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.

Two sections that appeared in this chapter last year, "Alternative Capital Budget and Capital Expenditure Presentations" and "Supplemental Physical Capital Information", are not included this year, primarily because the information in these sections changes little from year to year, and the reader may refer to earlier budgets for this information or analysis.

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. Gen-

eral 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 acquisition 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, physical investment and research and development related to education and training are 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 25, "The Budget System and Concepts," 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 $345.2 billion in 2003. They are estimated to increase to $376.7 billion in 2004 and are projected to increase further to $390.0 billion in 2005. Major Federal investment outlays will comprise an estimated 16 percent of total Federal outlays in 2005 and 3.2 percent of the Nation's gross domestic product (GDP). 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 $179.8 billion in 2005. 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 $85.6 billion 2005. Almost all of these outlays, or an estimated $78.4 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 $31.1 billion in 2005. These outlays include $16.4 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 Postal Service facilities; facilities for space and science programs, and Indian Health Service hospitals and clinics. Outlays for the acquisition of major equipment are estimated to be $14.1 billion in 2005. The largest amounts are for the air traffic control system. For the purchase or sale of land and structures, disbursements are estimated to exceed collections by $0.6 billion in 2005. These purchases are largely for buildings and land for parks and other recreation purposes.

Grants to State and local governments for physical investment are estimated to be $63.1 billion in 2005. More than two-thirds of these outlays, or $43.8 billion, are to assist States and localities with transportation infrastructure, primarily highways. Other major grants for physical investment fund sewage treatment plants, community development, and public housing.

Conduct of research and development. Outlays for the conduct of research and development are estimated to be $124.0 billion in 2005. 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 $71.4 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 $52.6 billion in 2005. 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 $86.2 billion in 2005. 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 $51.4 billion in 2005, three-fifths of the total. They include education programs for the disadvantaged and the disabled, vocational and adult education programs, training programs in the Department of Labor, and Head Start. Direct Federal education and training outlays are estimated

Table 6–1. COMPOSITION OF FEDERAL INVESTMENT OUTLAYS

(In billions of dollars)

	2003 Actual	Estimate	
		2004	2005
Federal Investment			
Major public physical capital investment:			
Direct Federal:			
National defense	74.7	85.2	85.6
Nondefense	29.5	31.0	31.1
Subtotal, direct major public physical capital investment	104.2	116.3	116.7
Grants to State and local governments	59.8	61.3	63.1
Subtotal, major public physical capital investment	164.1	177.6	179.8
Conduct of research and development:			
National defense	57.3	65.8	71.4
Nondefense	44.1	49.2	52.6
Subtotal, conduct of research and development	101.4	115.0	124.0
Conduct of education and training:			
Grants to State and local governments	45.2	50.6	51.4
Direct Federal	34.5	33.6	34.8
Subtotal, conduct of education and training	79.7	84.2	86.2
Total, major Federal investment outlays	**345.2**	**376.7**	**390.0**
MEMORANDUM			
Major Federal investment outlays:			
National defense	132.0	151.0	157.0
Nondefense	213.1	225.7	233.0
Total, major Federal investment outlays	345.2	376.7	390.0
Miscellaneous physical investment:			
Commodity inventories	–0.6	–1.1	–0.4
Other physical investment (direct)	5.7	4.2	3.7
Total, miscellaneous physical investment	5.1	3.1	3.3
Total, Federal investment outlays, including miscellaneous physical investment	350.3	379.8	393.3

to be $34.8 billion in 2005. Programs in this category are primarily aid for higher education through student financial assistance, loan subsidies, the veterans GI bill, and health training programs.

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 Outlays

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 $0.4 billion in 2005.

Outlays for other miscellaneous physical investment are estimated to be $3.7 billion in 2005. 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		
	2003 Actual	2004 Estimate	2005 Estimate	2003 Actual	2004 Estimate	2005 Estimate
GRANTS TO STATE AND LOCAL GOVERNMENTS						
Major public physical investments:						
Construction and rehabilitation:						
Transportation:						
Highways	29,518	33,763	33,517	30,379	31,089	32,710
Mass transportation	10,629	6,939	7,017	7,336	8,228	7,666
Air transportation	3,379	3,381	3,501	2,681	3,395	3,471
Subtotal, transportation	43,526	44,083	44,035	40,396	42,712	43,847
Other construction and rehabilitation:						
Pollution control and abatement	2,499	2,511	2,348	2,883	1,037	2,359
Community development block grants	4,905	4,934	4,618	5,569	5,990	5,586
Other community and regional development	1,481	1,203	901	1,379	1,532	1,456
Housing assistance	7,250	6,845	6,711	7,827	8,133	8,384
Other construction	255	402	139	715	704	204
Subtotal, other construction and rehabilitation	16,390	15,895	14,717	18,373	17,396	17,989
Subtotal, construction and rehabilitation	59,916	59,978	58,752	58,769	60,108	61,836
Other physical assets	1,247	1,265	1,189	1,074	1,195	1,290
Subtotal, major public physical capital	61,163	61,243	59,941	59,843	61,303	63,126
Conduct of research and development:						
Agriculture	254	264	283	251	260	261
Other	553	574	830	319	495	870
Subtotal, conduct of research and development	807	838	1,113	570	755	1,131
Conduct of education and training:						
Elementary, secondary, and vocational education	34,392	36,527	37,971	29,004	34,903	35,967
Higher education	458	461	395	487	594	487
Research and general education aids	696	742	693	782	819	683
Training and employment	3,531	3,350	4,337	4,603	3,837	3,625
Social services	9,775	9,929	10,145	9,607	9,726	9,946
Agriculture	455	439	420	423	436	421
Other	911	269	249	282	236	267
Subtotal, conduct of education and training	50,218	51,717	54,210	45,188	50,551	51,396
Subtotal, grants for investment	112,188	113,798	115,264	105,601	112,609	115,653
DIRECT FEDERAL PROGRAMS						
Major public physical investment:						
Construction and rehabilitation:						
National defense:						
Military construction and family housing	7,283	6,357	6,416	5,917	6,560	6,451
Atomic energy defense activities and other	835	883	489	795	834	714
Subtotal, national defense	8,118	7,240	6,905	6,712	7,394	7,165
Nondefense:						
International affairs	1,101	1,098	1,100	656	1,000	987
General science, space, and technology	2,318	2,065	2,418	2,436	2,137	2,287
Water resources projects	3,035	2,906	2,330	3,104	2,583	2,654
Other natural resources and environment	1,728	2,106	1,756	1,905	1,662	2,030
Energy	1,685	1,598	1,586	1,685	1,600	1,580
Postal Service	442	637	714	307	409	530
Transportation	345	426	546	342	389	564
Veterans hospitals and other health facilities	2,542	1,646	1,791	2,187	1,675	1,581
Federal Prison System	263	178	.....	533	275	390
GSA real property activities	1,720	1,748	1,636	1,298	1,926	1,872
Other construction	3,297	2,349	1,765	2,919	2,582	1,905
Subtotal, nondefense	18,476	16,757	15,642	17,372	16,238	16,380
Subtotal, construction and rehabilitation	26,594	23,997	22,547	24,084	23,632	23,545

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

(in millions of dollars)

Description	Budget Authority			Outlays		
	2003 Actual	2004 Estimate	2005 Estimate	2003 Actual	2004 Estimate	2005 Estimate
Acquisition of major equipment:						
National defense:						
Department of Defense	78,484	80,918	74,986	67,890	77,705	78,246
Atomic energy defense activities	128	202	142	128	157	182
Subtotal, national defense	78,612	81,120	75,128	68,018	77,862	78,428
Nondefense:						
General science and basic research	545	562	608	463	601	568
Space flight, research, and supporting activities	485	670	681	411	544	667
Postal Service	803	1,267	730	470	602	927
Air transportation	3,654	2,879	3,536	2,763	3,970	3,725
Water transportation (Coast Guard)	433	557	571	436	433	483
Other transportation (railroads)	1,043	1,218	900	1,001	1,334	900
Hospital and medical care for veterans	1,034	1,019	1,020	1,949	1,936	1,936
Law enforcement activities	1,488	1,890	1,829	1,187	1,832	1,876
Department of the Treasury (fiscal operations)	492	591	498	547	577	576
Department of Commerce (NOAA)	779	773	852	681	645	768
GSA general supply fund	676	750	724	626	750	724
Other	856	749	930	935	936	998
Subtotal, nondefense	12,288	12,925	12,879	11,469	14,160	14,148
Subtotal, acquisition of major equipment	90,900	94,045	88,007	79,487	92,022	92,576
Purchase or sale of land and structures:						
National defense	–23	–33	–33	–23	–33	–33
Natural resources and environment	434	296	223	458	343	296
General government	179	170	161	200	265	214
Other	28	42	117	16	32	89
Subtotal, purchase or sale of land and structures	618	475	468	651	607	566
Subtotal, major public physical investment	118,112	118,517	111,022	104,222	116,261	116,687
Conduct of research and development:						
National defense:						
Defense military	58,793	65,432	69,791	53,778	61,347	67,041
Atomic energy and other	3,836	3,968	4,315	3,550	4,449	4,363
Subtotal, national defense	62,629	69,400	74,106	57,328	65,796	71,404
Nondefense:						
International affairs	269	269	255	229	260	258
General science, space and technology						
NASA	7,369	7,596	7,774	6,002	7,148	7,921
National Science Foundation	3,640	3,762	3,862	3,235	3,473	3,727
Department of Energy	2,509	2,712	2,624	2,480	2,718	2,624
Subtotal, general science, space and technology	13,787	14,339	14,515	11,946	13,599	14,530
Energy	1,275	1,435	1,468	1,325	1,504	1,621
Transportation:						
Department of Transportation	547	531	566	483	546	599
NASA	999	1,034	919	1,663	1,026	1,000
Other	181	181	229	49	293	228
Subtotal, transportation	3,002	3,181	3,182	3,520	3,369	3,448
Health:						
National Institutes of Health	25,178	27,021	27,681	21,835	24,559	26,698
All other health	725	652	719	927	652	688
Subtotal, health	25,903	27,673	28,400	22,762	25,211	27,386

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

(in millions of dollars)

Description	Budget Authority			Outlays		
	2003 Actual	2004 Estimate	2005 Estimate	2003 Actual	2004 Estimate	2005 Estimate
Agriculture	1,432	1,538	1,216	1,377	1,391	1,306
Natural resources and environment	2,018	2,049	2,040	1,839	1,791	1,953
National Institute of Standards and Technology	421	410	326	433	449	488
Hospital and medical care for veterans	817	822	770	783	812	770
All other research and development	1,097	1,346	1,329	882	1,833	1,575
Subtotal, nondefense	48,477	51,358	51,778	43,542	48,455	51,456
Subtotal, conduct of research and development	111,106	120,758	125,884	100,870	114,251	122,860
Conduct of education and training:						
Elementary, secondary, and vocational education	1,902	1,648	1,341	1,858	2,063	1,754
Higher education	23,872	22,105	23,260	23,875	21,642	23,118
Research and general education aids	1,789	1,856	1,882	1,699	1,838	1,887
Training and employment	1,563	1,576	1,661	1,514	1,528	1,611
Health	1,634	1,575	1,297	1,500	1,704	1,568
Veterans education, training, and rehabilitation	2,227	2,479	2,502	2,295	2,633	2,795
General science and basic research	935	930	864	775	953	901
National defense	8	8	8	9	8	8
International affairs	405	349	376	393	352	373
Other	619	763	643	567	886	774
Subtotal, conduct of education and training	34,954	33,289	33,834	34,485	33,607	34,789
Subtotal, direct Federal investment	264,172	272,564	270,740	239,577	264,119	274,336
Total, Federal investment	376,360	386,362	386,004	345,178	376,728	389,989

PART II: PERFORMANCE OF FEDERAL INVESTMENT

Introduction. In recent years there has been increased emphasis on the performance of Government programs. The Congress mandated in the Government Performance and Results Act of 1993 that performance plans be developed and that the agencies report annual progress against these plans.

In addition, this Administration began in the *2004 Budget* to assess every Federal program over a five year period by a method known as the Program Assessment Rating Tool, or PART. With this budget, the second year of using the PART, the Administration has assessed about two-fifths of the programs of the Federal Government The PART system assesses each program on 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 85 percent, adequate if the score is 50 to 70 percent, and inadequate if the score is 49 percent or lower. The program is given a rating "Results Not Demonstrated" if the program does not have a good performance measure or does not have data for that measure. 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. 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 covers the following 119 programs.

- Programs for capital assets are those identified in the PART system as "capital assets and service acquisition" (44 programs);
- Programs for research and development are essentially those identified in the PART system as "research and development" (59 programs); and
- Programs for education (16 programs) are primarily programs in the Department of Education that are not grants to State and local governments (e.g., Federal Pell grants to individuals). This category also includes a few education programs in other agencies, such as the Montgomery GI Bill in the Department of Veterans Affairs and the Health Professions program in the Department of Health and Human Services.

Information on these and other programs assessed by PART is on the CD ROM that accompanies this volume.

Summary of ratings. Table 6–3 shows that the average weighted score for the 119 investment programs that have been rated by PART was 66 percent, which is a rating of "adequate". These programs had total spending of $132.0 billion in 2003. Of these programs:

- 39 were rated "results not demonstrated" ($42.1 billion);
- 23 were rated effective ($8.8 billion);
- 31 were rated moderately effective ($34.6 billion);
- 19 were rated adequate ($39.4 billion); and
- 7 were rated ineffective ($7.1 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
	Average Scores			
Purpose	80%	91%	76%	85%
Planning	74%	76%	74%	75%
Management	81%	84%	64%	80%
Results/Accountability	49%	58%	35%	51%
Weighted Average [1]	64%	71%	53%	66%
Average Rating	Adequate	Moderately effective	Adequate	Adequate
	Number of Programs			
Ratings [2]				
Results not demonstrated	19	15	5	39
Effective	6	16	1	23
Moderately effective	10	20	1	31
Adequate	7	6	6	19
Ineffective	2	2	3	7
Total number of investment programs rated	44	59	16	119
	In millions of dollars (2003)			
Results not demonstrated	$36,114	$2,842	$3,116	$42,072
Effective	1,005	7,736	49	8,790
Moderately effective	29,140	5,337	171	34,648
Adequate	19,500	570	19,361	39,431
Ineffective	6,215	89	779	7,083
All investment programs that were rated in PART	$91,974	$16,574	$23,476	$132,024

[1] Weighted as follows: Purpose (20%), Planning (10%), Management (20%), Results/Accountability (50%).
[2] The rating of effective indicates a score of 85 percent or more; moderately effective, 70–85 percent; adequate, 50–70 percent; and ineffective, 49 percent or less.

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. Air Combat Program ($15.1 billion in 2003). Rating: *Moderately Effective.* This program consists of a number of individual aircraft and helicopter research, development and procurement programs that, taken together, comprise DOD's investment in air combat capabilities. The PART analysis showed that the program purpose is clear owing to the unique military requirement for these systems.

Department of Defense. Shipbuilding ($9.5 billion). Rating: *Adequate.* This program buys new ships and overhauls older ships for the Navy. The assessment shows that the program has a clear purpose, and the Navy has specific cost, schedule, and performance goals for each shipbuilding program. The program has experi-

enced cost increases and schedule slips on some ship construction programs.

Tennessee Valley Authority (TVA) ($7.6 billion in 2003). Rating: *Moderately Effective.* TVA is the fifth largest electric utility in the country, generating power at 48 coal-fired, hydropower, nuclear, and other power plants that it operates to meet the electricity needs of 8.3 million people (3 percent of the U. S. market). The PART assessment gave TVA mixed reviews. TVA does an excellent job generating power at its existing power plants. A decade ago TVA's nuclear power plants posed serious technical and safety problems but it has overcome these problems and today its nuclear power plants set industry standards.

However, TVA has a high level of debt compared to many of its competitors in the electricity industry. It has recently issued a strategic plan that includes a debt reduction target of $3 billion to $5 billion over the next 10 to 12 years, which is incorporated into the budget estimates for TVA and will be a basis on which TVA's annual performance plans are developed.

Department of Defense. Missile Defense ($7.5 billion in 2003). Rating: *Results Not Demonstrated.* This program consists of multiple systems and capabilities developed by the Missile Defense Agency (MDA) or military services. This program fields active defenses against short, medium, and long-range missiles in a multi-layered global system.

The assessment found that: a) the Department of Defense continues to design, engineer, and develop extensive missile defense capabilities, but has not programmed adequate funds to procure and operate newly developed capabilities; b) technical progress continues, but there have been challenges. Some missiles have operated effectively, but also experienced command and control problems; some tests have failed, but some were a success.

Department of Energy. Environmental Management ($7.6 billion in 2003). Rating: *Adequate.* This program protects human health and the environment by cleaning up waste and contamination resulting from more than 50 years of nuclear weapons production and energy research at 114 Department of Energy sites in the United States and its territories. The assessment found that managers are implementing reforms that are improving program performance. The program needs to develop annual cost and schedule performance measures.

General Services Administration. GSA's Regional IT Solutions Program ($5.8 billion in 2003). Rating: *Results Not Demonstrated.* This program provides expert technical, acquisition, and information technology products and services to Federal clients. This assessment found that the program is useful to Federal agencies that do not have in-house expertise to acquire IT products or services. The assessment also found that the program does not have long-term outcome goals that relate to other government agencies or the private sector.

Department of Defense. Communications Infrastructure ($5.6 billion in 2003). Rating: *Results Not Demonstrated.* This program includes all networks and systems for transmission of voice, data, and video information for the Department. This assessment revealed that DOD does not manage its communications infrastructure on an enterprise or department-wide basis. The assessment also suggested that DOD should develop common performance measures to be used across the entire department for this program.

Department of Defense. Airlift Program ($5.3 billion in 2003). Rating: *Moderately Effective.* This program consists of a number of individual Air Force tactical and strategic airlift aircraft research, development and procurement programs that, taken together, comprise DOD's investment in airlift capabilities. The analysis showed that this is a coherent program with a clear and basic long-term goal, namely to be able to move military forces and their equipment from the U.S. to anywhere in the world whenever required. DOD must aggressively examine possible trade-offs within the program that could lower the cost of meeting the airlift requirement without sacrificing military readiness or combat capabilities.

Department of Housing and Urban Development. Project-Based Rental Assistance ($4.8 billion in 2003). Rating: *Ineffective.* This program provides funding to landlords who rent a certain number of affordable apartments to low-income families or individuals. Assistance is tied directly to the properties—tenants cannot move without losing their assistance. The program receives low performance scores in part because there is confusion over program objectives, the program lacks strong financial accountability, and it produces poor results relative to alternative forms of housing assistance.

Education

Department of Education. Federal Pell Grants ($11.4 billion in 2003). Rating: *Adequate.* This program provides grant aid to nearly five million needy students to help them pay for an undergraduate education. The assessment found that the program helps ensure that low-income students can afford a college education. However, the Department of Education has only been minimally successful in achieving its long-term and annual performance goals for its main student aid programs. In addition, Pell grants, like other student aid, are prone to abuse, where students who under-report family income receive more aid than they should. The Department estimates that net overawards in Pell total more than $350 million annually.

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 12, "Stewardship," in this volume. Additional detail about these methods appeared in a methodological note in the 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.[1] The total stock grew at a 2.2 percent average annual rate from 1960 to 2003, with periods of faster growth during the late 1960s and the 1980s. The stock amounted to $2,137 billion in 2003 and is estimated to increase to $2,266 billion by 2005. In 2003, the national defense capital stock accounted for $646 billion, or 30 percent of the total, and nondefense stocks for $1,491 billion, or 70 percent of the total.

[1] Constant dollar stock estimates are expressed in chained 2000 dollars, consistent with the December 2003 revisions to the National Income and Product Accounts. The shift to a more recent base year changes the reported level of real stocks, but leaves the year-to-year trends largely the same.

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	Commu-nity 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	2,022	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	2,137	646	1,491	379	166	213	1,112	690	193	135	94
2004 est.	2,204	663	1,541	393	167	226	1,148	716	196	135	100
2005 est.	2,266	677	1,588	405	168	237	1,183	741	199	136	106

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 $1,491 billion in 2003. With the investments proposed in the budget, nondefense stocks are estimated to grow to $1,588 billion in 2005. 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 an estimated $646 billion in 2003 to $677 billion in 2005.

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 2003, 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 35 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 $1,054 billion in 2003 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 2003. 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 this budget is projected to increase the stock to $513 billion in 2005.

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	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	418	40	378	428	268	161	846	308	539
Annual data:									
2000	423	48	375	543	368	175	966	416	549
2001	421	50	371	563	386	177	984	436	548
2002	435	52	383	579	405	175	1,014	457	557
2003	456	54	402	598	424	174	1,054	478	577
2004 est.	483	55	428	621	445	176	1,104	501	604
2005 est.	513	57	456	646	467	178	1,159	524	634

[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 $1,292 billion in 2003 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. [2] Nearly three-quarters is for elementary and secondary education, while the remaining one quarter is for higher education.

The federally financed education stock has grown steadily in the last few decades, with an average annual growth rate of 5.4 percent from 1970 to 2003. The expansion of the education stock is projected to continue under this budget, with the stock rising to $1,465 billion in 2005.

[2] For estimates of the total education stock, see table 12–4 in Chapter 12, "Stewardship."

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	70	51	20
1965	98	71	27
1970	225	176	49
1975	324	260	64
1980	458	356	102
1985	565	421	144
1990	745	550	195
1995	853	619	234
Annual data:			
2000	1,121	819	302
2001	1,174	847	327
2002	1,221	879	342
2003	1,292	932	360
2004 est.	1,378	1,004	374
2005 est.	1,465	1,073	391