12. STEWARDSHIP

Introduction

The budget is an essential tool for allocating resources within the Federal Government and between the public and private sectors; but current outlays, receipts, and the surplus or deficit do not provide enough information to evaluate fully the Government's financial and investment decisions. Indeed, changes in the annual budget deficit or surplus can be misleading indicators of the Government's financial condition. For example, the temporary shift from annual deficit to surplus in the late 1990s did nothing to correct the long-term deficiencies in the Nation's major entitlement programs, which are the major source of the long-run shortfall in Federal finances. This would have been more apparent if greater attention had focused on long-term measures such as appear in this chapter. As important as the current budget surplus or deficit is, other indicators are also needed to properly judge the Government's fiscal condition.

For the Federal Government, there is no single number that corresponds to the bottom line in a business balance sheet or income statement. The Government is ultimately judged by how its actions affect the country's security and well-being, and that cannot be summed up with a single statistic. Although its financial condition is important, the Government does not and is not expected to earn a profit. Instead, its fiscal status is best evaluated using a broad range of data and several complementary perspectives. This chapter presents a framework for such analysis. Because there are serious limitations on the available data and the future is uncertain, this chapter's findings should be interpreted with caution; its conclusions are subject to future revision.

The chapter consists of four parts:

- Part I explains how the separate pieces of analysis link together. Chart 12–1 presents the linkages in a schematic diagram.
- Part II presents the Government's physical and financial assets and its legal liabilities, which are all collected in Table 12–1. This table is similar to a business balance sheet, but for that reason it misses some of the Government's unique fiscal characteristics. That is why it needs to be supplemented by information in Parts III and IV.
- Part III shows possible paths for the Federal budget extending well beyond the normal budget window and describes how these projections vary depending on key economic and demographic assumptions. The projections are summarized in Table 12–2 and in a related set of charts. This part also presents discounted present value estimates of the funding shortfall in Social Security and Medicare in Table 12–3. Together such data indicate the full range of the Government's future responsibilities and resources under current law and policy. In particular, they show the looming challenge that Federal entitlement programs create for the budget in the long run.
- Part IV returns the focus to the present. It features information on national economic and social conditions that are affected by what the Government does. The private economy is the ultimate source of the Government's resources. Table 12–4 presents summary data for total national wealth, while highlighting the Federal investments that have contributed to that wealth. Table 12–5 presents a small sample of economic and social indicators.

PART I—HOW TO EVALUATE FEDERAL FINANCES

No single framework can encompass all of the factors that affect the financial condition of the Federal Government. Nor can any framework serve as a substitute for actual analysis. Nevertheless, the framework presented here offers a useful way to examine the financial aspects of Federal policies that goes beyond the standard measures of outlays, receipts and the surplus/deficit. It includes information that would appear on a balance sheet, but it goes beyond that to include long-run projections of the budget that can be used to show where future fiscal strains are most likely to appear. It also includes measures that indicate some of what society has gained economically and socially from Federal programs funded through this and past budgets.

The Government's legally binding obligations—its liabilities—consist in the first place of Treasury debt owed to the public. Other liabilities include the pensions and other benefits owed to retired Federal employees and veterans. These employee obligations are a form of deferred compensation; they have counterparts in the business world, and would appear as liabilities on a business balance sheet. Accrued obligations for Government insurance policies and the estimated present value of failed loan guarantees and deposit insurance claims are also analogous to private liabilities. These Government liabilities are discussed further in Part II along with the Government's assets. They are collected in Table 12–1. Although they are important, the obligations shown in Table 12–1 are only a subset

of the Government's total financial responsibilities. Indeed, the full extent of the Government's fiscal exposure through its various programmatic commitments dwarfs the outstanding debt held by the public or even the total of all acknowledged Federal liabilities. The commitment to Social Security and Medicare alone amounts to many times the value of outstanding Federal debt.

In addition to Social Security and Medicare, the Government has a broad range of programs that dispense cash and other benefits to individual recipients. It also provides a wide range of other public services that must be financed through the tax system. The Government is not constitutionally obligated to continue operating any of these programs without change, and specific benefits and services may be modified or even ended at any time, subject to the decisions of Congress and the President. Indeed, such changes are a regular part of the legislative cycle. For such reasons, these programmatic commitments are not "liabilities" in a legal or accounting sense, and they would not appear on a balance sheet, but they remain Federal responsibilities and will have a claim 'on budgetary resources for the foreseeable future. All of these programs are reflected in the long-run budget projections in Part III. It would be misleading to leave out any of these programmatic commitments in projecting future claims on the Government or in calculating the Government's long-run fiscal balance.

The Federal Government also has resources that go beyond the assets that would appear on a business's balance sheet. These additional resources include most importantly the Government's sovereign power to tax. Because of these additional responsibilities and resources, the best way to analyze the future strains on the Government's fiscal position is to make a long-run projection of the entire Federal budget, as is done in Part III of this chapter, which provides a comprehensive measure of the Government's future cash flows.

Over long periods of time, the spending the Government does must be financed by the taxes and other receipts it collects. Although the Government can borrow for temporary periods, it must pay interest on any such borrowing, which adds to future spending. In the long run, under normal financial conditions, a solvent Government must pay for its spending out of its receipts. The projections in Part III show that under an extension of the estimates in this budget, long-run balance in this sense is not achieved, mostly because projected spending for Social Security, Medicare, and Medicaid grow faster than the revenue available to pay for them.

The long run budget projections and the table of assets and liabilities are silent on the question of whether the public is receiving value for its tax dollars or whether Federal assets are being used effectively. Information on those points requires performance measures for Government programs supplemented by appropriate information about conditions in the economy and society. Recent changes in budgeting practices will contribute to the goal of more complete information about Government programs and permit a closer alignment of the cost of programs with performance measures. These changes are described in detail in the main *Budget* volume itself, in chapter 2 of this volume, and in the accompanying material that describes results obtained with the Program Assessment Rating Tool (PART). This Stewardship chapter complements the detailed exploration of Government performance with an assessment of the overall impact of Federal policy as reflected in some general measures of economic and social well-being.

Relationship with FASAB Objectives

The framework presented here meets the stewardship objective [1] for Federal financial reporting recommended by the Federal Accounting Standards Advisory Board (FASAB) and adopted for use by the Federal Government in September 1993.

> *Federal financial reporting should assist report users in assessing the impact on the country of the Government's operations and investments for the period and how, as a result, the Government's and the Nation's financial conditions have changed and may change in the future. Federal financial reporting should provide information that helps the reader to determine:*
>
> *3a. Whether the Government's financial position improved or deteriorated over the period.*
>
> *3b. Whether future budgetary resources will likely be sufficient to sustain public services and to meet obligations as they come due.*
>
> *3c. Whether Government operations have contributed to the nation's current and future well-being.*

The presentation here is an experimental approach for meeting this objective at the Government-wide level. It is especially intended to meet the broad interests of economists and others in evaluating trends over time, including both past and future trends. The annual *Financial Report of the United States Government* presents related information, but from a different perspective. The *Financial Report* includes a standard business-type balance sheet. The assets and liabilities on that balance sheet are all based on transactions that have already occurred. A somewhat similar table can be found in Part II of this chapter. The *Report* also includes a Statement of Social Insurance and it reviews a substantial body of information on the condition and sustainability of the Government's social insurance programs. However, the *Report* does not try to extend that review to the condition or sustainability of the Government as a whole, which is the main focus of this chapter.

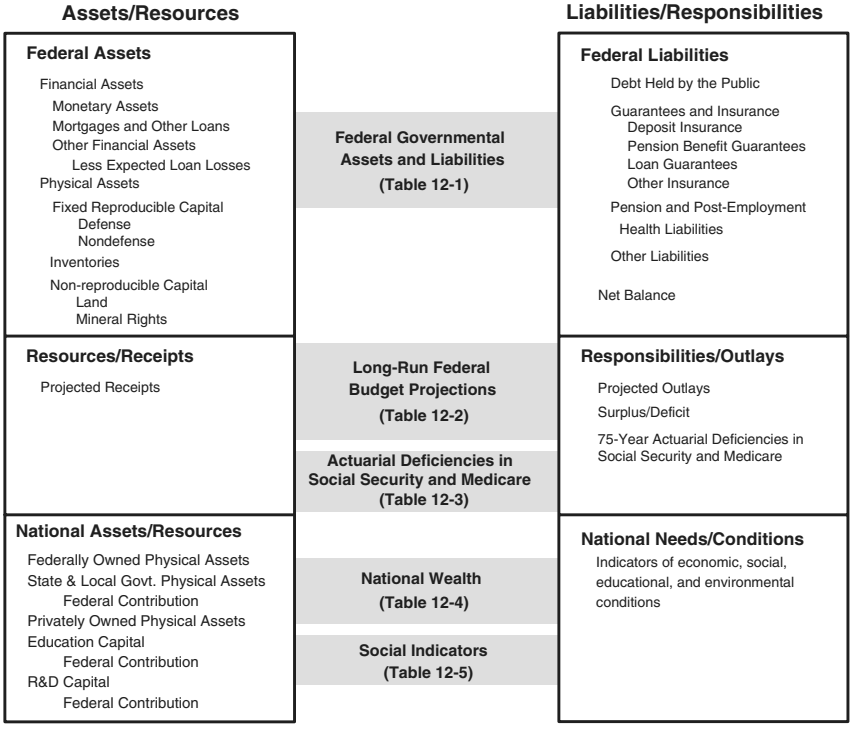
Connecting the Dots: The presentation that follows consists in large part of a series of tables and charts. Taken together, they serve similar functions to a business's balance sheet. The schematic diagram, Chart 12–1, shows how the different pieces fit together. The tables and charts should be viewed as an ensemble, the main elements of which are grouped in two broad

[1] Statement of Federal Financial Accounting Concepts, Number 1, *Objectives of Federal Financial Reporting,* September 2, 1993. Other objectives are budgetary integrity, operting performance, and systems and controls.

categories—assets/resources and liabilities/responsibilities.

- Reading down the left-hand side of Chart 12–1 shows the range of Federal resources, including assets the Government owns, tax receipts it can expect to collect based on current and proposed law, and national wealth that provides the base for Government revenues.
- Reading down the right-hand side reveals the full range of Federal obligations and responsibilities, beginning with Government's acknowledged liabilities based on past actions, such as the debt held by the public, and going on to include future budget outlays that maintain present policies and trends. This column ends with a set of indicators highlighting areas where Government activity affects society or the economy.

Chart 12-1. A Presentation of the Federal Government's Financial Condition



QUESTIONS AND ANSWERS ABOUT THE GOVERNMENT'S STEWARDSHIP

1. According to Table 12–1, the Government's liabilities exceed its assets. No business could operate in such a fashion. Why does the Government not manage its finances more like a business?

The Federal Government has fundamentally different objectives from a business enterprise. The primary goal of every business is to earn a profit, and the Federal Government properly leaves almost all activities at which a profit could be earned to the private sector. For the vast bulk of the Federal Government's operations, it would be difficult or impossible to charge prices—let alone prices that would cover expenses. The Government undertakes these activities not to improve its balance sheet, but to benefit the Nation.

For example, the Federal Government invests in education and research. The Government earns no direct return from these investments; but people are made richer if they are successful. The returns on these investments show up not as an increase in the Government assets but as an increase in the general state of knowledge and in the capacity of the country's citizens to earn a living and lead a fuller life. A business's motives for investment are quite different; business invests to earn a profit for itself, not others, and if its investments are successful, their value will be reflected in its balance sheet. Because the Federal Government's objectives are different, its balance sheet behaves differently, and should be interpreted differently.

2. Table 12–1 seems to imply that the Government is insolvent. Is it?

No. Just as the Federal Government's responsibilities are of a different nature than those of a private business, so are its resources. Government solvency must be evaluated in different terms.

What the table shows is that those Federal obligations that are most comparable to the liabilities of a business corporation exceed the estimated value of the assets actually owned by the Federal Government. The Government, however, has access to other resources through its sovereign powers. These powers, which include taxation, allow the Government to meet its present obligations and those that are anticipated from future operations even though the Government's current assets are less than its current liabilities.

The financial markets clearly recognize this reality. The Federal Government's implicit credit rating is the best in the world; lenders are willing to lend it money at interest rates substantially below those charged to private borrowers. This would not be true if the Government were really insolvent or likely to become so. Where governments totter on the brink of insolvency, lenders are either unwilling to lend them money, or do so only in return for a substantial interest premium.

QUESTIONS AND ANSWERS ABOUT THE GOVERNMENT'S STEWARDSHIP

3. Why are Social Security and Medicare not shown as Government liabilities in Table 12–1?

Future Social Security and Medicare benefits may be considered as promises or responsibilities of the Federal Government, but these benefits are not a liability in a legal or accounting sense. The Government has unilaterally decreased as well as increased these benefits in the past, and future reforms could alter them again. These benefits are not ignored in this presentation of the Government's finances, but they are shown elsewhere than in Table 12–1. They appear in two ways: Budget projections as a percent of GDP from now through 2080, in Table 12–2, and the actuarial deficiency estimates over roughly the same period in Table 12–3.

Other Federal programs exist that are similar to Social Security and Medicare in the promises they make— Medicaid—for example. Few have suggested counting the future benefits expected under these programs as Federal liabilities, yet it would be difficult to justify a different accounting treatment for them if Social Security or Medicare were to be classified as a liability. There is no bright line dividing Social Security and Medicare from other programs that promise benefits to people, and all the Government programs that do so should be accounted for similarly.

Furthermore, if future Social Security or Medicare benefits were to be treated as a liability, then future payroll tax receipts earmarked to finance those benefits ought to be treated as a Government asset. This treatment would be essential to correctly gauge the future claim. Tax receipts, however, are not generally considered Government assets, and for good reason: the Government does not own the wealth on which future taxes depends. Including taxes on the balance sheet would be wrong for this reason, but without counting taxes the balance sheet would overstate the drain on net assets from Social Security and Medicare. Furthermore, treating taxes for Social Security or Medicare differently from other taxes would be highly questionable.

Finally, under Generally Accepted Accounting Principles (GAAP), Social Security is not considered to be a liability, so not counting it as such in this chapter is consistent with the accounting standards.

4. Why can't the Government keep a better set of books?

The Government is not a business, and accounting standards designed to illuminate how much a business earns and how much equity it has could provide misleading information if applied naively to the Government. The Government does not have a "bottom line" comparable to that of a business corporation, but the Federal Accounting Standards Advisory Board (FASAB) has developed, and the Government has adopted, a conceptual accounting framework that reflects the Government's distinct functions and answers many of the questions for which Government should be accountable. This framework addresses budgetary integrity, operating performance, stewardship, and systems and controls. FASAB has also developed, and the Government has adopted, a full set of accounting standards. Federal agencies now issue audited financial reports that follow these standards and an audited Government-wide financial report is issued as well. In short, the Federal Government does follow generally accepted accounting principles (GAAP) just as businesses and State and local governments do for their activities, although the relevant principles differ depending on the circumstances. This chapter is intended to address the "stewardship objective"—assessing the interrelated condition of the Federal Government and the Nation. The data in this chapter illuminate the trade-offs and connections between making the Federal Government "better off" and making the Nation "better off."

QUESTIONS AND ANSWERS ABOUT THE GOVERNMENT'S STEWARDSHIP

5. When the baby-boom generation begins to retire in large numbers beginning within the next ten years, the deficit could become much larger than it ever was before. Should this not be reflected in evaluating the Government's financial condition?

The aging of the U.S. population will become dramatically evident when the baby-boomers begin to retire, and this demographic transition poses serious long-term problems for Federal entitlement programs and the budget. Both the long-range budget projections and the actuarial projections presented in this chapter indicate how serious the problem is. It is clear from this information that reforms are needed in these programs to meet the long-term challenges.

6. Would it make sense for the Government to borrow to finance needed capital—permitting a deficit in the budget—so long as the borrowing did not exceed the amount spent on investments?

This rule might not actually permit much extra borrowing. If the Government were to finance new capital by borrowing, it should plan to pay off the debt incurred to finance old capital as the capital is used up. The net new borrowing permitted by this rule would not then exceed the amount of net investment the government does after adjusting for capital consumption. But, as discussed in Chapter 6, Federal net investment in physical capital is usually not very large and has even been negative, so little if any deficit spending would have been justified by this borrowing-for-investment criterion, at least in recent years.

The Federal Government also funds substantial amounts of physical capital that it does not own, such as highways and research facilities, and it funds investment in intangible "capital" such as education and training and the conduct of research and development. A private business would never borrow to spend on assets that would be owned by someone else. However, such spending is today a principal function of Government. It is not clear whether this type of capital investment would fall under the borrowing-for-investment criterion. Certainly, these investments do not create assets owned by the Federal Government, which suggests they should not be included for this purpose, even though they are an important part of national wealth.

There is another difficulty with the logic of borrowing to invest. Businesses expect investments to earn a return large enough to cover their cost. In contrast, the Federal Government does not generally expect to receive a direct payoff from its investments, whether or not it owns them. In this sense, investments are no different from other Government expenditures, and the fact that they provide services over a longer period of time is no justification for excluding them when calculating the surplus or deficit.

Finally, the Federal Government must pursue policies that support the overall economic well-being of the Nation and its security interests. For such reasons, the Government may deem it desirable to run a budget surplus, even if this means paying for its own investments from current receipts, and there are times when it is necessary to run a deficit, even one that exceeds Government net investment. Considerations in addition to the size of Federal investment must be weighed in choosing the right level of the surplus or deficit.

PART II—THE FEDERAL GOVERNMENT'S ASSETS AND LIABILITIES

Table 12–1 takes a backward look at the Government's assets and liabilities summarizing what the Government owes as a result of its past operations netted against the value of what it owns. The table gives some perspective by showing these net asset figures for a number of years beginning in 1960. To ensure comparability across time, the assets and liabilities are measured in terms of constant FY 2003 dollars. Government liabilities have exceeded the value of assets (see chart 12–2) over this entire period, but, in the late 1970s, a speculative run-up in the prices of oil and other real assets temporarily boosted the value of Federal holdings. When those prices subsequently declined, Federal asset values declined and only recently have they regained the level they had reached temporarily in the mid-1980s.

Currently, the total real value of Federal assets is estimated to be 50 percent greater than it was in 1960. Meanwhile, Federal liabilities have increased by over 200 percent in real terms. The decline in the Federal net asset position has been due partly to persistent Federal budget deficits that have boosted debt held by the public most years since 1960. Other factors have also been important in reducing net Federal assets such as the large increases in health benefits for Federal retirees and the sharp rise in veterans' disability compensation. The slower growth in Federal assets compared with liabilities also helped reduce the net asset position.

The shift from budget deficits to budget surpluses in the late 1990s temporarily checked the decline in Federal net assets, but only for a few years. Currently, the net excess of liabilities over assets is about $4.9 trillion or nearly $17,000 per capita. As a ratio to GDP, the excess of liabilities over assets reached a peak of 51 percent in 1995; it declined to 38 percent in 2000 and was 45 percent in 2003. The average since 1960 has been 34 percent.

Assets

Table 12–1 offers a comprehensive list of the financial and physical resources owned by the Federal Government.

Financial Assets: According to the Federal Reserve Board's Flow-of-Funds accounts, the Federal Government's holdings of financial assets amounted to $0.6 trillion at the end of FY 2003. Government-held mortgages and other loans (measured in constant dollars) reached a peak in the early 1990s as the Government acquired mortgages from savings and loan institutions that had failed. The Government subsequently liquidated most of the mortgages it acquired from bankrupt savings and loans in the 1990s. The face value of mortgages and other loans overstates their economic worth. OMB estimates that the discounted present value of future losses and interest subsidies on these loans was about $40 billion as of 2003. These estimated losses are subtracted from the face value of outstanding loans to obtain a better estimate of their economic worth.

Reproducible Capital: The Federal Government is a major investor in physical capital and computer software. Government-owned stocks of such capital have amounted to about $1.0 trillion in constant dollars for most of the last 40 years (OMB estimate). This capital consists of defense equipment and structures, including weapons systems, as well as nondefense capital goods. Currently, slightly less than two-thirds of the capital is defense equipment or structures. In 1960, defense capital was about 90 percent of the total. In the 1970s, there was a substantial decline in the real value of U.S. defense capital and there was another large decline in the 1990s after the end of the Cold War. Meanwhile, nondefense Federal capital has increased at an average annual rate of around 2–1/2 percent. The Government also holds inventories of defense goods and other items that in 2003 amounted to about 20 percent of the value of its fixed capital.

Non-reproducible Capital: The Government owns significant amounts of land and mineral deposits. There are no official estimates of the market value of these holdings (and of course, in a realistic sense, many of these resources would never be sold). Researchers in the private sector have estimated what they are worth, however, and these estimates are extrapolated in Table 12–1. Private land values fell sharply in the early 1990s, but they have risen since 1993. It is assumed here that Federal land shared in the decline and the subsequent recovery. Oil prices have been on a roller coaster since the mid-1990s. They declined sharply in 1997–1998, rebounded in 1999–2000, fell again in 2001, and rose in 2002–2003. These fluctuations have caused the estimated value of Federal mineral deposits to fluctuate as well. In 2003 as estimated here, the real value of Federal land and mineral rights was higher than at any time since 1982.

These estimates are limited to land and mineral rights. They, thus, omit some valuable assets owned by the Federal Government, such as works of art and historical artifacts partly because there is no realistic basis for valuing such unique assets and also because, as part of the Nation's historical heritage, these objects are never likely to be sold.

Total Assets: The total value of Government assets measured in constant dollars has been increasing for the past five years, but it was still lower in 2003 than it was in the early 1980s. The Government's asset holdings are vast. As of the end of FY 2003, Government assets were estimated to be worth about $3.0 trillion, about 27 percent of GDP.

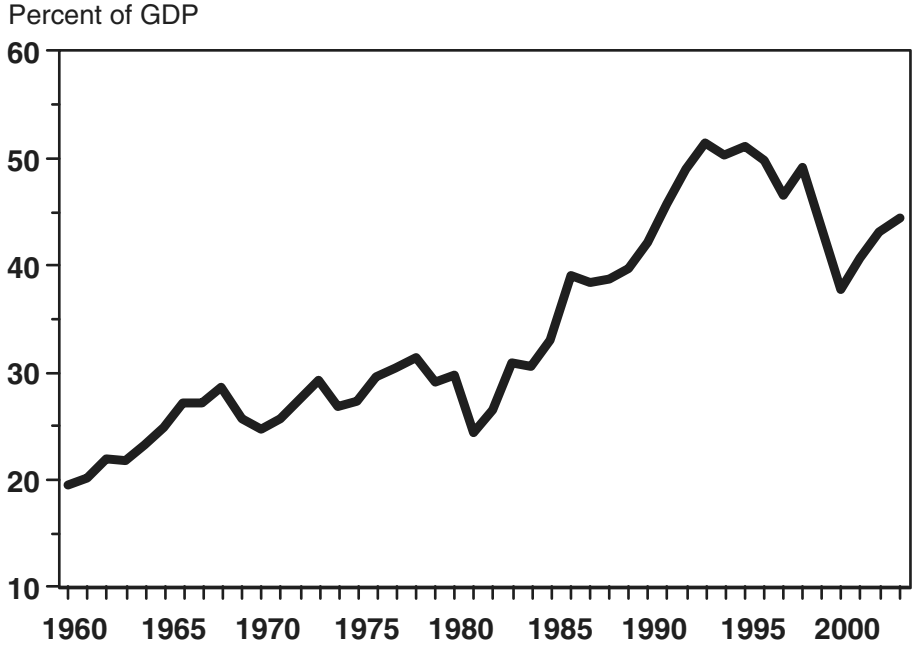
Table 12–1. GOVERNMENT ASSETS AND LIABILITIES*

(As of the end of the fiscal year, in billions of 2003 dollars)

	1960	1965	1970	1975	1980	1985	1990	1995	2000	2001	2002	2003
ASSETS												
Financial Assets:												
Cash and Checking Deposits	44	63	39	32	49	32	43	44	59	52	79	53
Other Monetary Assets	1	1	1	1	2	2	2	1	7	12	19	9
Mortgages	28	27	40	42	78	80	102	70	81	78	76	74
Other Loans	104	143	179	179	230	301	214	163	137	129	121	118
less Expected Loan Losses	–1	–3	–5	–9	–18	–18	–20	–25	–39	–39	–46	–47
Other Treasury Financial Assets	63	79	69	62	87	129	206	247	226	241	258	292
Total	239	310	324	307	428	526	546	511	539	553	603	589
Nonfinancial Assets:												
Fixed Reproducible Capital:	1,030	1,021	1,062	1,029	974	1,102	1,143	1,149	1,007	994	992	998
Defense	890	836	845	772	693	806	827	808	661	640	630	631
Nondefense	140	185	217	257	281	297	316	341	346	354	362	367
Inventories	274	237	221	197	244	279	247	191	196	190	195	194
Nonreproducible Capital:	443	455	436	646	1,035	1,110	876	666	998	1,058	1,045	1,202
Land	96	133	168	266	340	353	363	282	438	457	526	553
Mineral Rights	347	322	268	380	696	757	513	384	560	601	519	649
Subtotal	1,747	1,713	1,719	1,873	2,254	2,491	2,267	2,005	2,200	2,241	2,232	2,394
Total Assets	**1,986**	**2,023**	**2,043**	**2,180**	**2,682**	**3,018**	**2,813**	**2,515**	**2,739**	**2,795**	**2,835**	**2,984**
LIABILITIES												
Debt held by the Public	1,194	1,228	1,093	1,111	1,381	2,284	3,112	4,135	3,601	3,423	3,600	3,915
Insurance and Guarantee Liabilities:												
Deposit Insurance	.....	.....	.....	.....	2	10	75	5	1	3	2	1
Pension Benefit Guarantee	.....	.....	.....	45	33	45	45	22	43	53	82	71
Loan Guarantees	*	1	2	7	13	11	16	31	39	40	38	36
Other Insurance	33	29	23	21	28	17	21	18	17	16	16	16
Subtotal	33	30	25	73	76	83	157	76	100	112	139	124
Pension and Post-Employment Health Liabilities:												
Civilian and Military Pensions	836	1,051	1,256	1,423	1,889	1,874	1,832	1,776	1,810	1,819	1,861	1,886
Retiree Health Insurance Benefits	200	252	301	341	453	449	439	426	406	795	820	842
Veterans Disability Compensation	198	249	298	330	339	280	252	275	584	713	863	955
Subtotal	1,234	1,552	1,855	2,094	2,680	2,603	2,523	2,477	2,800	3,328	3,544	3,684
Other Liabilities:												
Trade Payables and Miscellaneous	29	35	44	56	86	112	154	128	104	106	104	116
Benefits Due and Payable	21	26	35	43	53	66	74	80	82	89	97	99
Subtotal	50	61	79	99	138	178	228	208	187	195	201	215
Total Liabilities	**2,511**	**2,870**	**3,052**	**3,377**	**4,276**	**5,148**	**6,020**	**6,896**	**6,687**	**7,058**	**7,484**	**7,937**
Net Assets (Assets Minus Liabilities)	**–525**	**–847**	**–1,009**	**–1,197**	**–1,594**	**–2,130**	**–3,207**	**–4,380**	**–3,948**	**–4,263**	**–4,649**	**–4,953**
Addenda:												
Net Assets Per Capita (in 2003 dollars)	–2,911	–4,365	–4,929	–5,550	–6,988	–8,921	–12,797	–16,406	–13,958	–14,908	–16,084	–16,961
Ratio to GDP (in percent)	–19.8	–25.4	–25.3	–26.5	–29.5	–33.0	–42.5	–51.4	–37.9	–41.0	–43.4	–44.6

*This Table shows assets and liabilities for the Government as a whole, excluding the Federal Reserve System. Data for 2003 are extrapolated in some cases.

Chart 12-2. Net Federal Liabilities



Liabilities

Table 12–1 includes Federal liabilities that would also be listed on a business balance sheet. All the various forms of publicly held Federal debt are counted, as are Federal pension and health insurance obligations to civilian and military retirees and the disability compensation that is owed the Nation's veterans. The estimated liabilities stemming from Federal insurance programs and loan guarantees are also shown. The benefits that are due and payable under various Federal programs are also included, but these are short-term obligations not long-term responsibilities.

Other obligations, including future benefit payments that are likely to be made through Social Security and other Federal income transfer programs, are not shown in this table. These are not Federal liabilities in a legal or accounting sense. They are Federal responsibilities, and it is important to gauge their size, but they are not binding in the same way that a liability is. That is why a simple balance sheet can give a misleading impression of the Federal financial position. The budget projections and other data in Part III are designed to provide a sense of these broader responsibilities and their claim on future budgets.

Debt Held by the Public: The Federal Government's largest single liability is the debt owed to the public. It amounted to about $3.9 trillion at the end of 2003, down from a peak value of $4.2 trillion (in constant 2003 dollars) in 1996. Publicly held debt declined for several years in the late 1990s because of the unified budget surplus that had emerged at that time, but as the deficit has returned, publicly held debt has begun to increase again, while remaining below its previous peak level measured in real terms.

Insurance and Guarantee Liabilities: The Federal Government has contingent liabilities arising from the loan guarantees it has made and its insurance programs. When the Government guarantees a loan or offers insurance, cash disbursements are often small initially, and if a fee is charged, the Government may even collect money; but the risk of future cash payments associated with such commitments can be large. The figures reported in Table 12–1 are estimates of the current discounted value of prospective future losses on outstanding guarantees and insurance contracts. The present value of all such losses taken together is about $0.1 trillion. As is true elsewhere in this chapter, this estimate does not incorporate the market value of the risk associated with these contingent liabilities; it merely reflects the present value of expected losses. Although individually many of these programs are large and potential losses can be a serious concern, relative to total Federal liabilities or even the total debt held by the public, these insurance and guarantee liabilities are fairly small. They were less than 2 percent of total liabilities in 2003.

Pension and Post-Employment Health Liabilities: The Federal Government owes pension benefits as a form of deferred compensation to retired workers and to current employees who will eventually retire. It also provides civilian retirees with subsidized health insurance through the Federal Employees Health Benefits program and military retirees receive similar benefits. Veterans are owed compensation for their service related

disabilities. While the Government's employee pension obligations have risen slowly, there has been a sharp increase in the liability for future health benefits and veterans compensation. The discounted present value of all these benefits was estimated to be around $3.7 trillion at the end of FY 2003 up from $2.8 trillion in 2000.[2] There was a large expansion in Federal military retiree health benefits legislated in 2001.

Net Assets

The Government need not maintain a positive balance of net assets to assure its fiscal solvency, and the buildup in net liabilities since 1960 has not significantly damaged Federal creditworthiness. Long-term Government interest rates in 2003 reached their lowest levels in 45 years, although by year end rates were substantially above their low point in May. For the year as a whole, the average level of long term rates were lower than in any year since 1963. Despite the continued good performance of interest rates, there are limits to how much debt the Government can assume without putting its finances in jeopardy. Over an extended time horizon, the Federal Government must take in enough revenue to cover all of its spending including debt service. A Government that borrows must eventually pay for what it has borrowed. The Government's ability to service its debt in the long run, however, cannot be gauged from a balance sheet alone. To judge the prospects for long-run solvency it is necessary to project the budget into the future.

PART III—THE LONG-RUN BUDGET OUTLOOK

A balance sheet with its focus on obligations arising from past transactions can only show so much information. For the Government, it is important to anticipate what future budgetary requirements might flow from future transactions as implied by current law. Despite their uncertainty, very long-run budget projections can be useful in sounding warnings about potential problems. Federal responsibilities extend well beyond the next five or ten years, and problems that may be small in that time frame can become much larger if allowed to grow.

Programs like Social Security and Medicare are intended to continue indefinitely, and so long-range projections for Social Security and Medicare have been prepared for decades. Budget projections for individual programs, even ones as important as Social Security and Medicare, do not reveal the Government's overall budgetary position. Only by projecting the entire budget is it possible to anticipate whether sufficient resources will be available to meet all the anticipated requirements for individual programs. It is also necessary to estimate how the budget's future growth compares with that of the economy to judge how well the economy might be able to support future budgetary needs.

To assess the overall financial condition of the Government, it is necessary to examine the future prospects for all Government programs including the revenue sources that support Government spending. Such an assessment reveals that the key drivers of the long-range deficit are, not surprisingly, Social Security and Medicare along with Medicaid, the Federal program that helps States provide health coverage for low-income people and nursing home care for the elderly. Medicaid, like Medicare and Social Security, is projected to grow more rapidly than the economy over the next several decades and to add substantially to the overall budget deficit. Under current law, there is no offset anywhere in the budget that is large enough to cover all the demands that will eventually be imposed by Social Security, Medicare, and Medicaid.

Future budget outcomes depend on a host of unknowns—constantly changing economic conditions, unforeseen international developments, unexpected demographic shifts, the unpredictable forces of technological advance, and evolving political preferences to name a few. The uncertainty increases the further into the future projections are extended. Such uncertainty, while making accuracy more difficult, actually *enhances* the importance of long-term projections. People are generally averse to risk, but it is not possible to assess the likelihood of future risks without projections. Although a full treatment of risks is beyond the scope of this chapter, the chapter is able to show how the budget projections respond to changes in some of the key economic and demographic parameters. Given the uncertainties, the best that can be done is to work out the implications of expected developments on a "what if" basis.

The Impending Demographic Transition

In 2008, the first members of the huge generation born after World War II, the so-called baby-boomers, will reach age 62 and become eligible for early retirement under Social Security. In the years that follow, the elderly population will skyrocket, putting serious strains on the budget because of increased expenditures for Social Security and for the Government's health programs serving this population.

The pressures are expected to persist even after the baby-boomers are gone. The Social Security actuaries project that the ratio of workers to Social Security beneficiaries will fall from around $3\frac{1}{2}$ currently to a little over 2 by the time most of the baby-boomers have retired. Because of lower fertility and improved mortality, that ratio is expected to continue to decline slowly from there. With fewer workers to pay the taxes needed to

[2] The pension liability is the actuarial present value of benefits accrued-to-date based on past and projected salaries. The 2003 liability was extrapolated. The retiree health insurance liability is based on actuarial calculations of the present value of benefits promised under existing programs. Estimates are only available since 1997. For earlier years the liability was assumed to grow in line with the pension liability, and for that reason may differ significantly from what the actuaries would have calculated for this period. Veterans' disability compensation was taken from the *2002 Financial Report of the United States Government* and *Reports from earlier years.*

support the retired population, the budgetary pressures will continue to grow. The problem posed by the demographic transition is a permanent and a growing one.

Currently, the three major entitlement programs—Social Security, Medicare and Medicaid—account for 43 percent of non-interest Federal spending, up from 30 percent in 1980. By 2040, when most of the remaining baby-boomers will be in their 80s, these three programs could easily account for 70 percent of non-interest Federal spending. At the end of the projection period, the figure rises to nearly 80 percent of non-interest spending. In other words, under an extension of current-law formulas and the policies in the budget, almost all of the budget would go to these three programs alone. That would severely reduce the flexibility of the budget, and the Government's ability to respond to new challenges.

An Unsustainable Path

These long-run budget projections show clearly that the budget is on an unsustainable path, although the rise in the deficit unfolds gradually. The budget deficit is projected to decline as the economy expands over the next several years, while most of the baby-boomers will remain in the work force. As the baby-boomers begin to reach retirement age in large numbers, the deficit begins to rise steadily. This process is projected to begin about 10 years from now, i.e., in about 10 years, the deficit as a share of GDP reaches a low point and then begins an inexorable increase. By the end of the projection period for this chapter in 2080, rising deficits would drive publicly held Federal debt to levels several times the size of GDP.

The revenue projections in this section start with the budget's estimate of receipts under the Administration's proposals. They assume that individual income tax receipts will rise somewhat relative to GDP. This increase reflects the higher marginal tax rates that people will face as their real incomes rise in the future (the tax code is indexed for inflation, but not for real economic growth). In terms of total receipts collected relative to GDP, those income tax increases are partly offset by declines in Federal excise tax receipts, which are generally not indexed for inflation. Payroll taxes also are projected to decline relative to GDP because the base for these taxes—cash wages and salaries—has shown a tendency to decline relative to total compensation, which again partly offsets the increase in income tax receipts. Even so, the overall share of Federal receipts in GDP is projected to rise above the average of 17 to 19 percent that prevailed from 1960 through the mid-1990s and approaches 22 percent by 2080.

The long-run budget outlook is highly uncertain (see the technical note at the end of this chapter for a discussion of the forecasting assumptions used to make these budget projections). With pessimistic assumptions, the fiscal picture deteriorates even sooner than in the base projection. More optimistic assumptions imply a longer period before the pressures of rising entitlement spending overwhelm the budget. But despite the unavoidable uncertainty, these projections show that under a wide range of reasonable forecasting assumptions, the resources generated by the programs themselves will be insufficient to cover the long-run costs of Social Security and Medicare. The recently passed Medicare Prescription Drug, Improvement, and Modernization Act of 2003, which added a vital new prescription drug benefit to Medicare, will put additional cost pressures on the program. However, this legislation made other important changes to Medicare, including a significant increase in private sector participation and new fiscal safeguards, which may help address Medicare's long-run shortfall. Despite these improvements, Medicare's long-run financial outlook remains uncertain, and it is likely that further reforms will be necessary to sustain both Medicare and Social Security in the future.

Alternative Economic and Technical Assumptions

The quantitative results discussed above are sensitive to changes in underlying economic and technical assumptions. Some of the most important of these alternative economic and technical assumptions and their effects on the budget outlook are discussed below. Each highlights one of the key uncertainties in the outlook. All show that there are mounting deficits under most reasonable projections of the budget.

Table 12–2. LONG-RUN BUDGET PROJECTIONS OF 2005 BUDGET POLICY

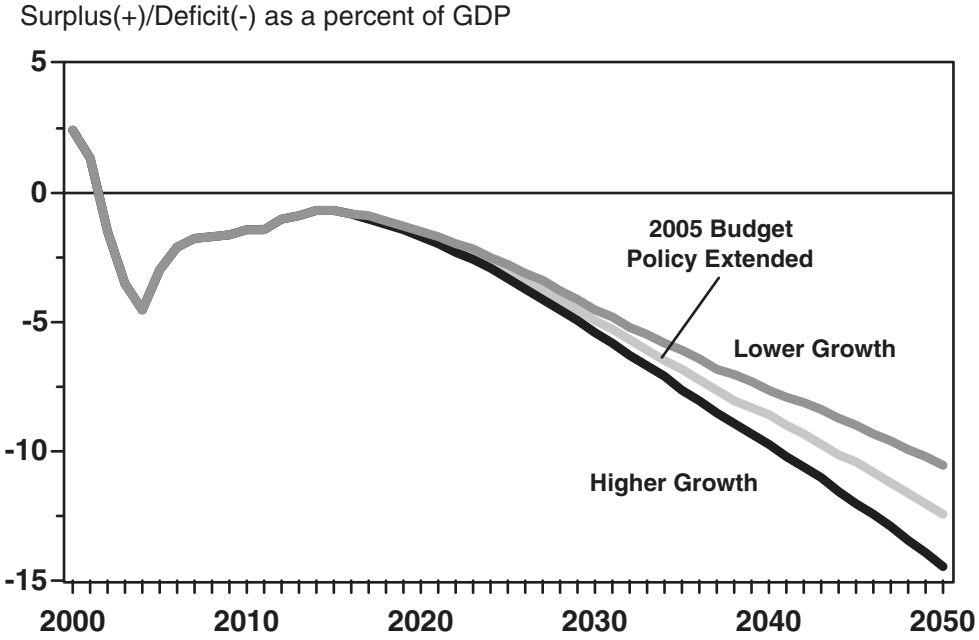
(Percent of GDP)

	2000	2010	2020	2030	2040	2060	2080
Discretionary Spending Grows with GDP:							
Receipts	20.9	17.9	18.6	19.0	19.5	20.6	21.6
Outlays	18.4	19.3	20.3	24.1	28.2	37.7	53.2
Discretionary	6.3	6.2	5.4	5.4	5.4	5.4	5.4
Mandatory	9.8	11.0	13.0	15.9	17.9	20.6	24.6
Social Security	4.2	4.2	5.0	6.0	6.2	6.5	6.8
Medicare	2.0	2.9	3.9	5.9	7.4	9.6	12.5
Medicaid	1.2	1.7	2.1	2.4	2.7	3.3	4.1
Other	2.4	2.3	1.9	1.7	1.5	1.2	1.1
Net Interest	2.3	2.1	1.8	2.7	4.9	11.7	23.2
Surplus or Deficit (–)	2.4	–1.4	–1.7	–5.0	–8.7	–17.2	–31.6
Primary Surplus or Deficit (–)	4.7	0.7	0.1	–2.3	–3.8	–5.5	–8.4
Federal Debt Held by the Public	35.1	39.3	34.0	51.3	92.2	219.3	432.3

1. *Health Spending:* The projections for Medicare over the next 75 years are based on the actuarial projections in the 2003 Medicare Trustees' Report, as adjusted for the effects of the Medicare prescription drug and modernization bill enacted in December 2003. Following the recommendations of its Technical Review Panel, the Medicare trustees assume that over the long-run "age- and gender-adjusted, per-beneficiary spending growth exceeds the growth of per-capita GDP by 1 percentage point per year." This implies that total Medicare spending will rise faster than GDP throughout the projection period.

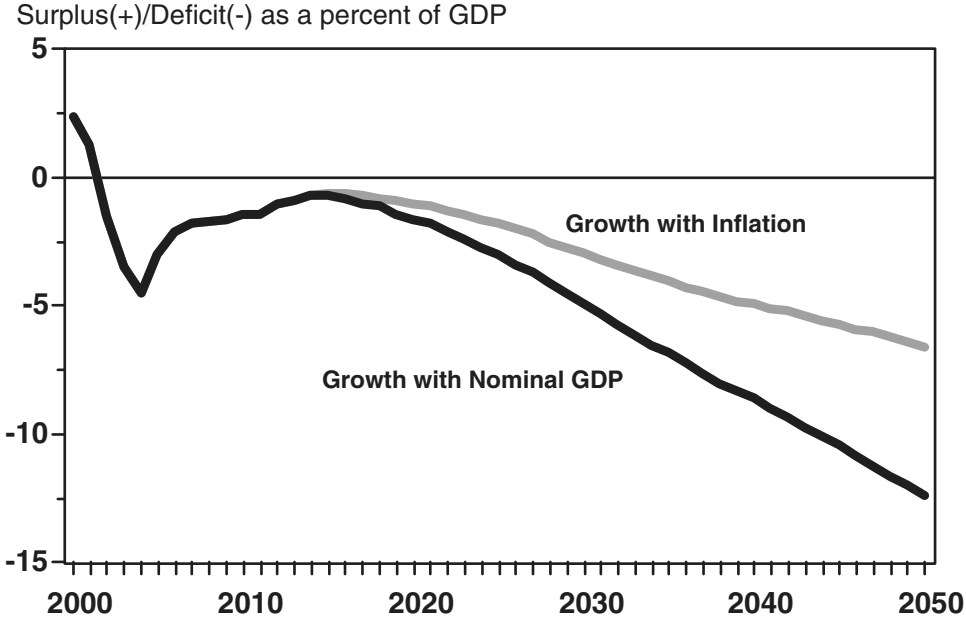
Eventually, the rising trend in health care costs for both Government and the private sector will have to end, but it is hard to know when and how that will happen. "Eventually" could be a long way off. Improved health and increased longevity are highly valued, and society may be willing spend a much larger share of income on them than it has heretofore. Whether society will be willing to devote the large share of resources to health care implied by these projections is an open question. The alternatives highlight the effect of raising the projected growth rate in per capita health care costs by 1/4 percentage point and the effect of lowering it by the same amount.

Chart 12-3. Health Care Cost Alternatives



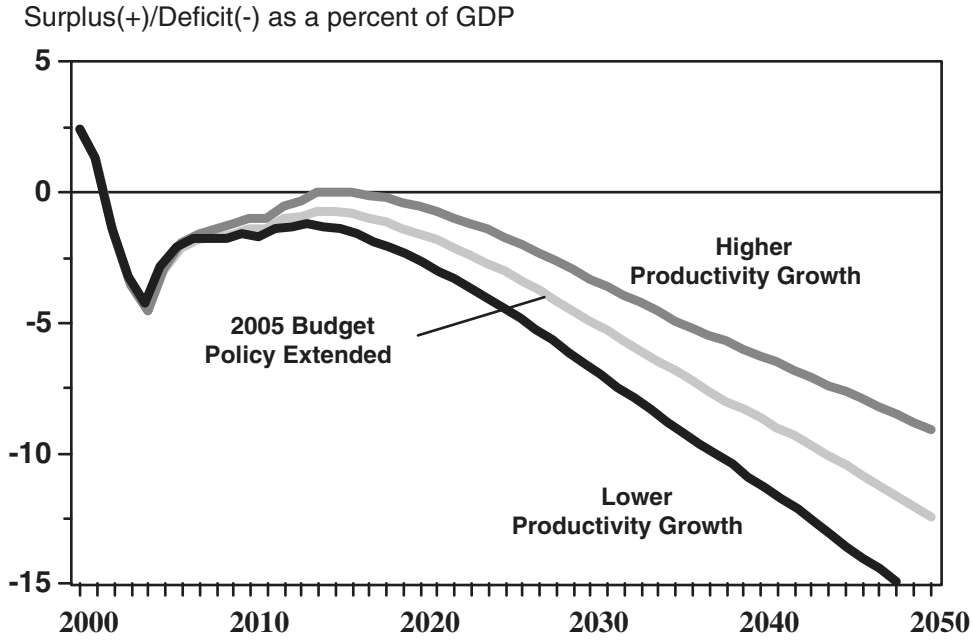
2. *Discretionary Spending:* The assumption used to project discretionary spending is essentially arbitrary, because discretionary spending is determined annually through the legislative process, and no formula can dictate future spending in the absence of legislation. Alternative assumptions have been made for discretionary spending in past budgets. Holding discretionary spending unchanged in real terms is the "current services" assumption used for baseline budget projections when there is no legislative guidance on future spending levels. Extending this assumption over many decades, however, is not necessarily realistic. When the population and economy are expected to grow, the demand for public services is likely to expand, although not necessarily as fast as GDP. The current base projection assumes that discretionary spending keeps pace with the growth in GDP in the long run, so that spending increases in real terms whenever there is real economic growth. An alternative assumption would be that discretionary spending increases only for inflation. In other words, real inflation-adjusted level of discretionary spending holds constant. This alternative moderates the long-run rise in the deficit because the shrinkage in discretionary spending as a share of GDP partially offsets the rise in entitlement outlays.

Chart 12-4. Alternative Discretionary Spending Assumptions



3. *Productivity:* The rate of future productivity growth has an important effect on the long-run budget outlook. It is also highly uncertain. Over the next few decades an increase in productivity growth would reduce the projected budget deficits appreciably. Higher productivity growth adds directly to the growth of the major tax bases, while it has only a delayed effect on outlay growth even assuming that in the long-run discretionary outlays rise with GDP. In the latter half of the 1990s, after two decades of much slower growth, productivity growth increased unexpectedly and it has increased again during the first three years of the new century. The increase in productivity growth is one of the most welcome developments of the last several years. Although the long-run growth rate of productivity is inherently uncertain, it has averaged 2.3 percent since 1948, and the long-run budget projections assume that real GDP per hour will also grow at a 2.3 percent annual rate over most of this century. The alternatives highlight the effect of raising the projected productivity growth rate by 1/4 percentage point and the effect of lowering it by a same amount.

Chart 12-5. Alternative Productivity Assumptions



4. *Population:* The key assumptions for projecting long-run demographic developments concern fertility, immigration, and mortality.

- The demographic projections assume that fertility will average around 1.9 births per woman in the future, just slightly below the replacement rate needed to maintain a constant population—2.1 births.
- The rate of immigration is assumed to average around 900,000 per year in these projections. Higher immigration relieves some of the downward pressure on population from low fertility and allows total population to expand throughout the projection period, although at a much slower rate than has prevailed historically in the United States.
- Mortality is projected to decline; i.e., people are expected to live longer. The average female lifespan is projected to rise from 79.5 years in 2002 to 85.5 years by 2080, and the average male lifespan is projected to increase from 74.2 years in 2002 to 81.6 years by 2080. A technical panel to the Social Security Trustees recently reported that the improvement in longevity might even be greater.

Chart 12-6. Alternative Fertility Assumptions

Surplus(+)/Deficit(-) as a percent of GDP

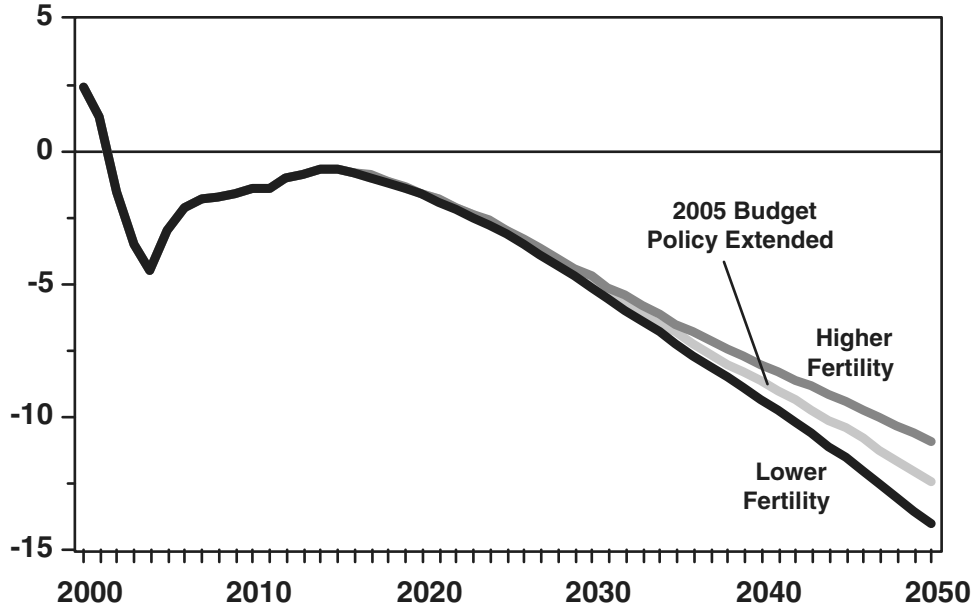


Chart 12-7. Alternative Mortality Assumptions

Surplus(+)/Deficit(-) as a percent of GDP

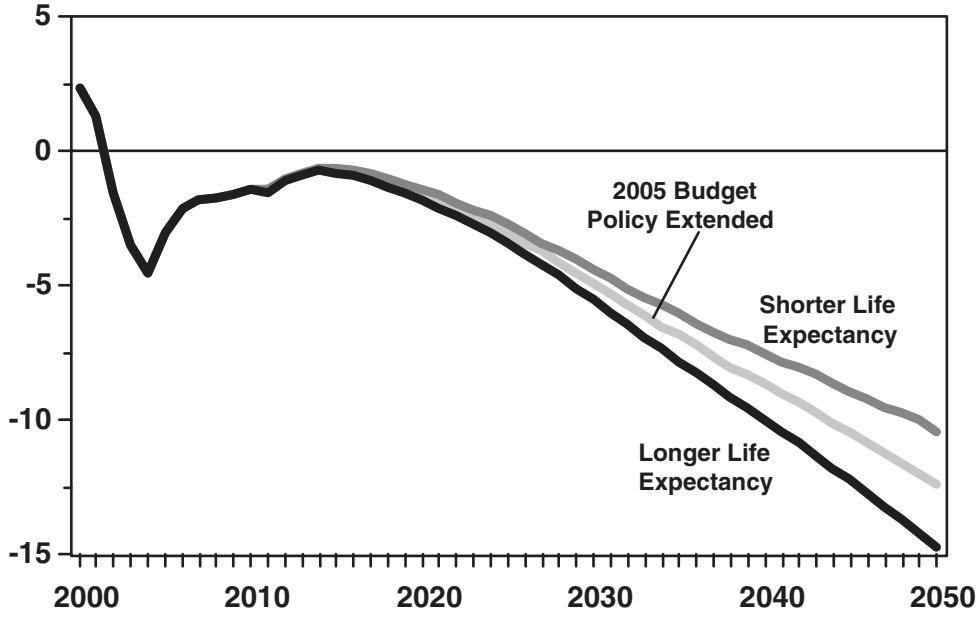
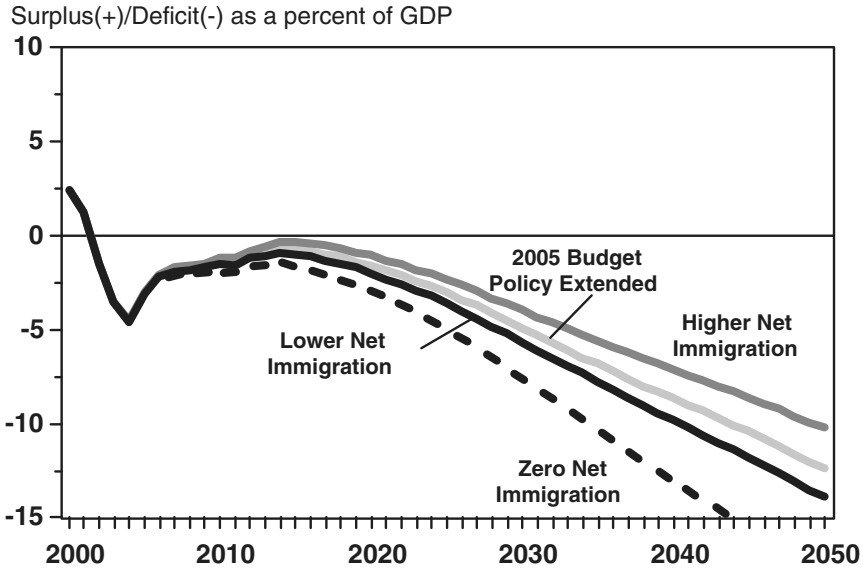


Chart 12-8. Alternative Immigration Assumptions



Actuarial Projections for Social Security and Medicare

Social Security and Medicare are the Government's two largest entitlement programs. Both rely on payroll tax receipts from current workers and employers for at least part of their financing, while the programs' benefits largely go to those who are retired. The importance of these programs for the retirement security of current and future generations makes it essential to understand their long-range financial prospects. Although Social Security and Medicare's Hospital Insurance (HI) program are currently in surplus, actuaries for both programs have calculated that they face long-run deficits. How best to measure the long-run imbalances in Social Security and in the consolidated Medicare program, including Supplementary Medical Insurance (SMI) as well as HI, is a challenging analytical question, but reasonable calculations suggest that each program faces such a huge financial deficiency that it will be very difficult for the Government as a whole to maintain control of the budget without addressing each of these program's financial problems.

Social Security: The Long-Range Challenge

Social Security provides retirement security and disability insurance for tens of millions of Americans through a system that is intended to be self-financing over time. The principle of self-financing is important because it compels corrections in the event that projected benefits consistently exceed dedicated receipts.

While Social Security is running surpluses today, it will begin running cash deficits in about 15 years. Social Security's spending path is unsustainable under current law. The impending retirement of the baby-boom generation, born following World War II, will greatly increase the number of Social Security beneficiaries beginning within ten years. Demographic trends toward lower fertility rates and longer life spans mean that the ratio of retirees to the working population will remain permanently higher. The number of workers available to support each retiree will decline from 3.3 today to 2.2 in 2030 and continue to drift down slowly from there. This means that the Government will not be able to meet current-law benefit obligations at current payroll tax rates.

The future size of Social Security's shortfall cannot be known with any precision, but a gap between Social Security receipts and outlays emerges under a wide range of reasonable forecasting assumptions. Long-range uncertainty underscores the importance of creating a system that is financially stable and self-contained. Otherwise, if the pessimistic assumptions turn out to be more accurate, the demands created by Social Security could compromise the rest of the budget and the Nation's economic health.

The current structure of Social Security leads to substantial generational differences in the average rate of return people can expect from the program. While previous generations have fared extremely well, the average individual born today can expect to receive less than a two percent annual real rate of return on their payroll taxes (including the employer's portion, which most economists believe is borne by labor). Moreover, such estimates in a sense overstate the expected rate of return for future retirees, because they assume no changes in current-law taxes or benefits, even though such changes are needed to meet Social Security's financing shortfall. As an example, a 1995 analysis found that for an average worker born in 2000 a 1.7 percent rate of return would turn into a 1.5 percent rate of return after adjusting revenues to keep the system solvent.

One way to address the issues of uncertainty and declining rates of return, while protecting national savings, would be to allow individuals to invest some of their payroll taxes in personal retirement accounts. The President's Commission to Strengthen Social Security presented various options that would include personal accounts within the Social Security framework.

Medicare: The Long-Range Challenge

Medicare provides health insurance for tens of millions of Americans, including most of the nation's seniors. It is composed of two programs: Hospital Insurance (HI) or Part A, which covers medical expenses relating to hospitalization, and Supplementary Medical Insurance (SMI) or Part B, which pays for physician and outpatient services, and will now also pay for the new prescription drug benefit.

Like social security, HI is self-financing through dedicated taxes. According to the Medicare trustees' most recent report, projected spending for HI under current law will exceed taxes going into the HI trust fund after 2012, and the fund is projected to be depleted by 2026. Looking at the long run, the Medicare actuaries project a 75-year unfunded promise to Medicare's HI trust fund of around $6 trillion. However, this measure tells less than half the story because it does not include the deficiency in Medicare's SMI trust fund. SMI's only source of dedicated revenues is beneficiary premiums, which generally cover about one-quarter of its expenses. SMI's funding structure creates an enormous financing gap for the program, and is the largest contributor to the total Medicare program shortfall of $15.8 trillion (or $15.6 trillion including trust fund assets). (These estimates are as of the 2003 Medicare trustees' report and do not reflect the effects of the recent Medicare prescription drug and reform legislation.)

SMI's financing shortfall is covered by an unlimited tap on general revenues, the ultimate source of which is the Federal taxpayer. The new Medicare prescription drug legislation builds in fiscal safeguards to monitor Medicare's use of general revenues. The trustees are required to analyze Medicare's reliance on these funds, and issue a warning if Medicare's reliance on general revenues is projected to exceed 45 percent of total Medicare expenditures at any point during the following six years. Current projections indicate that Medicare's reliance on general revenues may exceed this threshold as early as 2014. If the trustees issue a warning in two consecutive years, the bill provides special legislative procedures to allow the President and Congress to address the shortfall in advance of financial crises in the Medicare trust funds.

The 75-Year Horizon: In their annual reports and related documents, the Social Security and Medicare trustees typically present calculations of the 75-year actuarial imbalance or deficiency for Social Security and Medicare. The calculation covers current workers and retirees, as well as those projected to join the program within the next 75 years (this is the so-called "open-group" calculation; the "closed-group" covers only current workers and retirees". These estimates measure the present discounted value of each program's future benefits net of future income. They are complementary to the flow projections described in the preceding section.

The present discounted value of the Social Security imbalance was estimated to be about $5 trillion at the beginning of 2003, and the comparable estimate for Medicare was around $16 trillion. (The estimates in Table 12–3 were prepared by the Social Security and Medicare actuaries, and they are based on the intermediate economic and demographic assumptions used for the 2003 trustees' reports. These differ in some respects from the assumptions used for the long-run budget projections described in the preceding section, but the basic message of Table 12–3 would not change if OMB assumptions had been used for the calculations.)

Limiting the calculations to 75 years understates the deficiencies, because the actuarial calculations omit the large deficits that continue to occur beyond the 75th year. The understatement is significant, even though values beyond the 75th year are discounted by a large amount. The current deficiency in Social Security is essentially due to the excess benefits paid to past and current participants compared with their taxes. For current program participants, the present value of expected future benefits exceeds the present value of expected future taxes by about $12 trillion. By contrast, future participants—those who are now under age 15 or not yet born—are projected to pay in present value about $7 trillion more over the next 75 years than they will collect in benefits over that period. In fixing the horizon at 75 years, most of the taxes of these future participants are counted without a full accounting for their expected benefits, much of which will be received beyond the 75th year. For Social Security, the present value of benefits less taxes in the 76th year alone is nearly $0.1 trillion. Altogether, the far distant benefits, estimated in perpetuity, add about $7 trillion to the imbalance, which essentially offsets the expected net contribution from future participants over the next 75 years.

Medicare: A significant portion of Medicare's deficiency is caused by the rapid expected increase in future benefits due to rising health care costs. Some, perhaps most, of the projected increase in relative health care costs reflects improvements in the quality of care, although there is also evidence that medical errors and waste add unnecessarily to health care costs. Even though the projected increases in Medicare spending are likely to contribute to longer life-spans and safer treatments, the financial implications remain the

Table 12–3. ACTUARIAL PRESENT VALUES OVER A 75–YEAR PROJECTION PERIOD

(Discounted Present Value of Expected Benefit Payments in Excess of Future Earmarked Taxes and Premiums as of Jan. 1, 2003, Trillions of Dollars)

	2000	2001	2002	2003
Social Security				
Future benefits less future taxes for those age 15 and over	9.6	10.5	11.2	11.7
Future benefits less taxes for those age 14 and under and those not yet born	–5.8	–6.3	–6.7	–6.8
Net present value for past, present and future participants	**3.8**	**4.2**	**4.6**	**4.9**
Medicare				
Future benefits less future taxes and premiums for those age 15 and over	9.9	12.5	12.9	15.0
Future benefits less taxes and premiums for those age 14 and under and those not yet born	–0.7	0.3	0.4	0.8
Net present value for past, present and future participants	**9.2**	**12.8**	**13.3**	**15.8**
Social Security and Medicare				
Future benefits less future taxes and premiums for those age 15 and over	19.5	23.0	24.1	26.7
Future benefits less taxes and premiums for those age 14 and under and not yet born	–6.5	–6.0	–6.3	–6.0
Net present value for past, present and future participants	**13.0**	**17.0**	**17.8**	**20.7**
Addendum:				
Actuarial deficiency as a percent of the discounted payroll tax base:				
Social Security	–1.89	–1.86	–1.87	–1.92
Medicare HI	–1.21	–1.97	–2.02	–2.40

same. As long as medical costs continue to outpace the growth of GDP and other expenditures, as assumed in these projections, the financial pressure on the budget will mount.

The rapid projected growth of Medicare spending is reflected in the estimates in Table 12–3. For current participants, the difference between the discounted value of benefits and taxes plus premiums is $15 trillion, which is larger than the similar gap for Social Security. For future participants over the next 75 years, Medicare benefits are projected to be roughly equal in magnitude to future taxes and premiums. Unlike Social Security, the discounted value of future taxes does not exceed benefits during this period even though benefits beyond the 75th year are not counted. Extending the calculation beyond the 75th year would add many trillions of dollars in present value to Medicare's actuarial deficiency, just as it would for Social Security. Passage of the Medicare Prescription Drug, Improvement and Modernization Act added to Medicare's actuarial deficiency, but it is uncertain how large the final impact will be given that the legislation increased private sector participation and added new fiscal safeguards which may help address Medicare's financial shortfall. The 2004 Medicare trustees' report will provide actuarial estimates of long-run Medicare income and expenditures that reflect the new law.

General revenues have historically covered about 75 percent of SMI program costs, with the rest being covered by premiums paid by the beneficiaries. In Table 12–3, only the receipts explicitly earmarked for financing these programs have been included. The intragovernmental transfer is not financed by dedicated tax revenues, and the share of general revenues that would have to be devoted to SMI to close the gap increases substantially under current projections. Other Government programs also have a claim on these general revenues, and SMI has no priority in the competition for future funding. From the standpoint of the Government as a whole, only receipts from the public can finance expenditures.

The Trust Funds and the Actuarial Deficiency: The simple fact that a trust fund exists does not mean that the Government necessarily saved the money recorded there. To have saved the Social Security and HI trust fund surpluses as they accumulated would have required the Government to set aside the surpluses reducing the unified budget deficit dollar for dollar with the change in the trust fund balance (or adding dollar for dollar to a unified budget surplus). It is an open question whether this happened or not. The large unified budget deficits that prevailed during most of the time when the trust funds were increasing suggests that the Government did not do this, although to know this for sure it would be necessary to know what the unified deficit would have been in the absence of those trust fund surpluses, and that is not really knowable.

The assets in the trust funds are special purpose financial instruments issued by the Treasury Department. At the time Social Security or Medicare redeems these instruments to pay future benefits not covered by future income, the Treasury will have to turn to the public capital markets to raise the funds to finance the benefits, just as if the trust funds had never existed. From the standpoint of overall Government finances, the trust funds do not reduce the future burden of financing Social Security or Medicare benefits.

In any case, the trust funds remain small in size compared with the programs' future obligations and well short of what would be needed to pre-fund future benefits as indicated by the programs' actuarial deficiencies. Historically, Social Security and Medicare's HI program were financed mostly on a pay-as-you-go basis, whereby workers' payroll taxes were immediately used

to pay retiree benefits. For the most part, workers' taxes have not been used to pre-fund their own future benefits, and taxes were not set at a level sufficient to pre-fund future benefits even had they been saved.

The Importance of Long-Run Measures in Evaluating Policy Changes: Consider a proposed policy change in which payroll taxes paid by younger workers were reduced by $100 this year while the expected present value of these workers' future retirement benefits were also reduced by $100. The present discounted value of future benefit payments would decrease by the same amount as the reduction in revenue. On a cash flow basis, however, the lost revenue occurs now, while the decrease in future outlays is in the distant future beyond the budget window, and the Federal Government must increase its borrowing to make up for the lost revenue in the meantime. If policymakers only focus on the Government's near-term borrowing needs, a reform such as this would appear to worsen the Government's finances, whereas the policy actually has a neutral impact. Extending the forecast horizon to 75 years, as in this chapter, can help to avoid such a false impression, although any fixed horizon, even 75 years, can give rise to a distorted comparison if budget effects continue past that point.

Now suppose that future outlays were instead reduced by a little more than $100 in present value. In this case, the actuarial deficiency would actually *decline,* even though the Government's borrowing needs would again increase. Focusing on the Government's near-term borrowing alone, therefore, can lead to a bias against policies that could improve the Federal Government's overall fiscal condition. Taking a longer view of policy changes and considering measures of the Government's fiscal condition other than the unified budget surplus or deficit can correct for such mistakes.

PART IV—NATIONAL WEALTH AND WELFARE

Unlike a private corporation, the Federal Government routinely invests in ways that do not add directly to its assets. For example, Federal grants are frequently used to fund capital projects by State or local governments for highways and other purposes. Such investments are valuable to the public, which pays for them with its taxes, but they are not owned by the Federal Government and would not show up on a conventional balance sheet for the Federal Government. It is true, of course, that by encouraging economic growth in the private sector, the Government augments future Federal tax receipts. However, the fraction of their returns that comes back to the Government in higher taxes is far less than what a private investor would require before undertaking a similar investment.

The Federal Government also invests in education and research and development (R&D). These outlays contribute to future productivity and are analogous to an investment in physical capital. Indeed, economists have computed stocks of human and knowledge capital to reflect the accumulation of such investments. Nonetheless, such hypothetical capital stocks are obviously not owned by the Federal Government, nor would they appear on a typical balance sheet as a Government asset, even though these investments may contribute to future tax receipts.

To show the importance of these kinds of issues, Table 12–4 presents a national balance sheet. It includes estimates of national wealth classified into three categories: physical assets, education capital, and R&D capital. The Federal Government has made contributions to each of these categories of capital, and these contributions are shown separately in the table. At the same time, the private wealth shown in Table 12–4 can be drawn on by Government to finance future public activities. The Nation's wealth sets the ultimate limit on the resources available to the Government. Data in this table are especially uncertain, because of the strong assumptions needed to prepare the estimates.

The conclusion of the table is that Federal investments are responsible for about 7 percent of total national wealth including education and research and development. This may seem like a small fraction, but it represents a large volume of capital—$6.0 trillion. The Federal contribution is down from near 9 percent in the mid-1980s and from around 11 percent in 1960. Much of this reflects the shrinking size of defense capital stocks, which have declined from around 12 percent of GDP in the mid-1980s to 6 percent in 2003.

Physical Assets: The physical assets in the table include stocks of plant and equipment, office buildings, residential structures, land, and the Government's physical assets such as military hardware and highways. Automobiles and consumer appliances are also included in this category. The total amount of such capital is vast, around $46 trillion in 2003, consisting of $39 trillion in private physical capital and $7 trillion in public physical capital (including capital funded by State and local governments); by comparison, GDP was about $11 trillion in 2003. The Federal Government's contribution to this stock of capital includes its own physical assets of $2.4 trillion plus $1.1 trillion in accumulated grants to State and local governments for capital projects. The Federal Government has financed about one-fourth of the physical capital held by other levels of government.

Education Capital: Economists have developed the concept of human capital to reflect the notion that individuals and society invest in people as well as in physical assets. Investment in education is a good example of how human capital is accumulated.

This table includes an estimate of the stock of capital represented by the Nation's investment in formal education and training. The estimate is based on the cost of replacing the years of schooling embodied in the U.S.

Table 12–4. NATIONAL WEALTH

(As of the end of the fiscal year, in trillions of 2003 dollars)

	1960	1965	1970	1975	1980	1985	1990	1995	2000	2001	2002	2003
ASSETS												
Publicly Owned Physical Assets:												
Structures and Equipment	2.0	2.3	2.9	3.5	3.8	4.0	4.4	4.8	5.5	5.6	5.6	5.6
Federally Owned or Financed	1.2	1.3	1.4	1.6	1.6	1.9	2.0	2.1	2.1	2.1	2.2	2.2
Federally Owned	1.0	1.0	1.1	1.0	1.0	1.1	1.1	1.1	1.0	1.0	1.0	1.0
Grants to State and Local Governments	0.2	0.2	0.3	0.5	0.6	0.8	0.8	0.9	1.1	1.1	1.2	1.2
Funded by State and Local Governments	0.9	1.1	1.5	2.0	2.2	2.1	2.4	2.7	3.4	3.5	3.4	3.3
Other Federal Assets	0.7	0.7	0.7	0.8	1.3	1.4	1.1	0.9	1.2	1.2	1.2	1.4
Subtotal	2.8	3.0	3.5	4.4	5.1	5.4	5.5	5.6	6.7	6.8	6.8	6.9
Privately Owned Physical Assets:												
Reproducible Assets	7.1	8.2	10.0	12.8	16.7	17.6	20.0	21.9	26.5	27.0	27.9	28.7
Residential Structures	2.7	3.2	3.8	4.9	6.7	6.9	7.8	8.8	10.9	11.3	11.8	12.4
Nonresidential Plant and Equipment	2.9	3.3	4.1	5.4	6.9	7.6	8.4	9.2	11.1	11.3	11.6	11.8
Inventories	0.6	0.7	0.9	1.1	1.4	1.3	1.4	1.4	1.6	1.5	1.5	1.5
Consumer Durables	0.9	1.0	1.3	1.5	1.8	1.9	2.3	2.5	2.8	2.9	3.0	3.1
Land	2.1	2.5	2.9	3.7	5.7	6.5	6.7	5.2	8.0	8.4	9.7	10.2
Subtotal	9.2	10.7	12.9	16.5	22.4	24.1	26.6	27.1	34.5	35.4	37.5	38.9
Education Capital:												
Federally Financed	0.1	0.1	0.2	0.3	0.5	0.6	0.8	0.9	1.2	1.2	1.3	1.4
Financed from Other Sources	6.2	8.0	10.8	13.3	17.4	20.8	26.9	30.1	39.1	40.7	42.2	44.0
Subtotal	6.3	8.1	11.0	13.6	17.8	21.4	27.7	31.0	40.3	41.9	43.5	45.4
Research and Development Capital:												
Federally Financed R&D	0.2	0.3	0.5	0.6	0.6	0.7	0.8	0.9	1.0	1.0	1.1	1.1
R&D Financed from Other Sources	0.1	0.2	0.3	0.4	0.5	0.7	0.9	1.1	1.5	1.6	1.7	1.7
Subtotal	0.3	0.6	0.8	0.9	1.1	1.4	1.7	2.1	2.5	2.6	2.7	2.9
Total Assets	**18.6**	**22.3**	**28.2**	**35.5**	**46.4**	**52.2**	**61.5**	**65.8**	**84.0**	**86.8**	**90.6**	**94.1**
Net Claims of Foreigners on U.S. (+)	–0.1	–0.2	–0.2	–0.1	–0.4	0.0	0.9	1.5	2.8	2.7	3.1	4.2
Net Wealth	**18.7**	**22.5**	**28.4**	**35.6**	**46.7**	**52.2**	**60.6**	**64.3**	**81.1**	**84.1**	**87.5**	**89.9**
ADDENDA:												
Per Capita Wealth (thousands of 2003 dollars)	103.6	115.9	138.5	165.1	204.8	218.6	242.0	240.8	286.9	294.0	302.7	307.8
Ratio of Wealth to GDP (in percent)	704.4	716.4	695.7	696.3	679.2	674.0	663.6	683.5	688.9	711.4	714.4	718.2
Total Federally Funded Capital (trils 2003 dollars)	2.1	2.4	2.8	3.3	3.9	4.5	4.7	4.8	5.5	5.6	5.8	6.1
Percent of National Wealth	11.5	10.7	9.9	9.3	8.4	8.7	7.8	7.4	6.8	6.7	6.6	6.8

population aged 16 and over; in other words, the goal is to measure how much it would cost to reeducate the U.S. workforce at today's prices (rather than at its original cost). This is more meaningful economically than the historical cost, and is comparable to the measures of physical capital presented earlier.

Although this is a relatively crude measure, it does provide a rough order of magnitude for the current value of the investment in education. According to this measure, the stock of education capital amounted to $45 trillion in 2003, of which about 3 percent was financed by the Federal Government. It was nearly equal to the total value of the Nation's stock of physical capital. The main investors in education capital have been State and local governments, parents, and students themselves (who forgo earning opportunities in order to acquire education).

Even broader concepts of human capital have been proposed. Not all useful training occurs in a schoolroom or in formal training programs at work. Much informal learning occurs within families or on the job, but measuring its value is very difficult. Labor compensation, however, amounts to about two-thirds of national income with the other third attributed to capital and thinking of this labor income as the product of human capital suggests that the total value of human capital might be two times the estimated value of physical capital assuming human capital had earned a similar rate of return to other forms of capital. Thus, the estimates offered here are in a sense conservative, because they reflect only the costs of acquiring formal education and training, which is why they are referred to as education capital rather than human capital. They constitute the part of human capital that can be attributed to formal education and training.

Research and Development Capital: Research and Development can also be thought of as an investment, because R&D represents a current expenditure that is made in the expectation of earning a future return. After adjusting for depreciation, the flow of R&D investment can be added up to provide an estimate of the current R&D stock.[3] That stock is estimated to have been $2.9 trillion in 2003. Although this represents a large amount of research, it is a relatively small portion

[3] R&D depreciates in the sense that the economic value of applied research and development tends to decline with the passage of time, as still newer ideas move the technological frontier.

of total National wealth. Of this stock, 38 percent was funded by the Federal Government.

Liabilities: When considering how much the United States owes as a Nation, the debts that Americans owe to one another cancel out. When the debts of one American are the assets of another American, these debts are not a net liability of the Nation as a whole. Table 12–4 is intended to show National totals only. Total debt is important even though it does not appear in Table 12–4. The amount of debt owed by Americans to other Americans can exert both positive and negative effects on the economy. Americans' willingness and ability to borrow helped fuel the expansion of the 1990s, and continues to support consumption in the current recovery. On the other hand, bad debts, which are not collectible, can cause serious problems for the banking system.

The only debts that do appear in Table 12–4 are the debts Americans owe to foreigners. America's foreign debt has been increasing rapidly in recent years, because of the rising imbalance in the U.S. current account. Although the current account deficit has been at record levels recently, the size of this debt remains small compared with the total stock of U.S. assets. It amounted to 4.5 percent of total assets in 2002.

Federal debt does not appear explicitly in Table 12–4 because most of it consists of claims held by Americans; only that portion of the Federal debt which is held by foreigners is included along with the other debts to foreigners. Comparing the Federal Government's net liabilities with total national wealth does, however, provide another indication of the relative magnitude of the imbalance in the Government's accounts. Currently, Federal net liabilities, as reported in Table 12–1, amount to 5.6 percent of net U.S. wealth as shown in Table 12–4. Prospectively, however, Federal liabilities are a much larger share of national wealth, as shown by the long-run projections in Part III.

Trends in National Wealth

The net stock of wealth in the United States at the end of FY 2003 was about $90 trillion, about eight times the level of GDP. Since 1961, it has increased in real terms at an average annual rate of 3.7 percent per year. It grew very rapidly from 1960 to 1973, at an average annual rate of 4.5 percent per year, slightly faster than real GDP grew over the same period. Between 1973 and 1995 growth slowed, as real net wealth grew at an average rate of just 3.1 percent per year, which paralleled the slowdown in real GDP over this period. Since 1995 growth has picked up for both net wealth and real GDP, with wealth growing at an average rate of 4.3 percent since 1995. This is the same period in which productivity growth accelerated following a similar slowdown from 1973 to 1995.

The net stock of private nonresidential plant and equipment accounts for about 30 percent of privately owned physical capital. It grew 3.3 percent per year on average from 1960 to 2003. It grew especially rapidly from 1960 to 1973, at an average rate of 3.9 percent per year. Since 1973 it has grown more slowly, averaging around 3.0 percent per year. Unlike most other categories of wealth accumulation, there was very little acceleration in the growth of plant and equipment over the last eight years compared with 1973–1995. Private plant and equipment grew 3.0 percent per year on average between 1973 and 1995 and just 3.1 percent per year from 1995 through 2003. Higher than average growth in the investment boom of the late 1990s has been offset by less rapid growth since then. Meanwhile, privately owned residential structures, consumer durables and land have all grown more rapidly in real value since 1995 than from 1973 to 1995.

The accumulation of education capital has averaged 4.7 percent per year since 1960. It also slowed down between 1973 and 1995, and has grown somewhat more rapidly since then. It grew at an average rate of 5.8 percent per year in the 1960s, about 1.9 percentage point faster than the average rate of growth in private physical capital during the same period. Since 1995, education capital has grown at a 4.9 percent annual rate. This reflects both the extra resources devoted to schooling in this period, and the fact that such resources were increasing in economic value. R&D stocks have also grown at about 4.2 percent per year since 1995.

Other Federal Influences on Economic Growth

Federal investment decisions, as reflected in Table 12–4, obviously are important, but the Federal Government also contributes to wealth in ways that cannot be easily captured in a formal presentation. The Federal Reserve's monetary policy affects the rate and direction of capital formation in the short run, and Federal regulatory and tax policies also affect how capital is invested, as do the Federal Government's policies on credit assistance and insurance.

Social Indicators

There are certain broad responsibilities that are unique to the Federal Government. Especially important are fostering healthy economic conditions including sound economic growth, promoting health and social welfare, and protecting the environment. Table 12–5 offers a rough cut of information that can be useful in assessing how well the Federal Government has been doing in promoting these general objectives.

The indicators shown in Table 12–5 are only a subset drawn from the vast array of available data on conditions in the United States. In choosing indicators for this table, priority was given to measures that were consistently available over an extended period. Such indicators make it easier to draw valid comparisons and evaluate trends. In some cases, however, this meant choosing indicators with significant limitations.

The individual measures in this table are influenced to varying degrees by many Government policies and programs, as well as by external factors beyond the Government's control. They do not measure the outcomes of Government policies, because they generally

Table 12–5. ECONOMIC AND SOCIAL INDICATORS

General categories	Calendar Years	1960	1965	1970	1975	1980	1985	1990	1995	2000	2001	2002	2003
Economic:													
Living Standards	Real GDP per person (2000 dollars)	13,840	16,420	18,392	19,961	22,666	25,382	28,429	30,128	34,753	34,550	34,934	35,648
	average annual percent change (5–year trend)	1.7	3.5	2.3	1.7	2.6	2.3	2.3	1.2	2.9	2.3	1.8	1.7
	Median Income:												
	All Households (2002 dollars)	N/A	N/A	35,030	34,763	36,608	37,648	39,949	39,931	43,848	42,900	42,409	N/A
	Married Couple Families (2001 dollars) [1]	29,746	34,620	41,516	43,113	47,086	48,798	52,394	54,284	60,748	60,335	N/A	N/A
	Female Householder, Husband Absent (2001 dollars) [1]	15,032	16,831	20,107	19,847	21,177	21,434	22,237	22,713	26,434	25,745	N/A	N/A
	Income Share of Lower 60% of All Households	31.8	32.2	32.3	32.0	31.5	30.0	29.4	28.0	27.3	26.8	27.1	N/A
	Poverty Rate (%) [2]	22.2	17.3	12.6	12.3	13.0	14.0	13.5	13.8	11.3	11.7	12.1	N/A
Economic Security	Civilian Unemployment (%)	5.5	4.5	4.9	8.5	7.1	7.2	5.5	5.6	4.0	4.8	5.8	6.0
	CPI-U (% Change)	1.7	1.6	5.8	9.1	13.5	3.5	5.4	2.8	3.4	2.8	1.6	2.3
Employment	Increase in Total Payroll Employment Previous 12 Months.	–0.4	2.9	–0.4	0.4	0.3	2.5	0.3	2.2	1.9	–1.8	–0.5	–0.1
	Managerial or Professional Jobs (% of civilian employment).	N/A	N/A	N/A	N/A	N/A	27.3	29.2	32.0	33.8	34.4	34.6	34.8
Wealth Creation	Net National Saving Rate (% of GDP) [3]	10.2	12.1	8.2	6.6	7.5	6.1	4.6	4.7	5.9	3.3	1.6	0.7
Innovation	Patents Issued to U.S. Residents (thousands) [4]	42.3	54.1	50.6	51.5	41.7	45.1	56.1	68.2	103.6	105.5	99.6	N/A
	Multifactor Productivity (average 5 year percent change)	0.9	2.9	0.8	1.1	0.8	0.5	0.5	0.6	1.1	0.7	N/A	N/A
	Nonfarm Output per Hour (average 5 year percent change).	1.8	3.5	2.0	2.3	1.2	1.7	1.4	1.5	2.5	2.4	3.0	3.4
Environment:													
Air Quality	Nitrogen Oxide Emissions (thousand short tons)	18,163	21,296	26,883	26,377	27,079	25,757	25,530	24,956	23,199	22,349	N/A	N/A
	Sulfur Dioxide Emissions (thousand short tons)	22,268	26,799	31,218	28,043	25,925	23,307	23,078	18,619	16,317	15,790	N/A	N/A
	Lead Emissions (thousand short tons)	N/A	N/A	221	160	74	23	5	4	4	4	N/A	N/A
Water Quality	Population Served by Secondary Treatment or Better (mils).	N/A	N/A	N/A	N/A	N/A	140.3	162.3	173.8	201.4	N/A	N/A	N/A
Social:													
Families	Children Living with Mother Only (% of all children)	9.2	10.2	11.6	16.4	18.6	20.2	21.6	24.0	22.3	22.7	23.2	N/A
Safe Communities	Violent Crime Rate (per 100,000 population) [5]	160.0	199.0	364.0	482.0	597.0	558.1	729.6	684.5	506.5	504.5	494.6	483.8
	Murder Rate (per 100,000 population) [5]	5.1	5.1	7.8	9.6	10.2	8.0	9.4	8.2	5.5	5.6	5.6	5.6
	Murders (per 100,000 Persons Age 14 to 17)	N/A	N/A	N/A	4.5	5.9	4.9	9.8	11.0	4.7	N/A	N/A	N/A
Health	Infant Mortality (per 1000 Live Births)	26.0	24.7	20.0	16.1	12.6	10.6	9.2	7.6	6.7	6.8	6.9	6.7
	Low Birthweight [<2,500 gms] Babies (%)	7.7	8.3	7.9	7.4	6.8	6.8	7.0	7.3	7.6	7.7	7.8	N/A
	Life Expectancy at birth (years)	69.7	70.2	70.8	72.6	73.7	74.7	75.4	75.8	77.0	77.2	N/A	N/A
	Cigarette Smokers (% population 18 and older) [6]	N/A	41.9	39.2	36.3	33.0	29.9	25.3	24.6	23.1	22.6	22.3	21.6
Learning	High School Graduates (% of population 25 and older)	44.6	49.0	55.2	62.5	68.6	73.9	77.6	81.7	84.1	84.3	N/A	N/A
	College Graduates (% of population 25 and older)	8.4	9.4	11.0	13.9	17.0	19.4	21.3	23.0	25.6	26.1	N/A	N/A
Participation	Individual Charitable Giving per Capita (2000 dollars)	240	288	345	367	400	411	456	432	575	585	573	N/A
	–by presidential election year)	1960	1964	1968	1972	1976	1980	1984	1988	1992	1996	2000	
	Voting for President (% eligible population)	62.8	61.9	60.9	55.2	53.5	52.8	53.3	50.3	55.1	49.0	51.2	

[1] Median income for married couple and female householder families not updated yet for 2002.

[2] The poverty rate does not reflect noncash government transfers such as Medicaid or food stamps.

[3] Does not reflect December 2003 revisions to National Income and Product Accounts, which are not yet complete for national saving. 2003 through Q3 only.

[4] Preliminary data for 2002.

[5] Not all crimes are reported, and the fraction that go unreported may have varied over time, 2003 data are preliminary for the first half of the year.

[6] Smoking data for 2003 through June.

do not show the direct results of Government activities, but they do provide a quantitative measure of the progress or lack of progress in reaching some of the ultimate values that Government policy is intended to promote.

Such a table can serve two functions. First, it highlights areas where the Federal Government might need to modify its current practices or consider new approaches. Where there are clear signs of deteriorating conditions, corrective action might be appropriate. Second, the table provides a context for evaluating other data on Government activities. For example, Government actions that weaken its own financial position may be appropriate when they promote a broader social objective. The Government cannot avoid making such trade-offs because of its size and the broad ranging effects of its actions. Monitoring these effects and incorporating them in the Government's policy making is a major challenge.

It is worth noting that, in recent years, many of the trends in these indicators turned around. The improvement in economic conditions has been widely noted, and there have also been some significant social improvements. Perhaps, most notable has been the turnaround in the crime rate. Since reaching a peak in the early 1990s, the violent crime rate has fallen by a third. The turnaround has been especially dramatic in the murder rate, which was lower in 2000

than at any time since the 1960s. The 2001 recession has had an effect on some of these indicators. Unemployment has risen and real GDP growth has declined. But as the economy recovers much of the improvement shown in Table 12–5 is likely to be preserved and extended.

TECHNICAL NOTE: SOURCES OF DATA AND METHOD OF ESTIMATING

Long-Range Budget Projections

The long-range budget projections are based on long-range demographic and economic assumptions. A simplified model of the Federal budget, developed at OMB, computes the budgetary implications of these assumptions.

Demographic and Economic Assumptions: Through 2014, the assumptions are identical to those used for the budget. These budget assumptions reflect the President's policy proposals. The economic assumptions are extended beyond this point by holding constant inflation, interest rates, and unemployment at the levels assumed in the final year of the budget forecast. Population growth and labor force growth are extended using the intermediate assumptions from the 2003 Social Security trustees' report. The projected rate of growth for real GDP is built up from the labor force assumptions and an assumed rate of productivity growth. Productivity growth is held constant at the average rate of growth implied by the budget's economic assumptions.

- CPI inflation holds stable at 2.5 percent per year; the unemployment rate is constant at 5.1 percent; and the yield on 10-year Treasury notes is steady at 5.8 percent, which are the final values at the end of the budget forecast for each of these variables.
- Real GDP per hour grows at the same average rate as in the Administration's medium-term projections—2.3 percent per year—through 2080.
- Consistent with the demographic assumptions in the trustees' reports, U.S. population growth slows from around 1 percent per year to about half that rate by 2030, and even slower rates of growth beyond that point. Population growth reaches 0.3 percent per year at the end of the projection period in 2080 and it is still slowing.
- Real GDP growth declines over time with the expected slowdown in population growth which feeds through to the labor force. An aging population also contributes less work effort, and this is also reflected in the projections. Historically, real GDP has grown at an average yearly rate of 3.4 percent. In these projections, real GDP growth declines to 2.6 percent by 2020, and averages that rate for the next 60 years.

The economic and demographic projections described above are set by assumption and do not automatically change in response to changes in the budget outlook. This is unrealistic, but it simplifies comparisons of alternative policies.

Budget Projections: For the period through 2014, receipts and outlays follow the budget's policy projections. Beyond the budget horizon, receipts are projected using simple rules of thumb linking income taxes, payroll taxes, excise taxes, and other receipts to projected tax bases derived from the economic projections. Discretionary outlays grow at the rate of growth in nominal GDP. Social Security is projected by the Social Security actuaries using these long-range assumptions. Medicare benefits are projected based on the estimates in the 2003 Medicare trustees' report, adjusted for differences in the assumed growth rate in GDP per capita and for the effects of the Medicare Prescription Drug, Improvement, and Modernization Act of 2003. Federal pensions are derived from the most recent actuarial forecasts available at the time the budget is prepared, repriced using Administration inflation and wage growth assumptions. Medicaid outlays are based on the economic and demographic projections in the model. Other entitlement programs are projected based on rules of thumb linking program spending to elements of the economic and demographic projections such as the poverty rate.

Federally Owned Assets and Liabilities

Financial Assets: The source of data is the Federal Reserve Board's Flow-of-Funds Accounts.

Fixed Reproducible Capital: Estimates were developed from the OMB historical data base for physical capital outlays and software purchases. The data base extends back to 1940 and was supplemented by data from other selected sources for 1915–1939. The source data are in current dollars. To estimate investment flows in constant dollars, the nominal investment series was deflated using chained price indexes for Federal investment from the National Income and Product Accounts. The resulting capital stocks were aggregated into nine categories and depreciated using geometric rates roughly following those used by the Bureau of Economic Analysis in its estimates of physical capital stocks.

Fixed Nonreproducible Capital: Historical estimates for 1960–1985 were based on estimates in Michael J. Boskin, Marc S. Robinson, and Alan M. Huber, "Government Saving, Capital Formation and Wealth in the United States, 1947–1985," published in *The Measurement of Saving, Investment, and Wealth,* edited by Robert E. Lipsey and Helen Stone Tice (The University of Chicago Press, 1989).

Estimates were updated using changes in the value of private land from the Flow-of-Funds Balance Sheets and from the Agriculture Department for farm land; the value of Federal oil deposits was extrapolated using the Producer Price Index for Crude Energy Materials.

Debt Held by the Public: Treasury data.

Insurance and Guarantee Liabilities: Sources of data are the OMB Pension Guarantee Model and OMB esti-

mates based on program data. Historical data on liabilities for deposit insurance were also drawn from CBO's study, The Economic Effects of the Savings and Loan Crisis, issued January 1992.

Pension and Post-Employment Health Liabilities: For 1979–2001, the estimates are the actuarial accrued liabilities as reported in the annual reports for the Civil Service Retirement System, the Federal Employees Retirement System, and the Military Retirement System (adjusted for inflation). Estimates for the years before 1979 are extrapolations. The estimate for 2002 is a projection. The health insurance liability was estimated by the program actuaries for 1997–2001, and extrapolated back for earlier years. Veterans disability compensation was taken from the Financial Report of the United States Government (and the Consolidated Financial Statement for some earlier years). Prior to 1976, the values were extrapolated. For 2003, the estimates from the Department of Veterans Affairs' 2003 Performance and Accountability Report.

Other Liabilities: The source of data for trade payables and miscellaneous liabilities is the Federal Reserve's Flow-of-Funds Accounts. The Financial Report of the United States Government was the source for benefits due and payable.

National Balance Sheet

Publicly Owned Physical Assets: Basic sources of data for the Federally owned stocks of capital are the Federal investment flows described in Chapter 6. Federal grants for State and local government capital are added, together with adjustments for inflation and depreciation in the same way as described above for direct Federal investment. Data for total State and local government capital come from the revised capital stock data prepared by the Bureau of Economic Analysis extrapolated for 2002–03.

Privately Owned Physical Assets: Data are from the Flow-of-Funds national balance sheets and from the private net capital stock estimates prepared by the Bureau of Economic Analysis extrapolated for 2002–03 using investment data from the National Income and Product Accounts.

Education Capital: The stock of education capital is computed by valuing the cost of replacing the total years of education embodied in the U.S. population 16 years of age and older at the current cost of providing schooling. The estimated cost includes both direct expenditures in the private and public sectors and an estimate of students' forgone earnings, i.e., it reflects the opportunity cost of education. Estimates of students' forgone earnings are based on the year-round, full-time earnings of 18–24 year olds with selected educational attainment levels. These year-round earnings are reduced by 25 percent because students are usually out of school three months of the year. For high school students, these adjusted earnings are further reduced by the unemployment rate for 16–17 year olds; for college students, by the unemployment rate for 20–24 year olds. Yearly earnings by age and educational attainment are from Money Income in the United States, series P60, published by the Bureau of the Census.

For this presentation, Federal investment in education capital is a portion of the Federal outlays included in the conduct of education and training. This portion includes direct Federal outlays and grants for elementary, secondary, and vocational education and for higher education. The data exclude Federal outlays for physical capital at educational institutions because these outlays are classified elsewhere as investment in physical capital. The data also exclude outlays under the GI Bill; outlays for graduate and post-graduate education spending in HHS, Defense and Agriculture; and most outlays for vocational training. The Federal share of the total education stock in each year is estimated by averaging the prior years' shares of Federal education outlays in total education costs.

Data on investment in education financed from other sources come from educational institution reports on the sources of their funds, published in U.S. Department of Education, Digest of Education Statistics. Nominal expenditures were deflated by the implicit price deflator for GDP to convert them to constant dollar values. Education capital is assumed not to depreciate, but to be retired when a person dies. An education capital stock computed using this method with different source data can be found in Walter McMahon, "Relative Returns to Human and Physical Capital in the U.S. and Efficient Investment Strategies," *Economics of Education Review,* Vol. 10, No. 4, 1991. The method is described in detail in Walter McMahon, *Investment in Higher Education,* Lexington Books, 1974.

Research and Development Capital: The stock of R&D capital financed by the Federal Government was developed from a data base that measures the conduct of R&D. The data exclude Federal outlays for physical capital used in R&D because such outlays are classified elsewhere as investment in federally financed physical capital. Nominal outlays were deflated using the GDP deflator to convert them to constant dollar values.

Federally funded capital stock estimates were prepared using the perpetual inventory method in which annual investment flows are cumulated to arrive at a capital stock. This stock was adjusted for depreciation by assuming an annual rate of depreciation of 10 percent on the estimated stock of applied research and development. Basic research is assumed not to depreciate. These are the same assumptions used in a study published by the Bureau of Labor Statistics estimating the R&D stocks financed by private industry U.S. Department of Labor, Bureau of Labor Statistics, *The Impact of Research and Development on Productivity Growth,* Bulletin 2331, September 1989. Chapter 6 of this volume contains additional details on the estimates of the total federally financed R&D stock, as well as its national defense and nondefense components.

A similar method was used to estimate the stock of R&D capital financed from sources other than the Federal Government. The component financed by universities, colleges, and other nonprofit organizations is

estimated based on data from the National Science Foundation, Surveys of Science Resources. The industry-financed R&D stock component is estimated from that source and from the U.S. Department of Labor, *The Impact of Research and Development on Productivity Growth,* Bulletin 2331, September 1989.

Experimental estimates of R&D capital stocks have been prepared by BEA. The results are described in "A Satellite Account for Research and Development," *Survey of Current Business,* November 1994. These BEA estimates are lower than those presented here primarily because BEA assumes that the stock of basic research depreciates, while the estimates in Table 12–5 assume that basic research does not depreciate. BEA also assumes a slightly higher rate of depreciation for applied research and development, 11 percent, compared with the 10 percent rate used here.

Sources of Data and Assumptions for Estimating Social Indicators

The main sources for the data in this table are the Government statistical agencies. The data are all publicly available, and can be found in such general sources as the annual *Economic Report of the President* and the *Statistical Abstract of the United States,* or from agencies' web sites.