A Set of Generational Accounts for Australia: Base Year 1994/95

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Abstract

The baseline Australian generational accounts for 1994/95 presented in this paper reveal a moderate imbalance in favour of current generations, and thus a reversal of the imbalance evident in the 1990/91 base year accounts (Ablett, 1996a). However, alternative simulations suggest the fiscal constraint implied by recent official government projections should be sufficient to correct the generational imbalance of the baseline accounts. Generational accounting results involving several migration scenarios are also presented. These lend support to the view that migration has an overall net positive effect on government finances.

1. Introduction

Recent fiscal policy debates in Australia have been dominated by the issue of whether fiscal policy should be generally tightened, particularly in terms of restraining expenditures. Politically, those advocating significant fiscal tightening appear to have won the argument, with the new Liberal/National coalition government elected in March 1996 announcing wide-ranging cuts to expenditure as well as some revenue raising measures. The main argu-

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ments put forward for fiscal tightening have been the desirability of reducing the relative size of the public sector in the economy, the need for government to play a role in improving national saving (e.g. FitzGerald, 1993), and more recently, concerns about the fiscal burden to be inherited by young and future Australians (e.g. National Commission of Audit, 1996). This paper provides some perspective on the last mentioned argument.

The generational accounting technique used here was first suggested by Auerbach, Gokhale and Kotlikoff (1991, 1992, 1994). From the perspective of a base year and given assumptions about future fiscal policies, growth and demographic change, generational accounts show the projected per capita present value of *remaining* lifetime net payments to government by each generation distinguished by year of birth. Generational imbalance in fiscal policy is gauged by comparing the (full lifetime) generational accounts of newborns in the base year and future generations (born after the base year). In addition, generational accounting exercises can give an indication of the intergenerational redistribution implied by alternative fiscal policy scenarios. Ablett (1996b) presents a brief summary of the generational accounting methodology.

As currently practised, generational accounting does not take account of general equilibrium feedback effects, therefore it can only approximate what would be the true incidence of fiscal policy changes on the welfare of generations.[1] In this regard, research by Fehr and Kotlikoff (1995) suggests the approximation may generally be fairly good. An additional problem with the technique is determination of appropriate discount and per capita growth rates to be used in the calculations. However, it is commonly found in applications that the qualitative conclusions to be drawn from generational accounts are robust against a range of growth and discount rate assumptions.

Despite its limitations, generational accounting has already been applied in a number of countries and its use is spreading. Generational accounts are now published annually as part of the U.S. government budget papers.

The baseline Australian generational accounts for 1994/95 presented in this paper reveal a moderate imbalance in favour of current generations, and thus a reversal of the imbalance evident in the 1990/91 base year accounts (Ablett, 1996a). Such a deterioration in generational balance appears to vindicate the need for fiscal restraint. However, as shown in Section 4, the fiscal constraint implied by recent official government projections should be sufficient to correct the projected generational imbalance. This result should add perspective to discussions of the need for further drastic expenditure cuts. The paper also looks at the effects of

migration on the fiscal burden of current and future generations of Australians.

Before presentation of the baseline results (Section 3) and some alternative scenario simulation results (Section 4), Section 2 of this paper explains the adjustment for migration which is used in the Australian accounts. The impact of various migration scenarios on these accounts is examined in Section 5. The results of this section suggest post base year migrants belonging to age cohorts alive in the base year are likely to make a significant net positive contribution to the Australian public sector and hence to other Australians. Furthermore, post base year migration leads to a reduction in the generational accounts of future generations in Australia, compared to a zero net migration counterfactual.

2. Adjusting Generational Accounts for Migration

It is common practice in generational accounting to treat net migration of a particular age cohort in a given year as an offset to the mortality rate of the resident cohort of the same age. Such a procedure is justifiable in countries where net migration is relatively unimportant, but in the case of Australia it can have a significant effect on the calculated generational accounts of domestic born cohorts, as shown in Section 5.[2]

To understand how migration affects generational accounts, one should first note that the per capita generational account for each currently living cohort is usually calculated by dividing the cohort's total account by the number of members of the cohort *alive and resident* in the country in the base year. However, the cohort's total account will be affected by migration. Consider the case of 20 year olds in the base year. If there is no migration of people belonging to this age cohort after the base year and all the other assumptions of the generational accounting exercise are satisfied, then calculation of this cohort's generational account in the manner described above will indeed give a valid indication of the average remaining lifetime net fiscal burden facing members of this cohort. However, if foreigners aged 20 in the base year migrate subsequent to the base year then, ceteris paribus, the generational account so calculated will not, strictly speaking, represent the average net present value of tax contributions of 20 year olds resident in the country in the base year. This is explained by the fact that post-base year migration swells the numbers of members of a given cohort alive in future years, leading to a change in the cohort's total calculated net contribution. The same reasoning obviously applies to all cohorts alive in the base year. In view of this, in the results of Sections 3 and 4 the net contributions

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of post base year migrants were excluded when calculating the accounts of currently living (resident) generations.[3]

In terms of the government's present value budget constraint, post base year migration affects the aggregate generational accounts of all future generations by changing both the present value of future government consumption expenditure and the aggregate generational accounts of currently living generations; migration affects future government consumption not only directly, but also indirectly by increasing the number of future births.

Some care is needed, however, in calculating the per capita generational accounts of future generations when migration is significant. In accord with previous applications of generational accounting, in this paper the projected aggregate generational account of future generations is distributed assuming that the per capita accounts (at birth) of all future generations are the same except for some per capita annual growth rate. Normally it is also assumed implicitly that the net fiscal burden on a given future generation is borne completely by domestic born members of that generation. But where migration is significant, it is important to make some assumption about how a future generation's net fiscal burden is to be shared between domestic born and migrant members of the generation, otherwise any positive effect of migration will be understated. The assumption made here is that, on average, migrants belonging to a future generation will make the same generational account contribution as domestic born members of the generation.[4] The resulting accounts can be described as generational accounts of future generations adjusted for migration.

3. Baseline 1994/95 Accounts

Details of the data used in calculating the Australian generational accounts are given in the Appendix. Payments to government were divided into taxes on labour income, capital income and property, and indirect taxes. Benefits from government were grouped into the following categories: age pensions, family and child benefits, unemployment benefits, other social security benefits, school benefits, higher education benefits, tertiary and further education benefits, hospital benefits, and non-hospital health benefits. As in the base year 1990/91 Australian generational accounts, government consumption expenditure on education was allocated to generations on the basis of participation rates. Similarly, government consumption expenditure on health was allocated to generations according to profiles of health care consumption by age and sex obtained from survey data.[5]

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The generational accounts assume that there is a government budget constraint. This constraint operates in such a way that in any given year the sum of the government's net wealth and the present value of projected net payments to the government by all current and future generations must equal the present value of all current and future government final consumption expenditures. The government net wealth estimate used in the calculation of the 1994/95 base year accounts was general government net debt as at 30 June, 1995.[6] This conforms with current generational accounting practice.

The baseline Australian generational accounting results presented in Tables 1 and 2, referring to the base year July 1, 1994 to June 30, 1995, use the low migration scenario described in Appendix B. The low migration scenario is considered most realistic given recent experience and moves to limit the growth of annual migration to Australia. In the results of this section, all per capita payments, benefits and government consumption expenditure, except for subsidies to industry, are assumed to grow at a uniform rate.[7] Subsidies to industry are assumed to remain at their real 1994/95 level; these have remained fairly constant over the last half decade, and both the current federal government and the opposition Labor party are committed to reducing industry protection.

Table 1: Per Capita Generational Accounts – Base Year 1994/95

Thousands of $Australian
Assumed real income growth = 1%; discount rate = 5%

Age in 1994/95	Persons	Males	Females
0	22.2	49.3	6.4
5	34.5	67.9	-0.8
10	65.7	106.8	22.8
15	104.3	154.1	51.5
20	140.2	196.4	81.3
25	149.0	211.7	85.2
30	144.3	206.4	82.8
35	137.6	192.6	82.5
40	120.4	168.0	73.3
45	91.4	132.9	49.2
50	54.4	90.0	17.6
55	14.4	41.0	-13.8
60	-15.8	1.9	-33.5
65	-33.0	-22.4	-43.5
70	-37.2	-27.4	-45.8
75	-33.0	-22.1	-41.6
80	-27.4	-18.0	-33.5
85	-21.9	-14.4	-25.9
90	-17.6	-13.6	-19.2
Future Generations	51.3		

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Table 1 gives the preferred base case accounts, which assume a 5 per cent per annum discount rate and a real per capita growth rate of 1 per cent for all generational account components. Table 2 presents some sensitivity analysis using three different discount rates and three different per capita growth rates.

Table 2: Per Capita Generational Accounts (persons) – Base Year 1994/95
Thousands of $Australian

Productivity growth rate (%)	0.75			1			1.5		
Discount rate (%)	3	5	7	3	5	7	3	5	7
Present generation (1)	68	18	-4	78	22	-2	100	33	2
Future generations (2)	108	47	28	122	51	29	164	61	31
Absolute imbalance (2)-(1)	40	29	32	44	29	31	64	28	29

Table 1 shows how the remaining lifetime generational accounts of those alive in the base year vary systematically by age and sex. Elderly generations in the base year have negative accounts because they tend to receive more in benefits than they pay in taxes over their retirement years. Females generally have lower accounts than males because on average they earn less, pay less income tax and receive more transfer payments. They receive more than males in age pensions since they retire earlier and live longer.

As noted previously, generational imbalance is gauged by comparing the accounts of base year newborns and future generations (represented here by those born in 1995/96); it is assumed that all future generations face the same generational account at birth, except for the assumed growth rate. Here the comparison is made with reference to these generations' accounts for males and females combined (persons), i.e. a weighted average of the male and female accounts. As can be seen in Tables 1 and 2, there is a moderate generational imbalance in favour of current generations for all discount and growth rate combinations presented. For example, in Table 1 the generation born in 1994/95 is projected to face an average net fiscal burden of $22,200 in present value terms whilst the corresponding figure for 1995/96 newborns (representing future generations) is $51,300. These results are in stark contrast to the base year 1990/91 (Ablett, 1996a) results which revealed an opposite imbalance. However, there is reason to believe that these base case results present a somewhat pessimistic assessment of generational imbalance, a point taken up in the next section.

The deterioration in generational imbalance in Australia since 1990/91 is mainly due to increased government purchases, increased government indebtedness, and cyclical changes in government revenues and transfer

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payments.[8] As a result of the economic recession of the early 1990's and discretionary spending measures, general government debt as a percentage of GDP increased from a low of 11 per cent in June 1990 to 26 per cent in June 1995. Most of this increase reflected increases in federal government debt as opposed to state and local government debt (ABS, 1995).

4. The Generational Impact of Alternative Scenarios

The results of this section assume a low net migration scenario, a discount rate of 5 per cent per annum and a uniform per capita growth rate of 1 per cent of all account components, unless otherwise stated.

The first point of interest is how large are the changes needed to bring about generational balance, and what effect would this have on current generations. Table 3 reveals how the Australian baseline generational accounts would change as a result of each of several immediate (in 1994/95) and permanent policy changes that would imply generational balance: a 5.4 per cent increase in all tax revenues, a 13.0 per cent decrease in all transfer

Table 3: Per Capita Generational Accounts (persons) – Base Year 1994/95

Thousands of $Australian
Assumed real income growth = 1%; discount rate = 5%

		Policy Scenario		
Age in 1994/95	Base case (Table 1)	5.4% Increase in tax revenues	13% decrease in transfers	8.8% decrease in govt. purchases
0	22.2	28.6	28.1	26.7
5	34.5	42.4	41.3	39.7
10	65.7	75.3	73.5	70.3
15	104.3	116.0	113.4	108.0
20	140.2	153.5	150.1	142.9
25	149.0	162.7	159.1	151.4
30	144.3	157.7	154.6	146.4
35	137.6	150.7	148.2	139.7
40	120.4	132.7	131.3	122.4
45	91.4	102.4	103.0	93.4
50	54.4	63.8	67.0	56.4
55	14.4	21.9	27.9	16.3
60	-15.8	-9.9	-2.0	-14.1
65	-33.0	-28.5	-20.0	-31.5
70	-37.2	-33.7	-25.8	-35.9
75	-33.0	-30.2	-23.7	-31.9
80	-27.4	-25.2	-19.8	-26.5
85	-21.9	-20.3	-16.1	-21.3
90	-17.6	-16.4	-13.1	-17.1
Future generations	51.3	28.6	28.1	26.7

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payments, and an 8.8 per cent decrease in government purchases (including public education and health consumption expenditure). Comparing the first two of these scenarios, we see that current generations aged to 40 years would be marginally better off under a cut in transfer payments, but those older than 40 years would be decidedly worse off under this policy. This result is expected given the importance of transfer receipts to the elderly and taxation payments by the young.

The 8.8 per cent decrease in government purchases only affects the accounts of currently living generations through its effect on public education and health consumption expenditures allocated to generations. It results in only minor changes to these generations' accounts. However all the alternative scenarios of Table 3 imply an approximate halving of the accounts of future generations. These results demonstrate that 'permanent' changes in fiscal policy which imply only minor changes in the net fiscal burden of currently living generations can have quite major effects on the fiscal burdens of future generations. The results of four other simulations are given in Table 4.

Table 4: Per Capita Generational Accounts (persons) – Base Year 1994/95

Thousands of $Australian

Assumed real income growth = 1%; discount rate = 5%

		Scenario			
Age in 1994/95	Base Case	A	B	C	D
0	22.2	26.9	29.9	31.9	26.0
5	34.5	40.3	43.3	45.5	38.9
10	65.7	72.8	75.6	77.8	70.8
15	104.3	113.0	115.4	117.5	110.1
20	140.2	149.3	151.9	153.9	146.7
25	149.0	153.8	160.7	162.8	156.3
30	144.3	142.0	155.8	157.9	152.3
35	137.6	129.7	149.0	151.1	146.4
40	120.4	106.2	131.4	133.5	129.7
45	91.4	70.4	101.8	104.1	101.0
50	54.4	27.7	64.0	66.4	64.0
55	14.4	-16.6	23.0	25.5	23.6
60	15.8	-49.3	-8.3	-5.9	-7.7
65	-33.0	-64.1	-26.8	-24.6	-26.5
70	-37.2	-63.1	-32.2	-30.4	-32.4
75	-33.0	-54.3	-29.2	-27.8	-29.7
80	-27.4	-44.1	-24.6	-23.5	-25.3
85	-21.9	-34.6	-20.0	-19.3	-20.7
90	-17.6	-27.0	-16.4	-15.9	-16.9
Future generations	51.3	69.9	22.1	13.5	34.8

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Scenario A

In this simulation the 'small country assumption' is used, whereby the incidence of corporate income taxes is supposed to fall on labor income. This assumption is based on the hypothesis that in a small open economy taxes on mobile capital are borne by the non-mobile factor of production (labour). Its application results in an increase in the relative imbalance in favour of current generations compared to future generations, with quite large decreases in the accounts of middle-aged and elderly current generations, and marginal increases in the accounts of those aged under 30 years in the base year. Since capital ownership is more concentrated amongst older generations, this result is not surprising.

Scenario B

This scenario applies the public sector total outlay and revenue projections up to fiscal year 1998/99 contained in the National Fiscal Outlook (1996). These projections take account of specific announced policy measures as at May 1996, but do not include the $A8 billion cut to the official national government deficit over 1996/97 – 1997/98 foreshadowed by the recently elected government (see Scenario C below). They foresee total government outlays falling from 34.9 per cent of GDP in 1994/95 to 32.6 per cent of GDP in 1998/99, with total government revenue falling marginally as a percentage of GDP up to 1998/99. In calculating the accounts for this scenario, the annual percentage changes in total outlays and revenue implied by the projections were applied uniformly to all generational account benchmarking aggregates for years up to 1998/99; the general per capita growth rate was applied to all years after 1998/99.

The fiscal constraint (compared to 1994/95) implied by the National Fiscal Outlook projections leads to substantial changes in the generational accounts, indicating that the baseline 1994/95 Australian accounts represent a somewhat pessimistic view. Generational imbalance is reversed with the generational account of future generations becoming 26 per cent less than that of base year newborns.

Scenario C

Scenario C is similar to Scenario B except that it factors in an additional $A4 billion cuts to projected government outlays in both 1996/96 and 1997/98. The implied percentage changes in total outlays are applied uniformly to all benchmarking outlay aggregates.[9] This scenario is designed to give an approximate indication of the possible effects of the current federal government's stated goal of balancing the official federal government budget by the end of the 1997/98 financial year. It leads to more than

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a doubling of the relative imbalance in favour of future generations evident in the results for Scenario B.

Scenario D

This scenario is the same as the baseline scenario except that it assumes zero growth in per capita public age pensions after the base year. Such a scenario is relevant in view of the move towards self-funded retirement incomes in Australia, although under current rules compulsory saving for retirement (superannuation) is unlikely to have a significant moderating effect on public age pension benefits until well into the next century (Ablett, 1996a).[10] Compared to the base case, it leads to a significant decrease in the accounts of future generations, but still leaves generational imbalance marginally in favour of currently living generations.

5. Some Migration Simulations

Two conclusions emerge from the generational accounting simulation results presented in this section.[11] First, future migrants belonging to generations alive in 1994/95 (the base year of the calculations) are likely to make a substantial net positive direct contribution to the Australian public sector. Second, when the implied per capita fiscal burden to be borne by future generations is considered, future migration *per se* is also projected to have a net positive effect on public sector resources.[12]

The above conclusions can be understood by way of an example. Consider an historically typical migrant to Australia who arrives after completing her formal education in her country of origin. Arriving at the start of her working life, she will tend to make net positive contributions to the public sector over many years through the taxation/social security system. In present value terms, the burden she will represent for the public sector once retired will be minimal. If the experience of a sufficient number of migrants approaches this stylised example, then the first conclusion above is not surprising.

However, the second conclusion need not be so clear cut. Our 'typical' migrant, being younger than the average age of all Australian residents, contributes to a moderation in the ageing of the population. Supposing she is indeed a female, she renders the age pyramid of females younger, and hence the overall birth rate higher than it would have been otherwise. This will be the case even if, as assumed here, migrant women display the same age specific fertility rates as women in Australia generally. The increased birth rate will however lead to increased demands on public sector resources associated with the education and welfare of greater numbers of children;

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there will also be greater infrastructure needs for the larger population. The results presented in this section suggest that these increased demands on the public sector are not sufficiently important to lead to an increase in the generational accounts of future generations.

Some could argue that generational accounting is an inadequate vehicle for examining the direct net contribution of migrants to government because it ignores differences in average payment/benefit levels between migrants and non-migrants belonging to the same age/sex cohort. However, previous Australian studies (e.g. Whiteford, 1991) suggest that such differences may not be great and are mainly associated with the settling in period of recent arrivals. More importantly, the validity of generational accounting in this context does not depend primarily on whether there are systematic differences between net payments to government by migrants and non-migrants, but rather on the extent to which the average net payments of post base year migrants differ from those of the resident base year population. Inasmuch as the resident population already contains a relatively high proportion of migrants, as in Australia, the average net payment differences between residents and future migrants of the same age may not be large. If this is the case, it is reasonable to conclude that general population level and age composition considerations hold the key to gauging the likely overall direct long-term contribution of future migration to the public purse. The approach used here is based on this view.

There have been numerous studies which specifically try to gauge the impact of migration on the public purse, particularly in North America and Australia.[13] In contrast to the long term generational accounting approach used here, most previous studies in this area have tried to assess the impact of migrants on public sector finances in a given year, and have not considered all payments to and all benefits received from all levels of government.

Firstly, consider the generational account contribution of post base year migrants belonging to cohorts alive in the base year. This can be gauged by calculating the accounts of currently living generations without excluding the net contributions of these migrants, i.e. following the usual generational accounting practice (cf. Section 2), and comparing them with the results obtained from a simulation assuming zero future net migration. This is done in Table 5 for the low, high and super high migration scenarios described in the Appendix. The last row of the table gives the percentage increase in the aggregate generational accounts of all currently living generations compared to the zero migration scenario.

Table 5: Per Capita Generational Accounts (persons) – Base Year 1994/95
(Including net contribution of post base year migrants alive in 1994/95)
Thousand of $Australian
Assumed real income growth = 1%; discount rate = 5%

	Post 1994/95 Migration Scenario			
Age in 1994/95	Zero	Low	High	Super High
0	22.2	32.6	36.8	43.7
5	34.5	46.2	50.9	59.0
10	65.7	78.5	83.7	92.7
15	104.3	118.3	124.0	134.1
20	140.2	150.6	155.9	165.6
25	149.0	157.4	161.7	170.9
30	144.3	150.4	153.1	159.4
35	137.6	140.8	142.0	145.2
40	120.4	121.9	122.4	123.9
45	91.4	91.6	91.7	92.3
50	54.4	54.0	53.9	54.3
55	14.4	13.6	13.5	13.6
60	-15.8	-16.8	-16.9	-16.8
65	-33.0	-33.9	-34.0	-33.7
70	-37.2	-38.0	-38.0	-37.6
75	-33.0	-33.7	-33.8	-33.2
80	-27.4	-28.1	-28.1	-27.5
85	-21.9	-22.7	-22.7	-22.0
90	-17.6	-18.5	-18.5	-17.6
% Aggregate increase		7.05	10.18	16.46

The message from Table 5 is quite clear. For generations aged up to 45 years in 1994/95, post-1994/95 migrants belonging to these generations are projected to contribute directly, in aggregate, positive net present value amounts to the Australian public sector, at least before government consumption expenditure is considered. This is implied by the increased generational accounts of these cohorts (including the contribution of migrants) compared to the zero post 1994/95 migration scenario. It is also evident that higher migration accentuates this positive net contribution. The greatest net positive contributions are associated with young cohorts. This is largely explained by two factors. Firstly, the composition of currently recorded and future projected migrant intakes is such that many migrants receive all or most of their education in their home country before migrating to Australia between the ages of 20 and 40 and joining the (tax paying) adult work force. Secondly, there will be significantly more future migrants coming from younger 1994/95 age groups than from older age groups.

The story for those aged over 45 years in 1994/95 is different. As future migrants in these cohorts will arrive either shortly before retirement or after

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retirement, their generational account contribution will mostly be negative, thus adding to the public burden of supporting the aged population. However, since migrants in these age groups represent a relatively minor proportion of migrant intakes, their negative contributions are not sufficient to make the total net contribution over all cohorts negative.

The total percentage increases over all cohorts given in the last row of Table 5 are arguably quite significant. For example, under the high migration scenario, future migration of members of generations alive in 1994/95 is projected to increase directly the aggregate generational account contribution of these cohorts by over 10 per cent.

Whether future migrants belonging to generations alive in the base year will make an overall net positive contribution to the public sector also depends on the increase in public consumption expenditure associated with them. However, it is possible to calculate this amount given the assumptions relating to government consumption expenditure in the base case generational accounts. For each migration scenario, Table 6 shows the per migrant generational account contribution, government consumption expenditure and the difference between these two amounts (the 'net contribution') for those alive in, but migrating after the base year.[14] Note that the first of these amounts is not comparable to the generational accounts of base year residents since it refers to contributions by post-base year migrants belonging to many different generations and migrating over possibly many future years.

Table 6: Contribution of Future Migration of Cohorts Alive in 1994/95

Thousands of $Australian per migrant
Assumed real income growth = 1%; discount rate = 5%

	Migration Scenario		
	Low	High	Super High
Per migrant generational account contribution	53.5	54.7	56.5
Government consumption per migrant	34.9	34.2	33.3
Net contribution per migrant	18.6	20.5	23.2

The overall net contributions in Table 6 are indeed positive. The simulations also show a significant reduction in the net contribution of migrants when the migration associated increase in government consumption expenditure is included.[15] Since the assumed age structure of arriving migrants is the same under each scenario, the differences in results across scenarios in Table 6 are purely due to differences in the timing of net migration increases.

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To gauge the net contribution of future migration *per se* on government resources it is necessary to investigate its effect on the per capita generational accounts of future generations. Table 7 shows these for the various migration scenarios.[16]

Table 7: Generational Accounts of Future Generations

Thousands of $Australian
Assumed real income growth = 1%; discount rate = 5%

	Post – 1994/95 Migration Scenario			
	Zero	Low	High	Super High
Generational account	59.9	51.3	48.5	44.3
% Change due to migration	-14.4	-19.0	-26.0	

It is evident from Table 7 that under the assumptions of the generational accounting exercise positive post base year migration is projected to have a favourable effect on the generational accounts of future generations, and that this effect is greater the higher is the level of migration. For example the high migration scenario would reduce the generational accounts of future generations by 16.3 per cent compared with the zero migration counterfactual.

6. Concluding remarks

The Australian baseline accounts for 1994/95 show a moderate generational imbalance in favour of generations alive in the base year. This result is based on applying a uniform growth rate to all per capita payments, benefits and government consumption after the base year, and a low net migration scenario. If the fiscal constraint inherent in recent government projections is indeed realised, then the baseline imbalance result is likely to be reversed, as suggested by the simulations of section 4. The projected generational imbalance is also reduced markedly if the baseline scenario is altered simply by holding real per capita age pension benefits constant at their base year levels.

The results reinforce the view that the level of net payments by government to older generations is the most important policy factor in the redistribution of resources between generations in Australia. Discretionary government expenditure is also important, however it is more easily altered over the short term. The move to privately funded retirement incomes could prove the most significant element in the determination of generational imbalance over the long term.

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The simulations relating to migration imply that post base year migration should have an overall positive generational effect, as reflected in a reduction in the generational accounts of future generations. This result is mainly driven by the relative dominance of young working aged people in the composition of migrant intakes, compared to the resident Australian population. In the future it would be desirable to see whether this conclusion is supported by similar analyses in other countries with relatively high rates of migration.

Appendix

(i) Population Projections Used

Four sets of population projections for years up to 2100 are used in this paper's calculations. All four are based on the mortality and medium fertility assumptions described in the published projections of the Australian Bureau of Statistics (1994). These suppose improvements in age/sex specific mortality rates up to 2041 and a constant total fertility rate per woman of 1.884. For the purposes of this paper it was assumed that no further improvements in mortality would occur after 2041.

The first set of population projections represents the zero post-base year migration counterfactual that is used in Section 5. It was calculated by applying the assumed age/sex specific mortality rate and age specific fertility rates to the cohorts alive in each year up to 2100, starting with the resident population surviving to year 1995/96.

Population projections representing low and high migration scenarios were obtained by extending the Australian Bureau of Statistics population series A (low migration) and D (high migration) for 1993-2041 up to 2100. These projections incorporate steady increases in net migration up to 2000/01, after which annual net migration remains constant at 70000 for series A and 100000 for series D. The relative age and sex composition of migration by category of movement (permanent or long-term arrivals or departures) after 1994/95 is assumed to remain constant at the average composition for the years 1990/91 to 1992/93. Results given in Sections 3 and 4 are based exclusively on the low migration scenario.

An additional 'super high' migration scenario assumes net annual migration to Australia of 150000 for all years after 1994/95. The relative age and sex composition of this net migration is assumed to be the same as that for the other positive migration scenarios.

(ii) Age/Sex Profile Data

As in Ablett (1996a), the Australian generational accounts for generations alive in 1994/95 are based on a set of age/sex profiles of estimated average payments to, and average benefits from, the Australian government in 1994/95. Most of these were derived using data from the Australian Bureau of Statistics' 1988 Household Expenditure Survey (HES) and 1990 Household Income Survey (HIS), benchmarked against national account and government finance aggregates. Some details of these estimates are given below.

(iii) Payments to Government

The benchmarking aggregate for labour income taxes in 1994/95 was estimated by multiplying the proportion of wages, salaries and supplements in domestic factor incomes by the sum of payroll taxes and income taxes on individuals and enterprises. The benchmarking aggregate for capital income taxes was taken to be the remainder of this sum of taxes.

The 1994/95 labour income tax aggregate of was distributed by age and sex category using data on annual wage and salary income from the person records of the HIS. Capital income taxes were distributed using a relative age/sex profile of annual income from interest, dividends and rent derived from the HIS.

As no survey data exists which would allow one to obtain directly a suitable age/sex profile of property taxes paid by individuals, it was necessary to make use of the household unit data of the HIS. In particular, the average amount paid in rates per year by households classified by age, sex and marital status of the reference person was calculated. The averages for married classifications were halved to give an estimate of the average rates paid by reference person considered as an individual, i.e. it was assumed that on average spouses paid equal amounts of rates. The average amount of rates paid by a person of a particular age/sex category was then simply calculated as the weighted mean of average rates paid by households with married and unmarried reference persons in that age/sex category. The resulting profile was used to distribute property taxes for 1994/95 by age and sex.

In the case of indirect taxes, data from the HES Fiscal Incidence Study was used to derive a profile of average weekly indirect taxes paid by households classified by age, sex and marital status of the household reference person. Assuming that the indirect tax burden was shared equally between spouses, it was then possible to derive the required age/sex profile, using an analogous calculation to that employed in the case of property taxes.

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(iv) Benefits from Government

Relative age/sex profiles of family and child, unemployment and other social security benefits received were derived from the HIS. Old age benefits, including benefits to ex-servicemen and their dependents, were distributed according to a relative age/sex profile for these benefits obtained from the HES.

Government final consumption on health in 1994/95 was divided into hospital and non-hospital components according to the relative importance of current government outlays on these two areas of health expenditure in that year. The corresponding personal benefit aggregates (mainly Medicare benefits) were added to each of these components to obtain estimates of aggregate hospital and non-hospital benefits for 1994/95. Hospital benefits for 1994/95 were distributed by age and sex using a relative age/sex profile of hospital usage derived from the Australian Bureau of Statistics' 1990 National Health Survey (NHS) data showing the number of hospital episodes by age and sex in 1989/90. NHS data on the number of consultations with a doctor by age and sex was used to calculate the relative age/sex profile employed to distribute non-hospital health care benefits.

Separate profiles were calculated for school, higher education, and tertiary and further education (TAFE) benefits by age and sex. The relevant 1994/95 aggregates for these were calculated by dividing the sum of government final consumption expenditure on education and education related cash benefits (e.g. Austudy) between the three items in line with their relative importance in total current government outlays on education in that year.

For primary and secondary education, the average benefit per school student was calculated with reference to estimated aggregate school education benefits in 1994/95 and an estimate of the number of school students in 1994/95. This average benefit was assumed to represent the education benefit received by all persons aged 5-14 years in 1994/95. For those aged 15-19 years, 20-24 years, and 25-64 years, the average benefit per school student was multiplied by the appropriate participation rates to obtain estimated school education benefits by age and sex.

Higher education participation rates were multiplied by average higher education benefits (per student) to obtain a profile of higher education benefits by age and sex. A similar procedure was used to distribute aggregate 1994/95 TAFE benefits.

Notes

1. Bohn (1992), Haveman (1994) and Buiter (1995) provide notable critiques of the generational accounting methodology.
2. The population projections used in this paper which assume positive net migration actually imply that up to about age 45, future net migration will exceed annual deaths for each generation.
3. The contribution of post base year migrants belonging to cohorts alive in the base year was of course taken into account in the calculation of the projected *aggregate* generational account contributions of currently living and future generations.
4. This assumption seems the most natural to make, although it may be reasonable to suppose migrants belonging to future generations make a greater average contribution than Australian born members of their cohort, given the historical age composition of arriving migrants.
5. The imputation of government consumption expenditure on education and health to generations means that the accounts presented here are not calculated purely on the basis of net cash payments. Inasmuch as different age groups do not benefit equally from expenditures in these areas in a given year, it is felt that the procedure adopted is preferable to simply including these expenditures in government expenditure which is not allocated to generations.
6. The government net debt figure used does not include net financial debt of public trading enterprises. The use of net financial debt as a proxy for net wealth can be criticised in that the value of government non-financial assets is ignored. Inclusion in the government net wealth measure of the net financial debt of public trading enterprises and exclusion of their non-financial assets would simply add further weight to this criticism, especially given the inclination of contemporary Australian governments to sell public assets.
7. Since the population projections employed only go up to the year 2100, total government final consumption was assumed to grow at the assumed per capita growth rate after 2099/2100. Final consumption expenditure on education and health was excluded from aggregate government consumption expenditure, since this is allocated to generations. In addition, net transfers to government form public trading enterprises were treated as negative consumption expenditure.
8. Part of the difference in the results between the 1990/91 and 1994/95 accounts can be explained by the use of different measures of government net wealth. In particular, if the government net wealth measure used in establishing the 1990/91 Australian accounts is applied to the base year 1994/95, under the scenario of Table 1 the projected average net fiscal burden on 1995/96 newborns (representing future generations) would be $40,300 instead of $51,300, representing a reduction of 38 per cent in the difference between the accounts of base year and 1995/96 newborns.
9. There will of course be a number of changes on the revenue side of government finances as well, such as the raising of the national health care (Medicare) levy on high income earners who do not have private health insurance. Much uncertainty also surrounds the ways in which state governments will react to expenditure cuts by the federal government. It is felt, however, that reducing projected outlays in the manner described captures the main generational implications of the announced generalised fiscal constraint.

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10. No moderation in public age pensions due to compulsory superannuation is factored into the generational accounts presented here.
11. Except for varying migration assumptions, this section makes the same assumptions as used in establishment of the base case accounts of Section 3 above (including a 5 per cent discount rate and a 1 per cent growth rate). The qualitative results reported in this section are the same under all the discount and real income growth rate combinations considered in Section 3.
12. The general issue of economic gains from migration is not considered here. Borjas (1994 and 1995) provides comprehensive reviews of the issues involved.
13. Notable North American studies include Blau (1984), Jensen (1989) and Simon (1989). Australian studies include Whiteford (1991) and Centre for International Economics (1992).
14. The per migrant averages in Table 6 were calculated by dividing the appropriate aggregate contributions of all post-1994/95 migrants alive in 1994/95 by the projected total net migration of these cohorts post-1994/95.
15. The existence of economies of scale in the provision of public services would of course tend to increase the net positive contribution of migrants to the public sector.
16. The accounts of future generations in Table 7 are adjusted for migration in the manner described in Section 2.

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