

Generational Accounting and Generational Transfers

David Collard, University of Bath

Generational accounting is a powerful technique, developed relatively recently by Auerbach *et al* (1999), Kotlikoff (1995) and others for measuring the relative fiscal burdens falling upon different generations. In the course of calculating generational accounts, its proponents have uncovered potentially large generational imbalances, which take the form of large increases in taxation for future generations in order to finance generous social security for present generations. They argue that these imbalances are unfair as between generations and should be eliminated. This paper (1) takes an overview of the methodology of generational accounting, (2) notes some of the conclusions from generational accounts so far published, (3) states the advantages and limitations of the approach, (4) assesses its relevance to developing countries and (5) briefly considers simpler demographically based measures.

1. An overview of the methodology

To understand how these accounts are constructed take an extremely simple example. Let there be four overlapping generations (Table 1), the young, the younger working generation, the older working generation and the old¹. The working generations pay taxes to finance childcare and education for the young and state health care and pensions for the old. So, over a lifetime, each cohort pays taxes and receives benefits in cash and kind. The generational account (see Definitions) for each cohort is the present value of the net taxes to be paid over that cohort's remaining lifetime. The old generation (say the retired) are on average net recipients of payments from the state. Their generational account will therefore be negative. The older working generation will be net recipients later on when they come to retire but the present value of these is more than offset by the taxes they are currently paying. The younger working generation, too, will eventually be net recipients but their present value is very small compared with the present value of taxes to be paid over its working lifetime. Both the working groups will have positive generational accounts with the younger working group having the larger account (since their discounted pensions are worth much less). The young are, of course, net recipients but their generational account will be positive if the present value of their expected tax payments is greater than their receipts in childhood (which will normally be the case). To facilitate comparison with Auerbach's work, let us refer to the young generation as "newborns". The crucial calculation is the generational account of a future generation relative to the generational account of a "newborn". If this ratio is significantly greater than one it may be said that the burden on future generations is "unfair".

N_{FG}	Future generation					
N_{NEW}	Current young					
N_{W1}	Younger working					
N_{W2}	Older working					
N_{OLD}	Current old					
	Time period	1	2	3	4	5

Table 1. Overlapping generations

¹ Auerbach *et al.* (1999) in fact worked with up to 19 "generations" in 5 year periods.

This comparison between newborns and “future generations” may seem odd. But the reason for it is quite straightforward. The whole exercise is forward looking, starting from the current period. The generational accounts of people who are already part way through their lives is of interest (see below) but the relevant comparison is one of generational accounts over whole lifetimes. How is the generational account of future generations to be calculated? In the work of Auerbach *et al.* (1999) it emerges as a residual on the assumption that the government’s inter-temporal budget constraint must balance. Thus:

$$\text{Generational account of living generations} \quad N_{OLD} + N_{W2} + N_{W1} + N_{NEW} \quad [1]$$

$$\text{plus generational account of future generations} \quad N_{FG} \quad [2]$$

must equal

$$\text{present value of government consumption} \quad G \quad [3]$$

$$\text{minus government net wealth} \quad W \quad [4]$$

Since [1], [3] and [4] are all known, [2], may be obtained as a residual. The burden of taxation for future generations compared with the burden on newborns is then $\frac{N_{FG}}{N_{NEW}}$. It may be thought

surprising that one is able to calculate a single N_{FG} for whole stream of future generations stretching out to infinity. The reason for this is that expenditure trends are fixed and a constant productivity trend is assumed so that the real burden of taxation is the same over all future generations.

2. Policy conclusions from completed accounts

The impressive volume by Auerbach *et al.* (1999) contains case studies from 17 (mainly developed) countries. Far from being dry technical studies many of them give rise to drastic policy recommendation in order to avoid imposing unfair burdens on future generations. These generally take the form of cuts in government expenditure, cuts in transfer payments or increases in taxation: perhaps “transfer cuts of roughly two-fifths in Italy, one-quarter in Japan, and one-fifth in the United States, the Netherlands and Brazil” (p. 99). They therefore have potentially very serious social and political implications.

The accounts are summarised in Table 2, which is derived from tables 4.2 in the volume. The important figures are in the final column. They show what the life-time taxes paid by future generations will be (on present policies) relative to the taxes paid by “newborns”. The most dramatic example is Japan where the proportional generational imbalance is as high as 170%, i.e., future generations will pay nearly 2.7 times as much yes tax as newborns.

Definitions

Two key concepts are required: the generational account and the inter-temporal budget constraint. The generational account is the present value for a cohort of the net tax it pays over its whole life (its “tax burden”). Thus for any one cohort the generational account may be written:

$$N_{t,k} = \sum_{s=k}^{k+D} T_{s,k} P_{s,k} (1+r)^{-(s-k)}. \quad [1]$$

where $T_{s,k}$ is net tax paid in period s by a generation born in year k , $P_{s,k}$ is the population born in year k surviving into year s , D is the maximum length of life and r is the annual discount rate. Year k will be either the year of birth or, for living generations, the current year t .

The inter-temporal budget constraint says that the sum of all generational accounts must equal the present value of government consumption expenditure minus government net wealth;

$$\sum_{k=t-D}^t N_{t,k} + (1+r)^{-(k-t)} \sum_{k=t+1}^{\infty} N_{t,k} = \sum_{s=t}^{\infty} G_s (1+r)^{-(s-t)} - W_t^g \quad [2]$$

where the left hand side are the generational accounts split between the living and future generations (as above), G is government consumption and W is government net wealth.

Source: A.J. Auerbach and L. Kotlikoff, *The Methodology of Generational Accounting*, chapter 2 in Auerbach *et al.* (1999)

Country	newborns (a)	future generations (b)	absolute generational imbalance (c)	proportional generational imbalance % (d)
United States	86.3	130.4	44.1	51.1
Japan	143.4	386.2	242.8	169.3
Germany	165.0	316.8	151.8	92.0
Italy	114.2	264.8	150.6	131.8
Canada	113.8	114.0	0.2	0.0
Thailand	8.3	1.0	-7.3	-88.0
Australia	79.6	105.2	25.6	32.2
Denmark	84.0	124.0	40.0	46.9
Netherlands	110.0	193.8	83.7	76.0
New Zealand	57.3	55.3	-2.0	-3.4
France	151.5	222.8	71.3	47.1
Norway	106.3	173.5	67.2	63.2
Portugal	61.8	98.7	36.9	59.7
Sweden	184.3	143.5	-40.9	-22.2
Argentina	22.7	36.1	13.4	58.6
Belgium	93.5	147.8	54.2	58.0
Brazil	14.3	27.0	12.7	88.8

Table 2. Generational Accounts, 1995 (thousands of U.S. dollars).²

² Columns (a) and (b) are the net taxes paid by “newborns” and “future generations” as already described. Column (c) is the absolute difference between them and column (d) is column (c) expressed as a percentage of column (a). The fact that the figures given below may not correspond to those in the summary table illustrates that the calculations are quite sensitive to the assumptions made.

It is worth noting policy suggestions for some of the countries concerned.

USA:

Gokale *et al.* (Chapter 21 in Auerbach *et al.*, 1999) provide an update of a previous study based on 1993, which had shown that future generations would have to pay taxes at 84.4% if present policies continued into the future. The figure was intended to shock, as it would, of course, never be politically acceptable. However, the update, based on data from two years later, produced estimates of *only* 49.2% for future generations compared with 28.6% for newborns. This dramatic shift is returned to in section 3.1 (v). The authors nevertheless conclude that “the schedule of such a policy cannot persist. At some point, projected government purchases must fall or scheduled net taxes must rise – if not for living generations, then for future ones” (p. 516).

France:

“The calculations presented in this study indicate that the present system of benefits and taxes, if continuously maintained for current adults, is out of balance in the long run from a generational perspective. The size of the generational imbalance implies that a lack of fiscal policy adjustment will leave future generations of French citizens facing a lifetime net tax burden that is more than one and a half times as large as those confronting current adult generations based on existing policies” (Levy and Doré, Chapter 11 in Auerbach *et al.*, 1999, p.270). Thus the fiscal burden falling on future generations is 96% greater than that falling on “newborns” (i.e., those born in 1995). Suggested policies include: higher employment rates and later retirement for 50-65 year olds; higher participation rates by 60-65 year olds; a 10% cut in transfer payments *or* a 17% reduction in government spending *or* a 7% increase in taxes.

Brazil:

By the mid-90s there was something of a crisis in welfare funding which was being financed by a series of transitory taxes. This was against a background of an ageing population and a declining fertility rate. “The general conclusion is that the actual path of fiscal policies, coupled with the demographic transition, imposes a heavy burden on future generations of Brazilians” (Malvar, Chapter 8 in Auerbach *et al.*, 1999, p. 178). Malvar does not present explicit dependency ratios but notes (his table 8.9) that the burden is extremely sensitive to the fertility rate. Essentially the reforms had forced a redistribution of income towards the elderly. So “this means that *if the current path of fiscal policies prevails in the future*, generations born after 1995 will have to pay much more in taxes and social security contributions throughout their lifetimes, or will receive much less in benefits ... than those born in 1995” (*ibid.* p. 187, italics added). The authors also provide a simulation of the hypothetical case without the 1986 reforms. As expected, this showed a much lower burden on future generations (less than 10%). Suggested policies include: a reduction in government spending by 26% *or* an increase in taxes and social insurance contributions of 12% *or* a reduction in all transfer payments to workers by 18%.

Thailand:

Thailand is one of the few developing countries for which generational accounts have been drawn up and its accounts look very different from most of the others presented. It has had a formal social security system only since 1993 (extended in 1998) and “a long history of extended family relationships in which family members across generations provide help to one another throughout their lifetimes” (Katwani and Krongkaew, Chapter 18 in Auerbach *et al.*, 1999, p. 413). In the mid-1990s the Thai economy was characterised by a young population (approximately 50% being under 25), high rates of economic growth (8%), a low ratio of government spending to GDP and significant conventional fiscal surpluses. The proportion of those over 65 to the 25-64 group was

only a little over 9%. “If current Thais make the remaining lifetime tax payments indicated in these tables, the Thai government will have sufficient resources to provide a very large subsidy to future Thais” (ibid. p. 428). However, this baseline result does not take the 1993 social security reforms into account. Once this is done the tax burden on future generations turns out to be positive. Kotlikoff comments “if we were to balance the burden between currently living” (and future) “generations in the base case, we could permanently lower personal and corporate income taxes, value-added taxes or property taxes by about 70%. Alternatively a reduction of all taxes by 36% would suffice. Would we recommend such a policy? No, particularly given the likely imminent introduction of pay-as-you-go social security by the Thai government” (Kotlikoff, 1995, p.37).

The United Kingdom:

There was no UK study in the Auerbach volume: the first such study was published by Cardarelli *et al.* (2000)³. The projected UK generational imbalance is quite modest compared with those of the US, Japan or Germany, partly because retirement pensions have for some time been indexed to prices rather than earnings and partly because recent prudent fiscal policy has been projected into the future. On the baseline calculation income tax would have to rise by only 5.7% to achieve a generational balance. Even this imbalance would vanish if productivity were to grow by ¼ percent more than the baseline assumption and expenditures were not raised in line with the tax rate.⁴ The authors go on to state “on the other hand, baseline policy...does not achieve generational balance. This suggests that additional fiscal measures will be needed to prevent Britain’s children from paying higher lifetime net tax rates than those now being paid by their parents” (p. F573). With looser policies there would be a much larger shortfall and a 34% tax rise would be required. Agulnik *et al.* (2000) have noted that the proposals in the Green Paper on Pension Reform (DSS 1998) would move generational accounts in the “wrong” direction in that (with policies unaltered) it would raise the additional taxes required from 5.7% to 9.8%.

3. Advantages of the approach.

3.1. Fiscal fairness

The method provides an empirical measure of fiscal fairness across the generations. It predicts the net tax burden falling on future generations compared with newborns, given current policies. If the burden is substantially larger, there is a *prima facie* case for asserting that the policies are “unfair” to future generations.

Comments

- (i) Fairness across the generations is not just a matter of fiscal policy. More generally it is a matter of consumption per head. If economic growth is taking place so that future generations are expected to be considerably richer than we are, we may feel that the burden of generational imbalance is a burden that will not be felt too heavily.
- (ii) Fiscal adjustment is not the only kind of adjustment between generations: some generations are bigger net savers than others and therefore make larger bequests.

³ This was a revised version of Cardarelli *et al.* (1998).

⁴ However, the document also assumes a slowdown in health care spending per beneficiary, an assumption that has to be revised following new health commitments already announced and to be included in the July 2000 Comprehensive Spending Review. This illustrates the sensitivity of (long run) generational accounts to (short run) changes in the political climate.

In principle it is possible that living generations might increase their bequests in such a way as to cancel out any generational imbalance: indeed, on the assumption of “Ricardian Equivalence” they will always do so.⁵ To that extent the generational imbalance will be neutralised. Consider an older generation which is benefiting from a generous pay-as-you-go pensions regime: they could increase their saving, thus enabling the next generation to inherit more and neutralising the threatened imbalance. The importance of Ricardian Equivalence is hotly debated in the literature, as is the bequest motive itself (see Kotlikoff, 1995). However, critics of generational accounting do not need to rely upon Ricardian Equivalence but on the much weaker assumption of a bequest motive. To the extent that a bequest motive exists, generational imbalances will be undone to some degree (Buiter, 1997).

- (iii) Other, though broadly similar, measures are equally possible: for example the permanent decrease in government spending or the permanent increase in taxation that would be required to restore generational imbalance (see Cardarelli *et al.* 2000). Importantly, as the accounts are forward-looking, only the remaining lifetimes of living generations are included (but see Auerbach *et al.* p.496). The standard comparison is of future generations with “newborns” but they could equally well have been compared with, say, the current old generation. Or, *a fortiori*, closely adjacent generations could be compared, for example the old with the older working generation. Hills (1992, 1996) has carried out such an analysis for the UK. He found that most cohorts had balanced generational accounts, though there was evidence that the earliest cohorts studied (from 1905 onwards) had done best.
- (iv) As in many studies across the generations little attention is paid to within-generation fairness. It could happen that reductions in social expenditures, so as to avoid generational imbalances, would impact heavily upon the less well-off. There could then be a trade-off between inter-generational and intra-generational fairness.⁶

3.2. Fiscal sustainability

The proponents of generational accounting insist that generational balance or imbalance is a much more useful measure of fiscal sustainability than is the current fiscal surplus or deficit. Generational accounting takes a long-term view and is based on very explicit assumptions. The current deficit, on the other hand, “is an arbitrary accounting construct with no necessary relationship to the fundamental stance of fiscal policy (Auerbach *et al.* p.10)... The complete lack of any consistent relationship between nations’ generational imbalances and their deficit or debt positions is not surprising given that from a theoretical perspective, there is no intrinsic connection between the two measures” (*ibid.* p.88). It is easy to show that generational imbalance could occur even though the current budget balanced. For example, a generous pension programme could be put in place now, which could not, in the future, be financed at current taxation levels for an ageing population. So the current budget would be balanced even though there was generational imbalance. It is argued

⁵ The so-called Ricardian Equivalence theorem is due to Ricardo (1820). Ricardo argued that the three methods of paying for a war, taxation, borrowing or a funding system (a combination of the two) were equivalent if (altruistic) people intended to make bequests, since they would increase their bequests so as to create an income flow exactly equal to the extra stream of taxation required to finance a loan. Having explained this proposition in one of the most brilliant pieces of sustained argument in the whole literature, Ricardo noted that it would probably not hold in practice.

⁶ In Auerbach *et al.*, a distinction is made between male and female accounts, though Banks *et al.*, (2000) argue that since no account is taken of within-household sharing, women’s taxes are understated and benefits over-stated.

that, in any case, it is always possible to manipulate the current balance by redefining items. The generational account, it is argued, gives a much truer account of fiscal balance and is much less subject to manipulation. Further, because its assumptions are explicit, it is easy to calculate the consequences of changing them: for example productivity growth, population or real interest rates. It is also possible to change assumptions about policy. Some of the gloomier predictions are based upon present policies being carried through into the future. If, instead, policies are modified or abandoned, the consequences can be fed into the model.

Comments

- (i) It is hard to believe that, once accepted by politicians, generational accounts, like current deficits, would not themselves be manipulated (Cutler, 1993).
- (ii) The inter-temporal budget constraint requires that, as a proportion of income, government debt must eventually converge to zero. But repayment of debt can be put off more or indefinitely as long as it is not growing too rapidly: in principle the deficit could continue to be pushed forward into the distant future. Fiscal sustainability does *not* require that existing debt must be repaid by the next few generations.
- (iii) The dependence of generational accounts on long-term assumptions may be a disadvantage as well as an advantage: its assumptions are remarkably rigid (Haveman, 1994). For example, the welfare regime is assumed to stay in place not merely for the current elderly but for “newborns” for the whole of their lives. Future generations then have to pick up the bill. In practice governments are likely to respond to financial and other pressures by changing policy: policy will evolve over time. So the more shocking outcomes might very well not materialise.
- (iv) The “thought experiment” requires forecasts or assumptions about the key variables (productivity growth, interest rates and population growth up to, say 100 years into the future). GA results are very sensitive to the assumptions made about demography, about productivity growth and about discount rates. For example, labour migration into the richer countries could provide taxable income to finance the future elderly, or productivity growth could be much slower than that recently experienced (see the case of Thailand). As for discount rates the central rate used was 5% but cases may be made for using a pure rate of time preference (at around 2%) or a rate near the rate of return (say 9%). A standard response to this type of problem is to carry out a sensitivity analysis and this has indeed been done. Kotlikoff (1997, p. 305) agrees that alternative projections are possible but argues that “each of these scenarios delivers... the same message: unless the U.S. government takes dramatic steps soon, it will leave an enormous tax burden for our children”.
- (v) But the longer-term predictions of generational accounting are remarkably sensitive to relatively short-term changes. Cardarelli *et al.* (2000) note that dramatically different results would follow depending on whether one assumed a tighter or a looser fiscal policy: and Agulnik *et al.*, (2000) show that the Pensions Green Paper of 1998 worsens generational imbalance. Some of the exercises carried out in the early 1990s have already been revised with substantially different outcomes. It is alarming that an allegedly long run, robust, technique should be so sensitive to, for example, the phase of the cycle at which the base calculations are made. At the very least the comparisons should be normalised across the cycle.

3.3. Patterns of life-time allocation

Generational accounts are firmly grounded in economic theory, not just because they obey the government's inter-temporal budget constraint but because they are consistent with the life-cycle hypothesis. Cohorts receive net benefits when young and old and pay net taxes when working. The pattern is similar to lifetime savings: people are net borrowers when young, net savers when working and net dis-savers when old. An advantage of generational accounting is that it makes explicit the allocation of government expenditures across the different age groups.

Comments

- (i) The allocation of benefits to specific age groups is a major part of the generational accounting exercise. Cash benefits are straightforward though even they present some problems, such as the allocation of cash benefits *within* households. The allocation of benefits in kind (mainly health and education) is much more troublesome.
- (ii) The treatment of education is particularly controversial. Indeed, Auerbach *et al.* (1999) generally produce two sets of estimates, one which treats education just as a transfer to the age group concerned (their case B) and the other which treats it as government consumption (their case A). Proportional generational imbalances are substantially lower using the latter method (only one-third in the USA). The authors do not take the radical further step and treat educational expenditures as an investment. Educational expenditure may usefully be seen as part of a generational bargain in which case it is a lifetime income-enhancing transfer, which should not be counted as net cost. Provided that the rate of return on education is greater than the rate of interest educational expenditure reduces the tax burden for all generations.
- (iii) Fairness between living generations is not a major concern of the forward-looking generational accounting literature. But there is no reason in principle why the exercise should not be backward looking. Having carried out such a study for the UK, Hills (1992) found that most cohorts had generational accounts that balanced over their lifetimes, though there was evidence that the earliest cohorts of those studied (from 1905 onwards) had done best. In terms of debates about so-called "welfare generations" e.g., Thomson (in Johnson and Thomson, 1989, 33-56) these comparisons between living generations are at least as interesting as longer inter generational comparisons.
- (iv) It is important that allocations across lifetimes should be as accurate as possible. Banks *et al.* (2000) show that life-cycle allocations based upon cross-section data (such as the *Family Expenditure Survey* or the *General Household Survey*) can be highly misleading when compared with "true" time series data obtained by tracing the same cohorts across a series of *Family Expenditure Surveys*. The patterns for women and for male employment are strikingly different as are those between more and less educated households within the same cohort.
- (v) There is no attempt to allocate government consumption across age groups. As Haveman (1994, p. 100) writes, "a shift in the consumption of public exhaustive expenditures from short-lived activities (like traffic control) to

long-lived capital investment (like education) would have no effect on the generational accounting tabulations”. Similarly only the cost aspects of long-lived but non-revenue yielding items (like pollution reduction) are counted.

- (vi) The theoretical underpinning of the model is the life-cycle hypothesis, which assumes rational individuals allocating resources over their lifetimes in a rational manner. To the extent that households are “liquidity constrained” (Buiter, 1997) the hypothesis is misleading. Kotlikoff (1997) defends the model on the grounds that very few households are myopic or seriously liquidity constrained.

4. Generational accounts and developing countries

Most, though not all, of the generational accounts published so far have been for developed countries but the method also applies in principle to developing countries. However, as well as technical factors, such as the non-availability of data and expertise, there are reasons for considering a different approach.

- The demographics are very different. Many developing countries still have expanding populations and consequently high proportions of young people. The old-age dependency rates, on the other hand, are quite low. Fertility rates are higher than in developed countries and life expectancy is shorter. The effect of a higher proportion of young people will probably be to increase taxes paid by the current generation and reduce the generational accounts (and hence the net burdens) of future generations as the present value of net taxes decreases with age (and becomes negative for the old). Superficially the demographic structure of developing countries makes the introduction of pay-as-you-go schemes much less hazardous in the short term and the reform of existing schemes much less urgent (but see Kotlikoff, 1995).
- A high young-dependency rate generates the “burden” of having to rear and educate the young. Admittedly this should not prove to be a net lifetime burden for the working generation as a positive rate of return to education will increase the earning power of the next generation and therefore permit (though not guarantee) transfers to the then old. Nevertheless it represents a real burden for poor and probably liquidity constrained populations.
- In most developing countries the formal welfare sector is still rather small and most generational transfers will take place within the extended family. The fiscal balance is therefore not likely to dominate the distribution of welfare across the generations. Non-fiscal transfers, consisting of formal and informal bequests, for example, will be much more important. Thus there is much more scope for any fiscal generational redistribution to be offset by informal transfers. Generational accounts tell an even less complete story about generational equity than it does in developed countries.

5. Implicit generational transfers and dependency ratios.

This section proposes a very much simpler (and technically cruder) way of comparing burdens across the generations. Much of generational accounting relates to demographic factors. These same demographic factors lie behind a much more commonly used measure of generational burdens, the dependency ratio. For convenience I distinguish between the “child dependency ratio”

and the “age dependency ratio”⁷. This is because the required transfer rate depends upon two things,

- the “generosity” of transfers to the young and the old, and
- the child and age dependency ratios.

Thus the implied generational transfer tax τ is given by

$$\tau = er_1 + pr_2 \quad [5]$$

where e is educational and other transfers per capita to the young as a proportion of total income, p is “pension” paid to each of the old, again as a proportion of income, and r_1 and r_2 are the child and age dependency ratios respectively.

This dependency-ratio based measure of the transfer rate is both broader and narrower than the generational account. It is broader than the generational account in that it picks up consumption transfers to the young and to the old, which have nothing directly to do with taxation. That is to say, it is not merely concerned with fiscal transfers. It is narrower than the generational account in that it ignores government consumption expenditure (which may be seen as transfers within the working generation) and the important issue of the current deficit. The size of the current deficit is a separate fiscal issue and should be distinguished from the structural pressures on the working generation that arise from key decisions about e and p , and from the pressures of demography.

The following is intended as an illustration. Assume a welfare regime in which real resource transfers are made to each child (age 0-14) equivalent to 40% of an adult’s earnings and transfer to each old person (60 plus) equivalent to 50% of an adult’s earnings⁸. These are equivalent to e and p above. To calculate the “generational transfer tax”, it is also necessary to know relative population size so that τ may be calculated, as in [4] above. The population projections are taken from Lutz (1996) (appendix 4, central estimates in each case). Table 3 gives the implicit generational transfer taxes⁹. In the period up to 2050 the “burden” of looking after the young is expected to fall almost everywhere, most dramatically in Africa. On the other hand the “burden” of looking after the old is predicted to increase everywhere, even in Sub-Saharan Africa. It will be highest in the Pacific OECD and in Europe and North America. On the assumptions made, the overall “burden”, taking the child and age transfers together, will increase dramatically in some regions: for example, it will increase to over 50% in the Pacific OECD countries. However, there are several regions where it will change very little (North Africa, Central Asia, the Middle East and South Asia) and one region (Sub-Saharan Africa) where it will fall substantially.¹⁰

Calculation of such transfer taxes is a far cruder exercise than generational accounting. The direct use of dependency ratios does, however, sidestep some of the serious difficulties with GA and does emphasise the two most important causes of generational imbalance: transfers and demography. This point may be made by presenting the above illustrations as “proportional generational imbalances” in the manner of generational accounts.

⁷ Commonly these are expressed as proportions of the 0-14 population and the 60+ population respectively to the 15-60 population.

⁸ The proportional child transfer seems “reasonable” based on educational expenditures and equivalence scales from family expenditure surveys: the age transfer is assumption is arbitrary.

⁹ The separate implied “child” and “age” transfer taxes are available from the author.

¹⁰ In developing countries (and to a lesser degree in developed countries) there are child labourers in the below-14 age group and many old people work until they die or become too infirm to continue. Both factors reduce the formal transfer tax on the 15-60 generations.

Region	1995	2050	2100
North Africa	.33	.29	.33
Sub-Saharan Africa	.41	.25	.30
China and CPA	.24	.37	.38
Pacific Asia	.27	.31	.36
Pacific OECD	.26	.51	.52
Central Asia	.32	.31	.34
Middle East	.38	.28	.35
South Asia	.31	.28	.36
East Europe	.27	.45	.47
European FSU	.28	.44	.41
Western Europe	.28	.46	.42
Latin America	.29	.33	.39
North America	.29	.40	.44

Table 3. Implicit transfer “taxes”

Thus the increased burden of transfers to the young and the old, on proximate future generations, is substantial in the developed countries as well as in so-called “transitional” countries and the Pacific Basin. It is interesting that for Europe and North America the proportional imbalances shown in Table 4 are in the same “ball-park” as those in Table 2.

Region	2050	2100
North Africa	-12	0
Sub-Saharan Africa	-39	-27
China and CPA	+54	+58
Pacific Asia	+15	+33
Pacific OECD	+96	+100
Central Asia	-3	+6
Middle East	-26	-8
South Asia	-10	-8
East Europe	+67	+74
European FSU	+57	+46
Western Europe	+64	+50
Latin America	+13	+34
North America	+38	+51

Table 4. Proportional generational imbalances

Generational equity seems to require some reduction in benefits or increases in taxation for current generations and newborns on demographic grounds alone. However, the burden will fall for Africa, Asia and the Middle East. In those areas it would not be at all appropriate, over the next century, to ask current generations or newborns to retrench for reasons of equity across generations..

6. Conclusions

The main concern of this paper has been to explain the relatively new technique of generational accounts and to discuss some of its limitations. Generational accounts are lifetime fiscal accounts for whole cohorts and enable one to predict the relative fiscal burdens of future generations and “newborns”. The pioneers of the method have developed a “tool-kit” which has been very widely

used¹¹, particularly in developed countries (section 1). Applying this tool-kit they show that, for most developed countries, future generations will have to pay higher taxes to finance pensions for the current old and for “newborns” *if present policies are allowed to continue*. This presents a serious potential threat to the implicit generational bargain and drastic benefit cuts or current tax increases are advocated so as to avert it (section 2). The technique has quite serious limitations however. Fiscal imbalance is not the only, or even the most important, aspect of fairness across generations and it may or may not be inconsistent with fiscal sustainability (section 3). The analysis is less relevant to developing than to developed countries (section 4). It is however possible to develop alternative, though perhaps cruder, measures based on dependency ratios (section 5).

References

- Agulnik, P., Cardarelli, R. and Sefton, J. (2000). The Pensions Green Paper: a generational accounting perspective. *Economic Journal*, 110, F598-609.
- Auerbach, A.J., Kotlikoff, L., Leibfritz, W. (1999). *Generational Accounting Around the World*. Chicago and London: University of Chicago Press for NBER.
- Banks, J., Disney, R. and Smith, Z. (2000). What can we learn from generational accounts for the United Kingdom? *Economic Journal*, 110, F575-597.
- Buiter, W.H. (1997) Generational accounts, aggregate saving and intergenerational distribution. *Economica*, 64, 605-26.
- Cardarelli, R., Sefton, J. and Kotlikoff, L.J. (1998). *Generational Accounting in the UK*. National Institute of Economic and Social Research.
- Cardarelli, R., Sefton, J. and Kotlikoff, L.J. (2000). Generational Accounting in the UK. *Economic Journal*, 110, F547-574.
- Cutler, D. (1993) Review of generational accounting: Knowing who pays, and when, for what we spend.” *National Tax Journal*, 46 (1), pp. 61–67.
- DSS (1998) *A New Contract for Welfare: Partnership in Pensions*. London: TSO.
- Haveman, R. (1994) Should generational accounts replace budget deficits? *Journal of Economic Perspectives* 8 (1), pp. 95-112.
- Hills, J. (1992) *Does Britain have a Welfare Generation: An Empirical Analysis of Generational Inequity*. STICERD Welfare State Programme. WSP-76, London School of Economics.
- Johnson, P. and Thomson, D. (editors), (1989) *Workers versus Pensioners*. Manchester: Manchester University Press.
- Kotlikoff, L.J. (1995) *Applying Generational Accounting to Developing Countries*. IED Discussion Paper no. 67, Boston University.

¹¹ To that extent they have developed a highly successful research programme in the sense of Lakatos.

- Kotlikoff, L.J. (1997) Reply to Diamond and Cutler's reviews of generational accounting. *National Tax Journal*, 50 (2), pp. 303-314.
- Lutz, W. (ed.) (1996). *The Future Population of the World*. International Institute for Applied Systems Analysis. London: Earthscan.
- Ricardo, D. (1820). *Funding System*. Volume IV of *Works and Correspondence of David Ricardo*, edited by P. Sraffa, Cambridge and London: Cambridge University Press.
- Thomson, D. (1989). The Welfare State and the Generational Conflict: Winners and Losers, in P. Johnson and D. Thomson (editors) *Workers versus Pensioners*. Manchester: Manchester University Press.

Correspondence

David Collard
ESRC Research Group on Wellbeing in Developing Countries
University of Bath
Claverton Down
Bath BA2 7AY
collarddavid@yahoo.co.uk