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Generational Accounting: A New Approach to Understanding the Effects of Fiscal Policy on Saving

Alan. J. Auerbach

University of Pennsylvania, Philadelphia, PA and NBER, Cambridge, MA, USA

Jagadeesh Gokhale

Federal Reserve Bank, Cleveland, OH, USA

Laurence J. Kotlikoff

Boston University and NBER, Cambridge, MA, USA

Abstract

An alternative to deficit accounting is proposed for understanding the government's treatment of current and future generations. The alternative, called generational accounting, is based on the government's intertemporal budget constraint. Generational accounting is used to describe the redistributive and saving impacts of four alternative policies. The findings indicate that the fiscal deficit is thoroughly unreliable as a measure of either generational policy or the policy-induced stimulus to aggregate demand. The findings also suggest that fiscal policies that redistribute across generations can have important effects on national saving rates.

I. Introduction

Recent years have witnessed a growing unease with use of the fiscal deficit to gauge the stance of economic policy. Many economists as well as non-economists are questioning whether a single number, that relates primarily to a government's current cash flow, is the kind of measure needed to understand 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 and government assets. They have also pointed out the complete failure of the deficit to record the enormous integenerational redistribution arising from unfunded social security

programs, "revenue-neutral" changes in the tax structure, and government-induced changes in the market values of real and financial assets.

Doubts about the deficit have been accentuated by the demographic transition occurring in most OECD countries. The aging of populations, with its attendant increase in the number of retirees dependent on workers, 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 very 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 opened to question the goal of balancing the federal budget inclusive of social security. If funds for future needs are to be accumulated, should the U.S. not be running a unified federal budget surplus? But if so, how large should the surplus be? And will such surpluses reduce aggregate demand and depress the economy?[1]

This study focuses on an alternative to the deficit — generational accounting — and its use in assessing fiscal policy, particularly the impact of fiscal policy on saving. Generational accounting indicates how changes in policies alter different generations' present expected values of 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 it simply reflects the economically arbitrary labelling of government receipts and payments; see Kotlikoff (1984, 1989) and Auerbach and Kotlikoff (1987).

The paper proceeds in Section II by discussing the use of generational accounting to measure directly generational burdens. Section III reports baseline U.S. generational accounts for 1989. It also examines four

[1] The U.S. 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 occurred formally, it has not precluded the continued calculation of and attention paid to the unified budget deficit. Indeed, in its January 1991 report on the FY91 deficit, the U.S. Congressional Budget Office not only discussed the deficit inclusive of social security, but three other deficits as well. The $166 billion difference between the largest and smallest of these numbers is roughly 3 per cent of predicted 1991 U.S. GNP!

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 affect major redistribution across generations, in the case of three of the four policies the deficit is completely unaffected. Section IV discusses the potential use of generational accounting for assessing the saving impact of fiscal policy. Section V concludes the paper.

II. Generational Accounting

How Should We Measure Generational Policy?

How does economic theory suggest we measure the government's generational policies? The answer is generational accounts. Generational 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 spread over the different generations that show 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 future generations will pay and projecting the number of people who show up in the future, we can determine the growth-adjusted burden (generational account) on those who will be born in the future.

The Simple Mathematics of Generational Accounting[2]

To make the above description of generational accounting more precise, we write the government's intertemporal budget constraint for year t as

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

The first term on the l.h.s. of (1) adds together the present value of the net payments of all generations alive at time t. Net payments refers here to all taxes paid to the government less all transfers received from the government. Government refers here to federal, state and local 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, i.e., those born in year $t-D$. The second term on the l.h.s. of (1) adds together the present value of remaining net payments of future generations. The r.h.s. consists of W_t^g, 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 pretax rate of return in year j.

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

The term $N_{t,k}$ is defined as

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

In expression (2) $\overline{T}_{s,k}$ stands for the projected average net payment to the government made in year s by a member of the generation born in year k. A generation's average net payment in year s refers to 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

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

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 generations'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 r.h.s. 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).

Assessing the Intergenerational Stance of Fiscal Policy

Given the r.h.s. of equation (1) and the first term on the l.h.s. of equation (1), the value of the second term on the r.h.s. of equation (1), which is the present value of payments required of future generations, can be determined as a residual. The amount that needs to be taken from each successive generation to balance the government's intertemporal budget can also be determined, 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 which reflect changes in generational accounts. Hence, knowing how generational accounts change in response to policy is essential to 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.

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 the government's real assets against all its real liabilities (including

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 future transfer payments and future consumption spending and the public's implicit obligations to pay future taxes. It accounts for state and local as well as federal government fiscal policy. In using replacement cost valuation of assets, it accounts for government redistribution through asset markets. Finally, in projecting transfers, spending and taxes through time and the implied burden on future generations, generational accounting deals with the question of economic growth, including growth associated with demographic change.

III. Illustrating Generational Accounting

U.S. Generational Accounts as of 1989

Tables 1 and 2 illustrate generational accounting for the U.S. based on policy as of 1989 (prior to the 1990 budget agreement). These tables are reproduced from Auerbach, Gokhale and Kotlikoff (1991), which, incidentally, contains all the details on the data used to form these tables. The tables include three aspects. First, they report 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. Second, they provide a decomposition of each age–sex group's 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. What we do here is assess the burden on typical members of future generations if current generations are treated, in the future, no better or worse than can be predicted on the basis of current policy.

In looking at the accounts, it should be kept in mind that they are forward looking. They do not consider net payments 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-age generations, but negative for older generations. Through the rest of their lives, young and middle-age Americans can expect, on balance, to pay money to the government, whereas older Americans can expect, on balance, to receive money from the government.

Table 1. *The composition of male generational accounts ($r = 0.06$, $g = 0.0075$). Present values of receipts and payments (thousands of dollars)*

		Payments						Receipts					
										Welfare			
Generation's Age in 1989	Net Payment	Labor Income Taxes	FICA Taxes	Excise Taxes	Capital Income Taxes	Seigno-rage	Property Taxes	OASDI	HI	AFDC	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												

Table 2. *The composition of female generational accounts ($r = 0.06$, $g = 0.0075$). Present values of receipts and payments (thousands of dollars)*

Generation's Age in 1989	Net Payment	Payments						Receipts					
		Labor Income Taxes	FICA Taxes	Excise Taxes	Capital Income Taxes	Seigno-rage	Property Taxes	OASDI	HI	Welfare		UI	Food Stamps
										AFDC	General		
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												

Compare, for example, the $176,200 average bill of 40 year old males with negative $42,700 average bill of 70 year old males. Males aged 40 can anticipate spending many more years working and paying income and payroll taxes on their labor earnings. 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 substantial taxes 40 year-olds will pay over the next 20 or so years have a larger present value than do the substantial transfers they will receive in the following 20 or so years.[3] For 70 year old males, the story is quite different. These males 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 combined 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.

The usefulness of generational accounts is in (1) comparing their values before and after a particular policy change and (2) comparing the burden on future generations (the last row in the tables) with the burden on the youngest members of current generations, i.e., newborns. These comparisons, rather than the initial level of the accounts, should be the focus of the reader's attention.[4]

The Relative Burden on Future Generations

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

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[3] Take the case of 40 year old males. The present value of their social security retirement and disability benefits, which is the transfer component with the largest present value, is $21,900. But this figure is less than a third of 40 year old males' $65,100 projected average present value payroll tax payment.

[4] 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, today's 70 year-old's generational account 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".

female generations was 20 per cent larger than that on 1989 male and female newborns. The equal size of the male and female differentials is no accident; rather, 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 be handed bills that are larger, even after adjusting for growth, than the bills being handed today's American newborns? It means that Americans alive today, including today's newborns, not slated to pay enough to keep the fiscal burden on future generations from rising.

If we spread the burden in a proportionate manner across everybody who comes along in the future it means that, even after taking growth into account, future generations will all pay 20 per cent more than current newborns in net tax payments over their lifetimes. What does "adjusted for growth" mean? Well, suppose the economy's growth rate of output per worker is 1 per cent per year. Then the payment scenario under discussion means that next year's newborn will pay 1 per cent more than this year's newborn because of growth and 20 per cent more because of the imbalance of fiscal policy. The following year's newborn will pay 2 per cent more because of growth and 20 per cent more because of the imbalance of policy. And on and on...

What if the U.S. government does not immediately start requiring successive new generations to pay more — indeed, 20 per cent more than the additional amount they will pay due to growth? What if instead it waits say, 10 years, to start raising the lifetime net payments of new generations? Then when we do generational accounting 10 years from now, we will learn that the 20 per cent figure has grown to 35 per cent (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 57 per cent growth-adjusted larger burden than today's newborns. This is the zero-sum nature of generational accounting. If Americans now alive are not going to pay more, and if the U.S. government is not going to make those coming along in the short term pay more, it will have to extract a much more substantial sum from those coming along in the long term.

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. If the U.S. chose to raise income tax rates, immediately and permanently, the required increase in the average rate would be 5.3 per cent, which would raise the average rate from 14.5 per cent to 15.3 per cent.

Using Generational Accounting to Detect Generational Policy

Table 3 considers four hypothetical policies, each of which has a significant impact on the U.S. generational distribution of fiscal burdens. The first, but only the first, of these policies, alters the U.S. federal deficit. This policy (reported in Column 1) is a five-year, 20 per cent 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 the 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 per cent increase in social security retirement and disability

Table 3.* *Changes in generational accounts arising from four hypothetical policies (thousands of dollars)*

	5 Year Tax Cut	20 Per cent Social Security Benefit Increase	Shifting from Payroll to Sales and Excise Taxes	Eliminating Investment Incentives
Males				
Ages				
0	1.9	2.7	1.0	0.9
10	3.2	3.9	−1.3	1.5
20	2.2	5.5	−6.5	2.3
30	−0.3	5.2	−8.8	2.1
40	−2.7	2.4	−7.5	0.2
50	−4.4	−2.7	−3.8	−2.5
60	−5.0	−10.2	0.7	−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	0.4	0.2
Females				
Ages				
0	1.0	1.0	3.5	0.4
10	1.7	1.5	3.2	0.6
20	0.7	1.9	1.5	0.8
30	−0.2	0.9	1.8	1.2
40	−1.0	−1.0	2.4	0.6
50	−1.9	−4.5	3.1	−0.5
60	−2.1	−10.0	3.9	−1.8
70	−1.5	−11.0	3.9	−2.4
80	−0.9	−7.5	2.8	−2.4
Future Generations	1.0	1.1	3.8	0.1

*Reprinted from Kotlikoff (1992).

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 per cent, and the reduced revenue is made up by increases in consumption taxes, which, in the U.S. context, mean increases in sales and excise taxes.

The fourth policy, reported in Column 4, involves the elimination of U.S. investment incentives. Elimination of investment incentives refers to a present value revenue neutral equalization of effective tax rates of assets of different vintages. To understand how this policy alters the generational accounts, we need to clarify our 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 value this capital at market prices, we valued it at replacement cost less a tax discount. The elimination of investment incentives is then treated as (a) the elimination of this one-time tax discount (as opposed to treating it/labelling it as a capital gain) and (b) 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.

There are several points to make about the results of these policy experiments. First, the magnitude and pattern of integenerational redistribution bears no necessary relation to the reported deficit. The tax cut policy of Column 1 generates over three quarters of a trillion dollars of official debt, but does substantially less damage to young and future generations than the pay-as-you-go social security benefit increase in Column 2, which leads to zero increase in official I.O.U.s. For instance, under the tax cut policy, males aged 20 lose, on average, $2,200 in present value. Under the social security benefit increase policy, they lose $5,500, which is over 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, rather than future generations. Column 4, involving the elimination of investment incentives, illustrates this point. This policy does most of its damage to generations that 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 old could end up hurting future generations as well if these policies are reactivated during the years such generations are young.

Third, by using generational policies that do not show up in the official deficit, it is easy to offset the generational impact of policies that do. For example, the generational impacts of the tax cut of Column 1 could 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 3, indicates the true stimulus to national consumption of policy changes. In contrast, as the examples in Table 3 show, the deficit need bear no relationship to the underlying stimulus to consumption. Thus, generational accounting, rather than the deficit, provides the proper guide to 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 changes in national consumption. While additional work is needed to connnect changes in generational accounts to changes in national income, we are able here 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 intertemporal consumption choice. Such incentive effects would, in our framework, be captured as changes in the propensities to work and consume out of lifetime resources. Unfortunately, at the present 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 which accentuate economic uncertainy 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 using data from the U.S. Bureau of Labor Statistics Consumer Expenditure Survey for the years 1981 through 1986 to determine households' propensities to consume out of household lifetime income by the age of the household head. In this calculation, human wealth, nonhuman

Table 4. *Consumption propensities by age and sex*

Age	Males	Females
18	0.029	0.065
20	0.032	0.066
25	0.038	0.070
30	0.044	0.073
35	0.050	0.077
40	0.055	0.080
45	0.061	0.084
50	0.067	0.087
55	0.073	0.091
60	0.079	0.094
65	0.085	0.097
70	0.091	0.101
75	0.097	0.104
80+	0.108	0.111

wealth, social security wealth and pension wealth of survey adults were estimated.[5]

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 the consumption expenditure on children living at home to their parents. In the case of married parents, we ascribed half of the children's consumption to the husband and half to the wife. For purposes of this calculation, we excluded observations on households in which individuals other than children co-reside with the household head. The consumption expenditures that were identifiably those of the husband (wife) were ascribed to the husband (wife). The remaining household consumption expenditures were divided evenly between the husband and wife.

Table 4 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 used these consumption propensities to determine the first year impact on U.S. consumption and saving of the four hypothetical policies of Table 3.[6] We

[5] This calculation is part of ongoing research of Andrew Abel, Douglas Bernheim and Laurence J. Kotlikoff.

[6] 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 give the policy's first-year impact on U.S. consumption.

then recalculated 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 per cent. Under the tax cut policy the saving rate falls to 3.32 per cent. It is 2.76 per cent for the pay-as-you-go social security policy, 3.73 per cent for the shift from payroll to consumption taxation, and 3.44 per cent for the elimination of investment incentives.

Of the four hypopthetical policies, the 20 per cent 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 per cent point 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 consider here only the income effects of these policies on saving; i.e., we ignore substitution effects. Finally, the results here ignore general equilibrium changes in factor prices which, 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

We have explored the use of generational accounting in understanding the intergenerational redistribution arising from alternative fiscal policies. It has also been demonstrated how policy-induced changes in generational accounting can be used to consider the impact of policy changes on national saving. The findings confirm what many economists have long suspected: that the fiscal deficit is thoroughly unreliable as a measure of either generational policy or 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. There are many refinements of generational accounting that need to be implemented. In addition, the analysis of average consumption pro-

pensities needs to 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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