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GENERATIONAL ACCOUNTING: A NEW APPROACH FOR UNDERSTANDING THE EFFECTS OF FISCAL POLICY ON SAVING

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Introduction

Recent years have witnessed a growing unease with the use of the fiscal deficit to gauge the stance of economic policy. Many economists as well as noneconomists are questioning whether a single number, which relates primarily to the government's current cash flow, is the kind of measure needed to understand the longer-term effects of fiscal policy on saving, investment, and growth. They also ask whether the deficit can tell us how we are treating different generations, both those currently alive and those yet to come. Economists and policymakers have long criticized the deficit for failing to account for inflation, economic growth, government assets, and implicit liabilities. Doubts about the deficit have been accentuated by the demographic transition occurring in most Organization for Economic Cooperation and Development (OECD) countries. The aging of populations, with its attendant increase in the number of retirees dependent on workers to fund their benefits, raises major concerns about the viability of a short-run, pay-as-you-go approach to fiscal budgeting.

In recognition of these concerns about the demographic transition, the U.S. federal government decided in 1983 to accumulate a large Social Security trust fund to help finance the baby boom generation's Social Security benefits. This decision represented a remarkable and highly praiseworthy break with short-term budgeting. But it also raised new questions about using the unified federal deficit, which includes Social Security, as a measure of fiscal policy. In particular, it has provoked discussion about the goal of balancing the federal budget inclusive of Social Security. If funds for future needs are to be accumulated, shouldn't the United States be running a unified federal budget surplus? If so, how large should it be? And will such a policy reduce aggregate demand and depress the economy?

The government's response to the problem of using the short-term budget deficit as an instrument for long-term planning is to exclude Social Security from the federal deficit. While this redefinition has formally occurred, it has not precluded the continued calculation of and attention paid to the unified budget deficit. Indeed, in its January 1991 report on the fiscal year 1991 deficit, the Congressional Budget Office (CBO) discussed not only the deficit inclusive of Social Security, but three other deficits as well. The CBO predicted 1) a total deficit of $360 billion (which excludes Social Security, but includes the savings and loan [S&L] bailout), 2) a Gramm-Rudman deficit of $256 billion (which excludes Social Security and the S&L bailout), 3) a National Income and Product Accounts deficit of $298 billion (which includes Social Security and the S&L bailout), and 4) a National Income and Product Accounts deficit of $194 billion (which includes Social Security and excludes the S&L bailout). The huge $166 billion difference between the largest and smallest of these numbers is roughly 3 percent of the predicted 1991 U.S. gross national product (GNP).

The proliferation of deficits, coming as it does after years of "smoke and mirrors" budget gimmickry (for example, time-shifting of payments, moving some expenditure items off-budget, and making unrealistic economic assumptions in projecting future paths of revenues and expenditures) has taken its toll on public confidence in federal budgeting. In a Time/CNN poll administered during the 1990 budget debate, 500 Americans were asked, "If the Bush Administration and Congress reach agreement on a deficit plan, do you expect a) one that avoids the real issues or b) a meaningful accord?" Fully 70 percent of the respondents chose a).

This paper discusses an alternative to the deficit — generational accounting — and its use in assessing fiscal policy, particularly in regard to the impact on saving. Generational accounting indicates how changes in policies alter different generations' present expected values of their remaining lifetime net payments to the government. According to the standard life-cycle theory, one's lifetime present-value net payment, rather than one's immediate cash-flow payment to the government, is the critical determinant of one's consumption response to government policy. From the perspective of the life cycle and other neoclassical consumption theories, the government's deficit does not properly measure policy-induced stimuli to consumption. Indeed, from a theoretical perspective, the measured deficit need bear no relationship to the underlying intergenerational stance of fiscal policy, since the deficit simply reflects the economically arbitrary labeling of government receipts and payments (Kotlikoff [1984, 1989] and Auerbach and Kotlikoff [1987]).

The paper proceeds in the next section by pointing out that intergenerational redistribution is the central question underlying concern about the deficit. It then provides examples of a range of policies in which the deficit fails to measure changes in generational burdens. Section II discusses the use of generational accounting to measure generational burdens directly. Section III reports baseline U.S. generational accounts for 1989. It also examines four hypothetical policies to illustrate the ability of the new approach to keep track of changes in generational burdens. While all four of the hypothetical policies effect major redistributions across generations, in the case of three of these policies, the deficit is completely unaffected. Section IV discusses the potential use of generational accounting for assessing the impact of fiscal policy on saving, and section V concludes the paper.

I. What Question Is the Deficit Supposed to Answer?

The key economic question associated with fiscal deficits is, Which generation will pay for what the government spends? The answer to this question is obviously important for assessing generational equity, but it is also central to the issues of national saving, investment, and growth. Letting those of us currently alive off the hook in paying the government's bills permits us to consume more, which lowers national saving. Reduced national saving translates into reduced domestic investment, which translates into slower growth in capital per worker, which ultimately means slower growth in real wages. Reduced national saving also leads to trade deficits as foreign savers help to finance domestic investment.

Knowing which generations pay is also critical for stabilization policy. Obviously, reducing fiscal burdens on current generations at the price of increased burdens on future generations will stimulate current generations' demand for consumption. In addition, policies that redistribute toward older generations will expand current consumption demand. The reason is that older generations, because they have fewer years left to live, have higher propensities to consume their available resources than do younger generations (see Abel, Bernheim, and Kotlikoff [1991]).

Unfortunately, the federal deficit does not record a great deal of the government's generational policy. Take, for example, the huge postwar buildup of pay-as-you-go Social Security systems in the United States and in most OECD countries. As Feldstein (1974) first stressed, this method of financing Social Security has transferred great sums of money to those generations who retired in the last four decades. Much of the bill for that transfer was handed to young and middle-aged workers in the form of high payroll taxes, and the rest of the bill will be paid by future generations, who will likely face even higher payroll taxes. Because of the manner in which OECD governments chose to describe (label) Social Security contributions and benefit payments, this enormous intergenerational redistribution had essentially no effect on reported fiscal deficits. In the case of the United States, had the government historically labeled contributions to Social Security as "loans" to the government, rather than as "taxes," official U.S. debt would be more than three times its current level.[1]

Another example of generational policy not captured by the deficit is a switch from income to consumption taxation that is "revenue neutral." As first stressed by Summers (1981), such balanced-budget policies can redistribute substantial sums from current elderly generations toward both current young and future generations. The reason is that under a consumption tax, the current elderly will pay substantially more taxes than they would under an income tax. If the current elderly pay more and the government's consumption spending is not altered, other generations will pay less.[2]

A third example is government policy that alters the market value of previously accumulated assets. Consider the case of an investment incentive that lowers the market value of existing capital. Since the elderly hold most of the existing capital, this policy redistributes from the elderly to the middle-aged, young, and future generations, who are able to purchase the same

1 Gross U.S. federal debt is currently about $3 trillion. The Social Security Office of the Actuary reports that its closed-group unfunded liability is $7 trillion.

2 A partial switch from income to the equivalent of consumption taxation actually occurred in the United States from 1981 through 1986, when the Accelerated Cost Recovery System of depreciation moved the effective tax structure away from income taxation toward consumption taxation.

physical existing capital stock, but at a lower price. Again, this redistribution does not show up on the government's books.

A fourth example of generational policy missed by the deficit is a balanced-budget change in the structure of government transfer payments that pays for increased (reduced) transfer payments to the elderly, by reducing (increasing) transfer payments to the young and middle-aged.

A fifth example is preannounced policies that redistribute across generations. An example here is the 1983 U.S. legislation that reduced the prospective Social Security benefits of baby boomers by about one-fifth. While this piece of legislation had no impact on the 1983 deficit, it certainly represented very significant generational policy.

These and other examples indicate that, as a measure of generational policy, the deficit's problems run much deeper than is commonly believed. One could correct the federal deficit for many things — inflation, growth, the business cycle, government assets, and state and local surpluses — and still end up with a measure of fiscal policy that misses pay-as-you-go Social Security schemes, revenue-neutral changes in the tax and transfer structure, policies that redistribute through asset markets, and policies that are preannounced. As discussed in Auerbach and Kotlikoff (1987), the detrimental saving, investment, and growth effects of generational policies missed by the deficit can be many times larger than those generational policies, such as tax cuts, that show up in the deficit. Indeed, as Kotlikoff (1989) points out, ignoring incentive effects, generational policies that differ in their impact on reported deficits are intrinsically identical and really represent the same generic policy being described with different words.

II. Generational Accounting

A. How Should We Measure Generational Policy?

Economic theory suggests we should measure the government's generational policies with generational accounts. These accounts indicate in present value what the typical member of each generation can expect, on net, to pay to the government now and in the future. A generational account is thus a set of numbers, one for each existing generation, indicating the average remaining lifetime burden imposed by the government on members of the generation. The proper use of these accounts leads to an assessment of generational policy that is independent of the words the government uses to label its receipts and payments.

Generational accounts indicate not only what existing generations will pay, but also the likely payments required of future generations. The burden on future generations is determined by working through the government's intertemporal budget constraint. This constraint says that the present value of the government's spending on goods and services cannot exceed the sum of three terms: 1) the government's net wealth, 2) the present value of net payments by current generations (the sum of the generational accounts multiplied by the number of people in each generation), and 3) the present value of net payments of future generations. In other words, the government must ultimately pay for its spending with its current assets or with resources obtained from current and future generations. At any point in time, we can project the present value of the government's spending and also estimate terms 1) and 2). By subtracting 1) and 2) from the present value of government spending, we can determine the aggregate present-value burden on future generations.

How will the total burden on all future generations be distributed over the different generations showing up in the future? No one knows for sure.

But let's assume the burden is spread smoothly across all future generations, such that each new generation's burden keeps pace with the economy's rate of productivity growth. Then, knowing the total amount that future generations will pay and projecting the number of people that will be born in the future, one can determine the growth-adjusted burden per capita (generational account) on future generations.

B. The Simple Mathematics of Generational Accounting[3]

To make the above description of generational accounting more precise, we write the government's intertemporal budget constraint for year t in equation (1):

$$(1) \qquad \sum_{s=0}^{D} N_{t,t-s} + \sum_{s=1}^{\infty} N_{t,t+s} = W_t^g + \sum_{s=t}^{\infty} G_s \prod_{j=t+1}^{s} \frac{1}{(1+r_j)}.$$

The first term on the left-hand side of (1) adds the present value of the net payments of all generations alive at time t. Net payments refers to all taxes paid to the government (federal, state and local) less all transfers received from the government. The expression $N_{t,k}$ stands for the time t present value of remaining lifetime net payments of the generation born in year k. The index s in this summation runs from age 0 to age D, the maximum age of life. The first element of this summation is $N_{t,t}$, which is the present value of net payments of the generation born in year t; the last term is $N_{t,t-D}$, the present value of remaining net payments of the oldest generation alive in year t, namely those born in year t-D. The second term on the left-hand side of

3 The remainder of this section draws heavily on Auerbach, Gokhale, and Kotlikoff (1991).

(1) adds the present value of remaining net payments of future generations. The right-hand side consists of W^g_t, the government's (federal, state, and local) net wealth in year t, plus the present value of government consumption. In the latter expression, G_s stands for government consumption expenditure in year s, and r_j stands for the pre-tax rate of return in year j.

Equation (1) indicates the zero-sum nature of intergenerational fiscal policy. Holding the right-hand side of the equation fixed, an increase (decrease) in government payments to (receipts taken from) existing generations means a decrease in the first term on the left-hand side of (1) and requires an offsetting increase in the second term on the left-hand side of (1); i.e., it requires reduced payments to, or increased payments from, future generations.

The term $N_{t,k}$ is defined in equation (2):

$$(2) \qquad N_{t,k} = \sum_{s=\max(t,k)}^{k+D} \bar{T}_{s,k} P_{s,k} \prod_{j=t+1}^{s} \frac{1}{1+r_j} .$$

In this expression, $\bar{T}_{s,k}$ stands for the projected average net payment to the government made in year s by a member of the generation born in year k. By a generation's average net payment in year s, we mean the average across all members of the generation alive in year s of payments made, such as income, payroll, and consumption taxes, less all transfers received, such as Social Security, welfare, and unemployment insurance. The term $P_{s,k}$ stands for the number of surviving members of the cohort in year s who were born in year k. For generations who are born prior to year t, the summation begins in year t. For generations who are born in year k, where k>t, the summation begins in year k. Regardless of the generation's year of birth, the discounting is always back to year t.

A set of generational accounts is simply a set of values of $N_{t,k}$ divided by $P_{t,k}$ (the generation's current population size in the case of existing generations, or initial population size in the case of future generations), with the property that the combined total value of the $N_{t,k}$'s adds up to the right-hand side of equation (1). In our calculation of the $N_{t,k}$'s for existing generations (those whose $k \leq 1989$), we distinguish male from female cohorts, but to ease notation, we did not append sex subscripts to the terms in (1) and (2).

C. Assessing the Intergenerational Stance of Fiscal Policy

Given the right-hand side and the first term on the left-hand side of equation (1), the value of the second term on the right-hand side, which is the present value of payments required of future generations, can be determined as a residual. One can further determine the amount that needs to be taken from each successive generation to balance the government's intertemporal budget, assuming that each successive generation's payment is the same up to an adjustment for growth.

Understanding the size of the $N_{t,k}$'s for current generations and their likely magnitude for future generations certainly does not fully reveal the intergenerational incidence of fiscal policy. As studied in Auerbach and Kotlikoff (1987), intergenerational redistribution (changes in generational accounts) will alter the time path of factor prices, which has additional effects on the intergenerational distribution of welfare. Such changes in factor prices result from changes in the supply of capital relative to labor. But the policy-induced changes in the supplies of capital and labor can, in turn, be traced back to changes in consumption and labor supply decisions that reflect changes in generational accounts. Hence, knowing how generational accounts change in response to policy is essential for understanding not only the direct generational welfare effects of government policy, but also the indirect (though not necessarily smaller) effects associated with factor price changes.

D. Advantages of Generational Accounting

Generational accounting automatically deals with each of the major concerns raised by those who think the deficit is conceptually sound, but simply needs to be adjusted. It deals with inflation by measuring all payments and receipts in inflation-adjusted (constant) dollars. It nets all of the government's real assets against all of its real liabilities (such as the S&L bailout) to form the value of government net worth, which is ultimately used to help determine the burden on future generations. It directly considers the government's implicit obligations to make future transfer payments and to undertake future consumption spending, and also considers the public's implicit obligations to pay future taxes. It accounts for state, local, and federal government fiscal policy. By using replacement-cost valuation of assets, it accounts for government redistribution through asset markets. Finally, in projecting transfers, spending, taxes, and the implied burden on future generations through time, generational accounting deals with the question of economic growth, including growth associated with demographic change.

III. Illustrating Generational Accounting

A. U.S. Generational Accounts as of 1989

Tables 1 and 2 illustrate generational accounting for the United States based on policy as of 1989 (prior to the 1990 budget agreement). They are reproduced from a previous paper by Auerbach, Gokhale, and Kotlikoff (1991), which contains all of the details on the data used to form these tables. The tables indicate, first, each age-sex group's generational account. Second, they provide a decomposition of each age-sex group's generational account into the different present-value taxes and transfers that are netted against each other to form the generational account. Third, at the bottom of each table, they indicate the implied burden on future generations based on our illustrative assumptions that policy toward current generations remains unchanged and that the lifetime bill facing each new future generation is identical except for an adjustment for growth. As discussed below, there are other ways to use generational accounting to document the imbalance in generational policy. Here, we assess the burden on typical members of future generations under the assumption that current generations will be treated no better or worse in future years than can be predicted based on current policy.

In looking at the accounts, one should keep in mind that they are forward-looking; they do not consider net payments that particular generations made in the past. The generational accounts are not total lifetime bills, but rather remaining lifetime bills. This explains why the accounts are positive for young and middle-aged generations, but negative for older generations. Through the rest of their lives, young and middle-aged Americans can expect, on balance, to pay money to the government, whereas older Americans can expect, on balance, to receive money from the government.

Compare, for example, the $176,200 average bill of 40-year-old males with the negative $42,700 average bill of 70-year-old males. Males who are now age 40 can anticipate spending many more years working and paying income and payroll taxes on their labor earnings (the Labor Income Taxes and FICA Taxes columns in tables 1 and 2). While these males will receive some welfare and unemployment benefits in the short run, most of their transfers will come much later from Social Security, including Medicare (the Old Age Survivors and Disability Insurance [OASDI] plus Health Insurance [HI] columns in the tables). The substantial taxes that those now 40 years old will pay over the next 20 or so years have a larger present value than the substantial transfers they will receive during the 20 or so years after they retire. The present value of Social Security retirement and disability benefits for 40-year-old males, which is the transfer component with the largest present value, is $21,900. But this figure is less than a third of their projected average present-value payroll tax payment of $65,100.

For 70-year-old males, the story is quite different: They are generally retired and are already receiving substantial Social Security retirement and Medicare benefits. On average, the present value of the ongoing benefits of these males exceeds the present value of their remaining tax payments. For 70-year-old males, Social Security and Medicare benefits together have a present value of $91,500, while the present value of capital income taxes, which is the tax with the largest present value, is only $29,300.

B. <u>The Relative Burden on Future Generations</u>

Tables 1 and 2 indicate that as of 1989, U.S. fiscal policy was out of generational balance in the sense that the burden on both future male and female generations was about 21 percent larger than that on male and female newborns in 1989. The equal size of the male and female differentials is no accident; this equivalent-percentage treatment of future males and females was assumed for purposes of describing the imbalance in generational policy. What exactly does it mean that future American newborns will pay a larger tab, even after adjusting for growth, than that being handed today's American newborns?

It means that individuals alive today, including today's newborns, aren't slated to pay enough to keep the fiscal burden on future generations from rising.

If we spread the burden proportionately across everyone who comes along in the future, it means that, even after taking growth into account, future generations will all pay 21 percent more than current newborns in net tax payments over their lifetimes. What does "adjusted for growth" mean? Suppose the economy's growth rate of output per worker is 1 percent per year. Then the payment scenario being discussed means that next year's newborn will pay 1 percent more than this year's newborn because of growth and 20 percent more because of the imbalance of fiscal policy. The following year's newborn will pay 2 percent more because of growth and 20 percent more because of the imbalance of policy, and so on.

What if the U.S. government doesn't immediately start requiring successive new generations to pay more — indeed, 21 percent more than the additional amount they will pay because of growth? What if, for example, the government waits 10 years before increasing the lifetime net payments of new generations? Then generational accounting 10 years from now will reveal that the 21 percent figure has grown to 35 percent (not shown in the table). And if the U.S. government waits 20 years to start extracting more from future generations, those born in 2010 and thereafter will face a growth-adjusted burden that is 57 percent larger than that on newborns in 2009. This is the zero-sum nature of generational accounting. If Americans alive now do not pay more, and if the U.S. government does not make those born in the near future pay more, it will have to extract a much more substantial sum from those who are born in years thereafter.

C. The Cost to Current Americans of Correcting the Generational Imbalance in Policy

What would it cost Americans now alive to keep future Americans from paying a bigger share of their lifetime incomes to the government than the share current newborns are scheduled to pay? One way to answer this question is to calculate the size of the immediate and permanent increase in income or other tax rates that would equalize the burden on current and future newborns. For example, an immediate increase in consumption tax rates would make almost everyone who is currently alive pay more, not only those who have just been born.

If the United States chose to raise income tax rates immediately and permanently, the required increase in the average rate would be 5.3 percent, which would raise the average rate from 14.5 percent to 15.3 percent.[4] This assumes that state and local, as well as federal, income taxes would be increased. Simply raising federal income taxes to equalize generational burdens necessitates a 6.5 percent increase in the average federal income tax rate.[5]

If, instead, the United States eliminated the extra burden on future generations by immediately and permanently raising payroll taxes, these taxes would have to rise by 7.8 percent, with the 12.8 percent average tax rate increasing to 13.8 percent.[6] Alternatively, average sales/excise tax rates

4 The average rate here is defined as all federal, state, and local income taxes divided by net national product (NNP). The data are from 1989.

5 The average federal income tax rate is 11.8 percent for 1989. It is measured as federal labor plus capital income taxes divided by NNP.

6 The average payroll tax rate is defined as total federal, state, and local payroll taxes divided by total U.S. labor income. The data are from 1989.

could be immediately and permanently increased by 10.2 percent, from a 10.5 percent rate to an 11.6 percent rate.[7] Finally, if the United States chose to raise capital income taxes immediately and permanently, the average capital income tax rate would climb by 14.3 percent, from a rate of 25.1 percent to a rate of 28.7 percent.[8]

Each of these different methods of achieving generational balance produces different tax receipts and different deficits this year and through time. This is just one more indication that generational balance and budget balance bear no intrinsic relation. The largest increase in immediate annual revenue — $37 billion — would arise in the case of payroll taxation, and the smallest increase — $33 billion — would occur if capital income taxation were used.[9]

Permanently raising average tax rates, regardless of which ones, means that future generations will pay these higher taxes as well. If income taxes

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7 The average sales/excise tax is defined as total federal, state, and local indirect business taxes divided by U.S. personal consumption expenditure. All data used in the calculation are from 1989.

8 The average capital income tax rate is measured as total federal, state, and local capital income tax revenue divided by total U.S. capital income. All data are from 1989.

9 Compared with increasing payroll taxes, increasing capital income taxes makes the current elderly also pay to help correct the generational policy imbalance. For a given amount of additional annual revenue, the present value of the payments of all current generations combined is larger under the capital income tax than under the payroll tax. Raising the capital income tax raises the current elderly's present-value projected net tax payments, but also increases the projected present-value net payments of the current young and middle-aged, who will pay these higher capital income taxes in the future. Thus, one can collect fewer dollars from the capital income tax and still equalize generational burdens because each dollar raised under the capital income tax does double duty in raising the present value of net payments of those currently alive.

are raised to equalize the accounts of current and future newborns, the equalizing value is $76,089. It is $76,350 for the payroll tax, $76,576 for the sales/excise tax, and $75,641 for the capital income tax. Even the largest of these four figures is only 4 percent larger than the $73,716 that today's newborns will pay under current policy. Hence, if individuals currently alive pay a bit more now, one can eliminate the need for future Americans to pay a lot more later.

Table 3 indicates how much more existing and subsequent generations will pay under the four different approaches to equalizing generational burdens. The numbers are present values and are in thousands of dollars. The required payments are not staggeringly large, but neither are they trivial. Consider an increase in the income tax. For a middle-aged female, the increase in her generational account is about $2,500. For a middle-aged male, the additional present-value bill averages about $5,300. With the exception of the very old, who pay about $200 more, raising the income tax would represent a substantial loss to those currently alive, with the biggest absolute burden falling on baby boomers. However, compared with the costs to current generations, the gains to future generations are quite substantial. By paying for more of the government's spending, current generations would, in the case of an income tax increase, lower the projected burdens on future males (females) by a growth-adjusted $13,500 ($6,600).

The additional burden placed on different generations can vary considerably when one type of tax increase is substituted by another. For example, under the payroll tax increase, 70-year-old males pay only $300 more on average, while under the capital income tax increase, they pay an additional $2,700. The choice of taxes also determines how the burden is split between males and females. If the sales/excise tax is increased, the additional bills faced by current females of a particular age will be as large or almost as large as those faced by current males of the same age. The reason is that U.S. females pay proportionately more in sales and excise taxes than they do in income and payroll taxes.

D. Using Generational Accounts — A Word of Caution

The usefulness of generational accounts is in comparing their values before and after a particular policy change and in comparing the burden on future generations (the last row in tables 1-4) with the burden on the youngest members of current generations, namely newborns. These comparisons, rather than the initial level of the accounts, should be the focus of attention.

The reason to focus on policy-induced changes in the accounts and on comparisons of future generations with current newborns is that such analyses are not sensitive to the choice of labels attached to government receipts and payments. In contrast, the initial levels of the accounts (with the exception of the accounts for newborns and future generations) are sensitive to the choice of accounting labels. To understand this point, consider again the negative $42,700 account of 70-year-old males. Now think how much larger (less negative) that number would be had the government historically called Social Security contributions "loans" rather than "taxes" and Social Security benefits "repayment of principal plus interest on the loans" plus an "old-age tax," where the old-age tax adjusts for the fact that benefits may not precisely equal principal plus interest on contributions. With this alternative language, the 70-year-old's generational account today would be a lot larger (a lot less negative); it would exclude the $61,900 in present value of

Social Security (OASDI) benefits indicated in table 1, and it would include the present value of the old-age tax.

E. Using Generational Accounting to Detect Generational Policy

Table 4 considers four hypothetical policies, each of which has a significant impact on the U.S. generational distribution of fiscal burdens. The first of these policies is the only one that alters the U.S. federal deficit. This policy (reported in column 1) is a five-year, 20 percent reduction in the average federal income tax rate. At the end of the tax cut, the tax rate is increased above its initial value in order to maintain constant the ratio of U.S. debt (including the newly accumulated government debt) to GNP; i.e., the tax rate increase is sufficient to cover the product of the interest rate less the growth rate, times the additional accumulated stock of government debt.

The second policy, reported in column 2, is an immediate and permanent 20 percent increase in Social Security retirement and disability benefits financed on a pay-as-you-go basis by increases in payroll taxes. The third policy, reported in column 3, involves an equal revenue switch in the tax structure. Specifically, payroll taxes are reduced immediately and permanently by 30 percent, and the reduced revenue is made up by increases in consumption taxes, which, in the U.S. context, means increases in sales and excise taxes.

The fourth policy, reported in column 4, involves the elimination of U.S. investment incentives. By this we mean a present-value, revenue-neutral equalization of effective tax rates on assets of different vintages. To understand how this policy alters the generational accounts, we need to clarify the treatment of investment incentives in our generational accounting.

Specifically, the reduction in the market value of existing capital, arising from the availability of investment incentives for new capital, is treated as a one-time tax paid by the current owners of this existing capital; i.e., rather than valuing this capital at market prices, we value it at replacement cost less a tax discount. The elimination of investment incentives is then treated as 1) the elimination of this one-time tax discount (as opposed to treating it/labeling it as a capital gain) and 2) an increase in the effective capital income tax rate necessary to offset, in present value, this one-time windfall. In the first year, this requires an increase in aggregate capital income taxes equal to the product of the interest rate less the growth rate times the initial tax discount on existing capital. Subsequent-year increases in capital income taxes equal the first-year increase times the appropriate growth factor.

The results of these policy experiments point out several issues. First, the magnitude and pattern of intergenerational redistribution bears no necessary relation to the reported deficit. The tax-cut policy of column 1 generates more than $750 billion of official debt, but does substantially less damage to the young and future generations than the pay-as-you-go Social Security benefit increase in column 2, which leads to zero increase in official debt. For instance, under the tax-cut policy, 20-year-old males lose, on average, $2,200 in present value. Under the Social Security benefit increase policy, they lose $5,500, which is more than two-and-a-half times as much.

Second, some policies that redistribute to current older generations do so primarily to the detriment of current young generations, but do not affect future generations by much. Column 4, involving the elimination of investment incentives, illustrates this point. This policy does most of its damage to generations who are now young; the increased payment required of future males is only $200, while 20-year-old males lose $2,300. Of course, policies that just redistribute from the current young to the current elderly could also end up hurting future generations if these policies are reactivated during the years such generations are young.

Third, by using generational policies that don't show up in the official deficit, one can easily offset the generational impact of policies that do. For example, the generational impacts of the tax cut of column 1 can be overcome by running the reverse of the policy in column 4, i.e., by increasing, rather than decreasing, investment incentives and thereby reversing the sign of all the numbers in column 4.

Fourth, since changes in consumption decisions depend, according to the life-cycle model, on changes in each generation's total projected lifetime payments, generational accounting such as that in table 4 indicates the true stimulus to national consumption of policy changes. In contrast, as the examples in table 4 show, the deficit need bear no relationship to the underlying stimulus to consumption. Thus, generational accounting, rather than the deficit, provides the proper guide for stabilizing the economy and assessing the impact of policy on saving.

IV. Using Generational Accounting to Assess Policy-Induced Changes in Saving

Changes in national saving can be traced to changes in national income and in national consumption. While additional work is needed to connect changes in generational accounts to changes in national income, we are able to assess the income effects of policy changes on national consumption by multiplying changes in the generational accounts by generation-specific propensities to consume. This analysis abstracts from the incentive effects arising from policy changes. Certainly, incentive effects can be quite important for labor supply decisions as well as for intertemporal consumption choice. Such incentive effects would, in our framework, be captured as changes in the propensities to work and consume from lifetime resources. Unfortunately, at this time there are available only initial estimates of propensities to consume by age and sex, but no indication of how these propensities respond to changes in the structure of incentives. Another caveat involves the issue of uncertainty. The appropriate propensities to consume in the case of policies that accentuate economic uncertainty will, presumably, be smaller than those in the case of policies that reduce uncertainty. In this analysis we ignore both incentive issues and uncertainty.

The age- and sex-specific consumption propensities used here were calculated based on data compiled in Abel, Bernheim, and Kotlikoff (1991). Their study uses the U.S. Bureau of Labor Statistics' Consumer Expenditure Survey for the years 1981 to 1986 to determine households' propensities to consume out of household lifetime income according to the age of the household head. In the course of that study, the authors estimated the human wealth, nonhuman wealth, Social Security wealth, and pension wealth of surveyed adults.

For purposes of this study, we formed the average ratio of consumption to lifetime income (the sum of human wealth, nonhuman wealth, Social Security wealth, and pension wealth) by age and sex for adult generations. In these calculations, we ascribe to parents the consumption expenditures of their children living at home. In the case of married parents, we ascribe half of the children's consumption to the husband and half to the wife. For purposes of this calculation, we exclude observations on households in which individuals other than children reside with the household head. The consumption expenditures that are identifiably those of the husband (or wife) are ascribed to that individual. The remaining household consumption expenditures are divided evenly between the husband and wife.

Table 5 reports the weighted-average ratios of consumption to the present value of lifetime income by age and sex arising between the fifth and sixth deciles of the distribution of lifetime income. We use these consumption propensities to determine the first-year impact on U.S. consumption and saving of the four hypothetical policies of table 4. Specifically, for each policy we multiply the changes in generational accounts for each age-sex group by the number of individuals in that group times the group's consumption propensity. The sum of these numbers across all age-sex groups gives the policy's first-year impact on U.S. consumption. We then recalculate the U.S. net national saving rate for 1989 based on each of the four policies. The actual 1989 U.S. net national saving rate was 3.67 percent. Under the tax-cut policy, the saving rate falls to 3.24 percent. It is 2.76 percent for the pay-as-you-go Social Security policy, 3.73 percent for the shift from payroll to consumption taxation, and 3.44 percent for the elimination of investment incentives.

Of the four hypothetical policies, the 20-percent increase in unfunded Social Security benefits has the largest first-year impact on national saving, reducing the saving rate by almost one quarter. The 0.91 percent initial-year drop in the saving rate is of the same order of magnitude as the saving-rate decline reported in Auerbach and Kotlikoff's (1987) simulation analysis of unfunded Social Security.

In comparison with the saving decline from the Social Security experiment, the decline in national saving arising from the five-year income tax cut is less than half as large. Part of the explanation for the smaller impact is, as indicated above, that the generational impact of this policy is substantially smaller than that of the change in Social Security. The second part of the explanation is that we are considering here only the income effects of these policies on saving; i.e., we are ignoring substitution effects. Finally, the results here ignore general equilibrium changes in factor prices that, when anticipated, could influence even the initial-year impact of policy changes on saving.

As predicted by Summers (1981), a partial shift from wage to explicit consumption taxation does increase the national saving rate, but the increase reported here is modest. The elimination of implicit consumption taxation arising from the removal of investment incentives has a somewhat larger effect on national saving.

V. Conclusion

This paper explores the use of generational accounting in understanding the intergenerational redistribution arising from alternative fiscal policies. It also demonstrates how one can use policy-induced changes in generational accounting to consider the impact of policy changes on national saving. The findings confirm what many economists have long suspected: The fiscal deficit is thoroughly unreliable as a measure either of generational policy or of the policy-induced stimulus to aggregate demand. The findings also suggest that fiscal policies of the type actually conducted by OECD countries in the postwar period could have important effects on OECD national saving rates.

The results discussed here should, however, be viewed as preliminary. Many refinements of generational accounting need to be implemented. In addition, the analysis of average consumption propensities should be improved and extended to the consideration of marginal consumption propensities.

Finally, the sensitivity of the findings to alternative growth- and interest-rate assumptions deserves careful exploration.

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Table 1

The Composition of Male Generational Accounts (r=.06, g=.0075)

Present Values of Receipts and Payments

(thousands of dollars)

		Payments						Receipts					
Generation's Age in 1989	Net Payment	Labor Income Taxes	FICA Taxes	Excise Taxes	Capital Income Taxes	Seigno- rage	Property Taxes	OASDI	HI	AFDC	Welfare General	UI	Food Stamps
0	73.7	24.8	26.5	22.9	9.5	0.0	1.6	4.5	1.1	0.3	4.4	1.0	0.3
5	93.2	31.8	34.0	26.3	12.2	0.1	2.0	5.5	1.5	0.4	4.3	1.2	0.4
10	116.8	40.8	43.6	29.8	15.6	0.1	2.6	6.7	1.9	0.5	4.6	1.6	0.5
15	145.3	52.2	55.8	32.8	20.0	0.1	3.3	8.1	2.4	0.6	5.1	2.0	0.7
20	169.1	61.9	66.2	33.9	24.8	0.1	4.1	9.5	2.9	0.7	5.3	2.4	0.8
25	193.0	70.3	75.1	35.8	32.4	0.1	5.3	12.0	3.8	0.9	5.6	2.6	0.9
30	194.5	69.6	74.4	34.2	38.4	0.1	6.1	14.3	4.6	0.8	5.4	2.3	0.9
35	186.0	65.2	69.7	32.0	43.8	0.0	6.9	17.2	5.7	0.6	5.2	2.0	0.8
40	176.2	60.9	65.1	30.5	49.8	0.0	7.6	21.9	7.4	0.5	5.3	1.8	0.7
45	155.4	54.4	58.1	28.7	54.2	0.0	7.8	29.8	10.0	0.4	5.5	1.5	0.6
50	114.1	42.1	45.0	24.4	52.1	0.0	7.1	37.1	12.4	0.3	5.4	1.1	0.5
55	69.7	31.0	33.2	20.8	48.7	0.0	6.6	47.9	16.0	0.2	5.4	0.7	0.4
60	18.9	20.2	21.5	17.9	44.1	0.0	6.1	62.6	22.0	0.1	5.6	0.3	0.3
65	-31.8	9.1	9.7	14.7	37.0	0.0	5.4	71.2	30.7	0.0	5.6	0.0	0.2
70	-42.7	4.0	4.3	11.9	29.3	0.0	4.5	61.9	29.6	0.0	4.9	0.0	0.2
75	-41.5	1.8	2.0	9.5	22.5	0.0	3.7	48.9	27.9	0.0	4.1	0.0	0.1
80	-35.6	0.6	0.6	7.5	17.2	0.0	3.0	36.9	24.4	0.0	3.0	0.0	0.1
85	-28.2	0.0	0.0	6.1	14.3	0.0	2.4	28.2	20.9	0.0	1.8	0.0	0.1
90	-1.5	0.0	0.0	1.2	6.7	0.0	0.5	5.4	4.2	0.0	0.2	0.0	0.0
Future Generations	89.5												

Source: Authors' calculations

Table 2

The Composition of Female Generational Accounts (r=.06, g=.0075)

Present Values of Receipts and Payments

(thousands of dollars)

		Payments						Receipts					
Generation's Age in 1989	Net Payment	Labor Income Taxes	FICA Taxes	Excise Taxes	Capital Income Taxes	Seigno-rage	Property Taxes	OASDI	HI	Welfare AFDC	Welfare General	UI	Food Stamps
0	36.4	14.0	14.9	20.2	3.5	0.0	2.1	5.0	1.5	2.3	7.8	0.4	1.3
5	46.5	17.7	18.9	23.0	4.5	0.0	2.6	6.1	1.9	2.9	7.2	0.6	1.7
10	60.4	23.3	24.9	27.2	5.9	0.1	3.5	7.5	2.5	3.8	7.8	0.7	2.2
15	70.7	28.1	30.1	29.0	7.2	0.1	4.2	8.6	3.0	4.6	8.2	0.9	2.6
20	85.5	34.8	37.2	32.2	9.3	0.0	5.4	10.9	3.9	5.2	9.2	1.1	3.3
25	91.0	36.3	38.8	33.2	11.7	0.0	6.5	13.1	4.8	4.5	9.0	1.1	3.0
30	90.9	35.1	37.5	33.1	14.9	0.0	7.4	15.7	6.1	3.5	8.5	1.0	2.4
35	86.9	32.9	35.2	32.1	18.3	0.0	8.1	18.6	7.7	2.5	8.2	0.9	1.9
40	78.2	29.7	31.7	30.1	21.4	0.0	8.6	21.9	9.8	1.7	7.8	0.7	1.4
45	62.9	25.4	27.2	27.4	23.8	0.0	8.9	27.0	12.6	1.0	7.6	0.6	1.0
50	41.0	20.4	21.8	24.2	25.0	0.0	8.9	34.0	16.3	0.6	7.3	0.4	0.7
55	11.7	14.9	15.9	20.8	24.9	0.0	8.7	43.9	21.3	0.2	7.2	0.3	0.5
60	-22.5	9.3	9.9	17.4	23.4	0.0	8.2	55.1	27.8	0.0	7.2	0.2	0.4
65	-53.7	4.8	5.1	14.2	20.8	0.0	7.6	61.2	37.4	0.0	7.2	0.1	0.4
70	-60.2	2.0	2.2	11.5	17.3	0.0	6.9	56.5	36.8	0.0	6.5	0.0	0.3
75	-57.9	0.7	0.7	9.1	13.2	0.0	6.0	47.4	34.5	0.0	5.5	0.0	0.3
80	-50.8	0.0	0.0	7.2	8.8	0.0	5.1	37.4	29.9	0.0	4.5	0.0	0.2
85	-42.7	0.0	0.0	5.8	4.5	0.0	4.2	28.7	24.7	0.0	3.6	0.0	0.2
90	-7.4	0.0	0.0	1.0	0.4	0.0	0.7	4.7	4.2	0.0	0.6	0.0	0.0
Future Generations	44.2												

Source: Authors' calculations

Table 3

Additional Present Value of Net Payments Needed
to Equalize Generational Burdens

(thousands of dollars)

	Tax to Be Increased			
	Income Tax	Payroll Tax	Sales/Excise Tax	Capital Income Tax
Males				
Ages				
0	1.8	2.1	2.3	1.4
10	3.0	3.4	3.0	2.3
20	4.5	5.0	3.3	3.5
30	5.4	5.5	3.3	5.1
40	5.2	4.7	2.9	6.1
50	4.2	3.2	2.3	5.9
60	2.6	1.4	1.7	4.6
70	1.2	.3	1.1	2.7
80	.5	0	.6	1.4
Future Generations	-13.5	-13.1	-12.9	-13.9
Females				
Ages				
0	1.0	1.2	2.1	.5
10	1.6	2.0	2.7	.9
20	2.2	2.8	3.1	1.3
30	2.5	2.7	3.2	2.0
40	2.5	2.3	2.9	2.8
50	2.1	1.5	2.3	3.0
60	1.3	.6	1.6	2.5
70	.7	.2	1.1	1.7
80	.2	0	.6	.6
Future Generations	-6.6	-6.3	-5.5	-7.0

Source: Authors' calculations

Table 4

Changes in Generational Accounts Arising from Four Hypothetical Policies

(thousands of dollars)

	5 Year Tax Cut	20 Percent Social Security Benefit Increase	Shifting from Payroll to Sales and Excise Taxes	Eliminating Investment Incentives
Males				
Ages				
0	1.9	2.7	1.0	.9
10	3.2	3.9	-1.3	1.5
20	2.2	5.5	-6.5	2.3
30	-.3	5.2	-8.8	2.1
40	-2.7	2.4	-7.5	.2
50	-4.4	-2.7	-3.8	-2.5
60	-5.0	-10.2	.7	-4.7
70	-2.6	-11.9	3.4	-5.0
80	-1.6	-7.3	2.8	-4.0
Future Generations	1.9	3.1	.4	.2
Females				
Ages				
0	1.0	1.0	3.5	.4
10	1.7	1.5	3.2	.6
20	.7	1.9	1.5	.8
30	-.2	.9	1.8	1.2
40	-1.0	-1.0	2.4	.6
50	-1.9	-4.5	3.1	-.5
60	-2.1	-10.0	3.9	-1.8
70	-1.5	-11.0	3.9	-2.4
80	-.9	-7.5	2.8	-2.4
Future Generations	1.0	1.1	3.8	.1

Source: Authors' calculations

Table 5

Consumption Propensities by Age and Sex

Age	Males	Females
18	.029	.065
20	.032	.066
25	.038	.070
30	.044	.073
35	.050	.077
40	.055	.080
45	.061	.084
50	.067	.087
55	.073	.091
60	.079	.094
65	.085	.097
70	.091	.101
75	.097	.104
80+	.108	.111

Source: Authors' calculations