

GENERATIONAL ACCOUNTING AROUND THE WORLD[†]

Generational Accounting Around the Globe

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Generational accounting is a relatively new method of long-term fiscal planning and analysis. It addresses the following closely related questions. First, how large a fiscal burden does current policy imply for future generations? Second, is fiscal policy sustainable without major additional sacrifices on the part of current or future generations or major cutbacks in government purchases? Third, what alternative policies would suffice to produce *generational balance*, a situation in which future generations face the same fiscal burden as do current generations when adjusted for growth (when measured as a proportion of their lifetime earnings)? Fourth, how would different methods of achieving such balance affect the remaining lifetime fiscal burdens, the *generational accounts*, of those now alive?

Developed less than a decade ago by Alan Auerbach et al. (1991) and Kotlikoff (1992), generational accounting has spread around the globe, from New Zealand to Norway. Much of this accounting is being done at the governmental or multilateral institutional level. The U.S. Federal Reserve, the U.S. Congressional Budget Office, the U.S. Office of Management and Budget, the Bank of Japan, the Bank of England, Her Majesty's Treasury (United Kingdom), the Bundesbank, the Norwegian Ministry of Finance, the Bank of Italy, the New Zealand Treasury, the European Com-

mission,¹ the International Monetary Fund, and the World Bank have been or are currently involved, either directly or indirectly, in generational accounting. Generational accounting has also drawn considerable interest from academic and government economists.²

This paper presents a selection of the latest generational-accounting results for the following 22 countries: Argentina, Australia, Austria, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Thailand, the United Kingdom, and the United States. Many of these findings are reported in Auerbach et al.'s (1999) edited volume comparing generational accounts around the world and Raffelhüschen's (1998) edited volume comparing generational accounts in the European Union.

I. What Is Generational Accounting?

Generational accounts are defined as the present value of *net taxes* (taxes paid minus transfer payments received) that individuals of different age cohorts are expected to pay, under current policy, over their remaining lifetimes. Adding up the generational accounts of all currently living generations gives the collective contribution of those now alive toward paying the government's bills.

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¹ The European Commission has an ongoing project to do generational accounting for European Union member nations under the direction of Raffelhüschen (see Raffelhüschen, 1998).

² David Cutler (1993), Auerbach et al. (1994), Robert Haveman (1994), Congressional Budget Office (1995), Peter Diamond (1996), Willhelm H. Buiter (1997), Hans Fehr and Kotlikoff (1996–1997), Kotlikoff (1997), Daniel Shaviro (1997), Raffelhüschen (1998), and others have debated its merits.

The government's bills refers to the present value of its current and future purchases of goods and services plus its net debt (its financial liabilities minus its financial and real assets, including the value of its public-sector enterprises). Those bills left unpaid by current generations must be paid by future generations. This is the hard message of the *government's intertemporal budget constraint*, the basic building block of modern dynamic analyses of fiscal policy.

This budget constraint can be expressed in a simple equation: $A + B = C + D$, where D is the government's net debt, C is the sum of future government purchases, valued to the present, B is the sum of the generational accounts of those now alive, and A is the sum of the generational accounts of future generations, valued to the present. Given the size of the government's bills, $C + D$, the choice of who will pay is a zero-sum game; the smaller is B , the net payments of those now alive, the larger is A , the net payments of those yet to be born.

The comparison of the generational accounts of current newborns and the growth-adjusted accounts of future newborns provides a precise measure of generational imbalance. The accounts of these two sets of parties are directly comparable because they involve net taxes over entire lifetimes. If future generations face, on a growth-adjusted basis, higher generational accounts than do current newborns, current policy is not only generationally imbalanced, it is also unsustainable. The government cannot continue, over time, to collect the same net taxes (measured as a share of lifetime income) from future generations as it would collect, under current policy, from current newborns without violating the intertemporal budget constraint. The same is true if future generations face a smaller growth-adjusted lifetime net tax burden than do current newborns. However, in this case, generational balance and fiscal sustainability can be achieved by reducing the fiscal burden facing current generations, rather than the other way around.

The calculation of generational imbalance is an informative counterfactual, not a likely policy scenario, because it imposes all requisite fiscal adjustments on those born in the future.

But it delivers a clear message about the need for policy adjustments. Once such a need is established, interest naturally turns to alternative means of achieving generational balance that do not involve foisting all the adjustment on future generations.

II. Generational Accounting versus Deficit Accounting

A critical feature of generational accounting is that the size of the fiscal burden confronting future generations (the term A in $A + B = C + D$) is invariant to the government's fiscal labeling (how it describes its receipts and payments). The same, unfortunately, is not true of the government's official debt. As described in Kotlikoff (1992, 1993), from the perspective of neoclassical economic theory, neither the government's official debt nor its change over time (the deficit) is a well-defined economic concept. Rather these are accounting constructs whose values are entirely dependent on the choice of fiscal vocabulary and bear no intrinsic relationship to any aspect of fiscal policy, including generational policy. In terms of our equation $A + B = C + D$, different choices of fiscal labels alter B and D by equal absolute amounts, leaving C and A unchanged.

To see the vacuity of fiscal labels, consider just three out of the infinite set of alternative ways a government could label its taking \$100 more, measured in present value, in net taxes from a citizen named Nigel. Nigel's remaining lifetime net-tax payments increase by \$100; there is an additional net flow of \$100 to the government from Nigel this year, and no additional net flows from Nigel to the government next year. The government could say this is:

- (i) "a \$100 tax levied this year on Nigel";
- (ii) "an \$800 loan made this year by Nigel to the government less a \$700 transfer payment to Nigel, plus a tax levied next year on Nigel of $\$800(1 + r)$, plus a repayment next year to Nigel of $\$800(1 + r)$ in principle plus interest"; or
- (iii) "A \$5,000,000,000 tax paid this year by Nigel, less a \$4,999,999,900 loan to Nigel this year by the government, plus a

\$4,999,999,900(1 + r) transfer payment next year to Nigel, plus a repayment next year by Nigel of principle and interest of \$4,999,999,900(1 + r).³

(In the last two cases, r is the interest rate.) Compared to case (i)'s language, using the language in the other cases will generate an \$800 larger deficit in case (ii), and a \$4,999,999,900 smaller deficit in case (iii). Although the government's reported deficit is dramatically different depending on how it labels the additional \$100 it gets this year from Nigel, Nigel's economic circumstances are unchanged. Regardless of which language the government uses, it is still getting \$100 more in present value from Nigel in net taxes, and Nigel's own economic resources are, in each case, depressed by \$100. Since Nigel's annual cash flows are the same, alternative choices of language have no impact on the degree to which he is liquidity-constrained in choosing how much to consume and save.³

Unfortunately, the ability to avoid hard policy decisions by manipulating the reported deficit has not escaped politicians around the world. In the United States in the 1980's this practice was christened "smoke and mirrors." It was exemplified by the government's decision first to put the social-security system off budget when it was running deficits, and then to put it on budget when it was running surpluses. In France and Belgium substituting words for deeds was used in selling the assets of state-owned companies to get enough revenue to fall below Maastricht's deficit limit while maintaining these companies' major li-

abilities, their unfunded pension plans. In Germany, the Bundesbank had to prevent the federal government from revaluing its gold stock to meet Maastricht's deficit limit. These and countless other examples are symptomatic of a much deeper problem, namely, that there are no economic fundamentals underlying the deficit, and its use is an utter charade.

III. Generational Imbalances Around the Globe

Table 1 shows four mutually exclusive ways the 22 countries listed above could achieve generational balance. The alternatives are cutting government purchases, cutting government transfer payments, increasing all taxes, and increasing income taxes (corporate as well as personal). Each of these policies is described in terms of the immediate and permanent percentage adjustment needed. The magnitudes of these alternative adjustments provide an indirect measure of countries' generational imbalances.

The four different policies are considered under two definitions of government purchases and transfer payments. Definition A treats education as a government purchase and not as a transfer payment. Definition B does the opposite. Because of space limitations, we focus on definition B.

According to the second column in the table, 13 of the 22 countries need to cut their noneducational government spending by over one-fifth if they want to rely solely on such cuts to achieve generational balance. This group includes the United States and Japan and the three most important members of the European Monetary Union: Germany, France, and Italy. Four of the 13 countries (Austria, Finland, Spain, and Sweden) need to cut their noneducation purchases by more than half, and two countries (Austria and Finland) need to cut this spending by more than two thirds!

Bear in mind that generational accounting is comprehensive with respect to including regional, state, local, and federal levels of government. Therefore, the cuts being considered here are equal proportionate cuts in government spending at all levels. In the United States, where a large proportion of government spending is done at the state and local level, achieving generational balance by just

³ Moreover, the same set of economic incentives Nigel faces for saving or working are provided in all three cases. For example, suppose the government imposes an additional marginal tax rate of t on Nigel's current labor income in order to generate the additional \$100 in revenue measured in present value. In case (i), this would be described as "a tax at rate t on this year's labor earnings." In case (ii), it would be described as "a marginal subsidy at rate $7t$ to this year's labor supply plus a marginal tax on this year's labor supply at rate $8t(1 + r)$ where the payment is due next year." In case (iii), it would be described as "a marginal tax of $50t$ plus a marginal subsidy at rate $49t$ to be paid next year." In each case, the net marginal income from Nigel's earning an additional dollar this year is reduced by t times one dollar.

TABLE 1—INTERNATIONAL COMPARISONS OF
GENERATIONAL ACCOUNTING: ALTERNATIVE WAYS
TO ACHIEVE GENERATIONAL BALANCE

Country	Cut in government purchases		Cut in government transfers	
	A	B	A	B
Argentina	24.6	29.1	16.8	11.0
Australia	8.8	10.2	12.1	9.1
Austria	56.8	76.4	25.0	20.5
Belgium	11.2	12.4	6.0	4.6
Brazil	23.8	26.2	21.3	17.9
Canada	0.0	0.1	0.0	0.1
Denmark	9.9	29.0	4.7	4.5
Finland	47.6	67.6	26.5	21.2
France	17.2	22.2	11.5	9.8
Germany	21.1	25.9	17.6	14.1
Ireland	-2.1	-4.3	-2.5	-4.4
Italy	37.0	49.1	18.0	13.3
Japan	26.0	29.5	28.6	25.3
Netherlands	21.0	28.7	21.4	22.3
New Zealand	-1.0	-1.6	-0.8	-0.6
Norway	11.5	9.9	9.4	8.1
Portugal	7.6	9.8	9.6	7.5
Spain	50.6	62.2	22.5	17.0
Sweden	37.6	50.5	22.6	18.9
Thailand	-38.1	-47.7	-185.1	-114.2
United Kingdom	6.6	9.7	9.6	9.5
United States	18.7	27.0	19.8	20.3
Country	Increase in all taxes		Increase in income tax	
	A	B	A	B
Argentina	10.7	8.4	97.1	75.7
Australia	5.1	4.8	8.5	8.1
Austria	20.1	18.4	60.7	55.6
Belgium	3.7	3.1	11.7	10.0
Brazil	12.4	11.7	78.9	74.0
Canada	0.0	0.1	0.0	0.2
Denmark	3.4	4.0	5.8	6.7
Finland	20.6	19.4	54.1	50.8
France	7.1	6.9	66.0	64.0
Germany	9.5	9.5	29.5	29.5
Ireland	-1.1	-2.1	-2.5	-4.8
Italy	12.4	10.5	33.3	28.2
Japan	15.5	15.5	53.6	53.6
Netherlands	8.5	8.9	14.9	15.6
New Zealand	-0.4	-0.4	-0.8	-0.8
Norway	7.4	6.3	11.3	9.7
Portugal	4.2	4.2	13.3	13.3
Spain	17.4	14.5	53.9	44.9
Sweden	16.1	15.6	42.9	41.9
Thailand	-25.0	-25.0	-81.7	-81.8
United Kingdom	2.6	2.7	9.4	9.5
United States	10.5	10.8	23.8	24.4

Notes: Table entries are percentage adjustments needed to achieve generational balance. In the columns labeled "A," education expenditure is treated as government consumption. In the columns labeled "B," education expenditure is treated as government transfers and distributed by age groups. Sources: Raffelhüschen (1998), Kotlikoff and Willi Leibfritz (1999), and authors' calculations.

cutting federal spending would require that spending be roughly halved. Given U.S. fiscal nomenclature, this means "running" federal surpluses that are more than \$300 billion larger than is currently the case.⁴

Not all countries suffer from generational imbalances. In Ireland, New Zealand, and Thailand, future generations face a smaller fiscal burden, measured on a growth-adjusted basis, than do current ones given the government's current spending projections. Hence, governments in those countries can spend more over time without unduly burdening generations yet to come. There are also several countries in the list, including Canada and the United Kingdom, with zero or moderate generational imbalances as measured by the spending adjustment needed to achieve perfect balance. What explains these tremendous cross-country differences? Fiscal policies and demographics differ dramatically across countries. The United States, for example, suffers from rampant federal health-care spending. Japan's health-care spending is growing less rapidly, but it is aging much more quickly. The United Kingdom has a policy of keeping most transfer payments fixed over time in real terms. Germany is dealing with the ongoing costs of reunification.

One alternative to cutting spending is cutting transfer payments. In Japan, education, health care, social-security benefits, unemployment benefits, disability benefits, and all other transfer payments would need to be immediately and permanently slashed by 25 percent. In the United States, the figure is 20 percent; in Brazil, it is 18 percent; in Germany, it is 14 percent; and in Italy it is 13 percent.

These and similar figures for other countries represent dramatic cuts and would be very unpopular. So too would tax increases. If Japan were to rely exclusively on across-the-board tax hikes, tax rates at all levels of government (regional, state, local, and federal) and of all types (value-added, payroll, corporate income,

⁴ These figures come from Jagadeesh Gokhale et al. (1999), a joint study of the Federal Reserve Bank of Cleveland and The Congressional Budget Office (CBO). They incorporate the latest CBO projections of federal government spending and receipts and, therefore, of federal surpluses.

personal income, excise, sales, property, estate, and gift) would have to rise overnight by more than 15 percent. In Austria and Finland, they would have to rise by more than 18 percent. If these three countries relied solely on income-tax hikes, they would need to raise their income-tax rates by over 50 percent! In France and Argentina, where income-tax bases are relatively small, income-tax rates would have to rise by much larger percentages. The requisite income-tax hikes in the United States and Germany are roughly one-quarter. In contrast, Ireland could cut its income-tax rates by about 5 percent before it needed to worry about overburdening future generations.

The longer countries wait to act, the bigger the adjustment needs to be when action is finally taken. Consider the United Kingdom. It needs an immediate permanent 9.5-percent income-tax hike, if it wants to achieve generational balance through that channel. But if it waits five years, the requisite income-tax hike is 11.1 percent; it is 15.2 percent with a 15-year delay, and 21.0 percent with a 25-year delay.

IV. Conclusion

Generational accounting is being done in a large and growing number of countries around the world. Notwithstanding its shortcomings, generational accounting has four major advantages over deficit accounting: it is forward-looking; it is comprehensive; it poses and answers economic questions; and its answers are invariant to the economically arbitrary choice of fiscal vocabulary.

The findings reported here are shocking. An array of countries, including the United States, Germany, and Japan, have severe generational imbalances. This is true notwithstanding the fact that the United States is currently reporting an official surplus, Germany's reported deficit is within Maastricht limits, and Japan has the lowest reported ratio of net debt to GDP of any of the leading industrialized countries. The imbalances in these and the majority of the other 19 countries considered in this paper place future generations at grave risk. They also augur high future rates of inflation, since printing money is the easiest way politicians have of "meeting" government obligations. Such a policy, if conducted in Western Eu-

rope, would seriously jeopardize the nascent European Monetary Union. For Japan, which is currently in recession, the insistence of the international community that it dramatically loosen its fiscal policy is advice well worth ignoring. Japan, like most countries considered here, needs to get its long-run fiscal house in order, and right away. The longer Japan and the other countries wait, the more severe their generational problems will become.

REFERENCES

- Auerbach, Alan J.; Gokhale, Jagadeesh and Kotlikoff, Laurence J. "Generational Accounts: A Meaningful Alternative to Deficit Accounting," in D. Bradford, ed., *Tax policy and the economy*, Vol. 5. Cambridge, MA: MIT Press, 1991, pp. 55-110.
- _____. "Generational Accounting: A Meaningful Way To Assess Generational Policy." *Journal of Economic Perspectives*, Winter 1994, 8(1), pp. 73-94.
- Auerbach, Alan J.; Kotlikoff, Laurence J. and Leibfritz, Willi, eds. *Generational accounting around the world*. Chicago: University of Chicago Press, 1999 (forthcoming).
- Buiter, Wilhelm H. "Generational Accounts, Aggregate Saving and Intergenerational Distribution." *Economica*, November 1997, 64(256), pp. 605-26.
- Cardarelli, Roberto; Sefton, James and Kotlikoff, Laurence J. "Generational Accounting in the UK." Mimeo, National Institute for Economic and Social Research, London, U.K., 1998.
- Congressional Budget Office. *Who pays and when: An assessment of generational accounting*. Washington, DC: U.S. Government Printing Office, November 1995.
- Cutler, David. "Review of Generational Accounting: Knowing Who Pays, and When, for What We Spend." *National Tax Journal*, March 1993, 46(1), pp. 61-76.
- Diamond, Peter. "Generational Accounts and Generational Balance: An Assessment." *National Tax Journal*, December 1996, 49(4), pp. 597-607.
- Fehr, Hans and Kotlikoff, Laurence J. "Generational Accounting in General Equilibrium." *Finanzarchiv*, 1996-1997, 53(4), pp. 1-27.

- Gokhale, Jagadeesh; Page, Benjamin R. and Sturrock, John R.** "Generational Accounts for the U.S.: An Update," in Alan J. Auerbach, Laurence J. Kotlikoff, and Willi Leibfritz, eds., *Generational accounting around the world*. Chicago: University of Chicago Press, 1999 (forthcoming).
- Haveman, Robert.** "Should Generational Accounts Replace Public Budgets and Deficits?" *Journal of Economic Perspectives*, Winter 1994, 8(1), pp. 95–111.
- Kotlikoff, Laurence J.** *Generational accounting*. New York: Free Press, 1992.
- _____. "From Deficit Delusion to the Fiscal Balance Rule: Looking for a Sensible Way To Describe Fiscal Policy." *Journal of Economics*, Supplement 1993, 7, pp. 17–41.
- _____. "Reply to Diamond's and Cutler's Reviews of Generational Accounting." *National Tax Journal*, June 1997, 50(2), pp. 303–14.
- Kotlikoff, Laurence J. and Leibfritz, Willi.** "An International Comparison of Generational Accounts," in Alan J. Auerbach, Laurence J. Kotlikoff, and Willi Leibfritz, eds., *Generational accounting around the world*. Chicago: University of Chicago Press, 1999 (forthcoming).
- Raffelhüsch, Bernd.** "Aging, Fiscal Policy and Social Insurances: A European Perspective." Mimeo, Albert Ludwigs University of Freiburg, Germany, 1998.
- Shapiro, Daniel.** *Do deficits matter?* Chicago: University of Chicago Press, 1997.