text
  - Soft Earmarks - Contained in Congressional committee report
    - Not binding, but customarily acted upon
    - Most earmarks are soft earmarks
- 9,192 for $11.1b in FY 2010

Due to budgetary constraints, the Committee is unable to recommend full funding to complete the construction of all ongoing projects. The following table summarizes the Committee’s recommendations for Agricultural Research Service, Buildings and Facilities:

<table>
<thead>
<tr>
<th>Agricultural Research Service Buildings and Facilities</th>
<th>Committee Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Research Center, Beltsville, MD</td>
<td>3,000</td>
</tr>
<tr>
<td>Agricultural Research Center, Logan, UT</td>
<td>5,000</td>
</tr>
<tr>
<td>Agricultural Research Center, Pullman, WA</td>
<td>2,000</td>
</tr>
<tr>
<td>Animal Biocomplex Facility, Boise, ID</td>
<td>2,000</td>
</tr>
<tr>
<td>Appalachian Fruit Laboratory, Kearneysville, WV</td>
<td>1,500</td>
</tr>
<tr>
<td>ARS Biotechnology Lab, Loman, MS</td>
<td>1,000</td>
</tr>
<tr>
<td>ARS Research and Development Center, Ashburn, VA</td>
<td>6,000</td>
</tr>
<tr>
<td>ARS Waste Management Research Facility, Bowling Green, KY</td>
<td>5,000</td>
</tr>
<tr>
<td>Dairy Forage Agricultural Research Center, Prairie du Sac, WI</td>
<td>1,000</td>
</tr>
<tr>
<td>National Cold Water Aquaculture Center, Ormsby, ME</td>
<td>1,500</td>
</tr>
<tr>
<td>Pacific Basin Agricultural Research Center, Hilo, HI</td>
<td>1,000</td>
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<tr>
<td>Sugarcane Research Laboratory, Hilo, HI</td>
<td>1,000</td>
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<tr>
<td>Systems Biology Research Facility, Lincoln, NE</td>
<td>4,000</td>
</tr>
</tbody>
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Total: 44,000
The Federal Budget Cycle

- 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
  - July 2010 - $59b for war operations, FEMA, and Haiti aid
The FY 2011 Federal Budget

- $3.8t total budget, $1.4t unified deficit
- $1.3t discretionary budget (+1.1%)
  - $441b nonsecurity budget (-1.0%)
- Rescuing the Economy
- A Foundation for Economic Growth and Job Creation
  - Small business initiatives
  - Investing in science and basic research
- Restoring Responsibility
  - Three year non-security discretionary funding freeze
Composition of the Proposed FY 2011 Budget
Total Outlays = $3.8 trillion

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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

FY 2010-2015 data are budget projections.
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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%)
- The federal R&D investment is also spread across 11 of the 12 appropriations subcommittees.
- Role of federal R&D
  - Supports federal missions
  - Drives U.S. innovation
Character of R&D

- The Innovation Lifecycle
  - Basic Research
    - Study toward knowledge or understanding of fundamental properties and phenomena without a specific need in mind.
  - Applied Research
    - Study toward knowledge or understanding necessary to satisfy a specific need.
  - Development
    - The application of knowledge or understanding toward the production of materials, devices, systems, or methods.
- Facilities and Equipment (R&D Plant)
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. © 2010 AAAS
Total R&D by Agency, FY 2011
budget authority in billions of dollars

- DOD, $78.0
- HHS (NIH), $32.2
- DOE, $11.2
- NASA, $11.0
- All Other, $6.6
- NSF, $5.5
- USDA, $2.4
- DHS, $1.0

Total R&D = $148.1 billion

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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Trends in R&D by Agency

in billions of constant FY 2010 dollars

FY 2010 and FY 2011 figures are latest estimates.
1976-1994 figures are NSF data on obligations in the Federal Funds survey.
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Trends in Research by Agency

in billions of constant FY 2010 dollars

FY 2010 and FY 2011 figures are latest estimates.
Research includes basic research and applied research.
1976-1994 figures are NSF data on obligations in the Federal Funds survey.
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NASA

- **Total R&D**
  - Request: $11.0b
  - House: $9.7b, +4.1%
  - Senate: $10.5b, +12.4%

- **NASA Reauthorization (S.3729)**
  - International Space Station through 2020
  - One additional shuttle mission
  - Commercial cargo and crew services for near-earth orbit
  - New space launch system and multi-purpose crew vehicle
  - New $500 million Space Research and Technology Program
USDA

- **Total R&D**
  - Request: $2.1b
  - House: $2.2b, +4.4%
  - Senate: $2.2b, +3.9%

- **ARS R&D (Intramural)**
  - Request: $1.1b
  - House: $1.2b, -3.3%
  - Senate: $1.3b, +0.0%

- **AFRI Total (Extramural)**
  - Request: $429m, +63.4%
  - House: $312m, +18.9%
  - Senate: $310m, +18.1%
National Science Foundation

- Total
  - Request: $7.42b
  - House: $7.42b, +8.0%
  - Senate: $7.35b, +7.0%
- R&D
  - Request: $5.54b
  - House: $5.50b, +8.6%
  - Senate: $5.49b, +8.3%
- National Innovation Strategy
- Workforce Development
- Broadening Participation
Department of Energy

- **Total R&D**
  - Request: $11.2b
  - House: $10.9b, +1.6%
  - Senate: $11.0b, +3.3%

- **Office of Science**
  - Request: $5.1b
  - House: $4.9b, -0.1%
  - Senate: $5.0b, 2.2%

- **ARPA-E**
  - Request: $300m
  - House: $220m
  - Senate: $200m
NIST

- Total R&D
  - Request: $705m
  - House: $673m, +16.1%
  - Senate: $734m, +26.6%

- NIST Labs R&D (STRS)
  - Request: $521m
  - House: $491m, +9.0%
  - Senate: $521m, +15.6%

- Competitive Manufacturing and Construction in a Clean-Energy Economy
  - +$34.6 million
National Institutes of Health

- Total
  - Request: $32.2b
  - House: $32.2b, +3.2%
  - Senate: $32.2b, +3.2%
- Cancer and autism spectrum disorders
- AIDS research - Global Fund
- National Nanotechnology Initiative: +6.0% to $382m
- Therapeutics for Rare and Neglected Diseases (TRND)
- National Synchrotron Light Source-II (NSLS-II): $33m
Trends in Nondefense R&D by Agency

in billions of constant FY 2010 dollars

FY 2010 and FY 2011 figures are latest estimates.
FY 2012 through FY 2015 are projections.
1976-1994 figures are NSF data on obligations in the Federal Funds survey.
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Department of Defense

- **Total R&D**
  - Request: $78.4b
  - House: $79.3b, -5.1%
  - Senate: $79.3b, -5.1%

- **S&T (6.1-6.3 + medical)**
  - Request: $12.4b
  - Senate: $14.0b, -5.5%

- From major weapons systems to counter insurgency in future years
R&D in the FY 2011 Budget Request
percent change from FY 2010

- NOAA: 22.0%
- NIST: 21.6%
- NASA: 17.8%
- NSF: 9.4%
- DOE Energy: 6.8%
- DOE Defense: 5.0%
- DOE Science: 3.8%
- NIH: 3.1%
- USGS: 2.8%
- EPA: 1.8%
- VA: 1.5%
- DOT: -1.3%
- DOD: -5.2%
- USDA: -5.5%
- DHS: -9.0%

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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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
FY 2011 R&D Budget Request by Function

percent change from FY 2010

- Transportation: 43.0%
- Commerce: 17.3%
- Space: 12.0%
- Environment: 7.4%
- Energy: 6.5%
- Health: 6.5%
- General Science: 6.3%
- International: 0.0%
- Defense: -4.8%
- Agriculture: -5.8%
- Justice: -31.8%

Source: OMB and agency budget data.
Environment includes natural resources R&D
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STEM Education

- $3.7b, +$32m from FY 2010
- K-12 Education
  - Dept of Ed: $450m, NASA: $63m, NSF: $41m
- RE-ENERGYSE (Undergraduate)
  - NSF: $19m, DOE: $55m
- Undergraduate Diversity
  - NSF: +14% to $103m
- Graduate Fellowships
  - NSF: +16% to $158m, NIH: +5% to $824m, EPA: +55% to $17m
  - DOD: +4% to $40m, DOE: +$10m to $15m
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
Trends in Federal R&D

percent of GDP

FY 2011 figures are latest AAAS estimates of the FY 2011 request.
R&D includes conduct of R&D and R&D facilities.
Data to 1984 are obligations from the NSF Federal Funds survey.
GDP figures are from Budget of the U.S. Government FY 2011.
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Total World R&D, 2007

in billions of PPP $

US, $369

China, $102

Japan, $148

Other EU, $97

U.K., $39

Germany, $72

Korea, $42

All Other, $186

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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Next Steps

- So far, the House has passed 2 appropriation bills and have subcommittee approval of 9 others. The Senate Appropriations Committee has reported on 11 bills, but none have passed the full Senate.

- Congress passed a CR which extends funding until December 3.

- A 12-bill omnibus might pass in lame-duck session with Senate support.

- FY 2012: OMB Memos: 5% reduction; list of low-impact programs totaling 5% of discretionary budget. Initial budget submissions were due to OMB by September 13. Republicans proposing FY 2008 levels and fiscal commission might recommend FY 2010 levels.
For More Information...

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

Twitter: @AAAS_RDBudget

The FY 2012 AAAS Forum on Science and Technology Policy is May 5-6, 2011 in Washington, DC
Workshop

- Conference the Commerce, Justice, Science and Related Agencies (CJS) appropriations bill
- Determine mechanism for compromise
- Fill in final conference numbers
- Appoint a spokesperson to hold a press conference and take questions