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The Fiscal Stance in Sweden:
A Generational Accounting Perspective

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Abstract

Generational accounts provide answers to a simple question: how much will future generations have to pay in net taxes as compared to today's generations? In this paper, we review the concept of generational accounting and provide estimates for Sweden, where public finances deteriorated substantially after 1990. Accounts are computed on the basis both of policies in place in September 1994 and of subsequent measures adopted before end-1994. The results suggest that the measures will improve significantly the relative position of future generations, who would nevertheless continue to face a large net tax burden.

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<u>Contents</u>	<u>Page</u>
Summary	iii
I. Introduction	1
II. Public Finances in Sweden	2
1. Deterioration in the public finances	2
2. The outlook: a financial approach	4
III. Generational Accounting in Brief	7
1. Basic framework	7
2. Interpreting generational accounts	9
a. Consumer behavior	10
b. Government consumption	11
c. Who repays the debt?	11
d. Normative prescription	12
e. Financial flows	12
IV. Generational Accounts for Sweden	14
1. Definitions and assumptions	14
a. Net tax payments of living generations	15
b. Government net wealth and government consumption	16
c. Key assumptions	16
2. Base case	17
3. Sensitivity analysis	19
4. Policy scenarios	22
a. Policy scenario excluding pension reforms	22
b. Policy scenario including pension reforms	24
c. Results	25
V. Conclusion	25
Tables	
1. Sweden: General Government Accounts	3
2. Sweden: November 1994 Supplementary Budget Measures	5
3. Sweden: Official Fiscal Adjustment Scenario	6
4. Sweden: Generational Accounts Under the Base Case Scenario	18
5. Sweden: Generational Accounts for Different Countries	20
6. Sweden: Generational Accounts of Males Under Alternative Productivity Growth and Discount Rates	21
7. Sweden: Generational Accounts Under the Policy Scenario, Excluding Impact of Pension Reform	23
8. Sweden: Generational Accounts Under the Policy Scenario, Including Impact of Pension Reform	26
References	28

Summary

In recent years, the concept of generational accounting has emerged as yet another approach to the assessment of fiscal policy and has stirred considerable debate. At one extreme, Kotlikoff recommends that alternative measures of the deficit be discarded and replaced by generational accounts. At the other extreme, some analysts contend that generational accounting provides little useful information because it depends on uncertain projections of the economy and population, on assumptions about key economic variables far into the future, and to some extent on a particular model of consumer behavior. This paper provides a brief review of generational accounting and presents estimates of accounts for Sweden, where there has been a considerable and rapid deterioration of public finances since 1990.

A generational account refers simply to the present value of taxes, net of transfers, that the representative individual of a particular generation can expect to pay over his or her remaining lifetime. Given the government's intertemporal budget constraint and a number of operational--if controversial--assumptions, the net tax burdens of future generations can also be derived. Thus, generational accounting indicates the inter-generational burdens implied by current tax and spending policies.

The paper argues that although the estimates obtained from generational accounting need to be interpreted with great caution, generational accounts can provide useful information on the potential impact of fiscal policy on the lifetime budget constraints of households of different generations. Inevitably, in order to assess the macroeconomic impact of fiscal policies, the analyst armed with estimates of generational accounts must opt for one or another model of consumption. So it is with all indicators of fiscal policy.

Estimates for Sweden suggest that substantial intergenerational burdens have been and remain implicit in the tax and transfer system there. Prior to the introduction of budget consolidation measures in November 1994 and in the budget for fiscal year 1995/96, future generations faced a lifetime net tax burden that was approximately 40 percent higher than that of newborns. When account is taken of medium-term spending cuts and tax increases, as well as future reductions in public old-age pensions, the relative net tax burden on future generations falls significantly, even to a level below that faced by newborns. At the same time, future generations continue to face large lifetime tax burdens.

I. Introduction

It is well known, at least among interested observers of fiscal policy, that there are many definitions of the deficit from which to choose, such as, for instance, the cash deficit, the operational deficit or the primary balance, among others. ^{1/} In recent years, the concept of generational accounting has emerged as yet another approach to the assessment of fiscal policy. Generational accounts, introduced by Kotlikoff (1992) and first implemented by Auerbach, Gokhale, and Kotlikoff (1991), have stirred considerable debate among analysts as to their usefulness in fiscal policymaking and budgetary analysis. At one extreme, Kotlikoff (1992) recommends that alternative measures of the deficit be discarded and replaced by generational accounts. Multinational organizations such as the IMF and the World Bank have been urged particularly strongly by Kotlikoff to calculate and publish regularly generational accounts for as many countries as possible. At the other extreme, some analysts contend that generational accounting provides little useful information because it depends on uncertain projections of the economy and population, assumptions about key economic variables well into the future, and, to some extent, on a particular model of consumer behavior.

Generational accounts have been computed for a growing, albeit still small, number of countries. Accounts for the United States have frequently been published as an addendum to the Budget of the Federal Government. The Governments of Italy and Norway have also estimated generational accounts, and the Government of New Zealand has recently opted to make similar estimates and to consider adding such calculations to the battery of other indicators used there to assess fiscal policy. Finally, Lindbeck and others (1994) recommended strongly that such accounts be computed for Sweden, especially in the light of the significant deterioration of the public finances after 1990.

The purpose of this paper is to present an assessment of the fiscal stance in Sweden using generational accounting. The paper is organized as follows. Section II provides an overview of recent fiscal developments in Sweden, and presents an assessment of the outlook for public finances using one traditional approach, namely, the debt dynamic approach. Section III presents an overview of generational accounting, noting the principal aspects which affect its interpretation. Section IV presents estimates of generational accounts for Sweden based on policies that were in place prior to the September election (which returned the Social Democratic party to power) and then on policies announced by the new government in November 1994. ^{2/} Finally, Section V provides some concluding remarks.

^{1/} See Blejer and Cheasty (1991).

^{2/} Additional budget tightening measures were adopted in January 1995; these have not been incorporated in the estimates reported in this paper.

II. Public Finances in Sweden

1. Deterioration in the public finances

Public finances in Sweden began to deteriorate rapidly around the beginning of the decade (Table 1). In 1989, the general government--central government, local governments, and the social security system--recorded a sizable surplus of about 5 1/2 percent of GDP. By 1993, the general government budget balance was in deficit by over 13 percent of GDP, improving slightly in 1994 when a deficit of 11 3/4 percent of GDP was recorded. Correspondingly, the net wealth of the general government weakened considerably. In 1989, the general government's financial assets exceeded its financial liabilities by some 4.8 percent of GDP; by December 1994, liabilities exceeded assets by 30.5 percent of GDP. Most of this decline reflected the rapid accumulation of gross debt by the central government, which rose from 48 percent of GDP in 1989 to 78 percent at end-1993.

The deterioration of the general government's budgetary condition reflects both a decline in a still high aggregate revenue ratio of 59 percent of GDP and, especially, a surge in spending to 70 percent of GDP, neither trend explained entirely by the weakening of economic activity. ^{1/} Most of the increase in the share of public spending in Sweden has been due to increases in transfer payments, which account for a sizeable portion of household income in Sweden. Transfers to households increased by 5 percentage points of GDP between 1990-94, reaching 25 1/2 percent of GDP in 1994. Approximately half of this increase is attributable to higher aggregate unemployment benefits and spending on labor market programs, with higher pension outlays accounting for an equivalent share of the increase in the spending ratio.

After reaching 65 percent of GDP in 1990, the share of general government revenue declined during most of the period to 1994. A large portion of the decline resulted from an unanticipated loss of revenue due to the 1990-91 tax reform. The reform was intended to be revenue-neutral, with reduced direct tax receipts to be offset by broadened VAT and business tax bases. In the event, the reforms were underfinanced. Further reductions in the aggregate revenue ratio resulted from a lowering of the payroll tax rate by 4 percentage points, which remained high nevertheless at over 33 percent of wages in 1994.

^{1/} Estimates of the share of the cyclical component of the deterioration of the general government budget balance range from under 50 percent to over 60 percent. In either case, a substantial portion is attributable to structural imbalances in Swedish public finances.

Table 1. Sweden: General Government Accounts 1/

	1989	1990	1991	1992	1993	1994 <u>2/</u>
<u>(In billions of Swedish kronor)</u>						
Taxes	510.7	552.0	544.8	528.3	531.6	525.3
Social security contributions	182.3	205.9	218.2	206.8	197.3	212.5
Other	56.8	63.1	60.7	91.6	68.5	72.1
Total revenue	809.4	887.1	896.2	907.6	873.4	883.6
Interest payments	66.2	68.0	74.4	82.3	87.8	112.3
Transfers to households	250.1	277.0	315.2	348.7	374.1	385.4
Other transfers	73.9	80.2	95.8	144.2	161.5	108.8
Consumption	322.6	372.1	394.4	400.3	401.7	409.3
Investment	30.3	32.8	32.7	39.1	41.5	44.5
Total expenditure	743.1	830.2	912.5	1,014.6	1,066.6	1,060.4
Financial savings	66.3	57.0	-16.3	-107.0	-193.3	-176.8
Central Government	38.5	18.9	-57.9	-140.6	-249.7	-215.2
Local authorities	-4.8	-8.3	-1.8	15.9	24.7	9.3
Social security sector	32.6	46.4	43.3	17.7	31.7	29.0
<u>(In percent of GDP)</u>						
Total revenues	65.7	65.2	61.9	63.0	60.3	58.4
Of which: taxes	56.2	55.7	52.7	51.1	50.3	48.8
Total expenditure	60.3	61.0	63.0	70.5	73.6	70.1
Public sector financial saving	5.4	4.2	-1.1	-7.4	-13.3	-11.7

Sources: National Institute of Economic Research; and Ministry of Finance.

1/ National accounts basis. Excluding nonfinancial public enterprises.

2/ Official projection as of September 1994.

2. The outlook: a financial approach

Despite bold and far-reaching reforms adopted by the previous Government, the outlook for public finances over the medium term remained tenuous at best in the Autumn of 1994. 1/ In order to reverse the explosive growth of public debt and to stabilize the debt ratio by 1998, substantial and sizable further measures were required of the new Government that was formed after the elections in September 1994. Thus, the Government proposed in November 1994 a budget savings package (Table 2) intended to reduce the financial deficit by an additional SKr 57 billion, consisting of SKr 36 billion of tax increases, SKr 11 billion of specified spending cuts, and another SKr 14.5 billion of spending reductions that were to be specified in the Fiscal Year 1995/96 budget proposal to be submitted to Parliament in January 1995. The latter would also include an additional SKr 20 billion in further budget consolidation measures. 2/ All of the measures are to be phased in over the period to 1998.

The impacts of the fiscal consolidation package on the public finances and the debt-to-GDP ratio have been simulated by the Ministry of Finance of Sweden under alternative assumptions regarding the growth rate (2 and 3 percent per year) but with similar assumptions about wage and price (under 3 percent annual rate of increase of the CPI) prospects. Both simulations assume that the effective nominal interest rate on public debt declines from 8 percent in 1994 to 6 3/4 percent in 1998. The results of the 3 percent growth rate simulation are shown in Table 3. As can be seen, under the given assumptions and assuming full implementation, the debt ratio would peak in 1996, and fall to 92 percent of GDP in 1998.

Two potentially important questions can be posed regarding the assessment of public finances that is implied by this type of analysis. First, is the time horizon over which the assessment is made sufficiently long to account for latent pressures that can be linked to the aging of the Swedish population? 3/ This would seem to be a critical concern in view of the fact that a sweeping reform of the public pension system (see Section IV) has been approved and is to be phased in over the next two decades. Second, does the financial flow approach on which the traditional debt dynamic analysis is based yield an indicator of the sustainability of fiscal policy sufficiently well-grounded in economic principles? As noted

1/ It is estimated that measures put in place by the previous Government reduced the general government budget deficit by SKr 90 billion (6 percent of GDP) during 1992 and 1994. The Government had also put in place additional reforms that would provide further savings in future years.

2/ Although the aggregate savings have been taken into account in this paper, their specific distribution across transfer categories was not known at the time of writing.

3/ The old-age dependency rate (the ratio of the number of persons aged 65 years and over to the number of persons aged 15-64) is projected to rise from 17 percent in 1994 to 24 percent in 2050.

Table 2. Sweden: November 1994 Supplementary Budget Measures

I. <u>Tax Measures</u>	<u>Full Effect 1/</u> (<u>Billions of kronor</u>) <u>2/</u>
Social Security fees to be raised 3 percentage points to 6.95 percent. The tax will apply only to wages up to 7 1/2 basic amounts (currently SKr 240,000). It will be deductible against the income tax.	14.4
Full taxation of dividends and capital gains for household and small firms at 30 percent. This represents a return to double taxation and a reversal of the 1990 tax reform in this area.	7.5
Partial indexing of the state tax bracket and the standard deduction. (Savings are calculated assuming 3 percent inflation.)	4.4
The top marginal tax rate raised from 50 percent to 55 percent effective 1995-98.	4.2
Other measures	5.8
<u>Total tax measures</u> (As a percent of GDP)	<u>36.3</u> 2.4
II. <u>Spending Measures</u>	
Partial indexation of pension benefits	5.7
Reduced family support	2.3
Reduced support to large families	0.5
Reduced support to single parents	0.8
Reduced agricultural support	0.3
Church tax administration	0.8
Other specified items	0.6
<u>Total specified</u> (November 1994)	<u>11.0</u>
<u>Total spending measures</u> (yet to be specified)	<u>14.5</u>
<u>Total spending measures</u> (As a percent of GDP)	<u>25.5</u> 1.7

Source: Ministry of Finance.

1/ Indicates the annual savings expected in 1998 relative to unchanged policies. Spending totals are on a gross basis and exclude an estimated SKr 4 billion in lost revenue.

2/ 1994/95 prices.

Table 3. Sweden: Official Fiscal Adjustment Scenario

	1994	1995	1996	1997	1998
<hr/>					
	<u>(Percent change)</u>				
<u>Selected economic indicators</u>					
GDP growth	2.5	3.4	3.0	3.0	3.0
Total unemployment rate 1/	13.1	12.4	12.2	11.5	10.6
Effective interest on public debt	8.0	7.4	7.3	7.2	6.7
	<u>(In percent of GDP)</u>				
<u>Public sector</u>					
Financial balance	-11.1	-8.7	-6.0	-4.3	-0.9
Of which:					
Primary balance	-4.1	-2.5	0.9	2.4	5.2
Revenue	58.7	59.1	59.6	60.0	60.5
Expenditure	69.7	67.8	65.6	64.3	61.4
Gross debt	92.2	95.7	96.6	95.8	91.6
Assumed cumulative budget saving <u>measures (in billions of SKr)</u>	--	35	55	75	95

Sources: Ministry of Finance; and Fund staff estimates.

1/ Percent of labor force.

earlier, a principal criticism of this approach made by advocates of generational accounting is that such traditional methods do not and cannot provide such information.

The paper thus turns to a presentation of the stance of fiscal policy in Sweden using generational accounting as a complementary tool for budgetary analysis.

III. Generational Accounting in Brief

1. Basic framework

The status of the traditional government budget balance as the most meaningful measure of the impact of the government's taxation and spending policies on the behavior of economic agents is challenged by some. Rather than focusing on the traditional budget, these analysts argue that what should, in principle, matter is whether the lifetime budget constraints of households currently alive are augmented or reduced by the government's current fiscal policies. The cash deficit provides little information regarding this question. In contrast, generational accounting, by allowing for the variability of transfers and taxes across age and sex groups in the population, helps to assess the potential impact of fiscal policies on household budgets, under admittedly strained assumptions about consumer behavior. ^{1/}

The starting-point of generational accounting is that all individuals, both those alive today and members of future generations, face, under current policy, future streams of taxes and transfers that can be more or less anticipated. A *generational account* simply reflects the present value of the expected net tax payments of a representative individual today, where "net taxes" refers to taxes paid less transfers received. Generational accounts incorporate explicitly the intertemporal budget constraint of the government, which requires that the present value of current and future government consumption be covered by the sum of the net tax payments of all current and future generations and the government's current net wealth. ^{2/}

The key question that generational accounting is aimed at addressing is how much future generations are likely to have to pay in net taxes as compared to generations alive today. Indeed, what differentiates generational accounting from the traditional budget deficit is its emphasis on the intertemporal distribution of fiscal burdens. The sum of the present value of the net taxes of all generations alive today subtracted from the

^{1/} It is frequently argued that the interpretation of generational accounts requires acceptance of the life-cycle model of consumer behavior (Buiter (1995)). This is discussed further below.

^{2/} A "generation" is defined as a group of individuals of the same age and the same sex.

present value of future government consumption equals the new net debt that will accumulate over time. Given an operational assumption typically adopted in generational accounting that repayment of government's existing and new debt is spread (normally evenly, except for an adjustment for real growth) across future generations, it is straightforward to derive an estimate of the accounts of these future generations as well.

Formally, generational accounts are derived from the government's intertemporal budget constraint, which says that at any time t :

Present value of net tax payments of current generations	+	Present value of net tax payments of all future generations	+	Government net wealth at time t	=	Present value of government consumption
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or, symbolically:

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

The first term on the left-hand side of equation (1) is the present value at time t of the net tax payments that all generations alive at that time are contributing to the budget and can be expected to contribute in the future; $s=0$ refers to the two generations born this year, $s=1$ to the generations born last year, $s=2$ to those born two years ago, and so on. The maximum age is D . The second term shows the present value at time t of the net tax payments that all generations born in the future (i.e., at time $t+1$, $t+2$, and so on) may be expected to pay. W_t^g denotes government net financial wealth at time t . G_s is government consumption in year s (starting again at t). All future flows are discounted to year t at the pretax rate of r_j .

The first and second terms of equation (1) are defined more explicitly as:

$$N_{t,k} = \sum_{s=n}^{s=f} \sum_{k=\max(t,k)}^{k=D} T_{s,k}^s \cdot P_{s,k}^s \cdot \prod_{j=t+1}^s \left(\frac{1}{1+r_j} \right) \quad (2)$$

where n = males, f = females, and life expectancy at birth, D , is assumed to be constant over time. $1/T_{s,k}^s$ is the net tax payment at time s of the representative of the generation born at time k . $P_{s,k}^s$ denotes the number of members of the generation born at k and still alive at s . For generations alive at time t , summation starts at time t (because $k < t$); for generations

1/ Survival probabilities do not have to be employed explicitly here, as they are already incorporated implicitly in the population projections used to estimate generational accounts.

born later, the summation starts with the year k (the year of birth). ^{1/}
All figures are in current values, discounted at the rate r_j .

The formulation of equation (1) makes clear the implications of the government budget constraint. For example, a tax reform that lowers the overall tax burden for all living generations will, holding the right-hand side constant, ultimately increase the tax burden on future generations. Conversely, a large enough initial stock of net government wealth can possibly permit a stream of future government consumption without increasing the net tax burden of future generations.

Despite the apparent simplicity of generational accounts, their interpretation has been seen to be problematic. The next section focuses briefly on a number of important aspects of generational accounting that are controversial.

2. Interpreting generational accounts

Kotlikoff (1992) argues that the main virtue of generational accounting is in providing answers to the following questions: "First, if we follow current policy and do not extract more from those generations today, including those who have just been born, how will the treatment of future generations compare with that of current newborns? Second, if we do change policy, which of the different generations now alive and coming in the future will gain and which will lose (and by how much)?" and "Focusing on differences in the accounts either across current and future generations or for the same generation but across policies is the 'appropriate use' of generational accounting." ^{2/}

Despite the enthusiasm with which generational accounting is promoted by its proponents, ^{3/} there is no consensus about replacing the traditional budget deficit with generational accounting. ^{4/} However, many commentators recognize its usefulness as a complement to the traditional budget deficit. Debate continues, however, over the interpretation and, therefore, the usefulness of generational accounts. While it is beyond the scope of this paper to delve fully into all aspects of the debate, it is useful to review here the principal aspects of generational accounting which

^{1/} In this case, account is not taken of the net taxes paid by currently living generations prior to year t .

^{2/} Kotlikoff (1992), pp. 123-24.

^{3/} In characterizing the objective of his book, *Generational Accounting*, Kotlikoff states that its principal message is that there "... is [an] urgent need to switch from an outdated, misleading, and fundamentally noneconomic measure of fiscal policy, namely the budget deficit, to generational accounting."

^{4/} See Muellbauer (1992) and Haveman (1994).

are key to its interpretation. 1/ Some of these are theoretical, while others touch upon method of implementation.

a. Consumer behavior

A number of analysts have asserted that for generational accounts to provide useful additional information (relative to the standard budget deficit), strong assumptions are required about consumer behavior. 2/ In particular, consumers are supposedly required to be rational, forward-looking with perfect foresight, and not subject to liquidity constraints. Ultimately, according to these observers, households must behave according to the life-cycle model of consumption. But as Auerbach et al. (1994) have correctly noted, such assumptions are not needed for computed generational accounts to provide "...descriptions of fiscal burdens placed on different generations...." 3/ Strictly speaking, the computation of generational accounts represents only "accounting," albeit very involved accounting, given the generic question that is being asked: how large a net tax burden is implied by prospective policies for each living generation, and for all future generations? To be sure, the empirical task requires considerable data and the adoption of many assumptions (see below), but this is no different from other simulations into the future.

Nevertheless, the ultimate purpose of any fiscal indicator is to provide an unambiguous sense of a particular aspect (e.g., the sustainability of a budgetary stance, the aggregate demand impact of fiscal policy, etc.) of budgetary policy. 4/ In order to infer an aggregate demand impact from a computed generational account, it is inevitably necessary to make an assumption about the underlying model of consumer behavior. More succinctly, a view about how the estimated net tax affects an individual's lifetime budget constraint is needed before one can begin to interpret the estimates in an economically meaningful way. The degree to which positive private intergenerational transfers may offset negative public intergenerational transfers would also have an important bearing on the interpretation of generational accounts. 5/ Although there is little evidence of strong intergenerational altruism (i.e., private intergenerational transfers tend to be small), 6/ knowing the approximate size of the negative public intergenerational transfer provides a useful indication of the scale of the offsetting private transfers that would be needed.

1/ See Haveman (1994) and Auerbach et al. (1994).

2/ Haveman (1994) and Buiter (1995).

3/ Auerbach et al. (1994), p. 87.

4/ It has been argued that no single indicator can be expected to answer the different questions surrounding fiscal policy, such as "how sustainable is a given budgetary stance" versus "what is the impact of the current government budget on aggregate demand." See Blanchard (1990).

5/ Barro (1974).

6/ Altonji et al. (1992) and Abel and Kotlikoff (1994).

b. Government consumption

Interpretation of the treatment of government consumption in generational accounting is clearly problematic. As typically constructed, generational accounts assume that future generations bear the full cost of current and future government consumption to the extent that it cannot be covered by the net tax payments of living generations. This construction reflects mostly difficulties of empirical implementation. First, as opposed to transfer payments and taxes, there is little *a priori* basis on which to allocate the benefits of government consumption to different generations except, perhaps education. Clearly, however, an improved approach to generational accounting would allow for an allocation of the value of nontransfer outlays across age and sex groups. ^{1/}

Second, interpreting the treatment of government consumption--by implicit assumption--as pure waste (Muellbauer (1992)) is, for all practical purposes, a naive use of generational accounts as indicators of the fiscal stance. Any indicator requires cautious interpretation, and a recognition of its strengths and weaknesses. Nevertheless, to the extent that benefits from government consumption can be assumed to accrue to future generations, it is clearly wrong to interpret the estimated accounts as indicative of a pure burden imposed by current and prospective policies.

It has also been suggested (Haveman (1994)) that generational accounting will overstate the burden on future generations to the extent that it does not take into account government asset purchases financed by tax increases. ^{2/} An increase in taxes paid by living generations to finance the purchase of physical assets should, in principle, be a wash for the utility-maximizing rational consumer, but would appear as an increase in the burden on living generations. While this is empirically unavoidable in most cases due to data limitations (i.e., the frequent inability to properly separate capital from current transactions in government spending), it is not correct conceptually. Properly accounted for, the asset purchase should increase the government's net wealth by the same amount as the stream of higher taxes.

c. Who repays the debt?

A closely related concern relates to the treatment of the accumulated debt of the government. Generational accounting presupposes that, for their remaining lifetime, living generations pay taxes and receive transfers as implied by the projections which underpin the calculations, while all future generations will pay the residual that is necessary to satisfy the government's intertemporal budget constraint, which requires that terminal

^{1/} Analogously, where nontax revenues are important, it would be important to allocate across generations the taxes that are implied.

^{2/} Generational accounting will, however, take into account past purchases of assets, and this is reflected in the initial level of net debt.

government debt be retired. The implication is that individuals with otherwise identical economic characteristics may be treated differently since they belong to different generations. In other words, the rate of payment of future net taxes would become birth-year dependent. As in the case of the treatment of government consumption, the assumption that future generations bear the burden of repayment of the accumulated debt is clearly extreme. Other distributions of the repayment are equally feasible, if not likely. However, the basic message of generational accounting is not affected by the construction of the accounts. Larger generational accounts for future generations (as compared to those of newborns) indicate a need to increase net tax burdens--either for a subsection of future populations or, to a smaller extent, future populations as a whole.

d. Normative prescription

It would be desirable for an indicator of the intergenerational redistribution of fiscal policy to provide a clear normative prescription for budgetary policy. As is true of other indicators, generational accounts provide no obvious and unambiguous guideline. If there is a strong imbalance in the treatment of different generations, what would be a more satisfactory intergenerational transfer: none, or half of what is projected under current policy? 1/ Auerbach et al. (1994) are not clear about this: "Generational accounting describes not only the burdens that fiscal policy places on different generations, but also the changes in policy needed to alter the distribution of such burdens. In the case of U.S. fiscal policy, achieving the goal of stabilizing the lifetime tax rates of future generations of Americans will require a much more significant sacrifice...." 2/ But "stabilization" could be achieved at any level of net tax. Indeed, a situation in which all future generations face the same net taxes could be considered as a kind of stabilization. But should a "zero" net tax burden on all future generations dominate all other policies? Except for the fact that all real world taxes are distortionary and, therefore, result in welfare losses, and that these losses increase disproportionately with the rate and should therefore, be minimized, economic theory provides little guidance regarding the appropriate level of intergenerational transfers.

e. Financial flows

Abstracting from the conceptual considerations discussed above, however, generational accounts are grounded in neoclassical microeconomic theory. In this connection, Kotlikoff (1986) has argued that in contrast to

1/ It is interesting to note, for instance, that the Government of New Zealand has initiated the computation of generational accounts because it is concerned that current fiscal policy may be transferring an excessive amount of resources to future generations. Generational accounting will not necessarily provide an answer to this difficult normative question.

2/ Auerbach et al., (1994), p. 93.

traditional measures of the deficit based on "arbitrary" definitions of "expenditures," "taxes" and "financing," generational accounts provide unambiguous indications of the true economic deficit implicit in the government's policies. ^{1/} Notwithstanding the potential theoretical merits of such critiques as levied by Kotlikoff against the traditional budget deficit, the fact remains that governments running cash deficits must, in the current period, finance these. The estimated net taxes that emerge from generational accounting do not necessarily provide an accurate indication of the financial claims by the government to finance the cash deficit. Moreover, it is well-known that the different options for financing a deficit--by selling bonds domestically, by borrowing abroad, or by monetization of the deficit--will have different macroeconomic effects. In practical terms, governments must determine the optimal means of financing a given cash-flow imbalance. Generational accounting abstracts from these concern, partly, as noted, because of the suggested arbitrariness of "labels" attached to government operations (Kotlikoff (1986)).

Generational accounting may not reflect the financial claims of current government policy. This can be seen from the following illustration. Suppose that current pensions are financed by concurrent payroll taxes (i.e., pensions are financed on a pay-as-you-go basis), and that the government enacts a policy of reducing payroll taxes immediately, to be offset by corresponding reductions in pension benefits beginning with retirements in some future year. Suppose further that these policies are scaled so that this leaves the estimated generational accounts unchanged. At the same time, however, there is an increase in the amount of financial resources the government requires to make current pension payments. Although increased demand for funds by the government could potentially be exactly offset by an increased supply of funds provided by forward-looking, rational households consuming according to the life-cycle model, these are possibly extreme assumptions to make. In any event, financial market participants would have to make their own assessment of the impact of the hypothetical policy on the relative demand for and supply of loanable funds.

Finally, it is worth noting that generational accounting does not take into account general equilibrium effects of fiscal policies or other factors that can be expected to have profound effects on relative prices in the future, such as population aging. As Auerbach and Kotlikoff (1987) have demonstrated, taking into account the dynamic effects of tax and spending policies on labor supply and saving can lead to very different possible macroeconomic effects over time than suggested by static analysis. A fuller appraisal of fiscal policy using generational accounts would, for instance, allow for the fact that the aging of the population, other things equal, could be associated with significant capital deepening as the proportion of workers in the population falls. There could be, in turn, an increase in the wage/rental ratio, and after-tax incomes could be higher than they would

^{1/} See Mackenzie (1993) for a critical assessment of the economic deficit.

otherwise be. ^{1/} Therefore, to the extent that real incomes are typically rising over time, generational accounting will not provide any indication of whether or not the tax burden, as reflected in the ratio of the lifetime taxes to the lifetime incomes of each generation, will rise or fall in the future.

This brief discussion of some of the principal contentious issues surrounding generational accounting is aimed at emphasizing the fact that such accounts need to be interpreted with care. Notwithstanding such a constraint, generational accounting can be very illuminating regarding the age and sex distribution of tax and transfer policies. Moreover, as is true of other measures of fiscal stance, changes in generational accounts, as opposed to their actual levels, may be less controversial. ^{2/}

IV. Generational Accounts for Sweden

This section reports estimates of generational accounts in Sweden. Generational accounts have been computed on the basis of three scenarios. In the first, the base case, accounts reflect tax and spending policies that were in place prior to the elections in September 1994. In the second and third, the "policy" scenarios, the estimated generational accounts include the impacts of some recent fiscal measures on future taxes and transfers, including--in the case of the third scenario--the potential effects of the recently announced pension reform on retirement outlays. The section first describes the data and assumptions used in making the calculations, and then turns to a presentation of the estimates.

1. Definitions and assumptions

The construction of generational accounts requires estimation of the following three basic elements:

- The present value of net tax payments (i.e., generational accounts) of living generations;
- Government net wealth in the base year; and
- The present value of future government consumption.

^{1/} See Solow (1956) and Auerbach et al. (1989).

^{2/} For instance, both the IMF and the OECD assess the stance of fiscal policy by computing changes in the levels of their respective measures of the budget balance adjusted for effects of the business cycle on the budget. See Heller et al. (1986) and Chouraqui et al. (1990).

a. Net tax payments of living generations

The most important ingredients in the calculation of generational accounts of living generations are net tax payments (taxes paid minus transfers received). Following Auerbach et al. (1994), average levels of benefit payments and taxation by age and sex group have been used. Data from the 1991 Income Distribution Survey (IDS) were used to determine per capita transfers and taxes by age and sex in 1991, while the 1992 survey was used for all subsequent years. In each year, 1991 to 1994, per capita taxes and transfers were calibrated to yield actual aggregate spending and revenues, thus incorporating policies implemented during the interim period. For 1995-99, medium-term projections of transfers and taxes were provided by the Ministry of Finance and were distributed across the population by age and sex in each year according to the age and sex pattern observed in the 1992 IDS. These projections reflect policies contained in the April 1994 Economic Policy Statement of the Government. Finally, as regards population projections, the analysis uses the most recent projections to 2050 of the Central Swedish Statistical Office. For subsequent years, the study relies on World Bank projections to the year 2190.

Several different taxes have been distinguished: (1) taxes on personal income paid to the central and local governments, (2) property taxes, (3) wealth and capital income taxes, (4) taxes on income from self-employment, and (5) social security contributions. 1/ The IDS surveys provide average payments by age and sex for each of the first five of these. Age- and sex-specific social security contributions were obtained by distributing aggregate payroll tax receipts across age and sex groups according to the same relative levels of payments as local income taxes. Aggregate value-added and excise taxes were also distributed, using age-consumption patterns from the United States, lacking such information for Sweden. 2/

Per capita transfer payments were available for five items: (1) pensions, (2) sick pay, (3) labor-market assistance, (4) parental allowances, and (5) educational grants. 3/ Data on child allowances, the accommodation allowance, and social assistance were available only by household and had to be distributed across single age and sex groups. For the years beyond 1999, it is assumed that taxes and transfers increase at the same rate as productivity growth.

1/ The survey also provides estimates of a so-called "tax reduction" provided to union members.

2/ We are grateful to Jogadeesh Gokhale for providing the age-consumption profile for the United States.

3/ Only transfers paid on a cash basis have been included in the analysis. No attempt has been made to impute the cash equivalents of benefits in kind (education, childcare, subsidized theater, etc.). These expenditures are included in government consumption.

b. Government net wealth and government consumption

Government net wealth consists of the difference between government financial assets and the gross debt of the general government. In 1991 (the base year of the analysis), the public sector net wealth is estimated to have reached about SKr 68 billion, or about 5 percent of GDP. ^{1/} This figure comprises the consolidated net wealth of the central and local governments and the social security sector.

Estimates of the present value of government consumption are based on actual spending in the years 1991-93, on estimates for 1994, and on the medium-term projections of the Ministry of Finance for the period 1995-99. For purposes of the present analysis, consumption of the general government includes subsidies that are not paid to households, as well as public investment. Beyond 1999, it is assumed that total expenditures on these items increase in line with productivity growth.

c. Key assumptions

Productivity growth: The rate of productivity growth is a critical parameter in generational accounting. Sweden, like many other industrialized countries, experienced a pronounced drop in the growth rate of labor productivity in recent years. On average, labor productivity grew by 1.1 percent annually between 1970 and 1993, as compared with 4 percent between 1950 and 1970 (Lindbeck and others (1994)). For present purposes, the average annual growth of productivity is assumed to remain constant at 1.5 percent per year over the long run. In order to assess the sensitivity of estimated generational accounts to the assumed rate of productivity growth, estimates are also provided based on rates of 1.0 percent and 3.0 percent.

Discount rate: The choice of discount rate is also fundamental to generational accounting. In the present study, it has been assumed that a rate which is midway between the average yield on government bonds and the real rate of return to private sector capital provides a reasonable indicator of society's trade-off between present and future consumption. On this basis, a real discount rate of 4.65 percent has been used, although alternative estimates using 4 percent and 6 percent are also provided. ^{2/}

^{1/} This figure has deteriorated sharply since then, with net debt equal to about 20 percent of GDP in 1993. This deterioration is implicit in the tax and spending levels observed in 1991-93.

^{2/} For Sweden, the average real rate of return on ten-year government bonds has been around 4.1 percent. For the rate of return to private sector capital, the 1980-93 average return to industrial bonds of 5.2 percent was used.

2. Base case

The base case scenario reflects the policies in place as of September 1994. The results from this scenario are presented in Table 4. The accounts are shown in U.S. dollars to facilitate comparisons with estimates for other countries. A negative value means that the generation is projected to receive more in transfers than it will pay in taxes over its remaining lifetime. Conversely, a positive figure implies that the generation will pay more in taxes than it will receive in transfers during the remainder of its life. ^{1/}

Males over age 60 and females over age 57 (not shown) benefit from the current tax/transfer system in Sweden, as reflected in a negative present value of future net taxes. On the other hand, the accounts of newborns are substantially positive; newborn males could be expected to pay \$153,400 in lifetime net taxes on the basis of policies in place in September 1994, while their female counterparts could expect to face a lower but still significant net lifetime tax of \$91,200. The net tax liabilities rise steadily thereafter, reaching a maximum of \$253,000 for males and \$134,400 for females at around the 30 year old cohort. In general, accounts for women are lower than for men. This is due largely to the fact that, although high by international standards, the labor force participation rates of women are lower than those of men (so that lifetime gross taxes are lower), while their pensions are roughly comparable to those of men. Finally, generations yet to be born would have faced substantial net lifetime tax bills, estimated at \$209,700 for males and \$124,700 for females, notwithstanding the budget consolidation measures already adopted by the previous government. These estimated net tax bills are 37 percent higher than those of the youngest living generations.

The reason for which the generational accounts reported in Table 4 are low compared to estimates for other countries lies in the fact that during the past two years or so, the previous government in Sweden, as already noted, adopted policies which, if sustained, reduced significantly the future net tax liability of unborn generations. Moreover, there was no net public debt in Sweden in the base year (1991), the "leverage effect" of subsequent policies is significant. Notwithstanding, the state of public finances in the Autumn of 1994 was such that a very sizable intergenerational burden was still implied by the prevailing mix of tax and spending policies and the accumulation of public debt during the past several years. These estimates thus confirm the widely held view that significant additional policy adjustment was needed to put Swedish public finances on a more sustainable path.

^{1/} The fact that the calculations are based on the remaining lifetimes of persons is important. The estimates do not reflect the lifetime net taxes paid by living generations, some of whom may have paid significantly more or less net taxes during previous years than they are estimated to face during the remainder of their lives.

Table 4. Sweden: Generational Accounts Under the Base Case Scenario

(In thousands of U.S. dollars) 1/

Generation's Age in 1991	<u>Present Value of Net Tax Payments</u>	
	Male	Female
0	153.4	91.2
5	174.1	101.7
10	196.8	112.2
15	218.8	120.8
20	244.3	128.7
25	248.8	132.1
30	253.0	134.4
35	237.0	128.0
40	218.9	122.0
45	177.4	92.9
50	127.8	57.5
55	69.9	19.1
60	1.9	-25.3
65	-18.4	-34.0
70	-43.4	-44.7
75	-34.5	-35.6
80	-22.1	-25.3
85	-11.3	-13.6
Future Generations	209.7	124.7
Percentage difference from account of age zero generation	37.0	37.0

Source: Fund staff estimates.

1/ Based on 1.5 percent per annum rate of productivity growth and discount rate of 4.65 percent.

These results are similar to generational accounts estimated for other countries (Table 5). The Swedish results exhibit the same general pattern as observed in Italy, the United States, and Norway. Thus, the ages at which these accounts reach their maximum, as well as the ages at which they turn negative, are roughly the same. The divergence of the accounts of men and women is smaller in Sweden than elsewhere, however. The difference between the net tax bills of future Swedish generations and newborns (Table 4) might seem to be surprisingly low, given the weak state of public finances in Sweden since the beginning of the decade, ^{1/} and the close to 300 percent difference obtained in the case of Italy. When the generational accounts were calculated on the basis of fiscal policies that were in place in 1991 and 1992, however, virtually identical results to those reported for Italy were obtained; future generations faced at that time net lifetime tax liabilities close to 300 percent greater than those faced by newborns.

3. Sensitivity analysis

In view of the potential sensitivity of the estimates to different assumptions regarding the rate of productivity growth and the discount rate, Table 6 reports the estimated accounts for males under different assumptions. ^{2/} Compared to the base case scenario, the burden imposed on future generations varies substantially depending upon the assumptions made. In general, the higher the discount rate (for a given rate of productivity growth), the lower the generational accounts of future generations. This reflects, of course, the fact that future flows are given much less importance in this case. On the other hand, rising productivity leads to falling relative burdens on future generations.

To understand this result, consider the following. Over their life-cycle, individuals tend to first receive net transfers, then make net tax payments and, when old, again receive net transfers. In these calculations, higher productivity boosts taxes and transfers equally, but, because of discounting, the generational accounts of younger generations are more heavily affected by the increase in the early tax payments than by the increase in the later transfers. ^{3/} For older living generations, the

^{1/} The general government deficit in Sweden reached 7.4 percent of GDP in 1992, and 12.9 percent in 1993.

^{2/} The accounts for females are quantitatively similarly sensitive to changes in assumptions.

^{3/} It is important to emphasize here that in the sensitivity analyses, between 1991 and 1999, taxes, transfers, and public consumption have been made invariant to changes in the assumed level of productivity growth. Hence, only projections of taxes and transfers from the year 2000 and beyond are affected by alternative assumptions. For young generations, the influence of higher net transfers is therefore relatively low and outweighed by the higher (due to higher productivity growth) net tax payments during working years.

Table 5. Sweden: Generational Accounts for Different Countries

(In thousands of U.S. dollars)

Age of Generation in Base Year	<u>Italy (1990) 1/</u>		<u>Norway (1992) 2/</u>		<u>USA (1992) 3/</u>		<u>USA (1992, with reform) 4/</u>	
	Men	Women	Men	Women	Men	Women	Men	Women
0	65.1	14.1	129.9	5.6	76.4	42.9	83.2	45.8
20	203.8	103.9	274.5	53.6	183.0	94.2	194.7	100.1
40	95.5	6.3	218.3	38.9	165.2	65.0	180.3	80.1
60	-142.3	-122.5	-29.6	-81.8	-48.4	-91.2	-35.0	-74.4
80	-64.5	-63.4	-54.6	-59.0	-80.9	-102.6	-77.9	-98.2
Future generation	259.5	56.3	305.4	13.1	202.5	113.8	144.7	79.7
Percentage difference (in percent)	299	299	135	135	165	165	74	74
Base case assumption 5/ (in percent)	5, 1.5		4, 0.75		6, 0.75		6, 0.75	

1/ Franco et al. (1992).

2/ Auerbach et al. (1991).

3/ Budget of the United States Government (1994).

4/ Budget of the United States (1994). The figures include the effects of the Omnibus Budget Reconciliation Act 1993 and the expected impact of a health care system if implemented as proposed by the U.S. Administration.

5/ First figure: real discount rate; second figure: productivity growth.

Table 6. Sweden: Generational Accounts of Males Under Alternative Productivity Growth and Discount Rates

(In thousands of U.S. dollars)

Age	Discount Rate 1/			Productivity Growth 2/		
	4 percent	4.65 percent	6.0 percent	1 percent	1 1/2 percent	3 percent
0	190.9	153.4	99.8	134.7	153.4	230.8
5	211.1	174.1	119.4	155.9	174.3	246.1
10	232.4	196.8	141.9	179.7	196.8	261.5
15	252.2	218.8	165.5	203.6	218.8	274.4
20	274.2	244.3	194.6	231.3	244.3	289.7
25	274.6	248.8	204.6	238.5	248.8	283.2
30	273.8	253.0	215.8	245.5	253.0	276.4
35	252.6	237.0	208.1	232.6	237.0	250.0
40	229.1	218.9	198.9	217.1	218.9	223.0
45	182.6	177.4	166.3	177.7	177.4	175.0
50	128.8	127.8	124.5	129.3	127.8	121.9
55	68.0	69.9	72.4	71.7	69.9	63.6
60	-1.2	1.9	7.1	3.5	1.9	-3.5
65	-21.6	-18.4	-12.9	-17.4	-18.4	-21.9
70	-45.8	-43.7	-38.9	-42.8	-43.7	-45.1
75	-35.9	-34.5	-31.7	-34.3	-34.5	-35.1
80	-22.8	-22.1	-20.8	-22.1	-22.1	-22.1
85	-11.4	-11.3	-10.9	-11.3	-11.3	-11.3
Future generation:	245.0	209.7	160.2	194.2	209.7	273.7
Percentage-difference from account of age zero generation	28.4	36.7	60.3	44.2	36.7	18.6

Source: Fund staff estimates.

1/ Assumes a productivity growth rate of 1 1/2 percent.

2/ Assumes a discount rate of 4.65 percent.

opposite effect occurs; higher productivity increases the present value of their net transfers.

In the case of future generations, two influences are at work. On the one hand, their net tax payments rise because the debt burden inherited from living generations rises with higher productivity. On the other hand, with higher productivity, absolute net tax payments for future generations rise more rapidly. ^{1/} As in the accounts estimated by Franco et al. (1992), this double-edged influence can be seen by the fact that, with higher productivity, the absolute level of the generational accounts of future generations rises, whereas the relative burden--measured as the percentage difference between the accounts of newborns and future generations--falls.

As noted earlier, generational accounting is especially useful in assessing the impact of changes in tax and transfer policies when these affect persons of different ages in different ways. Thus, accounts have also been calculated incorporating a number of the policies most recently introduced by the Government in Sweden.

4. Policy scenarios

Two policy scenarios have been considered. In the first, account is taken of all the measures noted in Section II and, thus, that had been announced as of November 1994. In the second scenario, the estimated generational accounts also take into account the projected levels of old-age pensions implied by the recent pension reform, a brief description of which is provided below.

a. Policy scenario excluding pension reforms

As noted, under this scenario, account is taken of all the measures reported in Table 2. All per capita levels of transfers and taxes have been scaled to accord with the aggregate levels projected to 1998 by the authorities in Sweden. Government consumption has also been adjusted in each year to reflect official projections. Finally, as in the base case, all variables are then assumed to increase subsequently at the same rate as the rate of productivity growth.

The results are shown in Table 7. As is evident, the consolidation measures put in place by the Government would, if sustained, have a substantial impact on the intergenerational burden implied by Sweden's tax-transfer system. The program itself is fairly ambitious. When implemented fully as proposed, the tax increases and expenditure cuts amount to approximately 4 percent of GDP. By raising the net taxes to be paid by living generations, the net tax burden that would be transferred to future generations would be lowered substantially. Future male and female

^{1/} Recall that the account of generation $t+1$ is equal to the account of the generation born in year t augmented by productivity growth.

Table 7. Sweden: Generational Accounts Under the Policy Scenario,
Excluding Impact of Pension Reform

(In thousands of U.S. dollars) 1/

Generation's Age in 1991	<u>Present Value of Net Tax Payments</u>	
	Male	Female
0	177.7	110.7
5	201.9	123.8
10	228.0	136.8
15	253.8	148.0
20	279.9	155.6
25	285.6	159.5
30	289.5	161.4
35	272.9	154.5
40	253.5	147.8
45	209.9	117.0
50	158.0	79.5
55	97.3	38.8
60	23.0	-9.5
65	-1.9	-21.3
70	-32.8	-35.5
75	-29.4	-29.8
80	-20.3	-22.0
85	-14.4	-13.8
Future Generations	159.4	99.2
Percentage difference from account of age zero generation	-10.0	-10.0

Source: Fund staff estimates.

1/ Based on 1.5 percent per annum rate of productivity growth and discount rate of 4.65 percent.

generations would nevertheless face large net tax bills of \$159,400 and \$99,200, respectively.

b. Policy scenario including pension reform

Although not formally part of the recent policy package, the reform of the old-age pension system is expected to affect significantly the level of pension outlays during the next half century. 1/ It is therefore important that this be taken into consideration in the recalculation of generational accounts. The main elements of the reform are as follows. The existing pension system, consisting of the basic pension (*folkpension*), the earnings-related ATP (*Allmäntilläggspension*) pension, and various pension supplements, is to be replaced by a single, albeit multi-tiered, pension. The contribution rate will be set at 18.5 percent of all income that carries pension rights. Of this contribution rate, 16.5 percentage points are to be used to pay current pensions on an ongoing basis (i.e., on a pay-as-you-go basis), while the remaining 2 percentage points are to be invested in individual capitalization accounts, the so-called *premium reserve account*. The latter component thus constitutes the "funded" element. In addition, the reformed system will provide a *guarantee pension*, which is to be equal to 2.1 base amounts, to those persons who will have accrued too few pension credits to assure an acceptable standard of living. 2/

Pensions, which are to be based on lifetime contributions, are to be paid up to 7.5 base amounts. The aim is to make the system more--albeit not wholly--actuarially fair. Pensions are to rise annually by the rate of inflation plus the amount of change in a so-called "Economic Adjustment Index," which is equal to the deviation of real wage growth from a predetermined norm. Although the norm had not been agreed at the time of writing, projections of pension outlays were made by authorities on the assumption that the index would be set at 1.5 percent. Thus, full inflation protection is assured if real wage growth equals the norm. When real wage growth exceeds or falls short of the norm, the real value of pensions is raised or lowered, respectively.

The new system is to be implemented gradually over the next two decades. Persons born in 1934 or earlier are to receive their old-age pensions from the old system, while the pensions of persons born in 1954 or later are to come entirely from the reformed scheme; persons born between

1/ Pension reform has been under consideration for many years in Sweden. In June 1994, the Parliament approved the principles on which the reform is to be founded. For a detailed description of the reform, see Ministry of Health and Social Affairs (1994). See also Lachman and others (1995), Chapter 5.

2/ The "base amount" is the basic accounting unit of public pensions and much of the rest of the social insurance system. The base amount is typically adjusted annually for changes in consumer prices, and currently equals SKr 35,200.

1935 and 1953 are to be phased into the new scheme during the transitional period. In general, the reformed system is expected to result in a considerable reduction in aggregate pension outlays in the years ahead, especially after 2010. This policy scenario incorporates projections for total pension outlays to 2050 provided by the Ministry of Health and Social Affairs. As in the base case, the projections assume annual real wage growth of 1.5 percent. For the years beyond 2050, it is assumed that average pensions will increase with productivity growth.

c. Results

The results obtained from incorporation of the pension reform are presented in Table 8. As can be seen, the substantial reduction in pensions implied by the reform would improve even further the generational accounts of future generations. The improvement in the generational accounts of unborn cohorts comes at the expense, of course, of reduced net lifetime transfers to living generations. In fact, if sustained, the policies would result, over the very long run (and as in the previous policy scenario), in a lower net tax burden on future generations than on newborns today. The net tax burden would still be very large, however. The size of the impact varies both by sex and age, given the composition of the measures that have been taken, and the length of time remaining in the lifetimes of each cohort.

V. Conclusion

The purpose of this paper has been to present an assessment of the stance of fiscal policy in Sweden using generational accounting, which provides an alternative approach to the more standard methods used by analysts. A less obvious objective has also been to determine the extent to which standard and widely available spreadsheet software could be utilized to compute such accounts, given the extraordinary data requirements. ^{1/}

For a number of years, many analysts have on occasion considered the long-run implications of various government programs, especially public pensions and health care. Typically, this has been done by simulating the paths of spending and of earmarked revenues, taking into account the effects of demographic projections and other factors such as program maturation and, for instance, anticipated changes in labor force participation rates. Armed with such simulations, analysts are able to alert policymakers of structural imbalances that may not necessarily be evident in the current period or the near term. This type of empirical analysis, when utilized diligently and with care, can help shape early adjustments to future spending and tax policies to ensure that fiscal policy remains on a sustainable path.

^{1/} Spreadsheets and an accompanying manual are available selectively upon request. These spreadsheets were used by the OECD in a recent study of generational accounts in the G-7 countries.

Table 8. Sweden: Generational Accounts Under the Policy Scenario,
Including Impact of Pension Reform

(In thousands of U.S. dollars) 1/

Generation's Age in 1991	<u>Present Value of Net Tax Payments</u>	
	Male	Female
0	184.8	116.4
5	210.3	130.5
10	237.8	144.4
15	264.8	156.4
20	292.0	164.8
25	298.5	169.1
30	302.8	171.1
35	286.0	164.0
40	266.0	157.0
45	222.0	125.7
50	169.6	87.8
55	107.0	45.7
60	31.1	-3.9
65	3.9	-17.2
70	-29.1	-32.9
75	-27.4	-28.3
80	-20.4	-21.8
85	-14.8	-13.7
Future Generations	141.5	89.2
Percentage difference from account of age zero generation	-23.0	-23.0

Source: Fund staff estimates.

1/ Based on 1.5 percent per annum rate of productivity growth and discount rate of 4.65 percent.

Generational accounting represents an innovative approach to forward-looking analysis of fiscal policy. To be sure, interpretation of the accounts for purposes of macroeconomic policy formulation obliges the user to carefully gauge the reasonableness of the assumptions and the underpinning projections, and, importantly, to opt for one or another model of consumption. Only then can a judgment be made of the economic impact which can be potentially attributed to the estimated generational accounts. In the meantime, a wealth of information will have nevertheless been conveyed by these estimated tax burdens which, however roughly, reflect the age and sex pattern of the government's tax and spending policies. The user is, in the end, more informed than in the absence of such estimates.

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