Robbing the Cradle?

A Critical Assessment of Generational Accounting

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Executive Summary

Many proponents of deficit reduction have used the results of "generational accounting" to argue that current spending policies impose an enormous tax burden on future generations. However, the technique of generational accounting does not provide an accurate measure of the tax burden or the well-being of future generations, nor does it provide a basis for drawing conclusions about issues of intergenerational equity among living generations.

The following conclusions are based on an analysis of a set of generational accounts comparable to those included in recent budget analyses published by the Office of Management and Budget:

- The calculation of future tax burdens is extremely sensitive to the discount rate applied to future taxes and income. The high future tax burden shown in the accounts prepared to date disappears altogether if the tax burden is calculated using discount rates that are closer to the average real rate of interest on government debt. The accounts used in this analysis show the net lifetime tax burden for future generations falling from 89% of future labor income, at a 6% real discount rate, to 49% at a 3% discount rate and to 37% at a 2% rate.

  The period after World War II illustrates how the choice of the wrong discount rate can create enormous distortions. Because real interest rates were actually much lower than the rate of discount used in the generational accounts, the huge government debt built up during World War II never became a large burden for the age groups alive after the war. In fact, if the technique of generational accounting had been available in that period, it would have shown an enormous tax burden (over 71% of future labor income at a 6% discount rate) being imposed on future generations at that time as well.

- Government debt is not a burden to future generations as a whole, since it is owed mostly to people who live in the United States. While the debt will be passed along to future generations, ownership of the debt, in the form of government bonds, will be passed along as well. The repayment of interest and principle is therefore a payment from some people in the country to other people in the country. This can create an issue of intragenerational distribution at any given point, but it cannot create an issue of intergenerational distribution between currently living individuals and generations not yet born.

  The well-being of future generations will depend on the quality of the education they receive, the quality of the capital stock (both public and

The well-being of future generations will depend not on the size of the debt but on the quality of the education they receive, the quality of the capital stock that is passed on to them, the state of the physical environment they inherit, and the social strength of the society into which they are born.

private) that is passed on to them, the state of the physical environment they inherit, and the social strength of the society into which they are born. The size of the government debt is not a substitute for these diverse factors.

- The calculation of an enormous tax burden for future generations in the generational accounts relies on health care projections that imply an economic collapse early in the next century. Under these projections, a family of four at the median income level would pay 97% of its income for health care in the year 2030; a couple over age 65 at the median income level would pay 134% of its income. This level of health care expenditures is clearly unsustainable, regardless of whether it is financed privately or through the government. If health care costs grow as a result of the aging of the population and overall inflation, then the net tax burden on future generations would fall by nearly 30 percentage points when calculated at a 6% discount rate.

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- The calculations in generational accounts are sensitive to whether an item is treated as a transfer (a negative tax) or as government consumption. In the accounts prepared for the United States to date, health care spending is treated as a transfer, while education spending is treated as government consumption. In other words, every increase in the cost of health care services provided to the elderly under Medicare is treated in the generational accounts as if a tax rebate were handed to them, while increased support for education is seen as raising the tax burden for future generations. If education is instead counted as a transfer to the age cohorts that directly benefit from it, then the tax burden on future generations in the generational accounts is drastically reduced, falling by almost 32 percentage points (when calculated at a 6% discount rate).

  By removing the projected explosion in health care costs and treating government payments for education in a manner consistent with government payments for health care, the huge tax burden predicted to fall on future generations disappears altogether. At a 6% discount rate, these adjustments lower the net tax burden on future generations from 88.7% of future labor income to just 27.6%. At a 3% real discount rate, the burden falls to 24.8% of future labor income.

- If the consumer price index significantly overstates inflation, as has recently been claimed by Federal Reserve Board Chairman Alan Greenspan, then the tax burden on future generations will be far lower than is currently believed. A significant CPI overstatement of inflation implies that real wages are growing far more rapidly than is generally recognized. If the CPI overstates inflation by 1% a year (the midpoint of the Greenspan estimate), then the net lifetime tax burden for future generations would fall

by 15.5 percentage points using the standard 6% discount rate. (This effect assumes no changes in government policy to acknowledge the overstatement.) By comparison, current plans to balance the budget will reduce the net lifetime tax burden for future generations by less than 12 percentage points.

Since the family already exists as an institution to redress intergenerational inequality, it is not clear that the government can meaningfully improve the situation, particularly if it ignores issues of intragenerational inequality. For example, increasing the tax burden on a family at the median income level may reduce the likelihood that their children will be able to attend college. Alternatively, requiring poor and middle-income elderly to pay more of their own health care costs may lead to deteriorating living standards for younger generations if children must ensure that their parents have adequate health care.

Introduction

Responsible people recognize the necessity of maintaining and improving the quality of life they pass on to future generations. But the current national debate over issues of generational equity is not about this goal; it is about how best to realize this goal and how best to measure our progress.

One technique that has been proposed for measuring generational equity is generational accounting. In generational accounting, the lifetime net tax burdens (total taxes paid less cash transfers received, like Social Security or welfare)[1] of each age group are measured and compared to the tax burdens of other age groups within the current population as well as to the tax burden of generations not yet born. For example, a generational accounting of current tax and spending policy would tell us the total amount of taxes that a 15-year-old, a 10-year-old, a 5-year-old, and those not yet born could expect to pay over a lifetime, holding current policies in place. These calculations should then allow an assessment of the extent to which government tax and transfer policy achieves the goal of generational equity.

Generational accounting has helped to drive home the point that the official federal budget, with its reported surplus or deficit, is a far-from-comprehensive measure of the impact of current policy on future generations.

Since it was first developed in a series of technical papers (Kotlikoff 1989 and Auerbach, Gokhale, and Kotlikoff 1991), and a popular book (Kotlikoff 1993), generational accounting has had a significant impact both within the economics profession and on the national policy debate over the deficit. In fact, since 1992, generational accounts have been incorporated into the official analysis and presentation of the budget (*Budget of the U.S. Government 1993*; *Budget Baselines, Historical Data, and Alternatives for the Future 1993*, and *Budget of the U.S. Government: Analytical Perspectives 1995*).

Generational accounting has helped to drive home the point that the official federal budget, with its reported surplus or deficit, is a far-from-comprehensive measure of the impact of current policy on future generations. In particular, generational accounting has called attention to the large liability of the Social Security and Medicare accounts resulting from future benefit projections. As Kotlikoff argues persuasively (1993, pp. 144-61), the decision not to include these liabilities in calculating the national debt is largely arbitrary, and it obstructs a clear assessment of the burden that current policy will present to future generations.

In the generational accounts that have been prepared to date, the prospects for future generations appear bleak. For example, according to the set of generational accounts that appeared in the *Analytical Perspectives* accompanying the 1995 federal budget, future generations will face a net tax burden equal to

82% of their lifetime labor income. This compares to a tax burden of just 29% for someone born in 1920 and 33.2% for someone born in 1950. The other published sets of accounts give comparable figures of generational imbalance. On their face, these accounts would seem to provide strong support for the argument that current generations are being extremely unfair to future generations. In fact, these figures are often cited by those who say that Medicare and Social Security benefits for those now living should be drastically curtailed in order to protect the well-being of future generations.

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This paper will examine the system of generational accounting to determine whether it presents an accurate way of measuring generational equity. The following section discusses the technique of generational accounting and presents some of the actual accounts that have been calculated for the United States. The second section presents criticisms of the generational accounts that have been prepared and of their proposed use as a measure of generational equity. The final section presents a simplified version of generational accounts for the period immediately following World War II; it is designed to show how the procedures would have measured the tax burden for future generations at that time. The exercise should provide some guidance as to how reliable generational accounts may be as a predictor of the living standards of future generations. The paper ends with a brief assessment of the merits of generational accounting as a tool for measuring generational equity.

Generational Accounting: What It Is, and What It Shows

While economists have raised questions about the adequacy of the accounting in the official budget for some time, these concerns took on a new urgency in the 1980s when the deficit expanded enormously as a share of GDP. As the deficit became the central focus of economic policy debate, the importance of measuring it accurately became crucial to determine both the extent of the problem and the extent to which specific measures actually reduced the deficit.[2] The latter point is particularly important for policy purposes, since it is generally easier to reduce the deficit by redefining it than by actually increasing taxes or cutting spending. The proponents of generational accounting hoped to produce a system of accounts that would measure what is important about the deficit (in their view, its intergenerational division of tax burdens) and that would be immune to gimmicks in labeling.

The basic methodology of generational accounting involves the attribution of current and future tax and transfer payments to particular age groups.

Of particular importance in this regard are the liabilities associated with future Social Security and Medicare payments. At present, these programs reduce the official deficit, since they now take in more revenue in dedicated taxes than they are paying out in benefits.[3] There has been considerable political debate about whether it is proper to count these surpluses in the calculation of the official deficit. Generational accounting would move beyond such semantic or political issues associated with particular measures of the deficit in order to examine the actual tax burden that will fall on each age cohort.

The basic methodology of generational accounting involves the attribution of current and future tax and transfer payments to particular age groups. The first step is to determine how much of each type of tax, imposed by all levels of government (income tax, sales tax, payroll tax, excise tax, etc.) is paid by an average person at each age level. The accounts are also broken down by sex.[4] The same technique is used for transfer payments, which are then subtracted from tax payments to get age- and gender-specific net tax burdens. Future net tax payments are then calculated for each age cohort by projecting current net tax burdens forward, under the assumption that current policies are left in place. In effect, this procedure assumes that a typical 40-year-old will pay the same amount of net taxes in 10 years that a 50-year-old does now, and the same amount in 20 years as a 60-year-old does now. These numbers are adjusted for inflation and productivity growth, so that higher future tax levels attributable only to inflation or productivity growth do not affect the calculations.

Wherever current policy specifies future changes in net tax burdens, the changes are incorporated into the calculations. For example, under current law, a person who is 35 in 1995 will receive full Social Security benefits at age 67, not 65, as is currently the case; this change in eligibility is reflected in the generational accounts.[5] The largest projected change from current spending and benefit levels is in health care spending. The generational accounts incorporate projections of future age- and sex-specific health care spending under the assumption that current mandates are left in place. These projections have an enormous impact on the calculations. Their implications will be discussed in detail in a later section.

While discounting future payments in this manner is a standard economic procedure, the rate of discount chosen is important.

Once age- and sex-specific tax burdens are assigned for all future years for currently living individuals, these year-by-year totals are summed for each sex and age cohort to produce an age- and sex-specific lifetime tax burden. The net tax payments for future years are discounted (usually at a 6% real annual rate) in adding up the total tax burden. By this calculation, a net tax payment next year of $1,000 would count only as much as a net tax payment of $943 this year (943 is equal to 1,000/1.06); continuing the math, a net tax payment of $1,000 in 10 years would count only as much as a net tax payment of $558 this year. Future payments are discounted in this manner because, by delaying a payment into the future, it is generally possible to earn a return on the investment of the money. At a 6% return on investment, $558 put aside now will be $1,000 in 10 years. While discounting future payments in this manner is a standard economic procedure, the rate of discount chosen is important. Differences in this discount rate can have an enormous effect on the measure of an individual's lifetime net tax burden. This issue will also be addressed in more detail in a later section.

The tax burden borne by future generations is derived from an equation in which the present value of all future government purchases (the sum of future government spending, discounted, as discussed above) cannot exceed the sum of (1) the present value of all future net tax payments of living generations, plus (2) the present value of tax payments made by all future generations, minus (3) the present value of the government debt. The equation can be rearranged to show the present value of the net tax payments of future generations as the sum of the present value of the national debt and the present value of all future government consumption spending, minus the present value of all future tax payments by living individuals.

This burden on future generations can then be assessed as either a share of future labor income, by comparing it to the present discounted value of future

labor income, or converted into a dollar figure.[6] Future labor income can be calculated by projecting growth rates for the labor force and productivity. Auerbach, Gokhale, and Kotlikoff (1991) use Social Security projections for their estimates of labor-force growth, and they estimate in their standard accounts that productivity will grow at the rate of 0.75% per year.

Table 1 shows the lifetime net tax rate for age cohorts born between 1900 and 1992 and for future generations in a typical generational accounting exercise.[7] It also compares the burden before and after passage of the Clinton deficit reduction package (the Omnibus Budget and Reconciliation Act of 1993, or OBRA93).

The most striking feature of the chart is the 82% lifetime net tax rate projected for future generations.

Several aspects of these calculations deserve attention. First, there is a fairly gradual upward trend in net tax burdens from the age cohort born in 1900 through the age cohort born in 1980. This trend is reversed slightly for the two youngest age cohorts. Second, the shifts in these accounts are relatively minor. The rise in the lifetime net tax burden rose from 29% for those born in 1920 (today's 75-year-olds) to 36.9% for those born in 1980 (today's 15-

TABLE 1
Lifetime Net Tax Rates
(Percent)

Generation's Year of Birth	Before OBRA93	After OBRA93
1900	23.6	23.6
1910	27.2	27.2
1920	29.0	29.0
1930	30.5	30.6
1940	31.6	31.9
1950	32.8	33.2
1960	34.4	35.0
1970	35.7	36.5
1980	36.0	36.9
1990	35.5	36.5
1992	35.4	36.3
Future generations	93.7	82.0
Percent difference: Future generations and 1992	165.1	126.0

Source: OMB (1994).

year-olds) is hardly a case of the old robbing from the young. In fact, today's 75-year-olds would have far more to complain about relative to those born 20 years before them than today's 25-year-olds would have relative to their preceding generations. The lifetime net burden rose from 23.6% to 29%, a 5.4 percentage-point increase in the 20 years between 1900 and 1920; over the 50 years between 1920 and 1970, the burden rose by only 7.5 percentage points.

Yet, the most striking feature of the chart is the 82% lifetime net tax rate projected for future generations. Taken at face value it implies that future generations will face an extraordinary tax burden. However, it is also likely that some of this burden will be borne by younger people currently living, since it will not be possible to raise taxes on future generations (at least those born in the near future) without raising them on people who have already been born. For example, if payroll taxes were raised beginning in the year 2010, anyone still working in that year would be subject to the higher tax rate. People just entering the labor force in 2010 would pay the higher tax rate for their entire working lives, and would therefore be most affected by the tax increase, but anyone who works at all after the tax rate has been increased will face a somewhat higher tax burden. For this reason, the scenario in these accounts almost certainly implies a much greater net tax burden for young age cohorts than is indicated in the chart.

The cost of delaying tax increases in these accounts is to make the burden of future generations even greater.

The cost of delaying tax increases in these accounts is to make the burden of future generations even greater. In these calculations the young and some of those yet to be born can be protected from higher tax burdens, but only at the cost of imposing still higher tax burdens on some more distant future generations. In his popular book, *Generational Accounting: Knowing Who Pays, and When, for What We Spend*, Larry Kotlikoff proposes a principle of intergenerational equity in which each generation faces the same tax burden relative to its income. By this measure, the key calculation is the difference between the tax burden faced by the youngest currently living individual and the tax burden of those yet to be born. According to Table 1, this difference is enormous: the calculations show that future generations will have a tax burden 126% higher than that of a child born in 1992, subject to current tax and transfer policies. By these accounts, unless serious measures are taken soon to redress this generational imbalance, future generations will be confronted with an unbearable tax burden.

Generational Equity: Does Generational Accounting Give the Score?

Besides the many technical problems with the way generational accounts are calculated (these will be examined later), there are fundamental issues that need to be addressed as well. The most significant is whether measuring relative tax burdens is actually a reasonable way to assess intergenerational equity. To consider this question, it is important to break the tax burden down into its two components: the debt that is passed along, and the government's current spending, which must be financed by either current taxes or additional borrowing.

The Debt Burden

Although it has become standard in discussions of the budget to refer to the debt as a burden that is passed on to future generations, there is a serious logical flaw in this thinking. While the federal government's debt may be seen as a burden to those who pay the taxes to finance the interest, the interest payments are ultimately received back by the people (mostly Americans) who own the debt.[8] Furthermore, just as the debt will be passed on to future generations, so will ownership of the debt in the form of government notes, bonds, and bills.[9] At some point, there will be no living members of current generations to either pay or collect interest on the debt; the people both paying and collecting it will be our children, grandchildren, and great-grandchildren. In other words, the debt may present a problem of intragenerational equity (between people who have inherited government bonds and people who haven't), but it doesn't directly raise any issue of intergenerational equity. The fact that the government debt in the future may be large relative to the size of the economy may tell us something about how income is distributed among members of future generations, but it tells us nothing about how income is distributed between generations.

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Since this point is so much at odds with the way in which the debt is presented in current policy debates, it is worth some further examination. A rhetorical device created by Kotlikoff—the Martian economist Marty, who comes to Earth to learn about our government's finances—is helpful here. Imagine that at some future date Marty flies over the United States and drops thousands of billions of pieces of paper each stating that the U.S. government will pay the holder of the piece of paper one dollar. Marty has just created a

huge debt burden for the generations that happen to be alive at that point. The generational accounts will show that these generations have become tragic victims of this malicious Martian (unless they are so cruel as to pass the burden on to future generations). Yet Marty's pieces of paper cannot possibly make the nation as a whole any poorer. Some people—the ones who did not get their fair share of the pieces of paper Marty dropped—may end up poorer. If they have to pay an equal share of the additional taxes required to service the debt they will be poorer in the future. The nation as a whole, however, is just as wealthy after Marty's paper drop as it was before. It can affect only the distribution of wealth among people in the nation, not its aggregate level.

If the taxes required to pay interest on the debt constitute too large a burden for workers who don't receive any of the interest, then the people who receive the interest should be required to pay higher taxes on their interest income.

This is the point that generational accounting, and indeed most discussion of the debt, ignores. The national debt can never be a burden for the nation as a whole, since the interest on the debt is income for the holders of the debt. The debt presents a problem only of intragenerational equity, not of equity between generations. If the taxes required to pay interest on the debt constitute too large a burden for workers who don't receive any of the interest on the debt, then the people who receive the interest should be required to pay higher taxes on their interest income.

In fact, one reason the generational accounts prepared to date indicate such a huge net tax burden on future generations is that they compare the total tax burden to labor income alone. This calculation overstates the burden that must be borne by workers, since a significant portion of taxable income is derived not from labor but from dividends and profits. Moreover, if the projections in the generational accounts are borne out, then the portion of personal income attributable to capital income will increase enormously, since interest on the debt will become large relative to total income. At present, personal interest and dividend income is approximately 24% of labor income. The projections in the generational accounts (OMB 1992) imply that this ratio will rise to 36% by 2030 and 61% by 2050.[10] Unless the tax rate on interest and other income from capital is actually lowered, the portion of the tax burden that will have to come from labor income should decline significantly.

The claim, often made in popular discussions of the generational accounts (e.g., Glassman 1995), that future generations will pay 82% of their lifetime income in taxes ignores income from capital altogether. The implicit assumption is that future taxes on capital income will be zero. If future generations indeed choose to raise tax rates on labor income so that tax rates on capital income can be lowered, it would not be surprising that the tax rate on labor income will be extraordinarily high. This high tax rate cannot be blamed on

earlier generations, however, except insofar as the political system that was inherited disproportionately benefits the wealthy and puts them in a situation where they can successfully resist tax increases.[11]

In addition to directly taxing the interest earned by holders of the debt, another way in which the intragenerational inequality created by a large debt can be mitigated is by inflation. Since the debt is fixed in dollar terms, inflation erodes its real value. When prices rise, a dollar can buy less, and the holders of any debt fixed in dollar terms become less wealthy. Virtually every nation in the world has at some time used inflation, either deliberately or incidentally, to erode the real value of the debt. The case of the United States after World War II provides an interesting example. At the end of the war, the publicly held debt was approximately 111% of GDP, more than twice the current ratio of 52%. Over the next 35 years, from 1945 to 1980, the real value of the debt fell by near 40%, even though the government ran deficits in all but eight of those years. This seemingly contradictory set of events occurred because the average interest rate on the debt was about 4%, while the average inflation rate was over 5%, yielding an average real interest rate of approximately negative 1%. The value of the debt was therefore being eroded by inflation even as the government continued to borrow.[12]

Historically, both inflation and the taxation of interest on the debt have been used as means to alleviate the burden that interest payments could pose to wage earners.

There are reasons why inflation, and particularly high rates of inflation, are not desirable. But the fact that it is possible to drastically reduce the real burden of the debt with just moderate rates of inflation should drive home the inadequacy of the national debt as a measure of intergenerational equity. Historically, both inflation and the taxation of interest on the debt have been used as means to alleviate the burden that interest payments could pose to wage earners. These options will always be available to future generations for addressing any intragenerational inequities created by the debt burden.

The fact that the interest burden created by the debt does not constitute an intergenerational transfer does not mean that the debt or deficits cannot have an impact on the living standards of future generations. A more real but far more indirect way in which deficits can place a burden on future generations is by pushing up interest rates, and higher interest rates may have the effect of reducing private investment. Insofar as this is the case, such an outcome will reduce the amount of capital available to future generations, thereby lowering their productivity and reducing the amount of wealth available to the nation as a whole.[13]

There are two very important qualifications to this story, however. First, the link between a higher deficit and lower levels of investment is tenuous.

Second, even insofar as there is a link, the annual deficits and resulting debt are simply part of a causal chain, not the measure of the intergenerational burden.

Economists have long debated both the extent to which deficits affect interest rates and the extent to which interest rates affect investment. The evidence on the first issue is at best mixed. While some studies have found evidence of a link between deficits and interest rates, a large number have found no link (e.g., Eisner 1993; Evans 1985 and 1987).[14] A recent review of research found the evidence largely inconclusive (Barth et al. 1991).[15]

The overwhelming weight of the empirical evidence is that interest rates have at most a marginal impact on investment.

As for the effect of interest rates on investment, most of the studies that have examined the evidence have found a very limited impact. For example, Fazzari (1993) examined the investment behavior of more than 5,000 firms over a 20-year period and found that interest rates had almost no impact on investment; the rate of sales growth and cash flow were found to be much more important. In fact, Fazzari found that interest rates had any effect at all only on the investment behavior of the slowest-growing firms in the sample; there was no statistically significant relationship between levels of investment and interest rates for more rapidly growing firms. Virtually all of the studies cited in a recent review article (Chirinko 1993) found only a weak or statistically insignificant relationship between interest rates and investment. In short, the overwhelming weight of the empirical evidence is that interest rates have at most a marginal impact on investment.

Since the links between both higher deficits and higher interest rates and between higher interest rates and lower investment are tenuous, it is a leap to assert that higher deficits reduce the capital stock.[16] Furthermore, a far more direct measure of this crowding-out burden on future generations than the debt is the rate of growth of the capital stock itself. If the capital stock is growing at an acceptable rate, then there is no sense in which future generations, taken as a whole, are being burdened by the debt. If the rate of growth of the capital stock is inadequate, then future generations may see limited improvements in their living standards, regardless of the size of the debt.[17] And the stock of private capital is not the only consideration. Current generations will pass on a whole society to future generations that includes not only the private capital stock, but also a stock of public capital in the form of roads, airports, public schools, research laboratories, and other types of infrastructure. Also passed on will be a body of knowledge in the form of scientific research and industrial applications and specific skills through the education and training of future workers. In addition, future generations will inherit the

natural environment in whatever state current generations choose to leave it. People living today can either repair past environmental damage in order to pass on a cleaner, healthier environment, or they can defer cleanup efforts into the future. Further environmental deterioration might even be allowed now in order to minimize current production costs. The same is true of the social environment in the sense that generations of children raised in poverty and deprived of education, job skills, and economic opportunities will likely pose severe problems long into the future. Any serious measure of generational equity would have to take into account all factors that will affect the quality of life of future generations. If intergenerational tax burdens are the sole yardstick of generational equity, then policies that clearly hurt future generations will appear in the generational accounts to lighten their burden.

The generational accounts indicate that lifetime net tax rates have risen throughout this century at the same time that living standards on the whole have improved enormously.

The Burden of Current Government Spending

Once it is recognized that the debt is an intragenerational transfer, the significance of tax burdens as an intergenerational issue begins to diminish. A society's commitment of a higher proportion of its resources to publicly provided goods may be simply a reflection of changes in taste or technology. For example, as the United States changed from an agricultural to a manufacturing society, public education expanded to include high school. This expansion also required significant increases in tax revenue. If future generations should decide to expand public education still further to encompass post-secondary education, it is hard to see the resulting increase in the tax burden as an intergenerational injustice. Yet such would be the implication of the generational equity rule set out by Kotlikoff.[18]

Ultimately, it is not clear what the tax burden says about intergenerational equity. It is hoped that future generations will enjoy higher living standards, and developing means to assess the rate at which living standards rise by generations might be useful. In all probability, however, such well-being will have little to do with relative tax burdens. The generational accounts indicate that lifetime net tax rates have risen throughout this century at the same time that living standards on the whole have improved enormously.

Differences in tax burdens do not tell us much about equity in any case. No one would argue that the wealthy are worse off than the poor because their incomes are taxed at a higher rate. Similarly, it is not obviously unfair that future, presumably wealthier generations pay a higher portion of their income in taxes than did older, relatively poorer generations. We should design eco-

nomic policies to ensure that the after-tax income of future generations provides them with better standards of living than are enjoyed by current generations. Whether this leads to a higher or lower lifetime net tax burden is beside the point.[19]

The last issue basic to the notion of intergenerational equity is whether a generation, or age cohort, is a meaningful unit of analysis. Since there are substantial transfers within families between generations, gains measured in intergenerational terms can easily be exceeded by intragenerational losses. For example, higher tax rates on the working poor may do more to reduce the living standards of their children than any possible gains from a lower lifetime net tax burden. Similarly, eliminating or reducing Medicare benefits for the elderly may effectively reduce the living standards of their children (and grandchildren), who will have to assume these costs either directly or through a diminution in their inheritance. However well-intentioned the efforts of policy makers might be, the family is probably better suited to distributing benefits and burdens between generations than is the government. How policies made today will affect future generations is an important question, but in terms of equity the efforts of policy makers might better be spent worrying about the distribution between families rather than within them.

How policies made today will affect future generations is an important question, but in terms of equity the efforts of policy makers might better be spent worrying about the distribution between families rather than within them.

Technical Problems With Generational Accounting

In addition to the issues discussed above, which question the extent to which the lifetime net tax burden is really a meaningful measure of a generation's well-being, there are also a number of technical problems with the way in which lifetime net tax burdens have been calculated in the generational accounts. Some of these problems have been noted by the proponents of generational accounting, but they have yet to be dealt with in the preparation of the accounts. Until these technical issues are addressed effectively, they will provide further grounds for skepticism toward generational accounting.

The Choice of Discount Rates

The first and most basic problem with generational accounting is the arbitrariness of the rate at which future wages, taxes, and transfers are discounted. While accounts have been prepared with discount rates ranging between 2.5% and 9%, most of the analysis has been conducted assuming a 6% real rate. Since generational accounting purports to calculate the average lifetime tax burden for *all* future generations, the discount rate makes an enormous differ-

ence. For example, looking 200 years in the future, $1 billion at a 9% real discount rate would be worth just $33 today. At a 2% rate, that same $1 billion would be worth $19,053,101 today. The lifetime net tax burden for future generations goes from 37% of labor income using a 2% discount rate to 166% using a 9% discount rate.[20]

The rate of discount makes a huge difference in the calculation of the relative tax burden even among currently living generations. The taxes designated for Social Security and Medicare represent a large portion of the tax burden for most working people. At a high rate of discount, the return that currently employed workers will receive in retirement would appear to be much lower than the taxes they paid in, thereby implying a high tax burden for today's workers due to these programs. Such is not the case when low rates of discount are used: today's workers would receive much more in retirement benefits than they paid into the programs in taxes. The 6% discount rate that is most frequently applied in the generational accounts gives a discounted value of $26,500 for the lifetime Social Security taxes for a newborn male in 1989, compared to a discounted value of only $5,600 for lifetime Medicare and Social Security benefits combined (Auerbach, Gokhale, and Kotlikoff 1991, 97). The $20,900 gap accounts for more than 28% of the newborn's projected lifetime net tax burden. At a 3% rate of discount, taxes and benefits essentially balance.

The lifetime net tax burden for future generations goes from 37% of labor income using a 2% discount rate to 166% using a 9% discount rate.

The discounting also affects the fact that some taxes and payments are treated as accruing to children, whereas others are not. Most important in this respect are excise taxes. Excise taxes paid on goods that children consume are imputed to the children's generational accounts,[21] and the 6% rate of discount gives these taxes inordinate importance. The present discounted value of the excise taxes expected to be paid by age 20 by a male born in 1989 was calculated as $10,700, just under 15% of his lifetime net tax burden (Auerbach, Gokhale, and Kotlikoff 1991, 97). The burden is even higher for females: the $8,600 they would pay in excise taxes before age 20 is more than 23% of their lifetime net tax burden. These tax burdens are at least partially offset by the benefits attributed to children. The presented discounted value of the benefits received before age 20 was approximately $3,800 in 1989 for a newborn male, $6,200 for a newborn female.[22]

The reason for selecting 6% as the discount rate is largely arbitrary. It is a midpoint between 3%, an approximation of the real rate on risk-free assets (government debt) in recent years, and 9%, which approximates the return on investment in physical capital. Selection of this midpoint is justified by the

claim that government tax and transfer payments are more risky than interest on a risk-free asset but less risky than private capital (see Auerbach, Gokhale, and Kotlikoff 1991, 74-75, or Office of Management and Budget 1994, 30).

Critics of generational accounting have found this rationale inadequate (Haveman 1994, Aaron 1991). Tax and transfer payments are not necessarily less certain than the interest on government debt, nor is it obvious that an identical rate would be appropriate for both.[23] Besides, the real rate of interest on government debt has varied enormously. As noted before, the average from 1945 to 1980 was negative; projecting 3% for all future generations seems high by comparison. Furthermore, selecting a discount rate higher than the interest rate on government debt creates an apparent contradiction: given a choice between financing government operations with money valued at 6% or money borrowed at 3%, why wouldn't rational taxpayers choose to borrow for as long as they could?

If the growth rate of the economy exceeded the rate of discount, then the burden would be passed along to an infinite number of future generations and would therefore approach zero.

The choice of real discount rates affects not only the relative tax burdens between generations but also the possibility of calculating the tax burden for future generations. Since this burden is supposed to be spread equally over all future generations, the rate of discount has to be higher than the rate of growth for there to be a burden to pass on. If the growth rate of the economy exceeded the rate of discount, then the burden would be passed along to an infinite number of future generations and would therefore approach zero. For example, if the rate of discount is 2% but the economy grows at a 3% annual rate, eventually the economy will grow enough to make any debt burden inconsequential.[24] In fact, the economy's growth rate has frequently exceeded the real rate of interest on government debt: such was the case in 32 of the 34 years from 1946 to 1980, so it seems implausible to rule out this possibility in the future. This means that it may not be possible to calculate a meaningful "average lifetime net tax rate" for all future generations.

Another problem with a high discount rate is that it devalues the earnings of future generations. The standard 6% real discount rate combined with the standard growth rates projected in generational accounts implies that the income earned over the next 17 years will have greater value than *all* future income.[25] The only way in which the income of generations can be assigned equal value is if the discount rate is set equal to the growth rate of the economy. However, this would make the size of the tax burden passed on to future generations impossible to calculate, since any debt passed on by current generations would be an infinitely small portion of all future labor income. Thus, the possibility of calculating a debt burden imposed on future generations is

TABLE 2
Standard Generational Account

Lifetime Net Tax Rate	Discount Rate
37.4%	2%
49.0	3
88.7	6
166.2	9

Source: Author's calculations.

dependent on a formula that devalues their income relative to current generations.[26]

Table 2, which gives the lifetime net tax rate for future generations under a range of discount rates, shows how sensitive the calculations are to the choice of discount rate. As the rate falls, the future tax rate falls toward the ratio of government consumption (nontransfer) spending to future labor income.[27] Since the lowest real discount rate in the table (2%) is still slightly higher than the real growth rate in the projections, the tax burden for future generations is somewhat greater than what would be attributable to their own expenditures on government consumption. Still, the 37% lifetime net tax burden appears far less ominous than the 89% burden implied by a 6% real discount rate, and certainly less calamitous than the 166% burden under a 9% discount rate.

The 37% lifetime net tax burden appears far less ominous than the 89% burden implied by a 6% real discount rate, and certainly less calamitous than the 166% burden under a 9% discount rate.

Is It Necessary to Pay Off the Debt?

The intergenerational government budget constraint does not actually require that future generations pay off the existing government debt, only that they pay interest on it (Office of Management and Budget 1994, 29). Ultimately, the difference between paying off the debt and just paying the interest becomes inconsequential, since the discounted value of the original principal approaches zero as the analysis goes far enough into the future. For example, at the 6% discount rate used in the generational accounts, the present value of paying off a $3 trillion debt in 200 years would be only about $25 million. In this regard, servicing the debt without further borrowing is essentially equivalent to paying it off in full.

However, there is an alternative, entirely sustainable principle that could be applied. The government could adhere to the rule that the debt-to-GDP ratio should remain constant for all future generations (see Eisner 1994, 126-

127; or Sawicky 1994, 49-52). Under this rule, current and future generations could continue to borrow, but not a rate that would increase the size of the debt relative to the economy. At any future point the debt would be larger than at present, but it would not have grown relative to the size of the economy, and therefore the interest payments required to service it would pose no greater burden to the generations alive then than they do now.

This relaxation of the intergenerational budget constraint has a significant impact on the plight of future generations in the generational accounts. **Table 3** compares the lifetime net tax rates for future generations under two assumptions: that they are prohibited from further borrowing, and that they allowed to borrow by an amount that keeps the debt-to-GDP ratio constant.[28]

If the government can borrow at an interest rate lower than what people see as the tradeoff between present and future taxes, it would be irrational for it not to increase its borrowing.

Once the possibility of future borrowing is treated explicitly, however, the problem with using a discount rate different than the interest rate on government debt becomes more apparent. If the government can borrow at an interest rate lower than what people see as the tradeoff between present and future taxes, it would be irrational for it not to increase its borrowing. For example, if the government can borrow $1 billion at a 3% real interest rate, but the rate at which society discounts its future income and payments is 6%, then the present value of paying $30 million annually in interest forever is $750 million, not a bad price to pay for $1 billion. As the table indicates, this change in the borrowing constraint leads to a substantial reduction in the lifetime net tax rate for future generations when the burden is calculated at a high discount rate. As

TABLE 3
Generational Account With Constant Debt-to-GDP Ratio

	Lifetime Net Tax Rate	
Constant Debt/GDP*	Standard Account**	Discount Rate
37.9%	37.4%	2%
48.7	49.0	3
78.0	88.7	6
112.2	166.2	9

* Future generations allowed to borrow.
** Future generations prohibited from borrowing.

Source: Author's calculations.

expected, at a 3% discount rate the burden is essentially unchanged, and at 2% discount rate it actually rises slightly.[29]

Transfers and Government Consumption

Perhaps nothing is more central to the contribution of generational accounting than the treatment of Social Security and Medicare as intertemporal transfers where the difference between the discounted value of benefits and the discounted value of taxes is treated as a tax. This tax can be either positive or negative, although the projected explosion of health care costs makes it likely to be negative. While these particular government payments (along with welfare, unemployment compensation, and disability payments) are treated as negative taxes in the generational accounts computed to date, there are other government payments that, although they directly benefit particular individuals, are treated as government consumption that benefits everyone equally.

If these payments were counted as transfers to the young, as Medicare payments are to the elderly, for example, the generational accounts would present a radically different picture.

Foremost in this category are government payments for education. While these payments clearly benefit most directly the age cohorts that are enrolled in school, they are treated as undifferentiated government consumption in the generational accounts. If these payments were counted as transfers to the young, as Medicare payments are to the elderly, for example, the generational accounts would present a radically different picture. Since one of the main goals of generational accounting is to prevent deceptive bookkeeping, it seems reasonable to apply the same principle to education and other age-specific benefits to the young as is applied to benefits such as Medicare.

Auerbach, Gokhale, and Kotlikoff (1991, 72 fn) have discussed the possibility of imputing government consumption more precisely to the specific age cohorts that benefit, but they have not done so in the accounts prepared for the United States to date.[30] In fact, since the major age-specific expenditures benefit the young (29.1% of overall government consumption and 69% of age-specific consumption (Auerbach, Gokhale, and Kotlikoff 1991, 72)), taking them into account yields a substantial reduction in the burden for future generations. This result is particularly evident under the 6% rate of discount in the standard accounts, which magnifies the impact of expenditures early in life.

Table 4 compares the net lifetime tax rate for future generations under two assumptions: that government expenditures on education are counted as negative taxes for the age cohorts that directly benefit from them, and that education expenditures are viewed as general consumption.[31] Since these calculations include only government spending on education, they understate the

TABLE 4
Generational Accounts With Education as a Transfer Payment

Lifetime Net Tax Rates		
Education Adjustment	Standard Account	Discount Rate
27.2%	37.4%	2%
35.2	49.0	3
57.0	88.7	6
102.0	166.2	9

Source: Author's calculations.

Since these calculations include only government spending on education, they understate the full impact of attributing all age-specific expenditures as transfers to the groups that benefit from them.

full impact of attributing all age-specific expenditures as transfers to the groups that benefit from them.

The accounts for currently living generations also change when they are adjusted for government consumption spending on the young. This effect can be seen by examining spending on primary and secondary education. The average government expenditure per student on education in kindergarten through grade 12 was $4,619 in 1989.[32] Attributing this amount in equal payments to a newborn male in 1989 changes his net lifetime tax burden from $73,700 to $38,733, a 47% reduction. For a newborn female in 1989 the tax burden falls from $36,400 to $1,433, a 96% reduction.

Other Technical Issues

There are several minor but nonetheless serious problems with generational accounts as they are currently prepared. Perhaps the most important is the failure to account for public investment. A direct way in which the government affects the quality of life of future generations is through the quality of the infrastructure and other types of publicly owned capital that it passes on. In the accounts that have been prepared to date, there is no distinction made between government spending on investment goods and spending for consumption. This practice has been noted as an inadequacy to be overcome in future work (see, e.g., Office of Management and Budget 1994, 22).

While including public investment is unlikely to change the basic story in the standard accounts—that a large debt burden will be passed on to future generations—it may significantly alter the appearance of the lifetime net tax burden of currently living generations. There is no obvious correct way to incorporate public investment into the generational accounts, but a simple and

sensible principle would be to treat spending that increases the size of the net public capital stock relative to GDP as a surplus in the accounts (to be counted against any deficit run in that year), while a fall relative to GDP would be treated as adding to the deficit.

A second comparatively minor but nonetheless significant point is that the generational accounts are driven solely by spending patterns for which projections into the distant future are available. This is a complex issue. It makes sense to use whatever information is available in drawing up future budget projections, but, the fact that only certain types of information are available is hardly accidental. This selective availability of information stands out most clearly in the projections of health care spending into the next century. The Health Care Financing Administration (HCFA) has made crude projections of health care expenditures through the year 2030; the enormous growth projected provides the basis for much of the future tax burden found in the standard accounts.

In the accounts that have been prepared to date, there is no distinction made between government spending on investment goods and spending for consumption.

Because a government agency exists to project health care costs, these costs are available for the generational accounts. There are, of course, other types of government spending that could also undergo enormous expansion (or contraction) in coming years, but this spending will not affect the generational accounts because no government agency has responsibility for making the projections.

An obvious example of such an expenditure is corrections. The real rate of growth in spending on corrections was 9.2% a year from 1985 to 1990 (U.S. Department of Justice 1992, 4). If this growth rate is projected into the future (the Department of Justice does not offer such projections), corrections is seen to have an enormous impact on the generational accounts. **Table 5** compares the lifetime net future tax burden under two scenarios, one in which this growth rate continues into the future, and one in which it is ignored and thus, implicitly, remains constant as a share of GDP. Following the treatment of HCFA projections, the table assumes that after the year 2030 corrections expenditures remain constant as a share of GDP (8.25%).

The inclusion of these projections for corrections spending produces a massive increase in the lifetime net tax rate for future generations. The projections themselves are undoubtedly implausible, but it is not obvious that they are any more implausible than the projections for health care spending. If a major purpose of generational accounts is to devise a system that is less susceptible to political manipulation than the current one, this seems to be going in the wrong direction. There is nothing in this process to prevent a future

TABLE 5
Generational Accounts With Corrections Projections

Lifetime Net Tax Rate		
Including Corrections	Standard Account	Discount Rate
51.2%	37.4%	2%
65.5	49.0	3
115.2	88.7	6
206.5	166.2	9

Source: Author's calculations.

If generational accounts come to be used as a means of assessing intergenerational equity, there will be considerable incentive to resort to nontax measures that might have the effect of redistributing income between generations.

administration from establishing a "Corrections Financing Administration," which will produce a quasi-official projection like the one included here. As with the recent inclusion of HCFA projections, the generational accounts would then show that an enormous new burden had been placed on future generations, even though nothing had changed except the data collection. It is difficult to see how a nonpolitical criterion can be found for deciding which projections get included in the data when the projections themselves are little more than crude guesswork.

Another technical point is that the generational accounts count only actual taxes when assessing the government-imposed burden on a particular age cohort. While taxes are the most obvious way in which the government can affect the economic life of its citizens, it is not the only one. Government regulation of everything from workplace wage, hour, and health and safety issues to patents and copyrights has a major impact on the distribution of income in the economy. In some cases the impact is extremely direct, as when the government requires military service from men between the ages of 18 and 20.[33]

The difficulty in calculating such burdens is not a reason to exclude them from the generational accounts. In fact, if generational accounts come to be used as a means of assessing intergenerational equity, there will be considerable incentive to resort to nontax measures that might have the effect of redistributing income between generations. For example, laws requiring community rating for health insurance, without regard to age, would have a substantial redistributive effect between generations but would not show up directly in the generational accounts. Similarly, selling off the public airwaves can significantly affect the distribution of tax burdens between current and future genera-

tions, since future generations will have lost that revenue option. The calculations needed to apportion these burdens and benefits are extremely complex. For example, does a patent awarded to a drug company increase future wealth as a result of having providing an incentive for the development of the product? Or does it decrease wealth by creating a monopoly position that extracts excessive profits from future generations?[34]

The fact that these questions are not easily answered points to the limitation of using net tax burdens as a measure of intergenerational equity. There are many burdens and benefits that the government will pass along that will never appear directly as a tax or expenditure. Limiting our scorekeeping to these particular areas will ensure that we miss much of the game.

There are many burdens and benefits that the government will pass along that will never appear directly as a tax or expenditure. Limiting our scorekeeping to these particular areas will ensure that we miss much of the game.

The Health Care Horror Story

Much of the reason that the future appears so bleak in the generational accounts is that health care spending is projected to rise enormously over the next 35 years, from slightly over 14% of GDP at present to over 26% in 2030. The effect of this explosion in spending is amplified in the accounts by a rise in the government's share in health care expenditures from approximately 44% now to 53.3% in 2030 (Waldo et al. 1991, 234-6).

To show the extent to which this scenario affects the generational accounts, **Table 6** compares it to an alternative projection of health care spend-

TABLE 6
Generational Accounts Without Excessive Health Care Inflation

Lifetime Net Tax Rate			
No Health Inflation*	No Health Inflation and Constant Debt/GDP Ratio**	Standard Account	Discount Rate
32.5%	33.1%	37.4%	2%
38.6	38.3	49.0	3
59.3	48.6	88.7	6
107.6	53.6	166.2	9

* Assumes the inflation rate in health care is equal to the overall inflation rate.
** Assumes future generations are allowed to borrow.

Source: Author's calculations.

ing. This alternative scenario assumes that costs rise only as a result of the aging of the population and general inflation.[35] The second projection assumes that future health care costs are contained in this way, and that future generations are allowed to borrow to the extent that the debt-to-GDP ratio remains constant.

These alternatives produce an enormous reduction in the tax burden, with the size of the reduction rising with the discount rate. The low health care cost scenario leads to a reduction of 29.4 percentage points in the lifetime tax burden when calculated with a 6% discount rate. The lifetime net tax rate falls to under 39% of future labor income in the scenario with a 3% discount rate. In the low health cost scenario, with a 6% discount rate and constant debt-to-GDP ratio, the lifetime net tax burden falls to 48.6%. These numbers strongly suggest that it is not the retirement of the baby boom generation that is responsible for the huge deficits projected into the future.[36] Rather, the explosion of health care costs is the largest single factor behind the dire forecasts in the generational accounts.[37]

These numbers strongly suggest that it is not the retirement of the baby boom generation that is responsible for the huge deficits projected into the future.

While this point is often noted, the obvious implication is too often ignored. If health care costs actually follow the path suggested in these projections, the nation is facing a disaster regardless of whether the government bears the costs or not. The projections imply that in the year 2030 the average cost of health care per person will be approximately $12,148, or $48,592 for a family of four, in 1994 dollars.[38] If incomes grow 0.75% a year, as projected in the generational accounts, then the median family income in that year will be $50,191. Thus, a family of four at the median income *will spend 97% of its income on health care.*[39] This is clearly an impossible burden. Even if the government eliminated all its health care spending (i.e., it eliminated Medicare and Medicaid completely), Americans would face enormous hardship as they attempted to cope with rising health care costs.

The situation is even more unbearable for the elderly. In the projections in the generational accounts, the average health care expenditures for a person over 65 in 2030 will be $23,847 (1994 dollars). With the median income for a family over 65 projected to be $35,584,[40] a family of two over 65 at the median income will be spending 134% of its income on health care. Eliminating Medicare might remove this expenditure from the generational accounts, but unless future generations are willing to let their parents go without health care, they probably will not consider themselves to have benefited much from this step toward intergenerational equity.

If anything close to these projections comes true, then the United States is

facing a catastrophe. It is not clear what is to be learned about intergenerational equity by inserting this disaster scenario into the generational accounts. It is somewhat akin to predicting a nuclear war and then assessing its impact on future tax burdens. Certainly, the survivors will face an enormous tax burden as they attempt to rebuild the nation and provide care for the victims. But is it helpful to treat nuclear war as a deficit problem? Just as we work to prevent nuclear war from occurring, we also have to prevent an explosion in health care costs. Insulating the budget from the effects of either does nothing to address the basic problem.

Finally, it is not clear why the accounts should show the elderly getting a windfall when the cost of providing them with health care rises astronomically. By this logic, every time a health care provider increases the cost of his or her services, the patient is the beneficiary. If, say, doctors on average increase what they charge the elderly by $1,000 per year, and this cost is covered by Medicare, the payment is treated exactly the same as if the government were handing every senior citizen a check for $1,000. Insofar as this system of accounting makes the projections of a health care disaster appear as a problem of intergenerational equity, it has obstructed efforts to deal with the real problem of health care cost inflation, and it has created false villains.

Based on these projections, in 2030 a family of four at the median income will spend 97% of its income on health care.

Table 7 looks at the two scenarios for health care described above (in which costs are held to the level of general inflation plus allowances for the aging of the population) combined with the effect of counting education as a

TABLE 7
Generational Accounts Without Excessive Health Care Inflation and With Education as a Transfer Payment

	Lifetime Net Tax Rate		
No Health Inflation*	No Health Inflation and Constant Debt/GDP Ratio**	Standard Account	Discount Rate
22.4%	22.9%	37.4%	2%
24.8	24.4	49.0	3
27.6	16.8	88.7	6
43.4	-10.6	166.2	9

* Assumes the inflation rate in health care is equal to the overall inflation rate.
** Assumes future generations are allowed to borrow.

Source: Author's calculations.

transfer payment to the young.

Looking at the generational accounts in this light shows there is no basis for the claim that future generations are being impoverished: the tax burdens are quite moderate at the full range of discount rates. The negative tax rate in the scenario with a 9% real discount rate and a constant debt-to-GDP ratio means that the education benefits passed on to future generations will be of greater value than the interest burden on the existing debt.

Historical Generational Accounts: Lessons From the Past

One way to assess the efficacy of generational accounting is to apply its methodology to a past period and measure how closely it predicted subsequent tax burdens. For example, what kind of tax burden would generational accountants living in the period after World War II have predicted for us today?[41] The choice of the postwar period should be particularly helpful: federal deficits resulting from the war effort had pushed the debt to the point where it was 110% of GDP (the current burden, 52%, is less than half that ratio.) In other words, this is a time when the generational accounts are likely to have shown a bleak outlook for future generations.

Generational accountants in 1950 would have predicted about as bleak a picture for future generations then as predicted now.

In fact, the next quarter century was a period of unprecedented prosperity. Median family income more than doubled in the period from the end of the war to 1973. Housing construction and purchases of consumer durable goods, such as automobiles, boomed. Higher education expanded as a college education became affordable to large segments of the middle class for the first time. In addition, the burden of the government debt was reduced enormously, as the debt-to-GDP ratio fell to under 30%. The lesson to be learned is that, if the generational accounts of this period indicate an extraordinary tax burden for future generations, then generational accounting is not necessarily a good predictor of the well being or the tax burden of future generations.

Table 8 compares the lifetime net tax rate for future generations in the year 1950, under a range of discount rates, with the projections as of 1995 from the standard accounts. As can be seen, generational accountants in 1950

TABLE 8
Historical Generational Accounts

Lifetime Net Tax Rate		
1950 Projections	Standard Account 1995	Discount Rate
31.8%	37.4%	2%
37.2	49.0	3
71.4	88.7	6
184.2	166.2	9

Source: Author's calculations.

would have predicted about as bleak a picture for future generations then as predicted now. In fact, in the 9% discount rate scenario the situation would have appeared considerably worse in 1950 than it does now.

There are several factors combining to create this result. The most important is the high discount rate used in the standard accounts. Since the debt burden in 1950 was huge relative to the size of the economy, any trajectory of spending for current generations that doesn't have them actually paying down the debt is going to project a ruinous tax burden for future workers. Future generations do not begin entering the labor force in significant numbers until 20 years after the date the accounts are computed; by that point, with earnings discounted at 6% a year, their lifetime labor income is already greatly diminished. (For example, earnings of $1 million 20 years into the future would be counted as only $312,000 using a 6% discount rate.) This large discounting factor guarantees that any significant debt passed on to future generations will be a substantial burden relative to their lifetime labor income.

While the standard set of generational accounts in effect imputes a 6% real interest rate on the debt, the average real interest rate on the debt was actually negative 2.6% in the 29 years from 1945 to 1975, when the debt-to-GDP ratio was falling.

In actual experience, the debt left over from World War II turned out to be a relatively minor burden. While the standard set of generational accounts in effect imputes a 6% real interest rate on the debt, the average real interest rate on the debt was actually negative 2.6% in the 29 years from 1945 to 1975, when the debt-to-GDP ratio was falling.[42] Although inflation was moderate for most of this period, its cumulative effect was to significantly erode the value of the debt.[43] Consequently, it was never a significant burden for taxpayers.

A second important factor driving the dire picture in these accounts is the liability of Social Security. Then, as now, the retirement programs could not be funded far into the future at the existing level of taxation. The main reasons were the same: a growing population, which meant that the number of future retirees would be larger than the number of current retirees, and lengthening life expectancies. But because the Social Security tax was raised gradually in future years—from 3% in 1950, to 7.5% by the end of the 1960s, to 8.7% by the end of the 1970s, and to 11.2% in 1990 (Social Security Administration 1993, 25)—the burden was not severe.[44] This gradual rate of increase was sufficient to maintain a positive balance in the fund without taking a great toll on the working population, since after-tax wages still increased at a rapid pace.

A third factor driving the dire picture presented here is the low growth rate of the economy used in the generational accounts. The accounts shown in Table 8 for 1950 assume a 1.5% growth rate, 0.75% attributable to productivi-

ty growth and 0.75% to population growth. The growth rate most frequently used in generational accounting is 0.75% for productivity, along with Census-derived population estimates of approximately the same magnitude. The average annual growth rate of the economy was more than twice as high from 1946 to 1973—nearly 3.5%. This more rapid rate in effect allowed the country to outgrow the debt. While the real value of the debt fell by nearly 50% during this period, as a share of GDP it fell by nearly 80%. The growth in GDP did even more to reduce the burden of the debt than did the rare budget surplus or the reduction in its real value through inflation.

A fourth factor is that the average rate of unemployment in this period was much lower than the 6% unemployment rate assumed in the generational accounts. Unemployment averaged just over 4.6% for the 20 years from 1950 to 1970, meaning higher tax revenues and lower government payments for unemployment insurance, welfare, and food stamps than would have accompanied higher unemployment. Therefore, a lower unemployment rate can have a substantial impact on reducing the deficit. While much of the economics profession has come to believe that the economy cannot sustain an unemployment rate below 6%, it is not clear what was different about the economy in the period before 1970 that allowed for much lower rates of unemployment. Nor is it clear why the economy can *never* again reach these lower rates, as is implied in the generational accounts.

The postwar decades of growth and rising real incomes show that a large national debt is not necessarily an obstacle to a prosperous economy.

The nation's experience in coping with an enormous national debt in the postwar years reveals more than just doubts about generational accounting. Those decades of growth and rising real incomes show that a large national debt is not necessarily an obstacle to a prosperous economy. This does not mean that the debt is of no concern: rather, that it should be kept in perspective. Paying down the debt was clearly not the first priority of the 1950s generation, yet those age groups managed both to prosper and to significantly reduce the burden of the debt in the quarter century following the war. Instead, their focus was on promoting the overall growth of the economy. This overburdened generation built the roads and bridges that allowed for large-scale development of the suburbs; subsidized home mortgages through the tax system to encourage home ownership; supported higher education though loans and direct payments, which led to a drastic improvement in the quality of the workforce; and supported crucial research and development in industries such as aerospace and electronics. This set of policies, which made growth and rising living standards the central issue, turned out to be the most effective way of dealing with the burden of the debt as well.

Conclusion

The proponents of generational accounting deserve credit for calling attention to the inadequacy of the official deficit and debt as measures of the burden being passed into the future. But as a comprehensive measure of intergenerational equity, generational accounts fall short. The most important factor determining the well-being of future generations will be one that the generational accountants do not measure: the overall health of the economy and society that is passed on. The claim that generational accounting can contribute to assessing this larger picture does not stand up to closer scrutiny. The accounts drawn up for 1950, which failed to predict a quarter century of unprecedented prosperity, should make this point clear.

The most important factor determining the well-being of future generations will be one that the generational accountants do not measure: the overall health of the economy and society that is passed on.

A second fundamental problem with generational accounts is that, by focusing on issues of *intergenerational* equity, they obscure questions of *intragenerational* equity. This shortcoming is both unfortunate and ironic. It is ironic because the key measure in the generational accounts—the size of the debt burden—is in fact a question of intragenerational equity. Interest on the debt is paid from some members of living generations to other members of living generations. The comparative well-being of different generations depends on far broader and more amorphous measures of the overall quality of life.

The focus of generational accounts on intergenerational equity is unfortunate, because the family already exists as an institution to deal with intergenerational inequality. Parents who are economically well-situated are unlikely to leave their children destitute, and vice-versa. Arguing that the government can somehow do a better job of allocating resources between generations than can the family is a strong claim. On the other hand, no significant institutional structure exists to address problems of intragenerational inequality. To the extent that a concern for intergenerational equality distracts policy makers from addressing the inequalities that exist within generations, or worse, leads to policies that broaden these inequalities, it can indeed be harmful.

Finally, generational accounting is extremely complex, and in a democratic system this is not a consideration to be dismissed lightly. The vast majority of the population is already mystified by the budget as it is currently calculated, and large percentages have virtually no knowledge of the relative costs of different budget items.[45] As for generational accounting, even Ph.D economists specializing in public finance have considerable difficulty working with the accounts.

Generational accounts represent an exponential leap in complexity over the current budgetary system. If they were to be used as the standard system of accounts—displacing the official budget, as proponents advocate—nonexperts would find it virtually impossible to get a clear sense of the budget. The already limited democratic involvement in the budget process would be reduced even further.[46]

The complexity of generational accounting creates a strong presumptive case against its adoption as an alternative to the budget. It is important that we use the proper tools to measure economic phenomena, but unless generational accounts present information that could not be presented in a more comprehensible manner,[47] we should rely on simpler tools. There is little reason to believe that generational accounting meets this standard.

Appendix 1
The Construction of Generational Accounts 1995

The simplified generational accounts constructed for this analysis were designed as a tool for uncovering the factors that lead to the projection of a huge tax burden for future generations in the generational accounts prepared to date. They apply a methodology similar to that used by Auerbach, Gokhale, and Kotlikoff, but it focuses only on the tax burden passed on to future generations. Unlike the generational accounts prepared by Auerbach et al., this simplified version does not provide a basis for comparing the tax burden among currently living generations.

Future Government Spending

The projected path of future noninterest federal government spending through the year 2004 was constructed by taking current projections for federal spending from *The Economic and Budget Outlook: An Update* from September 1994 (Congressional Budget Office 1994). Since ultimately all taxes, transfers, and spending are converted to present values, following Auerbach et al. net interest spending is excluded. After the year 2004 non-health care and non-Social Security federal spending are assumed to stay constant as a share of GDP. For health care spending, Medicare and Medicaid spending are assumed to follow the projections described in the middle scenario in Waldo et al. (1991). Following the procedure used in the generational accounts in the 1994 *Analytical Perspectives* (Office of Management and Budget 1994), health care spending is assumed to remain constant as a share of GDP after 2030. Unlike the accounts in *Analytical Perspectives*, however, no further adjustments are made for changes in the age and sex distribution of the population after 2030. The projections from the Social Security trustees' 1994 report are used for Social Security projections through 2070. After 2070, Social Security payments are assumed to continue to grow at the same rate as assumed for the period 2065-70.

For state and local spending, the share of GDP that went to non-health spending is assumed to remain constant. State medical spending is assumed to grow from 1995 to 2030 at the rate described in the middle scenario in Waldo et al. (1991); after that, it remains constant as a share of GDP. Transfer payments are not broken out of state spending; instead, their share of GDP is assumed to remain constant and is counted as government consumption.

Tax Revenue

The estimates of federal tax revenue through 2004 come from CBO's 1994 *Budget Outlook*. The growth projections of the Social Security trustees are used to estimate OASDI and HI taxes from 2004 through 2070. For the years after 2070, tax revenues are assumed to continue to grow at the rate projected for 2065 to 2070. Other federal tax revenues are assumed to

remain constant at the share of GDP projected by CBO for 2004 (CBO 1994). In the case of state and local governments, taxes are assumed to match their current expenditure levels and to remain constant as a share of GDP.

Other Projections

The size of the current debt used in this analysis is $1,904 billion, which was calculated by Jagadeesh Gokhale as the net debt as of the end of calendar year 1992. (This debt figure differs from the conventionally used measure of publicly held national debt because it includes state and local assets and liabilities as well as federal assets that generate revenue.) To that figure, $354.1 billion was added, which is an estimate of the deficit accumulated in the period from the end of 1992 to the beginning of the 1995 fiscal year. This yields an accumulated debt of $2,259 billion.

For GDP growth, the estimates in the *Budget Outlook* through the year 2004 are used; for the years after 2004, the analysis uses the projections in the intermediate scenario of the Social Security trustees. For the years after 2070, the growth rate for the years 2065 to 2070 is projected to continue indefinitely. The same sources are used for inflation projections. The projected long-run rate of productivity growth in the trustees' report is 0.9%, slightly higher than the 0.75% used in most calculations of generational accounts. Use of this figure should have the effect of slightly reducing the lifetime net tax burden on future generations.

The burden passed on to future generations is the present discounted value of the sum of future government spending, future transfers to current generations, and the outstanding debt, minus tax payments by current generations. Following the procedure used in the 1995 *Analytical Perspectives*, this tax burden is compared to the present discounted value of future labor income. Labor income is assumed to be 80% of national income for all future years; this has been its average level in recent years.

Divisions Between Current and Future Generations

Taxes between current and future generations are apportioned by taking the age-specific gross tax payments from Auerbach et al. (1991) and the population projections to the year 2050 from the Census Bureau (Bureau of the Census 1993). The age-specific tax payments are assumed to remain at the levels in Auerbach et al., and then the share of the total tax burden that would come from current and future generations is calculated based on the size of age cohorts in the Census projections. This calculation only determined the apportionment between current and future generations, since the actual levels were determined by the procedure discussed above.

Social Security and Medicare benefits received by current and future generations are apportioned using the following formula: current generations receive 100% until 2060, 3.33% less each year until 2090, 0% after 2090. Since the discounting factor will be very large by the

time future generations begin to retire around 2060 (at a 6% annual rate, benefits received in 2060 would be divided by 44.1 to get their present discounted value), the degree of inaccuracy in this approximation should not be of much consequence.

Differences in Accounts

The major differences in the treatment of government spending between these accounts and those in Auerbach et al. are that (1) transfer payments such as welfare, food stamps, and Medicaid were not broken out and counted as age-specific negative taxes, and (2) government non-transfer spending is assumed to stay constant as a share of GDP after 2004, instead of adjusting to the changing age distribution of the population.

The first difference should lead to a slightly higher tax burden for future generations than in the Auerbach et al. accounts, since this analysis would not count the transfers received by members of future generations as negative taxes. Since the size of these transfers is relatively small, this difference is likely to be of little consequence.

Ignoring the effect of changes in demographics on government spending is probably of even less consequence. Auerbach et al., relying on data from the Organization for Economic Development and Cooperation, attribute 29.1% of government non-transfer expenditures to the young (age 0-24), 6% to the middle-aged (age 25-64), and 7.1% to the old (over 65). The Social Security projections they use in their calculation show a gradual decline in the share of the population that is young. The percentage of the population that is under 25 is projected to fall from 35.9% in 1995, to 34.6% in 2010, and to 32.6% by 2040 (Bureau of the Census 1993). Since the young receive a disproportionate share of government consumption expenditures per capita, holding government consumption expenditures fixed as a share of GDP will lead to somewhat larger expenditures than in the Auerbach et al. approach. The difference would not be large in any case, but the fact that the percentage of older people (who receive a slightly less disproportionate share of government consumption) in the population is rising will almost completely offset declines in spending on the young. In any case, most government non-transfer spending will not even be affected by demographic shifts, since 57.8% of government consumption is treated as non-age specific.

Appendix 2
The Construction of Generational Accounts 1950

The procedure followed in constructing the 1995 accounts was largely followed for the generational accounts for 1950. One major complication was the selection of a base year. Spending patterns fluctuated enormously with the demobilization following World War II and the subsequent military buildup associated with the start of the Cold War and the Korean War. Thus, the particular year chosen would make an enormous difference in the generational accounts, since the pattern of spending in that year would be frozen for all future years. To reduce the size of this problem, the average share of GDP of non-interest and non-Social Security spending are used over the four years from 1946 to 1949 to get a base for future years. As with the 1995 accounts, state and local spending and taxes are assumed to balance for the base year and all future years at their average share of GDP in this four-year period. No allowances are made for increasing health care spending in these accounts, since this period pre-dated Medicare, and health care spending still would have been a fairly small part of total spending. These calculations count federal non-interest, non-Social Security spending as 15.12% of GDP, federal non-Social Security tax revenue as 15.92% of GDP, and state and local taxes and spending as 6.52% of GDP.

For Social Security taxes, it is assumed that tax revenues remain at the same share of GDP as in 1950; this incorporates a 50% increase in Social Security taxes that took effect in 1950. To calculate future Social Security benefits, the average annual payment per recipient was calculated based on the average monthly payment in 1950; this came to $438 per year (Social Security Administration 1993, 190). The average real payment is assumed to rise at the rate of 0.75% annually, the overall rate of productivity growth. The number of actual recipients for the years from 1950 to 1990 are then multiplied to get total payments (Social Security Administration 1993, 190). For years after 1970 this figure is reduced by 5% to account for self-employed workers who were not included in the program as of 1950. After 1990, Social Security payments are assumed to remain constant as a share of GDP. These accounts include a small adjustment for the fact that unemployment averaged 4.6% in the base period 1946-49, whereas the standard generational accounts assume a 6% unemployment rate in perpetuity. Using a very conservative extrapolation from Okun's Law, the base year GDP was reduced by 2%.[48] This lower base affects federal tax revenues, which were fixed as a share of GDP, but not federal expenditure levels, which were fixed as percent of actual 1950 GDP. This corresponds to the actual pattern of taxes and spending, since spending is largely fixed independent of the state of the economy, while tax revenue fluctuates with the level of output. State and local taxes remained a constant share of actual 1950 GDP.

For the debt, the analysis uses the publicly held federal debt at the end of fiscal year 1949—$214.9 billion. A GDP growth rate of 1.5% was projected, half due to population

growth and half due to productivity growth.

A simple formula was used to approximate the division of tax payments and labor income between current and future generations. The formula assumed that the share of future generations in each was the same: 0% for 20 years 1950-70, an increase of 1.5% per year for the 10 years 1970-80, an increase of 2.5% per year for the 10 years 1980-90, and an increase of 3% a year for the 20 years 1990-2010. After 2010, all taxes and labor income are apportioned to future generations. This formula gives the general pattern of the division between current and future generations, but the limited availability of age-specific data makes the construction of more precise accounts for this period difficult.[49] Retirement benefits are apportioned between current and future generations according to the same formula used in the 1995 accounts.

Appendix 3
The Impact of an Overstated Consumer Price Index

In fall 1994, Federal Reserve Board Chairman Alan Greenspan testified to Congress that the consumer price index (CPI) overstates the annual rate of inflation by between 0.5% and 1.5% a year. He suggested that Congress take account of this overstatement in its indexation formulas for taxes and government benefits. More recently, other economists have presented evidence to Congress on both sides of this issue. While the evidence for an upward bias in the CPI is ambiguous (Baker 1995), the existence of such a bias would have a significant impact on the prospects of future generations. Specifically, an upward bias in the CPI implies that real wages have been rising more rapidly than is generally recognized. This in turn implies that, if current trends continue, future generations will be far better off than is currently believed.

Appendix Table 1 shows how the generational accounts would change if the CPI actually overstates inflation. The calculation is based on a 1% CPI overstatement of inflation, the midpoint of the Greenspan range, and assumes no changes in government policy (that is, taxes and government benefits continue to be indexed to the inflation rate indicated by the biased CPI). The existence of a 1% upward bias in the CPI lowers the lifetime net tax burden for future generations by 15.5 percentage points compared to the base scenario, when calculated at a 6% discount rate. By comparison, Auerbach et al. (1995) recently calculated that current plans to balance the budget will reduce the lifetime net tax burden by less than 12 percentage points.

APPENDIX TABLE 1
Generational Accounts with Greenspan Adjusted CPI

Lifetime Net Tax Rate		
Standard Account	Greenspan Adjusted	Discount Rate
37.4%	23.6%	2%
49.0	37.4	3
88.7	73.2	6
166.2	131.1	9

Source: Author's calculations.

ENDNOTES

1. The proponents of generational accounting argue that this net measure is the only meaningful measure of individuals' actual tax burdens. In this view, a large gross tax payment that is offset by a large transfer payment received from the government later in life, such as Social Security, should be treated as a loan. Generational accounting can be and has been used to examine gross tax burdens as well, but the thrust of most of the analysis has been the calculation of net tax burdens.

2. Perhaps the most widely accepted criticisms of the accounting in the official deficit are those associated with Robert Eisner (Eisner and Pieper 1984; Eisner 1989a; Eisner 1994). Eisner argues that the official deficit mismeasures the impact of fiscal policy by not recognizingthe impact of inflation on the debt and by not distinguishing between capital outlays and operational expenditures.

The impact of inflation can be seen with a simple example. Suppose the government debt is $1 million and annual inflation is 5%. If the government pays 8% interest on its debt, its annual interest payment is $80,000, and this amount would be entered into the government's accounts as an expenditure. Eisner would argue that only $30,000 should be considered an expenditure, because inflation will have reduced the real size of the outstanding debt by $50,000 at the end of the year. The fact that there was 5% inflation means that the government would have in essence taxed the holders of the debt by 5% of its value, or $50,000, had they not gotten any interest on their loan. In Eisner's accounting, the first 5% of interest is just offsetting the inflation tax. It is only the additional interest (the real interest), which actually increases the purchasing power of the holders of the government's debt, that Eisner would consider a real expenditure.

Eisner also argues for a distinction in the budget between operating expenses and capital expenditures. This is a common practice in private business as well as in state and local budgeting. The federal budget treats all spending the same, regardless of whether it is for something that will be immediately consumed (e.g., meals for the military) or whether it will last for several decades (e.g., airports, roads, or bridges). Private corporations generally distinguish between these two types of expenditures; instead of listing the full cost of a large capital expenditure (e.g., a new factory) in its operating budget in the year it was purchased, private corporations will only include the portion that is actually used up, or depreciated, in that year. Eisner argues that the federal budget is distorted by not using a similar procedure for capital expenditures. Counting capital expenditures in the same manner as any other expenditure in the federal budget leads us to overstate the deficit in periods when capital expenditure is expanding rapidly and to understate it during periods when capital expenditure is stagnant or contracting.

3. The surplus is actually attributable entirely to the Social Security Old-Age and Survivors Insurance (OASI) trust fund. The Social Security Disability Insurance program has been running a deficit for several years and has had to borrow from the OASI. The Hospital Insurance fund spending also exceeds its current tax receipts, although it can still finance its operations from the surplus it built up in prior years. Just after the end of the decade, it will also have to borrow from the OASI fund, unless the cost of providing benefits is reduced or the size of

the designated tax is increased (Social Security Administration 1994). The Supplemental Medical Insurance component of Medicare is currently running a deficit that is being financed out of general revenues.

4. Most of the data for specific age and gender tax burdens come from the Bureau of the Census' Survey of Income and Program Participation. The best discussion of the methodology used can be found in Auerbach, Gokhale, and Kotlikoff (1991).

5. The estimates of future benefits levels come from the Social Security Board of Trustees annual reports.

6. When converting from a share of labor income to calculating the future net tax burden in dollar terms, labor income is adjusted for productivity growth. This means that if average labor income is 10% higher, then the future tax burden would be adjusted downward by 10%. This makes it possible to distinguish between an increase in net taxes that is due simply to economic growth and an increase in net taxes attributable to a greater relative tax burden.

7. These tax rates are forward looking in the sense that they give estimated tax burdens from the time of birth of each age cohort. This method would give a different (and higher) lifetime net tax rate than one that looks back from the standpoint of only those members of an age cohort who are still alive. For example, the lifetime net tax rate of someone still alive who was born in 1900 would be far less than for an average member of that age cohort. The vast majority of people born in 1900 have already died, whereas those still alive would be reducing their net tax burden through receipt of transfer payments like Social Security and Medicare.

8. The issue of foreign ownership of the debt will be discussed later in this section. The discussion here is focused only on the question of the debt as a measure of intergenerational transfers within the country.

9. This point is discussed in Eisner 1994, pp. 121-44.

10. This calculation is based on the tax and spending projections in OMB 1992. It assumes that current tax policy remains in place throughout the period and that the real interest on the federal debt is 3%. It also assumes that the share of income generated in the private sector that goes to interest and dividends does not change. Currently, dividend payments and interest generated in the private sector account for approximately 18% of national income. These projections imply that government interest payments will rise from their current level of approximately $225 billion in 1995 to $5,146 billion in 2030 and to $34,728 billion in 2050. If the labor share of national income remains at 80%, it will be approximately $28,830 billion in 2030 and $79,878 billion in 2050.

11. The economic distortions associated with taxes can be seen as an actual burden, but even here the net tax burden that is the focus of generational accounts is the wrong measure. The relevant tax rate from the standpoint of determining distortions is the *gross* tax rate, not the net tax rate. The extent to which individuals modify their behavior in response to a tax of a particular size is largely independent of whatever government transfers they may receive for other reasons.

12. It is important to note that the low and negative interest rates prevailed throughout the

whole period from 1945 to 1980, not just the high inflation years of the 1970s. The real interestpaid on government debt was negative in 11 of the 25 years from 1946 to 1970 and in four of the 10 years from 1951 to 1960.

13. The generational accounts as they are currently designed cannot pick up this effect, since they assume a constant rate of productivity growth (usually 0.75% annually) regardless of the size of the debt burden. This has been noted as an area where future refinements will be made (e.g., Office of Management and Budget 1994, 22), but in the accounts prepared to date the debt and annual deficits have no impact on productivity or GDP growth.

14. Kotlikoff (1993, 83-7) points out the problem of finding a link between various measures of the deficit and interest rates. This is one of his reasons for advocating generational accounting as a true measure of fiscal burdens.

15. One of the major problems in testing for the effect of deficits on interest rates is that it is not clear how the deficit should be measured. For example, the deficit generally rises in a recession as tax collections fall and transfer payments such as unemployment compensation and welfare rise. This sort of cyclical deficit would not generally be expected to raise interest rates, however, since demand for loans usually falls a great deal in a recession in any case. Even abstracting from cyclical fluctuations in the deficit, there is still a problem of distinguishing between the impact of a current deficit and the impact of expected future deficits. In principle, actors in financial markets are forward looking, and they respond to expected changes in future deficits rather than just to current deficits. Thus, if future deficits are expected to rise, then current interest rates might be high even if the current deficit is low. This practice would remove any direct link between current deficits and current interest rates. Since there is no easy or obvious way to quantify expectations of future deficits, it is difficult to find compelling evidence on the impact of expected deficits on interest rates. Two examples of studies that examined this link are Feldstein (1986) and Thomas and Abderrezak (1988).

16. The government debt can also have an effect on the level of foreign indebtedness of the nation, insofar as deficits actually drive up interest rates. If the deficit raises U.S. interest rates, then the value of the dollar should increase relative to other currencies (assuming everything else is equal). With a more highly valued dollar, U.S. exports become more expensive to foreigners, causing exports to fall. At the same time, imports become cheaper for people in the United States, leading people here to buy more foreign goods. Since the United States is exporting less and importing more, its trade deficit increases, which forces the United States to borrow from abroad. This borrowing makes the nation poorer in the future, since it will lead to higher payments of interest, profits, or dividends to foreigners.

While this is a realistic scenario in which the debt can make future generations worse off, there are two important qualifications. First, the link between the deficit and higher foreign indebtedness is not strong. Before there can be any effect at all, the deficit has to push up interest rates *and* the higher interest rates have to raise the value of the dollar. As noted earlier, the linkbetween interest rates and the deficit is tenuous at best. Furthermore, the effect of interest rates on the value of the dollar is not very clear, since there are many other factors that affect the value of currencies as well (see Blecker 1992).

The second qualification is that the government debt does not provide even an indirect measure of this effect on the living standard of future generations. The relevant measure is the

net asset position of the United States (i.e., how many foreign assets are held by people living in the United States minus the amount of U.S. assets held by people living abroad). The government's debt tells us nothing about this, since it is possible that the United States can have a very positive net asset position (the foreign assets held by people in the United States are larger than the U.S. assets owned by foreigners) at a time when it has a very large government debt, as was the case immediately after World War II. Again, when it comes to the question of intergenerational equity, the government debt is not the measure that matters.

17. The real capital stock has been growing at an annual rate of 2.37% in the high deficit years from 1980 to 1992. This is only slightly lower than the 2.77% rate of growth in the years 1948-80 (author's calculations based on the Bureau of Labor Statistics' unpublished Multifactor Productivity Tables.)

18. Auerbach, Gokhale, and Kotlikoff (1991, 72 fn) suggest that it would be desirable to impute benefits such as education to the specific beneficiaries. This practice would reduce the likelihood that increased public provision of such goods would lead to a violation of the principle of generational equity. However, increased provision of a pure public good (e.g., a healthy ozone layer) would still appear as a source of generational inequity.

19. Since the principle of generational equity has not applied in the past (each generation has faced a higher net lifetime tax burden than the preceding one), the first generation subject to this condition will face a singular injustice. It will be forced to bear a higher lifetime net tax burden than the preceding generation, but will be denied the opportunity to borrow from the next (which will be richer on average) in the form of passing on a higher tax burden. It is difficult to see the fairness of this position.

20. These calculations are based on a simplified set of generational accounts constructed for this analysis. These accounts are designed to capture the main factors driving the large lifetime net tax burden of future generations relative to current ones. The methodology used in constructing these accounts is explained in detail in Appendix 1.

21. There is no obvious reason for the imputation of excise taxes paid on goods consumed by children to the children themselves, instead of their parents, and none is provided.

22. To calculate the discounted value of the taxes paid and benefits received before age 20 from the table in the article, future tax payments (or transfer receipts) projected from age 20forward are discounted and subtracted from the projection at age 0. Growth projections in the tables are incorporated by increasing taxes and transfers at the rate of 0.75% a year.

23. The fact that Social Security and Medicare both in effect provide an inflation-adjusted annuity should make them less risky than government debt, which provides a nominal return whose real value can vary enormously.

24. At a 3% real growth rate, the economy will be approximately 370 times its current size in 200 years. If a 2% real discount rate is applied to earnings, they would still be over seven times as large as they are now. The present discounted value would be even larger for years further into the future. The sum of earnings for all future years goes to infinity, dwarfing any finite debt burden. This means that, if the rate of economic growth exceeds the rate of interest paid on the existing debt, eventually the inherited debt burden will become inconsequential.

25. The long-run growth rate assumed in the standard set of generational accounts is approximately 1.65% a year (0.75% productivity and 0.9% labor-force growth). This growth rate combined with a real 6% discount rate implies that the present value of each successive year's income is slightly less than 95.9% of the previous year's income. At this rate, the present value of all future income is less than 25 times the value of this year's income. More than half of this value will be realized in the next 17 years.

26. The implications of this devaluation can be profound. For example, if we could adopt a technology that would double income for the next 25 years but destroy the world after 100 years, it would appear a net plus under a 6% real discount rate.

27. This ratio is approximately 27% in the accounts used in this analysis.

28. Instead of adding in the current outstanding debt, these calculations include the sum of the discounted value of the future interest payments that will be needed to keep the debt-to-GDP ratio constant.

29. The difference at the 3% rate is due to various rounding errors.

30. They did count education as a transfer payment in a set of generational accounts prepared for Norway (Auerbach, Gokhale, Kotlikoff, and Steigum 1993).

31. To measure the impact of treating government education spending on the young as a transfer, current government education expenditures as a share of GDP (5.5%) are divided equally among the age cohorts from 5 to 17. This method attributes government spending on both preschool and postsecondary education to kindergarten through 12th grade education.

32. This average is calculated from tables 210 and 212 in the *Statistical Abstract of the United States* 1992. To estimate the impact of counting educational spending as transfers to the young, it is assumed that this spending rose 0.75% annually, the overall rate of productivity growth in the Auerbach, Gokhale, and Kotlikoff accounts; the assumed discount rate is 6%. It is important to note that the lifetime net tax burdens in the accounts that appear in Auerbach, Gokhale, and Kotlikoff (1991) are far lower than in the accounts in more recent budget analyses, since the latter incorporate projections of explosive growth in health care costs through 2030.

33. There is not an obvious way to calculate the implicit cost to the individual of mandatory military service, but it is possible to make crude projections. If a year in the military is treated as being of equivalent value to working a year at a full-time minimum wage job, then the productivity-adjusted value for a person born in 1989 would be approximately $10,000 per year. If half of this is considered a tax because of the coercion of a mandatory draft, then the individual is being taxed $5,000 per year of military service. The present discounted value of this tax at birth with a 6% discount rate is $3,405. This would add just under 5% to the newborn male's lifetime net tax burden calculated in Auerbach, Gokhale, and Kotlikoff (1991) and over 9% to a newborn female's tax burden. At a 3% rate of discount, the present value is $5,790. This would add slightly less than 3% to a newborn male's lifetime burden and over 6% to a newborn female's burden.

The more serious cost of involuntary military service, using the standard 6% discount rate of generational accounting, is the delay of future earnings by two years. Assuming that

losing two years of potential labor-market experience to the military only affects the timing of future earnings but not the amount (i.e., a person at age 30 who served two years in the military earns as much as he would have at age 28 had he not served, and the same applies for all other ages), the delay in earnings would be equivalent to a tax of 12.4% on all future labor income. This means that not counting mandatory military service as a tax understates the lifetime net tax burden for those age cohorts subject to a draft by approximately 15 percentage points. A recent study (Angrist 1990) found that white veterans from the Vietnam War era earned on average 15% less than comparable non-veterans more than 10 years after their military service had ended.

34. In his review of Kotlikoff's book, Cutler (1994) argues that past military expenditures could be counted as benefits for future generations insofar as they lessened the need for future military expenditures and increased security. This argument further demonstrates the difficulty of assigning burdens and benefits to specific generations.

35. These projections are derived from the "draconian scenario" in Waldo et al. (1991, 240-1). The rate of growth of government health care expenditures in these generational accounts was 0.6% higher annually than the general growth rate in this scenario in order to produce the same shift in the public share that took place in the "middle scenario." This method almost certainly overstates the actual shift, since a major factor in the rising government share is theoverall rate of growth of health expenditures. After 2030, it is assumed that health care spending remains constant as a share of GDP. This assumption differs slightly from the methodology used in the accounts calculated for the most recent budget analysis by not taking into account changes in the age-sex composition of the population after 2030 (Office of Management and Budget 1994, 30).

36. For example, using the Social Security trustees' middle scenario, it would be possible to always maintain a positive balance in the OASDI fund if payroll taxes were raised a total of 0.1% per year (0.05% on the employee side and 0.05% on the employer side) beginning in 2010 and continuing to 2040. This would lead to a total increase in the tax rate of 3 percentage points over 30 years. By comparison, the tax rate for Social Security rose by 4 percentage points in the 20 years from 1970 to 1990.

Even this scenario might be excessively pessimistic. It assumes that immigration declines from its 1980 levels by approximately 23% relative to the size of the workforce (Social Security Administration 1994, 133-4). This low rate of immigration remains in place even as the size of the domestic workforce stagnates with the retirement of the baby boom generation. A more reasonable projection might have immigration growing both absolutely and relative to the size of the labor force as the baby boom generation retirees. This outcome could significantly lessen the need to raise Social Security taxes.

37. It is also worth noting that the net tax burden on living generations would be substantially larger if health care costs do not follow the explosive trajectory incorporated into Auerbach, Gokhale, and Kotlikoff's accounts. Since government spending on health care is counted as a transfer or negative tax, the size of this negative tax will be substantially smaller with less growth in health care costs. A reduction in the size of transfers will increase the lifetime net burdens for living generations.

38. This calculation assumes the overall real growth rate of health care expenditures in the

middle scenario in Waldo et al. (1991). The current health care expenditures per person come from the National Medical Expenditure Survey in Agency for Health Care Policy and Research (1991).

39. It is appropriate that *median* incomes be compared with *average* expenditures in this case. The median is informative about family income because it is the midpoint of the income distribution—half the families have higher incomes and half have lower. In this sense it can be seen as showing the living standard of a typical family. An average can be distorted by a small number of very wealthy people.

While the median would be relevant for assessing income, the *average* health care cost would be the relevant expense if people continue to have the bulk of their expenditures covered by insurance. Insurance evens out the distribution of costs, so that the median should be close to the average, assuming that even high-risk people are able to purchase insurance. If currentpractices continue to hold, even with the projected health care cost explosion the median family should expect to pay the average cost of health care.

Median family income for 2030 is a projection based on the median family income for 1993, growing at the rate of productivity growth. Health care expenditures are based on the cost estimates in Agency for Health Care Policy and Research (1991) and the growth projections from the middle scenario in Waldo et al. (1991).

40. Median family income for the elderly in 2030 is based on the estimate of median household income for households headed by individuals over 65 in Bureau of the Census (1992, 53). Median income for the elderly is assumed to rise at the same rate as productivity through the year 2030. Health care expenditures are based on the cost estimates for households headed by individuals over age 65 in Agency for Health Care Policy and Research (1991) and the growth projections from the middle scenario in Waldo et al. (1991).

41. The construction of this set of accounts is described in detail in the second technical appendix.

42. This rate was calculated by first dividing the amount of net interest paid by the government in a year by the outstanding debt at the beginning of the year. The change in the GDP deflator was subtracted to convert this amount into a real interest rate. To average the rates over the 29-year period, each year was weighted by the ratio of debt to GDP that existed at the beginning of the period.

It is important to note that low real interest rates characterized the whole period, not just the high inflation years of the 1970s. Whatever ill effects are associated with inflation, they did not prevent enormous improvements in living standards over this 35-year period.

43. It has become the accepted wisdom that real interest rates have been at historically high levels in recent years because the deficit is high. Ironically, if real interest rates were at the same levels they were in the period 1945-75, the budget would be almost balanced.

44. The 1950 tax increase is incorporated into the accounts.

45. A recent *New York Times* poll found that nearly half the public thought that either foreign aid or welfare was the largest item in the budget. In fact, foreign aid accounted for approximately 1% of spending in 1995, while the various programs that can be thought of as welfare (Aid to Families With Dependent Children, food stamps, and low-income housing

assistance) totaled less than 3% of the budget.

46. From a standpoint of involving the public in the political debate about the budget, using generational accounting as an analytical tool merely as a supplement to the official budget is of dubious value. At least some reporters seem to have completely misunderstood the accounts that have appeared to date (e.g., Glassman 1995).

47. For example, 75-year budget projections would probably convey at least as much information as generational accounts.

48. Okun's law states that a 2 percentage-point increase in GDP lowers the unemployment rate approximately 1%.

49. Applying this formula to the 1995 accounts lowered the burden on future generations by approximately 17 percentage points below the levels obtained using the technique described in Appendix 1.

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