
The Impact of Immigration on the Ageing of Australia's Population

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A statement of the issue

In 1998, just over 12 per cent of Australia's population were aged 65 years and over. Population projections indicate that this percentage is likely to at least double in the next 40 years. This trend has given rise to concerns about the capacity of our economy in the future to support the older members of our society. In particular, an older population implies increased costs for aged pensions and health and aged care services.

As part of the response to this future situation, it has been suggested that we should reduce the extent or speed of ageing through changes to immigration policy. The argument is that, as immigrants are younger on average than the Australian population, an increase in the level of immigration would reduce the ageing of the population. To strengthen the case, it has also been suggested that the immigration program should recruit persons who are younger than the immigrants that enter Australia now. The call is for more and younger immigrants who have skill levels at least equal to those of immigrants at present. In addition, proponents of this position sometimes claim that immigrants have higher fertility than the Australian average, so that higher immigration would increase Australia's birth rate and, hence, reduce ageing of the population.

The counter argument is that immigration makes only a marginal difference to the ageing of the population because, in the longer term, immigrants themselves grow old. Larger immigration leads to larger numbers of older people, with little impact on population age structure. In other words, immigration is an inefficient response to the ageing of the population and a belief in immigration as a solution may draw our attention away from the social and economic reforms necessary as we face an ageing future. In addition, proponents of this position sometimes argue that, rather than importing high fertility immigrants, there is a need to support childbearing and childrearing in Australia so that our fertility rate stops falling.

Public debate about these two points of view has waxed and waned over the past 15 years, rising again in the past 12 months. The aim of this report is to examine the validity of the propositions that underpin these arguments.

Why is our population ageing?

As fertility and mortality rates fall, populations age. In Australia, as in other advanced industrialised countries, fertility and mortality rates have been falling for more than a century. In 1870, 42 per cent of Australia's population were aged less than 15 years and 2 per cent were aged 65 years and over. In 1998, 21 per cent were aged less than 15 years and 12 per cent were aged 65 years and over. Thus, ageing is not a new phenomenon. Being an outcome of increased control over both childbearing and death, ageing for the last century has generally been welcomed, so why is it that ageing has now become a major concern?

The sudden emergence of ageing as an issue is indicated by the lack of concern expressed about ageing in the 1975 Report of the National Population Inquiry (the Borrie Report). Indeed, the ageing of the population received only passing mention in this, the most comprehensive report on Australia's population ever undertaken and no mention at all in the concluding chapters related to policy.

Ageing has recently emerged as an issue because fertility and mortality have both fallen since the mid-1970s to a greater extent than was envisaged in the Borrie Report. As birth and death rates have fallen in Australia, the speed and the future level of population ageing have increased sharply. The year 1973 was the last year of recorded statistics available at the time of writing of the Borrie Report. If birth rates were the same at each age today as they were in 1973, there would have been 40 per cent, or 100,000, more births in 1998. If death rates at each age were the same today as they were in 1971-76, there would have been 60 per cent, or 78,000, more deaths in 1998. These are remarkable changes within a short period of time. One hundred thousand fewer people each year at the young end of the age structure and almost 78,000 more people each year at the old end of the age structure are the reasons ageing of the population has emerged as a policy issue.

In addition, ageing will be rapid in the second, third and fourth decades of the next century because, in those years, the large post-war, baby-boom generation will be in the older age groups. In this sense, rapid ageing of the population is the product of a sustained period of high fertility rates (1946-1975) followed by a sustained period of low fertility rates (1976 onwards). That the extent of ageing in 2020, for example, is related to births up to 75 years earlier indicates that population ageing is a long-term process. Even projections of population 50 years into the future may fall short of measuring the full impact of ageing.

Research and opinion on the issue: 1983-1998

Ageing, and the possible impacts of immigration on ageing, emerged as policy considerations in the early 1980s, when new official projections based on assumptions of sustained low fertility and lower mortality rates showed that ageing was likely to be more rapid and more severe than the Borrie Report had indicated. Discussion of the issue in the 1980s and early 1990s has been reviewed extensively by Young (1994) and our analysis draws on her work.

The issue of immigration and ageing was addressed in a joint study by the Committee for the Economic Development of Australia (CEDA) and the Department of Immigration and Ethnic Affairs (DIEA). In 1983, the main authors of this study wrote that the 'youngening' effect of immigration was regarded as an 'uncontroversial fact' (Norman and Meikle 1983: 15). By 1985, the same authors had become more ambivalent, writing in the final report that differences between projected age distributions were "not great, despite the large differences between the migration assumptions" and, on the same page, "immigration adds disproportionately large numbers to the younger age groups" (Norman and Meikle 1985: 84). As Young (1994: 56-7) reports, however, the technical work carried out for this study generally concluded that the impacts of immigration upon ageing were minimal. This result was confirmed during the 1980s by each new publication of the official projections made by the Australian Bureau of Statistics.

Despite this technical work, based on the Executive Summary of the CEDA/DIEA Report, newspapers reported the study's finding that "the mean age of the Australian population can be reduced by increasing the number of migrants". This position was backed by the Minister for Immigration, Mr Hurford, who wrote in 1985 that "migrants help our economy by reducing the average age and the costs associated with the greying of Australia" (The Age, 17 July 1985). Then, in 1986, the Migration Committee of the Government's National Population Council, reported that, "by adding younger people, immigration retards demographic ageing" (National Population Council 1986: 25). In 1987, the Minister for Immigration, Mr Young, said that "(w)ithout immigration we would experience an

accelerated ageing of the population, a steep increase in welfare payments and therefore higher taxation” (Young 1987).

Thus, the belief that immigration has a substantial retarding effect on ageing continued despite the empirical evidence available at the time demonstrating that this was not the case.

More empirical work was carried out in 1988 by the Committee to Advise on Australia's Immigration Policies (CAAIP). The Committee's report concluded that massive levels of immigration would be required to retard ageing (Centre for International Economics 1988: iv).

In the report *Australian Immigration: A Survey of the Issues* published by the Bureau of Immigration Research in 1990, University of Adelaide demographer, Graeme Hugo, concluded:

Claims, therefore, that the immigration program can retard the overall ageing of the population which is occurring must be treated with suspicion...Young has made a definitive demographic refutation of claims that immigration can have anything more than a slight retardation effect on the ageing of the Australian population (Hugo 1990: 49-50).

In the second half of the 1980s, the ANU demographer, Christabel Young, conducted a number of studies of the impact of immigration upon ageing. These studies concluded that large-scale immigration was not a sensible response to the ageing of the population (Young 1988, 1989). Her most important study of the issue was *Australia's Ageing Population – Policy Options* (Young 1990). Added to her previous empirical research, this report was highly influential in challenging the view that immigration could substantially retard population ageing. Following the publication of this report, official sources became much more circumspect about statements regarding immigration and ageing. For example, the December 1991 final report of the Population Issues Committee of the National Population Council, *Population Issues and Australia's Future*, stated that “while the level of immigration will affect the relative size of the labour force at any particular time, its impact will be transitory unless the size of the intake were to continue to increase” (National Population Council 1991: 30). The Chair of the Population Issues Committee, Professor Glenn Withers, as Commissioner of the Economic Planning Advisory Council (EPAC) said in 1992:

With respect to immigration, its use as a major instrument for response to demographic ageing would require substantially increasing levels of migration over time. It should be no surprise that migrants themselves do age and do bear children, so that the net effects of a given migration intake on ageing and on dependency ratios are more muted than might otherwise be thought (EPAC, 1992: 12).

A later EPAC study concluded:

Even the most ambitious migration programs, by historical standards, would not eliminate a substantial increase in age dependency ratios. The ageing of the population structure must therefore be addressed directly through effective

retirement income policies, health care reform, support for the disabled, etc. (Clare and Tulpule 1994: 17).

Young (1994: 54-56) also documents the shift away from the view that immigration can substantially retard ageing. This shift became evident in publications of the Department of Immigration and Ethnic Affairs during the early 1990s and was complete by 1999 when the Department stated that “(e)xtensive research has concluded that immigration is a very inefficient means of reducing the impact of ageing” (DIMA 1999: 10).

The notion that ageing can be substantially retarded by immigration has also been dismissed recently by a group of four academic writers with a long history of immigration research:

In the 1980s, immigration was advocated as a means of alleviating or ‘solving’ the ageing of the population – as the median age of immigrants is lower (by around five years) than that of the Australian population in general. In the 1990s, a more conservative view has gained ground and ABS projections now¹ show that ageing of the population is only slightly more pronounced without overseas migration (Castles, Foster, Iredale and Withers 1998: 33-4).

Against the flow? Alvarado and Creedy

During the 1990s, Jose Alvarado, an economist working in the Department of Premier and Cabinet in Victoria, and John Creedy, a professor of economics at the University of Melbourne, conducted research on migration, ageing and future social expenditure (Alvarado and Creedy 1996). The study was commissioned by the Bureau of Immigration, Population and Multicultural Research, but was published after that organisation had been abolished. The results of this work have also recently been published in two books (Alvarado and Creedy 1998; Creedy 1998). While these works are recently published, a great deal of the input data underlying the projections made by Alvarado and Creedy dates back to the 1980s.

The work of Alvarado and Creedy is most notable in that it goes beyond demographic outcomes to measure the economic benefit arising from a reduction in the proportion of people at older ages. The measure employed is the ratio of public social expenditure to gross domestic product (Box 1). In their 1996 report the authors make the general theoretical proposition that:

Large inflows of people with higher fertility and a younger age structure than the native population can retard the process of population ageing and therefore the growth in the ratio of social expenditure to GDP (Alvarado and Creedy 1996: 42).

They then go on to conclude from their own research that “the results of the study suggest that immigration can retard population ageing to some extent” (1996: 42) but in their final conclusion they state that:

Projections (of future social expenditure) appear to be more sensitive to changes in productivity growth, participation and unemployment rates than to changes in immigration levels (Alvarado and Creedy 1996: 44).

¹ ABS projections, including those in the 1980s, have always shown this result. Indeed, as we indicate below, as fertility has fallen ABS projections show an increasingly larger impact of immigration upon ageing.

Indeed, all studies of past and potential future social expenditure conclude that increases in the various categories of social expenditure are explained very largely by changes in demand per head and by changes in provision and not by demographic changes (Johnson 1999).

Alvarado and Creedy are cautious in their conclusions and do not call for a large-scale increase in the level of immigration. Despite this, it appears that their work has been the basis of a resurgence of the argument that large-scale immigration can keep the population young.

The issue reborn: 1999

The following quotations are representative of the resurgence of the view that immigration is the answer to the ageing of our population.

Labour knows that immigration can help keep our population young (Kim Beazley, Leader of the Opposition, Address to the Global Foundation Luncheon, 3 August 1998).

The prospect of a static, greying population is why the Premier, Mr Jeff Kennett, has joined the Australian Chamber of Commerce and Industry and the Federal Opposition in the chorus of voices calling for an increase in Australia's migrant intake (Editorial, *The Age*, 9 March 1999: 16).

Mr Sciacca said greater immigration, properly targeted, provided the best solution to securing the future for Australia's growing ageing population (*The Australian*, 19 February 1999: 1).

The answer is not to veto a long-term immigration program, condemning Australia to slowing population growth, an ageing population and worsening employment prospects (Editorial, *The Australian*, 4 August 1998).

The average reader would be forgiven for concluding from these statements that increased immigration can stop our population growth rate falling and can keep our population young, both literally and figuratively. The reappearance of these views is all the more remarkable because there has been no new research to suggest that they are anything but misleading. The fact is that nothing will keep Australia's population young and nothing will stop the fall in our population growth rate, short of our fertility rate rising to peak, baby-boom levels; an extremely unlikely scenario. In this report we confirm the finding of *all* previous empirical studies that substantial ageing of our population in the next 30 years is inevitable.

Box 1. Alvarado and Creedy's approach to the estimation of future social expenditure due to ageing

Creedy and Taylor (1993) obtained estimates for 1988 of the annual dollars per head of population spent by Commonwealth and State Governments for seven areas of social expenditure. The data were obtained from information published in 1990 by the Commonwealth Department of Community Services and Health. The seven areas of expenditure were the aged pension, other assistance to aged people, unemployment benefit, other social security, health, education, and employment programs. The unique feature of this data set was that it provided public social expenditure according to the age group of the person upon whom the money was expended. The total social expenditure per head for each age group across these seven categories provided a measure of the relative social cost of persons in each age category. For example, the total for a person aged 70-74 years was \$8,325 compared to \$2,870 for a person aged 16-24 years. That is, social monies expended by government on the older person were almost three times higher than social monies expended on the younger person.

Having obtained these estimates, Alvarado and Creedy applied them to estimates of the future population by age group. That is, they assumed that the relative costs by age remain unchanged into the future, or, in terms of the example, that the older person will continue to cost almost three times the younger person. They also estimate future levels of gross domestic product (GDP) so that the estimated future levels of social expenditure can be compared with future levels of GDP.

The study has many limitations: the population is not divided by sex, it does not consider potential changes in household composition, it includes only recurrent expenditure and not capital expenditure, it does not consider private expenditure or substitution between private and public expenditure, some areas of social expenditure are not included, and no allowance is made for feedbacks between the growth of social expenditure and the growth of GDP. Also, it does not allow for variation in future social expenditure costs and relative costs by age. If older people of a given age in future are more likely to have their own source of income as opposed to the aged pension (almost certainly the case), the method used by Alvarado and Creedy will overestimate the aged pension component of social expenditure. On the other hand, health expenditure per capita at each age has been growing, especially at older ages (Badham 1998) and, if this trend were to continue, the Alvarado and Creedy method would underestimate future health expenditure. Finally, the input data used by Alvarado and Creedy are dated. In particular, fertility has fallen below, and can be predicted to fall even further below, the level assumed by Alvarado and Creedy.

A revisionist view: Glenn Withers and 'A Younger Australia'

In 1999, Glenn Withers, now Professor of Public Policy at the Australian National University, has published what he calls 'a revisionist view' in his paper *A Younger Australia?* (Withers, 1999). As the quotations above indicate, until recently, Withers and the committees or organisations that he headed were consistent in their support of the view that immigration could have only a marginal impact upon ageing of the population. In the last year, however, Withers has promoted the opposing viewpoint:

Immigration has helped keep Australia younger in the past. But some demographers assert it cannot do so in the future, a view accepted by Government and used as a justification for lower immigration. This paper argues that the Government view and its demographic underpinnings are wrong. Once

deficiencies in conventional demographic methodology are allowed for, a much more significant impact of immigration is describable. These corrections involve migrant composition, projecting migration rates not levels, properly calculating dependency ratios and incorporating budget costs (Withers 1999: 1).

Immigration is also good for our society. An ageing society is not a creative and vibrant society. A younger Australia can be. Fortunately, Australia's population has not yet reached age profiles like Japan or Germany. But two decades from now a dramatic change is forecast: the ratio of the elderly to those of working age will double and the share of social expenditure in GDP will rise from the current 12 per cent to 25 per cent or more. Migration, in conjunction with other policies, can play a key role in moderating this (Withers 1998).

The statement that immigration has kept Australia's population young in the past is largely false. Australia's population has been kept young in the past by the previous higher levels of fertility and mortality (ABS 1997: 29). The title, 'A Younger Australia?', and the reference in the above quotation to a 'younger Australia' are also very misleading. These words suggest that immigration may make Australia younger than it is now. Withers contrasts the prospect of a future old population with a young and vibrant alternative that allegedly results from changes to immigration policy. His numbers show, however, that what he really means is that immigration may make Australia a little younger than it might otherwise be, that is, still considerably older than it is now. The potential for the literal interpretation of Withers's words was confirmed by Michelle Grattan in the Sydney Morning Herald (April 23: 17) when she reported that Withers challenged the recent orthodoxy that population ageing is inevitable. That is, his words have given the impression to a senior journalist that population ageing is not inevitable when it surely is.

Wither's 'A Younger Australia?' is not based upon new research. Instead, its primary sources are the studies by Clare and Tulpule, and Alvarado and Creedy, to which we have already referred. These studies have been dated by the changes to Australia's demography in the past decade². However, even allowing for the fact that these studies are not based upon recent demography, as quoted above, both studies concluded that the impact of immigration on ageing was considerably less than the impact of changes in social policy. Both concluded that there was no substitute for prudent social and economic planning to meet the needs of our future ageing population. Clare and Tulpule (1994: 17) call for effective retirement income policy, health care reform and support for the disabled. Although Withers may agree, he does not draw this conclusion in his recent paper, instead focusing only upon immigration as a response to ageing. Withers also provides a negative image of older people as "conservative and resistant to innovation" (1999: 4). In contrast, in the context of population ageing, the OECD (1998) stresses the importance of fostering a positive approach to older people. Indeed, the OECD emphasises the importance of reversing the trend to early retirement partly through the promotion of a more positive attitude by employers to older workers.

Withers, following Creedy and Alvarado, refers to the potential to reduce ageing through changes in the composition of immigrants. The first compositional aspect to which he refers is a shift to a younger intake of immigrants, increasing the proportion aged under 30 years

² Withers (1999a: 5) uses the 1996 official ABS projections in his Table 2. The 1998 official projections that assume lower levels of fertility are readily available.

from 60 per cent to 80 per cent³. Using the most recent data, we examine the potential for a younger age structure of immigrants in detail later in the paper. In doing so, we show that the alternative age distribution of immigrants used by Alvarado and Creedy and implicitly by Withers is implausible. Withers also states that Alvarado and Creedy model the impact on age structure of increasing the share of immigrants coming from non-English speaking backgrounds (NESB) to 75 per cent. The logic being that NESB migrants have higher fertility. In fact, this is a misinterpretation of what Alvarado and Creedy have done. They do not consider (or recommend, as Withers implies) a change in the ethnic composition of the immigration intake.

Most population projections, including the official projections made by the Australian Bureau of Statistics and those made in the studies of Young and Alvarado and Creedy, assume that immigration in the future will be a constant number (e.g. 100,000 per annum) rather than a constant percentage of the population size (e.g. one per cent per annum). Withers argues against this approach quoting Clare and Tulpule (1994: 12): “the assumption of fixed levels of migration is likely to be increasingly misleading the greater the period for which projections are made, at least in the presence of a growing population base.” In fact, the past 50 years of history of Australian immigration do not support their case. The trend line for the number of net migrants over the past 50 years is almost flat at an average of around 80,000 per annum, while the trend line for annual migration as a percentage of the population has been sharply downwards. In this report, we follow the conventional approach. In the end, a percentage of population translates into some number and the feasibility of the proposed intake would be judged by the feasibility of that number. Population projections made by the United Nations Population Division (United Nations Population Division, 1998) make use of an annual rate of net migration but the rate falls over time as the population increases.

Finally, Withers places major store by Alvarado and Creedy’s projections of social expenditure relative to GDP. While the Alvarado and Creedy study is valuable, being the only study of its type, its limitations are great (see Box 1). Other careful research is underway on the impact of ageing upon particular aspects of social expenditure. We await the outcomes of those studies.

The real questions

The popular debate on immigration and ageing has been polarised between those who claim that immigration has such a large effect upon ageing that it can keep our population young (or much less old) and those who argue that immigration has no worthwhile or appreciable impact on ageing. The two most detailed empirical research studies conducted in Australia on immigration and ageing both concluded that the reality lies between these two extremes. Both show that substantial ageing of the population is inevitable, but both also conclude that immigration can have some effect in retarding ageing.

Christabel Young concluded:

While an annual net migration of 50,000 compared with zero annual net migration has some effect in retarding the ageing of the population, each additional 50,000 has progressively less effect (Young 1990: 65).

³ In the most recent year for which statistics are available, 1997-98, 67 per cent of the ‘net’ migration intake was aged less than 30 years, not 60 per cent.

Alvarado and Creedy concluded:

Higher levels of immigration retard the growth of the social expenditure to GDP ratio...Under a scenario of 40,000 immigrants, the ratio of social expenditure to GDP is projected to grow 29 per cent between 2011 and 2031 (because of ageing of the population), but with 170,000 immigrants the rate of growth of that ratio is projected to fall to 22 per cent over the same period (Alvarado and Creedy 1996: 43).

The primary difference between the conclusions of the two studies is that Young argues that the first 50,000 net migrants have the greatest impact on slowing population ageing whereas Creedy and Alvarado suggest that it is large inflows of the order of 170,000 that can retard ageing. Thus, the real questions about ageing and immigration are:

- How much do differing levels of immigration change the speed and level of ageing?
- How much of a change in ageing due to immigration is beneficial from the perspective of efficiency?

Official wisdom seems to follow the Alvarado and Creedy argument that it is very large-scale immigration that retards ageing:

(M)assive levels of immigration would be needed to have any appreciable impact on the proportion of the population that is aged (DIMA 1999: 10).

Demographers have already shown that only an effective doubling of our immigration program would have an appreciable impact (on ageing of the population) (Phillip Ruddock, Minister for Immigration and Multicultural Affairs, quoted in *The Australian*, 4 August 1998: 3).

We have demonstrated elsewhere that if we literally want to keep our population young, that is, if we want to maintain the proportion of the population aged 65 years and over at its present level, then impossibly large immigration intakes would be required (McDonald and Kippen 1999a:12-13). On the other hand, in support of Young's conclusion, we demonstrate below that the largest and demographically most efficient impact of immigration on ageing occurs with the first 50,000 net migrants and that the impact reduces significantly with each additional 50,000 net migrants.

As Young (1994: 20) noted, the relative impact on ageing of additional immigrants is partially dependent upon the level of fertility. Essentially, as fertility falls, the number of immigrants that makes an appreciable difference increases. Since 1990, when Young's study was completed, fertility in Australia has fallen. Alvarado and Creedy's study is also based on dated demographic information. In this paper we address the two above questions in light of the most recent demographic trends.

A standard population projection

In the next sections of the paper, we examine the impacts on Australia's population age structure of differing future levels of fertility, mortality and migration. To enable meaningful

comparisons to be made, we make use of a standard population projection. The standard projection involves the following assumptions:

- Fertility (technically, the Total Fertility Rate or TFR) falls from 1.76 children per woman in 1998 to 1.65 children per woman by 2008. After this, fertility remains constant at 1.65 births per woman.
- Mortality follows a trend consistent with the official projections made by the Australian Bureau of Statistics (ABS 1998). Under this trend, expectation of life at birth increases by about 10 years over the next century.
- Annual net migration is set at 80,000 persons per annum, roughly the average of the past eight years (76,000) and of the past 50 years.
- The age distribution of 'net migrants' is set at the average applying for the years 1994-97.
- Immigration and emigration have no impact on the levels of fertility and mortality of the population.

The standard projection essentially represents a continuation of current demographic trends. This projection leads to Australia's population stabilising at 24-25 million people and zero population growth (McDonald and Kippen, 1999a: 4-9).

After examining the impacts on ageing of varying levels of fertility and mortality from those assumed in the standard, we examine the impact of altering the three migration assumptions by varying the level of annual net migration, the age structure of migrants and the fertility level of migrants.

Ageing and variations in fertility and mortality

Figure 1 shows the impact on ageing over the next century of different levels of fertility while maintaining the other assumptions of the standard projection. The figure shows the proportions of the population that would be aged 65 years and over under different assumptions about fertility. The result is that variations in fertility make very little difference to ageing in the next 25 years, but beyond that time, the differences between the projections in terms of population ageing begin to increase and become substantial in the second half of the next century. This reiterates the point made earlier that, in considering ageing of the population from the perspective of population policy, projections longer than 50 years are required. The path of fertility in the next 25 years will be an important determinant of ageing in the next century. In the long-term, each fall of 0.2 in the TFR produces a rise of about 2.8 percentage points in the proportion of the population aged 65 years and over. Thus, for example, a rise in fertility from the level of the standard (1.65 births per woman) to the level consistent with long-term replacement of the population (about 2.05 births per woman) would reduce (in comparison with the standard) the projected proportion of the population aged 65 years and over by 5.6 percentage points.

Figure 2 shows the impact on ageing over the next century of two different assumptions about future mortality while maintaining the other assumptions of the standard projection. The first assumption is that mortality will follow the standard assumption in which expectation of life at birth increases by about 10 years over the next century. The second is a more optimistic assumption that expectation of life will increase by 20 years over the next century. The second assumption, while being much more optimistic than the official ABS projection, is more in keeping with past trends in changes in expectation of life; expectation

of life has increased by about 20 years in the past century and by five years in the last two decades. The conclusions drawn from Figure 2 mirror those for changes in fertility; differing levels of mortality have only a very small impact on ageing in the next 25 years, but the impact becomes considerably greater in subsequent years. In the long-term, an additional ten years in expectation of life would add about eight percentage points to the proportion of the population aged 65 years and over. Thus, our population could be considerably older than current projections suggest if mortality rates fall more than is conventionally assumed. Such a fall would probably imply increased control over cancer mortality.

These results are given to provide perspective to the following analysis of the impact of different levels and compositions of migration upon ageing. No reasonable variation in the level of immigration from the standard can produce anything as large as an eight percentage point change in the proportion of the population aged 65 years and over, yet a plausible change in future mortality does produce that change. This perspective has been largely ignored in Australian studies of ageing.

Ageing and variations in the level of migration

Given the fertility and mortality levels of the standard, the impact upon ageing of differing levels of annual net migration is as shown in Figure 3. The conclusions here are quite different to those for variations in fertility and mortality. The impact of immigration on ageing in the first 25 years from 1998 is somewhat larger than the impacts of varying levels of fertility and mortality. Because immigrants, on average, are relatively young upon arrival in Australia, they have not had time to age in the first 25 years of the projection. Beyond 25 years, however, the impact of immigration on ageing tends to be much less than the impacts of potential changes in fertility and mortality, as shown in Figures 1 and 2. Figure 3 also indicates that substantial ageing of the population will occur over the next 30 years whatever the level of annual net migration.

Most importantly, Figure 3 shows that, at all points in time, the impact of immigration on ageing is subject to diminishing returns. Each additional 50,000 immigrants has a smaller impact on ageing. Between zero and 50,000 annual net migration, the 50,000 migrants would reduce the proportion of the population aged 65 years and over in the year 2098 by 3.0 percentage points. However, between 200,000 and 250,000 annual net migration, the additional 50,000 migrants would reduce the proportion aged by only 0.5 percentage points. That is, the impact upon ageing of the first 50,000 migrants is six times the impact of the fifth 50,000. On the other hand, each additional 50,000 migrants would produce the same addition to the total population (6.7 million people in 100 years).

The addition of 6.7 million people merely to change the aged proportion by less than half a percentage point is a very inefficient approach to modifying Australia's population age structure, evoking images of the sledgehammer and the walnut.

The efficiency of immigration in this regard may be quantified with an index of efficiency (Box 2).

Table 1 shows this index for different future levels of annual net migration. The table clearly shows that the level of efficiency falls off very rapidly as the level of annual net migration increases. This is particularly the case in the longer term, that is, over a century rather than over 50 years. Those who promote very high immigration as an approach to population

ageing usually focus on the impact of immigration in the first 30-50 years. The table shows the importance of taking a longer term view.

The results in Table 1 confirm the finding of Christabel Young that small-scale immigration makes the most important and efficient contribution to retardation of ageing. Use of increasingly larger scale immigration to retard ageing is very inefficient.

The central conclusion from Figures 1, 2 and 3 is that substantial ageing in Australia over the next few decades is absolutely inevitable and no reasonable change of course in the demographic components will prevent this from happening. Indeed, over the next 30 years, the demographic components operative during that time will have little bearing on the proportion of the population aged 65 years and over. However, variations in the paths of fertility and mortality over the next 30 years will have major impacts after 2028. As shown above, there is a case that the first 50,000 to 100,000 migrants have a worthwhile impact on reducing the ageing of the population (see also, McDonald and Kippen 1999a; McDonald and Kippen 1999b).

Box 2. An index of efficiency: reductions in the proportion of the population aged 65 years and over versus absolute population increase

A change in the assumptions about future migration leads to a change in both population size and age structure. Essentially, there is a trade off between a reduction in ageing of the population and an increase in the size of the total population. The index of efficiency measures the population increase resulting from the migration changes required to reduce the proportion of the population aged 65 years and over by one percentage point. For example, a shift in annual net migration from zero to 50,000 would reduce the proportion aged 65 years and over by 3.05 percentage points by the year 2098. The same change would produce an increase in the total population over the same period of 6.72 million. Hence:

$$\text{Index of efficiency} = \frac{\text{Population increase due to change}}{\text{Reduction in percentage aged 65+}} = \frac{6.72 \text{ million}}{3.05} = 2.2 \text{ million}$$

This means that, with this change in the level of migration, a one percentage point reduction in the aged population can be obtained at the cost of an addition to the size of the total population of 2.2 million people. An efficient change would be one that minimised the increase in the population for each one percentage point reduction in the proportion of the population aged 65 years and over.

Figure 1. Percentage of the population aged 65+ under different TFR assumptions, Australia 1998-2098

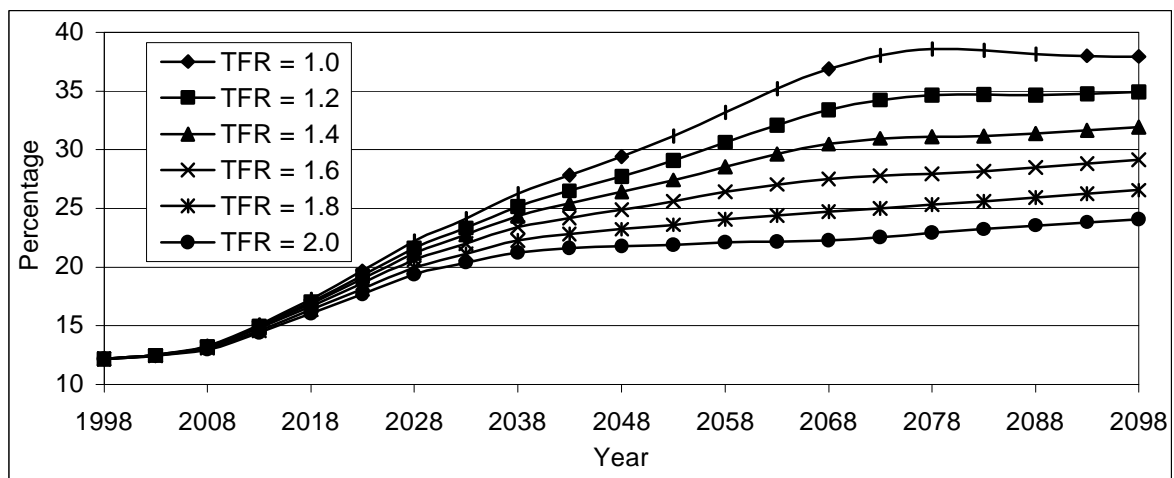


Figure 2. Percentage of the population aged 65+ under different mortality assumptions

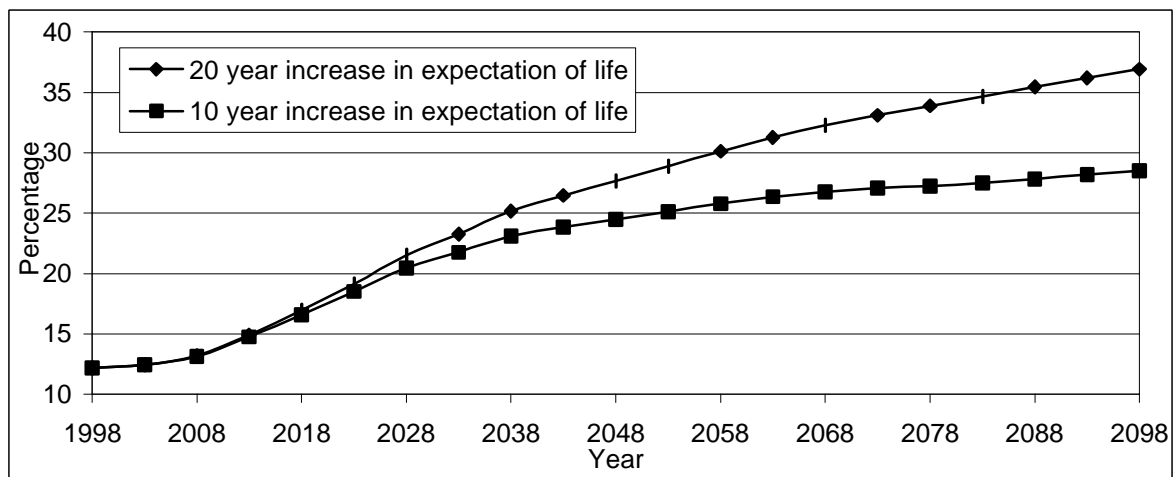


Figure 3. Percentage of the population aged 65+ under different annual net migration assumptions

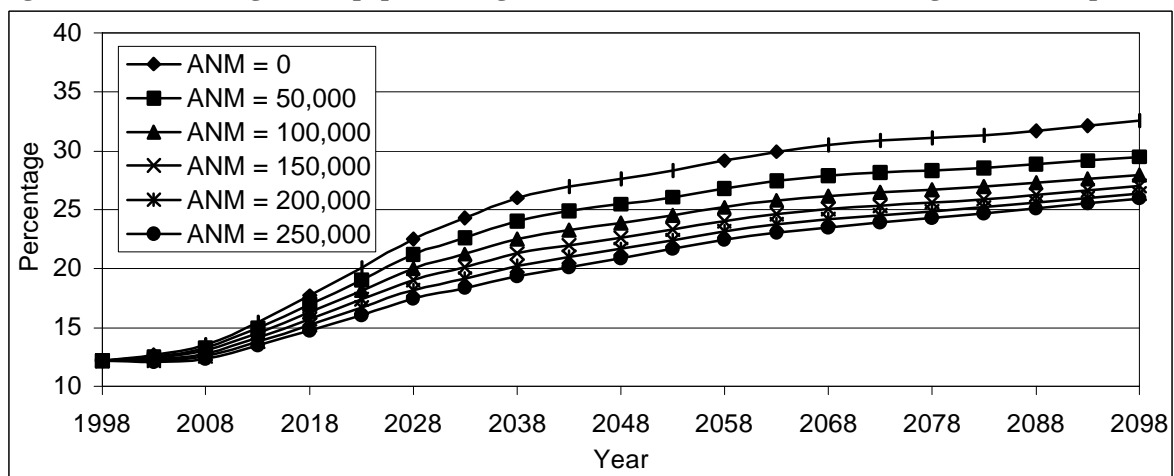


Table 1. Efficiency of changes in the level of annual net migration in relation to population ageing

Increment to annual net migration	Incremental reduction in 65+% (percentage points) ^a		Efficiency index (millions) ^b	
	2048	2098	2048	2098
0-50,000	2.2	3.0	1.5	2.2
50,000-100,000	1.6	1.5	2.1	4.3
100,000-150,000	1.2	0.9	2.7	7.2
150,000-200,000	1.0	0.6	3.4	10.7
200,000-250,000	0.8	0.5	4.2	14.9

- a. Each successive 50,000 increment to net migration would add a constant 6.72 million people to the total population by 2098. These increments would be added to the 13.90 million to which the population would fall in 2098 if there was zero annual net migration. The reductions in the proportion of the population aged 65 years and over are incremental reductions from the 27.7 percent (32.6 per cent) that would result by 2048 (2098) if annual net migration was zero.
- b. See Box 2

Ageing and variations in the age structure of the immigrants

Alvarado and Creedy have analysed the impact on ageing of a younger migrant intake. They assume an alternative age structure of immigrants, with 80 per cent of immigrants being aged less than 30 years compared to the 60 per cent that applied at the time they were making their projections⁴. Their result showed that the younger age structure of immigrants could reduce the proportion of the population aged 65 years and over by about 1.6 percentage points by 2051 (Alvarado and Creedy 1998). More importantly, they pointed out that this reduction was much more efficient (in terms of additions to the total population) than an increase in the migration intake level.

Alvarado and Creedy's alternative immigrant age structure involves an implausible shift in the ratio of persons aged 0-9 to persons aged 30-39, considering that the former are likely to be offspring of the latter. The suggested change has the number of children aged 0-9 years per adult aged 30-39 years increasing from 0.7 to 2.4 (Table 2).

Table 2: Children and parents: Alvarado and Creedy's alternative age structure of immigration compared with the actual intake

	Numbers aged 0-9	Numbers aged 30-39	Ratio of 0-9 to 30-39
Actual immigration intake (Average of 1988/9-1992/3)	19,190	26,613	0.72
Alvarado and Creedy alternative	30,708	12,906	2.38

However, it is possible to define younger immigrant age structures that are more plausible. We have defined two alternative possibilities. The first of these involves increasing both the percentages of children aged 0-14 years and the percentages in the ages that would be the parents of these children (Age Structure 2 in Appendix 1). To achieve this result, preference

⁴ A considerable move has already been made in this direction. In 1997-98, 66.7 per cent of net permanent and long-term migration was aged less than 30 years.

would need to be given in the migration intake to persons who had children. The second younger alternative concentrates net migration in the 15-29 ages (Age Structure 3 in Appendix 1). This would involve a greater preference for persons at these ages (a greater emphasis upon age than upon skill, for example).

The impacts upon ageing of these alternative migrant age structures are very small. Compared to the standard, the shift to Age Structure 2 would reduce the proportion aged 65 years and over by only 0.6 percentage points by 2048 and by 0.7 percentage points by 2098. The corresponding falls related to the use of Age Structure 3 are 0.8 by 2048 and 0.8 by 2098. However, as indicated by Alvarado and Creedy, the changes in age structure are much more efficient in achieving reductions in ageing than changes in the level of migration (Table 3). Nevertheless, given the difficulty involved in redefining the migration program to provide either a preference for families with children or to those aged 15-29 years, the small reduction in ageing related to these changes is unlikely to be worthwhile. In addition, the changes required would probably mean a reduction in the skill level of the intake.

Table 3. Efficiency of variations in the level, age structure and fertility of immigrants in relation to retardation of population ageing

Change to annual net migration	Reduction in 65+% (percentage points) ^a		Year	Efficiency index (millions) ^b	
	2048	2098		2048	2098
Level change	1.1	0.9		2.4	5.7
Age structure 2	0.6	0.7		0.3	1.0
Age structure 3	0.8	0.8		0.5	1.4
Fertility change	0.4	0.8		1.0	1.6
Level and Age 2	1.9	1.7		1.6	3.6
Level and Age 3	2.2	1.8		1.5	3.9
Level and Fertility	1.6	1.9		2.0	3.9
Age 2 and Fertility	1.0	1.5		0.6	1.3
Age 3 and Fertility	1.2	1.6		0.7	1.6
Level, Age 2 and Fertility	2.4	2.7		1.5	3.1
Level, Age 3 and Fertility	2.7	2.7		1.5	3.3

a. Reduction from the proportion of the population aged 65 years and over in the standard projection.

b. See Box 2

Ageing and variations in the fertility of immigrants

More controversial than choosing immigrants on the basis of their age is choosing them on the basis of their likely fertility. Alvarado and Creedy divided the Australian population into two groups, those born in English-speaking countries including Australia and those born in non English-speaking countries. Their methodology contains some errors⁵ but they

⁵ For example, they assume that second generation non-English speaking background (NESB) persons who are already living in Australia at the commencement of the projection period have Australian or English speaking background (AESB) demography during the projection period, but second generation NESB persons, born to immigrants who enter the country after the projection has commenced, have NESB demography. There are also errors in the way that NESB mortality rates have been estimated.

concluded that “the birthplace composition of immigrants has a negligible effect on the projections” (Alvarado and Creedy 1996: 44). Alvarado and Creedy do not recommend that we should change the ethnic composition of the migrant intake in order to reduce population ageing.

Projections of Australia’s population show that the impact of higher immigrant fertility on the course of population ageing is likely to be negligible. Under the assumptions of the standard projection, net migrants would require a TFR of 2.60 in order to reduce the proportion of the population aged 65 years and over in 2048 by one percentage point. A two percentage point reduction would require immigrant fertility to be 3.63 births per woman and a three percentage point reduction would require immigrant fertility of 4.76 births per woman.

In fact, immigrants to Australia from high fertility countries tend to be selective of the persons in those countries who have relatively low fertility. Also, a high proportion of Australia’s immigrants come from countries with low fertility such as the United Kingdom and New Zealand. Consequently, the overall level of immigrant fertility is very close to that of the Australian average (Abbasi-Shavazi 1998). Thus, much higher fertility among immigrants to Australia would imply a considerable shift in the source countries of the migration intake. This would be difficult to achieve while maintaining a non-discriminatory and a high-skills policy for the selection of immigrants. Furthermore, fertility is falling in almost all countries where the fertility rate is above two children per woman so that, by the middle of the next century, it can be expected that there will be very few countries with fertility rates above two children per woman. There is a high degree of impracticality associated with this approach to lowering the ageing of the population.

Comparative and cumulative impacts on ageing of different immigration options

To summarise the potential impacts of immigration upon ageing, we now compare the impact upon ageing and the relative efficiency of four changes to the migration assumptions of the standard. The four changes are:

- increasing the level of the annual net migration from 80,000 to 120,000
- changing the age of net migrants to Age Structure 2
- changing the age of net migrants to Age Structure 3
- changing the fertility of net migrants from 1.65 to 2.00

In addition, we examine the impacts of combinations of these changes. The results are shown in Table 3.

The largest impact of immigration upon ageing is produced in the final combination in the table. In this case, the proportion aged 65 years and over would be reduced compared to the standard projection by only 2.7 percentage points at the cost, by 2098, of an additional 3.4 million people for each of these percentage points. That is, the population would be larger than the standard by 9.2 million people. This is a very large number of additional people when the aim is merely to reduce the proportion aged 65 years and over from 28.5 per cent (the result for the standard projection in 2098) to 25.8 per cent. Indeed, the population aged 65 years and over would be 1.7 million people larger under this three-assumption combination than under the standard assumptions. Added to this is the impracticality of making the age structure of immigrants substantially younger than it is now or of choosing immigrants who would have higher fertility than the Australian average.

Finally, all of the reductions in the proportion of the population aged 65 years and over shown in Table 3 are small compared to the changes that would be brought about by potential movements in fertility and mortality. A change of 0.1 in the Total Fertility Rate would change the proportion aged 65 years and over by 1.4 percentage points by 2098 and a change in expectation of life of two years would change the proportion aged 65 years and over by 1.6 percentage points. These are small changes in fertility and mortality but they have impacts as large or larger than some major changes in migration.

Australia's changing age structure

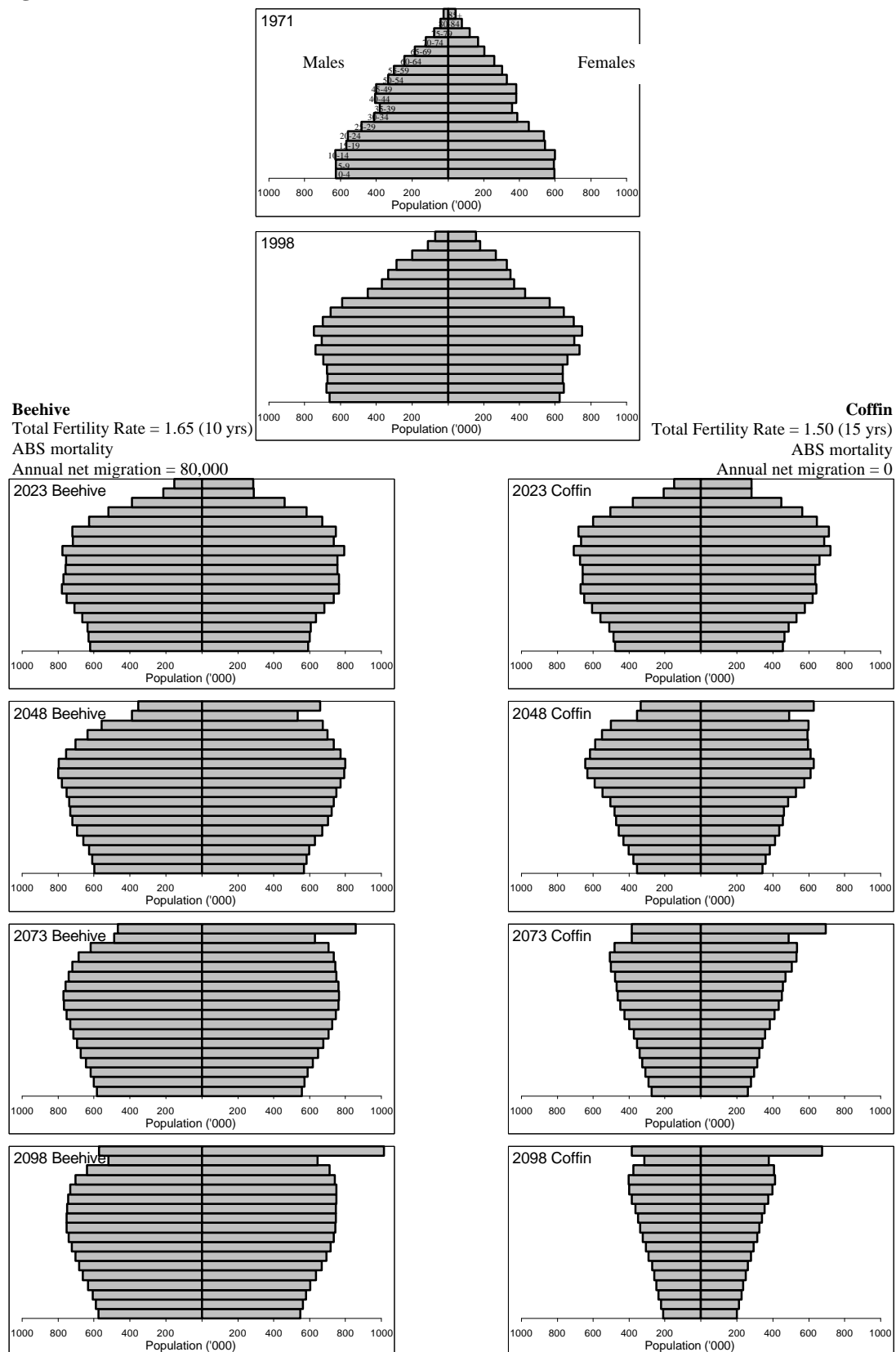
In the previous section, projections were considered in which migration assumptions had been varied. The impacts upon ageing observed were not impressive. However, the impact upon ageing of a shift in the net migration intake from zero to 80,000 (the assumption of the standard projection) reduces the proportion aged 65 years and over in 2098 by almost four percentage points. Thus, it can be concluded that the first 80,000 net migrants make a substantial contribution to the reduction of ageing of the population. This result is related to the changing nature of Australia's age structure that, in turn, is the product of our past fertility and mortality rates.

The past and future of Australia's age structure can be characterised in fundamental demographic terms. In 1971, our age structure, following a period of high fertility, had the shape of a pyramid except for a small irregularity arising from low fertility during the Depression. The pyramid is the classic shape of a population that is growing. As fertility has fallen, our age structure is moving towards a beehive shape, the shape that results from a combination of below replacement fertility and levels of net migration that would lead to at least zero population growth. However, our future age structure depends on the future course of the demographic components. There are two main possibilities. The zero-growth, beehive shape, will be maintained across the next century if the fertility level remains around 1.6 to 1.7 births per woman and net migration is in the region of 80,000 per annum. Higher levels of immigration within a range that is reasonable will ultimately only add people to the population and make little difference to the age structure. This is why the projections considered in Table 3 yielded unexciting results.

The other main possibility for Australia's future age structure is a shift to a coffin-shaped age structure, resulting from zero net migration and a lower level of fertility. This is the classic shape of a population that is declining in size. Its age structure is much older than that of the beehive. The beehive-shaped age structure has a relative concentration of people in the working ages, while the coffin-shape implies substantial falls in the absolute size of the labour force.

The change in our age structure from 1971 and the two alternative future age structures are shown in Figure 4.

Figure 4. Beehive and Coffin scenarios, Australia, 1971-2098



The ageing of Australia's population represents a fundamental, historical demographic change. The shift from a pyramid-shaped age structure is likely to occur only once in our history. A return to the pyramid shape would require a return to the fertility of the 1960s; twice as high as the present level of fertility. This seems extremely unlikely. From a population policy perspective, our choice now is between the beehive-shaped age structure and the coffin-shaped age structure. The beehive shape is clearly the superior option (McDonald and Kippen 1999a; McDonald and Kippen 1999b).

Conclusion

Given current trends in fertility and mortality, annual net migration to Australia of at least 80,000 persons is necessary to avoid spiralling population decline and substantial falls in the size of the labour force. This level of annual net migration also makes a worthwhile and efficient contribution to the retardation of population ageing. Levels of annual net migration above 80,000 become increasingly ineffective and inefficient in the retardation of ageing. Those who wish to argue for a higher level of immigration must base their argument on the benefits of a larger population, not upon the illusory 'younging power' of high immigration.

The effects upon ageing of a younger immigrant intake or higher migrant fertility are very small. Furthermore, implementation of either measure would be problematic. They are not realistic options.

It must also be pointed out that many permanent and long-term movements of people into and out of Australia are largely outside the control of the Government. The Government has an extremely limited capacity to prevent or accelerate any movement out of Australia.

Also, there is little control possible over movements into Australia of New Zealanders and of spouses and fiancés of Australians. Finally, the Government has only a limited degree of control at present over movements into Australia of students, temporary business entrants and holiday-makers. Thus, even though a government may aim for a particular level of annual net migration, the actual level achieved may be substantially removed from the target because of population movements outside governmental control.

Paul Johnson, an economist at the London School of Economics, recently provided a very important message in regard to population ageing (Johnson 1999). He argues that the 'problem' of population ageing does not require the implementation of draconian or extraordinary measures. He points out that Australia is in a better position to deal with ageing of the population than almost any other OECD country. Given Johnson's assessment and given that very high immigration levels are ineffective and inefficient in bringing about changes in the ageing of the population, it is not sensible to argue for large-scale immigration (above 80,000 net per annum) on the basis of its impact on ageing.

Substantial ageing of the population of Australia is inevitable over the next 30 years. No reasonable shift in our demography in the next three decades can change this outcome. Through prudent long-term policies in the areas of income support, health and service provision and retirement from employment, and through the promotion of positive attitudes to older people, Australia will be well-placed to meet the challenge of population ageing. At the same time, demographic trends in the next 30 years will be vital in determining the shape of Australia's age structure beyond 2030. With zero immigration and lower fertility, the ageing of our population will continue apace after 2030; the coffin scenario. Ageing of the

population can be substantially retarded beyond 2030 through combinations of fertility and immigration which guarantee at least zero population growth; the beehive scenario.

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Appendix 1. Alternative age structures of Australian net migration

Age group	Age structure 1 (Australia 1994-7)		Age structure 2		Age structure 3	
	Males %	Females %	Males %	Females %	Males %	Females %
0-4	3.2	2.8	5.0	5.0	3.0	3.0
5-9	3.6	3.5	5.0	5.0	3.0	3.0
10-14	3.7	3.6	4.0	4.0	3.0	3.0
15-19	7.4	7.8	6.0	6.0	9.0	9.0
20-24	6.9	7.9	7.5	7.5	10.0	10.0
25-29	4.9	7.1	9.0	9.0	12.0	12.0
30-34	5.1	5.7	4.0	4.0	3.0	3.0
35-39	3.9	4.0	4.0	4.0	2.0	2.0
40-44	3.0	2.6	2.0	2.0	1.5	1.5
45-49	2.0	1.6	1.0	1.0	1.0	1.0
50-54	1.2	1.2	1.0	1.0	1.0	1.0
55-59	1.1	1.3	0.5	0.5	0.5	0.5
60-64	1.2	1.0	0.5	0.5	0.5	0.5
65-69	0.7	0.6	0.3	0.3	0.3	0.3
70-74	0.4	0.4	0.2	0.2	0.2	0.2
75+	0.2	0.3	0.0	0.0	0.0	0.0
Total	48.5	51.5	50.0	50.0	50.0	50.0