

13. 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 deficit provide only a partial picture of the consequences of the Government's financial and investment decisions. Indeed, changes in the annual budget deficit or surplus can be misleading. 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 judge the Government's fiscal condition properly.

For the Federal Government, there is no single number that corresponds to a business's bottom line. The Government is 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 13-1 is a schematic diagram showing the linkages.
- Part II presents the Government's physical and financial assets and its legal liabilities, which are all collected in Table 13-1. 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 13-2 and in a related set of charts. This part also provides present value estimates of the funding shortfall in Social Security and Medicare in Table 13-3. These data indicate the Government's future responsibilities and resources under current law and policy. In particular, they show the looming challenge that Federal entitlement programs present 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 13-4 presents summary data for total national wealth, while highlighting the Federal investments that have contributed to that wealth. Table 13-5 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. 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 or deficit. It includes balance-sheet information, but it goes beyond that to include long-run projections of the budget showing 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. 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 13-1. Although they are important, the obligations shown in Table 13-1 are only a subset of the Government's 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. These include, to mention only a few examples: Medicaid, veterans' pensions and health care, and food stamps. It also provides a wide range of other public services that must be financed through the tax system. The specific benefits and services may be modified or even ended at any time by the Congress and the President. Indeed, changes in laws governing these programs are a regular part of the legislative cycle. For these reasons, these programmatic commitments do not constitute "liabilities" in a legal or accounting sense, and they would not appear on a balance sheet. Until modified by law, 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 has many assets. These include financial assets, such as loans and mortgages which the Government has acquired through a variety of credit programs. They also include the physical plant and equipment used to produce Government services. The Government owns a substantial amount of land. Such assets would normally be shown on a balance sheet. The Government also has resources that go beyond the assets that would be expected to appear on a balance sheet. These additional resources include most importantly the Government's sovereign power to tax.

Because of its unique 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. Part III of this chapter presents a set of such projections under different assumptions about policy and future economic and demographic conditions. 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, 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 providing more complete information about Government programs and permit a closer alignment of the cost of programs with performance measures. These changes have been described in detail in previous Budgets. They are described in chapter 2 of this volume, and in the accompanying material that describes results obtained with the Program Assessment Rating Tool (PART). This chapter complements the detailed exploration of Government performance with an assessment of the overall impact of Federal policy as reflected in general measures of economic and social well-being, which are presented in Table 13-5.

Relationship with FASAB Objectives

The framework presented here meets the stewardship objective¹ 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 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 balance sheet. The assets and liabilities on that balance sheet are all based on transactions and other events that have already occurred. A similar table can be found in Part II of this chapter but based on different data and methods of valuation. The *Report* also includes a statement of social insurance that reviews a substantial body of information on the condition and sustainability of the Government's social insurance programs. However, the *Report* does not extend that review to the condition or sustainability of the Government as a whole, which is a main focus of this chapter.

Connecting the Dots: The presentation that follows consists in large part of a series of tables and charts.

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

The schematic diagram, Chart 13–1, 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 categories—assets/resources and liabilities/responsibilities.

- The left-hand side of Chart 13–1 shows the full range of Federal resources, including assets the Government owns, tax receipts it can expect to collect given current and proposed law, and national wealth, including the trained skills of the

national work force, that provide the base for Government revenues.

- The right-hand side reveals the full range of Federal obligations and responsibilities, beginning with the Government's acknowledged liabilities from past actions, such as the debt held by the public, and including future budget outlays needed to maintain present policies and trends. This column ends with a set of indicators highlighting areas where Government activity affects society or the economy.

Chart 13-1. A Presentation of the Federal Government's and the Nation's Financial Condition

Assets/Resources		Liabilities/Responsibilities	
Federal Assets Financial Assets Monetary Assets Mortgages and Other Loans Other Financial Assets Less Expected Loan Losses Physical Assets Fixed Reproducible Capital Defense Nondefense Inventories Non-reproducible Capital Land Mineral Rights	Federal Governmental Assets and Liabilities (Table 13-1)	Federal Liabilities Financial Liabilities Debt Held by the Public Miscellaneous Guarantees and Insurance Deposit Insurance Pension Benefit Guarantees Loan Guarantees Other Insurance Federal Retiree Pension and Health Insurance Liabilities Net Balance	
	Long-Run Federal Budget Projections (Table 13-2)		
	Actuarial Deficiencies in Social Security and Medicare (Table 13-3)		
Resources/Receipts Projected Receipts		Responsibilities/Outlays Projected Outlays Surplus/Deficit 75-Year Actuarial Deficiencies in Social Security and Medicare	
National Assets/Resources Federally Owned Physical Assets State & Local Physical Assets Federal Contribution Privately Owned Physical Assets Education Capital Federal Contribution R&D Capital Federal Contribution	National Wealth (Table 13-4)	National Needs/Conditions Indicators of economic, social, educational, and environmental conditions	
	Social Indicators (Table 13-5)		

QUESTIONS AND ANSWERS ABOUT THE GOVERNMENT'S STEWARDSHIP

1. *According to Table 13–1, 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 different objectives from a business firm. The goal of every business is to earn a profit, and as a general rule the Federal Government properly leaves 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 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. Business investment motives 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 13–1 seems to imply that the Government is insolvent. Is it?*

No. Just as the Federal Government's responsibilities are different from those of 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—Continued

3. *Why are Social Security and Medicare not shown as Government liabilities in Table 13-1?*

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 13-1. They appear in two ways: budget projections as a percent of GDP in Table 13-2, and the actuarial deficiency estimates in Table 13-3.

Other Federal programs make similar promises to those of Social Security and Medicare—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 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 doesn't the Federal Government follow normal business practice in its bookkeeping?*

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, 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—Continued

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 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 shown in this chapter and the actuarial projections prepared for Social Security and Medicare 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 the Federal 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 would 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 pursues 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 will be other 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

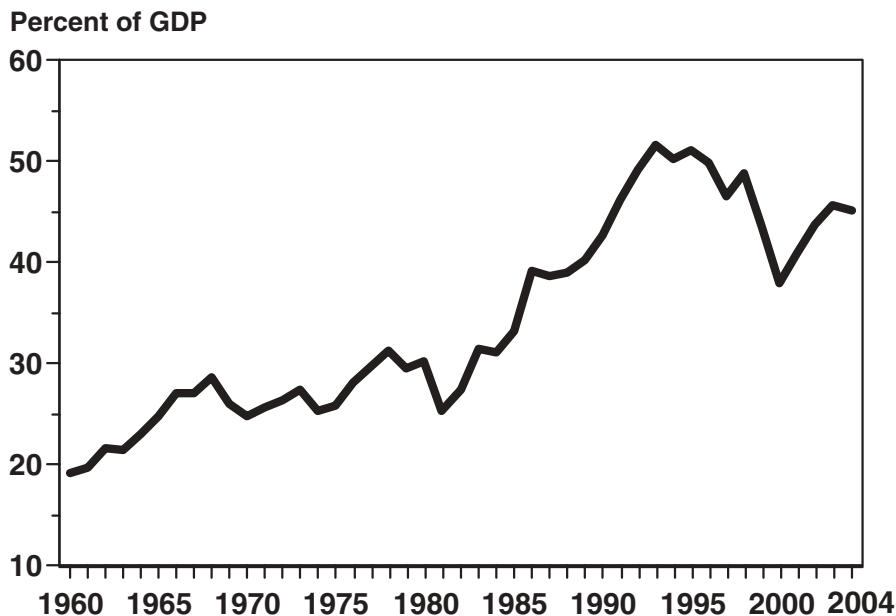
Table 13–1 takes a backward look at the Government's assets and liabilities summarizing what the Government owes as a result of its past operations netted against the value of what it owns. The table gives some perspective by showing these net asset figures for a number of years beginning in 1960. To ensure comparability across time, the assets and liabilities are measured in terms of constant FY 2004 dollars and the balance is also shown as a ratio to GDP. Government liabilities have exceeded the value of assets (see chart 13–2) 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 in the mid-1980s.

Currently, the total real value of Federal assets is estimated to be 62 percent greater than it was in 1960. Meanwhile, Federal liabilities have increased by 234

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 such as the large increases in health benefits for Federal retirees and the sharp rise in veterans' disability compensation. The relatively slow growth in Federal asset values 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 \$5.3 trillion or about \$18,000 per capita. As a ratio to GDP, the excess of liabilities over assets reached a peak of 51 percent in 1993; it declined to 38 percent in 2000; it rose above 45 percent in 2003; and it fell below 45 percent in 2004. The average since 1960 has been 34 percent (see Table 13–1).

Chart 13-2. Net Federal Liabilities



ernment also holds inventories of defense goods and other items that in 2004 amounted to about 25 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 13–1. 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 2002–2004. These fluctuations have caused the estimated value of Federal mineral deposits to fluctuate as well. In 2004 as estimated here, the combined real value of Federal land and mineral rights was higher than it has ever been, but only 3 percent greater than in 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 available inventory or realistic basis for valuing such unique assets.

Total Assets: The total value of Government assets measured in constant dollars has risen sharply in the past three years, and was higher in 2004 than ever before. The Government's asset holdings are vast. As of the end of FY 2004, Government assets were estimated to be worth about \$3.3 trillion or 28 percent of GDP.

Liabilities

Table 13–1 includes all Federal liabilities that would normally be listed on a 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, which can be thought of as a form of deferred compensation. 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 liabilities reflect only binding short-term obligations, not the Government's full commitment under these programs.

Future benefit payments that are likely to be made through Social Security and other Federal income transfer programs are not Federal liabilities in a legal or accounting sense. They are Federal responsibilities, however, and it is important to gauge their size, but they are not binding in the same way as a legally enforceable claim would be. That is why a 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 \$4.3 trillion at the end of 2004. 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.

Insurance and Guarantee Liabilities: The Federal Government has contingent liabilities arising from the loan guarantees it has made and from 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 13–1 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 2004.

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 \$4.0 trillion at the end of FY 2004 up from \$2.9 trillion in 2000.² There was a large expansion in Federal military retiree health benefits legislated in 2001.

The Balance of Net Liabilities

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 affected Federal creditworthiness. Long-term Government interest rates in 2003 reached their lowest

²The pension liability is the actuarial present value of benefits accrued-to-date based on past and projected salaries. The 2004 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 2004 *Financial Report of the United States Government* and Reports from earlier years.

levels in 45 years, and in 2004 they remained lower than at any time from 1965 through 2002. 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. The Government's ability to service its debt in the long run 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. That is the subject of the next section.

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 the uncertainty surrounding the necessary underlying assumptions, 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 important ones such as Social Security and Medicare, however, 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 gen-

erally 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 3.3 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 support the retired population, the budgetary pressures will continue to grow. The problem posed by the demographic transition is a permanent one; indeed, it is a growing one.

Currently, the three major entitlement programs—Social Security, Medicare and Medicaid—account for 44 percent of non-interest Federal spending, up from 30 percent in 1980. By 2035, when the remaining baby boomers will be in their 70s and 80s, these three programs could easily account for nearly two-thirds of non-interest Federal spending. At the end of the projection period, the figure rises to around three-quarters 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, aside from interest, 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 are still in the work force. As the baby boomers begin to reach retirement age in large numbers, the deficit begins to rise. In about 10 years, the deficit as a share of GDP is projected to reach a low point and then begin an inexorable increase. By the end of this chapter's projection period, rising deficits would drive publicly held Federal debt to levels 2½ 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 to eventually reach around 22 percent of GDP.

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 forecasting assumptions, the resources generated by the programs themselves will be insufficient to cover the long-run costs of Social Security and Medicare.

Table 13-2. LONG-RANGE MODEL RESULTS

(As a percent of GDP)

	1995	2005	2015	2025	2035	2045	2055	2065	2075
Receipts	18.5	16.8	18.5	19.1	19.6	20.2	20.9	21.5	22.0
Outlays:									
Discretionary	7.4	7.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9
Mandatory:									
Social Security	4.5	4.2	4.4	5.4	6.0	6.0	6.1	6.2	6.4
Medicare	2.1	2.4	3.3	4.6	6.0	7.0	7.9	9.1	10.4
Medicaid	1.2	1.5	1.9	2.1	2.3	2.6	2.8	3.0	3.3
Other	2.2	2.8	2.0	1.7	1.5	1.3	1.2	1.1	1.0
Subtotal, mandatory	10.1	10.9	11.6	13.8	15.8	16.9	18.0	19.5	21.2
Net Interest	3.2	1.5	1.9	2.0	3.1	4.8	6.9	9.7	13.3
Total outlays	20.7	20.3	19.4	21.8	24.8	27.6	30.8	35.1	40.4
Surplus or Deficit (–)	–2.2	–3.5	–0.9	–2.7	–5.2	–7.4	–10.0	–13.6	–18.4
Federal Debt Held by the Public	49.2	38.6	35.6	38.1	58.7	90.4	130.0	181.3	249.0

Note: The figures shown in this table for 2015 and beyond are the product of a long-range forecasting model maintained by the Office of Management and Budget. This model is separate from the models and capabilities that produce the detailed programmatic estimates in the Budget. It was designed to produce long-range forecasts based on additional assumptions regarding the growth of the economy, the long-range evolution of specific programs, and the demographic and economic forces affecting those programs. The model, its assumptions, and sensitivity testing of those assumptions are presented in this chapter.

Alternative Economic and Technical Assumptions

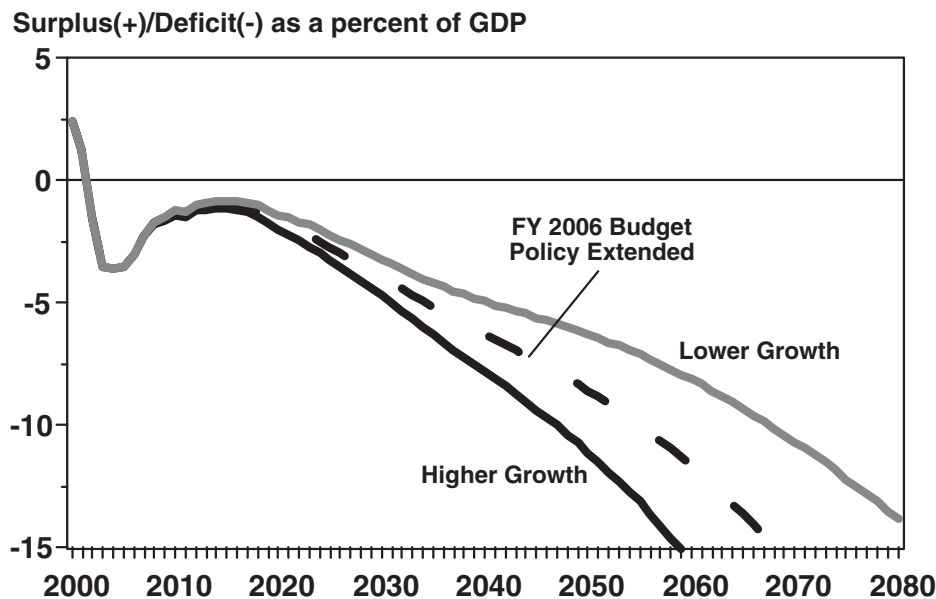
The quantitative results discussed above are sensitive to changes in underlying economic and technical assumptions. Some of the most important of these alternative economic and technical assumptions and their effects on the budget outlook are discussed below. All show that there are mounting deficits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

1. *Health Spending:* The projections for Medicare over the next 75 years are based on the actuarial projections in the 2004 Medicare Trustees' Report, that include the effects of the Medicare Prescription Drug and Modernization bill enacted in 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. Improved health and increased longevity are highly valued, and society has shown that it is willing to spend a larger share of income on them than it did in the past. 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 or lowering the projected growth rate in per capita health care costs by ¼ percentage point.

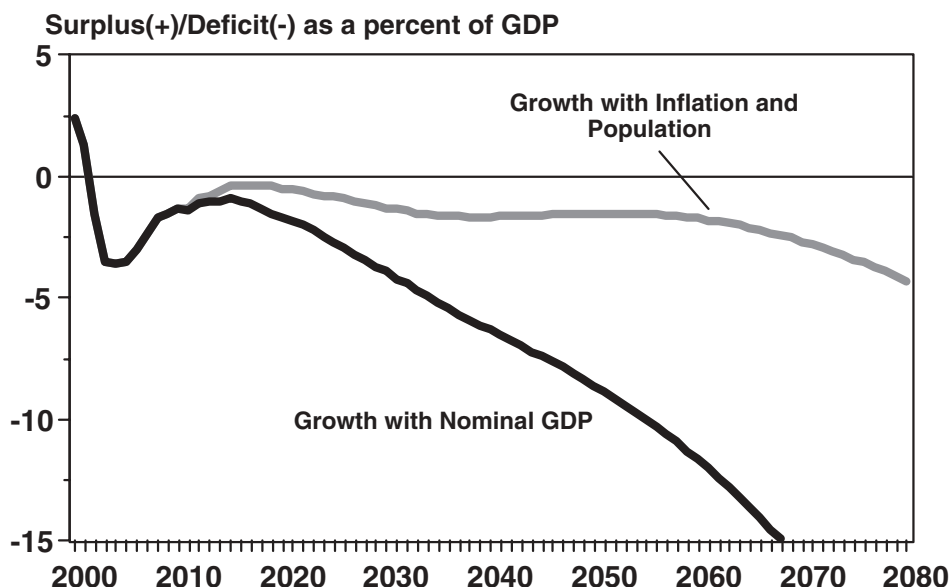
Chart 13-3. Health Care Cost Alternatives



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 realistic. When the population and economy grow, as assumed in these projections, the demand

for public services is very likely to expand as well. 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 to limit the percentage increase in discretionary spending to the increase in population plus inflation, in other words, to hold the real per capita inflation-adjusted level of discretionary spending 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.

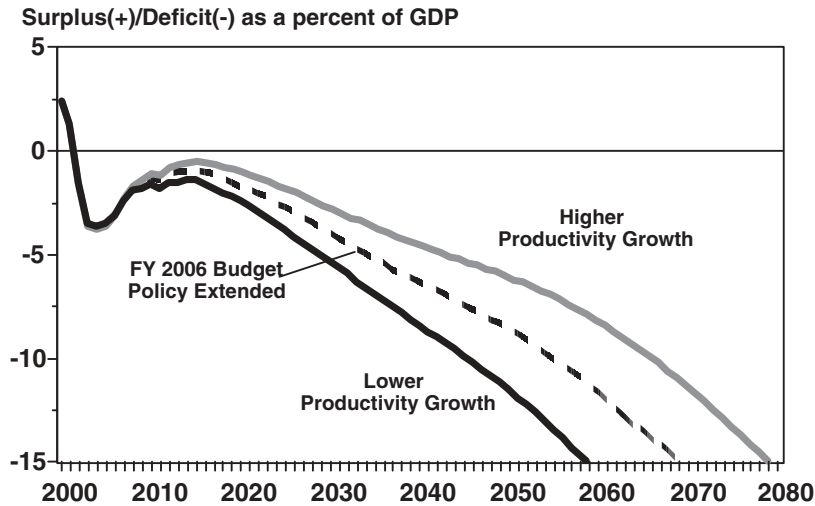
Chart 13-4. Alternative Discretionary Spending Assumptions



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 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, the rate of productivity growth increased unexpectedly and it has increased again since 2000. This increase in productivity growth is one of the most welcome de-

velopments 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. This is a cautious assumption. If the recent increase in trend productivity growth is sustained, it might continue growing faster than the historical average for some time to come. The alternatives highlight the effect of raising the projected productivity growth rate by $\frac{1}{4}$ percentage point and the effect of lowering it by the same amount.

Chart 13-5. Alternative Productivity Assumptions

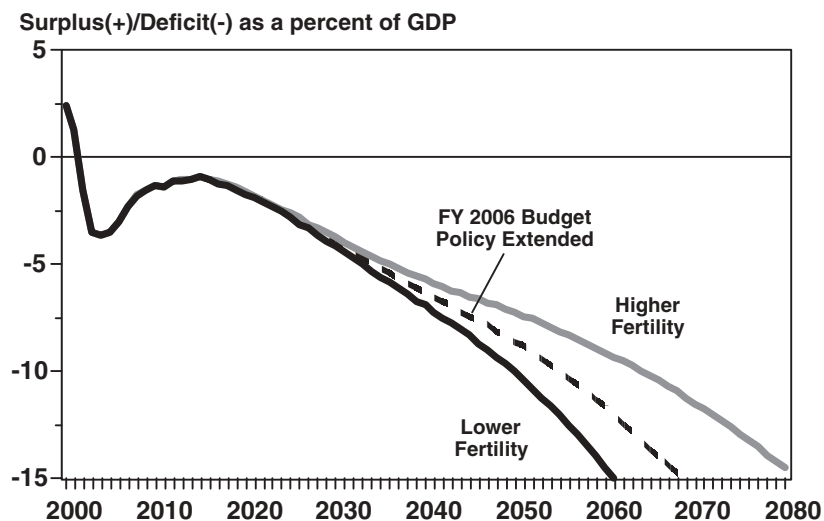


4. *Population:* The key assumptions for projecting long-run demographic developments are fertility, immigration, and mortality.

- 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.

Chart 13-6. Alternative Fertility Assumptions



- 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 growth from low fertility and allows total population to expand throughout the projection period, although at a much slower rate than has prevailed historically.
- Mortality is projected to decline, i.e., people are expected to live longer. The average female life-span is projected to rise from 79.5 years in 2003 to 85.3 years by 2080, and the average male life-span is projected to increase from 74.4 years in 2003 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 13-7. Alternative Mortality Assumptions

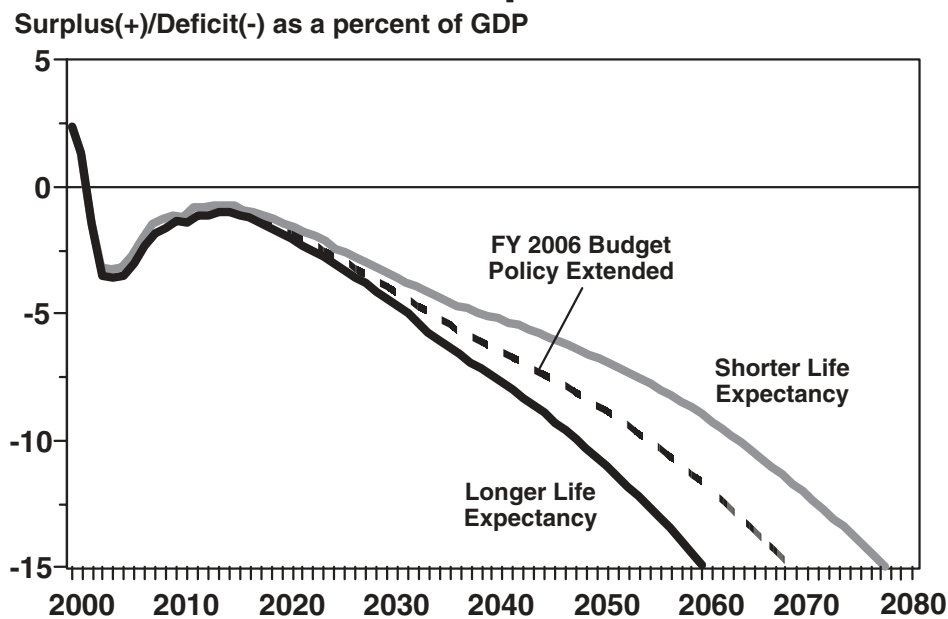
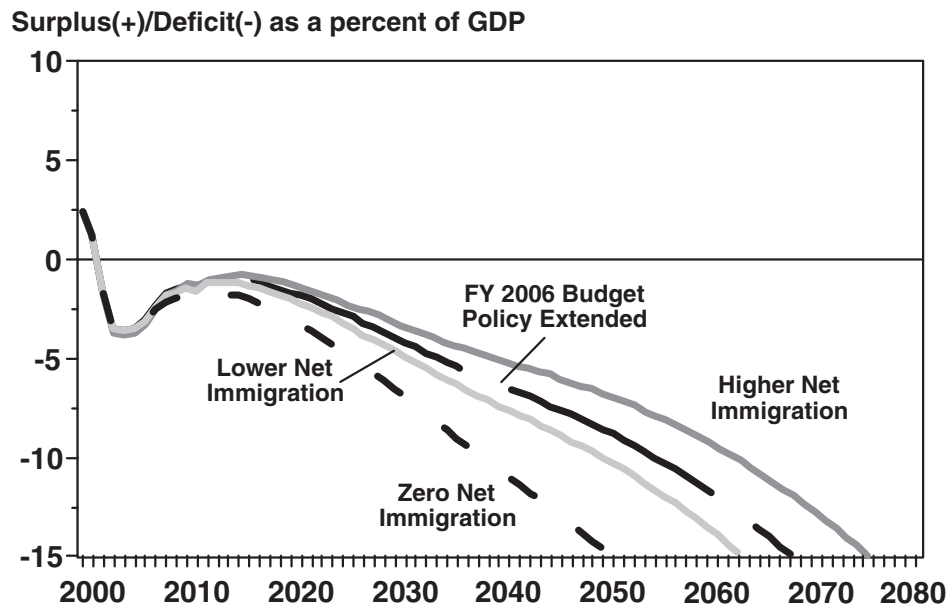


Chart 13-8. Alternative Immigration Assumptions



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. Both programs' actuaries have calculated that they face persistent long-run deficits. How best to measure the long-

run imbalance in Social Security is a challenging analytical question. The imbalance is even more difficult to measure in Medicare, which includes both Hospital Insurance (HI), funded through the payroll tax, and Supplementary Medical Insurance (SMI), financed through premiums and general revenues. Under reasonable assumptions, however, each program embodies 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 both of these programs' financial problems.

Social Security: The Long-Range Challenge

Social Security provides retirement security and disability insurance for tens of millions of Americans. The Social Security system 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 within 20 years. Social Security's spending path is unsustainable under current law. The retirement of the baby-boom generation, born following World War II, will begin to increase greatly the number of Social Security beneficiaries within five 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 following the baby boomers passage through the system. The number of workers available to support each beneficiary is projected to decline from over 3 today to just around 2 in 2030, and remain there indefinitely. This decline in the workforce available to support retiree benefits means that the Government will not be able to meet current-law benefit obligations at current payroll tax rates.

The size of Social Security's future shortfall cannot be known with 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, the demands created by Social Security could compromise the rest of the budget and the Nation's economic health. The actuarial shortfall is estimated to be \$11.9 trillion over an infinite horizon.

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 Supplemental Medical Insurance (SMI) or Part B, which pays for physicians' services and other related expenditures. Starting in 2006, Medicare will offer a voluntary prescription drug benefit, Medicare Part D, which is part of the SMI Trust Fund.

Like Social Security, HI is intended to be self-financing through dedicated taxes. According to the Medicare Trustees most recent report, the Trust Fund is projected to be depleted in 2019. Looking at the long run, the Medicare actuaries project a 75-year unfunded promise to Medicare's HI trust fund of around \$8.5 trillion (net present value). However, this measure tells less than half the story because it does not include the deficiency in Medicare's Part B and Part D programs. The main source of dedicated revenues to the SMI Trust Fund 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 \$28.1 trillion. SMI's financing gap is covered by an unlimited tap on general revenues. According to the Medicare Trustees 2004 report, "When the Part D program becomes fully implemented in 2006, general revenue transfers are expected to constitute the largest single source of income to the Medicare program as a whole—and would add significantly to the Federal Budget pressures."

This bifurcated trust fund structure finances Medicare as if the program offers two separate, unrelated benefits, instead of recognizing that Medicare provides integrated, comprehensive health insurance coverage. The Medicare Prescription Drug, Improvement and Modernization Act of 2003 took initial steps to address this problem and to monitor Medicare's use of general revenues. The Trustees are now required to include a new, comprehensive fiscal analysis, the Combined Medicare Trust Fund Analysis. This analysis examines the program as a whole, and signals whether Medicare's reliance on general revenue funding is projected to exceed 45 percent of total Medicare expenditures at any point in the following six years. Current projections indicate that Medicare's reliance on general revenues may exceed this threshold as early as 2012. The Administration supports efforts to integrate Medicare's financing structure and monitor the program's reliance on general revenue funding, such as a unified Medicare trust fund.

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 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 value of the Social Security imbalance over the next 75 years was estimated to be \$5.2 trillion as of January 1, 2004. The comparable estimate for Medicare was \$28.1 trillion. (The estimates in Table 13–3 were prepared by the Social Security and Medicare actuaries, and they are based on the intermediate economic and demographic assumptions used for the 2004 trustees’ reports. These differ in some respects from the assumptions used for the long-run budget projections described in the preceding section, but Table 13–3 would still show large imbalances if the budget assumptions had been used for the calculations.)

Doing the calculations for a 75-year horizon understates the deficiencies, because the 75-year actuarial calculations omit the large deficits that continue to occur beyond the 75th year. The understatement is significant, even though values in the distant future are discounted by a large amount. For example, merely

adding an additional year to the estimating period would widen the imbalance for Social Security from \$5.2 trillion to \$5.3 trillion. For the latest Social Security and Medicare trustees’ reports, the programs’ actuaries have also calculated the actuarial imbalances in perpetuity. See Table 13–3, which shows how much these distant benefits add to the programs’ imbalances.

The imbalance for Social Security, when estimated on a perpetuity basis, was \$11.9 trillion at the beginning of 2004. This was the amount that the Government would have had to raise in the private capital markets to resolve the program’s imbalance. It was entirely accounted for by the benefits due to current workers and beneficiaries. Future participants do not add to the total, but their contributions do not significantly reduce it either. If nothing else were to change, the estimated imbalance would grow every year at approximately the rate of interest, just as an unpaid debt grows with interest each year it remains outstanding. For Social Security this would imply an increase of approximately \$600 billion in 2004 and by growing amounts with every year that the imbalance remains unaddressed. The comparable imbalance in Medicare is even more staggering at \$61.9 trillion. Unlike Social Security, future participants do add significantly to the Medicare imbalance, but the exact size of the imbalance is harder to estimate for Medicare because of greater uncertainty regarding the future growth of medical costs. If these costs continue to rise faster than GDP,

**Table 13–3. ACTUARIAL PRESENT VALUES OF BENEFITS IN EXCESS OF FUTURE TAXES AND PREMIUMS
Over a 75-Year Projection Period as of January 1, in Trillions of Dollars**

	2000	2001	2002	2003	2004
Social Security					
Future benefits less future taxes for those age 15 and over	9.6	10.5	11.2	11.7	12.6
Future benefits less taxes for those age 14 and under and those not yet born	–5.8	–6.3	–6.7	–6.8	–7.3
Net present value for past, present and future participants	3.8	4.2	4.6	4.9	5.2
Medicare					
Future benefits less future taxes and premiums for those age 15 and over	9.9	12.5	12.9	15.0	24.6
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	3.4
Net present value for past, present and future participants	9.2	12.8	13.3	15.8	28.1
Social Security and Medicare					
Future benefits less future taxes and premiums for those age 15 and over .....	.....	23.0	24.1	26.7	37.2
Future benefits less taxes and premiums for those age 14 and under and not yet born .....	.....	–6.0	–6.3	–6.0	–3.9
Net present value for past, present and future participants .....	.....	17.0	17.8	20.7	33.3
Addendum:					
Actuarial deficiency as a percent of the discounted payroll tax base:					
Social Security	–1.89	–1.86	–1.87	–1.92	–1.89
Medicare HI	–1.21	–1.97	–2.02	–2.40	–3.12
In Perpetuity as of January 1					
					2004
Social Security .....	.....	.....	.....	.....	11.9
Medicare .....	.....	.....	.....	.....	61.9
Social Security and Medicare .....	.....	.....	.....	.....	73.8

then inevitably the Medicare program will place an unsustainable burden on the budget.

Social Security: The current deficiency in Social Security is essentially due to paying past and current participants more benefits than they have paid or will pay into the program in taxes (calculated in terms of present values). By contrast, future participants—those who are now under age 15 or not yet born—are projected to pay in present value about \$7.3 trillion more over the next 75 years than they will collect in benefits over that period. Limiting the horizon at 75 years, however, prevents a full accounting of the expected benefits for these future participants, since many future participants will pay all of their lifetime taxes within the 75-year period, while continuing to receive benefits after the 75th year, while others will pay some taxes within the 75-year horizon without receiving any benefits until much later.

Extending the estimates to perpetuity avoids this distortion because everyone's taxes and benefits are fully included in the calculation and discounted to the present. Altogether, the far distant benefits, estimated in perpetuity, add about \$6.7 trillion to the imbalance, which nearly offsets the expected net contribution of \$7.3 trillion from future participants over the next 75 years. In other words, the taxes that future participants are expected to pay will be large enough to cover the benefits due them under current law, but not large enough to cover those benefits plus the benefits promised to current program participants in excess of the taxes paid by current program participants.

Medicare: Over the next 75 years, benefits due to current program participants exceed payroll taxes and premiums by \$24.6 trillion in present value. This is twice as large as the Social Security gap for the same group. Future participants are also projected to collect more in benefits than they pay in taxes and premiums, but over the same time span the gap is much smaller for them, \$3.4 trillion. Even so, this pattern is different from that for Social Security, where future participants are net contributors over a 75-year horizon. Extending the horizon to infinity shows that the benefits due future participants will eventually exceed projected payroll tax receipts and premiums by a much larger margin. The infinite horizon projections shown at the bottom of Table 13–3 reveal that total Medicare benefits exceed future taxes and premiums by \$61.9 trillion in present value.

Passage of the Medicare Prescription Drug, Improvement and Modernization Act added substantially to Medicare's actuarial deficiency, as can be seen in the 75-year projections in Table 13–3 comparing 2003 with 2004. The legislation also increased private sector participation and added new fiscal safeguards which may help address Medicare's financial shortfall, but how large the impact of these changes will be is uncertain and their effects are not captured in the figures reported here.

General revenues have covered about 75 percent of SMI program costs for many years, with the rest being

covered by premiums paid by the beneficiaries. In Table 13–3, 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. From the standpoint of the Government as a whole, only receipts from the public can finance expenditures.

A significant portion of Medicare's actuarial 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, waste, and the many of the costs associated with medical liability claims add needlessly to costs. But even though the projected increases in Medicare spending are likely to contribute to longer life-spans and safer treatments, the financial implications remain the 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, and that is reflected in the estimates shown in Tables 13–2 and 13–3.

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. The trust fund surpluses could have added to national saving if debt held by the public had actually been reduced because of the trust fund accumulations. But it is impossible to know for sure whether this happened or not.

At the time Social Security or Medicare redeems the debt instruments in the trust funds to pay benefits not covered by 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, and for that reason, the trust funds are not netted against future benefits in Table 13–3. The eventual claim on the Treasury is better revealed by the difference between future benefits and future taxes or premiums.

In any case, trust fund assets 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 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.

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 if the savings occurred outside the budget window. 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 long-run 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 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 the return on investment 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 also contribute to future tax receipts.

To show the importance of these kinds of issues, Table 13-4 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 types of capital, and these contributions are shown separately in the table. At the same time, the private wealth shown in Table 13-4 can be drawn on by Government to finance future public activities. The Nation's wealth sets the ultimate limit on the resources currently available to the Government. Data in this table are especially uncertain, because of the strong assumptions needed to prepare the estimates.

The table shows 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—\$6.6 trillion. The Federal contribution is down from 8.8 percent in the mid-1980s and from 11.5 percent in 1960. Much of this reflects the relative decline in the stock of defense capital, which has fallen from around 13 percent of GDP in the mid-1980s to under 6 percent in 2004.

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, \$49.3 trillion in 2004, consisting of \$41.6 trillion in private physical capital and \$7.8 trillion in public physical capital (including capital funded by State and local governments); by comparison, GDP was around \$11.7 trillion in 2004. The Federal Government's contribution to this stock of capital includes its own physical assets of \$2.7 trillion plus \$1.3 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. Table 13-4 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. 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

Table 13–4. NATIONAL WEALTH
(As of the end of the fiscal year, in trillions of 2004 dollars)

	1960	1965	1970	1975	1980	1985	1990	1995	2000	2002	2003	2004
ASSETS												
Publicly Owned Physical Assets:												
Structures and Equipment	2.1	2.4	3.0	3.7	3.9	4.1	4.5	4.9	5.6	5.9	6.1	6.1
Federally Owned or Financed	1.2	1.3	1.4	1.6	1.7	1.9	2.0	2.1	2.1	2.2	2.2	2.3
Federally Owned	1.1	1.1	1.1	1.1	1.0	1.2	1.2	1.2	1.1	1.0	1.0	1.1
Grants to State and Local Governments	0.1	0.2	0.3	0.5	0.7	0.8	0.8	0.9	1.1	1.2	1.2	1.2
Funded by State and Local Governments	0.9	1.1	1.5	2.1	2.2	2.2	2.5	2.8	3.5	3.7	3.8	3.8
Other Federal Assets	0.7	0.7	0.7	0.9	1.3	1.4	1.2	0.9	1.2	1.2	1.4	1.7
Subtotal	2.8	3.1	3.6	4.5	5.2	5.5	5.6	5.8	6.8	7.2	7.5	7.8
Privately Owned Physical Assets:												
Reproducible Assets	7.3	8.3	10.2	13.0	16.1	17.5	20.0	22.1	26.7	28.6	29.5	30.5
Residential Structures	2.8	3.3	3.9	5.0	6.4	6.8	7.9	8.9	11.0	12.1	12.7	13.3
Nonresidential Plant & Equipment	2.9	3.3	4.1	5.4	6.5	7.4	8.3	9.0	10.9	11.6	11.7	12.0
Inventories	0.7	0.8	0.9	1.2	1.4	1.3	1.4	1.5	1.6	1.5	1.6	1.7
Consumer Durables	0.9	1.0	1.3	1.5	1.8	1.9	2.4	2.7	3.1	3.4	3.4	3.6
Land	2.1	2.5	2.9	3.8	5.8	6.6	6.8	5.2	7.8	8.9	9.5	11.0
Subtotal	9.4	10.9	13.1	16.8	21.9	24.1	26.8	27.3	34.5	37.6	38.9	41.6
Education Capital:												
Federally Financed	0.1	0.1	0.2	0.3	0.5	0.6	0.8	0.9	1.2	1.3	1.4	1.4
Financed from Other Sources	6.4	8.2	11.0	13.6	17.8	21.4	27.6	30.9	40.1	42.8	44.1	45.0
Subtotal	6.5	8.3	11.3	14.0	18.3	22.0	28.4	31.8	41.3	44.1	45.5	46.4
Research and Development Capital:												
Federally Financed R&D	0.2	0.4	0.5	0.6	0.6	0.7	0.8	1.0	1.0	1.1	1.1	1.2
R&D Financed from Other Sources	0.1	0.2	0.3	0.4	0.5	0.7	0.9	1.2	1.5	1.7	1.8	1.9
Subtotal	0.3	0.6	0.8	1.0	1.1	1.4	1.7	2.1	2.6	2.8	2.9	3.0
Total Assets	19.0	22.8	28.8	36.3	46.5	53.0	62.6	67.0	85.2	91.7	94.9	98.8
Net Claims of Foreigners on U.S. (+)	-0.1	-0.2	-0.2	-0.1	-0.4	0.1	0.8	1.6	3.0	3.5	4.1	4.5
Net Wealth	19.1	23.0	29.0	36.4	46.9	52.9	61.7	65.4	82.1	88.2	90.8	94.3
ADDENDA:												
Per Capita Wealth (thousands of 2004 \$)	106.1	118.5	141.5	168.7	205.6	221.7	246.4	244.9	290.4	305.6	311.5	320.5
Ratio of Wealth to GDP (in percent)	703.4	672.4	708.7	785.5	845.8	799.8	797.9	747.9	769.1	803.4	798.7	798.2
Total Federally Funded Capital (trillions 2004 \$)	2.2	2.5	2.9	3.4	4.1	4.7	4.8	4.9	5.6	5.8	6.2	6.6
Percent of National Wealth	11.5	10.7	9.9	9.3	8.7	8.8	7.8	7.5	6.8	6.6	6.8	7.0

\$46.4 trillion in 2004, of which about 3 percent was financed by the Federal Government. It was almost 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.

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 total 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 earns 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 \$3.0 trillion in 2004. Although this represents a large amount of research, it is a relatively small portion of total National wealth. Of this stock, 39 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 13–4 is intended to show National totals only. Total debt is important even though it does not appear in Table 13–4. The amount of debt owed by Americans to other Americans can exert both positive and negative effects on the economy. Americans' willingness and abil-

³R&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.

ity to borrow have helped fuel the current expansion by supporting consumption and housing purchases. On the other hand, growing debt would be a risk to future growth, if the ability to service the high level of debt were to become impaired.

The only debts that do appear in Table 13–4 are the debts Americans owe to foreigners for the investments that foreigners have made here. America's net 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 is at record levels, the size of the net foreign debt remains relatively small compared with the total stock of U.S. assets. It amounted to 4.5 percent of total assets in 2004.

Federal debt does not appear explicitly in Table 13–4 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 13–1, amount to 5.6 percent of net U.S. wealth as shown in Table 13–4. 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 2004 was almost \$100 trillion, about eight times the size of GDP. Since 1960, 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 3.0 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. Net wealth has been growing at an average rate of 4.2 percent since 1995, about the same rate as from 1960 to 1973. 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 29 percent of privately owned physical assets. It grew 3.3 percent per year on average from 1960 to 2004. 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, growth of plant and equipment over the last eight years accelerated by only a few tenths of a percentage point compared with 1973–1995. Private plant and equipment grew 2.9 percent per year on average between 1973 and 1995 and just 3.2 percent per year from 1995 through 2004. 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 and land have all grown much more rapidly in real value since 1995 than from 1973 to 1995.

The accumulation of education capital has averaged 4.6 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, 1.9 percentage points faster than the average rate of growth in private physical capital during the same period. Since 1995, education capital has grown at a 4.3 percent annual rate. This reflects both the extra resources devoted to schooling in this period, and the fact that such resources have been increasing in economic value. Meanwhile, R&D stocks have grown at an average rate of 4.1 percent per year since 1995.

Other Federal Influences on Economic Growth

Federal investment decisions, as reflected in Table 13–4, obviously are important, but the Federal Government also affects 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 preserving national security, fostering healthy economic conditions including sound economic growth, promoting health and social welfare, and protecting the environment. Table 13–5 offers a rough cut of information that can be useful in assessing how well the Federal Government has been doing in promoting the domestic portion of these general objectives.

TABLE 13-5. ECONOMIC AND SOCIAL INDICATORS

Calendar Years	1960	1965	1970	1975	1980	1985	1990	1995	2000	2002	2003	2004
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	34,760	34,953	35,664	36,893
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	1.9	1.7	1.7
Median Income:												
All Households (2003 dollars)	N/A	N/A	35,832	35,559	37,447	38,510	40,865	40,845	44,853	43,381	43,318	N/A
Married Couple Families (2003 dollars)	30,903	35,966	43,130	44,789	48,917	50,695	54,431	56,395	63,110	62,657	62,405	N/A
Female Householder, Husband Absent (2003 dollars)	15,616	17,485	20,889	20,619	22,000	22,267	23,102	23,596	27,462	29,665	29,307	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	27.1	26.9	N/A
Poverty Rate (%) (a)	22.2	17.3	12.6	12.3	13.0	14.0	13.5	13.8	11.3	12.1	12.5	N/A
Economic Security:												
Civilian Unemployment (%)	5.5	4.5	4.9	8.5	7.1	7.2	5.5	5.6	4.0	5.8	6.0	5.5
CPI-U (%) Change)	1.7	1.6	5.8	9.1	13.5	3.5	5.4	2.8	3.4	1.6	2.2	2.7
Payroll Employment Increase Previous 12 Months (millions)	-0.4	2.9	-0.4	0.4	0.3	2.5	0.3	2.2	1.9	-0.6	-0.1	2.2
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	34.6	34.8	34.9
Wealth Creation:												
Net National Saving Rate (% of GDP) (b)	10.6	12.4	8.3	6.7	7.4	6.2	4.4	4.1	5.9	1.7	1.2	1.6
Innovation:												
Patents Issued to U.S. Residents (thousands) (c)	42.3	54.1	50.6	51.5	41.7	45.1	56.1	68.2	103.6	104.6	105.9	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	N/A	N/A	N/A
Nonfarm Output per Hour (average 5 year percent change)	1.6	3.4	2.1	2.3	1.1	1.7	1.5	1.5	2.5	3.0	3.4	3.6
Environment:												
Air Quality:												
Nitrogen Oxide Emissions (thousand short tons)	18,163	21,297	26,883	26,377	27,079	25,757	25,529	24,956	22,598	21,102	N/A	N/A
Sulfur Dioxide Emissions (thousand short tons)	22,268	26,799	31,218	28,043	25,925	23,307	23,076	18,619	16,347	15,353	N/A	N/A
Lead Emissions (thousand short tons)	N/A	N/A	221	160	74	23	5	4	4	N/A	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	162	174	201	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	23.2	23.2	N/A
Safe Communities:												
Violent Crime Rate (per 100,000 population) (d) ..	160.0	199.0	364.0	482.0	597.0	558.1	729.6	684.5	506.5	494.4	475.0	N/A
Murder Rate (per 100,000 population) (d)	5.1	5.1	7.8	9.6	10.2	8.0	9.4	8.2	5.5	5.6	5.7	N/A
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	4.8	4.5	N/A	N/A
Health:												
Infant Mortality (per 1000 Live Births) (e)	26.0	24.7	20.0	16.1	12.6	10.6	9.2	7.6	6.9	7.0	6.8	6.6
Low Birthweight (<2,500 gms) Babies (%) (e)	7.7	8.3	7.9	7.4	6.8	6.8	7.0	7.3	7.6	7.8	7.9	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	77.3	N/A	N/A

TABLE 13-5. ECONOMIC AND SOCIAL INDICATORS—Continued

Calendar Years	1960	1965	1970	1975	1980	1985	1990	1995	2000	2002	2003	2004
Cigarette Smokers (% population 18 and older) (f)	N/A	41.9	39.2	36.3	33.0	29.9	25.3	24.6	23.2	22.4	21.6	20.1
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	84.1	84.6	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	26.7	27.2	N/A
Participation:												
Individual Charitable Giving per Capita (2000 dollars) (by presidential election year)	247 (1960)	296 (1964)	355 (1968)	377 (1972)	410 (1976)	422 (1980)	468 (1984)	444 (1988)	680 (1992)	669 (1996)	N/A (2000)	N/A (2004)
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	55.3

(a) The poverty rate does not reflect noncash government transfers such as Medicaid or food stamps.

(b) 2004 through Q3 only.

(c) Preliminary data for 2003.

(d) Not all crimes are reported, and the fraction that go unreported may have varied over time.

(e) Data for 2003–2004 provisional, data for 2004 through June.

(f) Smoking data for 2004 through June.

The indicators shown in Table 13–5 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 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 beginning around 1995 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, violent crime

has fallen by a third. The turnaround has been especially dramatic in the murder rate, which has been lower since 1998 than at any time since the early 1960s. The 2001 recession had an effect on some of these indicators: unemployment rose and real GDP growth declined for a time. But as the economy recovered much of the improvement shown in Table 13–5 was preserved. Indeed, productivity growth, the best indicator of future changes in the standard of living accelerated. Since 1999, it has increased faster than in any other five-year period since 1960.

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: For the years 2005–2015, 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 interval 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 2004 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 2.4 percent per year; the unemployment rate is constant at 5.1 percent; and the yield on 10-year Treasury notes is steady at 5.7 percent.
- Real GDP per hour grows at the same average rate as in the Administration's medium-term projections—2.3 percent per year.
- 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 slower rates of growth beyond that point. Annual population growth eventually reaches 0.2 percent.
- Real GDP growth declines over time with the expected slowdown in population growth and the increase in the portion of the population over age 65, which contributes less work effort. Historically, real GDP has grown at an average yearly rate of 3.4 percent. In these projections, average real GDP growth declines to around 2.5 percent per year.

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 2010, receipts and outlays follow the budget's policy projections. In the long run, 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 2004 Medicare trustees' report, adjusted for differences in inflation rate and the growth rate in GDP per capita. Federal pensions are derived from the most recent actuarial forecasts available at the time the budget is prepared, repriced using Administration inflation 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 principal 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, it was necessary to deflate the nominal investment series. This was done 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 estimates 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 1979-2003, 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 2004 is a projection. The health insurance liability was estimated by the program actuaries for 1997-2003, 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.

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 or financed 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 2004.

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 2004 using in-

vestment 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 devel-

oped 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 13–5 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 the respective agencies' web sites.

