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 internal 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 $430.4 billion in 2006. They are estimated to increase to $434.9 billion in 2007 and are projected to decline to $430.1 billion in 2008. Major Federal investment outlays will comprise an estimated 15 percent of total Federal outlays in 2008 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 $221.1 billion in 2008. Physical investment outlays are for construction and rehabilitation, the purchase of major equipment, and the purchase or sale of land and structures. Approximately two-thirds 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 $117.6 billion in 2008. Almost all of these outlays, or an estimated $107.8 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 $31.6 billion in 2008. These outlays include $18.3 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; construction for the administration of justice programs (largely in the Department of Homeland Security), construction of office buildings by the General Services Administration, and construction for embassy security. Outlays for the acquisition of major equipment are estimated to be $13.4 billion in 2008. The largest amounts are for the air traffic control system; law enforcement activities, largely in the Department of Homeland Security and the Federal Bureau of Investigation; and information systems in the Department of Veterans Affairs.

Grants to State and local governments for physical investment are estimated to be $71.8 billion in 2008. More than two-thirds of these outlays, or $51.6 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 $127.0 billion in 2008. 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 $72.9 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 $54.1 billion in 2008. 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 $82.1 billion in 2008. 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 $53.6 billion in 2008, 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 $28.5 billion in 2008. Programs in this category are primarily aid for higher education through student financial assistance, loan subsidies, the

Table 6–1. COMPOSITION OF FEDERAL INVESTMENT OUTLAYS

(In billions of dollars)

	2006 Actual	Estimate	
		2007	2008
Major public physical capital investment:			
Direct Federal:			
National defense	97.3	113.3	117.6
Nondefense	29.0	32.5	31.6
Subtotal, direct major public physical capital investment	126.3	145.8	149.2
Grants to State and local governments	64.1	69.2	71.8
Subtotal, major public physical capital investment	190.4	215.0	221.1
Conduct of research and development:			
National defense	73.0	75.5	72.9
Nondefense	49.8	52.7	54.1
Subtotal, conduct of research and development	122.8	128.1	127.0
Conduct of education and training:			
Grants to State and local governments	56.2	57.3	53.6
Direct Federal	61.0	34.5	28.5
Subtotal, conduct of education and training	117.2	91.8	82.1
Total, major Federal investment outlays	**430.4**	**434.9**	**430.1**
MEMORANDUM			
Major Federal investment outlays:			
National defense	170.3	188.7	190.6
Nondefense	260.1	246.2	239.5
Total, major Federal investment outlays	430.4	434.9	430.1
Miscellaneous physical investment:			
Commodity inventories	–1.0	–0.2	0.2
Other physical investment (direct)	3.1	3.2	3.4
Total, miscellaneous physical investment	2.1	3.0	3.6
Total, Federal investment outlays, including miscellaneous physical investment	432.5	437.9	433.7

veterans GI bill, and health training programs. The decline in spending from 2006 to 2007 reflects a significant decrease in estimates of Federal subsidies due to reduced student loan consolidation activity.

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 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. Purchases are estimated to exceed sales by $0.2 billion in 2008.

Outlays for other miscellaneous physical investment are estimated to be $3.4 billion in 2008. 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		
	2006 Actual	2007 Estimate	2008 Estimate	2006 Actual	2007 Estimate	2008 Estimate
GRANTS TO STATE AND LOCAL GOVERNMENTS						
Major public physical investments:						
Construction and rehabilitation:						
Transportation:						
Highways	36,357	37,555	39,943	33,975	34,914	37,621
Mass transportation	9,768	8,738	9,273	8,430	10,048	10,276
Air transportation	3,070	4,267	2,750	3,841	3,821	3,711
Subtotal, transportation	49,195	50,560	51,966	46,246	48,783	51,608
Other construction and rehabilitation:						
Pollution control and abatement	1,878	1,961	1,748	1,740	1,685	1,546
Community and regional development	22,054	5,173	3,535	6,310	9,147	9,231
Housing assistance	6,169	6,127	5,525	7,750	7,566	7,563
Other construction	579	311	289	553	533	379
Subtotal, other construction and rehabilitation	30,680	13,572	11,097	16,353	18,931	18,719
Subtotal, construction and rehabilitation	79,875	64,132	63,063	62,599	67,714	70,327
Other physical assets	1,423	1,372	1,299	1,515	1,494	1,507
Subtotal, major public physical capital	81,298	65,504	64,362	64,114	69,208	71,834
Conduct of research and development:						
Agriculture	266	275	229	270	284	276
Other	169	165	164	171	130	130
Subtotal, conduct of research and development	435	440	393	441	414	406
Conduct of education and training:						
Elementary, secondary, and vocational education	38,295	36,230	36,936	37,984	38,258	35,467
Higher education	501	500	337	540	582	510
Research and general education aids	764	784	694	727	813	710
Training and employment	4,965	5,157	4,803	4,801	4,749	4,543
Social services	10,109	10,239	9,567	10,015	10,255	9,873
Agriculture	456	456	436	423	443	496
Other	1,700	2,216	1,997	1,682	2,189	1,979
Subtotal, conduct of education and training	56,790	55,582	54,770	56,172	57,289	53,578
Subtotal, grants for investment	138,523	121,526	119,525	120,727	126,911	125,818
DIRECT FEDERAL PROGRAMS						
Major public physical investment:						
Construction and rehabilitation:						
National defense:						
Military construction and family housing	9,500	9,407	11,527	6,439	8,870	9,426
Atomic energy defense activities and other	668	628	489	654	577	504
Subtotal, national defense	10,168	10,035	12,016	7,093	9,447	9,930
Nondefense:						
International affairs	1,357	924	1,492	1,585	1,542	1,228
General science, space, and technology	2,114	1,941	2,285	2,183	2,879	3,261
Water resources projects	4,815	2,823	2,746	3,161	4,289	3,000
Other natural resources and environment	1,144	860	884	982	990	956
Energy	1,387	1,245	1,275	1,354	1,215	1,352
Postal Service	950	1,288	1,214	737	793	1,122
Transportation	130	136	64	91	218	123
Veterans hospitals and other health facilities	2,867	1,343	2,006	1,946	1,844	1,937
Administration of justice	821	1,658	1,518	467	1,397	1,799
GSA real property activities	1,911	949	1,420	1,484	1,476	1,839

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

(In millions of dollars)

Description	Budget Authority			Outlays		
	2006 Actual	2007 Estimate	2008 Estimate	2006 Actual	2007 Estimate	2008 Estimate
Other construction	1,938	1,776	1,342	1,991	1,966	1,680
Subtotal, nondefense	19,434	14,943	16,246	15,981	18,609	18,297
Subtotal, construction and rehabilitation	29,602	24,978	28,262	23,074	28,056	28,227
Acquisition of major equipment:						
National defense:						
Department of Defense	105,370	126,244	137,220	89,796	103,508	107,398
Atomic energy defense activities	510	490	383	444	344	354
Subtotal, national defense	105,880	126,734	137,603	90,240	103,852	107,752
Nondefense:						
General science and basic research	604	637	926	578	608	890
Space flight, research, and supporting activities	360	290	492	291	543	405
Postal Service	1,339	1,782	1,442	1,430	1,017	1,294
Air transportation	3,310	3,333	860	2,615	2,737	1,817
Water transportation (Coast Guard)	1,340	1,264	892	882	1,094	1,115
Other transportation (railroads)	1,293	1,114	900	1,257	1,188	900
Hospital and medical care for veterans	1,132	236	770	784	633	604
Law enforcement activities	1,802	1,902	2,054	1,448	1,891	1,939
Department of the Treasury (fiscal operations)	237	251	331	261	214	278
Department of Commerce (NOAA)	944	935	890	1,000	875	900
GSA general services funds	763	816	833	719	824	865
Other	2,038	1,767	2,544	1,473	1,952	2,425
Subtotal, nondefense	15,162	14,327	12,934	12,738	13,576	13,432
Subtotal, acquisition of major equipment	121,042	141,061	150,537	102,978	117,428	121,184
Purchase or sale of land and structures:						
National defense	–65	–39	–37	–65	–39	–37
Natural resources and environment	97	115	–323	145	129	–301
General government	168	164	156	162	164	156
Other	42	160	25	18	25	2
Subtotal, purchase or sale of land and structures	242	400	–179	260	279	–180
Subtotal, major public physical investment	150,886	166,439	178,620	126,312	145,763	149,231
Conduct of research and development:						
National defense:						
Defense military	73,559	77,821	78,243	69,323	71,755	69,856
Atomic energy and other	3,917	3,608	3,645	3,720	3,726	3,079
Subtotal, national defense	77,476	81,429	81,888	73,043	75,481	72,935
Nondefense:						
International affairs	255	255	255	258	258	258
General science, space, and technology:						
NASA	8,227	9,131	9,330	6,807	8,438	9,445
National Science Foundation	3,806	3,780	4,373	3,707	3,943	3,894
Department of Energy	2,914	2,943	3,394	2,966	3,013	3,192
Subtotal, general science, space, and technology	15,202	16,109	17,352	13,738	15,652	16,789
Energy	1,219	1,364	1,409	1,156	1,241	1,409
Transportation:						
Department of Transportation	792	729	788	563	576	499
NASA	893	589	730	722	736	669
Other	17	17	18	20	13	13
Subtotal, transportation	2,921	2,699	2,945	2,461	2,566	2,590
Health:						
National Institutes of Health	27,524	27,641	27,956	26,695	26,974	27,580

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

(In millions of dollars)

Description	Budget Authority			Outlays		
	2006 Actual	2007 Estimate	2008 Estimate	2006 Actual	2007 Estimate	2008 Estimate
All other health	694	676	671	653	659	670
Subtotal, health	28,218	28,317	28,627	27,348	27,633	28,250
Agriculture	1,588	1,485	1,397	1,509	1,511	1,458
Natural resources and environment	2,106	1,922	1,947	1,513	1,613	1,674
National Institute of Standards and Technology	366	319	398	398	378	409
Hospital and medical care for veterans	824	818	822	799	809	799
All other research and development	1,919	1,547	1,728	1,545	2,084	1,701
Subtotal, nondefense	53,144	53,216	55,216	49,311	52,246	53,670
Subtotal, conduct of research and development	130,620	134,645	137,104	122,354	127,727	126,605
Conduct of education and training:						
Elementary, secondary, and vocational education	1,355	1,326	1,080	1,656	1,634	1,343
Higher education	57,017	24,128	20,691	50,716	23,441	17,841
Research and general education aids	1,993	1,933	2,173	1,902	2,050	2,057
Training and employment	359	359	364	469	549	534
Health	1,353	1,351	994	1,334	1,311	1,222
Veterans education, training, and rehabilitation	3,338	2,842	3,332	2,980	3,321	3,316
General science and basic research	889	886	945	902	909	992
National defense				5		
International affairs	485	474	515	448	462	499
Other	655	555	611	595	826	672
Subtotal, conduct of education and training	67,444	33,854	30,705	61,007	34,503	28,476
Subtotal, direct Federal investment	348,950	334,938	346,429	309,673	307,993	304,312
Total, Federal investment	487,473	456,464	465,954	430,400	434,904	430,130

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 fifth year of using the PART, the Administration has assessed nearly 1,000 programs, approximately 96 percent 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 244 programs:

- Programs for capital assets are essentially those identified in the PART system as "capital assets and service acquisition" (92 programs);

- Programs for research and development are essentially those identified in the PART system as "research and development" (121 programs); and
- Programs for education and training (31 programs) are primarily programs in the Department of Education (e.g., Federal Pell Grants) that are not grants to State and local governments. This category 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 244 investment programs that have been rated by PART was "Moderately Effective". Of these programs:

- 57 were rated Effective;
- 83 were rated Moderately Effective;
- 55 were rated Adequate;
- 8 were rated Ineffective; and
- 41 were rated "Results Not Demonstrated".

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
	Average scores			
Purpose	84%	92%	80%	88%
Planning	80%	83%	74%	81%
Management	83%	87%	72%	84%
Results/Accountability	56%	60%	35%	55%
Weighted Average [1]	69%	74%	55%	70%
Average Rating	Adequate	Moderately effective	Adequate	Moderately effective
	Number of Programs			
Ratings [2]				
Effective	20	35	2	57
Moderately effective	31	49	3	83
Adequate	20	21	14	55
Ineffective	2	3	3	8
Results not demonstrated	19	13	9	41
Total number of investment programs rated	92	121	31	244

[1] Weighted as follows: Purpose (20 percent), Planning (10 percent), Management (20 percent), Results/Accountability (50 percent).

[2] The rating of Effective indicates a score of 85 percent or more; Moderately Effective, 70–84 percent; Adequate, 50–69 percent; and Ineffective, 49 percent or less.

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

Capital Assets

Department of Defense. Air Force Acquisition Systems. ($31.8 billion in 2006). Rating: *Moderately Effective*. This program acquires the equipment and other materiel needed by the Air Force to enable it to fulfill its mission of defeating enemy forces and protecting American troops.

The Air Force acquisition system delivers equipment that generally meets its required performance goals and fulfills the warfighters' needs. The acquisition system does not include control mechanisms to effectively limit factors which contribute to cost and schedule overruns. While the acquisition system already includes a limited number of specific performance measures, additional measures would help to better determine how well the acquisition system is performing.

Department of Defense. Marine Corps/Expeditionary Warfare. ($14.0 billion in 2006). Rating: *Moderately Effective*. 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 (DoD) has articulated a limited number of long-term performance measures for the expeditionary warfare program in response to an earlier assessment. DoD has identified goals related to Joint and Coalition Proficiency, Operational Reach, Force Projection, Sustainability, and Operational and Organizational Adaptability for the expeditionary warfare capability.

Department of Defense. Navy Shipbuilding ($13.4 billion in 2006). 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 281 ships in the fleet.

The Navy has specific cost, schedule, and performance goals for each shipbuilding program. 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.

Department of Defense (DoD). Air Combat Program ($13.4 billion in 2006). 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 management of the overall air combat program is currently based on the extensive system of regulations governing how individual acquisition programs are managed. Through these regulations DoD tracks the progress of individual programs and can hold managers accountable for their programs. 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.

Department of Defense. Future Combat Systems/Modularity Land Warfare ($9.7 billion in 2006). 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.

Tennessee Valley Authority. Tennessee Valley Authority Power ($9.3 billion in 2006). Rating: *Moderately Effective.* The Tennessee Valley Authority (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 Tennessee 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. The Tennessee Valley Authority committed to a debt reduction plan that will reduce its total debt $3 billion - $5 billion over a ten to twelve year period. TVA has since increased that debt reduction total to $7.8 billion by 2016.

Department of Energy. Environmental Management ($7.9 billion in 2006). 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. For example, the program is renegotiating cleanup contracts to include performance incentives. The program is also reorganizing operations to focus on risk reduction. The program needs to develop annual cost and schedule performance measures. The Department of Energy Inspector General and the Government Accountability Office have identified better performance measures as critical to assessing program achievements.

Department of Defense. Missile Defense ($7.7 billion in 2006). 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.

Education

Department of Education. Federal Pell Grants ($17.3 billion in 2006). 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 ($17.3 billion (subsidy cost) in 2006). 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 the program had meaningful performance measures and outcome data, it also found that it 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 reduces 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 R&D 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 R&D or education can be carried out by Federal or State government laboratories, universities and other nonprofit organizations, local governments, or private industry. R&D 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 2006, with periods of faster growth during the late 1960s and the 1980s. The stock amounted to $2,315 billion in 2006 and is estimated to increase to $2,454 billion by 2008. In 2006, the national defense capital stock accounted for $700 billion, or 30 percent of the total, and nondefense stocks for $1,615 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	Trans-portation	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	2,198	662	1,536	391	168	223	1,146	714	196	136	100
2005	2,256	680	1,576	400	168	232	1,176	736	198	137	105
2006	2,315	700	1,615	410	169	240	1,205	758	200	138	109
2007 estimate	2,387	729	1,658	421	171	250	1,236	781	203	139	114
2008 estimate	2,454	756	1,697	431	172	259	1,267	804	207	139	117

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 $1,615 billion in 2006. With the investments proposed in the budget, nondefense stocks are estimated to grow to $1,697 billion in 2008. 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 $756 billion in 2008.

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 2006, 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 (R&D) 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 $1,142 billion in 2006 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 2006. 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 $468 billion in 2008.

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 [1]

(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	255	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	542	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	431	54	376	639	449	190	1,070	504	566
2005	442	56	386	665	471	194	1,107	527	580
2006	452	57	395	690	493	197	1,142	549	593
2007 estimate	462	58	404	716	513	203	1,178	572	606
2008 estimate	468	59	409	742	535	207	1,210	594	616

[1] 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 $1,451 billion in 2006 in constant 2000 dollars. The vast majority of the Nation's education stock is financed by State and local governments, 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. [1] Nearly three-quarters is for elementary and secondary education, while the remainder is for higher education.

[1] For estimates of the total education stock, see table 13–5 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 2006. The expansion of the education stock is projected to continue under this budget, with the stock rising to $1,557 billion in 2008.

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	234	184	50
1975	349	282	67
1980	482	379	103
1985	577	434	143
1990	736	549	188
1995	880	643	237
Annual data:			
2000	1,133	825	308
2001	1,184	859	325
2002	1,227	890	336
2003	1,267	924	343
2004	1,328	961	367
2005	1,383	1,013	370
2006	1,451	1,057	394
2007 estimate	1,505	1,099	406
2008 estimate	1,557	1,141	415