

## 6. FEDERAL INVESTMENT

Investment spending is spending that yields long-term benefits. Its purpose may be to improve the efficiency of internal Federal agency operations or to increase the Nation's overall stock of capital for economic growth. The spending can be direct Federal spending or grants to State and local governments. It can be for physical capital, which yields a stream of services over a period of years, or for research and development or education and training, which are intangible but also increase income in the future or provide other long-term benefits.

Most presentations in the Federal budget combine investment spending with spending for current use.

This chapter focuses solely on Federal and federally financed investment.

In this chapter, investment is discussed in the following sections:

- a description of the size and composition of Federal investment spending;
- a discussion of the performance of selected Federal investment programs; and
- a presentation of trends in the stock of federally financed physical capital, research and development, and education.

### PART I: DESCRIPTION OF FEDERAL INVESTMENT

For more than fifty years, the Federal budget has included a chapter on Federal investment—defined as those outlays that yield long-term benefits—separately from outlays for current use. In recent years the discussion of the composition of investment has displayed estimates of budget authority as well as outlays.

The classification of spending between investment and current outlays is a matter of judgment. The budget has historically employed a relatively broad classification, encompassing physical investment, research, development, education, and training. The budget further classifies investments into those that are grants to State and local governments, such as grants for highways or education, and all other investments, called “direct Federal programs” in this analysis. This “direct Federal” category consists primarily of spending for assets owned by the Federal Government, such as defense weapons systems and general purpose office buildings, but also includes grants to private organizations and individuals for investment, such as capital grants to Amtrak or higher education loans directly to individuals.

Presentations for particular purposes could adopt different definitions of investment:

- To suit the purposes of a traditional balance sheet, investment might include only those physical assets owned by the Federal Government, excluding capital financed through grants and intangible assets such as research and education.
- Focusing on the role of investment in improving national productivity and enhancing economic growth would exclude items such as national defense assets, the direct benefits of which enhance national security rather than economic growth.
- Concern with the efficiency of Federal operations would confine the coverage to investments that reduce costs or improve the effectiveness of inter-

nal Federal agency operations, such as computer systems.

- A “social investment” perspective might broaden the coverage of investment beyond what is included in this chapter to include programs such as childhood immunization, maternal health, certain nutrition programs, and substance abuse treatment, which are designed in part to prevent more costly health problems in future years.

The relatively broad definition of investment used in this section provides consistency over time—historical figures on investment outlays back to 1940 can be found in the separate *Historical Tables* volume. Table 6–2 at the end of this section allows disaggregation of the data to focus on those investment outlays that best suit a particular purpose.

In addition to this basic issue of definition, there are two technical problems in the classification of investment data involving the treatment of grants to State and local governments and the classification of spending that could be shown in more than one category.

First, for some grants to State and local governments it is the recipient jurisdiction, not the Federal Government, that ultimately determines whether the money is used to finance investment or current purposes. This analysis classifies all of the outlays in the category where the recipient jurisdictions are expected to spend most of the money. Hence, the community development block grants are classified as physical investment, although some may be spent for current purposes. General purpose fiscal assistance is classified as current spending, although some may be spent by recipient jurisdictions on physical investment.

Second, some spending could be classified in more than one category of investment. For example, outlays for construction of research facilities finance the acqui-

sition of physical assets, but they also contribute to research and development. To avoid double counting, the outlays are classified in the category that is most commonly recognized as investment. Consequently, outlays for the conduct of research and development do not include outlays for research facilities, because these outlays are included in the category for physical investment. Similarly, spending for physical investment and research and development related to education and training is included in the categories of physical assets and the conduct of research and development.

When direct loans and loan guarantees are used to fund investment, the subsidy value is included as investment. The subsidies are classified according to their program purpose, such as construction or education and training. For more information about the treatment of Federal credit programs, refer to Chapter 7, "Credit and Insurance," in this volume.

This section presents spending for gross investment, without adjusting for depreciation.

## Composition of Federal Investment Outlays

### Major Federal Investment

The composition of major Federal investment outlays is summarized in Table 6–1. They include major public physical investment, the conduct of research and development, and the conduct of education and training. Defense and nondefense investment outlays were \$392.3 billion in 2005. They are estimated to increase to \$425.0 billion in 2006 and are projected to decline to \$415.5 billion in 2007. Major Federal investment outlays will comprise an estimated 15 percent of total Federal outlays in 2007 and 3.0 percent of the Nation's gross domestic product. Greater detail on Federal investment is available in Table 6–2 at the end of this section. That table includes both budget authority and outlays.

*Physical investment.* Outlays for major public physical capital investment (hereafter referred to as physical investment outlays) are estimated to be \$199.3 billion in 2007. Physical investment outlays are for construction and rehabilitation, the purchase of major equipment, and the purchase or sale of land and structures. More than three-fifths of these outlays are for direct physical investment by the Federal Government, with the remainder being grants to State and local governments for physical investment.

Direct physical investment outlays by the Federal Government are primarily for national defense. Defense outlays for physical investment are estimated to be \$99.2 billion in 2007. Almost all of these outlays, or an estimated \$90.2 billion, are for the procurement of weapons and other defense equipment, and the remainder is primarily for construction on military bases, family housing for military personnel, and Department of Energy defense facilities.

Outlays for direct physical investment for nondefense purposes are estimated to be \$30.3 billion in 2007. These outlays include \$17.3 billion for construction and rehabilitation. This amount includes funds for water, power, and natural resources projects of the Corps of

Engineers, the Bureau of Reclamation within the Department of the Interior, and the Tennessee Valley Authority; construction and rehabilitation of veterans hospitals and Indian Health Service hospitals and clinics; facilities for space and science programs; Postal Service facilities; and construction for embassy security. Outlays for the acquisition of major equipment are estimated to be \$12.6 billion in 2007. The largest amounts are for the air traffic control system.

Grants to State and local governments for physical investment are estimated to be \$69.9 billion in 2007. More than two-thirds of these outlays, or \$50.7 billion, are to assist States and localities with transportation infrastructure, primarily highways. Other major grants for physical investment fund sewage treatment plants, community and regional development, and public housing.

*Conduct of research and development.* Outlays for the conduct of research and development are estimated to be \$130.7 billion in 2007. These outlays are devoted to increasing basic scientific knowledge and promoting research and development. They increase the Nation's security, improve the productivity of capital and labor for both public and private purposes, and enhance the quality of life. More than half of these outlays, an estimated \$76.8 billion, are for national defense. Physical investment for research and development facilities and equipment is included in the physical investment category.

Nondefense outlays for the conduct of research and development are estimated to be \$53.9 billion in 2007. These are largely for the National Aeronautics and Space Administration, the National Science Foundation, the National Institutes of Health, and research for nuclear and non-nuclear energy programs.

A more complete and detailed discussion of research and development funding appears in Chapter 5, "Research and Development," in this volume.

*Conduct of education and training.* Outlays for the conduct of education and training are estimated to be \$85.5 billion in 2007. These outlays add to the stock of human capital by developing a more skilled and productive labor force. Grants to State and local governments for this category are estimated to be \$52.6 billion in 2007, more than three-fifths of the total. They include education programs for the disadvantaged and individuals with disabilities, other education programs, training programs in the Department of Labor, and Head Start. Direct Federal education and training outlays are estimated to be \$32.9 billion in 2007. Programs in this category are primarily aid for higher education through student financial assistance, loan subsidies, the veterans GI bill, and health training programs. The decline from 2006 to 2007 results in part from upward reestimates of \$11.4 billion in 2006 in loan subsidies for loans made in earlier years.

This category does not include outlays for education and training of Federal civilian and military employees. Outlays for education and training that are for physical investment and for research and development are in

**Table 6-1. COMPOSITION OF FEDERAL INVESTMENT OUTLAYS**  
(In billions of dollars)

	2005 Actual	Estimate	
		2006	2007
Major public physical capital investment:			
Direct Federal:			
National defense .....	89.5	97.3	99.2
Nondefense .....	27.3	30.2	30.3
Subtotal, direct major public physical capital investment .....	116.8	127.5	129.5
Grants to State and local governments .....	60.8	65.9	69.9
Subtotal, major public physical capital investment .....	177.7	193.4	199.3
Conduct of research and development:			
National defense .....	70.6	75.6	76.8
Nondefense .....	49.2	51.8	53.9
Subtotal, conduct of research and development .....	119.8	127.4	130.7
Conduct of education and training:			
Grants to State and local governments .....	51.6	53.7	52.6
Direct Federal .....	43.2	50.5	32.9
Subtotal, conduct of education and training .....	94.7	104.2	85.5
<b>Total, major Federal investment outlays .....</b>	<b>392.3</b>	<b>425.0</b>	<b>415.5</b>
<b>MEMORANDUM</b>			
Major Federal investment outlays:			
National defense .....	160.1	172.9	176.0
Nondefense .....	232.1	252.1	239.5
Total, major Federal investment outlays .....	392.3	425.0	415.5
Miscellaneous physical investment:			
Commodity inventories .....	-0.7	-0.8	-0.2
Other physical investment (direct) .....	2.8	3.2	3.3
Total, miscellaneous physical investment .....	2.1	2.4	3.1
Total, Federal investment outlays, including miscellaneous physical investment .....	394.4	427.4	418.6

the categories for physical investment and the conduct of research and development.

### Miscellaneous Physical Investment

In addition to the categories of major Federal investment, several miscellaneous categories of investment outlays are shown at the bottom of Table 6-1. These items, all for physical investment, are generally unrelated to improving Government operations or enhancing economic activity.

Outlays for commodity inventories are primarily for the purchase or sale of agricultural products pursuant to farm price support programs. Sales are estimated to exceed purchases by \$0.2 billion in 2007.

Outlays for other miscellaneous physical investment are estimated to be \$3.3 billion in 2007. This category includes primarily conservation programs. These are entirely direct Federal outlays.

### Detailed Table on Investment Spending

The following table provides data on budget authority as well as outlays for major Federal investment divided according to grants to State and local governments and direct Federal spending. Miscellaneous investment is not included because it is generally unrelated to improving Government operations or enhancing economic activity.

Table 6-2. FEDERAL INVESTMENT BUDGET AUTHORITY AND OUTLAYS: GRANT AND DIRECT FEDERAL PROGRAMS

(in millions of dollars)

Description	Budget Authority			Outlays		
	2005 Actual	2006 Estimate	2007 Estimate	2005 Actual	2006 Estimate	2007 Estimate
<b>GRANTS TO STATE AND LOCAL GOVERNMENTS</b>						
Major public physical investments:						
Construction and rehabilitation:						
Transportation:						
Highways .....	38,184	37,806	41,370	31,433	33,868	38,027
Mass transportation .....	8,039	8,482	8,729	7,826	8,338	8,932
Air transportation .....	3,696	3,070	2,725	3,530	3,800	3,705
Subtotal, transportation .....	49,919	49,358	52,824	42,789	46,006	50,664
Other construction and rehabilitation:						
Pollution control and abatement .....	2,233	1,880	1,759	2,021	1,755	1,706
Community and regional development .....	6,115	16,779	3,624	6,399	8,251	8,157
Housing assistance .....	6,505	6,203	5,593	7,687	7,776	7,435
Other construction .....	496	491	291	458	621	416
Subtotal, other construction and rehabilitation .....	15,349	25,353	11,267	16,565	18,403	17,714
Subtotal, construction and rehabilitation .....	65,268	74,711	64,091	59,354	64,409	68,378
Other physical assets .....	1,567	1,422	1,369	1,494	1,502	1,504
Subtotal, major public physical capital .....	66,835	76,133	65,460	60,848	65,911	69,882
Conduct of research and development:						
Agriculture .....	273	277	245	274	268	270
Other .....	223	226	203	212	194	178
Subtotal, conduct of research and development .....	496	503	448	486	462	448
Conduct of education and training:						
Elementary, secondary, and vocational education .....	37,169	37,814	36,381	36,393	38,164	37,689
Higher education .....	506	701	35	522	809	505
Research and general education aids .....	800	763	691	753	832	694
Training and employment .....	3,509	3,125	3,770	3,378	3,077	3,180
Social services .....	10,145	10,115	9,574	9,861	10,134	9,845
Agriculture .....	451	456	436	441	452	437
Other .....	249	242	245	226	234	229
Subtotal, conduct of education and training .....	52,829	53,216	51,132	51,574	53,702	52,579
<b>Subtotal, grants for investment</b> .....	<b>120,160</b>	<b>129,852</b>	<b>117,040</b>	<b>112,908</b>	<b>120,075</b>	<b>122,909</b>
<b>DIRECT FEDERAL PROGRAMS</b>						
Major public physical investment:						
Construction and rehabilitation:						
National defense:						
Military construction and family housing .....	8,190	9,172	8,537	6,150	7,431	8,309
Atomic energy defense activities and other .....	527	634	676	663	585	690
Subtotal, national defense .....	8,717	9,806	9,213	6,813	8,016	8,999
Nondefense:						
International affairs .....	1,922	1,330	1,450	1,436	1,276	1,343
General science, space, and technology .....	1,946	2,066	2,089	1,799	2,161	2,897
Water resources projects .....	3,318	4,316	2,692	2,749	4,040	3,402
Other natural resources and environment .....	969	974	810	988	1,021	935
Energy .....	1,309	1,468	1,281	1,307	1,435	1,296
Postal Service .....	708	1,118	1,698	678	677	1,103
Transportation .....	122	130	112	93	194	160
Veterans hospitals and other health facilities .....	2,133	2,371	1,655	1,618	1,851	1,941
Federal Prison System .....	25	49	-116	260	117	123
GSA real property activities .....	1,627	1,676	1,556	1,407	1,689	1,882
Other construction .....	2,617	2,541	1,989	2,538	2,551	2,207
Subtotal, nondefense .....	16,696	18,039	15,216	14,873	17,012	17,289

Table 6-2. FEDERAL INVESTMENT BUDGET AUTHORITY AND OUTLAYS: GRANT AND DIRECT FEDERAL PROGRAMS—Continued

(in millions of dollars)

Description	Budget Authority			Outlays		
	2005 Actual	2006 Estimate	2007 Estimate	2005 Actual	2006 Estimate	2007 Estimate
Subtotal, construction and rehabilitation .....	25,413	27,845	24,429	21,686	25,028	26,288
Acquisition of major equipment:						
National defense:						
Department of Defense .....	96,695	86,185	84,328	82,298	88,802	89,769
Atomic energy defense activities .....	381	473	473	388	470	456
Subtotal, national defense .....	97,076	86,658	84,801	82,686	89,272	90,225
Nondefense:						
General science and basic research .....	597	583	768	604	591	709
Space flight, research, and supporting activities .....	1,179	360	426	956	272	405
Postal Service .....	881	1,124	762	552	740	851
Air transportation .....	3,183	3,181	2,862	2,644	2,728	2,591
Water transportation (Coast Guard) .....	990	1,147	1,124	816	991	1,144
Other transportation (railroads) .....	1,207	1,293	900	1,221	1,330	900
Hospital and medical care for veterans .....	1,091	886	1,009	776	1,022	130
Law enforcement activities .....	1,717	1,798	1,948	1,684	1,628	1,846
Department of the Treasury (fiscal operations) .....	259	237	216	296	228	227
Department of Commerce (NOAA) .....	896	923	962	908	773	952
GSA general services funds .....	826	906	906	791	784	792
Other .....	837	2,035	2,071	785	1,775	2,078
Subtotal, nondefense .....	13,663	14,473	13,954	12,033	12,862	12,625
Subtotal, acquisition of major equipment .....	110,739	101,131	98,755	94,719	102,134	102,850
Purchase or sale of land and structures:						
National defense .....	-25	-28	-28	-25	-28	-28
Natural resources and environment .....	152	134	80	232	164	123
General government .....	161	168	164	158	168	164
Other .....	76	53	85	53	31	63
Subtotal, purchase or sale of land and structures .....	364	327	301	418	335	322
Subtotal, major public physical investment .....	136,516	129,303	123,485	116,823	127,497	129,460
Conduct of research and development:						
National defense:						
Defense military .....	69,608	71,860	74,213	66,467	71,572	72,871
Atomic energy and other .....	3,942	3,780	3,787	4,179	4,052	3,967
Subtotal, national defense .....	73,550	75,640	78,000	70,646	75,624	76,838
Nondefense:						
International affairs .....	255	255	255	258	258	258
General science, space, and technology:						
NASA .....	6,883	8,309	9,378	6,880	7,143	8,807
National Science Foundation .....	3,759	3,797	4,066	3,638	3,823	3,833
Department of Energy .....	2,832	2,890	3,246	2,809	2,900	3,246
Subtotal, general science, space, and technology .....	13,729	15,251	16,945	13,585	14,124	16,144
Energy .....	1,162	1,301	1,438	1,272	1,478	1,337
Transportation:						
Department of Transportation .....	507	657	509	444	706	628
NASA .....	954	929	721	834	812	802
Other .....	17	17	13	10	12	16
Subtotal, transportation .....	2,640	2,904	2,681	2,560	3,008	2,783
Health:						
National Institutes of Health .....	27,445	27,683	27,712	26,039	26,634	27,499
All other health .....	691	710	691	707	705	686
Subtotal, health .....	28,136	28,393	28,403	26,746	27,339	28,185

Table 6-2. FEDERAL INVESTMENT BUDGET AUTHORITY AND OUTLAYS: GRANT AND DIRECT FEDERAL PROGRAMS—Continued

(in millions of dollars)

Description	Budget Authority			Outlays		
	2005 Actual	2006 Estimate	2007 Estimate	2005 Actual	2006 Estimate	2007 Estimate
Agriculture .....	1,533	1,577	1,353	1,484	1,494	1,311
Natural resources and environment .....	2,104	2,089	1,972	1,854	2,069	1,898
National Institute of Standards and Technology .....	394	354	361	418	368	421
Hospital and medical care for veterans .....	742	765	765	714	738	744
All other research and development .....	1,625	1,950	1,903	1,353	2,177	1,932
Subtotal, nondefense .....	50,903	53,283	54,383	48,714	51,317	53,418
Subtotal, conduct of research and development .....	124,453	128,923	132,383	119,360	126,941	130,256
Conduct of education and training:						
Elementary, secondary, and vocational education .....	1,605	1,314	1,153	1,706	1,851	1,389
Higher education .....	31,756	45,512	22,359	31,482	39,332	21,477
Research and general education aids .....	1,880	1,900	1,962	1,954	1,988	1,942
Training and employment .....	1,626	328	1,366	1,652	458	1,346
Health .....	1,555	1,365	1,030	1,465	1,401	1,253
Veterans education, training, and rehabilitation .....	2,833	3,339	3,292	2,970	3,292	3,443
General science and basic research .....	904	898	920	919	936	924
National defense .....	8			9		
International affairs .....	406	455	503	423	421	475
Other .....	616	644	569	584	830	649
Subtotal, conduct of education and training .....	43,189	55,755	33,154	43,164	50,509	32,898
Subtotal, direct Federal investment .....	304,158	313,981	289,022	279,347	304,947	292,614
Total, Federal investment .....	424,318	443,833	406,062	392,255	425,022	415,523

## PART II: PERFORMANCE OF FEDERAL INVESTMENT

*Introduction.* In recent years there has been increased emphasis on improving the performance of Government programs. This emphasis began with the Government Performance and Results Act of 1993, which requires agencies to prepare strategic plans and annual performance plans, and then report on their actual performance annually.

This Administration set out to ensure that agencies worked to improve their performance, not just report on it. Beginning in the 2004 Budget, the Administration began to assess every Federal program by a method known as the Program Assessment Rating Tool, or PART. The Administration set a target of assessing all Federal programs over five years. With this budget, the fourth year of using the PART, the Administration has assessed almost 800 programs, about four-fifths of the Federal budget.

The PART assesses each program in four components (purpose, planning, management, and results/accountability) and gives a score for each of the components. The scores for each component are then weighted—results/accountability carries the greatest weight—and the program is given an overall score. A program is rated Effective if it receives an overall score of 85 percent or more, Moderately Effective if the score is 70 to 84 percent, Adequate if the score is 50 to 69 percent, and Inadequate if the score is 49 percent or lower.

The program may receive a rating “Results Not Demonstrated” if it does not have a good long-term and annual performance measure or does not have data to report on its measures. Chapter 2 of this volume discusses the PART concepts in more detail.

This section summarizes the results of the PART for direct investment programs, defined to include capital assets, research and development, and education and training. Because an entire program is assessed, not just the investment portion of the program, the assessments for some programs may cover more than just the investment spending. PART assessments of programs that are grants to State and local governments are not summarized in this chapter but are summarized in Chapter 8, “Aid to State and Local Governments,” in this volume.

This section summarizes 209 programs:

- Programs for capital assets are essentially those identified in the PART system as “capital assets and service acquisition” (79 programs);
- Programs for research and development are essentially those identified in the PART system as “research and development” (102 programs); and
- Programs for education and training (28 programs) are primarily programs in the Department of Education that are not grants to State and local governments (e.g., Federal Pell Grants). This cat-

egory also includes programs in other agencies, such as the Montgomery GI Bill in the Department of Veterans Affairs, the Health Professions program in the Department of Health and Human Services, and the Job Corps program in the Department of Labor.

Information on these and other programs assessed by PART is at *www.ExpectMore.gov*.

*Summary of ratings.* Table 6-3 shows that the average rating for the 209 investment programs that have

been rated by PART was “Adequate”. These programs had total spending of \$227.5 billion in 2005. Of these programs:

- 47 were rated effective (\$45.0 billion);
- 67 were rated moderately effective (\$69.0 billion);
- 46 were rated adequate (\$72.4 billion);
- 9 were rated ineffective (\$6.7 billion); and
- 40 were rated “results not demonstrated” (\$34.3 billion).

**Table 6-3. SUMMARY OF PART RATINGS AND SCORES FOR DIRECT FEDERAL INVESTMENT PROGRAMS**

(excludes grants to State and local governments for investment)

Criteria	Type of Investment			
	Physical capital	Research and development	Education and training	All investment programs
	Type of Investment			
Purpose .....	83%	92%	79%	87%
Planning .....	79%	83%	73%	80%
Management .....	82%	87%	67%	83%
Results/Accountability .....	55%	60%	34%	55%
Average Rating <sup>1</sup> .....	Adequate	Moderately effective	Adequate	Adequate
	Number of Programs			
	Ratings <sup>1</sup>			
Effective .....	16	29	2	47
Moderately Effective .....	24	41	2	67
Adequate .....	18	17	11	46
Ineffective .....	2	3	4	9
Results Not Demonstrated .....	19	12	9	40
Total number of investment programs rated .....	79	102	28	209
	In millions of dollars (2005)			
Effective .....	\$4,658	\$39,839	\$479	44,976
Moderately Effective .....	50,825	16,516	1,707	69,048
Adequate .....	45,064	1,737	25,602	72,403
Ineffective .....	5,323	166	1,249	6,738
Results Not Demonstrated .....	27,237	2,149	4,930	34,316
All investment programs that were rated in PART .....	\$133,107	\$60,407	\$33,967	\$227,481

<sup>1</sup> Ratings are determined by weighting the section scores as follows: Purpose (20 percent), Planning (10 percent), Management (20 percent), Results/Accountability (50 percent). The resulting weighted average is translated into a rating: Effective indicates a score of 85 percent or more; Moderately Effective, 70–84 percent; Adequate, 50–69 percent; and Ineffective, 49 percent or less. Regardless of the weighted average, a rating of Results Not Demonstrated may be given if the program does not have performance goals or has not collected data on its performance goals.

*Assessments of individual programs.* The ratings of the ten physical capital and education and training investment programs with the largest funding are summarized here. Information on research and development is in Chapter 5, “Research and Development” in this volume.

### Capital Assets

*Department of Defense.* Navy Shipbuilding (\$13.4 billion in 2005). Rating: *Adequate*.

This program buys new ships and overhauls existing ships. New ships are built at six privately-owned shipyards. Overhauls of existing ships are performed at both privately-owned and publicly-owned shipyards. The Navy currently has 280 ships in the fleet. The Navy conducts periodic reviews of programs at major

milestones of development and uses a structured reporting regime to help monitor the status of ship cost, schedule, and performance.

The Navy has experienced cost increases and schedule slips on some ship construction programs, although overall performance is adequate. For example, the first Virginia Class submarine was only 89 percent complete in 2003 when the target was 92 percent. In addition, the cost of the first Virginia class submarine increased by 24 percent in 2002.

*Department of Defense (DoD).* Air Combat Program (\$13.4 billion in 2005). Rating: *Moderately Effective*. The purpose of this program is to enable DoD to successfully wage war in the air by developing and producing a variety of tactical fighter and strike aircraft. DoD's individual programs within the overall air combat program are delivering aircraft at targeted rates, but in several cases, such as the F/A-22, at greater cost than projected.

DoD is moving towards an assessment of the overall capabilities provided by its programs, rather than its traditional assessment of individual acquisition programs. However, until the air combat program is managed as a single program (consisting of several systems) with clear long-term goals, it will be difficult to perform such a "capabilities based" assessment.

*Department of Defense.* Marine Corps/Expeditionary Warfare. (\$11.9 billion in 2005). Rating: *Results Not Demonstrated*. Expeditionary warfare is the temporary use of Marine Corps force in foreign countries. The expeditionary warfare program consists of specific investment programs for aviation assets, amphibious ships, weapons systems, equipment, vehicles, ammunition, and research and development.

The Department of Defense has not set long-term performance measures to guide program management and budgeting for expeditionary warfare. It does not have program measures that assess the most important aspects of expeditionary warfare and its strategic goals.

*Department of Defense.* Missile Defense (\$8.8 billion in 2005). Rating: *Adequate*. The mission of the Missile Defense Agency (MDA) is to defend the United States, deployed forces, and allies from ballistic missile attack. MDA is researching, developing and fielding a global, integrated and multi-layered Ballistic Missile Defense System (BMDS), comprising multiple sensors, interceptors and battle management capabilities.

MDA's strategic planning, resource allocation and management oversight activities are properly aligned to accomplish stated mission objectives. MDA budget requests and human resource management activities are explicitly tied to appropriate performance goals. MDA leaders regularly review and evaluate a wide array of performance data to inform and guide their decisionmaking.

*Tennessee Valley Authority.* Tennessee Valley Authority Power (\$7.8 billion in 2005). Rating: *Moderately Effective*. TVA is the Nation's largest public power company. Through 158 locally owned distributors, TVA provides power to nearly 8.5 million residents of the Ten-

nessee Valley. Some of TVA's former performance measures such as cents/KWH are no longer tracked. It is unclear how some of the new efficiency measures tracked by TVA relate to program performance. In its strategic plan, the Tennessee Valley Authority committed to a debt reduction plan that will reduce its total debt by \$3-\$5 billion over a ten-year to twelve-year period. TVA has since increased that debt reduction total to \$7.8 billion by 2016.

*Department of Defense.* Future Combat Systems/Modularity Land Warfare (\$7.4 billion in 2005). Rating: *Moderately Effective*. The Army's complementary transformation initiatives, Modularity and the Future Combat Systems, are designed to provide regional combatant commanders and soldiers with a lighter, faster, more survivable and rapidly deployable force with which to fight and win the United States' current and future land conflicts.

Although the Future Combat Systems program is currently on schedule and on cost, the program's long schedule, significant cost, and technological complexity put Future Combat Systems at substantial risk of cost and schedule overruns as the program moves from research and development to acquisition.

*Department of Energy.* Environmental Management (\$7.3 billion in 2005). Rating: *Adequate*. This program protects human health and the environment by cleaning up millions of gallons of radioactive waste, thousands of tons of spent nuclear fuel and special nuclear material, along with huge quantities of contaminated soil and water.

Managers are implementing reforms that are improving program performance, which will significantly reduce environmental, safety, and health risks. For example, at the Hanford (State of Washington) site, the program continues to expedite retrieval of radioactive waste from leak-prone, single-shell tanks and transfer the waste to double-shell tanks for safer storage until treated and disposed. The program recently completed the physical cleanup of the Rocky Flats (Colorado) site more than a year ahead of schedule and below estimated costs. Most of the site will transfer to the Department of the Interior to manage as a national wildlife refuge after the Environmental Protection Agency, with concurrence by the Colorado Department of Public Health and Environment, certifies that the cleanup meets human health standards.

*General Services Administration.* National Information Technology Solutions (\$6.3 billion in 2005). Rating: *Results Not Demonstrated*. This program provides expert technical, acquisition, and information technology products and services to Federal clients. GSA is reviewing the organization of both the National and Regional IT Solutions programs for possible consolidation.

The assessment found that the program is useful to Federal agencies that do not have in-house expertise to acquire information technology (IT) products or services. However, the program must better demonstrate the value it provides to customer agencies. The program must develop long-term outcome goals and efficiency

measures which are comparable to other Federal agencies or the private sector. While the program does have annual goals, it must develop annual goals which measure the savings and quality improvement that agencies achieve through use of this program.

### Education

*Department of Education.* Federal Pell Grants (\$12.4 billion in 2005). Rating: *Adequate*. This program helps ensure access to postsecondary education for undergraduate students by providing need-based grants that, in combination with other sources of student aid, help meet education costs. The program also promotes lifelong learning by encouraging low-income adults to return to school.

The program has meaningful performance measures and outcome data on these measures such as the degree to which Pell Grants are targeted to low-income students. New measures such as enrollment and graduation rates among low-income and minority students

have also been added. The program has met its current long-term performance goals and new measures will help track other key program goals.

*Department of Education.* Federal Family Education Loan Program (\$11.1 billion (subsidy cost) in 2005). Rating: *Adequate*. This program provides default insurance and interest subsidies to encourage private lenders to make postsecondary education loans to undergraduate and graduate students. The program also provides interest subsidies for eligible low-income students to cover interest accrued while in school.

Overall, the assessment concluded that both this program and the William D. Ford Direct Student Loan program fulfill their purpose of ensuring that low and middle income students can afford the costs of postsecondary education. The two programs combined provide over \$70 billion a year in new loans to students. While the PART found that these programs had meaningful performance measures and outcome data, it also found that both programs could be more cost efficient.

## PART III: FEDERALLY FINANCED CAPITAL STOCKS

Federal investment spending creates a “stock” of capital that is available in the future for productive use. Each year, Federal investment outlays add to this stock of capital. At the same time, however, wear and tear and obsolescence reduce it. This section presents very rough measures over time of three different kinds of capital stocks financed by the Federal Government: public physical capital, research and development (R&D), and education.

Federal spending for physical assets adds to the Nation’s capital stock of tangible assets, such as roads, buildings, and aircraft carriers. These assets deliver a flow of services over their lifetime. The capital depreciates as the asset ages, wears out, is accidentally damaged, or becomes obsolete.

Federal spending for the conduct of research and development adds to an “intangible” asset, the Nation’s stock of knowledge. Spending for education adds to the stock of human capital by providing skills that help make people more productive. Although financed by the Federal Government, the research and development or education can be carried out by Federal or State government laboratories, universities and other nonprofit organizations, local governments, or private industry. Research and development covers a wide range of activities, from the investigation of subatomic particles to the exploration of outer space; it can be “basic” research without particular applications in mind, or it can have a highly specific practical use. Similarly, education includes a wide variety of programs, assisting people of all ages beginning with pre-school education and extending through graduate studies and adult education. Like physical assets, the capital stocks of R&D and education provide services over a number of years and depreciate as they become outdated.

For this analysis, physical and R&D capital stocks are estimated using the perpetual inventory method.

Each year’s Federal outlays are treated as gross investment, adding to the capital stock; depreciation reduces the capital stock. Gross investment less depreciation is net investment. The estimates of the capital stock are equal to the sum of net investment in the current and prior years. A limitation of the perpetual inventory method is that the original investment spending may not accurately measure the current value of the asset created, even after adjusting for inflation, because the value of existing capital changes over time due to changing market conditions. However, alternative methods for measuring asset value, such as direct surveys of current market worth or indirect estimation based on an expected rate of return, are especially difficult to apply to assets that do not have a private market, such as highways or weapons systems.

In contrast to physical and R&D stocks, the estimate of the education stock is based on the replacement cost method. Data on the total years of education of the U.S. population are combined with data on the current cost of education and the Federal share of education spending to yield the cost of replacing the Federal share of the Nation’s stock of education.

It should be stressed that these estimates are rough approximations, and provide a basis only for making broad generalizations. Errors may arise from uncertainty about the useful lives and depreciation rates of different types of assets, incomplete data for historical outlays, and imprecision in the deflators used to express costs in constant dollars. The methods used to estimate capital stocks are discussed further in the technical note at the end of Chapter 13, “Stewardship,” in this volume. Additional detail about these methods appeared in a methodological note in Chapter 7, “Federal Investment Spending and Capital Budgeting,” in the *Analytical Perspectives* volume of the 2004 Budget.

### The Stock of Physical Capital

This section presents data on stocks of physical capital assets and estimates of the depreciation of these assets.

*Trends.* Table 6-4 shows the value of the net federally financed physical capital stock since 1960, in constant fiscal year 2000 dollars. The total stock grew at

a 2.2 percent average annual rate from 1960 to 2005, with periods of faster growth during the late 1960s and the 1980s. The stock amounted to \$2,257 billion in 2005 and is estimated to increase to \$2,381 billion by 2007. In 2005, the national defense capital stock accounted for \$680 billion, or 30 percent of the total, and nondefense stocks for \$1,577 billion, or 70 percent of the total.

**Table 6-4. NET STOCK OF FEDERALLY FINANCED PHYSICAL CAPITAL**

(In billions of 2000 dollars)

Fiscal Year	Total	National Defense	Nondefense								
			Total Non-defense	Direct Federal Capital			Capital Financed by Federal Grants				
				Total	Water and Power	Other	Total	Transportation	Community and Regional	Natural Resources	Other
Five year intervals:											
1960 .....	849	608	242	95	59	36	146	89	27	21	10
1965 .....	937	589	348	123	74	49	225	158	32	22	13
1970 .....	1,101	630	470	146	88	58	324	230	47	26	21
1975 .....	1,137	545	592	166	102	64	426	282	76	42	25
1980 .....	1,258	494	763	195	123	72	568	342	121	79	27
1985 .....	1,462	572	890	222	136	86	668	397	146	100	26
1990 .....	1,740	722	1,018	256	147	109	762	462	158	113	28
1995 .....	1,882	714	1,168	297	157	141	871	534	168	123	46
Annual data:											
2000 .....	1,979	635	1,345	337	160	178	1,007	618	183	131	75
2001 .....	2,023	631	1,391	351	163	188	1,040	640	186	132	81
2002 .....	2,078	636	1,442	366	165	201	1,076	666	189	134	87
2003 .....	2,138	646	1,492	380	166	213	1,112	690	193	135	94
2004 .....	2,199	662	1,536	391	168	223	1,146	714	196	136	100
2005 .....	2,257	680	1,577	400	168	231	1,178	737	198	138	105
2006 estimate .....	2,321	700	1,621	410	170	240	1,211	761	202	138	110
2007 estimate .....	2,381	717	1,664	420	171	249	1,244	786	205	139	114

Real stocks of defense and nondefense capital show very different trends. Nondefense stocks have grown consistently since 1970, increasing from \$470 billion in 1970 to \$1,577 billion in 2005. With the investments proposed in the budget, nondefense stocks are estimated to grow to \$1,664 billion in 2007. During the 1970s, the nondefense capital stock grew at an average annual rate of 5.0 percent. In the 1980s, however, the growth rate slowed to 2.9 percent annually, with growth continuing at about that rate since then.

Real national defense stocks began in 1970 at a relatively high level, and declined steadily throughout the decade as depreciation from investment in the Vietnam era exceeded new investment in military construction and weapons procurement. Starting in the early 1980s, a large defense buildup began to increase the stock of defense capital. By 1987, the defense stock exceeded its earlier Vietnam-era peak. In the early 1990s, however, depreciation on the increased stocks and a slower pace of defense physical capital investment began to reduce the stock from its previous levels. The increased defense investment in the last few years has reversed

this decline, increasing the stock from a low of \$631 billion in 2001 to \$717 billion in 2007.

Another trend in the Federal physical capital stocks is the shift from direct Federal assets to grant-financed assets. In 1960, 39 percent of federally financed nondefense capital was owned by the Federal Government, and 61 percent was owned by State and local governments but financed by Federal grants. Expansion in Federal grants for highways and other State and local capital, coupled with slower growth in direct Federal investment for water resources, for example, shifted the composition of the stock substantially. In 2005, 25 percent of the nondefense stock was owned by the Federal Government and 75 percent by State and local governments.

The growth in the stock of physical capital financed by grants has come in several areas. The growth in the stock for transportation is largely grants for highways, including the Interstate Highway System. The growth in community and regional development stocks occurred largely following the enactment of the community development block grant in the early 1970s. The value of this capital stock has grown only slowly in

the past few years. The growth in the natural resources area occurred primarily because of construction grants for sewage treatment facilities. The value of this federally financed stock has increased about 40 percent since the mid-1980s.

### The Stock of Research and Development Capital

This section presents data on the stock of research and development capital, taking into account adjustments for its depreciation.

*Trends.* As shown in Table 6-5, the R&D capital stock financed by Federal outlays is estimated to be \$1,106 billion in 2005 in constant 2000 dollars. Roughly half is the stock of basic research knowledge; the remainder is the stock of applied research and development.

The nondefense stock accounted for about three-fifths of the total federally financed R&D stock in 2005. Although investment in defense R&D has exceeded that of nondefense R&D in nearly every year since 1981, the nondefense R&D stock is actually the larger of the two, because of the different emphasis on basic research and applied research and development. Defense R&D spending is heavily concentrated in applied research and development, which depreciates much more quickly

than basic research. The stock of applied research and development is assumed to depreciate at a ten percent geometric rate, while basic research is assumed not to depreciate at all.

The defense R&D stock rose slowly during the 1970s, as gross outlays for R&D trended down in constant dollars and the stock created in the 1960s depreciated. Increased defense R&D spending from 1980 through 1990 led to a more rapid growth of the R&D stock. Subsequently, real defense R&D outlays tapered off, depreciation grew, and, as a result, the real net defense R&D stock stabilized at around \$420 billion. Renewed spending for defense R&D in recent years has begun to increase the stock, and it is projected to increase to \$462 billion in 2007.

The growth of the nondefense R&D stock slowed from the 1970s to the 1980s, from an annual rate of 3.8 percent in the 1970s to a rate of 2.1 percent in the 1980s. Gross investment in real terms fell during much of the 1980s, and about three-fourths of new outlays went to replacing depreciated R&D. Since 1988, however, nondefense R&D outlays have been on an upward trend while depreciation has edged down. As a result, the net nondefense R&D capital stock has grown more rapidly.

**Table 6-5. NET STOCK OF FEDERALLY FINANCED RESEARCH AND DEVELOPMENT <sup>1</sup>**

(In billions of 2000 dollars)

Fiscal Year	National Defense			Nondefense			Total Federal		
	Total	Basic Research	Applied Research and Development	Total	Basic Research	Applied Research and Development	Total	Basic Research	Applied Research and Development
Five year intervals:									
1970 .....	261	16	245	215	67	148	475	82	393
1975 .....	276	21	256	262	97	165	538	118	421
1980 .....	279	25	255	311	131	179	590	156	434
1985 .....	321	30	291	339	174	165	659	204	455
1990 .....	403	36	367	382	229	154	785	265	520
1995 .....	423	43	380	461	294	167	884	336	547
Annual data:									
2000 .....	423	48	375	543	368	175	966	416	549
2001 .....	421	50	371	563	386	177	984	436	548
2002 .....	420	52	368	587	406	181	1,007	458	549
2003 .....	423	53	370	613	428	186	1,036	481	555
2004 .....	430	54	375	640	450	190	1,070	505	565
2005 .....	439	56	383	666	473	194	1,106	529	577
2006 estimate .....	451	57	394	692	495	197	1,143	553	591
2007 estimate .....	462	59	403	718	518	201	1,180	577	603

<sup>1</sup> Excludes stock of physical capital for research and development, which is included in Table 6-4.

### The Stock of Education Capital

This section presents estimates of the stock of education capital financed by the Federal Government.

As shown in Table 6-6, the federally financed education stock is estimated at \$1,394 billion in 2005 in constant 2000 dollars. The vast majority of the Nation's education stock is financed by State and local govern-

ments, and by students and their families themselves. This federally financed portion of the stock represents about 3 percent of the Nation's total education stock.<sup>1</sup> Nearly three-quarters is for elementary and secondary education, while the remainder is for higher education.

<sup>1</sup>For estimates of the total education stock, see table 13-4 in Chapter 13, "Stewardship."

The federally financed education stock has grown steadily in the last few decades, with an average annual growth rate of 5.2 percent from 1970 to 2005.

The expansion of the education stock is projected to continue under this budget, with the stock rising to \$1,519 billion in 2007.

**Table 6-6. NET STOCK OF FEDERALLY FINANCED EDUCATION CAPITAL**

(In billions of 2000 dollars)

Fiscal Year	Total Education Stock	Elementary and Secondary Education	Higher Education
Five year intervals:			
1960 .....	71	51	20
1965 .....	102	74	28
1970 .....	233	184	50
1975 .....	347	282	65
1980 .....	479	379	101
1985 .....	575	434	141
1990 .....	730	544	186
1995 .....	874	639	235
Annual data:			
2000 .....	1,136	825	311
2001 .....	1,186	859	327
2002 .....	1,228	891	338
2003 .....	1,277	932	346
2004 .....	1,341	968	373
2005 .....	1,394	1,001	393
2006 estimate .....	1,462	1,045	417
2007 estimate .....	1,519	1,086	433