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Fiscal and Generational Imbalances: An Update

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Executive Summary

This paper provides an update of the U.S. fiscal and generational imbalances that we originally calculated in Gokhale and Smetters (2003) and presents the calculations in several alternative ways. We find that a lot has changed in just a few years. In particular, the nation's fiscal imbalance has grown from around $44 trillion as of fiscal year-end 2002 to about $63 trillion, mostly due to the recent adoption of the prescription drug bill (Medicare, Part D). The imbalance also grows by more than $1.5 trillion (in inflation adjusted terms) each year that action is not taken to reduce it.

This imbalance now equals about 8 percent of all future gross domestic product (GDP) and it could, in theory, be eliminated by more than doubling the employer-employee payroll tax from 15.3 percent of wages to over 32 percent immediately and forever—assuming, quite critically, no reduction in labor supply or national saving and capital formation. Massive cuts in government spending would also be required to achieve fiscal balance: the total federal fiscal imbalance now equals 77.8 percent of non–Social Security and non-Medicare outlays.

1. Introduction

The oldest baby boomers will attain Social Security's early retirement age of 62 in 2008, and will become eligible for Medicare benefits by 2011. As this generation enters retirement, the population share of retirees will climb rapidly, increasing from about 20 percent today to 37 percent by 2035. Projected longevity improvements mean that the retiree population share will continue to increase gradually during the

remainder of this century. This ongoing and irreversible process of population aging in the United States will exert tremendous pressure on government budgets in terms of both their size and composition.

Combined with the politically inflexible eligibility and benefit rules of entitlement programs, population aging will induce a shift in federal budget priorities from discretionary spending such as defense, infrastructure, education, and research and development to mandatory outlays such as Social Security, Medicare, and Medicaid. If the increase in these mandatory outlays cannot be controlled, maintaining growth in discretionary outlays to keep pace with overall economic growth will require higher taxes. An important additional factor that is likely to cause the share of government in the economy to grow is the rapid projected increase in health-care costs—which have historically grown at a much faster pace than general price inflation.

We have argued elsewhere that fiscal policymaking would become easier if the impending change in federal budget priorities were preceded by an adjustment in our fiscal vocabulary—that is, by adopting new measures to gauge the federal government's fiscal health (Gokhale and Smetters 2003).[1] Traditional measures—such as annual deficits and debt held by the public projected for a limited number of future years—are not adequate for providing lawmakers with the information necessary for enacting new policies in the presence of the age wave. The backward-looking nature of these measures makes it difficult to gauge whether the future fiscal commitments created by laws that Congress enacts are affordable or not. These measures also bias Congress's decisions, inducing rejection of reforms that could improve the nation's long-term fiscal outlook by undertaking a short-term sacrifice.

The two measures that we have proposed in the past are called the fiscal imbalance (FI) and the generational imbalance (GI) (Gokhale and Smetters 2003). The most important differences between traditional fiscal measures and our proposed measures are that the latter are forward-looking and apply a time discount to future dollar flows. The FI measure equals the current level of debt held by the public (representing past overspending) plus the present discounted value of future federal non-interest expenditures less the present discounted value of future federal receipts.[2,3] In other words, FI shows the extent to which current U.S. federal fiscal policy is *not sustainable*. FI equals zero for a sustainable (or balanced) policy—wherein outstanding debt held by the public plus future spending commitments are balanced

with future receipts in present value. While FI encompasses all federal programs, it can also be calculated separately for specific federal programs, including Social Security.

The FI measure includes all future federal financial shortfalls without a time limit. Of course, it can also be calculated under a finite time horizon. But truncating the calculation in this way could seriously misstate the size of the total FI because it would ignore the present value of shortfalls accruing outside the particular choice of budget window. Under current U.S. fiscal policy, our estimates suggest that even if the federal budget window were extended from the normal five-year or ten-year window to seventy-five years (the standard projection window used by the Social Security and Medicare trustees), the projected shortfall would miss over half of the true present value imbalance. Restricting attention to such truncated calculations of fiscal shortfalls could significantly bias policymaking toward obtaining short-term benefits at the expense of policies with short-term costs but larger long-term gains. This short-term policy bias would make current generations better off at the expense of future ones.

Even the FI measure, however, does not fully reflect this policy bias. For example, a strict pay-as-you-go financed retirement benefit has no effect on either traditional budget measures or on FI since the costs of such a program are, by construction, financed out of contemporaneous receipts. Still, such a program would transfer resources toward older people who would receive a benefit without having paid much in taxes when working. Such a program would reduce national savings and increase interest rates, as was pointed out in a seminal work by Feldstein (1974). Under a dynamically efficient economy (one in which the steady-state interest rate exceeds the growth rate), this transfer to older generations is financed by younger and future generations, who pay more taxes under this program relative to their benefits in present value.

To capture the intergenerational redistributive effects of such pay-as-you-go policies, we also proposed a second, complementary measure—the generational imbalance (GI). This measure calculates the contribution of *past and current generations* to FI, that is, the amount of overspending by past and current generations under current law. In other words, whereas FI shows the extent to which current fiscal policy is not sustainable, GI measures the amount by which benefits to past and current generations (including prospective benefits of current generations) exceed their tax payments (including prospective tax

payments by current generations) in present value. The GI measure is also useful in estimating the amount by which such obligations induce a reduction in national saving and capital formation.

The GI measure is calculated under projections of taxes and benefits and assuming continuation of current policies throughout the lifetimes of current generations. Therefore, GI can be interpreted as the amount of implicit debt under current fiscal policy that past and current generations are passing to future generations, who must finance it through tax payments in excess of their benefits in present value. The amount of implicit debt can be changed, however, by changing current fiscal policy.

Most policy changes will affect both GI and FI. As noted earlier, however, a strictly pay-as-you-go-financed program—wherein higher benefits to older generations are fully financed out of higher taxes levied on working generations—would, by construction, have no impact on FI. But such a program would cause a potentially large increase in GI. Thus, while GI provides important information on the effect of fiscal policy on national savings, it also provides a complementary measure of policy sustainability. For instance, one could conceive of policies that are sustainable in a traditional static-scoring sense (i.e., for which FI = 0) but involve a very high implicit debt, as reflected in a high value of GI, which would produce unrealistically large tax hikes or benefits cuts.

Unfortunately, the GI measure can be cleanly estimated only for certain federal programs whose benefits and taxes can be easily distributed across the recipient population. For such programs, the GI measure indicates the contribution of past and current generations to the program's total FI.

This paper reports updated calculations of the infinite-horizon FI and GI measures. Our calculations are based on long-term federal spending and revenue projections made for the Budget of the United States Government for fiscal year 2005, the latest long-term budget projections available to us. We report the calculations—particularly Medicare's estimates—in several alternative ways, and we report the sensitivity of our results to different economic assumptions. We also report limited-horizon FI measures over budget windows of five, ten, twenty-five, fifty, and seventy-five years, and we show how those calculations would potentially severely bias fiscal policy decision-making.

Since the publication of our book (Gokhale and Smetters 2003), the nation's fiscal position has dramatically worsened, even relative to the

alarmingly large estimates that we presented two years ago. In particular, the FI has increased from around $44.2 trillion (expressed in constant 2002 dollars) to about $63.3 trillion (expressed in constant 2004 dollars). Restating the 2002 estimate of FI in 2004 dollars makes it equal to $45.9 trillion. About $3.4 trillion of the difference between this and FI as of fiscal year-end 2004 ($63.3 trillion) arises from the accrual of interest over two years (calculated in inflation adjusted terms). The enactment in 2003 of the prescription drug benefit (Medicare, Part D) adds $24.2 trillion to FI as of fiscal year-end 2004 (including one year's interest cost since enactment). However, the Office of Management and Budget's (OMB's) more favorable long-term productivity outlook reduced FI on the rest-of-federal-government account by $6.2 trillion, arising mainly from higher non-payroll-tax revenues. The remaining difference is explained by changes in revenue and outlay projections for Social Security and Medicare—especially reductions in Medicare Parts A and B outlays resulting from the introduction of Medicare Part D.

The GI measure indicates massive overspending by past and current generations in just the Social Security and Medicare programs—to the tune of $33.6 trillion. Again, this is under the assumption that general-revenue transfers are appropriated by the federal government for Medicare Parts B and D. Alternatively, if general-revenue transfers were viewed as dedicated to the Medicare program, the total GI value for Social Security and Medicare would equal $26.1 trillion.

Achieving fiscal balance would require either massive tax increases (e.g., more than doubling the employer-employee combined payroll tax immediately and forever) or massive cuts in government outlays, for example, a 77.8 percent immediate and permanent reduction in all non–Social Security and non-Medicare outlays. Such a sharp increase in taxes would likely send the U.S. economy into a tailspin and, therefore, pass along to future generations an economy that is in worse shape than the economy that baby boomers inherited from their parents. A sharp decrease in Social Security, health care, and other benefits, however, could entail significant hardship for retirees unless benefits could be reduced in a sufficiently progressive manner.

The FI and GI measures have now also been published by Social Security's and Medicare's trustees in their annual reports, starting with Social Security in 2003 and then both programs in 2004 and 2005. These presentations have been endorsed by the 2003 Social Security advisory board's technical panel on assumptions and methods (Social

Security Advisory Board 2003), which is composed of several prominent economists and actuaries outside the Social Security Administration. The calculations reported herein differ from the trustees' estimates because our calculations are based on long-term budget projections made under the administration's economic assumptions, whereas the trustees use their own set of assumptions, including a smaller interest rate and a smaller rate of productivity growth. As a result, the imbalances that we report for the Social Security and Medicare programs are actually somewhat *smaller* than what they find.

In addition to the Social Security trustees, the Federal Accounting Standards Advisory Board (FASAB) is actively considering ways to broaden the definition of liabilities associated with social insurance programs for purposes of financial reporting by the federal government. Doing so would be consistent with representing more fully the future implications of current laws—such as those of entitlement programs—that prescribe criteria for benefit eligibility and benefit amounts payable to those eligible until such time that Congress acts to change those laws.

Finally, the current administration appears to have endorsed, in principle, the formal reporting of future federal obligations and anchoring the legislative budget process on such measures. The fiscal year 2006 Budget of the United States Government calls for the following reforms:

> First, the Administration proposes a point of order against legislation which worsens the long-term unfunded obligation of major entitlements. The specific programs covered would be those programs with long term actuarial projections, including Social Security, Medicare, Federal civilian and military retirement, veterans disability compensation, and Supplemental Security Income. Additional programs would be added once it becomes feasible to make long-term actuarial estimates for those programs.
>
> Second, the Administration proposes new reporting requirements to highlight legislative actions worsening unfunded obligations. These requirements would require the Administration, as part of the President's Budget, to report on any enacted legislation in the past year that worsens the unfunded obligations of the specified programs.[4]

2. Estimates of U.S. Federal Fiscal Imbalances

This section presents calculations of the U.S. federal government's fiscal imbalances, using the Office of Management and Budget's long-range projections (made through the year 2080) as a starting point,

that are consistent with the federal budget for fiscal year 2005. Our long-range assumptions underlying our projections include an annual labor productivity growth rate (change in hourly labor compensation) of 1.8 percent per year and a consumer price inflation of 2.5 percent per year. Present values are calculated using a discount rate of 3.65 percent per year—consistent with the rates on outstanding thirty-year Treasury securities.[5]

Table 6.1 presents FI estimates for the entire federal government as well as separately for Social Security, Medicare, and rest-of-federal-government account. The federal government's total fiscal imbalance amounts to more than $63 trillion in 2004. Social Security contributes "only" $8 trillion to total federal FI.

Total federal FI equals 8.2 percent of the present value of future GDP. Some analysts prefer this measure of the total imbalance because it compares FI to the economy's resource base. However, because only about half of GDP is subject to taxation, the imbalance-to-GDP ratio measure severely understates the difficulty in financing such a large fiscal imbalance. Indeed, as shown in table 6.1, FI equals to 18.0 percent of all future *uncapped* payrolls—the present value of Medicare's tax base, which, unlike Social Security, does not impose a taxable wage ceiling.

In other words, even with a zero labor supply elasticity—a heroic assumption that almost all economists would dispute at existing tax rates—balancing the federal government's intertemporal budget constraint would require more than doubling the employer-employee combined payroll tax of 15.3 percent to more that 33.3 percent permanently and forever. Note, however, that the vast majority of the current 15.3 percent tax rate is levied only on earnings *below* the wage ceiling. In other words, both a large tax rate increase and a base broadening would be required to achieve fiscal balance under this hypothetical policy scenario.

More realistically, of course, labor supply would sharply fall in response to such a tax increase (Feldstein 1996, Prescott 2004). We conjecture that federal tax increases alone could never be successful in reducing the federal FI to zero. This view is only strengthened when we consider that many states are facing budget crises of their own due to rising Medicaid costs—fiscal imbalances that the calculations reported here ignore.[6,7] The extent to which federal taxes can be increased are therefore further limited by the need to increase revenues from the same tax base for state balancing budgets. That suggests

Table 6.1
U.S. Federal Fiscal Imbalance and Its Components Under Alternative Assumptions

	Fiscal Years						
	2004	2005	2006	2007	2008	2009	2010
Present Values in Billions of Constant 2004 Dollars							
Total fiscal imbalance—U.S. federal government	63,284	65,928	68,633	71,317	73,968	76,648	79,417
Social Security	8,006	8,352	8,709	9,067	9,422	9,784	10,158
Panel A: general revenue transfers are annually appropriated for Medicare Parts B and D							
Medicare	60,886	63,381	65,875	68,321	70,717	73,122	75,599
Rest of federal government	−5,608	−5,805	−5,951	−6,071	−6,171	−6,258	−6,339
Panel B: general revenue transfers are dedicated to Medicare Parts B and D							
Medicare	17,997	18,768	19,554	20,333	21,101	21,876	22,676
Rest of federal government	37,282	38,808	40,369	41,917	43,445	44,988	46,583
As a Percentage of the Present Value of GDP							
Total fiscal imbalance—U.S. federal government	8.2	8.3	8.4	8.5	8.6	8.8	8.9
Social Security	1.0	1.1	1.1	1.1	1.1	1.1	1.1
Panel C: general revenue transfers are annually appropriated for Medicare Parts B and D							
Medicare	7.9	8.0	8.1	8.2	8.3	8.4	8.5
Rest of federal government	−0.7	−0.7	−0.7	−0.7	−0.7	−0.7	−0.7
Panel D: general revenue transfers are dedicated to Medicare Parts B and D							
Medicare	2.3	2.4	2.4	2.4	2.5	2.5	2.5
Rest of federal government	4.8	4.9	5.0	5.0	5.1	5.1	5.2
Memo: Present Value of GDP (billions of constant 2004 dollars)	772,260	790,733	812,819	834,656	855,240	874,525	893,283

	Fiscal Years						
	2004	2005	2006	2007	2008	2009	2010
As a Percentage of the Present Value of (Uncapped) Payrolls							
Total fiscal imbalance—U.S. federal government	18.0	18.3	18.5	18.7	19.0	19.2	19.5
Social Security	2.3	2.3	2.3	2.4	2.4	2.5	2.5
Panel E: general revenue transfers are annually appropriated for Medicare Parts B and D							
Medicare	17.3	17.6	17.8	18.0	18.1	18.4	18.6
Rest of federal government	−1.6	−1.6	−1.6	−1.6	−1.6	−1.6	−1.6
Panel F: general revenue transfers are dedicated to Medicare Parts B and D							
Medicare	5.1	5.2	5.3	5.3	5.4	5.5	5.6
Rest of federal government	10.6	10.8	10.9	11.0	11.1	11.3	11.5
Memo: Present value of uncapped payrolls (billions of constant 2004 dollars)	352,529	360,875	370,810	380,586	389,750	398,302	406,604

Source: Authors' calculations.

federal spending reductions will have to play an important role in resolving the federal government's fiscal imbalance.

2.1 Alternative Presentations of Medicare's Portion of FI

In our book, Gokhale and Smetters (2003), we presented Medicare's portion of the total FI by ignoring the general revenue transfers received by Medicare Part B (Supplementary Medical Insurance). About 75 percent of Medicare Part B's outlays are financed out of general revenues. Moreover, Medicare Part D (prescription drug coverage), which was enacted after the publication of our book, is entirely financed out of general revenue transfers. Some commentaries correctly disputed our representation of the entire burden of Medicare's general revenue financing as Medicare's fiscal imbalance. That's because Medicare Parts B and D are not *intended* to be fully financed from dedicated federal receipts; to ignore general revenue contributions is to essentially ignore this aspect of current law and therefore to disregard the explicit intent of the U.S. Congress to partly finance Medicare out of general revenues. Auerbach, Gale, and Orszag (2004), for example, consider several alternative methods of presenting Medicare's shortfalls.

We still believe that the best way of presenting Medicare's shortfalls is to offset outlays by only its dedicated payroll taxes. The reason for this—based on budget accounting principles and not political or economic ones—is that the reported contribution of any program to the federal government's overall FI should reflect the budgetary savings (reduction in FI) generated by eliminating that program. Of course, we are *not* advocating Medicare's elimination. Rather, we favor accounting for Medicare's contribution to the FI by measuring the total amount of burdens generated by that program. Otherwise, the purpose of the calculations (measuring budgetary costs arising from operating federal programs) would become unclear.

Nonetheless, for the sake of completeness and to acknowledge that Congress intended Medicare to be partly financed out of general revenues, we present Medicare's contribution to total federal FI under two alternative views. First—and the approach we prefer—general revenue transfers are ignored by assuming that these transfers are annually appropriated for Medicare Parts B and D. Medicare's FI in 2004 is about $61 trillion under this perspective. Under the second view, we include general revenue transfers by assuming that they are dedicated to these two subprograms, in which case Medicare's FI is substantially lower—$18 trillion.

Regardless of one's view of how Medicare's finances should be represented, however, total federal FI remains unchanged at $63 trillion, as shown in table 6.1. When general revenue transfers are included as part of Medicare's finances, the contribution to FI by the "rest of federal government" simply increases by about $43 trillion, the difference between the two alternative measures of Medicare's FI.[8]

2.2 A Growing Fiscal Problem

Table 6.1 also shows that the fiscal imbalance is growing by about $2 trillion each year, or by about 20 percent of *this year's* GDP. Like a corpus of debt, an outstanding total federal FI accrues interest over time.[9] Under current estimates, its value will grow from $63.3 trillion at year-end 2004 to $79.4 trillion by year-end 2010 if policies and projections remain unchanged in the interim. However, a seemingly more optimistic view, also shown in table 6.1, indicates that the imbalance grows from 8.2 percent of *all future* GDP in 2004 to 8.3 percent of all future GDP in 2005. Relative to all future uncapped payroll, FI grows from 18.0 percent in 2004 to 18.3 percent in 2005.

The advantage of dividing FI by the present value of *all* future GDP or uncapped payroll is that this measure accounts for the fact that not only does FI grow over time but GDP and uncapped payrolls grow as well. Indeed, if the economy's capital stock were exactly at or above the golden rule level—implying that the economy's interest rate is less than or equal to the economy's growth rate—the ratio of FI relative to all future GDP (or uncapped payrolls) would *not* grow over time (see the discussion in the appendix). In that case, of course, federal deficits would not matter either—in fact, *reducing* national saving would be Pareto improving. The U.S. economy would be in Paul Samuelson's (1958) hypothetical world in which Ponzi games *are* feasible in the long run. Empirical studies, however, have rejected the hypothesis that the U.S. economy is dynamically inefficient (e.g., Abel et al. 1989).

The time-path of the ratio of FI to GDP or payrolls shown in table 6.1 indicates the trade-off available to policymakers between adopting smaller policy changes (tax increases or benefit reductions) effective immediately, or larger ones that would become effective after some years have passed.

Nonetheless, exactly how to report FI's growth over time—whether as a dollar figure or relative to the present value of GDP or uncapped payroll—has generated a heated debate. For example, Dr. Paul Krugman, a well-known economist and columnist at the *New York Times*, has repeatedly criticized President Bush for claiming that Social

Security's contribution to FI worsens by about $600 billion each year, as now estimated by the Social Security trustees.[10] Dr. Krugman's argument apparently rests on the fact that the growth of Social Security's FI *relative* to the present value of future GDP or payroll does not appear as alarming.[11]

However, Dr. Krugman can only reject the $600 billion figure if he also rejects the budget accounting system currently being used by the federal government in favor of the FI and GI metrics. But elsewhere, Krugman has referred to Social Security's FI estimate, which is now being produced by the Social Security trustees, as a scare tactic.[12] His positions, therefore, seem inconsistent to us. Indeed, the president's claim that Social Security's problem worsens by $600 billion each year is consistent with the standard deficit language that indicates the dollar amount that the national debt grows each year. The president's message simply emphasizes the need to look ahead rather than restrict attention to conventional cash-flow deficit as a guidepost for fiscal policymakers.

3. Social Security's Fiscal and Generational Imbalances

Table 6.2 shows a decomposition of Social Security's FI into two components—GI, which shows the contribution to FI on account of past and current generations (those age 15 and older during the fiscal year being considered), and FI minus GI, which shows the contribution to FI that future generations are scheduled to make under current policies. The first row of table 6.2 repeats Social Security's FI shown in table 6.1 (in constant 2004 dollars) for the sake of comparison.

The second row of table 6.2 shows the generational imbalance on account of Social Security. As it turns out, Social Security's GI is *larger* in present value than its FI, indicating that more than 100 percent of this program's FI is accounted for by the excess of benefits over payroll taxes in present value scheduled to be awarded to past and living generations.

The third row of table 6.2 shows that Social Security's GI can be decomposed into two parts: the first part is the present value of prospective excess benefits over payroll taxes that those age 15 and older will receive. As of fiscal year-end 2004, this part equals $11.2 trillion. The second part is the accumulated (present) value of excess benefits paid in the past compared to payroll taxes received by the Social Security system. It includes the present value of excess benefits over payroll

Table 6.2
Social Security's Fiscal and Generational Imbalances

	Fiscal Years						
	2004	2005	2006	2007	2008	2009	2010
Present Values in Billions of Constant 2004 Dollars							
Total fiscal imbalance in Social Security	8,006	8,352	8,709	9,067	9,422	9,784	10,158
Past and living generations (GI)	9,549	9,899	10,256	10,609	10,958	11,310	11,676
Future net benefits of living generations[a]	11,182	11,686	12,205	12,729	13,255	13,787	14,338
Trust fund	−1,634	−1,787	−1,949	−2,120	−2,297	−2,476	−2,662
Future generations[b]	−1,543	−1,547	−1,547	−1,543	−1,535	−1,527	−1,518
As a Percentage of the Present Value of GDP							
Total fiscal imbalance in Social Security	1.04	1.06	1.07	1.09	1.10	1.12	1.14
Past and living generations (GI)	1.24	1.25	1.26	1.27	1.28	1.29	1.31
Future net benefits of living generations[a]	1.45	1.48	1.50	1.53	1.55	1.58	1.61
Trust fund	−0.21	−0.23	−0.24	−0.25	−0.27	−0.28	−0.30
Future generations[b]	−0.20	−0.20	−0.19	−0.18	−0.18	−0.17	−0.17
As a Percentage of the Present Value of (Uncapped) Payrolls							
Total fiscal imbalance in Social Security	2.27	2.31	2.35	2.38	2.42	2.46	2.50
Past and living generations (GI)	2.71	2.74	2.77	2.79	2.81	2.84	2.87
Future net benefits of living generations[a]	3.17	3.24	3.29	3.34	3.40	3.46	3.53
Trust fund	−0.46	−0.50	−0.53	−0.56	−0.59	−0.62	−0.65
Future generations[b]	−0.44	−0.43	−0.42	−0.41	−0.39	−0.38	−0.37

Source: Authors' calculations.
[a]Those born 15 years ago and earlier. In the year 2004, for example, this category includes people born before 1990.
[b]Those born 14 years ago and later. In the year 2004, for example, this category includes people born during 1990 and later.

taxes paid to those alive today (age 15 and older) and those no longer alive since the system's inception in 1935. As of 2004, this value is *negative* $1.6 trillion, indicating past accruals of payroll tax surpluses in the Social Security Trust Fund. Adding these two parts yields the fiscal year-end 2004 value of GI—$9.5 trillion.

Because Social Security's FI is smaller than its GI, the difference, FI minus GI, is negative. Thus, under current policies, future generations (those age 14 and younger and those that will be born in the future) will *pay* more in the present value of payroll taxes compared to the present value of their Social Security benefits. The present value of future generations' excess payroll tax payments equals $1.5 trillion. Despite this overpayment, they will be asked to pay even more (or receive even less)—about $8 trillion more—in order to produce a sustainable system unless Social Security is reformed soon.

4. Medicare's Fiscal and Generational Imbalances

In the following discussion we will adopt the convention of representing Medicare's imbalance under our preferred perspective, which does not assume that general revenue transfers represent a free revenue source to Medicare. Table 6.3 shows FI and GI values for Medicare and its component programs [hospital insurance (Part A), supplementary medical insurance (or Part B), and the prescription drug benefit (Part D)].

Medicare's overall imbalance equals $60.9 trillion under current policies. Similar to the procedure used by the Center for Medicare and Medicaid Services in making long-range health care projections, the Office of Management and Budget's long-range budget projections assume that future federal health care outlays per capita will grow about 1 percent faster than GDP per capita through the next 75 years. Thereafter, this growth rate wedge is tapered down to equal GDP growth per capita.[13] Table 6.4 shows, however, that total (economy-wide) medical spending per capita has increased by 1.6 percent per year since 1980 and federal health-care outlay growth has averaged 1.8 percent (calculated exponentially) during the same period. This is much faster than assumed in official long-range federal budget projections used to calculate the FI and GI values of table 6.3. That makes the FI and GI estimates reported here considerably more conservative compared to those that would be obtained under a health care growth assumption closer to its historical average.

We estimate Medicare's overall FI to be $60.9 trillion as of fiscal year-end 2004. That equals 7.9 percent of GDP—almost equaling the entire federal FI of 8.2 percent. Medicare's FI equals 17.3 percent of the present value of uncapped payrolls. Despite the very conservative assumption about health care outlay growth, that's more than seven times larger than Social Security's FI.

Waiting until 2010 to change policies on Medicare's revenues or benefits would increase the program's FI to $75.6 trillion—increasing it as a share of GDP to 8.5 percent. Viewed alternatively, the additional resources required through policy changes in 2010 would be equivalent to imposing a tax of 18.6 percent of uncapped payrolls instead of 17.3 percent were the policy change undertaken immediately.

Table 6.3 also decomposes Medicare's FI into those computed on account of its sub-programs. Medicare Part A's and Part B's FIs are almost identical—between $18.0 and $19.0 trillion each as of fiscal year-end 2004. The Medicare prescription drug program's FI is larger by 25 percent—valued at $24.0 trillion.

A noteworthy difference between Social Security and Medicare is that GI constitutes a much smaller share in FI for Medicare than for Social Security.[14] Recall that more than 100 percent of Social Security's FI is accounted for by generous benefits awarded to past and scheduled for current generations compared to their payroll taxes, whereas future generations are projected to pay more in Social Security payroll taxes than they will receive in benefits. In contrast, Medicare's GI contributes only two-fifths of its total FI of $60.9 trillion and, under current Medicare tax and benefit rules, future generations are projected to receive $36.8 trillion more in future health care benefits than they will pay in present value of taxes. This result arises because much of Medicare's large FI is caused by rapid growth in future health care costs and outlays. Indeed, the conservative assumptions used in making future health care outlay projections suggest that these estimates may significantly understate Medicare's FI and significantly overstate the percentage contribution of Medicare's GI to its FI.

5. Comparison with Estimates by the Social Security and Medicare Trustees

Table 6.5 compares this paper's FI and GI estimates with those of Social Security and Medicare's trustees that are published in their 2005 annual reports. The Social Security program's FI is estimated at $11.1

Table 6.3
Medicare's Fiscal and Generational Imbalances

	Fiscal Years						
	2004	2005	2006	2007	2008	2009	2010
Present Values in Billions of Constant 2004 Dollars							
Total fiscal imbalance in Medicare (Parts A, B, and D)	60,886	63,381	65,875	68,321	70,717	73,122	75,599
Past and living generations	24,094	25,431	26,778	28,131	29,485	30,862	32,289
Future net benefits of living generations[a]	24,376	25,726	27,098	28,466	29,835	31,227	32,670
Trust fund	−282	−295	−320	−335	−350	−366	−381
Future generations[b]	36,791	37,951	39,097	40,190	41,232	42,261	43,310
Medicare Part A							
Fiscal imbalance	18,090	18,866	19,658	20,441	21,213	21,992	22,797
Past and living generations	7,462	7,869	8,292	8,722	9,155	9,599	10,062
Future net benefits of living generations[a]	7,722	8,136	8,572	9,014	9,461	9,918	10,394
Trust fund	−261	−268	−279	−292	−306	−319	−333
Future generations[b]	10,629	10,998	11,365	11,719	12,058	12,393	12,735
Medicare Part B							
Fiscal imbalance	18,610	19,295	19,983	20,665	21,328	21,992	22,674
Past and living generations	7,447	7,787	8,136	8,494	8,850	9,209	9,580
Future net benefits of living generations[a]	7,467	7,815	8,177	8,537	8,894	9,255	9,629
Trust fund	−21	−28	−41	−43	−45	−46	−49
Future generations[b]	11,163	11,507	11,847	12,171	12,479	12,783	13,094

	Fiscal Years						
	2004	2005	2006	2007	2008	2009	2010
Medicare Part D							
Fiscal imbalance	24,186	25,220	26,234	27,216	28,176	29,138	30,128
Past and living generations	9,186	9,775	10,349	10,915	11,480	12,054	12,647
Future net benefits of living generations[a]	9,186	9,775	10,349	10,915	11,480	12,054	12,647
Trust fund	0	0	0	0	0	0	0
Future generations[b]	15,000	15,446	15,885	16,301	16,695	17,084	17,480
Percentage of the Present Value of GDP							
Total fiscal imbalance in Medicare (Parts A, B, and D)	7.88	8.02	8.10	8.19	8.27	8.36	8.46
Past and living generations	3.12	3.22	3.29	3.37	3.45	3.53	3.61
Future net benefits of living generations[a]	3.16	3.25	3.33	3.41	3.49	3.57	3.66
Trust fund	−0.04	−0.04	−0.04	−0.04	−0.04	−0.04	−0.04
Future generations[b]	4.76	4.80	4.81	4.82	4.82	4.83	4.85
Medicare Part A							
Fiscal imbalance	2.34	2.39	2.42	2.45	2.48	2.51	2.55
Past and living generations	0.97	1.00	1.02	1.04	1.07	1.10	1.13
Future net benefits of living generations[a]	1.00	1.03	1.05	1.08	1.11	1.13	1.16
Trust fund	−0.03	−0.03	−0.03	−0.03	−0.04	−0.04	−0.04
Future generations[b]	1.38	1.39	1.40	1.40	1.41	1.42	1.43

(continued)

Table 6.3
(continued)

	Fiscal Years						
	2004	2005	2006	2007	2008	2009	2010
Medicare Part B							
Fiscal imbalance	2.41	2.44	2.46	2.48	2.49	2.51	2.54
Past and living generations	0.96	0.98	1.00	1.02	1.03	1.05	1.07
Future net benefits of living generations[a]	0.97	0.99	1.01	1.02	1.04	1.06	1.08
Trust fund	0.00	0.00	−0.01	−0.01	−0.01	−0.01	−0.01
Future generations[b]	1.45	1.46	1.46	1.46	1.46	1.46	1.47
Medicare Part D							
Fiscal imbalance	3.13	3.19	3.23	3.26	3.29	3.33	3.37
Past and living generations	1.19	1.24	1.27	1.31	1.34	1.38	1.42
Future net benefits of living generations[a]	1.19	1.24	1.27	1.31	1.34	1.38	1.42
Trust fund	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future generations[b]	1.94	1.95	1.95	1.95	1.95	1.95	1.96
Percentage of the Present Value of Uncapped Payrolls							
Total fiscal imbalance in Medicare (Parts A, B, and D)	17.27	17.56	17.77	17.95	18.14	18.36	18.59
Past and living generations	6.83	7.05	7.22	7.39	7.57	7.75	7.94
Future net benefits of living generations[a]	6.91	7.13	7.31	7.48	7.65	7.84	8.03
Trust fund	−0.08	−0.08	−0.09	−0.09	−0.09	−0.09	−0.09
Future generations[b]	10.44	10.52	10.54	10.56	10.58	10.61	10.65

	Fiscal Years						
	2004	2005	2006	2007	2008	2009	2010
Medicare Part A							
Fiscal imbalance	5.13	5.23	5.30	5.37	5.44	5.52	5.61
Past and living generations	2.12	2.18	2.24	2.29	2.35	2.41	2.47
Future net benefits of living generations[a]	2.19	2.25	2.31	2.37	2.43	2.49	2.56
Trust fund	−0.07	−0.07	−0.08	−0.08	−0.08	−0.08	−0.08
Future generations[b]	3.01	3.05	3.07	3.08	3.09	3.11	3.13
Medicare Part B							
Fiscal imbalance	5.28	5.35	5.39	5.43	5.47	5.52	5.58
Past and living generations	2.11	2.16	2.19	2.23	2.27	2.31	2.36
Future net benefits of living generations[a]	2.12	2.17	2.21	2.24	2.28	2.32	2.37
Trust fund	−0.01	−0.01	−0.01	−0.01	−0.01	−0.01	−0.01
Future generations[b]	3.17	3.19	3.19	3.20	3.20	3.21	3.22
Medicare Part D							
Fiscal imbalance	6.86	6.99	7.07	7.15	7.23	7.32	7.41
Past and living generations	2.61	2.71	2.79	2.87	2.95	3.03	3.11
Future net benefits of living generations[a]	2.61	2.71	2.79	2.87	2.95	3.03	3.11
Trust fund	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Future generations[b]	4.25	4.28	4.28	4.28	4.28	4.29	4.30

Source: Authors' calculations.

[a] Those born 15 years ago and earlier. In the year 2004, for example, this category includes people born before 1990.

[b] Those born 14 years ago and later. In the year 2004, for example, this category includes people born during 1990 and later.

Table 6.4
Growth in Health Care Expenditures per Capita, 1980 and 2003

			Exponential Growth Rate (percent)	
	1980	2003	Nominal	Real
National health expenditures	$1,067	$5,670	3.2	1.6
Private	612	3,084	3.1	1.5
Public	455	2,586	3.3	1.8
Federal	310	1,829	3.4	1.8
State and local	146	757	3.2	1.6
Prescription drugs	52	605	4.7	3.2
Memo items:				
GDP per capita	12,130	37,176	2.1	0.6
Consumer Price Index	82.4	188.9	1.6	

Source: Authors' calculations based on data from the Centers for Medicare and Medicaid Services (see http://www.cms.hhs.gov/statistics/nhe/historical/t1.asp). Figures for the Consumer Price Index (CPI-U, current series) are taken from the Bureau of Labor Statistics' web site.

Table 6.5
Comparison with Official Estimates for Social Security and Medicare (Present Values in Trillions of Constant 2004 Dollars)

	Ours	Social Security and Medicare Trustees
Social Security		
FI	8.0	11.1
GI	9.5	12.0
Medicare Part A		
FI	18.1	24.1
GI	7.5	9.4
Medicare Part B		
FI	18.6	25.8
GI	7.4	9.7
Medicare Part D		
FI	24.2	18.2
GI	9.2	6.7

trillion by the trustees, whereas it is just $9.5 trillion under the economic assumptions of the Office of Management and Budget. When we lower the discount rate from 3.65 percent to 3.30 percent, Social Security's FI increases to $11.5 trillion—higher than the trustees' estimate. That is, adopting the trustees' discount rate assumption would result in an even higher estimate of that program's unfunded obligation. Why the difference? The answer is OMB's higher productivity growth rate assumption—1.8 percent per year compared to 1.6 percent. Faster economic growth results in higher future tax revenues but also larger benefit obligations because of Social Security benefits. As it turns out, faster economic growth increases rather than reduces Social Security's unfunded obligations. In the words of the program's trustees:

> While faster real wage growth... results in increased tax revenue somewhat before it increases benefit levels, the cumulative additional growth in wage levels eventually results in greater dollar increases in the relatively large projected cost of the OASDI [Old Age, Survivors, and Disability Insurance] program than in the smaller projected tax revenues. Thus, eventually, faster real wage growth, alone, results in an increase in the unfunded obligation of the program.[15]

The Medicare trustees' estimate of the infinite horizon unfunded obligations for Medicare Part A (hospital insurance) equals $24.1 trillion, much higher than our estimate of $18.1 trillion. However, the proportion of FI contributed by GI is about 40 percent under both sets of estimates. For Medicare Part B, the trustees report an unfunded obligation of zero. That's because their reporting convention counts general revenue transfers to Medicare Part B as dedicated rather than appropriated for the program. Using our preferred approach of viewing general revenue transfers as appropriated, Medicare Part B's unfunded obligation equals $25.8 trillion. Again, GI contributes just under 40 percent of Medicare Part B's unfunded obligations under both sets of estimates.

Estimates of Medicare Part D (prescription drug coverage), shown in table 6.5, differ considerably. The trustees' estimate is smaller at $18.2 trillion, whereas ours is $24.2 trillion. Our estimate is based on OMB's projections of growth in prescription drug outlays. Reportedly, these projections are based on higher growth rates through 2040, as seen in figure 6.1. Again, however, the ratios of GI to FI are quite similar under both sets of estimates.

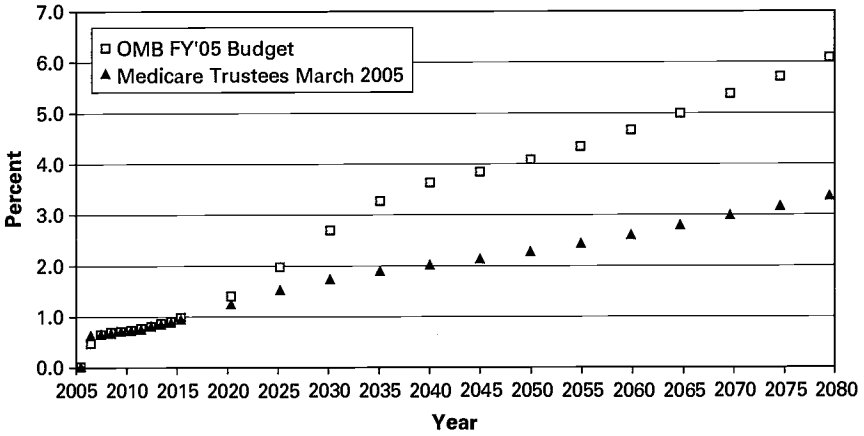

Figure 6.1
Medicare Part D's Projected Outlays as a Percentage of Projected GDP

Except for the magnitude of Medicare Part D outlay projections, the comparison of the two sets of estimates suggests broad agreement regarding the future projections for Social Security and Medicare and their allocation across past and current versus future generations. This is not, of course, surprising because OMB usually receives projections for both programs' revenues and outlays from their respective administrative agencies based on OMB's economic assumptions. For Medicare Part D expenditures projected in the fiscal year 2005 budget, OMB staff assumed higher outlay growth through the year 2040 (see figure 6.1).[16] These growth rates appear to be consistent with historical growth in economy-wide prescription drug expenditures (see table 6.4).

6. Estimates Under Alternative Budget Windows

Table 6.6 shows FI for selected budget windows. The last column of table 6.6 repeats the infinite horizon FI measure. It is clear from the numbers that calculating FI over short budget windows significantly understates the financial shortfall that the federal government faces. For example, the regularly reported budget window for the OMB is five years into the future. Over this period, the sum of Social Security's, Medicare's, and the rest of the federal government's fiscal imbalances amounts to $4.5 trillion. Over the Congressional Budget Office's (CBO's) regular budget-reporting horizon of ten years, the total

Table 6.6
Fiscal Imbalances for Selected Budget Windows as of Fiscal Year-End 2004 (Billions of Dollars)

	5 Years	10 Years	25 Years	50 Years	75 Years	Infinite Horizon
Total federal government	4,593	4,125	5,185	13,568	23,580	63,284
Social Security	−2,051	−2,430	−2,136	−45	1,742	8,006
Medicare	405	1,178	4,978	15,010	25,282	60,886
Rest of federal government	6,239	5,377	2,343	−1,397	−3,444	−5,608
Rest of federal government—outlays	6,034	11,244	24,416	41,048	52,900	81,323
Rest of federal government—revenues	−6,131	−12,203	−28,408	−48,781	−62,680	−93,266
Federal liabilities to Social Security	1,915	1,915	1,915	1,915	1,915	1,915
Debt held by the public	4,421	4,421	4,421	4,421	4,421	4,421

Source: Authors' calculations.

federal imbalance equals $4.1 trillion. Longer horizon fiscal imbalances are larger. For example, over the next fifty years, total federal FI equals $13.5 trillion. The short-term estimates of FI are much smaller because they ignore financial shortfalls accruing after the budget window's terminal year. Even the seventy-five-year FI estimate for the entire federal government equals only about one-third of the FI calculated in perpetuity.

7. FI and GI Estimates Under Alternative Productivity Growth Assumptions

Table 6.7 shows estimates of FI for fiscal year 2004 under alternative assumptions of productivity growth and discount rates. Variation around the labor-productivity growth assumption equals ±50 basis points. Thus, the "high" and "low" productivity growth estimates correspond to labor productivity growth rates of 2.3 percent and 1.3 percent per year, respectively. Variation around the discount rate assumption equals ±25 basis points per year. Thus, estimates under high and low discount rates reflect discounting at 3.9 and 3.4 percent per year, respectively. Finally, variation around the health care growth wedge assumption equals ±50 basis points: estimates under the high and low assumptions reflect health care growth rate wedges of 1.5 and 0.5 percentage points, respectively.

Table 6.7
Sensitivity of Fiscal Imbalances To Economic Assumptions (Present Values in Billions of Constant 2004 Dollars)

	Baseline Assumptions	Discount Rate		Productivity Growth		Excess Health Care Outlay Growth per Capita	
		High	Low	High	Low	High	Low
Total fiscal imbalance—U.S. federal government	63,284	49,356	84,236	85,795	47,278	75,819	52,423
Social Security	8,006	5,679	11,506	12,697	5,482	8,006	8,006
Medicare	60,886	48,054	79,794	89,489	41,951	70,539	52,530
Rest of federal government	−5,608	−4,378	−7,064	−16,391	−156	−2,726	−8,113
PV of excess of outlays over receipts	−11,943	−10,713	−13,400	−22,722	−6,497	−9,061	−14,449
Liability to Social Security and Medicare	1,915	1,915	1,915	1,915	1,915	1,915	1,915
Debt held by the public	4,421	4,421	4,421	4,421	4,421	4,421	4,421
Memo:							
Present value of GDP	772,260	665,833	918,267	999,295	626,711	772,260	772,260
Present value of payrolls	348,416	305,153	416,991	451,181	288,189	352,529	352,529

Source: Authors' calculations.

The FI for fiscal year 2004 is quite sensitive to variations in the discount rate. It is estimated to be $84 trillion under the low discount rate (3.4 percent) and $49 trillion under the high one (3.9 percent). The wide variation in FI estimates for small changes in the discount rate is only to be expected because a large share of total federal FI accrues after several decades have passed.

Normally, such wide variations in FI arising from small changes in the discount rate are taken as an indication that the FI measure is not reliable or useful. However, as we have argued in Gokhale and Smetters (2003), wide variations in FI triggered by discount rate changes confirm the need to adopt longer-term calculations because they indicate that a large fraction of the imbalance accrues after several decades have passed—a component that would be ignored under truncated horizons. For example, table 6.6 shows that about two-thirds of the total federal FI would arise under current policies after another seventy-five years have passed, and it is well known that a given change in the interest rate imposes a larger discount effect on fund flows that occur further out into the future.

Table 6.7 shows that FI equals $85.7 trillion under the high productivity growth rate assumption (2.3 percent). Social Security's fiscal imbalance increases from $8.0 trillion under baseline assumptions to $12.7 trillion when high productivity growth assumption is introduced. A considerable increase in FI also emerges in Medicare under the high productivity growth assumption. Note that increasing productivity growth also leads to higher growth in federal health care outlays because those outlays are assumed to grow 1 percentage point faster than growth in output per worker. The opposite result obtains when productivity growth is lowered to 1.3 percent per year. In that case, Medicare's FI is estimated to be $41.9 trillion.

Increasing or reducing the health-care growth wedge also considerably affects the total federal FI. Increasing the wedge by 50 basis points (from 1 percentage point to 1.5 percentage points) increases total federal FI by more than $12 trillion, to $75.8 trillion, and reducing the wedge by 50 basis points (to 0.5 percentage point) reduces federal FI to $52.4 trillion.

These wide variations in dollar estimates of FI may make this measure appear to be unsuitable as a guide for policymakers. However, a more stable measure of the size of the federal government's financial shortfall under current policies may be to view it as a ratio to GDP or

Table 6.8
Sensitivity of Total Federal Fiscal Imbalance as a Percentage of the Present Values of Total Payrolls and GDP

	GDP			Total Payrolls		
	Baseline	High	Low	Baseline	High	Low
Discount rate	8.2	7.4	9.2	18.0	16.2	20.2
Productivity growth per capita	8.2	8.6	7.5	18.0	19.0	16.4
Health care outlay growth per capita	8.2	9.8	6.8	18.0	21.5	14.9

Source: Authors' calculations.

a tax base. When expressed relative to the present value of taxes, this ratio shows the size of the tax increase that would be needed to create a sustainable fiscal federal policy.

Table 6.8 shows federal FI in perpetuity as a ratio, alternatively, to the present value of GDP and the present value of total payrolls. These ratios exhibit less volatility than dollar estimates because the denominator (the present value of GDP or payrolls) changes in the same direction as does FI in response to changes in each of the three assumptions. For example, although FI under high productivity growth ($85.8 trillion) is roughly double its size under the low productivity assumption ($47.3 trillion), the difference in its ratio to GDP is much less divergent—8.6 under the high-productivity assumption and 7.5 under the low-productivity assumption. Table 6.8 shows that, as a ratio of the present value of payrolls, FI ranges between 16.2 and 19.0 percent in response to the changes in productivity and discount rate assumptions considered here. In sum, while FI expressed in dollars is sensitive to the choice of interest rate and productivity, the size of the *policy change* itself that is necessary to eliminate the imbalance is fairly stable.

The variation in this ratio, however, is much larger under alternative assumptions on the size of the health-care growth rate wedge. Were health care outlays to grow 50 basis points faster immediately and permanently—something that the historical evidence on health care growth suggests is quite feasible (see table 6.4)—resolving the federal fiscal imbalance would require appropriating 21.5 percent of all future payroll. In contrast, were it possible to reduce the growth of health-care costs by 50 basis points, 14.9 percent of future payroll would still be needed to create a sustainable fiscal system.

There is an interesting difference between the estimates reported in table 6.8 and those reported in Gokhale and Smetters (2003). In our 2003 book, FI as a share of the present value of payrolls was smaller compared to the baseline when productivity growth was assumed to be faster and, symmetrically, was larger when productivity growth was assumed to be slower. However, the estimates reported in Gokhale and Smetters (2003) were made prior to the enactment of sizable additional benefits made available through the Medicare prescription drug law (Medicare Part D). The estimates reported here, however, include the effects of that law. With the addition of the drug benefits, the higher health-care growth rate accompanying the assumption of higher overall productivity growth results in a *larger* increase in projected benefit outlays compared to the increase in total projected payrolls. The reason is that the prescription drug benefit will begin paying benefits more quickly than the rate at which the payroll tax base grows.

8. Conclusion

This paper updates calculations of U.S. federal fiscal and generational imbalances. The result published in Gokhale and Smetters (2003) of a $44 trillion total federal fiscal imbalance as of fiscal year-end 2002 is now revised to $63 trillion. A small part of the increase arises from the accrual of interest on the existing fiscal imbalance. A large part of the increase comes from the enactment of significant additional Medicare benefits through the new prescription drug benefit. That law alone accounts for an increase in FI by $24 trillion.

The nation faces an extremely difficult challenge in implementing fiscal adjustments to reduce the fiscal imbalance built into today's fiscal policies. Given the large magnitude of the overall fiscal imbalance, its resolution from higher taxes alone is likely to trigger negative economic effects and does not appear to be feasible. Hence, a sizable part of the adjustment will be required through cuts in discretionary federal outlays and reductions in future entitlement obligations.

9. Appendix

This Appendix shows how the ratio of Fiscal Imbalance relative to GDP as well as the ratio of Generational Imbalance relative to GDP change over time when there are no changes in fiscal policy and projections.

9.1 Ratio of Fiscal Imbalance to the Present Value of GDP

In Appendix A of Gokhale and Smetters (2003) we show [in equation (6.1)] that absent changes in fiscal policies and budget projections, the fiscal imbalance measure grows at a rate equal to the rate of interest. That is:

$$FI_{t+1} = FI_t R^{-1} \tag{6.1}$$

Here, FI_t stands for the fiscal imbalance calculated as of time period t, and $R = 1/(1+r)$ stands for the discount factor, with r as the annual interest rate on long-term government debt.

Let Y_t stand for the discounted present value of GDP as of period t. If annual GDP in year t, y_t, grows at rate g per year, and G represents the growth factor $1/(1+g)$, we can write:

$$Y_t = \sum_{s=t}^{\infty} y_t \left(\frac{R}{G}\right)^{s-t} \tag{6.2}$$

Therefore:

$$\begin{aligned} Y_{t+1} &= \sum_{s=t+1}^{\infty} y_{t+1} \left(\frac{R}{G}\right)^{s-(t+1)} \\ &= \sum_{s=t+1}^{\infty} y_t G^{-1} \left(\frac{R}{G}\right)^{s-(t+1)} \\ &= G^{-1} \sum_{s=t}^{\infty} y_t \left(\frac{R}{G}\right)^{s-t} \\ &= G^{-1} Y_t \end{aligned} \tag{6.3}$$

Divide both sides of equation (6.1) by Y_t and manipulate the expression by using equation (6.3) to get:

$$\frac{FI_{t+1}}{Y_{t+1}} = \frac{FI_t}{Y_t} \left(\frac{R}{G}\right)^{-1} \tag{6.4}$$

Under normal conditions the economy is dynamically efficient—that is, $g < r$, implying that $G > R$. Hence, we can specify in general that:

$$\frac{FI_{t+1}}{Y_{t+1}} > \frac{FI_t}{Y_t} \tag{6.5}$$

That is, absent changes in policy and projections, the ratio of the fiscal imbalance to GDP grows larger over time. Thus, the share of GDP that must be devoted to resolving the fiscal imbalance increases if corrective policy changes are postponed.

9.2 Ratio of Generational Imbalance to the Present Value of GDP

In equation (A9) of our book (Gokhale and Smetters 2003), we show that:

$$R \cdot GI_{t+1} - GI_t = R \cdot NT_{t+1} \tag{6.6}$$

Here, GI_t stands for the generational imbalance in period t, and NT_t represents the present value lifetime net transfers to those born in period t as scheduled under current fiscal policies. Written alternatively:

$$GI_{t+1} = GI_t R^{-1} + NT_{t+1} \tag{6.7}$$

Equation (6.7) says that next period's GI equals this period's GI accumulated at the rate of interest plus the present value of the lifetime net transfer scheduled to be awarded to next period's newborn cohort under current fiscal policies.

Dividing both sides of equation (6.7) by Y_t and using equation (6.3) to manipulate the expression, we get:

$$\frac{GI_{t+1}}{Y_{t+1}} = \frac{GI_t}{Y_t}\left(\frac{R}{G}\right)^{-1} + \frac{NT_{t+1}}{Y_{t+1}} \tag{6.8}$$

That is, whether the ratio of GI to GDP grows faster, just as fast, or slower than the ratio of FI to GDP depends on whether $NT_{t+1} \gtreqless 0$.

Notes

The authors thank James Poterba for very helpful comments. The opinions and conclusions expressed are solely those of the authors and do not necessarily represent the opinions of the Cato Institute or The Wharton School. The authors thank the Office of Management and Budget for providing long-term budget projections and Felicitie Bell of the Social Security Administration for providing demographic projections and related underlying assumptions.

1. Others, for example, Auerbach et al. (2004), have also called for adopting fiscal measures based on a forward-looking accounting for the federal budget.

2. This measure has also been used by Auerbach, Gale and, Orszag (2004) and has been advocated by Alan Auerbach for over a decade now (e.g., Auerbach 1994). A key difference with our FI measure is that we focus on the implications of current law using a micro-based estimation model. In contrast, these authors alter future policy in directions they regard as realistic by extending aggregate Congressional Budget office projections.

3. The FI measure is also different from the generational balance measure first developed by Auerbach, Gokhale, and Kotlikoff (1991). The generational balance concept involves a hypothetical policy whereby future generations are arbitrarily assigned equal additional fiscal burdens except for an adjustment for economic growth. That hypothetical policy balances the government's intertemporal budget but, unlike the FI measure, is not consistent with a budget concept—that is, it does not reflect the implications of continuing current fiscal policies.

4. See the Analytical Perspectives, Budget of the United States Government, fiscal year 2006, Chapter 15.

5. For technical details of our micro-data-based projections and other details, refer to Gokhale and Smetters (2003). Although OMB's projected long-term interest rates in the fiscal year 2005 budget are slightly higher, we use a 3.65 percent annual rate to make present value estimates comparable with those published in Gokhale and Smetters (2003).

6. See, for example, Baker, Besendorfer, and Kotlikoff (2002). The fiscal problems that they measured, however, have likely worsened quite dramatically since their study because economic growth forecasts have been reduced and Medicaid cost forecasts have risen.

7. Our calculations only include the federal share of Medicaid costs (under "rest of federal government" in the calculations reported later).

8. We are currently developing the methodology for decomposing the "rest of federal government" account into GI and FI minus GI components, including defense, transportation, Medicaid, etc. We intend to present those results in a new paper.

9. The effective interest accrual on the total federal FI is a combination of the interest accruing on outstanding government debt, Social Security and Medicare trust funds, and the interest rates assumed to prevail during future years. As mentioned earlier, we use in this calculation the Office of Management and Budget's fiscal year 2004 assumption of a 3.65 percent interest rate on the longest-maturity Treasury securities outstanding.

10. For the most recent instance of this criticism, see Paul Krugman "Social Security Lessons," *New York Times*, August 15, 2005, page 17.

11. Kamin and Kogan (2005) offer a more thoughtful critique, which likely influenced Krugman's thinking.

12. See Paul Krugman, "The $600 Billion Man," *New York Times*, March 15, 2005, page 25.

13. This does not necessarily imply that aggregate Medicare outlays will grow no faster than GDP since one of the factors driving Medicare and GDP is demographic change. To the extent that the Medicare beneficiary population continues to grow faster than the productive population, aggregate Medicare spending would continue to increase at a faster pace relative to GDP. Our calculations indicate that the difference in the growth rates of the two aggregates is extremely small after the first seventy-five years and makes little difference to FI and GI estimates.

14. This assertion is based on the assumption that general revenue transfers are appropriated by Congress for Medicare each year and these funds are not dedicated to the program.

15. See the Social Security Trustees' (2005) Annual Report, Chapter IV.B.5, paragraph a.

16. Based on a phone conversation with a staff member of the Office of Management and Budget.

References

Abel, Andrew B., N. Gregory Mankiw, Lawrence H. Summers, and Richard J. Zeckhauser (1989). "Assessing Dynamic Efficiency: Theory and Evidence," *Review of Economic Studies*, 56(January):1–20.

Auerbach, Alan J. (1994). "The U.S. Fiscal Problem: Where We Are, How We Got Here, and Where We're Going," in Stanley Fischer and Julio Rotemberg (eds.), *NBER Macroeconomics Annual*, National Bureau of Economic Research. Cambridge, Mass.: MIT Press.

Auerbach, Alan J., Jagadeesh Gokhale, and Laurence J. Kotlikoff (1991). "Generational Accounting: A Meaningful Alternative to Deficit Accounting," *Tax Policy and the Economy*, 5:55–110.

Auerbach, Alan J., William G. Gale, and Peter R. Orszag (2004). "Sources of the Long-Term Gap," *Tax Notes*, May 24:1049–1059.

Baker Bruce, Daniel Besendorfer, and Laurence J. Kotlikoff (2002). "Intertemporal State Budgeting," NBER working paper no. 9067.

Centers for Medicare and Medicaid Services (2005). National Health Expenditures tables available at http://www.cms.hhs.gov/statistics/nhe/historical/default.asp.

Feldstein, Martin (1974). "Social Security, Induced Retirement and Aggregate Capital Accumulation," *Journal of Political Economy*, 82:905–926.

Feldstein, Martin (1996). "The Missing Piece in Policy Analysis: Social Security Reform," The Richard T. Ely Lecture, *American Economic Review*, 86(2):1–14.

Gokhale, Jagadeesh, and Kent Smetters (2003). "Fiscal and Generational Imbalances: New Budget Measures for New Budget Priorities," pamphlet, Washington, D.C.: American Enterprise Institute.

Kamin, David, and Richard Kogan (2005). "The Administration's Misleading $600 Billion Estimate of the Cost of Waiting to Act on Social Security," Washington, D.C.: Center on Budget and Policy Priorities.

Prescott, Edward (2004). "Why Do Americans Work More Than Europeans?" *Federal Reserve Bank of Minneapolis Quarterly Review*, 28(1):2–13.

Samuelson, Paul (1958). "An Exact Consumption-Loan Model of Interest with or Without the Social Contrivance of Money," *Journal of Political Economy*, 66(5):467–482.

Social Security Advisory Board (2003). "The 2003 Technical Panel on Assumptions and Methods Report," available at http://www.ssab.gov/NEW/documents/2003TechnicalPanelRept.pdf.

Social Security Trustees (2005). Annual Report, available at http://www.ssa.gov/OACT/TR/TR05/index.html.