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**Department of Immigration and
Multicultural and Indigenous Affairs**

The Importance of Age in Migrants' Fiscal Impact

prepared for the

**Department of Immigration and Multicultural
and Indigenous Affairs**

by

ACCESS ECONOMICS

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Executive Summary

This report examines the relationship between the age at arrival of permanent migrants and their net impact on the Commonwealth and State Budgets over their expected lifetimes in Australia. The analysis is based on year-by-year projections of the entire future lifetimes of a cohort of migrants arriving in Australia in 2000-01 (from the year they arrive until they either remigrate or die). The results are presented as the Net Present Value (NPV), in 2000-01, of the year-by-year budget impacts by discounting expected future flows of receipts and outlays. Budget impacts are calculated separately for the Commonwealth and the State Budgets for the five main visa categories. The State Budget results are reported as weighted averages across the States.

The estimates of the budget impacts are based on the first migrant cohort from the Longitudinal Survey of Immigrants to Australia (LSIA) and projections by a dynamic microsimulation model constructed for this project.

The following table provides an overview of the results. The table shows the average NPV, in 2000-01, of the estimated net impact on the Commonwealth and State Budgets for the five main visa categories of permanent migrants.

Estimated Average NPV in 2000-01 of Commonwealth and State Budgets Impact by Visa Category (2000-01 dollars)

	Family	SAS	Business Skills	Independent	Humanitarian	All Migrants
	\$000	\$000	\$000	\$000	\$000	\$000
Commonwealth	143	261	310	356	101	223
States	16	30	33	49	10	27
Total Budget	158	291	343	404	111	250

Source: The DIMIA Migrant Ageing Model and the Longitudinal Survey of Immigrants to Australia (1st cohort).

The average present value of the net impact on the total Commonwealth and State Budgets is estimated at \$250,000. The Commonwealth Budget accounts for almost 90 per cent of the total impact (\$223,000) while the State Budgets account for the rest (\$27,000).

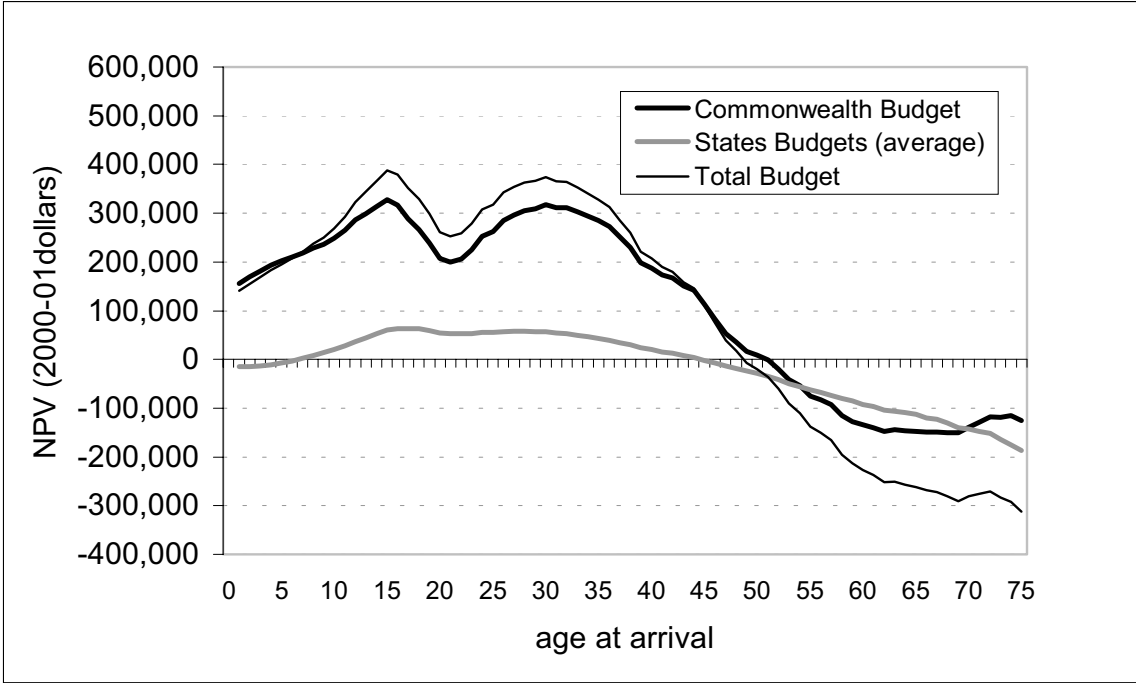
The budget impacts vary hugely across the visa categories although all five groups, on average, have positive impacts at both levels of government. The Skilled visa groups have the largest impacts, with \$404,000 for Independent migrants followed by Business Skills/ENS migrants (\$343,000) and Skilled Australian Sponsored (SAS) migrants (\$291,000). The budget impacts of Family migrants (\$158,000) and Humanitarian migrants (\$111,000) are somewhat lower than the Skilled visa groups. For all visa groups the State Budget impact accounts for around one-tenth of the total result.

The figure below shows the relationship between the NPV of the estimated net budget impact and the age at arrival of the migrants. The figure shows average budgets impact across all visa groups, with separate curves for Commonwealth and State Budgets (visa group specific age-at-arrival curves are shown in Section 5.2).

The total budget impact for migrant children increases with arrival-age from around \$141,000 for infants, to around \$388,000 at an arrival-age of 15 years. The age-at-arrival curve then

dips to a low at arrival-age of 21 years (\$253,000), before increasing to a second peak at arrival-age of 30 years (\$374,000). The dip at arrival-age around the age group 16 to 29 years is a result of the preponderance of low-impact Family and Humanitarian migrants arriving.

Estimated NPV of Net Commonwealth and State Budget Impact per Immigrant by Age at Arrival in 2000-01, Average for All Visa Categories, 2000-01 dollars



Source: The DIMIA Migrant Ageing Model and the Longitudinal Survey of Immigrants to Australia (1st cohort).

For migrants older than 30 years on arrival the budget impact decreases gradually until the ‘breakeven’ age-at-arrival of around 48-49 years, at which point the net impact turns negative. The breakeven age-at-arrival is slightly higher for the Commonwealth Budget (50-51 years) and lower for the State Budgets (44-45 years). After the budget impact has turned negative, it keeps decreasing with arrival-age until reaching a low after retirement age (60 to 75 years) just below \$-300,000.

The breakeven age-at-arrival varies considerably across the visa groups. This is illustrated by the following table, which shows the estimated breakeven age-at-arrival by visa group for the Commonwealth and State Budgets.

Estimated ‘Breakeven Age-at-Arrival’ for the NPV of the Total Commonwealth and State Budget Impact by Visa Category

	Family	SAS	Business Skills	Independent ¹	Humanitarian	All Migrants
Commonwealth	46	55	59	50	42-43	50-51
States	41	46-47	46-47	47-48	40-41	44-45
Total Budget	45-46	51-52	58-59	48-49	41-42	48-49

Source: The DIMIA Migrant Ageing Model and the Longitudinal Survey of Immigrants to Australia (1st cohort).

¹ Note that there were too few Independent migrants aged above 46 years to accurately determine the breakeven age-at-arrival for this visa group.

The Business Skills/ENS visa group has the highest breakeven age-at-arrival of around 58-59 years, followed by SAS migrants (around 51-52 years). The breakeven age-at-arrival for Family migrants is around 45-46 years on average and the Humanitarian migrants have the lowest breakeven age-at-arrival at around 41-42 years.

These results should not be interpreted as suggesting that migrants up to these breakeven ages will result in a positive outcome for government budgets. First, the breakeven ages are estimates and should be regarded as only broadly accurate, in part because of the inherent uncertainties associated with projecting the future lifetime outcomes for migrants. Secondly, and more importantly, to take migrants up to the estimated breakeven age is likely to lower the breakeven age in the skill stream categories. This is because the sample on which the results are based is probably biased towards successful migrants in the older age groups through self-selection. To be successful in their applications, older migrants would usually need higher order skills to overcome lower points for age in the points test.

The results presented in this report are based upon a series of *baseline assumptions* regarding a range of issues necessary to estimate future budget impacts. To test the robustness of the results a series of sensitivity analyses of the most important assumptions were carried out. For example:

- The NPV discount rate: The results are based on a 4 per cent discount rate used for the calculation of present values of the future budget impacts. The dollar values are quite sensitive to the discount rate, but the breakeven points are less sensitive. A higher discount rate (6 per cent) reduces the average results from \$250,000 to \$154,000, while the average breakeven age at arrival is increased by about 2 years from (48-49 to 50-51 years). A lower discount rate (2 per cent) increase the average results from \$250,000 to \$480,000, while the average breakeven age-at-arrival is reduced by about 2 years from (48-49 to 46-47 years).
- The interest rate on accumulated net budget contribution: The net budget impact is accumulated year by year, and imputed interest payments are calculated on the basis of a 2.5 per cent nominal interest rate (zero real). The interest payments contribute more than one-third (38 per cent) of the average results, but have virtually no impact on the breakeven age-at-arrival.
- Excluded receipts and outlays: The results exclude certain receipts (for example company taxes) and outlays (for example, defence spending) that are regarded as largely unaffected by immigration. The Commonwealth Budget analysis has equal coverage of receipts and outlays (around 75-76 per cent) while the coverage of State Budget outlays is higher (92 per cent) than for receipts (80 per cent). The sensitivity analysis showed that including, for example, Defence spending (\$13.8 billion) has the effect of reducing the average result by \$29,000 (from \$250,000 to \$221,000) while lowering the breakeven age-at-arrival by 1 year (to 47-48 years). Labour market convergence of immigrants: The results are based on estimates of gradual improvements in migrant labour market outcomes (labour force participation, employment and earned income) during the first two decades after arrival. By assuming a faster labour market convergence the results improve somewhat. On average the net budget impact increases by \$35,000 (from \$250,000 to \$285,000) and the breakeven age at arrival reduces by about 1 year. The improvement is largest for Family migrants and, in particular, the Humanitarian migrants (who also have the worst labour market performance of the visa groups).

Background to the study

The analysis presented in this report is a summary of a project carried out by Access Economics for the Department of Immigration and Multicultural and Indigenous Affairs. The analysis and the report was prepared by Hans Baekgaard, Access Economics. Valuable input, comments and advice from officers at DIMIA as well as from Ewen Waterman, Chris Richardson and Jeremy Rothfield of Access Economics are gratefully acknowledged.

Acronyms and definitions used in this report

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AIHW	Australian Institute of Health and Welfare
AMEP	Adult Migrant English Programme Charge
ATO	Australian Taxation Office
AWE	Average Weekly Earnings
BAD	Debit Tax
BS	Business Skills and ENS migrant visa category
CPI	Consumer Price Index
CSDA	Commonwealth/State Disability Agreement
DETYA	Commonwealth Department of Employment, Training and Youth Affairs
DIMIA	Commonwealth Department of Immigration and Multicultural and Indigenous Affairs
ENS	Employer Nominated Scheme
ESL	English as a Second Language
ETR	Effective Tax Rate
FID	Financial Institutions Duty
GDP	Gross Domestic Product
GST	Goods and Services Tax
IN	Skilled Independent migrant visa category
HES	Household Expenditure Survey
HSS	Humanitarian Settlement Services
HU	Humanitarian migrant visa category
LSIA	Longitudinal Survey of Immigrants to Australia
MU	'Migrating Unit Spouse' (partner of the Principal Applicant)
NCVER	National Centre for Vocational Education Research
NESB	Non-English Speaking Background
NPV	Net Present Value
NRC	National Research Council (United States)
NSW	New South Wales
NT	Northern Territory
NZ	New Zealand
OH	Other Household members in a migrant household

PA	Principal Applicant in a migrating household unit
QLD	Queensland
SA	South Australia
SAS	Skilled Australian Sponsored migrant visa category
TAS	Tasmania
TIS	Translation and Interpreting Service
US	United States of America
VIC	Victoria
WA	Western Australia

Throughout this report the term *State* or *States* are intended to also include reference to *Territory* and *Territories*.

The five visa categories used in this report refer to the ones used for the first cohort of the LSIA:

1. Family migrants;
2. SAS - skilled Australian sponsored (Skilled);
3. Business Skills/ENS (Skilled);
4. Independent (Skilled); and
5. Humanitarian.

The term ‘migrant’ is used in this report to mean ‘permanent migrants - not including New Zealanders’. It should also be noted that there are compositional changes in the current intake concerning the pooled group consisting of the Business Skills and ENS visa categories.

1. Introduction

Immigration policies have been an integral part of Australian population management since the early years of settlement. From an economic point of view, the decision to admit migrants into the country is, in a real sense, an investment decision that will continue to have an impact for a long time into the future. This paper focuses on an important economic impact of immigration, but it needs to be recognised that non-economic factors are also important in influencing immigration policy. The economic (and broader) impact of immigration can take a long time to take full effect, although the immediate impacts are often more apparent and receive more attention. The current size and composition of Australia's population is influenced importantly by past policies. At the same time, current policies and associated immigrant inflows will affect the population and the economy for some years into the future.

In measuring the fiscal impact of immigration it is important to decide whether we are measuring:

- the current impact of past immigration;
- the current impact of current immigration; or perhaps
- the future impact of current immigration.

In this report we seek to provide answers to the latter two questions. The contribution of the report can be defined as follows:

- To provide an overview of the methodology issues relating to the measurement of the fiscal impact of immigration with special reference to the effect of age at arrival;
- To estimate current and expected future fiscal impacts (detailed receipts and outlays) of immigrants by age at arrival and by migrant visa class; and
- To provide discounted estimates of the net present value (NPV) of expected future flows of receipts and outlays.

The results are presented separately for the Commonwealth and the State budgets. The State Budget results are reported as weighted averages across the States.

It is possible to identify three relevant strands of research that deal with the issue at one level or another:

1. Estimates of the relationship between the fiscal impact of immigration and the age at arrival;
2. Estimates of the fiscal impact of immigration abstracting from the age at arrival; and
3. Analysis of particular *aspects* of the relationship between fiscal impact and age at arrival.

Comprehensive studies of the relationship between the fiscal impact of immigration and the age at arrival are not common. In fact, we have only been able to identify one study that deals with this issue in great detail – the US study *The New Americans* commissioned by the National Research Council (see National Research Council, 1997). At the same time, there are several examples of studies that fall into the second category. Unfortunately, many of these studies of the fiscal impact of immigration are not as precise as they might be about what they are attempting to measure. Given that, there is a considerable risk that they are more likely to confuse the issues than to provide useful input upon which to inform the immigration debate. The *New Americans* study is a welcome exception. The study is focused on the situation in the US, but its careful treatment of the methodological issues makes it a

useful point of reference for the Australian case. For this reason we have devoted a special section to the *New Americans* study (see Section 3), which outlines the methodological issues raised in the study and some of the main results presented for the US case.

The second type of research most commonly attempts to measure the net fiscal impact of *current* migrant-headed households. That work is less relevant (and useful) to the present study, but some work is worth mentioning. The *New Americans* study provides estimates of the fiscal impact of *current* migration. The authors compare the results with those from another part of the study, which applies methods similar to the ones we apply in this report. The other studies of interest are the DIMIA Commonwealth and State Budget models (see Department of Immigration and Multicultural and Indigenous Affairs, 1999, 2001a and 2001b). The work presented here should be seen as supplementary to these models.

There is a plethora of research, from Australia and overseas, of the third category dealing with analysis of more limited aspects of the fiscal impacts of immigration. These studies provide insight into aspects of the relationship by examining the settlement process. For example, there is rich information on the relationship between the age at arrival and the earnings outcomes of immigrants, as well as their welfare dependency (and other aspects that affect Government outlays and receipts). In general, we refer to this research wherever it is relevant to our own estimation of receipts and outlays profiles. One report deserves particular attention, however, because of its detailed analysis of the relationship between the age at arrival of immigrants and their welfare dependencies, namely Birrell and Jupp 2000.

This report is organised as follows. Following the introduction, Section 2 provides an overview of the main methodological issues related to the measurement of the fiscal impact of immigration. It is important to appreciate that studies based on different methodologies can produce different outcomes without necessarily being based on markedly different assumptions. It is equally important to understand these differences to be able to properly assess their implication. In Section 3, we summarise the most important results from the *New Americans* study with special emphasis on the relationship between the fiscal impact of immigration and the migrant's age on arrival and the importance of the assumptions underlying the estimations. The following two sections describe our own approach and modelling results. Section 4 provides an overview of the model constructed to estimate the Budget impact of immigration on the basis of Australian data. The results are presented in Section 5 as a *baseline scenario* based on a set of reasonable assumptions. Section 5 also provides sensitivity analysis of the impact of changing various baseline assumptions such as the discount rate used for net present value calculations.

2. Measuring the fiscal impact of immigration: conceptual challenges and solutions

In measuring the fiscal impact of immigration there are a number of important methodology issues that need to be addressed and decisions made about preferred approaches. This is true regardless of whether one is looking at the overall impact of all immigrants or the impact by age at arrival. As mentioned previously, for example: is the focus on the fiscal impact of the current migrant population, historical immigration or recent arrivals? An important related question is how the children of migrants (overseas and native born) are treated. It is thus important whether we only consider the children of migrants for as long as they are in the parents' household (and generally quite expensive for the government) or we also include their remaining lifetimes and therefore the taxes paid on their future earnings.

In the United States there have been a number of studies conducted into the fiscal impact of immigration. The results vary widely. Some studies point to positive fiscal outcomes while others show negative fiscal impacts. The disparity of the results can usually be explained by the different methodologies and assumptions that the studies apply. It is therefore essential to put some effort into sorting out these methodological issues and, if possible, to examine the effect of applying different assumptions – especially for the particular assumptions that are more arbitrary (and therefore debatable).

Earlier studies such as the *New Americans* study and, in particular, MaCurdy et al, 1998, are helpful in identifying at least seven methodological issues that are important to consider:

1. The scope of receipts and outlays and how they are treated;
2. The dynamics of the analysis: cross-section or longitudinal;
3. The unit of analysis: migrant-headed households, migrating units or individuals;
4. The treatment of the descendants of immigrants;
5. Future budget constraints (which might affect the sustainability of current programs and entitlements);
6. The impact on State and Commonwealth Budgets;
7. Indirect impacts: second and third round effects.

These seven conceptual issues are now discussed in more detail.

2.1. The scope of receipts and outlays

The first issue is concerned with how to assign government outlays and receipts to individual immigrants. Which outlays and receipts should be included and how should they be attributed to persons and households? Does the level of receipts and outlays depend on age and, indeed, on age at (or time since) arrival? For large parts of the budget accounts there is an obvious link between particular receipts and outlays and particular persons or families. This is, for example, the case for cash benefits and most taxes and to some extent it is possible to assess the impact of the age-at-arrival factor. However, for non-cash benefits (such as education and health care) and other public expenditures it is not always obvious how to assign the value to individuals. In the case of a true public good like national defence, which must be provided collectively by the community, it may not even be appropriate.

Apart from true public goods, the problem applies in particular to public infrastructure such as research, roads, etc. where it is less obvious how additional immigration affects expenditures.

These issues are discussed in detail by MaCurdy et al (1998) who distinguish between congestible and non-congestible public goods according to whether they “are subject to a substantial amount of crowding” (cit, page 16). A public swimming pool, for example, is subject to crowding, but it is not necessarily fully utilised. The authors also argue that it may be important to identify to what extent there are, for example, economies of scale in providing public services that change the per-capita cost of providing the service to the native population. As we shall see, the treatment of public goods as either fully congestible (full assignment to individuals) or non-congestible (no assignment) matters a great deal to the results and it is thus important to be precise about the assumptions made and, if possible, to test the sensitivities to alternative specifications.

A related issue is how to measure per-person expenditure relating to different government services. For many services (and receipts) it is obvious that usage depends importantly on personal and family characteristics such as immigrant status/class, age, income and family structure (for example, social security, taxes, education costs etc.). However, for other outlays it is less obvious whether the patterns of usage warrant differentiating between migrants and non-migrants and age groups. This is, for example, the case for many congestible public goods such as roads and sports facilities. Ideally, the measurement of per-person outlays should take such factors into account, but in many cases there is simply no data available for a detailed analysis and population-wide averages must be used. Again, it is important to be specific about the assumptions made and to test how they might affect the overall outcome.

2.2. The dynamics of the analysis: snapshot or life profiles

The most common approach to measuring the fiscal impact of immigration is to take a snapshot of the situation at a point in time. That is, to measure the impact from a cross-section of overseas born persons or migrant-headed households on the basis of their current situation. There are some limitations with this approach and the results can be hard to interpret in relation to the effect of immigration policies. It is probably easiest to see this by considering a couple of examples of what that method does not measure. Indeed, a cross-sectional approach does not fully measure the impact of past immigration policies and, takes no account of the future impact of current immigration policies. To properly measure these impacts the analysis should be *dynamic*. That is, it should track the changes over time to immigrants and their descendants. To analyse the current impact of past immigration policies the analysis would have to include the effect of all the descendants of overseas born persons. Many descendants no longer live in migrant-headed households and are therefore excluded from the analysis (for the importance of these issues, see *The treatment of descendants* section below). Similarly, a proper measurement of the future impact of new immigrants should be based on dynamic projections of the future circumstances of new immigrants and, if possible, their Australian born descendants.

2.3. The unit of analysis

The ‘unit of analysis’ refers to whether individuals, families or households are used as the basic accounting unit. In previous studies, the choice of unit of analysis has differed for cross-sectional and dynamic studies (see the previous point). In *cross-sectional* analyses it is common to measure the fiscal impact of immigrants by looking at ‘migrant-headed households’ as a way of identifying immigrants. This method effectively ignores immigrants living in households that are headed by non-immigrants, while it includes native born (for example spouses and dependents) who live in migrant-headed households. The main reason for choosing this definition of the immigrant population is the fact that many outlays and

receipts cannot be easily assigned to individuals. Family payments and consumption taxes are common examples where the household or the family is the appropriate unit of analysis. The problem becomes difficult in *dynamic* analysis where the focus on life profiles makes the household unit very difficult to deal with, although not impossible. The dynamic section of the *New Americans* study (Chapter 7) argues that:

“Here we use the individual as the unit of account. We do so because it is necessary for longitudinal calculations. If we were to use households, we would have to deal with changing household structures over time through marriage, divorce, widowhood, the departure of growing children, the arrival of additional family members from abroad, death of elderly members and so on.” (cit. National Research Council, 1997, chapter 7, page 305)

We agree that dealing with the processes of household formation is difficult but we disagree that the simplifying assumption is “necessary for longitudinal calculations”¹. By avoiding the problem of household formation the study makes a strong assumption about the structure of the households of immigrants, namely that it does not change over time. The household situation of a migrant affects a variety of budget receipts and outlays. It is important that this is reflected in the results - even if the individual is used as the unit of account.

2.4. The treatment of descendants

An important implication of the ‘migrant-headed household’ assumptions applied by cross-sectional studies is that native born offspring of immigrants (second generation immigrants) are only included so long as they live in the migrant-headed household. The typical life profile of immigrants (and non-immigrants) shows that in fiscal terms children are generally a net cost until they commence a working career and start paying taxes. It is therefore a clear bias, if native born descendants of immigrants are only included while they are a cost to society. The challenge is that including descendants after they leave the parental household causes serious measurement problems (at least it does in Australia). It also raises an important question about how long into the future the descendants should be included. Should the accounting stop at the 2nd or 3rd generation or should it perhaps continue even further out? The further out in the future the analysis goes the more uncertainty there will be about everything from fiscal policies to changing demographics. The authors of the *New Americans* study correctly argue that the NPV discounting of future flows gradually reduce the weight of future generations and that it thereby reduces the philosophical problem of whether to consider uncertain projections several decades or even centuries into the future.

There is not an easy answer to this question, but its importance cannot be ignored. It makes a substantial difference to the outcome whether 2nd and 3rd generations are included (see the next section), and it therefore seems warranted to place appropriate qualifications on the result if they are not included. Another possibility is to exclude the native-born descendants altogether. After all, they are not immigrants and it could be argued that they should not be considered different to other native born children. Clearly, the descendants are a ‘consequence’ of the arrival of their immigrant forebears, but it is clearly wrong to include them only when they are a cost to the government. As a minimum the analysis should identify the cost of these children separately.

¹ In fact, *dynamic microsimulation* modelling provides a way of doing this (see Section 4).

2.5. Future budget constraints

In analysing the ongoing costs of programs there is an important question as to whether the present level of taxation and program funding can and will be continued indefinitely. This relates to the whether the current fiscal policies are sustainable over the future time horizon for which fiscal impacts are measured. In Australia, as in most western economies, there is a looming threat to current government policies in the form of the costs of an ageing population. The expected growth in expenditures to meet these costs (age pension, medical costs and other forms of care for the aged) will force governments to either increase taxes or to reduce outlays (or both) to avoid unsustainable development in the level of government debt.

It is likely that the Government's changes to retirement income policies in recent years will alleviate the burden of ageing by making the future aged more self-reliant. But further policy adjustments may be required that will affect levels of assistance provided to both immigrants and non-immigrants. So estimates of future costs based on current entitlements may just underline the need for policy adjustment rather than providing a realistic estimate of those future costs.

The problem applies to measurement of those fiscal impacts that deal with the future implications of the current immigrant intake (it is irrelevant to the current cost of immigration). However, it is an additional reason why *current* estimates of the fiscal impact of immigration cannot be interpreted as estimates of the likely future impacts. The available evidence suggests that changing the assumption regarding fiscal adjustments can turn a significantly positive outcome into a negative one (see Section 3). Clearly, this is an important issue.

2.6. State and Commonwealth Budget analysis

It is possible to break down the analysis for individual States and, indeed, this has been done in several cases where the fiscal impact of current immigrants is being measured. The *New Americans* study, for example, shows that the impact of current immigrants varies considerably across American States. The differences are mainly due to State differences in the characteristics and number of immigrants, as well as fiscal policies. In the case of dynamic analysis, however, it has been argued that such a breakdown would not make sense:

“..it does not make sense to do the longitudinal estimates for individual States and localities, because there is so much mobility from locality to locality and from State to State. Each year, 17 per cent of the US population changes residence, 6 per cent change County, and 3 per cent change State. For this reason it does not make sense to do calculations that are based on the assumption that people remain in the same State over their lifetimes, and that their descendants do the same. When we do these calculations at the national level, we can simply group together all the State and local expenditures.” (cit. National Research Council, 1997, Chapter 7, page 305)

According to recent research, the mobility rates in Australia are comparable to those in the United States (Bell and Hugo, 2000). This points to similar conclusions for Australia, namely that *State-specific* estimates of the future impact of new immigrants would be unreliable and that State averages therefore should be preferred. Indeed, the State budget results presented in this report are weighted averages across the Australian States (see the further discussion in Section 4.1.3.1.2).

2.7. Indirect impacts: second and third round effects

Most studies of the fiscal impacts of immigration only attempt to measure the immediate effects of immigration. Although difficult to quantify there are indirect effects that will affect government budgets in various ways. Examples of such indirect effects are the following:

- The effect on the incomes of native born persons via increased competition and greater labour mobility;
- The effect on the incomes of native born persons via the increased availability of skilled labour; and
- The effect on the employment chances of native born persons as a result of entrepreneurial activities of immigrants.

We have not seen examples of such effects being considered in measurements of the fiscal effects of immigration. Indeed, we have not attempted to do so in this report.

3. The ‘New Americans’ Study

The most comprehensive research to date into the fiscal impact of immigration was conducted as part of the *New Americans* study for the National Research Council (NRC) in the United States. Being based on US data and US State and Federal fiscal policies, the results from the *New Americans* study cannot be used to draw conclusions about the fiscal impact of immigration in Australia. However, the application of different methodologies and the testing of various assumptions underlying the *New Americans* study provide useful insight into the importance of the effect of the choice of methodology applied - in an Australian context. The review of the *New Americans* study in this section will therefore focus more on the effect of methodology and assumptions than the actual results in terms of magnitudes and direction of outcomes. The US experience will be used to direct our own efforts into modelling the relationship between the immigrants’ age at arrival and the fiscal impacts on State and Commonwealth Budgets. In addition, we will be able to assess how our choices may impact on the results and thereby assist in a correct interpretation of the outcomes.

The measurement of fiscal impact of immigration in the *New Americans* study falls in two parts:

- The fiscal impact of migrant-headed households (Chapter 6 of the *New Americans* study); and
- The future fiscal impact of new immigrants (Chapter 7 of the *New Americans* study).

The first part is a cross-sectional study based on NRC commissioned research covering case studies for the high immigration States of New Jersey and California (see Garvey and Espenhade, 1998; and Clune, 1998). This part of the study does not provide nationwide results. It looks at a snapshot of migrant-headed households and thus ignores the US born descendants of immigrants that have left the parents’ household (see the discussion in the previous section). With national defence as the only exemption, it is assumed that all public services are (congestible) private goods, which means that their costs are attributed to immigrant (and native) household on a per person basis. This is a very important assumption, which has the effect of biasing the fiscal costs upward.

The main findings of the annual fiscal impact of migrant-headed households are summarised in the following table:

Table 3-1 Estimated Net Fiscal Impact on State and Federal Budgets per Migrant-headed Household in New Jersey and California (1996 US dollars)

	New Jersey	California
State and local	-\$1,484	-\$3,463
Federal	\$520	\$127
Total	-\$964	-\$3,336

Source: National Research Council, 1997 (Chapter 6).

Note: The ‘Federal’ for New Jersey (\$520) has been derived from the California average.

The table shows that, based on cross-sectional analysis, the fiscal impact of immigrants is negative in both States. However, the results differ enormously between the two States, with the main reason being the difference between their immigrant populations. Californian immigrants tend to have lower incomes, be less skilled and to have more children compared with their New Jersey counterparts. This leads to another finding of the study, namely that the impact differs considerably across different immigrant groups. For example, the immigrants from Europe and Canada contribute positively while immigrants from Latin America (as a group) have the largest negative impact.

Interestingly, the negative result is not so much a consequence of higher social expenditures on immigrants. In fact, immigrants on average receive less social security assistance than native born households do. The difference results almost entirely from the lower immigrant tax contribution, which in turn is related to lower than average incomes.

Turning now to the longitudinal study described in Chapter 7 of the *New Americans* study (National Research Council, 1997), we get a broader picture than is achievable using the current migrant-headed household methodology. The analysis of the future impact of new immigrants is based on research commissioned by the *New Americans* project, which applied a much more flexible approach than its cross-sectional counterpart (see Lee and Miller, 1998). This approach allowed the authors to examine the fiscal impact of new immigrants over a time horizon into the future and, importantly it provided a framework for assessing the effect of some of the methodology assumptions described in the previous section. First, we provide a brief summary of the methodology.

The analysis is based on longitudinal projections of a cohort of recent immigrants and their descendants. To simplify matters, the authors assume individuals as the accounting unit, thereby avoiding the difficult task of modelling the processes for household formation and the correlation between the characteristics of household members (for example, the employment situation and incomes of spouses).

The construction of longitudinal immigrant profiles builds upon simple cross-sectional age profiles for outlays and receipts by education level and time since arrival². These variables are thus the drivers of the differences between the receipts and outlays associated with immigrant and native-born residents³. Indeed, these are the variables projected for the immigrants and their 2nd and 3rd generation descendants. The link between the incomes of immigrants and their descendants is driven by inter-generational improvements in educational achievements. The projection of education level for the children and grandchildren of immigrants is based on inter-generational transition matrices for three levels of education to account for the ‘rapid’ catch-up of descendants of immigrants to general education levels. The projections also required estimates of immigrants’ fertility and mortality rates as well as return emigration rates. In the US, immigrants have lower mortality and higher fertility rates than native born residents, although an estimated 30 per cent re-emigrate to their country of origin, “*presumably taking at least their younger children with them, thus substantially mitigating the effect of their higher fertility*” (cit. pp 304).

Other important features of the methodology applied by the study include:

- The age profiles for outlays and receipts shift upward at an assumed rate of productivity growth of 1 per cent annually.

² It is thus clear that, although the analysis is longitudinal, the authors have taken a cross-sectional approach to the estimation of the components of receipts and outlays.

³ This is clearly a simplification that warrants qualification of the results.

- Official projections of government debt under current tax and expenditure policies have been applied to adjust policies to fix the debt-to-GDP ratio at the 2016 level;
- The budget target is accomplished by a 50-50 combination of reducing benefits and increasing taxes; and
- Future flows have been discounted by a baseline rate of 3 per cent.

These assumptions are referred to as the baseline scenario. We will return to some of these assumptions to examine how they affect the results.

The first result presented in the study is an illustration of the ‘traditional’ cross-sectional fiscal impact of current immigrants. The effect is shown separately for immigrants, their native born children (aged <20), 2nd generation immigrants aged 20+ and 2nd generation aged 20-64. These results, which illustrate the effect of including/excluding descendants in the calculations, are repeated in the following table:

Table 3-2 Estimated Net Fiscal Impact on State and Federal Budgets per Migrant-headed Household in New Jersey and California (1996 US dollars)

	Immigrants	Children of Immigrants (2 nd < 20)	Immigrants + Children < 20	2 nd Generation 20+	2 nd Generation 20-64
	\$	\$	\$	\$	\$
Federal	1,310	-1,570	-550	-1,190	4,340
State and local	490	-4,820	-920	2,090	3,000
Total	1,800	-6,390	-370	910	7,350

Source: National Research Council, 1997 (Table 7.2).

The cross-sectional estimates in the table are affected by the same conceptual problems as other cross-sectional analyses (see the discussion in the previous section). However, they do provide useful insight into the effect of including descendants while they are young (and costly) while excluding them after they have become independent (and net contributors). The table shows that the negative impact from the cross-sectional calculations for migrant-headed households (-\$370)⁴ is caused entirely by their ‘expensive’ native born descendants. The estimates for the immigrants themselves are positive both at the federal level (\$1,310) and at the State/local level (\$490). In contrast, their native born descendants aged less than 20 years are very costly with a total impact of -\$6,390. The main part of the cost of the children affects the State/local budget (-\$4,820) due to the high cost of schooling and education. The table also illustrates the possible (positive) effect of adding 2nd generation immigrants to the picture.

⁴ The estimated cost of \$370 is only an approximation of the cost for migrant-headed households. Notice also that in contrast to the cross-sectional study it is a per capita estimate. The use of individuals as the accounting unit makes it less than straightforward to generate household estimates and the ‘<20’-assumption is an approximation of the age at which 2nd generation immigrants leave home. However, the authors show that the estimates are reasonably consistent with the case studies for New Jersey and California referred to above.

While these findings are interesting, the core contribution of the study is to provide estimates for the relationship between age of arrival of the immigrant and the discounted future fiscal impact for new immigrants and their descendants. These are illustrated by graphs (which we cannot incorporate here) that show the development in the NPV of the total future fiscal impact by age at arrival for three educational groups (<high school, high school, >high school). The impact is further decomposed into the effect for the immigrants themselves and that of their descendants. The main findings are the following⁵:

- The impact of descendants is significant and positive across all age groups⁶ until it withers away in their late thirties as reproduction age comes to an end;
- The difference between the outcomes by education levels (of the immigrating parents/grandparents) of 2nd and 3rd generation immigrants is not pronounced due to the improvement in educational attainment of immigrants' children and grandchildren;
- The total fiscal impact is positive for all educational groups for age of arrival until a breakeven point and thereafter it turns rapidly negative;
- The breakeven age at arrival comes relatively late for the '>high school' group (at around age 48 years) compared with around age 35 years for the 'high school' group and around age 22 years for the '<high school' group.

The first point underlines the previous discussion about the importance of considering native born descendants of immigrants. Adding the positive effect of these 2nd and 3rd generation descendants to the picture makes it look much more positive for immigrants arriving before their mid-thirties. Strikingly, it is only the '>high school' group that contributes positively in their own right at any age at arrival.

The following table shows the average fiscal impact across recently arrived immigrants. The estimates shown in this table are the core results of the study. The average discounted fiscal impact across the population of recent immigrants is an estimated \$80,000 per person. However, if the descendants are not included in the overall result it is slightly negative (at -\$3,000). The descendants account for a positive contribution of \$83,000 in NPV terms. The table also shows the significant difference between outcomes for the three educational groups. Again, the differences mainly come from the immigrants themselves. Only the '>high school' groups account for a positive outcome (\$105,000) in their own right. The outcome for '<high school' group is negative (-\$13,000) even when the descendants are counted.

⁵ The age at arrival estimates represent the NPV of the annual future flows of fiscal impact.

⁶ The age at arrival refers to the immigrant – not the native born descendant. Notice that the overseas born descendants are treated as individual immigrants in these calculations.

Table 3-3 Average Fiscal Impact of an Immigrant Overall and by Education Level (1996 US dollars)

	Education Level of Immigrant			
	<High School	High School	>High School	Overall
	\$	\$	\$	\$
Immigrants	-13,000	51,000	198,000	80,000
Immigrants themselves	-89,000	-31,000	105,000	-3,000
Descendants	76,000	82,000	93,000	83,000

Source: National Research Council, 1997 (Table 7.5).

Note: The estimates in the table represent the discounted fiscal impact for a number of future years and are thus not directly comparable to the annual estimates in the previous tables.

The study provides informative sensitivity tests of some of the main assumptions behind the results in the above table. The main findings are summarised by the following points:

- The assumption that future taxes and outlays must be adjusted to meet expected budget constraints is crucial to the overall outcome. If no adjustments were made (ie. the current policies are continued) the \$80,000 surplus would turn into a \$15,000 deficit;
- Applying alternative discounting interest rates (for the NPV calculation) shows that higher rates erode the outcome - a rate of 8% (instead of 3%) wither away almost the entire surplus (down from \$80,000 to \$8,000);
- Assuming that public goods (ie. national defence) are congestible goods would reduce the average outcome by \$85,000 to -\$5,000;
- Assuming that congestible goods are public goods would improve the average outcome by \$80,000 to \$160,000.

It is thus clear that some of these assumptions can have a significant impact on the outcome.

The authors acknowledge the difficulties many readers may have with the extremely long time horizon implied by the NPV calculations of the impact of immigrants and their descendants. They, therefore, provide further illustrations of the timing of the annual flows. These calculations show, for example, at which point in time in the future the decision today to take in extra immigrants is likely to turn into positive flows and (in a cumulative sense) to breakeven. Under the baseline assumptions, the total NPV of flows for an average immigrant turns positive after 40 years. Although the undiscounted flows only take 23 years to turn positive this must seem a long investment horizon by any policymaker's standard.

4. Our approach: an overview

The main purpose of the analysis described in this report is to provide estimates of the Net Present Value (NPV) of expected future flows of Commonwealth and State/Territory receipts and outlays associated with a *cohort of current* immigrants, that is one year's immigration intake. The calculation of NPV in budget terms for an immigrant cohort requires projections of the cohort's future flows of receipts and outlays from the year of arrival to the year they leave the population either by death or remigration. The future flows of receipts and outlays are created by a projection model that simulates the future lifetime profiles for a sample of immigrants arriving in Australia in 2000-01. In order to project the lifetime profiles of the immigrants in the most realistic manner possible, a tailor-made *dynamic microsimulation model* has been developed. The model ages the first cohort sample of immigrants (the *Base Population*) from the Longitudinal Survey of Immigrants to Australia (LSIA1)⁷ from the year they arrive through to the time they either remigrate or die. In this section we provide an overview of the model and its underlying assumptions.

The choice of dynamic microsimulation as the modelling approach was based on careful consideration of the factors that affect Government budget receipts and outlays. The two most important factors that influence the budget impact of individuals and families are the following:

- *Age at arrival*: The budget impact for a 'typical' person varies over the person's lifetime. The impact is generally negative during childhood and continues to be negative until the person leaves the education system and starts earning income. The impact then turns positive and remains so until the person retires, whereafter it again turns negative when tax payments are generally outweighed by increased government outlays such as social security pensions and age related medical costs.
- *Income earning capacity*: The employment success of immigrants in terms of employment and incomes affects some of the main budget accounts at both the receipts (direct and indirect taxes) and expenditure sides (social security in particular).

The expected lifetime budget impact of immigrants is a cumulative effect of the above two factors. It is thus strongly affected by their age at the time they arrive. As a rule of thumb, the NPV of whole-of-life impact increases with age-at-arrival until it reaches a peak at around the age when young persons leave the education system. The NPV then decreases until around retirement age and for most immigrant groups there is a breakeven age-at-arrival after which the impact is negative. After retirement age the (then negative) NPV again starts to increase as the expected number of years with pension and health care costs decrease. The breakeven point depends on many things but the most important factor is income earning capacity.

⁷ This study uses the first survey cohort of the Longitudinal Survey of Immigrants to Australia (LSIA1). The LSIA1 population was sampled among immigrants arriving during 24 months of 1993-94 and 1994-95 (1 September 1993 to 31 August 1995, to be precise). The first of three interviews was conducted around 6 months after arrival, the second interview around one year later and the third and final interview around two years after the second interview. The results of the second cohort of the LSIA (LSIA2) were not available for this report.

These patterns are general ones and the levels and other details differ considerably for immigrants with different capacities to settle successfully in their new country. This aspect is important for the analysis presented in this report; separate estimates are provided for the five main Visa categories, namely:

- 1 Family migrants;
- 2 SAS - skilled Australian sponsored (Skilled);
- 3 Business Skills/ENS (Skilled);
- 4 Independent (Skilled); and
- 5 Humanitarian.

The differences between the five visa groups regarding skills and other factors affect their impact on government budgets in a number of ways. The main differences are in the labour market performance of the visa groups and consequently, their income earning capacity. The labour market success of visa groups differs already in the first year after they arrive and large differences persist long after the initial settlement process is completed. The immigrants from the visa groups arrive with different educational qualifications and other skills such as English language proficiency. As a consequence, they are off to a different start in terms of employment chances and income levels. The skilled migrant groups are generally better equipped for the Australian labour market than the Humanitarian groups. In fact, the Business Skills/ENS group has lower unemployment rates than equivalent Australian born persons already during the first year after arrival. The Independent and SAS migrants soon catch-up and quickly overtake their Australian born counterparts. In contrast, the Family and, in particular, the Humanitarian visa groups have very high unemployment rates in the first years after arrival and, seen as a group, they may never catch-up fully with their Australian born counterparts.

The dynamic microsimulation model outlined in Section 4.1 models the differences between the migrant groups and it captures their impacts on the budget receipts and outlays.

4.1. A dynamic microsimulation model for immigrants

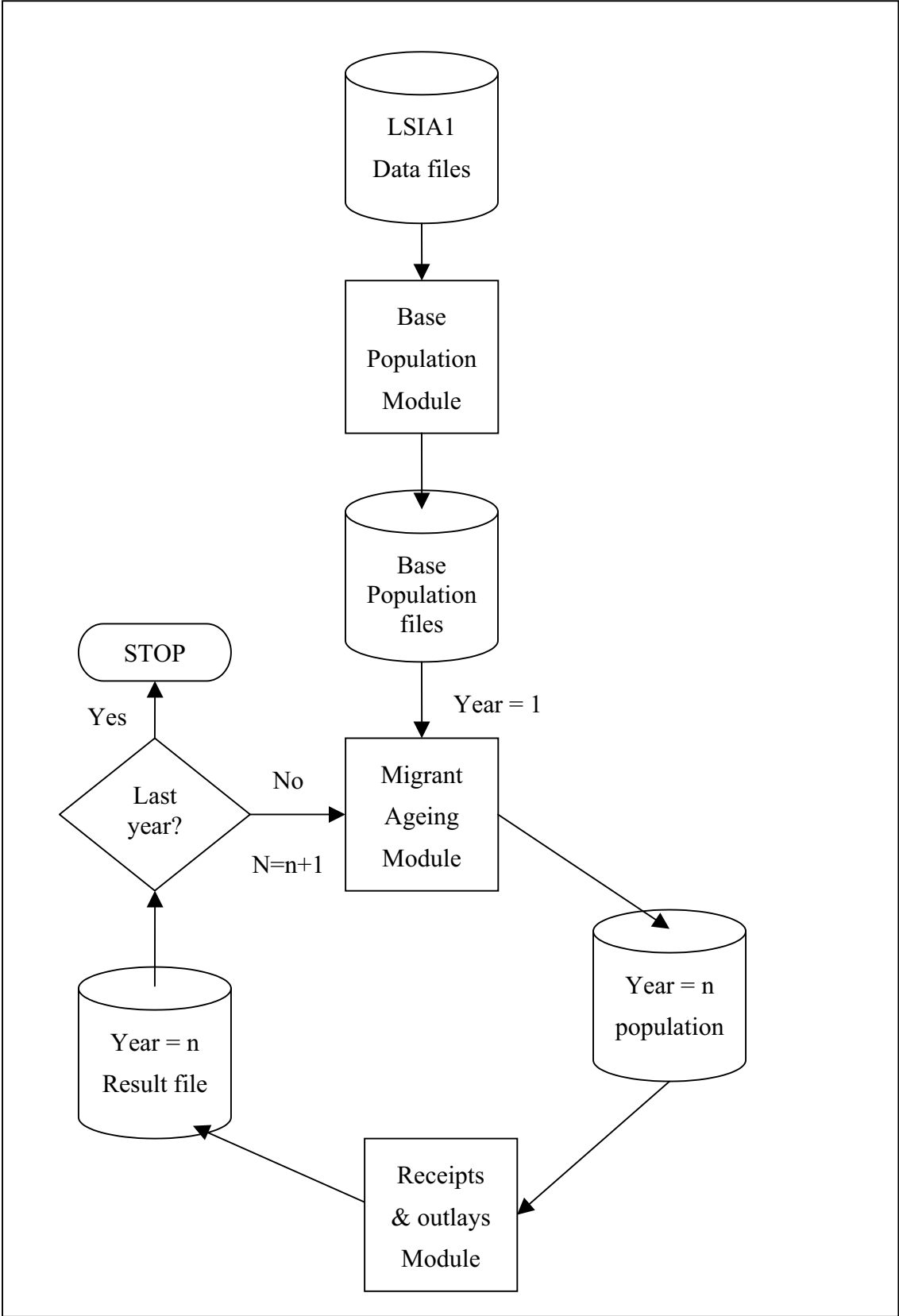
The dynamic microsimulation modelling technique is used to capture the differences between the budget impacts of migrants with different educational qualifications and other characteristics that affect their earnings performance over their remaining lifetimes in Australia. The modelling involves a series of processes that year by year simulate the life events of the individuals and families in the Base Population.

An overview of the model is at Figure 4-1. It consists of four main components:

1. The Base Population: a sample of a cohort of immigrants based on the LSIA1 survey file.
2. The Migrant Ageing module: performs the year by year ageing of the Base Population.
3. The Receipts and Outlays module: estimates the year by year receipts and outlays for the aged Base Population.
4. The Output module: summarises and presents the results.

The Base Population is created by a module (in SAS programming language) that extracts relevant information from the three waves of the LSIA1 files and arranges the variables in three files representing the immigrant population in the first, second and fourth years after arrival. The next step is the Migrant Ageing module, which ages the Base Population year by year through to the end of the simulation period (typically until all original immigrants are dead).

Figure 4-1 Overview of the immigrant dynamic microsimulation model



The Migrant Ageing module simulates the basic demographic and labour market processes such as child birth, couple formation/dissolution, labour force participation, employment and incomes. Subsequently, at each annual iteration, the Receipt and Outlays module simulates the budget receipt and outlays items such as direct taxes, indirect taxes, social payments, education outlays and health costs. The resulting output files (with information about each year of the simulation) is input to the Output module, which summarises and presents the results of the simulation in terms of the NPV of the future flows of receipts and outlays.

In the following subsections, the first three of the above model components are described in more detail. The output model is not described in this report.

4.1.1. *The Base Population*

The Base Population is created from the three waves of the LSIA1 files. LSIA1 is sampled from the cohort of permanent migrants (New Zealanders excepted) who entered Australia during the years 1994-95 and 1995-96. The survey is *longitudinal* in that the persons from the first interview were reinterviewed twice. The first interviews (wave 1) were conducted around 6 months after arrival, the second interviews (wave 2) one year later after around 18 months and the third interviews (wave 3) after another two years or around 42 months after arrival. The three waves have been applied to represent the original arriving population 1, 2 and 4 years after arrival. There are thus three Base Population files representing snapshots of the original immigrant population for the first, second and fourth years after arrival.

The unadjusted Base Population files for the second and fourth years are not, however, fully representative of the immigrant population for these years. This is due to survey attrition between the first and the subsequent interviews (attrition due to remigration is a natural part of immigrant ‘ageing’ and does not constitute a problem). There are two forms of sample attrition present in the LSIA1: whole households or individuals leaving the survey. The LSIA1 covers the whole household of the selected Principal Applicants, that is, it contains information about all the persons in the household. The immigrants from the first interview can thus leave the survey either because the whole household could not be interviewed or because individuals have left the PA’s household due to, for example, couples separating or young persons leaving their parents’ home (these persons have not been contacted for the second and third interviews). Both types of attrition could lead to biased results if these persons and households were not included in the results for the second and fourth years and, indeed, other future years of the projections.

We have addressed the attrition problem by *simulating* the circumstances for the attrition persons/units with the Migrant Ageing module from year 1 through to year 4. These simulated records have been added to the year 2 and 4 populations where they are absent due to attrition. Similarly, the ‘missing’ year 3 results have been obtained by ageing the year 2 population and accounting for a proportion of the population that would have left the survey due to remigration.

Therefore while the Migrant Ageing module (see the next section) generally commences the simulation from the Base Population in year 4, the module has also been applied to ‘update’ the households and persons who were not interviewed in wave 2 and/or wave 3 due to attrition.

The Base Population files have two datasets:

- An Adults dataset; and a
- Dependent children dataset.

The two datasets contain a broad range of variables describing the characteristics of the populations. There are thus demographic variables (with information about sex, age, marital status and family situation), education variables (with information about highest qualification and study status and institution) and labour force/income variables (with information about labour force participation, employment, earned income and income from other private sources).

During their lifetimes, most adult persons go through several marital phases. That is, they may change between being single persons or married, and later again separated/divorced and widowed. The model simulates these marital processes (see Section 4.1.2) and as a way of solving the ‘match making’ problem, the ‘Adults’ dataset has records with information about *pairs* of male and female adults who may or may not be actual partners (married or de facto). The pairs who are not actual partners are *prospective* spouses. In case a single person is set to become married or cohabiting they are coupled with the prospective spouse⁸.

The creation of the Base Population files was based on the ‘raw’ LSIA1 files although a number of steps were necessary in the process:

- Most LSIA1 variables had missing observations which required imputation techniques to be applied;
- The LSIA1 only covered detailed interviews with the Principal Applicants (PAs) and the so-called Migrating Unit Spouses (MUs), while much less detail was obtained in relation to Other Household members (OHs).
- The simulation model operates with Income Units as the basic unit of analysis. The Base Population module creates income units and selects the units which have migrating members.
- The *prospective spouses* for single adults (or sole parents) are created on the basis of correlation profiles between the characteristics of couples.

4.1.2. *The Ageing of the Migrant Population*

The purpose of the *Migrant Ageing Module* is to simulate the socio-demographic profiles for the future lives of the immigrant population. The module thus simulates demographic processes (such as births, deaths, couple formation and dissolution), education participation and completions, and labour market outcomes (such as participation, employment and incomes). These profiles are used as the basis for the estimation of the budget receipts and outlays. As illustrated by Figure 4-1, the Migrant Ageing module simulates the ageing of the Base Population sample year by year from the year of arrival until the last person is either dead or has left the country by remigration. The simulation is done at the level of persons and families. At each iteration, they are aged by one year and have their other characteristics adjusted on the basis of statistically estimated probabilities and distributions. The module simulates the demographic and labour market processes that are necessary to calculate the budget impact for individuals and families. The result is annual snapshots of the immigrant population as it ages into the future. These annual snapshots are then used for the purpose of calculating budget receipts and outlays for each person and income unit in the Receipt and Outlays module.

⁸ This arrangement is a convenient way of solving the computationally complex process of finding ‘adequate’ partners in a dynamic microsimulation model.

Table 4-1 An overview of the processes in the Migrant Ageing Module

Process	Type:	Data Source
Births	Conditional probabilities	1998-99 HES
Couple formation/dissolution <ul style="list-style-type: none"> – Cohabitation – Marriage – Separation/Divorce 	Transition probabilities (based on hazard rates)	The 1986 National Survey of the Australian Family Project (parameter estimates from Brasher 1996)
Deaths	Transition probabilities	ABS Catl. 3302.0
Remigration	Transition probabilities	LSIA1 and unpublished ABS departure data
Education	Transition probabilities	1998-99 HES, The Australian Youth Survey (AYS), Various DETYA statistics
Labour force: <ul style="list-style-type: none"> – Participation – Employment – Part-time/full-time – Earned income 	Conditional probabilities	1998-99 HES and LSIA1
Earned income	Conditional distribution	1998-99 HES and LSIA1
Other private income: <ul style="list-style-type: none"> – Rental income – Super/annuity income – Other investment – Workers comp. – Overseas pension 	Conditional distribution	1998-99 HES

Note: the processes for age and sex are straightforward.

Although our main interest is the annual snapshots, an important aspect of the ageing module is that some of its key processes maintain *longitudinal consistency* for individuals and families. This means that if, for example, a person has a Bachelor degree in one year, this person will continue to have a Bachelor degree as the highest educational qualification until a higher degree is obtained. This is achieved by simulating educational qualifications by modelling the *flows* through the education system as education commencements, participation, drop-outs and completions. The longitudinal aspect of processes like education is important for the modelling of budget impacts by visa classes as this ensures that the differences between the characteristics of the visa groups upon arrival is maintained over their futures lives in Australia. The flow through the education system is an example of processes that are guided by *transition probabilities* that model the chance of making a change from one year to the next. The model also makes use of *conditional probabilities* in some situations. A person's labour market status, for example, is thus determined by probabilities that depend on

the person's other characteristics such as age, visa group, time since arrival, educational qualifications etc.

Table 4-1 provides an overview of the processes in the Migrant Ageing module with an indication of the type of the process and the source of the data used for estimation purposes.

The following provides a brief description of the processes in Table 4-1.

Births

The birth of babies is modelled by assigning a probability to all females aged between 15 and 49 representing the chance of giving birth during a year. The probability is determined by a logistic regression and depends on the following variables:

- Age
- Number of children
- Age of youngest child
- Marital status/cohabitation

The probabilities are estimated on the basis of information in the 1998-99 HES.

Couple formation and dissolution

The simulation of marital status and cohabitation is guided by a number of interacting processes that model the probabilities of females entering and exiting cohabitation and marriage. Marital events are determined each year for the females in the Base Population on the basis of their current status and other characteristics such as duration of current status and, for example, age and educational qualification. The modelling approach is based on *survival functions* for transitions between marital and cohabitation status and draws on the parameter work by Brasher, 1996, which provides a full description of the estimation of the survival functions.

Deaths

The simulation of deaths is a straightforward implementation of age and sex specific deaths rates from ABS, 2000a. The model thus assumes that the life expectancy of migrants is similar to that of the population as a whole. When a member of the population dies, the person is 'cancelled' from the population and will no longer be counted. If the 'deceased' had a spouse who was originally a migrant that spouse is made a widower and a new prospective spouse will replace the deceased and remain part of the simulation for as long as the migrant spouse is alive.

Remigration

The remigration of immigrants is simulated by reducing the number of persons and families in the model population. During the first four years, remigration is captured by the attrition from LSIA1 population due to permanent remigration. The reduction in the modelled population due to permanent remigration has thus been treated as a part of the simulation process. The remigration beyond the fourth year after arrival required special treatment. The probability of remigration has been estimated on the basis of unpublished ABS estimates for permanent departures by period of residence in Australia in combination with historical data for permanent arrivals (see ABS, 2000b). The estimated share of the population who leaves the country year-by-year is then used to reduce the *person weights* for the model population as it is ageing.

Education

The education module simulates the flow of persons through the educational system from primary and secondary school through to TAFE and University. The following steps briefly describe the flow through the education system:

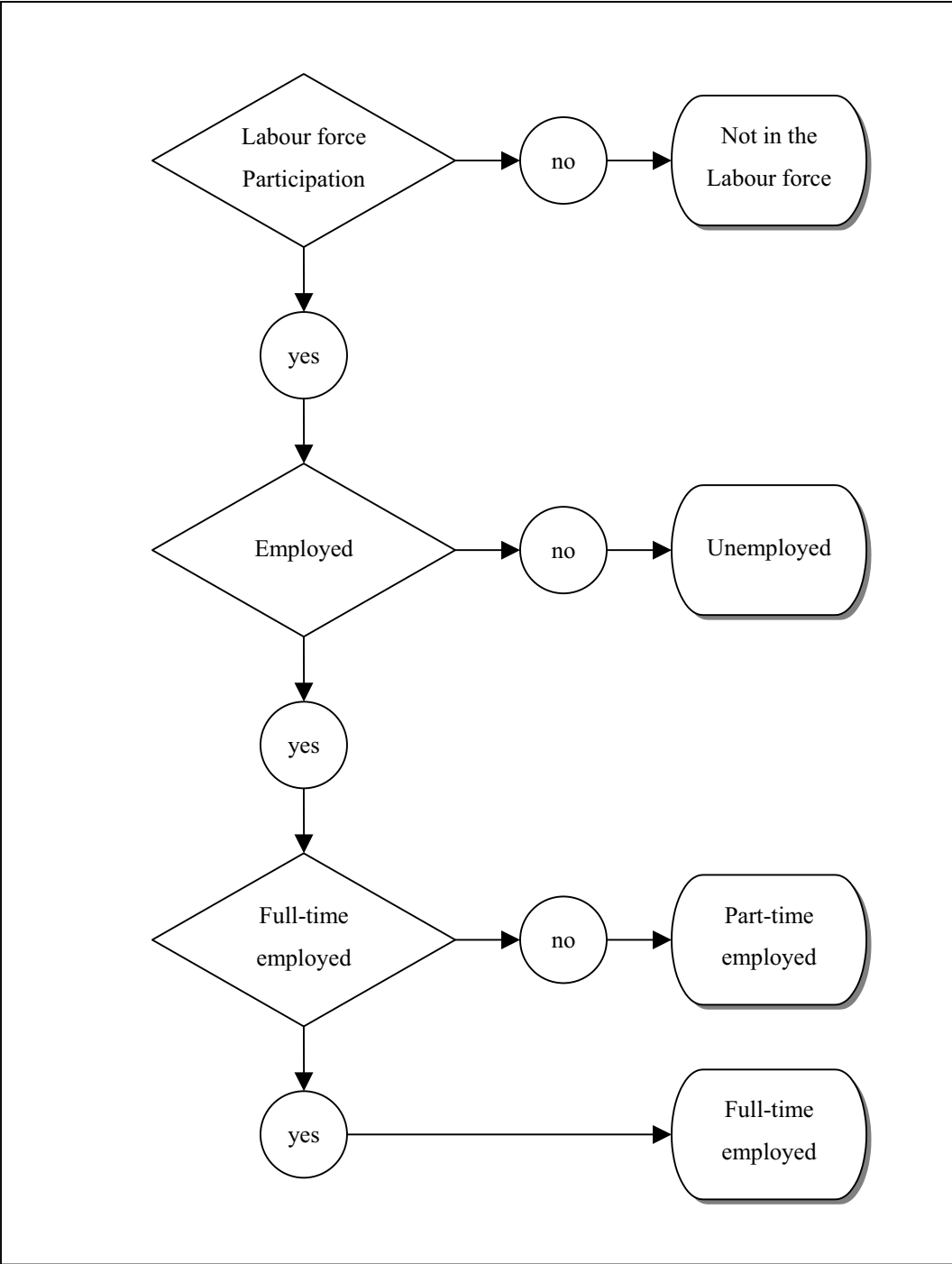
1. Primary school: children commence pre-school aged between 4 and 6 and continue through to year 6.
2. Secondary school: all children are assumed to continue from year 7 through to year 10 and continuation rates for year 10 to 11 and year 11 to 12 are determined by transition probabilities calculated from logistic regressions based on the Australian Youth Survey. The probabilities of continuing from year 11 and 12 depend on a number of personal characteristics (such as age and sex) and parent characteristics (such as country of birth, education, occupation and income)⁹.
3. TAFE and University: The education module simulates four levels of TAFE and University studies/degrees. The following steps guide commencements, continuations, drop-outs and completions:
 - Commencement of University from year 12: The continuation from year 12 to 1st year of University is determined by transition probabilities calculated from logistic regressions based on the Australian Youth Survey. The probabilities depend on a number of personal characteristics (such as age and sex) and parent characteristics (such as country of birth, education, occupation and income).
 - Non-student commencements: persons who are not studying can re-enter the education system at levels that they have the prerequisite qualifications for. The commencement probabilities are conditional upon sex and age and are estimated from DETYA enrolment statistics.
 - Continuations, drop-outs and completions: persons who are enrolled at a TAFE or a University course can either continue studying at the next level, cease studying with or without completing a degree, or change to another course with or without completing a degree.
4. Adjustment of the education flows: except for the transitions from year 10 to year 11, year 11 to year 12 and from year 12 to University, the simulation of migrant education participation and qualification is based on population-wide education transitions (with some adjustment of take-up rates for young immigrants based on estimates from the 1998-99 HES).

Labour force status

The Migrant Ageing module simulates the labour force status of a person. There are four possible outcomes: full-time employed, part-time employed, unemployed or out of the labour force. The process follows three steps as illustrated in Figure 4-2. The first step simulates a person's participation decision and thereby determines whether the person is in the labour force or not. Conditional upon being in the labour force, the second step determines whether a person is employed or unemployed. The third step determines whether an employed person is part-time or full-time employed.

⁹ The parameter work for continuation from year 10 to year 11, year 11 to year 12 and from year 12 to University is described in Hardin, 1996. Adjustments have been made to align the implied take-up rates with benchmark statistics for immigrants.

Figure 4-2 An overview of labour force transitions



The probabilities for the three steps are estimated as logistic regression equations on the basis of the 1998-99 HES (for the first two steps the probability estimations also apply the labour force information in the three waves of the LSIA1¹⁰). The information from the 1998-99 HES was used to estimate the relationship between the labour force status probabilities and a number of explanatory variables. Separate equations were estimated for males and females. The following explanatory variables proved to have a significant effect on the outcomes:

- Age

¹⁰ The LSIA1 collected part-time/full-time status. It was considered, but the quality was found to be too poor.

- Highest educational qualification
- Student status
- Marital status
- Age and number of dependents
- Country of birth (Australia, New Zealand¹¹, Other)
- Labour force status of the spouse for partnered females

The labour force equations were re-estimated using the data from the three LSIA1 waves. All the variables in the equations were identical to HES-based equations except that the ‘years-since-arrival’ variables were replaced by visa group specific ‘convergence’ terms consisting of visa group dummies and log-transformation of the ‘years-since-arrival’. These convergence terms replaced the HES-based ones and the overall levels were scaled to align the year 4 outcome with the estimated rates from the third LSIA1 wave.

The model has a parameter that allows the user to specify how many years the convergence is assumed to continue. In the model it is assumed that the convergence effect applies to all overseas born persons including those who obtain their highest educational qualification after migrating to Australia. Those who immigrate as children are thus assumed to follow the same labour market convergence as their parents.

Earned income

The simulation of labour force status results in populations of full-time and part-time employed persons who are subsequently assigned weekly incomes by a set of income equations. The modelling follows the methodology set out by Baekgaard, 2000, with incomes determined by separate equations for males and females and for full-time and part-time employed persons. The incomes include wage and salaries and business income for the self-employed (unincorporated business income). The equations are estimated by multivariate regression using the 1998-99 HES survey file. The explanatory variables used for the income equations were:

- Age
- Highest educational qualification
- Student status
- Marital status
- Age and number of dependents
- Country of birth (Australia, New Zealand, Other).

The equations for full-time employed males and females also included variables for the number of years since arrival in Australia. There was an identifiable (albeit weak) income catch-up effect. The longer full-time employed immigrants have been in Australia, the closer their income levels are to incomes of similar Australian born persons. A similar effect was not present for part-time employed persons.

A comparison of the simulated incomes for year 4 based on HES data with the reported incomes from the third LSIA1 wave showed that the HES-based outcomes were on average around 30 per cent above the equivalent LSIA1 averages for both full-time males and females

¹¹ A dummy for New Zealanders is required because they are excluded from the analysis presented in this report.

(with some variation for the visa groups). The discrepancies were somewhat smaller for part-timers. The adjustment factors used in the model ensure that the income equations simulate year 4 outcomes that are in line with the LSIA1 information. The model further assumes that it takes another 10 years on average (14 years in total) for immigrants to catch-up with the income levels of Australian born persons.

Other private income

The earned income is the largest component of private income simulated by the Migrants Ageing module. Other private income comprises the following five sources, with each simulated by separate equations:

1. Rental investment income: the net return from rental property investments (after deduction of interest payments and other expenses)
2. Superannuation and annuity income: regular income from superannuation and annuity products (does not include lump-sum payments)
3. Other investment income: includes interest income from accounts, bonds, debentures etc, dividends, royalties
4. Income from workers compensation
5. Overseas pensions: pensions from overseas governments (strictly speaking, this is not *private* income).

The income equations are estimated by multivariate regression using the 1998-99 HES survey file. The explanatory variables used for the five income equations were similar to those for earned income:

- Age
- Sex
- Highest educational qualification
- Marital status
- Age and number of dependents
- Country of birth (Australia, New Zealand, Other)
- The number of years since migrating to Australia.

Although the simulated 'other private incomes' are indexed by the changes in Average Weekly Earnings (AWE), the outcomes reflect to a large extent the situation in 1998-99. This may result in a degree of underestimation of the budget impact down the track when the immigrants begin to retire from the labour market. The reason is that the investment incomes of the future are driven by a combination of past, current and future savings behaviour. This is because these incomes are derived from assets that are accumulated over time. The changes in savings behaviour induced by, for example, the introduction of mandatory superannuation contributions will have implications for the incomes of future retirees who are likely to be better able to support themselves. This will in turn reduce the burden on government pensions and, at the same time, increase expected tax receipts from future retirees. These effects are not fully accounted for by the current version of the model and (other things equal) this will result in a degree of overestimation of pension payments and an underestimation of tax payments.

4.1.3. Budget Receipts and Outlays

The *Receipt and Outlays Module* estimates the impact on government budgets relating to the persons and families in the Base Population as they age year by year into the future. The files with person and family characteristics simulated by the Migrant Ageing module allows the budget items to be estimated on the basis of the age, age at arrival and the visa group of the migrants in the most detailed manner possible. However, it has not been possible to obtain full detail in relation to all budget items. The next two subsections provide an overview of the treatment of the Commonwealth and State Budgets (with details in Appendix A and B).

4.1.3.1.1. The Commonwealth Budget

The table below provides an overview of the modelled Commonwealth Budget items and following the table, the treatment of each item is described in more detail in Appendix A.

Table 4-2 An overview of the modelled Commonwealth Budget items

Budget item	Method	Data source
<i>Receipts:</i>		
Direct taxes and levies		
Income tax	Person specific simulation on the basis of taxable income and imputed deductions	– Tax rates and thresholds from the ATO
Medicare Levy		– Taxation statistics
Indirect taxes		
GST	Person specific based on Multivariate regression of income Unit expenditure shares (of disposable income) on the tax base	1998-99 HES
Alcohol tax		
Tobacco tax		
Petroleum tax		
User charges		
Adult Migrant English Programme Charge	Assigned on the basis of visa group specific take-up rates and charges	
Translation and Interpreting Service Charge	Assigned on the basis of visa group specific TIS usage and user charges	

Table 4-2 (continued)

<p>Migrant Health Charge</p>	<p>Visa group and age specific assigned - to migrants aged 65 or over upon arrival (Humanitarian are exempt)</p>
<p><i>Outlays:</i></p> <p>Settlement services costs</p> <p> Humanitarian Settlement Services</p> <p> Translation and Interpreting Service</p> <p> Adult Migrant English Programme</p> <p>Education costs</p> <p> Primary and secondary schools</p> <p> TAFE</p> <p> Universities</p> <p>Labour Market Assistance</p> <p> Job Network</p> <p>Social Security</p>	<p>Visa group specific assignment to all Humanitarian migrants on the basis of average costs and take-up rates</p> <p>Assigned on the basis of visa group specific TIS usage and average costs</p> <p>Assigned on the basis of visa group specific take-up rates and average costs</p> <p>Visa group specific assignment on the basis of government vs non-government schools and English proficiency</p> <p>Average costs assigned on the basis of person specific enrolment</p> <p>Average costs assigned on the basis of person specific enrolment</p> <p>Person specific assignment to all unemployed persons</p>

Table 4-2 (continued)

Disability Sup. Pension	Person specific simulation on the basis of:	<ul style="list-style-type: none"> – Rates and thresholds from Centrelink – 1998-99 HES (take-up)
Age Pension		
Wife/Carer Pension		
Sickness Allowance		
Newstart Allowance		
Youth Allowance		
Mature Age Allowance		
Partner Allowance		
Parenting Payment		
Special Benefit		
Family Tax Benefit		
Health		
Medicare Benefits	Age and sex specific assignment of average usage	Health Insurance Commission
Pharmaceutical Benefits	Age and sex specific assignment of average usage on the basis of imputed concession status	Health Insurance Commission
Hospital costs	Age and sex specific assignment of average usage	Australian Health Care Agreements
Public Administration		
Centrelink payments	Person specific assignment of average per capita cost to all recipients of Centrelink payments	<ul style="list-style-type: none"> – Budget Statements – Centrelink Annual Report
General Revenue Assistance	Per capita grants	Treasury Budget Papers
Capital Expenditure		
Settlement services	Assigned on the basis of visa group specific TIS usage and average capital expenditure	
Public administration (Centrelink payments)	Person specific assignment of average per capita capital expenditure to all recipients of Centrelink payments	<ul style="list-style-type: none"> – Budget Statements – Centrelink Annual Report

4.1.3.1.2. The State Budgets

The table below provides an overview of the modelled State Budget items. The estimates for the State Budgets are only reported as weighted averages across all States. The weights used for the averaging are calculated from a combination of State-specific settlers data and the national average sex by age profiles over the three years 1997-98, 1998-99 and 1999-00 for the five migrant categories. A more detailed description of the treatment of individual receipts and outlays is found in Appendix B.

Table 4-3 An overview of the modelled State Budget items

Budget item	Method	Data source
<i>Own-source revenue:</i>		
Payroll Tax	Estimated ETR of simulated earned income	1998-99 HES and State Budget Papers
Gambling Taxes	<i>Specific-to-average</i> based on two-step estimation of expenditure on gambling estimation of : (1) logit equation for non-zero expenditure (2) linear regression for expenditure (wins are converted to losses).	1998-99 HES
Motor Vehicle Taxes	<i>Specific-to-average</i> based on two-step estimation of expenditure on compulsory registration and third party insurance: (1) logit equation for positive expenditure (2) linear regression for expenditure.	1998-99 HES
Financial Institutions Duty	Estimated ETR of simulated disposable income of persons	1998-99 HES and State Budget Papers
Debit Tax	Estimated ETR of simulated disposable income of persons	1998-99 HES and State Budget Papers
Taxes on Insurance	<i>Specific-to-average</i> based on two-step estimation of expenditure on general insurance and life insurance: (1) logit equation for positive expenditure (2) linear regression for expenditure.	1998-99 HES

Table 4-3 (continued)

Land Tax	<i>Specific-to-average</i> based on two-step estimation of rent for private renter income units: (1) logit equation for housing tenure (LSIA1 information for year 1 to 4) (2) linear regression for expenditure on rent.	LSIA1 and 1998-99 HES
Conveyance and Transfer	<i>Specific-to-average</i> based on two-step estimation of home purchase and price for income units (separate equations for first and subsequent home buyers): (1) logit equation for housing tenure (derived from LSIA1 for year 1 to 4) (2) linear regression for purchase price.	LSIA1 and 1998-99 HES
Mortgage Duties	<i>Specific-to-average</i> based on two-step estimation of home purchase and mortgage value for income units (separate equations for first and subsequent home buyers): (1) logit equation for housing tenure (derived from LSIA1 for year 1 to 4) (2) linear regression for mortgage value.	LSIA1 and 1998-99 HES
Other Property Stamp Duties	Joined with 'Conveyance and Transfer'	
Other Duties	Per capita (aged 15+)	
Regulatory fees and fines	<i>Specific-to-average</i> based on two-step estimation of expenditure on 'Fines' & 'Government fees': (1) logit equation for positive expenditure (2) linear regression for expenditure.	1998-99 HES
Other	Per capita (aged 15+)	

Table 4-3 (continued)

<i>Commonwealth Grants:</i>		
Specific Purpose Payments	Same as Commonwealth model	
General Revenue Assistance	Same as Commonwealth model	
<i>Recurrent Expenditure:</i>		
Crime related law and order	<p><i>Take-up:</i> average imprisonment rates by sex and age, adjusted to age/sex adjusted incidence for (non-NZ) overseas-born population.</p> <p><i>Unit cost:</i> average expenditure per prisoner modified for:</p> <ul style="list-style-type: none"> – extra cost for Indigenous people – NESB prisoners 	ABS Catl. 4517.0: Prisoners in Australia, 2000
Education		
Primary school education	<p><i>Take-up:</i> simulated by the Migrant Ageing Module.</p> <p><i>Unit cost:</i> average expenditure per child modified for:</p> <ul style="list-style-type: none"> – point of delivery of service – extra cost for Indigenous people – NESB children 	Enrolment numbers from State Budget Papers.
Secondary school educat.	<p><i>Take-up:</i> simulated by the Migrant Ageing Module.</p> <p><i>Unit cost:</i> average expenditure per child modified for:</p> <ul style="list-style-type: none"> – point of delivery of service – extra cost for Indigenous people – NESB children 	Enrolment numbers from State Budget Papers.

Table 4-3 (continued)

<p>Non-Government schools</p>	<p><i>Take-up:</i> simulated by the Migrant Ageing Module.</p> <p><i>Unit cost:</i> average expenditure per child modified for:</p> <ul style="list-style-type: none"> - point of delivery of service - extra cost for Indigenous people - NESB children 	<p>Enrolment numbers from State Budget Papers.</p>
<p>TAFE</p>	<p><i>Take-up:</i> simulated by the Migrant Ageing Module.</p> <p><i>Unit cost:</i> average expenditure per student modified for:</p> <ul style="list-style-type: none"> - NESB students 	<p>Enrolment numbers from Australian Vocational Education and Training Statistics 2000 At a Glance, NCVET.</p>
<p>Other training and educat. Health</p>	<p>Per capita (15-64 year olds)</p>	
<p>Acute health, admitted</p>	<p><i>Take-up:</i> average patient days in public hospitals by sex and age adjusted to age/sex adjusted incidence for (non-NZ) overseas-born population.</p> <p><i>Unit cost:</i> average expenditure per patient day modified for:</p> <ul style="list-style-type: none"> - NESB patients 	<p>Australian Hospital Statistics, 1998-99 (AIHW)</p>
<p>Acute health, non-admitted</p>	<p><i>Take-up:</i> average visits to casualty, out-patients by age and sex adjusted to age/sex adjusted incidence for (non-NZ) overseas-born population.</p> <p><i>Unit cost:</i> average expenditure per visit modified for:</p> <ul style="list-style-type: none"> - NESB patients 	<p>1995 National Health Survey (ABS)</p>

Table 4-3 (continued)

<p>Aged care & primary hlth.</p>	<p><i>Take-up:</i> permanent resident with residential aged care by age and sex adjusted to age/sex adjusted incidence for overseas-born population.</p> <p><i>Unit cost:</i> average expenditure per patient day.</p>	<p>Residential aged care in Australia – a statistical overview, 1999-00 (AIHW)</p>
<p>Mental health services</p>	<p><i>Take-up:</i> average patient days with specialised psychiatric care by age and sex adjusted to age/sex adjusted incidence for overseas-born population.</p> <p><i>Unit cost:</i> average expenditure per patient day.</p>	<p>Mental health services in Australia – a statistical overview, 1998-99 (AIHW)</p>
<p>Public health services</p>	<p>Per capita (all persons)</p>	
<p>Disability services</p>	<p><i>Take-up:</i> average consumers of CSDA funded services by age adjusted to age adjusted incidence for overseas-born population.</p> <p><i>Unit cost:</i> average expenditure per consumer modified for:</p> <ul style="list-style-type: none"> - NESB users 	<p>Disability Support Services, 2000 – National data on services provided under the Commonwealth/State Disability Agreement (CSDA) (AIHW).</p>
<p>Community Care</p>	<p><i>Take-up:</i> 0-17 year olds.</p> <p><i>Unit cost:</i> average expenditure per 0-17 year olds modified for:</p> <ul style="list-style-type: none"> - extra cost for Indigenous people - NESB users 	

Table 4-3 (continued)

<p>Concessions (pensioner etc.)</p>	<p><i>Take-up:</i> Persons receiving Government pensions or income replacing benefits (simulated by the Migrant Ageing Module).</p> <p><i>Unit cost:</i> average expenditure per recipient using assumed weights:</p> <p>1: Age and Disability Support Pensioners;</p> <p>2/3: Mature Age Allowance, Mature Age Partner Allowance, Carer Payment and Parenting Payment (Single);</p> <p>1/3: Newstart Allowance, Partner Allowance, Widow Allowance, Special Benefit, Youth Allowance (unemployed), Sickness Allowance, Parenting Payment (partnered)</p>
<p>Housing Assistance</p>	<p><i>Take-up:</i> Persons receiving Government pensions or income replacing benefits.</p> <p><i>Unit cost:</i> average expenditure per person</p>
<p>Off. of Multicultural Affairs</p>	<p>Per capita</p>
<p>Other recurrent</p>	<p>Per capita</p>
<p><i>Capital expenditure:</i></p>	
<p>Crime related law and order</p>	<p>Apportioned share of total capex assigned in same proportion as the relevant recurrent expenditure</p>
<p>Other law and order</p>	
<p>Education</p>	
<p>Health</p>	
<p>Other</p>	
	<p>Per capita (all persons)</p>

5. The Results

This section provides an overview of the relationship between the age at arrival of a cohort of immigrants arriving in Australia during the year 2000-01 and the net budget impact over their future lives in Australia. As described in the previous section, the results rely on projections of the future circumstances of the migrant cohort. In projecting the future circumstances of the migrant population and the consequent impacts on Government budgets it is necessary to make a number of important assumptions. The results presented in the following are thus based on a series of assumptions about the behaviour and performance of the immigrants as well as the development in Australian economic policy and performance. Like all projections, the necessary assumptions are associated with a degree of uncertainty, which makes it important to examine the effect of alternative outcomes. The results are thus presented as a *baseline scenario* based on a set of reasonable assumptions accompanied by sensitivity analysis obtained by altering some of the core baseline assumptions. The baseline assumptions are described in Section 5.1 and the baseline results are shown in Section 5.2. The sensitivity analysis is presented in Section 5.3.

5.1. Baseline assumptions

The projection of future flows of budget receipts and outlays depends on a series of assumptions about the behaviour and performance of the migrant cohort as well as government policy and economic performance in general. It is possible to identify three main areas where assumptions are required:

1. Productivity growth, consumer prices and indexation of receipts and outlays.
2. Labour market outcomes for migrants and their families (participation and unemployment).
3. The scope of the receipt and outlays

The baseline assumptions are described in detail in the following four subsections.

5.1.1. Productivity growth, consumer prices and indexation

The assumptions about productivity growth and consumer prices compound the projected growth in individual receipt and outlays budget items in a number of ways. The productivity growth represents the real growth in average incomes from wages and salaries and incomes from other private sources (such as interest, dividends and private pensions). The baseline scenario also assumes that social security payments and the tax thresholds follow productivity growth. As a result, most taxes (both direct and indirect taxes) grow in line with the assumption about productivity improvements. The growth in many other receipts and outlays are CPI indexed. The baseline assumptions about productivity growth and the development in the Consumer Price Index are:

- *Average Weekly Earnings Growth*: 4.0 per cent over the entire projection period.
- *Consumer Price Index*: 2.5 per cent growth over the entire projection period.

As a consequence, the assumed average productivity growth is around 1.5 per cent per annum.

The following gives a brief summary of the indexation assumptions:

- All incomes are assumed to grow in line with Average Weekly Earnings (AWE);
- Social security payments and income test thresholds are assumed to grow in line with AWE;

- Tax thresholds are assumed to grow in line with AWE but with five yearly adjustments to catch-up with the changes in AWE over the past five years;
- Health services costs are assumed to grow in line with AWE;
- Education costs are assumed to grow in line with AWE for the States and with the CPI for the Commonwealth;

The detailed assumptions about indexation of receipts and outlays and the factors that influence them are outlined in Appendix A and B.

The following Table 5-1 shows the share of the covered Commonwealth and State Budget receipts and outlays that are indexed by AWE and the CPI. The table shows that majority of Commonwealth receipts and outlays (97 per cent of receipts and 89 per cent of outlays) are indexed by AWE. Around 68 per cent of State receipts and 53 per cent of State outlays are indexed by AWE.

Table 5-1 Estimated Share of the Commonwealth and State Budgets Receipts and Outlays indexed by AWE and the CPI, 2000-01

	Commonwealth		State	
	Receipts	Outlays	Receipts	Outlays
	%	%	%	%
AWE	97	89	68	53
CPI	3	11	32	47
Total	100	100	100	100

It is important to note that the growth in the receipts and outlays is the result of more complex processes than a simple indexation of rates of payments etc. The projections are based on a simulated *ageing* of the 2000-01 cohort of immigrants and the outcome is thus affected by the changing composition of the population in terms of labour market behaviour (such as unemployment and retirement patterns) and income generation in general. The ageing of the immigrants also reflects the age related changes in Government services related to, for example, education, health care and social security payments. The effects of indexation and ageing thus affect the results in different ways. The indexation affects the rates of payments as well as the tax base for direct and indirect taxes. In contrast, the ageing of the immigrant cohort mainly affects the outcome via its effect on the take-up rates and age related average costs and incomes. The figures in Table 5-1 only represent the indexation part of the growth in receipts and outlays.

5.1.2. Labour market outcomes: participation and unemployment rates and incomes

The first years after the immigrants arrive in Australia are characterised by continuous improvements in their labour market situation. While there are considerable differences in performance across the visa groups, they all experience improvements in labour force participation, unemployment and incomes. The skilled visa groups generally achieve higher participation rates and lower unemployment rates than their Australian born counterparts shortly after arrival. In contrast, humanitarian and family migrants start out with lower participation rates and higher unemployment rates and, while they experience some improvements during the first years after arrival, their performance remains below the Australian average for many years.

As described in Section 4.1.2, the labour market outcomes in terms of participation, unemployment and earned incomes are guided by a set of equations estimated on the basis of the 1998-99 Household Expenditure Survey and the LSIA1. These equations ensure that the projected relationships between labour market performance and the personal and family characteristics of the immigrants (such as age, education and child rearing) follow the patterns observed in the two datasets. In that respect, the projected income and labour market situation of the immigrants reflect the past performance of immigrants.

However, historical evidence does not provide information about how today's immigrants will perform in the future. From the LSIA1 we have information about the first three to four years after arrival, but not thereafter. From the HES we have information about current performance of past cohorts of immigrants, which allows us to assess how performance relates to the time of arrival by comparing different cohorts. While useful, this information does not provide hard evidence about the likely future performance of current immigrants. The problem has been solved in slightly different ways for participation/unemployment and earned incomes. In both cases assumptions have been made about future convergence:

Labour force participation and unemployment rates: As described in Section 4.1.2, we have used the information from the LSIA1 about labour market performance during the first 4 years after arrival to estimate *convergence curves* that we apply to participation and unemployment rates beyond year 4. We have combined these convergence curves with information from the HES about how many years the convergence continues along the convergence curves. By implication, the skilled visa groups continue to have higher participation and lower unemployment than their Australian born counterparts while the family and humanitarian migrants continue to have lower participation and higher unemployment.

Assumption: Labour force participation and unemployment rates continue converging towards visa group specific levels over a period of 20 years.

Earned income: The earned incomes of full-time employed persons are assumed to converge linearly toward the level for Australian born persons while the incomes of part-time employees are similar to the incomes of Australian born persons. The assumed baseline number of convergence years is broadly in line with the cross-sectional evidence from the HES:

Assumption: The convergence of earned income for full-time employed persons is based on the assumption that migrants converge towards the levels of Australian born persons with similar characteristics over a period of 15 years.

5.1.3. *The scope of receipts and outlays*

The baseline analysis described in the next section includes all person and family specific receipt and outlays overviewed by Table 4-2 and Table 4-3. The baseline results reflect the receipts and outlays that are directly related to individuals and families and thus directly attributable to persons on the basis of, for example, age and sex, and in many cases the number of years since arrival. As discussed in Section 2.1, these receipts and outlays are assumed to be affected directly by the size of the population and thus by the number of immigrants admitted into the country every year. The receipts and outlays included in the baseline analysis cover the main proportion of the receipts and outlays in Governments' budgets but not all. The following table provides an overview of the extent of these 'zero-impact' receipts and outlays for the Commonwealth and State Budgets:

Table 5-2 The Coverage of Receipts and Outlays of the Commonwealth and State Models

	Commonwealth	State
	%	%
Receipts	75	80
Outlays	76	92

The baseline analysis thus covers around 75-76 per cent of both receipts and outlays in the Commonwealth Budget. The omitted Commonwealth receipts are mainly company taxes and the outlays are mainly expenditures that are not directly related to persons (such as defence spending and public administration). The State Budget analysis covers around 92 per cent of the outlays and 80 per cent of the receipts. It is probable that some of these receipts and outlays are affected by immigration, but it is not possible to relate them to persons and we have thus left them out of the baseline analysis. Instead, the effect of including these budget items have been examined in Section 5.3, which provides sensitivity analysis of the effect of including, for example, defence spending on a per capita basis.

5.1.4. Other baseline assumptions

The baseline results are based on a number of other assumptions concerning the estimation of the future impact of current immigration, for example:

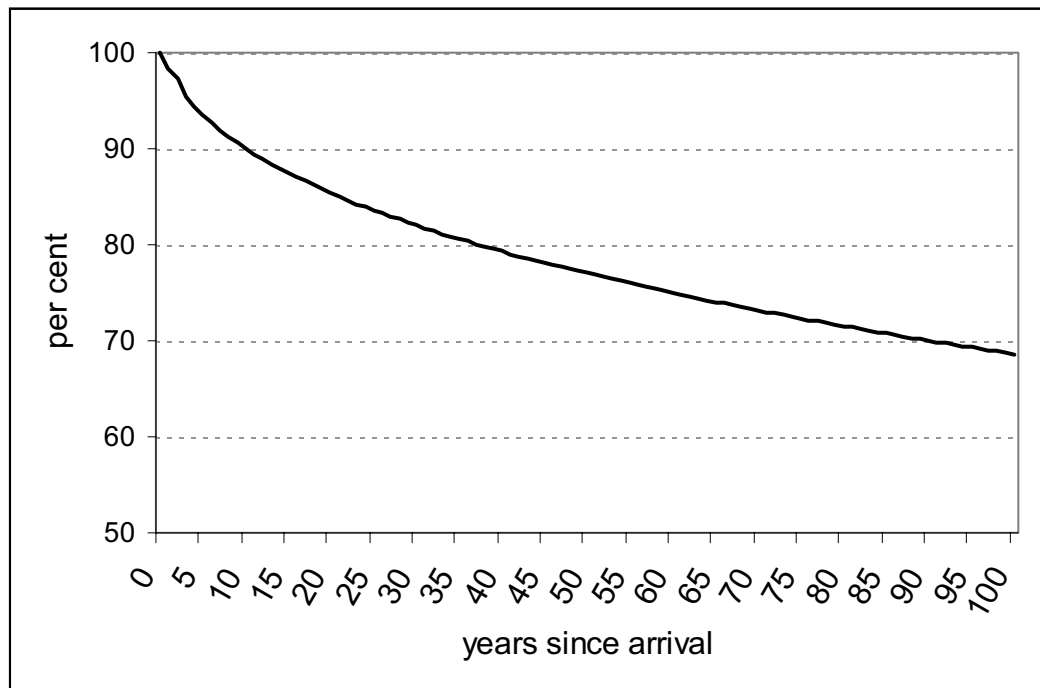
Remigration: As described in Section 4.1.2, a proportion of immigrants remigrate from Australia every year and this has been modelled in two ways. Remigration during the first four years is taken from the attrition in the LSIA1 and the subsequent remigration is based on estimates from departure data. These assumptions imply that the probability of remigration is independent of age but looking over a lifetime the probability of remigration at some time depends on the age at arrival. As a consequence, it is expected that less than 30 per cent of migrants who arrive as infants will remigrate while the figure is less than 20 per cent of immigrants who arrive at the age of 40.

Assumption: The baseline results are based on the assumption that just under 30 per cent of infant immigrants remigrate and that the probability declines the older their age at arrival. The average probability across all migrants is 23.6 per cent. The remigration process is illustrated by Figure 5-1, which shows the remaining proportion of original immigrants by the number of year since arrival.

Net present value (NPV) calculations: The calculation of the present value of the future impact of immigrants on Government budgets is based on a discounting rate representing the time value of money or a social rate of time preference. As mentioned in Section 3, the *New Americans* study applied a discount rate of 3 per cent, which is close to the average real bond yield in the US during the nineties. In Australia, the real bond yield was higher during the nineties (on average around 4½ per cent), but it has fallen progressively during the decade and Access Economics considers that 4 per cent is a realistic expectation going forward – if anything, a 4 per cent risk free real rate of return is expected to be on the high side.

Assumption: The baseline results are based on a 4 per cent real discount rate for the purpose of calculating the present value of future monetary flows.

Figure 5-1 Remigration: Share of Remaining Population (dead or alive) by Years Since Arrival



Source: LSIA1 and unpublished departure data

Interest rate for the accumulated capital account: Along with the estimation of annual net budget impacts for individual immigrants a capital account is maintained that accumulates a net liability (if negative) or asset (if positive). An interest payment is added to the annual budget impact on the basis of an assumed interest rate, which represents the alternative use of public funds. At the time an immigrant dies, the then present value of the future interest payments on the remaining debt/asset is added to the budget impact for the year. In the baseline scenario we have assumed an interest rate equal to the assumed inflation rate of 2.5 per cent. Alternatively, it could be argued that it would be appropriate to add the assumed long-term rate of productivity growth. We have applied a real rate of zero per cent, which is considered reasonable on the basis that Governments cannot maintain budget imbalance over the long term. It should be noted that the applied interest rate must be lower than the discount rate used for the calculation of NPVs (otherwise the NPV of the remaining debt/asset will be infinite negative/positive).

Assumption: The baseline interest rate applied to the accumulated capital account is equal to the assumed rate of inflation of 2.5 per cent.

5.2. Baseline results

In this Section we present the results based on the baseline assumptions described in the previous sections. The modelling estimates the year-by-year financial flows affecting the Commonwealth and State Budgets, which allows us to calculate the present value of the budget impacts over the remaining lives in Australia of a cohort of immigrants arriving in the year 2000-01. Separate estimates are shown for the five main visa categories, namely Family, SAS (SAS), Business Skills/ENS (BS), Independent (IN) and Humanitarian (HU) migrants¹². The results are presented as per person average impacts both as visa group averages and,

¹² In the following we will often abbreviate the visa categories as shown in the brackets.

importantly, as the relationship between the age at arrival and the NPV of the whole-of-life impacts of the visa groups. The analysis only considers the immigrants themselves and, unlike the *New Americans* study, it does not include the effect of Australia born descendants of immigrants, the so-called 2nd and 3rd generation immigrants. The results for the Commonwealth and State Budgets are first shown separately in the next two subsections before the total impact on Commonwealth and State Budgets are presented in Section 5.2.3.

5.2.1. *The Commonwealth Budget*

This section presents the results for the lifetime impact of immigrants on the Commonwealth Budget. The analysis is an extension of the results presented in a recent report prepared by Access Economics for the Department of Immigration and Multicultural and Indigenous Affairs (DIMIA, 2001a). In that report the budget impact of immigration was shown as the annual impact per 1,000 immigrants for the first 10 years after arrival to Australia. The modelling used for analysis has also been applied to produce annual estimates similar to those previously published. However, the current analysis goes further than the previous Commonwealth Budget modelling, which did not reflect the ageing of the migrant cohort beyond the period covered by the LSIA1 (that is, year 1 to year 4). In addition, the annual budget impacts can now be projected for the entire remaining lives in Australia for an immigrant cohort arriving in 2000-01. The result is shown in Figure 5-2. The figure shows the decomposition of the net impact on the Commonwealth Budget per immigrant (in 2000-01 dollars) arriving in 2000-01 for all migrants.

Figure 5-2 shows that in the first two years after arrival the net budget impact is negative. During subsequent years the budget impact improves dramatically and it continues to increase until it peaks around 30 years after arrival whereafter the impact tapers off before eventually turning negative 60 years after arrival.

The rapid increase in the annual budget impact during the first 25 years after arrival is the result of a combination of factors. The main explanations for the increase are:

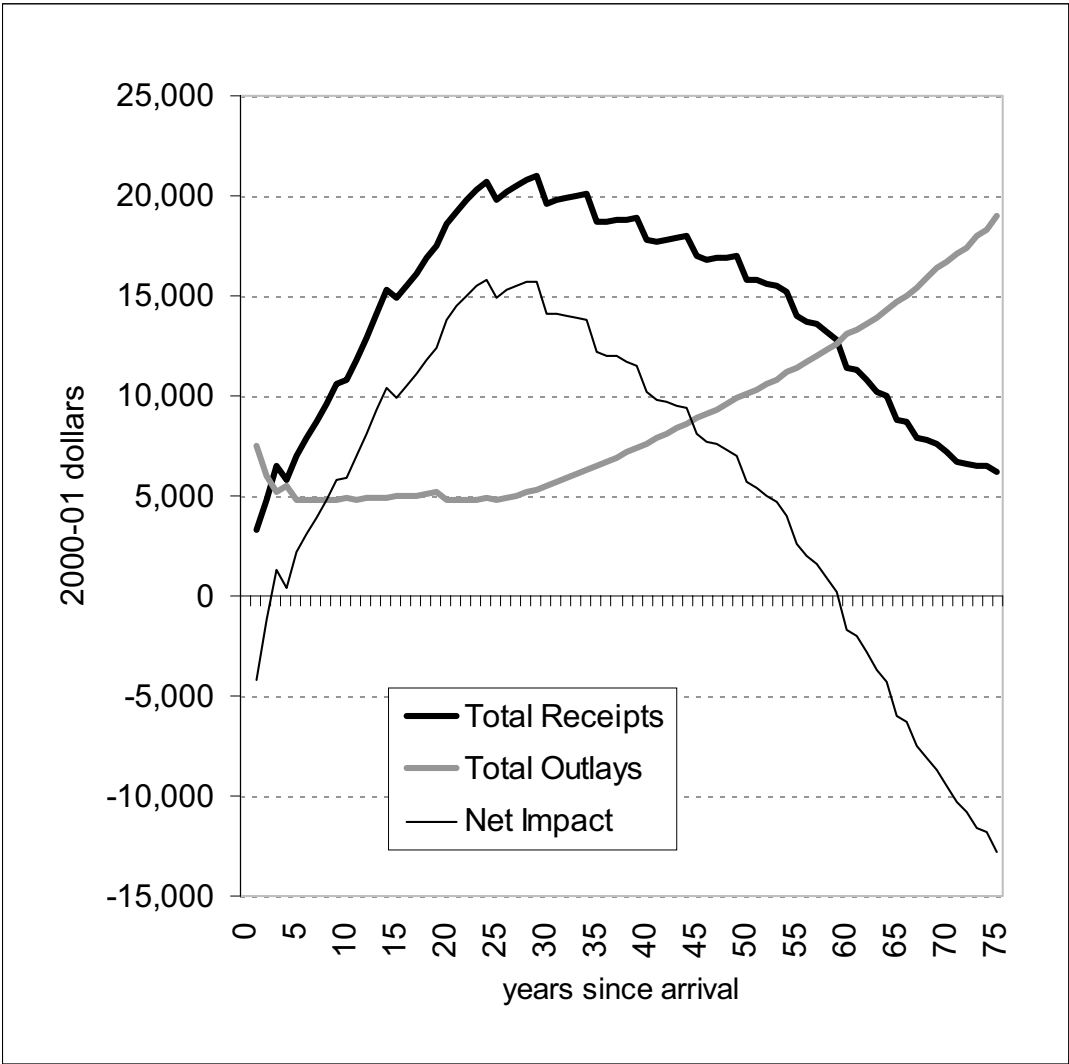
- A reduction in social security payments in the first years due to reducing unemployment and increasing incomes;
- Per capita outlays remain stable after the initial years, and thereafter the budget improvement is caused by improving labour market situations in terms of increased participation, reduced unemployment rates and increasing incomes; and
- A gradual reduction in the number of children and (eventually) young adults who on average have a substantial negative budget impact.

At the other end, a drop in the budget impacts sets in around 30 to 35 years after arrival. The drop is caused by the ageing of the immigrant cohorts as they approach retirement age.

Outlays begin to increase after around 30 years when many migrants reach retirement age and become eligible for the Age Pension and health-related expenses gradually increase.

The annual budget impact curve has kinks at regular five-year intervals. This is due to the underlying assumption regarding the indexation of tax thresholds, which implies that Commonwealth revenues drop slightly (other things equal) every five years starting from the 5th year. However, the first kink displayed by all visa groups (from year 3 to year 4) has a different explanation. It is caused by the slightly different methodologies applied for the 'LSIA1 years' (1, 2 and 4) and the remaining years (see Section 4.1).

Figure 5-2 Estimated Annual Impact on the Commonwealth Budget per Surviving Immigrant by Years Since Arrival, 2000-01 dollars



The picture in Figure 5-2 is summarised for individual visa groups in Table 5-3, which shows the NPV in 2000-01 of the year-by-year annual net budget impacts for the visa groups. The table shows receipts and outlays estimates as well as the net interest on the accumulated debt/asset account (see Section 5.1.4).

On average across all migrants, the net impact on the Commonwealth Budget is estimated at \$223,000. The average receipts are \$249,000 while non-interest outlays are estimated at \$110,000. The net impact of accounting for interest payments on accumulated debts/assets as a result of annual surpluses and deficits is \$85,000, which is around 38 per cent of the total net impact. The overall average covers large differences between the visa groups. Nevertheless, when looking at the whole-of-life impact, all migrant groups come out with a significant surplus.

It is emphasised that the net positive impact for Humanitarian migrants would almost disappear (and turn much less positive for other visa groups) if more budget outlays were included in the calculations (see Section 5.3).

Table 5-3 Estimated NPV in 2000-01 of Commonwealth Budget Impact by Visa Category (2000-01 dollars)

	Family	SAS	Business Skills	Independent	Humanitarian	All Migrants
	\$000	\$000	\$000	\$000	\$000	\$000
Receipts	204	265	291	316	202	249
Outlays	113	104	98	95	144	110
Interest	52	100	118	135	43	85
Net Impact	143	261	310	356	101	223

The three skilled migrant groups (SAS, Business Skills/ENS and Independent) provide the largest positive contributions to the Commonwealth Budget. With an estimated NPV of \$356,000, the Independent migrants show the largest surplus, followed by Business Skills/ENS migrants (with \$310,000) and SAS (estimated at \$261,000). The Family migrants provide an average surplus of \$143,000, while Humanitarian migrants come out with the lowest average surplus of \$101,000. It is interesting to note that, although the net budget contribution of the Family visa group is 42 per cent higher than that of the Humanitarian migrants, the estimated receipts from the Humanitarian migrants are almost the same as that of the Family migrants. The lower net result for the Humanitarian visa group is largely due to the higher social security cost during the initial period when Family migrants do not receive certain payments due to the waiting period. In addition, many Family migrants are ineligible for payments because of their dependence on the income of the resident family member who sponsored their visa application. In contrast, many Humanitarian migrants live in households that are totally dependent on social security.

The results in Table 5-3 also show that the differences between the skilled visa groups are predominantly caused by different receipts, more so than by different outlays.

Turning now to the relationship between the NPV of whole-of-life budget impact and the age-at-arrival of the immigrants, the following five charts (Figure 5-3 to Figure 5-7) show the picture separately for the visa groups. Figure 5-8 shows the average for all migrants.

Before interpreting the age-at-arrival curves, it is important to note that part of the volatility of the curves is caused by the sample size of the LSIA1 data used for the projections. The age-at-arrival curves are derived from five-year moving averages of one-year age groups and the LSIA1 has critically few observations for some age/visa groups. For example, the Independent migrant group barely has any persons aged above 50, which reflects the existing age criteria for admission under this category. For this reason we have cut out the age groups for each visa group above the age at which the representation is too low to allow a meaningful interpretation.

The age-at-arrival curves for migrant groups all follow the same pattern, although the breakeven age-at-arrival and the overall level of the curves differ considerably. The NPV of whole-of-life budget impact increases with age for all groups until the age at around 15 (when young persons start leaving the education system). The curves then drop off before they again

increase for most visa groups (all except Humanitarian and Business Skills/ENS migrants) to reach a second peak in the mid to late twenties. The dip in the age-at-arrival curves for the age groups around 15 to 25 is, on the face of it, somewhat counter-intuitive and deserves explanation. The lower budget impact for these age groups around the ages when it is common for young people to study is mainly caused by the composition of the migrants who arrive at these ages. The following observations can thus be made:

- A large proportion of the migrants in the 15-25 year age groups are either migrating spouses or children of the Principal Applicants. They have on average poorer skills than the PAs and are less likely to participate in an education that leads to above average lifetime incomes.
- There is a preponderance of females in these age groups and females tend to have lower lifetime incomes than males (and hence they pay less taxes). This is particularly the case for Family migrants who arrive as prospective spouses.
- Persons who arrive at the ‘normal’ age for university and other studies are generally less likely to have a tertiary education. There is no available evidence to suggest the extent to which these persons catch-up at a later stage. Even when they do, they tend to start their career late and thus end up with lower lifetime incomes than those who go straight through the educational system from school through to university and TAFE.
- The marked dip for ‘All migrants’ in the 15-30 year bracket is amplified by the relative weight of Family and Humanitarian migrants who on average have lower outcomes.
- It should also be noted that there are very few observations aged around 16-23 in the Independent migrant group, which makes the very marked dip for this group less well-founded.

Figure 5-3 Family Migrants: Estimated NPV of Net Commonwealth Budget Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars



Figure 5-4 SAS Migrants: Estimated NPV of Net Commonwealth Budget Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars



Figure 5-5 Business Skills/ENS Migrants: Estimated NPV of Net Commonwealth Budget Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars



Figure 5-6 Independent Migrants: Estimated NPV of Net Commonwealth Budget Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars



Figure 5-7 Humanitarian Migrants: Estimated NPV of Net Commonwealth Budget Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars



Figure 5-8 All Migrants: Estimated NPV of Net Commonwealth Budget Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars



The pattern for immigrants above 30 years of age follows the intuitive gradual decrease associated with a reduction in the number of years available for income generating employment. All the visa groups reach a breakeven point at an arrival age between 40 and 60 years. The following summarises the estimated age-at-arrival curves for the visa groups:

Family migrants: The peak budget impact of around \$260,000 is attained at an arrival age of 15 years. The post-education age peak is just under \$230,000 for immigrants arriving in their mid to late twenties. **Family migrants reach breakeven at arrival age around 46 years.** The budget impact continues to be negative thereafter and reaches a low at around -\$150,000 around the typical retirement age groups (60-70 years).

SAS migrants' maximum budget impact is around \$400,000 for immigrants arriving around 25 years of age. For immigrants arriving after their mid to late twenties the budget impact drops almost linearly. **SAS migrants reach breakeven arrival age around 55 years.** The budget impact then turns negative with a low of around -\$100,000 at arrival age 60, but there are too few SAS immigrants arriving older than 60 years to determine the shape of the curve thereafter.

Business Skills/ENS migrants reach a maximum budget impact of above \$470,000 for immigrants arriving aged between 18 and 28 years. The budget impact then drops and **Business Skills/ENS migrants reach breakeven at arrival age around 59 years.** Too few BS migrants are older than 60 when they arrive to assess a possible continuation of the curve. (That the peak budget impact for business migrants should extend to the lower end of the 16 to 28 years group is not intuitively obvious since business migrants that are already successful in business would generally be expected to be older. However, this result largely reflects the interaction of an assumption about future earnings with the long period that these young migrants contribute to tax revenues. Young migrants are assumed to take on the employment and income characteristics of older migrants in the same category as they pass through those ages. They also receive few educational services from governments as they are largely out of school before arrival. They do not become significant users of government services and benefits, therefore, until much later than migrants who were somewhat older on arrival.)

Independent migrants reach a maximum budget impact of above \$470,000 for immigrants arriving aged between 24 and 36 years at which age group the curve plateaus and then drops sharply for persons who arrive in their late thirties. However, the net budget impact stays significantly positive until the budget impact of **Independent migrants drops to a breakeven arrival age of around 50 years.** It should be noted that there are very few IN migrants arriving older than around 46 years and that the breakeven age therefore is based on a relatively 'thin' data material. Given the sharp drop in the curve around arrival age 45 (and the fact that most Independent migrants aged 45+ are non-PAs), it is quite plausible that an increase in the maximum admission age for Independent migrants would be associated with a breakeven age well above 50 years.

Humanitarian migrants do not display a significant dip at young age. However, the same effect is present and beyond the arrival age 15 peak of almost \$245,000 the decline is strongest up until arrival age of around 25 years. After arrival age of 35 years the budget impact drops off and **Humanitarian migrants reach breakeven at arrival age of around 42-43 years.** The budget impact then turns negative and the Humanitarian migrants arriving at an age of around 70 years have the most negative impact of all the groups close to -\$175,000.

The average migrant reaches breakeven at an arrival age around 50-51 years.

5.2.2. *The State Budgets*

The previous section presented estimates of the lifetime impact on the Commonwealth Budget and in this section similar analysis is shown for the State Budgets. The analysis extends the work presented in a recent report prepared by Access Economics for the Department of Immigration and Multicultural and Indigenous Affairs (DIMIA, 2001b). That report analyses the State by State impact of migrants on State Budgets as the annual impact per 1,000 immigrants for the first 10 years after arrival to Australia.

For reasons discussed earlier, the whole-of-life results for the State Budgets are reported as weighted averages across the States.

A first view of the State results is provided by Figure 5-9, which shows a decomposition of the average net budget impact on State Budgets per surviving immigrant (in 2000-01 dollars) arriving in 2000-01. The pattern is somewhat similar to the one for the Commonwealth Budget (see Figure 5-2) with an increasing budget impact during the first 25 years after arrival.

Figure 5-9 shows that the average State Budget impact is around zero during the first four years but turns positive already after five years and it keeps improving over the next 20 years or thereabouts. Nevertheless, the State Budget improves at a slower rate than the Commonwealth Budget impact. The improvement is mainly due to increasing receipts in the form of increasing State taxes caused by improved migrant incomes. Unlike many Commonwealth outlays, the State outlays are less affected by the improvements in incomes. State expenses are mainly affected by demographics. In fact, State outlays per migrant are almost unchanged during the first 25 years until the demographic changes start taking place as more and more migrants reach retirement age. The reason is that a large proportion of State expenses relating to, for example, health and care for the frail, are biased towards the elderly.

The net State Budget impact remains positive until around 42 years after arrival at which point the expenditure relating to the ageing of the migrants has started to increase dramatically – and it continues to do so over the remaining lifetime. The revenue continues to increase slightly due to increased payments from the Commonwealth that outweigh a drop in the States' own-source revenue as migrant incomes (and thereby taxes) taper off.

Table 5-4 shows the NPV in 2000-01 of the year-by-year annual net budget impacts for the visa groups. The table shows receipt and outlay estimates as well as the net interest on the accumulated debt/asset account (see Section 5.1.4).

On average across all migrants, the net impact on the State Budgets is estimated at \$27,000. The average receipts are \$117,000 while non-interest outlays are estimated at \$101,000. The net impact of accounting for interest payments on accumulated debts/assets as a result of annual surpluses and deficits is \$10,000, which is around 37 per cent of the total net impact. When looking at the receipts and outlays, the differences between the results for the five visa groups are much smaller than for the Commonwealth Budget. The outlays, in particular, do not vary all that much, and the highest result (\$105,000 for Humanitarian migrants) is only around 9 per cent higher than for the lowest group (\$96,000 for Independent migrants). Again, the reason is that State outlays are more affected by demographics than by incomes. On the receipts side the differences are larger due to the effect of incomes. The highest result (\$126,000 for Independent migrants) is thus 14 per cent higher than for the lowest result (\$111,000 for Humanitarian migrants).

Nevertheless, in percentage terms the differences between the net budget impacts across the groups vary considerably. The average lifetime impact for Independent migrants (\$49,000) is thus almost 5 times higher than for Humanitarian migrants (\$10,000).

Figure 5-9 Estimated Annual Impact on State Budgets per Surviving Immigrant by Years Since Arrival, 2000-01 dollars

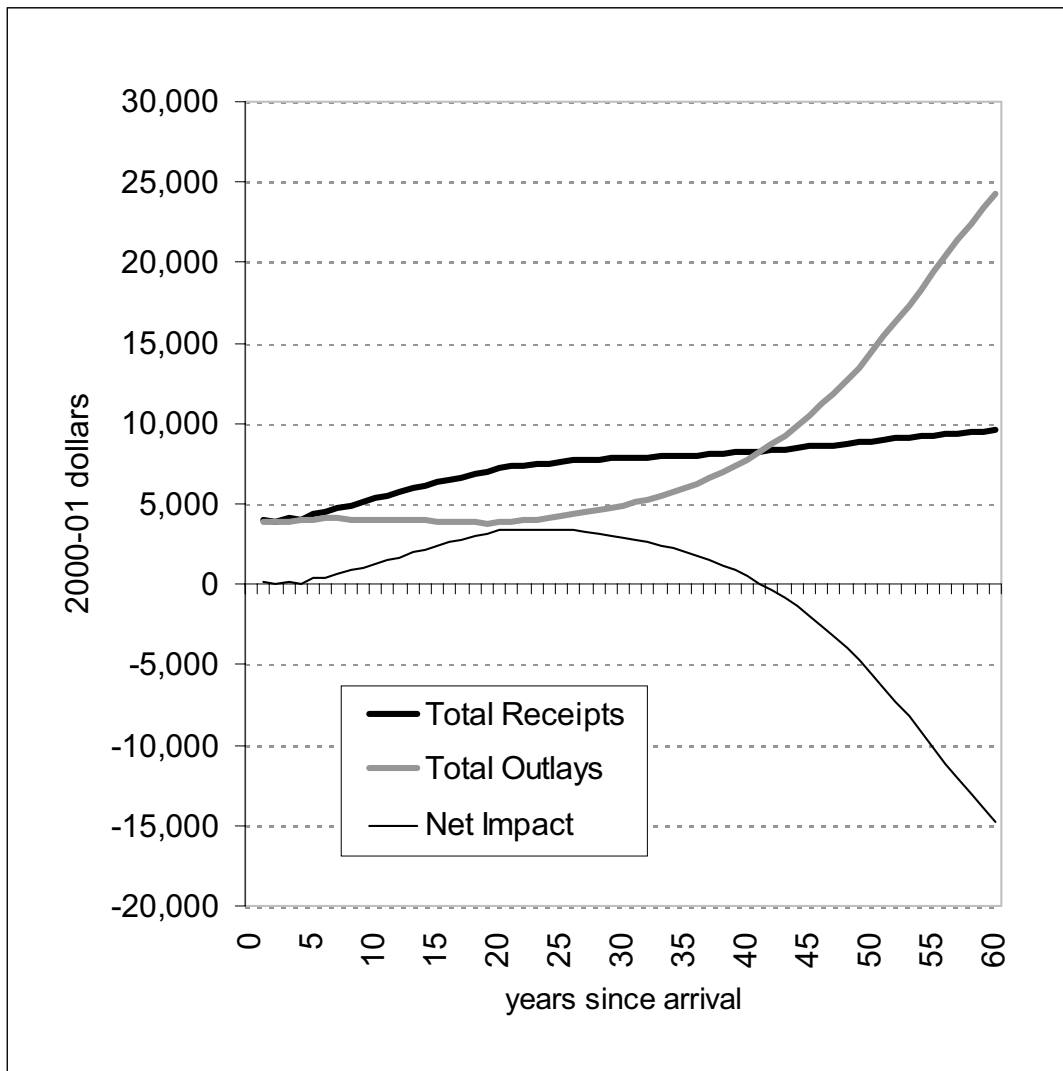


Table 5-4 Estimated NPV in 2000-01 of State Budgets Impact by Visa Category (2000-01 dollars)

	Family	SAS	Business Skills	Independent	Humanitarian	All Migrants
	\$000	\$000	\$000	\$000	\$000	\$000
Receipts	112	121	120	126	111	117
Outlays	102	102	100	96	105	101
Interest	6	11	12	18	4	10
Net Impact	16	30	33	49	10	27

Figure 5-10 Family Migrants: Estimated NPV of Net State Budgets Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars

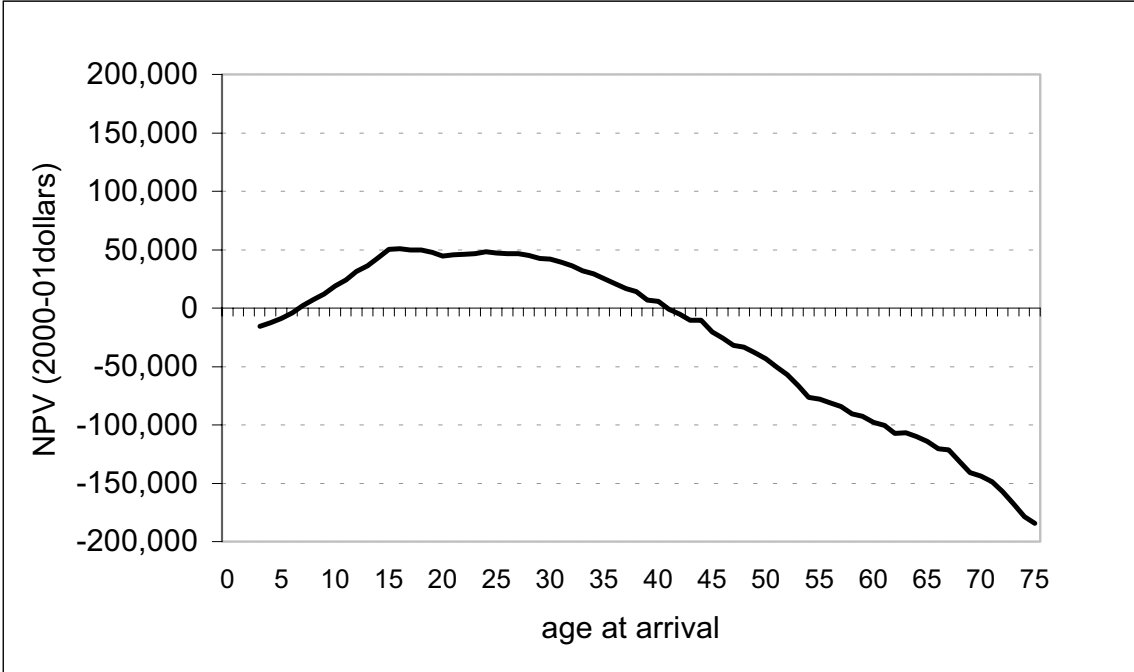


Figure 5-11 SAS Migrants: Estimated NPV of Net State Budgets Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars

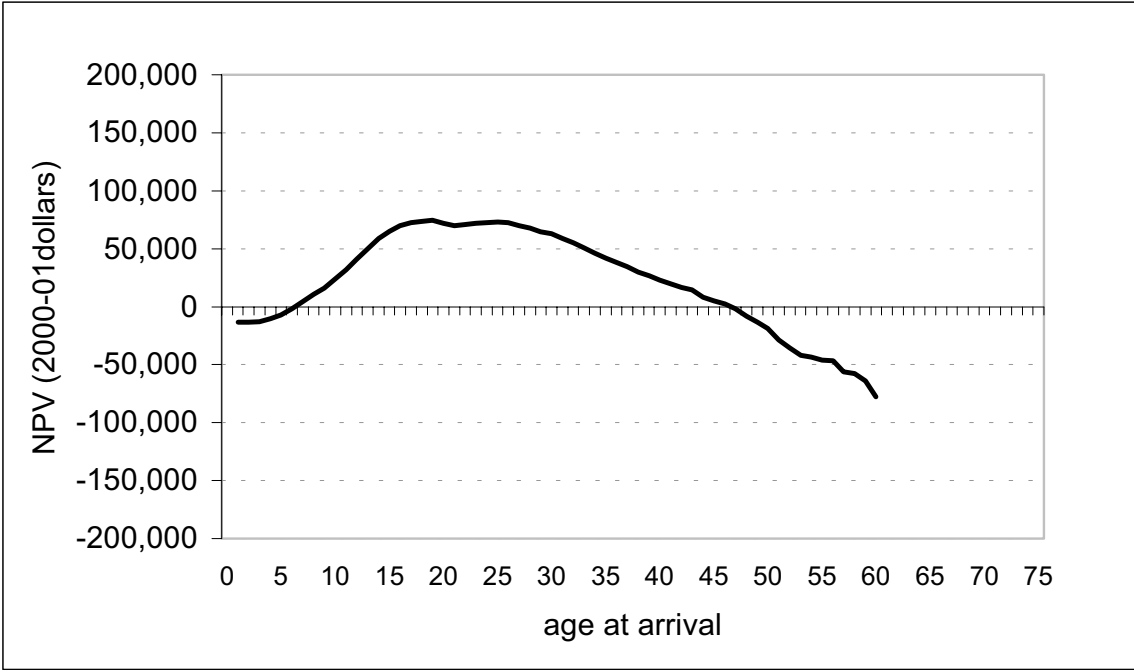


Figure 5-12 Business Skills/ENS Migrants: Estimated NPV of Net State Budgets Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars

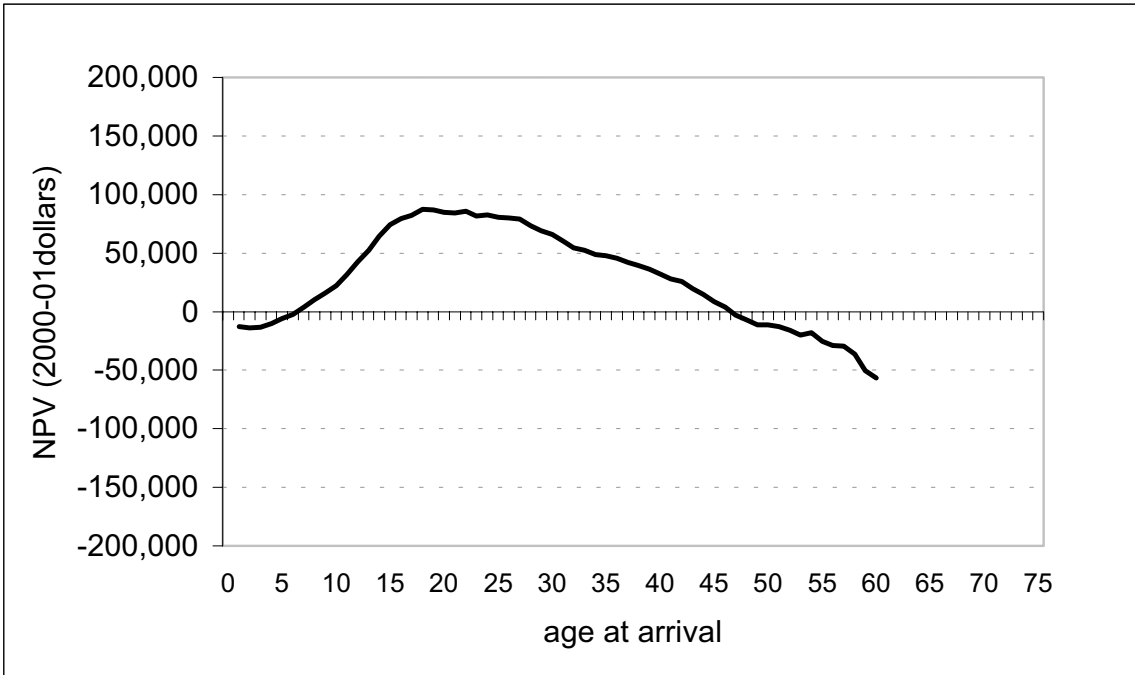


Figure 5-13 Independent Migrants: Estimated NPV of Net State Budgets Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars

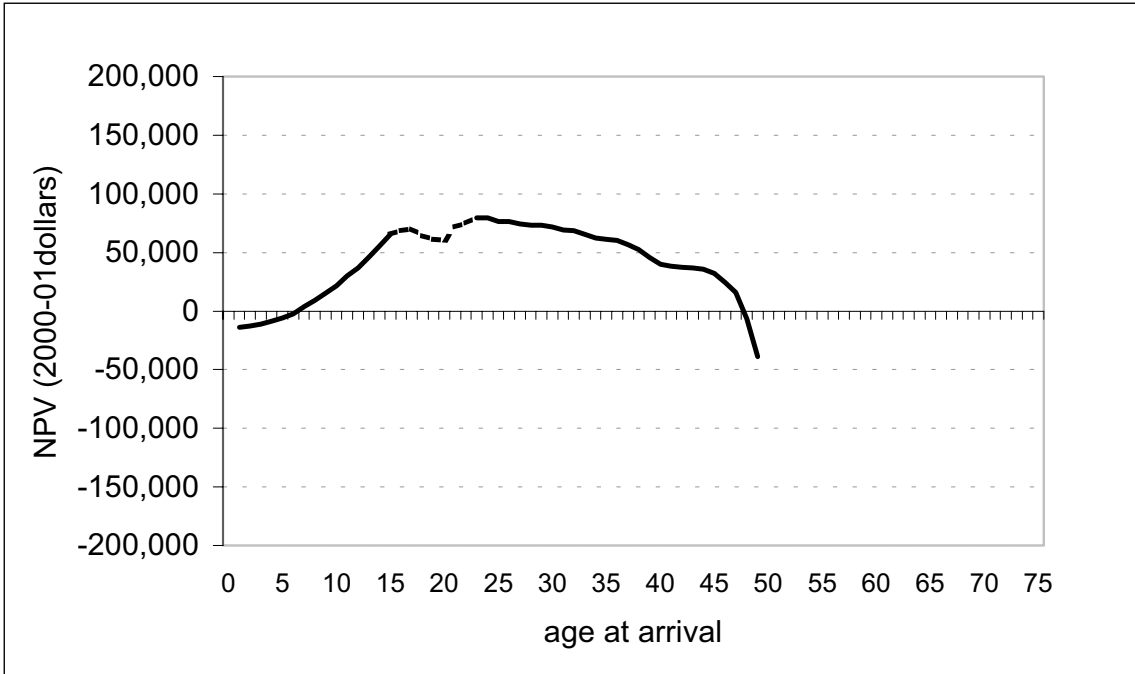


Figure 5-14 Humanitarian Migrants: Estimated NPV of Net State Budgets Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars

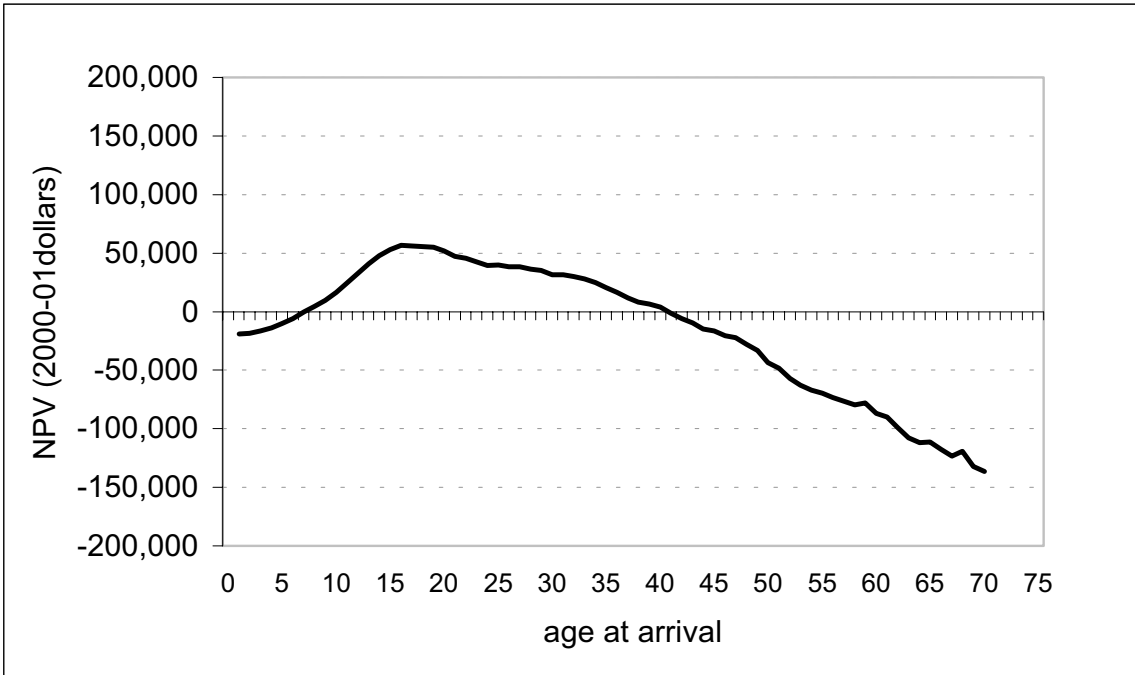
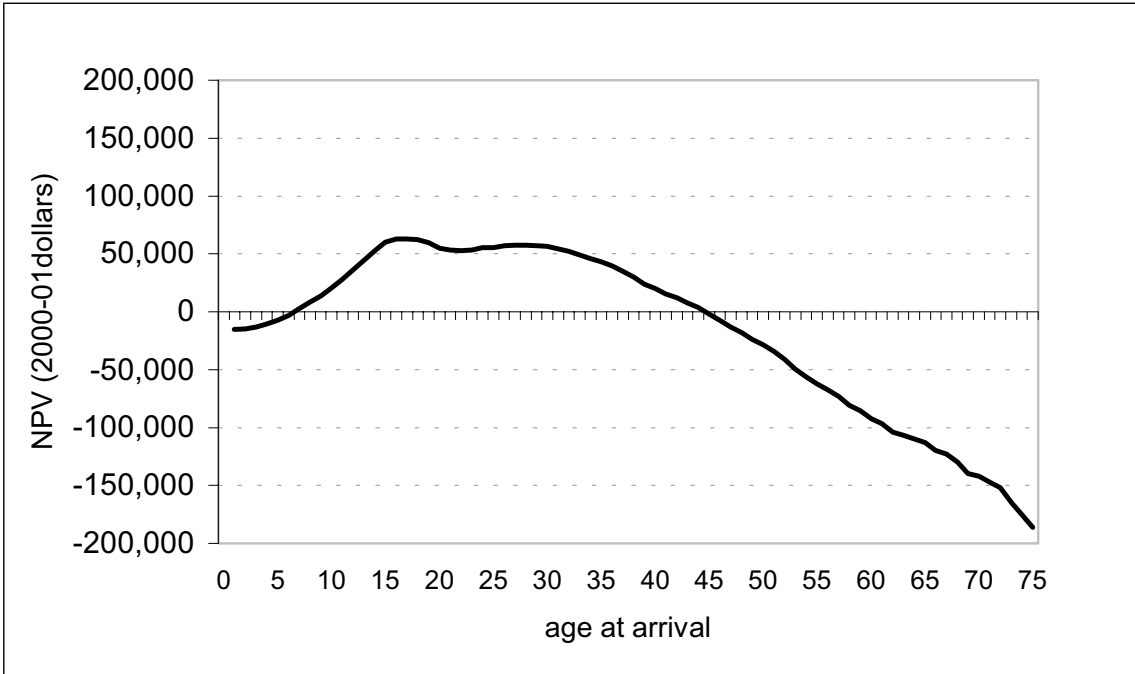


Figure 5-15 All Migrants: Estimated NPV of Net State Budgets Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars



Turning now to the relationship between the NPV of whole-of-life budget impact and the age-at-arrival of the immigrants, the five charts (Figure 5-10 to Figure 5-14) show the picture separately for the visa groups and Figure 5-15 shows the average for all migrants.

The State Budget age-at-arrival curves are similar for the five visa groups. They all show negative outcomes for child migrants arriving before the age of around seven years. The impact then improves with age until the typical age at which they leave the education system. Like the Commonwealth results, the age at which the age-arrival curves peak is different for the visa groups, with the Humanitarian migrants (who are less likely to take a tertiary education) reaching a maximum around age 15 while the skilled migrants arriving around age 25 have the highest result¹³.

Although the peak is attained at different arrival age, the lifetime budget impact decreases with age-at-arrival for all visa groups from arrival age above 27-28 years. The reason for the decrease is a combination of a reduced number of years as net contributors and a higher weight of the costly years at old age when the migrants (like other residents) are a large net burden to the State Budgets. All the visa groups reach a breakeven point at an arrival age between around 40 and 48 years. The following summarises the estimated age-at-arrival curves for the visa groups:

Family migrants: The peak lifetime budget impact of around \$50,000 is attained at an arrival age of 16 years. Apart from a slight dip around arrival age 20, the budget impact remains relatively unchanged until the late twenties whereafter the impact gradually tapers-off. **Family migrants reach breakeven at arrival age around 41 years.** The budget impact continues to be negative thereafter and reaches a low at around -\$185,000 for migrants arriving in their mid-seventies.

SAS migrants reach a maximum budget impact of around \$70-75,000 for immigrants arriving aged between 16 and 25 years. For immigrants arriving after their mid to late twenties the budget impact drops almost linearly. **SAS migrants reach breakeven arrival age around 46-47 years.** The budget impact then turns negative and keep decreasing to a low of -\$78,000 at arrival age 60. There are too few SAS immigrants arriving over the age of 60 years to determine the shape of the curve thereafter.

Business Skills/ENS migrants reach a maximum budget impact of around \$80-85,000 for immigrants arriving aged between 16 and 26 years. The budget impact then drops and **Business Skills/ENS migrants reach breakeven at arrival age around 46-47 years.** Too few BS migrants are older than 60 when they arrive to assess a possible continuation of the curve.

Independent migrants reach a lifetime budget impact of just \$80,000 for immigrants arriving aged 24 and it stays above \$70,000 until arrival age in the early thirties. It drops thereafter and persons who arrive in their late thirties to early forties contribute considerably less. However, the net budget impact stays significantly positive until the budget impact of **Independent migrants drops to a breakeven arrival age of around 47-48 years.** At arrival age 49-50 the net budget impact is around -\$40,000. However, it should be noted that there are very few Independent migrants who arrive older than around 46 years and that the curve beyond the breakeven age is based on relatively 'thin' data material (see the discussion in the previous section).

¹³ See the discussion in the previous section about the dip around arrival age of 20 years for some visa groups.

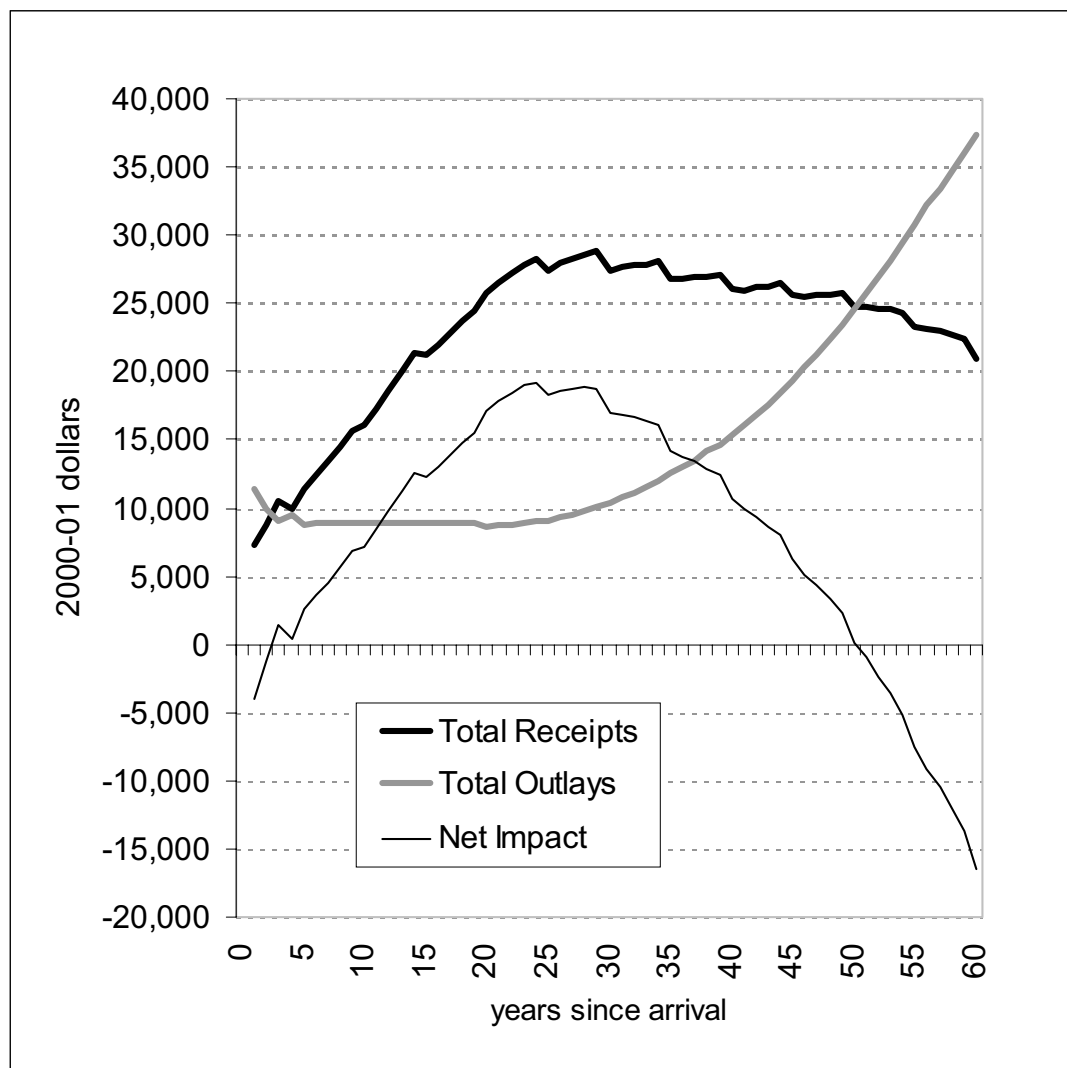
Humanitarian migrants reach a maximum budget impact of \$56,000 at the arrival age 16. By around an arrival age of 19 years the impact has fallen already. At that point most Humanitarian migrants have left the education system. **Humanitarian migrants reach breakeven at arrival age of around 40-41 years.** The budget impact then turns negative and the Humanitarian migrants arriving at an age of around 65-70 years have a negative impact below -\$110,000.

It is clear that the State Budget breakeven point is reached at a much lower arrival age than for the Commonwealth Budget for all visa groups. **The average migrant reaches breakeven for the State Budgets at an arrival age around 44-45 years,** compared with over 50 years for the Commonwealth Budget.

5.2.3. Total Budget Impact

In this section the results from the previous two sections are consolidated into a view of the lifetime effect on the combined Commonwealth and State Budgets. As previously, the results are shown separately for the five visa groups as well as the age-at-arrival curves for each visa group. Figure 5-16 shows the year-by-year estimated impact of an average migrant on the Commonwealth and State Budgets.

Figure 5-16 Estimated Annual Impact on the Commonwealth and State Budgets per Surviving Immigrant by Years Since Arrival, 2000-01 dollars



Because of the dominance of the Commonwealth Budget (in net impact terms), the picture in Figure 5-16 is somewhat similar to the one in Figure 5-2 for the Commonwealth Budget. The net impact is negative during the first couple of years and it improves substantially over the course of the first 25 years after the arrival year. The receipts start dropping back after around 30 years. The decrease is less steep than for the Commonwealth Budget as State receipts keep increasing slightly over the course of the projection period.

The outlays drop slightly during the initial five-year period and then stabilises over the next 20 years before an increase sets in around 25 years after arrival as many migrants start reaching retirement age. The net budget impact reaches a peak around 25 years after arrival and it falls back below zero after another 25 years. The breakeven point, at which point the impact turns negative, thus comes around 50 years after arrival. That is right between the breakeven points for the State Budgets (after 40 years) and the Commonwealth Budget (after 60 years).

The average NPV of lifetime total Commonwealth and State Budget impacts by visa group are shown in Table 5-5. The table is created by adding Table 5-3 and Table 5-4.

Table 5-5 Estimated NPV in 2000-01 of Commonwealth and State Budget Impacts by Visa Category (2000-01 dollars)

	Family	SAS	Business Skills	Independent	Humanitarian	All Migrants
	\$000	\$000	\$000	\$000	\$000	\$000
Receipts	316	385	411	442	313	366
Outlays	215	206	198	191	249	211
Net - recurrent	101	179	213	251	64	155
Interest	58	111	130	153	47	95
Net Impact	158	291	343	404	111	250

The table shows that average NPV of the lifetime net budget impact across all migrants is estimated at \$250,000. The net estimate comprises total receipts of \$366,000 and outlays of \$211,000 with a net recurrent result of \$155,000. The interest payments accruing on the accumulated debt/assets add another \$95,000 and **the total NPV net budget impact over the lifetime of an average migrant is estimated at \$250,000.**

The impact shows huge variation across the visa groups, although all five groups come out with a substantial positive impact. The skilled visa groups are the largest net contributors with Independent migrants at the top with \$404,000, the Business Skills/ENS migrants with \$343,000 and SAS migrants at \$291,000. The main differences between these three groups come from the differences in receipts rather than outlays.

The average lifetime budget impact of Humanitarian migrants is estimated at \$111,000 and the Family migrants at \$158,000. The difference between Humanitarian and Family migrants comes mainly from differences in outlays. Humanitarian migrants are more costly, especially during the first years after arrival.

The following six figures (Figure 5-17 to Figure 5-21) show the NPV of total Commonwealth and State Budget impact by age at arrival for the five visa groups. Figure 5-22 shows the average age-at-arrival curve across all migrants. The figures also show the Commonwealth Budget curve (the thin line) to illustrate how the budgets for the two levels of Government (Commonwealth versus States) drive the results.

The results are summarised by the following (refer to Sections 5.2.1 and 5.2.2 for detailed discussions of the Commonwealth and State results):

Family migrants: The peak budget impact of around \$300,000 is attained at an arrival age of 15 years. The post-education age peak is around \$270,000 for immigrants arriving in their mid to late twenties. **Family migrants reach breakeven at arrival age around 46 years.** The budget impact continues to be negative thereafter and reaches a low at around -\$300,000 around age 75 years.

SAS migrants reach a maximum budget impact of over \$460,000 for immigrants arriving around 24-26 years of age. For immigrants arriving after their mid to late twenties the budget impact drops almost linearly. **SAS migrants reach breakeven arrival age around 52 years.** The budget impact then turns negative with a low of around -\$177,000 at arrival age 60, but there are too few SAS immigrants arriving older than 60 years to determine to the shape of the curve thereafter.

Business Skills/ENS migrants reach a maximum budget impact of around \$550,000 for immigrants arriving aged between 16 and 27 years. The budget impact then drops and **Business Skills/ENS migrants reach breakeven at arrival age around 58-59 years.** Too few BS migrants are older than 60 when they arrive to assess a possible continuation of the curve.

Independent migrants reach a maximum budget impact of around \$475-500,000 for immigrants arriving aged between 23 and 36 years at which age group the curve plateaus and after arrival age of 36 years it drops sharply to the mid-\$300,000 range for persons who arrive in their late thirties to mid forties. However, the net budget impact stays significantly positive until the budget impact of **Independent migrants drops to a breakeven arrival age of around 48-49 years.** It should be noted that there are very few Independent migrants arriving older than around 46 years and that the breakeven age therefore is based on relatively 'thin' data material. Given the sharp drop in the curve around arrival age 45 (and the fact that most Independent migrants aged 45+ are non-PAs), it is quite plausible that an increase in the maximum admission age for Independent migrants would be associated with a breakeven age well above 50 years.

Humanitarian migrants peak early at an arrival age of 14-16 years with a NPV of around \$300,000. It then declines to the \$150,000 range for arrival-age 23 years and it stays at that level with a minor decline towards arrival ages in the mid-thirties. After arrival age of 35 years the budget impact drops off and **Humanitarian migrants reach breakeven at arrival age of around 42 years.** The budget impact of Humanitarian migrants then turns negative and bottoms at arrival age of around 65-70 years around the -\$300,000 level.

The figures clearly show that migrants' impact on the Commonwealth Budget is the main contributor to both the shapes and the levels of the age-at-arrival curves for most arrival-ages. However, this picture changes after **the average migrant reaches breakeven at an arrival age around 48-49 years.** Indeed, for migrants arriving aged around 50 or older the age related outlays in the State Budget increase in significance and for migrants arriving older than around 60 years around half of the net costs are incurred by the States.

Figure 5-17 Family Migrants: Estimated NPV of Net Commonwealth and State Budgets Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars

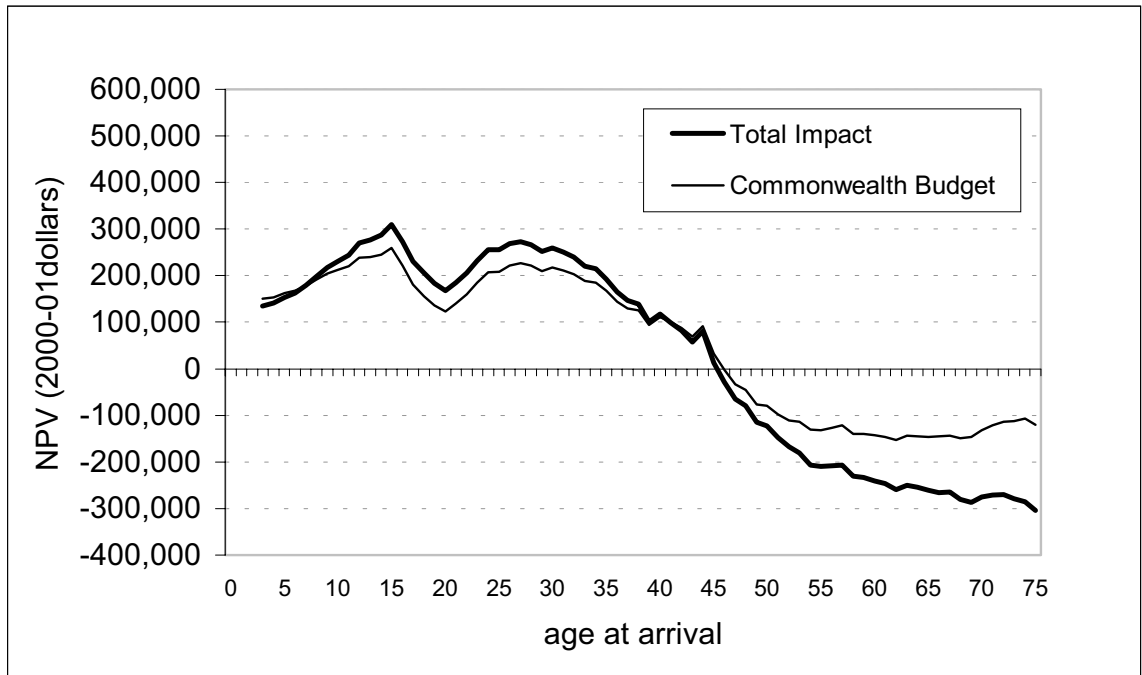


Figure 5-18 SAS Migrants: Estimated NPV of Net Commonwealth and State Budgets Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars

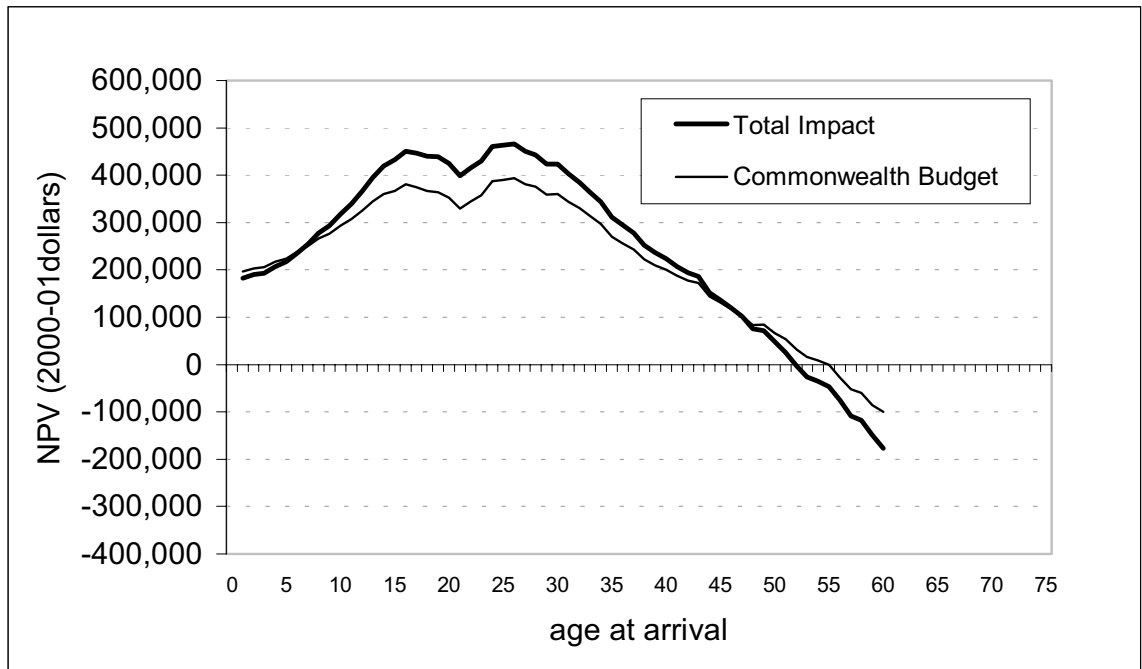


Figure 5-19 Business Skills/ENS Migrants: Estimated NPV of Net Commonwealth and State Budgets Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars

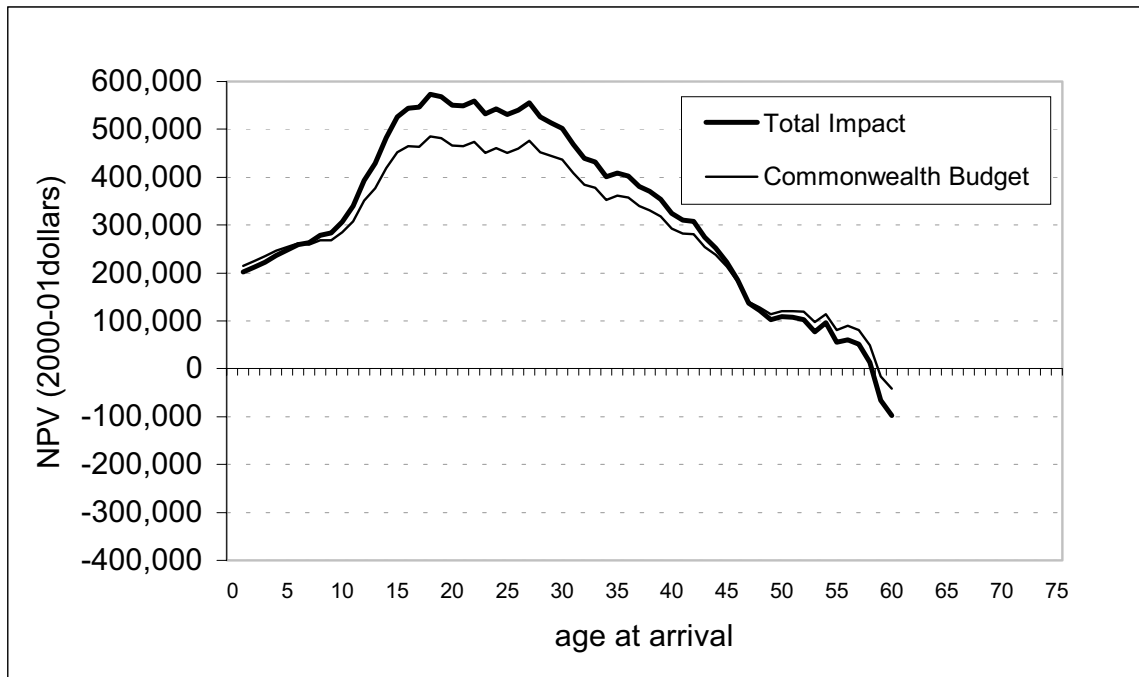


Figure 5-20 Independent Migrants: Estimated NPV of Net Commonwealth and State Budgets Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars

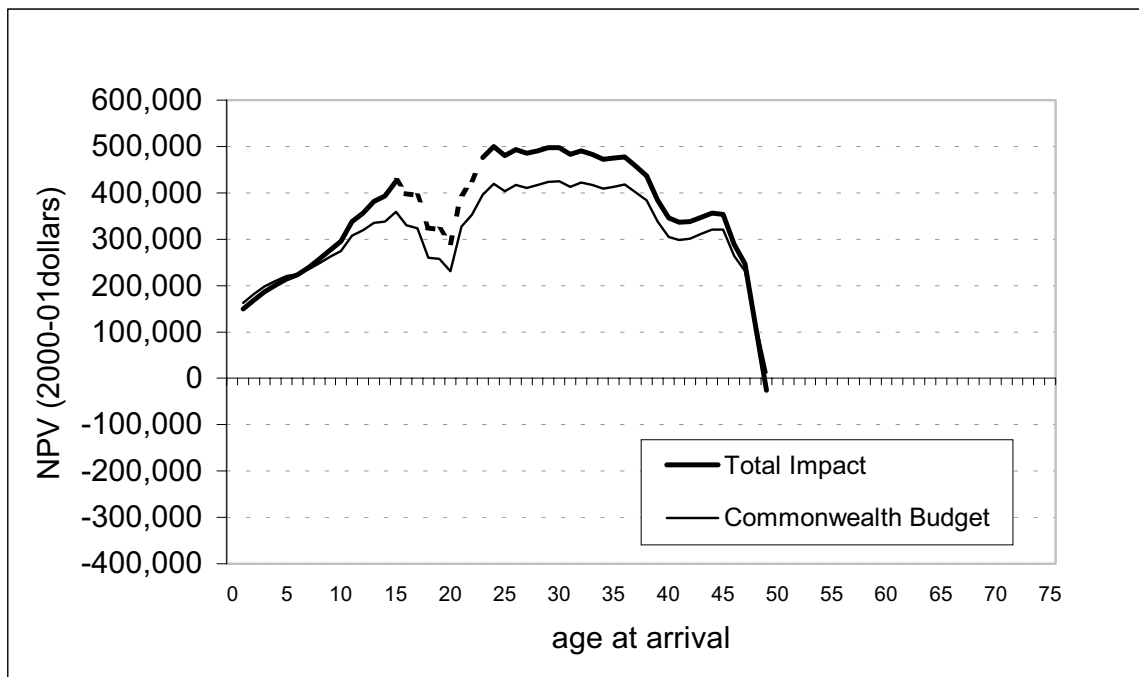


Figure 5-21 Humanitarian Migrants: Estimated NPV of Net Commonwealth and State Budgets Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars

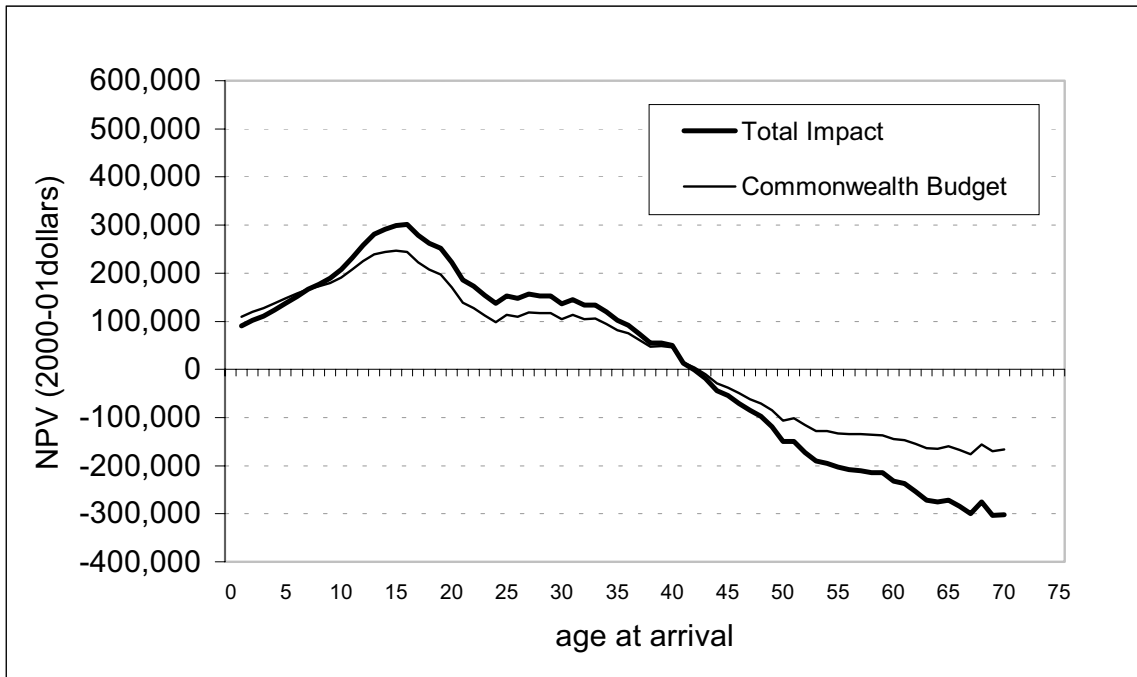
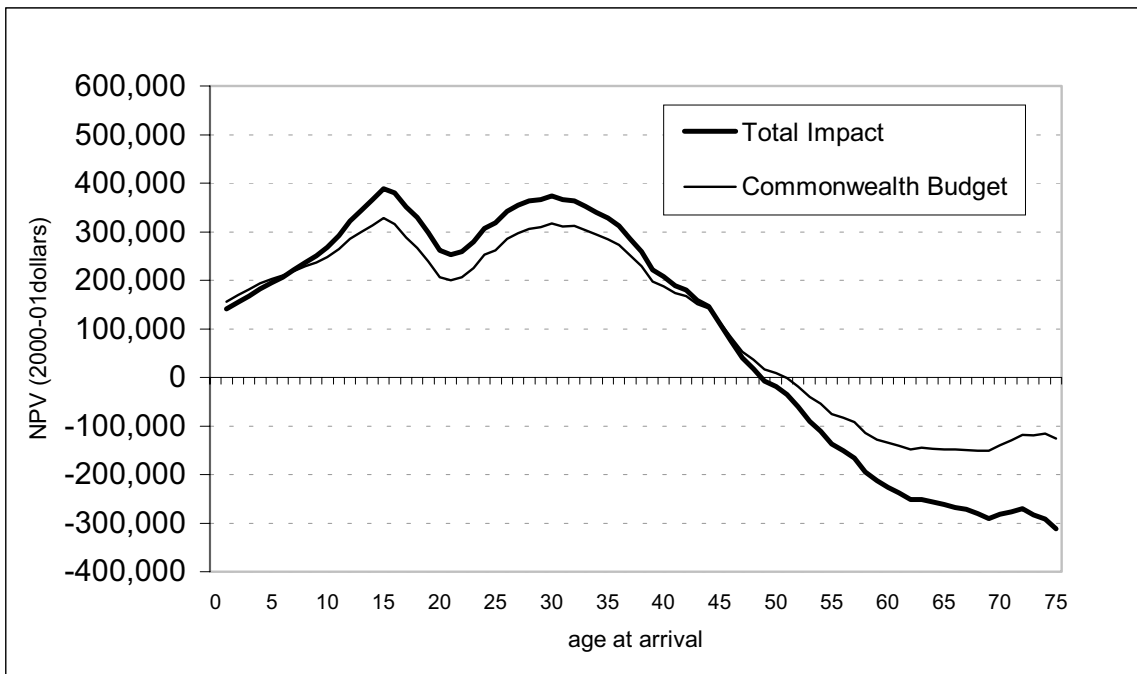


Figure 5-22 All Migrants: Estimated NPV of Net Commonwealth and State Budgets Impact per Immigrant by Age at Arrival in 2000-01, 2000-01 dollars



5.3. Sensitivity analysis

The results presented in the previous section were based upon a series of *baseline assumptions* regarding a range of issues necessary to estimate future budget impacts. In this section we provide sensitivity analysis of the baseline results by examining how they might be effected if alternative assumptions were adopted. The alternative assumptions that we will examine in the following are:

- *The NPV discount rate*: the effect of changing the 4 per cent adopted as the baseline rate to 2 per cent and 6 per cent.
- *The interest rate for the debt/asset account*: the baseline assumption of 2.5 per cent is changed to 0 per cent (thereby disregarding the effect of interest payments on accumulated debt/assets).
- *Remigration*: as an alternative to the baseline assumption that, on average, 23.6 per cent of the migrants remigrate, it is assumed that there is no remigration after the 4th year¹⁴.
- *Zero-impact receipts and outlays*: the baseline results assume that part of the Commonwealth and State Budgets are unaffected by migration. The effect of this assumption is tested by attributing additional outlays to the State and Commonwealth Budgets on a per capita basis. The three examples analysed are:
 - \$11.7 billion additional State Budget receipts: the difference between the coverage of receipts and outlays (see Table 5-2);
 - \$13.8 billion additional Commonwealth outlays: the budget of the Department of Defence; and
 - \$41.9 billion additional Commonwealth outlays: approximately the Commonwealth Budget zero-impact outlays.
- *Fiscal policy*: the baseline results are based on the assumptions that tax and social policies are ‘unchanged’ over the remaining lifetimes of the immigrants. The effect of changing this assumption is analysed in two examples:
 - a gradual reduction of the value of social security payments (pensions, allowances and family payments) by 20 per cent over a period of 15 years;
 - a gradual increase in the value of income tax payments (including levies) by 10 per cent over a period of 15 years.
- *Faster labour market convergence*: as described in Section 5.1.2, the baseline results are based on assumptions about the convergence of the labour market outcomes for migrants in terms of their performance relative to their Australian born counterparts¹⁵ (labour force participation, unemployment and earned incomes). As an alternative the following (more optimistic) assumptions are adopted:

¹⁴ The first four years of remigration is covered by the remigration incidence between the LSIA1 waves. This part of the modelled remigration is based on direct evidence on remigration, which is not tested by the sensitivity example.

¹⁵ Notice that by ‘Australian born counterparts’ we mean a group of Australian born persons who, as a group, have similar characteristics as the migrant visa groups. This is, indeed, the best benchmark for the labour market performance of the migrants.

- *Labour force participation and unemployment*: it is assumed that the groups that have not caught-up with their Australian born counterparts by year 10 after arrival are ‘forced’ to do so by following a straight line from year 4 to year 10;
- *Earned income*: it is assumed weekly earnings for full-time employed migrants catch-up fully with their Australian born counterparts in the 10th year after arrival (instead of in the 15th year assumed for the base case).

These changes mainly have an impact on migrants in the Family and Humanitarian visa groups and less so for the skilled groups who are already catching up quickly with their Australian born counterparts.

The effects of the alternative assumptions are illustrated by Table 5-6, which shows the effect on the average net impact on total Commonwealth and State Budgets for the five visa groups. Table 5-7 shows the effect on the breakeven age-at-arrival point. The effects on the age-at-arrival curve for ‘all migrants’ of the alternative NPV discount rates, additional receipts and outlays, and faster labour market convergence are further illustrated by Figure 5-23, Figure 5-24 and Figure 5-25.

Table 5-6 Impact of Alternative Assumptions on the Estimated NPV of the Total Commonwealth and State Budget Impact by Visa Category

	Family	SAS	Business Skills	Independent	Humanitarian	All Migrants
	\$000	\$000	\$000	\$000	\$000	\$000
Baseline	158	291	343	404	111	250
Discount rate:						
2%	+112	+296	+347	+360	+150	+230
6%	-57	-116	-133	-144	-64	-96
No interest	-36	-111	-130	-153	-47	-95
No remigration	15	32	36	36	20	25
Other receipts:						
\$11.7 billion	24	25	24	25	25	25
Other outlays:						
\$13.8 billion	-28	-29	-29	-30	-29	-29
\$41.9 billion	-86	-89	-87	-90	-88	-88
Fiscal policy:						
Taxes +10%	21	29	31	33	14	25
S. Sec. -20%	2	1	1	1	3	2
Both	24	30	32	34	17	27
Convergence ¹	45	15	12	23	70	35

¹ ‘Convergence’ refers to the alternative assumption regarding labour market convergence of immigrants as described above (labour market participation, unemployment and earned incomes).

Table 5-7 Impact of Alternative Assumptions on the ‘Breakeven Age-at-Arrival’ for the Estimated NPV of the Total Commonwealth and State Budget Impact by Visa Category

	Family	SAS	Business Skills	Independent ¹	Humanitarian	All Migrants
Baseline	45-46	51-52	58-59	48-49	41-42	48-49
Discount rate:						
2%	-1	-1	-1	<0	-1	-2
6%	+1	+1	0-1	>0	+2	+2
No interest	0	0	0	<0	0	0
No remigration	0	0	0	<0	0	0
Other receipts:						
\$11.7 billion	0	+1	0	>0	+2	+1
Other outlays:						
\$13.8 billion	-1	0	-1	<0	-1	-1
\$41.9 billion	-3	-2	-2	<0	-5	-2
Fiscal policy:						
Taxes +10%	0	+1	0	>0	+1	0
S. Sec. -20%	0	0	0	<0	+1	0
Both	0	+1	0	>0	+1	+1
Convergence ²	>0	+1	>0	>0	+3	+1

¹ Due to the lack of data for Independent migrants around their (baseline) breakeven age-at-arrival, it is not possible to provide reliable sensitivity analysis for this group.

² ‘Convergence’ refers to the alternative assumption regarding labour market convergence of immigrants as described above (labour market participation, unemployment and earned incomes).

The NPV discount rate

The discount rate used for the calculation of the net present value of the future budget impacts greatly affects the nominal values. **A 2 percentage point lower discount rate increases the average NPV by \$230,000 (from \$250,000 to \$480,000) and a 2 percentage point higher rate reduces the NPV by \$96,000 (from \$250,000 to \$154,000).** The picture across the visa groups shows that all groups are affected in the same direction and that they all preserve a positive result.

However, the impact of alternative discount rates varies considerably in magnitude for the visa groups. In absolute terms, the impact is higher for the visa groups with the highest baseline result (the Skilled migrant groups) whereas in relative terms, the impact is higher for Humanitarian migrants who have the lowest baseline outcome. The reason is that a relatively large proportion of the positive outcome for the Humanitarian migrants comes long after they arrive while their contribution on average is negative during the first years after arrival.

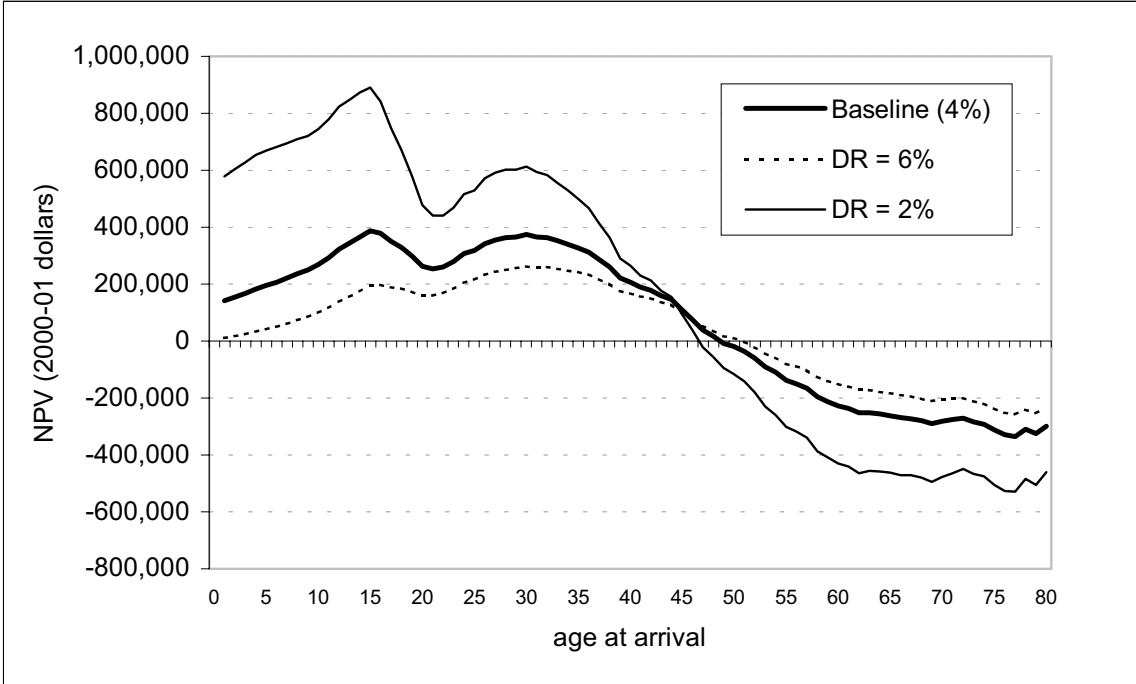
The Family migrants are the least affected by the alternative discount rates – both in absolute and relative terms. This is due to the age profile of this group with more elderly persons (parent migrants) for whom the (in budget terms) costly years after retirement come earlier and fewer children for whom the contributing years come later.

The effect of the alternative discount rates depends crucially on the age at arrival of the migrants. This is illustrated by Figure 5-23, which compares the NPV of the net total budget impact by age-at-arrival for the baseline (based on 4 per cent discount rate) and the alternative discount rates (2 per cent and 6 per cent). The figure shows that by changing the discount rates the age-at-arrival curve is literally rotated around a specific age-at-arrival point. At this ‘rotating’ point (which is around 45 years for the average migrant) the discounted receipts and outlays balance out regardless of the size of the discount rate.

Figure 5-23 shows that the outcome for the younger arrival age groups who have a positive result is increased by a lower discount rate and reduced by a higher discount rate.

The ‘rotating’ point is almost the same as the breakeven age-at-arrival for the average migrants. This is a coincidence: the ‘rotating’ point and the breakeven point are not identical. However, it is natural that they are close and this fact means that **the breakeven point is not affected much by changing the discount rate for the NPV calculations**. This is also the case for individual visa groups as shown in Table 5-7.

Figure 5-23 All Migrants: Estimated NPV of Net Commonwealth and State Budgets Impact per Immigrant by Age at Arrival in 2000-01, Effect of Alternative NPV Discount Rates: 2%, 4% (baseline) and 6%, 2000-01 dollars



The interest rate for the debt/asset account

The baseline results include a quite substantial component of the net result for assumed interest payments related to the debt/asset account, which accumulates the net results year by year. On average 38 per cent of the baseline results based on an interest rate equal to the CPI inflation assumption are due to these interest payments (calculated from the figures in Table 5-5).

It is possible to argue that the costs (or contributions) of migrants do not necessarily affect the budgets’ balance as Governments tend to aim for a balanced budget regardless of any net effect of migrants. The effect on the net result of not including the interest payments is shown in Table 5-6. **A reduction in the interest rate from 2.5 per cent to 0 per cent reduces the**

average result by \$95,000 (from \$250,000 to \$155,000). In absolute terms, the effect is stronger for the visa groups with the largest budget impacts (the skilled groups). However, in relative terms the result for Humanitarian migrants is affected most, namely 42 per cent compared with 38 per cent on average across the groups.

The effect of reducing the interest rate (to zero as it is) is similar to the effect of increasing the NPV discount rate. This is not surprising. However, unlike the discount rate effect, the effect of reducing the interest rate is more even across the visa groups. Like the discount rate effect (although the effect is reverse), the interest payments amplify both positive and negative results but the effects are spread out across future years, which reduces the variation caused by different year-by-year profiles for the budget results.

The exclusion of the interest payments does not affect the breakeven arrival age to any noteworthy extent.

Remigration

The baseline results assume that new migrants are as likely to remigrate in the future as previous migrants have been in the past¹⁶. This may or may not prove to be a good assumption and to test the implication of an alternative (extreme) assumption Table 5-6 show the effect of assuming that no migrants will remigrate after the 4th year after arrival. Across the visa groups the effect on the lifetime budget results of ‘no remigration’ are significantly positive. **On average the result would improve by around 10 per cent (up \$25,000 from \$250,000 to 275,000).** For reasons similar to the effect of changing the NPV discount rate, the effect is, in relative terms, highest for Humanitarian migrants (18 per cent) and lowest for the Family migrants (9 per cent).

The breakeven arrival age is almost unaffected by reducing remigration (see Table 5-7). If anything, the breakeven age-at-arrival is slightly lower with reduced remigration. On the face of it, this seems like a contradiction to the positive impact on the average lifetime budget outcomes shown in Table 5-6. The reason is, however, the effect of reducing remigration depends crucially on the age-at-arrival of the migrants. For young migrants, who can be expected to have long spell of years with positive budget contributions, remigration is ‘bad’ for the budget. For the older migrants who are closer to retirement (and negative budget impacts) remigration is ‘good’ for the budget.

Zero-impact outlays

The baseline analysis does not include all receipts and outlays in the Commonwealth and State Budgets. Outlays such as defence spending and public administration are clearly not directly affected by the size of the population. However, as we have seen in the previous section, increasing the population by taking in more immigrants improves the revenue capacity of Governments and hence their capacity to increase expenditure, including on the assumed zero-impact outlays. To examine this issue, Table 5-6 and Table 5-7 show the possible effect of including all or part of the zero-impact outlays on a per capita basis – thereby assuming that such spending are proportional to the size of the population. The tables show three examples of including additional per capita receipts by the equivalent of \$11.7 billion and additional per capita outlays by \$13.8 billion and \$41.9 billion. The additional receipts are equivalent to the higher coverage of State Budget outlays compared with receipts (see Table 5-2). In 2000-01 budget terms the additional outlay figures amount to the budget

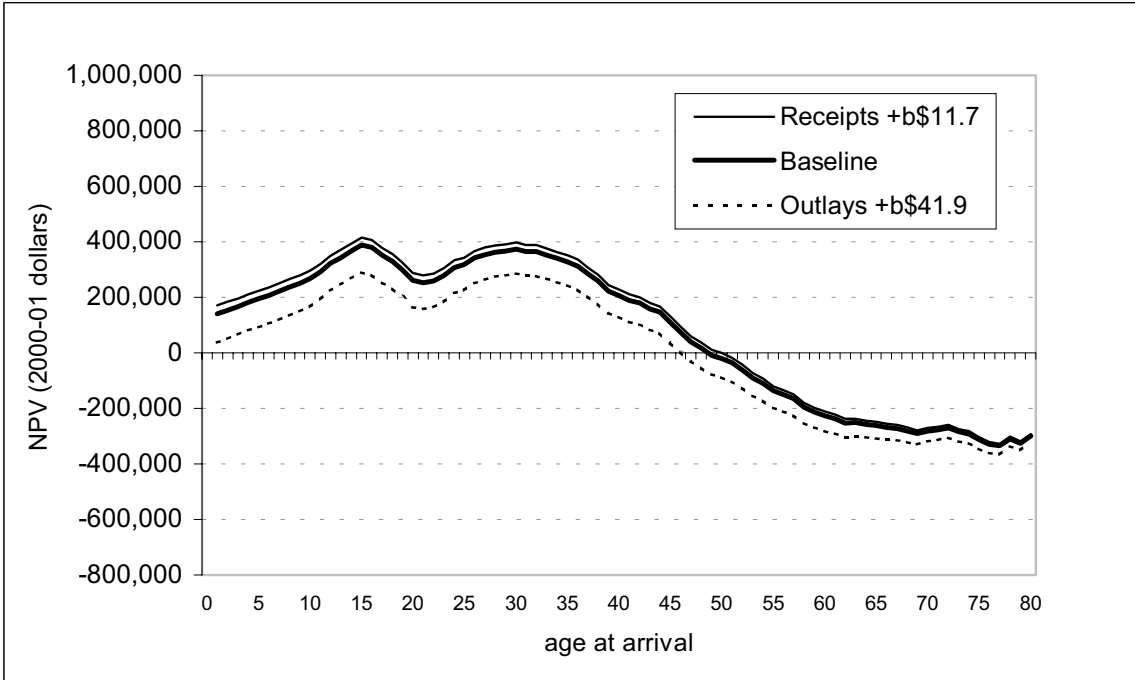
¹⁶ That is, to the extent that we have been able to correctly estimate past remigration rates (see Section 5.1.4).

for the Department of Defence (\$13.8 billion) and an estimate of all zero-impact outlays in the Commonwealth Budget (\$41.9 billion).

The effect of including additional per capita receipts or outlays is proportional to the net amount (see Table 5-6). **Including per capita receipts to the effect of matching the coverage of State Budget receipts and outlays increases the result by \$25,000 on average. Including defence spending (\$13.8 billion) reduces the result by \$29,000 on average and adding all Commonwealth Budget zero-impact outlays (\$41.9 billion) reduces the result by \$88,000. The effect, in nominal terms, is more or less the same for all visa groups and the net results are positive for all groups in both cases.** The slight differences between the visa groups are the results of their different age profiles and hence their average remaining life length.

Looking now at the effect of adding zero-impact outlays on the breakeven age-at-arrival, Table 5-7 shows that, **on average, the breakeven age-at-arrival is increased by 1 year by including \$11.7 billion zero-impact receipts and it is reduced by 1 year by including an additional \$13.8 billion in outlays and by 2 years by including an additional \$41.9 billion in outlays.** The impact on the breakeven age-at-arrival is pronounced for all visa groups although there are substantial differences across the groups. The effect on the breakeven age at arrival is strongest for the Humanitarian group namely a reduction in the breakeven arrival-age of 5 years (from 41-42 years to 36-37 years). The age-at-arrival curve of Humanitarian migrants is rather flat around the breakeven point (Figure 5-21), which means that lowering the curve by including additional outlays has a relatively large impact on the breakeven point.

Figure 5-24 All Migrants: Estimated NPV of Net Commonwealth and State Budgets Impact per Immigrant by Age at Arrival in 2000-01, Effect of Including Extra Receipts (\$11.7 billion) and Outlays (\$41.9 billion), 2000-01 dollars



The effect of including zero-impact receipts and outlays depends on the age at arrival of the migrants. This is illustrated by Figure 5-24, which compares the NPV of the net total budget impact by age-at-arrival for the baseline and additional receipts of \$11.7 billion and outlays of

\$41.9 billion. The figure shows that the effect of additional zero-impact receipts is positive for all arrival ages. Similarly, the effect of additional outlays is negative for all arrival ages. However, in both cases, the effect decreases with increased arrival age as the remaining years of impact are reduced.

Fiscal policy

The *New Americans* study argued that, in looking as far into the future as we do by projecting the lifetime budget impacts of new migrants, it is appropriate to consider the future constraints that the ageing of the population might put on future Government budgets (see the discussion in Section 2.5). The US study was thus based on the assumption that Government policies regarding taxes and social security payments are adjusted so as to achieve balanced budgets in line with projections of future budget results under unchanged policies. The taxes are thus increased and the social security payments reduced equally to achieve these budget balance objectives.

As discussed in Section 2.5, the budget implications of population ageing in Australia is not considered as important as in the US and we have not made any adjustments to the baseline results in lieu of the possibility of a tighter budget situation in the future. However, we have examined what the effect might be if such adjustments were made and Table 5-6 and Table 5-7 show the effect of gradually adjusting social security down and taxes up over the next 15 year period (from 2000-01 to 2014-15). When the adjustment is fully phased in, taxes are increased by 10 per cent and social security payments are reduced by 20 per cent across the board.

The effects on the lifetime budget impacts of the reduced social security payments are minuscule (see Table 5-6). Although pensions payments are set to increase dramatically as the migrants retire, this impact sets in at a relatively late stage when the discounted value has been reduced substantially. **The effect of a gradual reduction in social security payments by 20 per cent over the first 15 years is only around \$2,000 on average per person, which is too little to affect the breakeven age-at-arrival. The impact of a 10 per cent gradual increase in tax payments over 15 years is higher, at around \$25,000, although this does not have a noteworthy effect on the breakeven point either.**

Faster labour market convergence

Migrants' future labour market outcomes are important for their impacts on budget receipts and outlays. The LSIA1 provides a good indication of the labour market performance during the first 4 years after arrival. The 1998-99 HES provides information about the *cross-sectional* relationship between the current performance and years since arrival for previous migrant cohorts. The two data sources have thus been used to estimate the most likely paths for the labour market performance of the visa groups in future years.

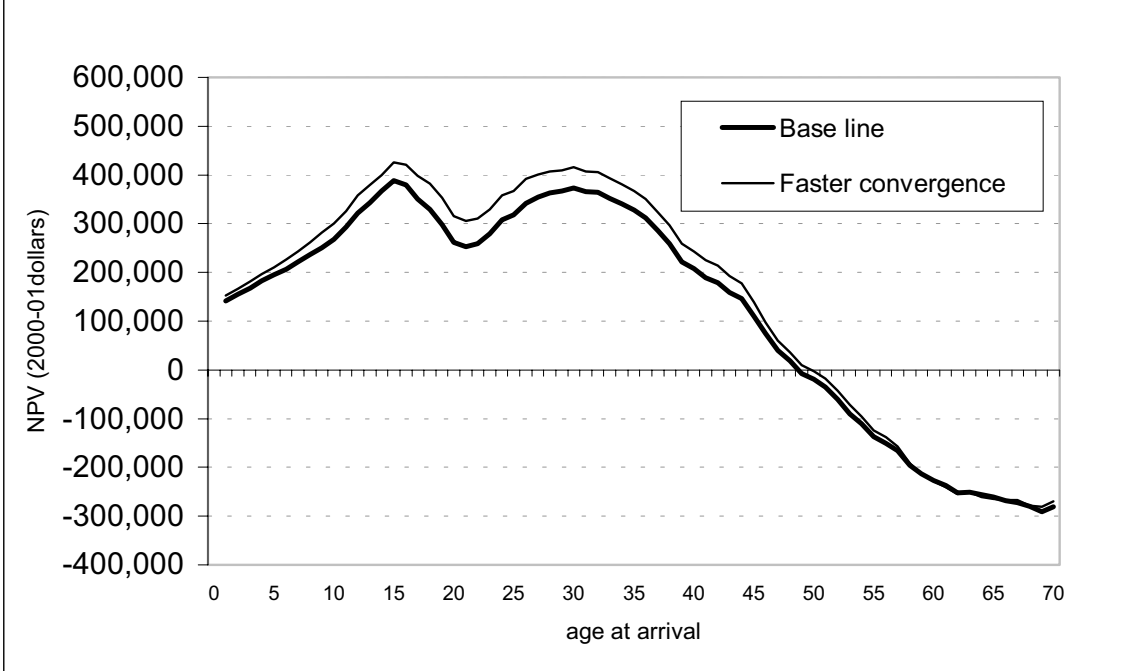
Although the baseline 'convergence' represents the most likely scenario, it is important to conjuncture that the implied developments in labour force participation, unemployment and earnings rates are by no means a certain outcome. Apart from the fact that the performance of migrants will change with the general labour market conditions it is eminent that new cohorts of migrants are different from past ones. It is thus important to test how the results might be affected if alternative assumptions about labour market convergence were adopted.

The effects of assuming faster labour market convergence are shown in Table 5-6 and Table 5-7. The tables show that the more optimistic assumptions (faster convergence) mainly implicates the results for the Family and Humanitarian visa groups. As implicated by the LSIA1, these groups start out with employment and earnings levels that are considerably below those of their Australian born counterparts. Although they show strong improvement

during the first years after arrival their subsequent convergence is slow and a full catch-up is expected to take many years. **By assuming a full catch-up after 10 years for Family and Humanitarian migrants their outcomes increase by \$45,000 and \$70,000 respectively. The outcome for the other visa groups are more modest (in the \$12,000 - \$23,000 range). The breakeven age-at-arrival is increased by less than 1 year for Family migrants and by 3 years for Humanitarian migrants.**

The impact on the age-at-arrival curve for all migrants of faster labour market convergence is shown in Figure 5-25. The figure shows that the effect depends significantly on the age at arrival of the migrants. The effect is strongest for persons arriving at working age while it tapers off for older migrants. Not surprisingly, there is virtually no impact on older migrants (aged around 60 or older). The effect on migrating children is smaller but significant. The increase in the outcome for children is a result of higher incomes of both themselves and their parents. The latter results in lower family payments and, to some extent, in improved educational outcomes.

Figure 5-25 All Migrants: Estimated NPV of Net Commonwealth and State Budgets Impact per Immigrant by Age at Arrival in 2000-01, Effect of Faster Labour Market Convergence, 2000-01 dollars



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Appendix A The treatment of Commonwealth Budget items

The following provides a description of the treatment of the modelled receipts and outlays in the Commonwealth Budget.

Commonwealth receipts

Income tax and Medicare Levy

The simulation of income tax and Medicare Levy is a detailed application of the tax system's rates and thresholds applied to the simulated taxable incomes of persons. The taxable income is calculated as the sum of its components (for example, earned income and investment incomes), less an imputed amount for employment related deductions. The main tax offsets¹⁷ are calculated on the basis of income and the receipt of relevant social security benefits.

The tax rates are assumed to be unchanged over the entire projection horizon but the thresholds are indexed every five years in line with the movement in Average Weekly Earnings.

Indirect taxes

The simulation of indirect taxes is based on estimated expenditure shares (of disposable incomes) for income units on the expenditure base relating to four categories of taxable expenditures with the following average rates applying:

- Goods and Services Tax (includes customs duty and luxury car tax): 10.9%
- Alcohol tax (beer and spirits excise tax and wine equalisation tax): 27.4%
- Tobacco tax: 70.5%
- Petroleum tax: 41.6%.

The expenditure shares were estimated using the 1998-99 HES file and relate to a number of variables for the characteristics of the income unit. The main explanatory variables were used:

- Age of the oldest person
- Income unit type (single person, sole parent, couple only, couple with children)
- Country of birth (Australia, New Zealand, Other)
- Employment status of main income earner
- Decile of disposable income.

The indirect taxes are allocated to the persons within an income unit in proportion to their contribution to the total disposable income of the unit.

No indexation of indirect taxes were required. These taxes are based on expenditure *shares* and therefore follow the developments in incomes.

User charges

¹⁷ The modelled tax rebates are: Low Income Earner Rebates, Pensioner Rebate, Low Income Aged Person Rebate and the Beneficiary Rebate.

Three migrant user charges are simulated by the model:

- Adult Migrant English Programme (AMEP) Charge: assigned as visa group specific rates to adult migrants from non-English speaking countries in eligible visa groups.
 - Eligibility: Skilled migrant adults from non-English speaking countries aged 15 and above (Family and Humanitarian are exempt)
 - Unit cost: an upfront fee charged the first year only
 - Take-up: 1999-00 AMEP registration rates
 - Growth: indexed by the CPI.
- Translation and Interpreting Service Charge (TIS): assigned as average charge to adult migrants.
 - Eligibility: All migrant adults aged 15 and above
 - Unit cost: average charge for services
 - Take-up: average annual visa group usage for year 1 to 10 (assumed zero thereafter)
 - Growth: indexed by the CPI.
- Migrant Health Charge: a flat fee assigned the first year to persons aged 65 or above in eligible visa groups
 - Eligibility: non-Humanitarian aged 65 or above
 - Unit cost: an upfront fee charged the first year only
 - Take-up: all eligible
 - Growth: indexed by the CPI.

Commonwealth outlays

Settlement services costs

The cost of three categories of settlement services are simulated in the model:

- Humanitarian Settlement Services (HSS): average costs assigned to all Humanitarian migrants
 - Eligibility: all Humanitarian migrants
 - Unit cost: average cost per participant
 - Take-up: 100% in year 1, 10% in year 2 and 0% thereafter
 - Growth: indexed by the CPI.
- Adult Migrant English Programme (AMEP) Charge: average costs assigned to adult migrants from non-English speaking countries on the basis of visa group specific take-up rates.
 - Eligibility: Adults from non-English speaking countries aged 15 and above (Humanitarians migrants are eligible in years 1 to 10, others in years 1 to 3 - although see take-up rates below)
 - Unit cost: average cost per hour

- Take-up: average annual hours and visa groups specific take-up rates for years 1 to 4 (zero thereafter)
- Growth: indexed by the CPI.
- Translation and Interpreting Service (TIS) Charge: assigned as average costs to adult migrants on the basis of visa group specific usage.
 - Eligibility: All migrant adults aged 15 and above
 - Unit cost: average per service cost
 - Take-up: average annual visa group usage for year 1 to 10 (assumed zero thereafter)
 - Growth: indexed by the CPI.

Social security payments

The social security payments to immigrants are simulated on the basis of the general and immigrant specific eligibility rules. The simulations apply current payment rates and income testing thresholds/rates appropriately indexed for future years. As shown in Table 4-2, a comprehensive list of pensions, allowances and family payments are simulated. The assignment of payments follow four steps:

1. General eligibility
2. Assignment of payment rates
3. Income tests; and
4. Migrant specific eligibility test.

The sequence of the general eligibility test gives priority to pensions over allowances and allowances over Parenting Payments (coupled). The following criteria have been applied for the eligibility tests (in the order mentioned):

1. The probability of receiving Disability Support Pension, Carer and Wife Pension and Sickness Allowance was assigned by logistic regression estimated using the 1998-99 HES.
2. Age Pension eligibility was assigned using the relevant age criteria.
3. Sole Parent Pension (Parenting Payment single rate) eligibility was assigned to single adults with one or more dependents under the age limit.
4. Eligibility to other allowances was assigned on the basis of relevant criteria regarding labour force participation, age and study status.
5. Parenting Payment (coupled rate) eligibility.
6. Special Benefit eligibility was assigned to persons in income units where both adults were out of the labour force and not qualifying for other income support.
7. Eligibility to Family Tax Benefits depends on the presence of eligible dependents.

The relevant rates of payment are assigned to eligible candidates and the income tests are applied to determine final eligible payments.

The eligibility is finally overridden by the special migrant eligibility test (the so-called waiting period which is specific to the visa groups).

The social security rates are indexed annually by the AWE index. This is more generous than the indexation rules, which imply CPI indexation for most payments (but not the pension

rate). It is, however, a more realistic assumption for long term projections where the CPI indexation would erode greatly the value of social security payments compared with other sources of income.

Labour market assistance

The cost associated with the operation of the Job Network is assigned to everyone who is in receipt of an allowance income support or a Special Benefit payment. The cost per recipient of the Job Network has been estimated as the total funding divided by the total number of recipients of the relevant payments. The cost is indexed by the change in the CPI.

Education costs

The cost of providing education to migrants is treated separately for the three main institutions namely primary and secondary schools, TAFE and University courses. The costs are attributed to persons determined by the education module to participate in studies at these three types of institutions as either part-time or full-time students. The cost of part-time students is assumed to be half that of full-time students.

- Primary and secondary schools: the average cost per student of the following cost components:
 - Government school grants: assigned to children in Government schools
 - Non-Government school grants: assigned to children in Non-Government schools
 - Government school targeted programs: assigned to children in Government schools
 - Non-Government school targeted programs: assigned to children in Non-Government schools
 - English as a Second Language: assigned to children from non-English speaking countries with decreasing take-up rates during the first three years after arrival and zero thereafter.
- TAFE: assignment of average cost per student
- University: assignment of average cost per student.

All Commonwealth education costs are indexed by the CPI.

Health expenditures

Health services provided to migrants at the Commonwealth Government's expense comprise three categories of payments relating to the Medicare Benefits Schedule (MBS), the Pharmaceutical Benefits Schedule (PBS) and Commonwealth's funding of public hospitals. The cost of these services are assigned to persons on the basis of their age and sex, and in the case of PBS on the access to concessional rates of patient co-payments.

- Medicare Benefits Schedule (MBS): average population wide MBS expenses by age are assigned to all persons
- Pharmaceutical Benefits Schedule (PBS): the assignment of PBS costs depends on whether a person is the holder of concession card. All persons who receive an income support payment (allowances and pensions) are assumed to be concession card holders.
- Hospital Benefits: the assignment of the cost of Hospital Benefits depends is age and sex specific and is derived from per capita usage index by age and sex and the total funding for public hospitals.

All health costs are indexed by AWE.

Public administration

This component comprises the cost of providing Centrelink services to recipients of payments and is derived as the total Centrelink revenue from the Commonwealth per client assisted.

Commonwealth grants to the States

Data on per capita general revenue assistance from the Commonwealth to the States was applied and assigned to all persons. The GST revenue is assumed to accumulate to the Commonwealth, and then distributed to the States in the form of general assistance grants (in place of the former financial assistance grants).

Capital expenditure

The simulation of Government budget impact includes attribution of two types of capital expenditure that are directly associated with migrants' usage of services namely Settlement Services and Public Administration in relation to Centrelink.

- Settlement Services: allocates estimate annual expenditure for 'technology upgrades' to users of Translation and Interpreting Services in proportion to their usage (in year 1 only).
- Centrelink: an average cost per receipt of Centrelink payments is assigned to recipients. The cost is estimated as the total Centrelink capital costs per client.

Capital expenditure is indexed by the change in the CPI.

Other receipts and outlays

The receipts and outlays described above are the ones that are considered to be directly attributable to persons and families (see the discussion in Section 2.1). The Commonwealth Budget includes many other items that cannot be identified as directly relating to the consumption or, indeed, receipt from individuals. On the expenditure side this includes public goods such as expenditures on national defence and public administration and infrastructure such as research, roads, etc. In these cases it is less obvious how additional immigration affects expenditures. On the receipts side, the taxes levied on corporations and other non-person bodies are not directly attributable to individuals, but over time they could potentially be affected by additional immigration.

The model identifies these receipts and outlays separately and allows them to be attributed either fully or partially to persons on a per capita basis.

Appendix B The treatment of State Budget items

The following provides a description of the treatment of the modelled receipts and outlays in the State Budgets.

State receipts

Payroll Tax

The simulation of payroll taxes is based on estimated State-specific Effective Tax Rates (ETRs) based on 1998-99 estimates of total earned income and tax collections in the States. In order to be consistent with the estimation data used for the income equations (see Section 4.1.2) we have used income estimates from the 1998-99 Household Expenditure Survey. The State-specific ETRs for payroll taxes are shown in Table 0-1.

Table 0-1 Estimated Effective Tax Rates for Payroll tax, FID and debit taxes by State, 1998-99.

	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
	%	%	%	%	%	%	%	%
Payroll tax	4.4	3.3	2.9	3.6	2.9	3.8	3.2	2.1
FID	0.63	0.53	0.00	0.45	0.51	0.40	0.56	0.34
Debit tax	0.36	0.40	0.48	0.31	0.44	0.30	0.32	0.30

Source: State Budget Papers and the 1998-99 Household Expenditure Survey.

Note: The tax base for payroll taxes is *earned income*, which for modelling includes net income for the self-employed (un-incorporated) because this is modelled jointly with wages and salaries. The tax base for FID and Debit taxes is disposable (after tax) income which is used as a proxy for these financial transaction taxes.

Gambling Taxes

The gambling expenditure of income units, as recorded by the 1998-99 HES, is used as an approximation of the gambling tax payments. The gambling tax paid by income units is based on a combination of the average tax paid in the States and *specific-to-average* take-up rates and unit receipts. The estimates of average gambling taxes per income unit in the States are shown in Table 0-2.

The specific-to-average take-up rates and unit receipts for individual income units are estimated using logistic regression (take-up) and linear regression (receipts of ‘users’) on the basis of the 1998-99 HES with the following explanatory variables:

- Age of the oldest person in the income unit
- Income unit type (single person, sole parent, couple only, couple with children)
- Country of birth (Australia, New Zealand, Other)
- Years since arrival
- Employment status of main income earner
- Decile of disposable income

- Educational qualification.

Table 0-2 Average Gambling, Motor Vehicle, Insurance and Land Taxes, and 'Regulatory fees and fines' per Income Unit by State, 2000-01.

	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
	\$	\$	\$	\$	\$	\$	\$	\$
Gambling tax	364.4	527.9	278.0	373.5	122.4	259.3	203.0	244.1
Motor vehicle tax	291.4	398.2	420.0	399.9	472.9	180.5	184.7	119.8
Tax on insurance	73.7	112.0	80.9	149.0	139.1	0.0	0.0	107.2
Land tax	276.9	209.2	126.2	106.0	215.6	114.9	0.0	184.4
Fees and fines	238.1	116.8	325.6	190.6	174.5	57.1	885.8	692.2

Source: State Budget Papers and the 1998-99 Household Expenditure Survey.

Gambling taxes are indexed by AWE.

Motor Vehicle Taxes

The estimation of motor vehicle taxes is similar to the method used for gambling taxes. The take-up is estimated using a logit equation for positive income unit expenditure on compulsory registration and third party insurance and a linear regression for actual weekly expenditure for income units with positive expenditures.

The explanatory variables for the motor vehicle tax equations were the same as for gambling taxes. The estimates of average motor vehicle taxes per income unit in the States are shown in Table 0-2.

Motor vehicle taxes are indexed by AWE.

Financial Institutions Duty (FID)

The FID applied in all States except Queensland but was abandoned from the financial year 2001-02 (the second year of the modelling period). It is not possible to get accurate information about how FID payments vary with personal characteristics such as sex, age and migrant status. As an approximation it has been assumed that a person's FID liability is proportional to disposable income, which is modelled in detail by the Migrant Ageing module (see Section 4.1.2). The estimated payment of FID is (like disposable income) specific for sex, age, migrant status, age at arrival etc. The State-specific ETRs (of disposable income) for FID are shown in Table 0-1.

Debit Tax (BAD)

Debit taxes are modelled in the same way as FID.

No indexation of Debit Tax was necessary because of the link to disposable income.

Taxes on Insurance

The estimation of taxes on insurance is similar to the method used for gambling taxes. The estimation uses a logit equation for positive income unit expenditure on general insurance and

life insurance¹⁸ and a linear regression for actual weekly expenditure for income units with positive expenditures.

The same explanatory variables as for gambling take-up and expenditure was used for insurance taxes. The estimates of average taxes on insurance per person in the States are shown in Table 0-2.

Taxes on insurance are indexed by AWE.

Land Tax

Land taxes are generally paid by the land owner, but in most States the primary residence is exempt (the exception is very high land values in NSW). The tax is levied as a percentage of the land value with progressive rates and a tax free threshold. In estimating the payment of land taxes by individuals we have made the following assumptions:

- Land taxes can be attributed to private renters (rather than the land owners);
- The tax payments are proportional to the rent payment (within each State)

On the basis of these assumptions, specific-to-average take-up rates and unit receipts were applied. The take-up rates were estimated using a logit equation for income units being private renters and the unit receipt is based on weekly rent payments.

The estimates of average land taxes per income unit in the States are shown in Table 0-2 and the explanatory variables are the same as those shown above for gambling taxes.

Land tax is indexed by AWE.

Conveyance and Transfer Duties

The conveyance and transfer duties are levied on the transfer of real property as a percentage of the transfer value with progressive rates (no tax free threshold). The main source of the duty is the transfer of residential property. The estimation of the contribution of migrants focuses on the purchase of owner-occupied houses. The specific-to-average method was used (logit regression based take-up rates and linear regression based unit receipts) for attributing duty payments to individual income units. A home purchase within a three-year period was used as a proxy for take-up, and the owner's current estimate of the value of the property was used as a proxy for the unit receipt.

The estimates of average conveyance and transfer duty per income unit in the States are shown in Table 0-3. The take-up in the first four years after the migrants arrive is based on LSIA1 information about home-ownership and estimated logit equations thereafter. The explanatory variables for the logit equations and the linear regressions for the purchasing price are the same as those shown above for gambling taxes.

¹⁸ Notice that taxes on life insurance are based on the insured sum rather than the premiums. We have used premiums as a proxy as only aggregate information about the insured sum is available.

Table 0-3 Average Duties per Income Unit by State, 2000-01.

	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
	\$	\$	\$	\$	\$	\$	\$	\$
Convey. & transfer	525.0	444.5	382.9	824.8	461.0	173.1	783.1	271.3
Mortgage & loan	60.4	78.1	55.0	112.2	65.2	30.8	0.0	13.0
Other Property	2.7	3.5	36.3	48.5	75.1	332.2	0.0	37.1
Other Duties ¹	37.0	31.8	0.0	104.7	39.7	0.0	115.5	634.9

Source: State Budget Papers and the 1998-99 Household Expenditure Survey.

¹ 'Other' duties includes a number of State-specific items, which explains the large variation across States.

Conveyance and transfer duties are indexed by the CPI.

Mortgage Duties

Mortgage duty is levied on the value of secured loans, which are predominantly mortgage loans in owner-occupied housing and rental property. As a proxy for the estimation of mortgage duties we have used a similar method to the one used for conveyance and transfer duties as both are associated with purchase owner-occupied housing. Again, the two-step take-up/unit receipt specific-to-average method was used. A logit equation based on a home purchase with a mortgage during a three-year period was used as a proxy for take-up and the outstanding value of the mortgage was used as a proxy for the unit receipt.

The estimates of average mortgage duties per income unit in the States are shown in Table 0-3.

Mortgage duties are indexed by the CPI.

Other Property Stamp Duties

These are relatively minor duties (see Table 0-3) that have been included with conveyance and transfer duties for the attribution of take-up rates and unit receipts for migrant units.

Other property stamp duties are indexed by the CPI.

Other Duties

Other duties are assigned as average values per income unit within each State.

Other duties are indexed by the CPI.

Regulatory fees and fines

The 1998-99 HES information about household expenditure on 'Fines' and 'Government fees' was used to derive specific-to-average take-up rates and unit receipts in the same manner as for gambling taxes. The explanatory variables in the two-step logit and linear regressions was similar to those for gambling taxes, except that it was not possible to identify a years-since-arrival effect for fees and fines. The estimates of average fees and fines per income unit in the States are shown in Table 0-2.

Fees and fines are indexed by the CPI.

Other Revenue

Other revenues (see Table 0-4) was allocated as the average per persons aged 15 and above in the States.

Table 0-4 Average Tax on Insurance Tax and ‘Other’ Revenue per Person aged 15 and Above by State, 2000-01.

	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
	\$	\$	\$	\$	\$	\$	\$	\$
‘Other’ revenue	393.8	254.7	1,145.5	706.2	952.2	69.5	253.5	360.5

Source: State Budget Papers.

Other revenue is indexed by the CPI.

Commonwealth transfers to the States

The treatment of the Commonwealth Grants to the States mirrors the calculations described in Section 4.1.3.1.1 for the Commonwealth Budget. The Special Purpose Payments and General Revenue Assistance relate to the following elements that are treated as revenue for the States:

- Vocational education (TAFE)
- English speaking Government schools (Government school grants)
- Non-English speaking Government schools (Government school grants and ESL programs)
- Health care grants (Hospital benefits)
- GST payments to the States (General Revenue Assistance).

The effect is that these payments are recurrent expenditure for the Commonwealth that match the grants received by the States. They cancel each other out and do not affect the bottom line of the aggregated Commonwealth and State Budgets.

State outlays

Crime related law and order

The recurrent expenditure by the States relating to ‘Law and order’ has been separated into two components:

- ‘Crime related law and order’ outlays are attributed to persons according to the relative crime rates of their sex, age and country of birth group.
- ‘Other law, order and public safety’ outlays are attributed to persons on a per capita basis under the ‘Other –recurrent expenditure’ category.

As a proxy for the cost of ‘Crime related law and order’ we have used specific-to-average imprisonment rates calculated from ABS statistics on prisoners in Australia (see ABS 2000b) by sex, age and country of birth groups. Specific-to-average rates for sex and age groups have been calculated and a further adjustment has been made to account for the sex/age adjusted rate for the overseas-born population (non-New Zealanders). The following table shows the sex by age and the adjustment for overseas-born persons:

**Specific-to-average imprisonment rates for sex/age groups
and overseas-born (non-New Zealanders)**

Age group	Males	Females
15-19	0.7534	0.0571
20-24	3.4348	0.2757
25-29	3.3099	0.2506
30-34	2.7287	0.1740
35-39	1.8801	0.1144
40-44	1.3427	0.0971
45-49	0.8973	0.0650
50-54	0.7155	0.0279
55-59	0.5009	0.0211
60-64	0.3755	0.0213
65+	0.1140	0.0017
Overseas born	0.7880	

Source: Own calculations based on ABS, 2000b

The table shows that imprisonment rates (and hence the cost related to ‘Crime related law and order’) are much higher for males than for females and that there is a peak around the 20-24 and 25-29 year age groups.

The attribution of ‘Crime related law and order’ to migrants are further modified by assuming that:

- the cost of Indigenous people is 9 per cent above average thereby lowering the specific-to-average unit costs for migrants; and
- the costs of persons from a Non-English Speaking Background is 5 per cent above average thereby increasing the specific-to-average unit costs for migrants.

The combined effect to the above modifiers is to reduce the unit costs for ‘Crime related law and order’ to 95.3 per cent of the average.

Crime-related law and order expenditure is indexed by the CPI.

Education

The cost to the States related to education is assigned to the persons set to participate in primary and secondary schooling or TAFE by the education module of the Migrant Ageing module (see Section 4.1.2). For primary and secondary schools, a special rate is applied to NESB students. The average cost per full-time student shown in the following table is calculated from the number of enrolments in each institution.

Table 0-5 The Average per full-time student in primary and secondary school and TAFE by State, 2000-01.

	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
	\$	\$	\$	\$	\$	\$	\$	\$
Government primary schools ¹								
NESB	5,910	7,028	7,368	7,414	7,844	6,652	8,959	8,326
Non-NESB	4,155	4,960	5,185	5,242	5,517	4,692	5,948	5,930
Government secondary schools								
NESB	8,173	9,109	8,575	10,135	7,102	9,767	9,702	10,953
Non-NESB	6,711	7,482	7,089	8,382	5,874	8,110	8,025	9,127
Non-Govt. schools	1,076	756	4,414	3,456	1,309	4,877	4,991	9,790
TAFE	1,697	1,552	2,089	2,191	2,478	2,194	3,228	3,105
Other education ²	53	92	71	40	128	92	135	11

Source: State Budget Papers and Australian Vocational Education and Training Statistics 2000 At a Glance, NCVET.

¹ Primary schools include pre-school.

² Average cost per person aged 15-64 in each State.

The unit cost estimates shown in Table 0-5 for Government and non-Government schools are adjusted by estimated cost differentials for Indigenous children and differences between rural and non-rural schools cost. The unit cost for TAFE students is adjusted to account for 5 per cent additional cost of NESB student proportionally to their share of all overseas-born TAFE students.

Education expenditure is indexed by AWE.

Other training and education

The cost of 'Other education and training' has been assigned to all 15-64 year olds as the nationwide average per capita in the age group (see Table 0-5).

Acute health, admitted services

The use of individuals of the public health system varies with age and to some extent with sex as well. The best available proxy for the use of admitted services is the use of public hospitals in terms of patient days broken down by sex, age and birth place. The Australian Institute of Health and Welfare publishes hospital statistics annually (AIHW, 2000a) that have been used to calculate specific-to-average State-specific take-up rates for (non-New Zealander) overseas-born persons by sex and age. The sex and age specific take-up rates were used and a further adjustment was made to account for the sex/age adjusted rate for the overseas-born population (non-New Zealanders). The following table shows the applied sex and age specific hospitalisation rates and the adjustment for the higher incidence for overseas-born persons (the table shows the Australian average – State-specific data has been used in the model):

Specific-to-average hospitalisation rates (patient days) for sex/age groups and overseas-born (non-New Zealanders), 1998-99

Age group	Males	Females
<1	3.13	2.62
1-4	0.38	0.29
5-14	0.19	0.16
15-24	0.43	0.56
25-34	0.55	0.88
35-44	0.53	0.61
45-54	0.74	0.68
55-64	1.39	1.11
65-74	2.76	2.13
75+	5.43	5.17
Overseas born	1.0648	

Source: Own calculations based on AIHW, 2000a

The table shows that, except for a relatively high usage for infants, the usage of public hospitals increases sharply with age after around the age of 55. The usage of females is slightly lower than for males for all age groups apart from the age groups around child birth (the higher rate for 75+ females is due to the higher average age). The table also shows age adjusted usage of public hospitals is around 6.5 per cent higher for overseas-born compared with the average Australian population.

The estimated unit cost for use of 'Acute health, admitted services' are adjusted by estimated cost differentials for NESB persons and differences between rural and non-rural hospital services.

'Acute health, admitted services' expenditure is indexed by AWE.

Acute health, non-admitted services

As a proxy for the usage of non-admitted services we have used information from the 1995 National Health Survey (ABS, 1995) about visits to casualty, emergency and outpatient departments during a two-week period. These data provide information on the sex and age profiles of service usage, which has been used to calculate the specific-to-average take-up rates shown in the following table:

Specific-to-average take-up rates for ‘visits to casualty, emergency and outpatient departments during a two-week period’ for sex by age groups, 1995

Age group	Males	Females
0-4	1.0252	0.9693
5-14	0.6934	0.6556
15-24	1.0454	0.9884
25-44	0.9828	0.9292
45-64	0.9637	0.9112
65-74	1.6384	1.5491
75+	1.6017	1.5144

Source: Own calculations based on ABS, 1995

The table shows that, as with admitted services, the usage of non-admitted services is higher for males than for females. It is also higher for infants (no specific data for <1 year olds were available) and increasing for the older age groups but that it drops for the 75+ year olds who are more likely to use admitted services.

The estimated unit cost for use of ‘Acute health, admitted services’ are adjusted by estimated cost differentials for NESB persons.

‘Acute health, non-admitted services’ expenditure is indexed by AWE.

Aged care and primary health

The usage of Aged care and primary health has been approximated by the use of statistics on residential age care published by the AIHW (AIHW, 2001a). The following table shows the take-up rates derived from the number of permanent residents in residential aged care by sex and age as well as an adjustment for overseas-born persons to reflect their below average sex/age adjusted usage (the table shows Australia average – State-specific data has been used in the model):

Specific-to-average take-up rates for ‘permanent residents in residential care’ by sex and age groups, 1999-00

Age group	Males	Females
55-64 ¹	0.52	0.47
65-69	0.96	0.91
70-74	2.06	2.33
75-79	4.34	6.18
80-84	9.17	15.80
85+	24.08	44.08
Overseas born	0.8400	

Source: Own calculations based on AIHW, 2001a

¹ The take-up rate for 55-64 age group includes all residents age <64. However, it has been applied only to 55-64 year olds in the model.

The use of residential care increases sharply with age. However, unlike health services, the usage is higher for older females than for their male counterparts. The sex and age adjusted usage of residential care is only 84 per cent of that of the usage of the average population.

No adjustments have been made to the unit cost of aged care and primary health.

‘Aged care and primary health services’ expenditure is indexed by AWE.

Mental health services

The take-up in relation to mental health service has been calculated from 1998-99 information on patient days and psychiatric care days in psychiatric hospitals and services (AIHW, 2001). The data provides breakdown of usage by sex/age and place of birth and have been used to calculate the specific-to-average take-up rates shown in the following table. The migrant specific sex by age take-up rates used in the model were calculated by adjusting for the lower sex/age adjusted usage of overseas-born persons.

Specific-to-average usage of Mental Health Services (Patient days and psychiatric care days) for sex/age groups and overseas-born persons, 1998-99

Age group	Males	Females
17 and under	0.11	0.14
18–24	1.64	0.91
25–34	1.68	0.94
35–44	1.09	0.96
45–54	1.36	1.23
55–64	1.52	1.17
65+	1.66	1.50
Overseas born	0.7930	

Source: Own calculations based on AIHW, 2000a

The table shows that except for the youngest age groups, males have a higher incidence of psychiatric problems requiring medical assistance. The usage is somewhat age related although not as strongly as for other health service. The sex/age adjusted usage of mental health services of overseas-born persons is only 79.3 per cent of the average population.

No adjustments have been made to the unit cost of mental health services.

‘Mental health services’ expenditure is indexed by AWE.

Public health services

The cost of public health services have been attributed as the per capita cost in individual States.

‘Public health services’ expenditure is indexed by AWE.

Disability services

The usage of disability services has been approximated by information on the use of services provided under the Commonwealth/State Disability Agreement (CSDA). The specific-to-average take-up rates in the following table were calculated from age group specific use of services for overseas-born persons relative to the average (the rates for Australian-born persons are shown for comparison).

The figures in the table show that overseas-born persons have a much lower incidence of use of disability services than their Australian born counterparts for all age groups except the very young (aged 0-4 years).

**Specific-to-average usage of CSDA Funded Services (Consumers
on a snapshot day) by birthplace, age groups, June 2000**

Age group	Overseas	Australia
0-4	0.85	0.72
5-14	0.24	0.68
15-24	0.34	1.48
25-44	0.28	1.86
45-59	0.24	1.38
60+	0.16	0.47

Source: Own calculations based on AIHW, 2001c

The health screening of immigrants appears to be a main explanation for the lower incidence of disability among migrants. The table also shows that age matters for the take-up of disability services although, obviously, the counter-intuitive drop in usage for the older age groups is explained by aged care replacing disability services for the aged.

No adjustments have been made to the unit cost of disability services.

'Disability services' expenditure is indexed by AWE.

Community Care

Due to the difficulties in getting official data in relation to the use of community care, the cost is evenly distributed across all 0-17 year olds.

Adjustments have been made to the cost of community services in lieu of the higher cost of services to Indigenous and NESB persons.

Community care expenditure is indexed by the CPI.

Concessions (pensioners and beneficiaries.)

The cost of concessions is allocated to the persons who are recipients of eligible Government benefits as modelled by the social security module of the Commonwealth Budget models (see Section 4.1.3.1.1). The take-up is thus the persons receiving Government pensions or income replacing benefits.

The unit cost differs for recipients of different payments. This reflects that the States provide three different types of concession cards that give access to different levels of reduced payments and other benefits for the holders. It has not been possible to get cost breakdown for individual concession cards. As an approximation we have assumed relative unit costs at three levels by applying the following weights for average expenditure per card holder:

1. Senior card: Weight=1 (Age and Disability Support Pensioners).
2. Pensioner card: Weight=2/3 (Mature Age Allowance, Mature Age Partner Allowance, Carer Payment and Parenting Payment (Single)).
3. Health Card: Weight=1/3 (Newstart Allowance, Partner Allowance, Widow Allowance, Special Benefit, Youth Allowance (unemployed), Sickness Allowance, Parenting Payment (partnered)).

State-specific unit costs per recipient were calculated using data on State-specific number of recipients (see, Department of Family and Community Services, 1999).

No adjustments have been made to the unit cost of concession cards.

Concessions expenditure is indexed by the CPI.

Housing Assistance

The beneficiaries of housing assistance are predominantly residents in Government housing. As a proxy, we therefore used information from the 1998-99 HES on housing tenure as 'Renting government housing authority' (around 5.5 per cent of all households in 1998-99). The HES information was used to derive specific-to-average take-up rates for housing assistance by applying a logistic regression that relates the chance of income units being 'public renters' to their characteristics (age, family type, birth place, education, employment status and income). The LSIA1 information on housing tenure as 'Renting a dwelling from the government' was used for the first four years of the simulation. The unit cost per income unit was calculated from the number of income units in each State.

No adjustments have been made to the unit cost of housing assistance.

Housing assistance expenditure is indexed by the CPI.

Office of Multicultural Affairs - recurrent

The cost of the Office of Multicultural affairs is allocated to persons on a per capita basis.

Office of Multicultural Affairs expenditure is indexed by the CPI.

Other – recurrent expenditure

The residual recurrent expenditure is allocated to persons on a per capita basis.

Other recurrent expenditure is indexed by the CPI.