THE FUTURE EXTENT OF POPULATION AGEING IN AUSTRALIA

Rebecca Kippen,[†] *The Australian National University*

This paper discusses the reasons for population ageing in Australia and considers the extent of population ageing in the future given different levels of the three components of population change: fertility, mortality and migration. While population ageing is inevitable, the degree of ageing in the long term will be highly dependent on future levels of fertility, mortality and migration. Hyperageing will be prevented if Australia maintains fertility close to current levels and net migration is kept around 50,000–100,000 per annum. Higher levels of migration add large numbers to the population without significantly affecting the age structure. The extent of ageing may be greater than official projections indicate if mortality falls faster than anticipated.

It is now established that Australia's population will become much older over the coming decades. In 1999, 12 per cent of Australia's population was aged 65 and over. Based on current trends this percentage is projected to double within fifty years, while the number of people aged 65 and over is projected to double within thirty years. At the same time the rate of population growth in Australia is slowing, having fallen from around 2 per cent per annum in the 1960s to just over 1 per cent in the 1990s. In light of a rapidly growing aged population coupled with slowing population growth, concerns have been expressed about Australia's future ability to support its older people.

A typical response to this perceived problem has been a call for increased migration in order both to boost the size of the population and the labour force and to keep the population 'young'. More recently, policy makers and others have recognized the important role fertility has to play in influencing age structure.

This paper discusses the reasons for population ageing and considers the extent of population ageing in the future given different levels of the three components of population change: fertility, mortality and migration.

Why is Australia's population ageing?

Australia's population is becoming older, and this ageing is projected to continue. There are three reasons for this. The first is that fertility has fallen to unprecedentedly low levels, with no indication that it will increase again in the future. The total fertility rate (TFR) has been below the level required to replace the population (2.1

[†] Demography and Sociology Program, Research School of Social Sciences, The Australian National University, Canberra, ACT 0200, Australia. Email: Rebecca.Kippen@anu.edu.au.

births on average per woman) since the mid-1970s, and has slowly but steadily declined in the 1990s. In 1999, the TFR stood at 1.75. Continuing low levels of fertility result in progressively fewer births each year and proportionately more people at older ages.

The second reason for population ageing is that, after decades of relative stability, mortality rates at older ages have fallen between 20 and 50 per cent since the early 1970s. This means that people who survive to adulthood now, on average, are living to much older ages than in the past. In the early 1970s, 74 per cent of Australians could expect to reach the age of 65, and these survivors could then, on average, expect to live for another 14 years to the age of 79 (ABS 1976).[1] Based on 1997–99 mortality rates (ABS 2000a), 87 per cent of Australians now reach the age of 65, and can then expect to survive for another 18 years to the age of 83.[2] The percentage of people who reach age 65, and the average length of life after this age, are set to continue increasing in the future.

Thirdly, there will be an additional increment to the older population in the two decades from 2010 as members of the large postwar Baby Boom cohort begin to turn 65. These Baby Boomers will continue to exert significant influence on the size of Australia's aged population and its proportion of the total population until around 2050.

Projecting population ageing

Although population ageing is inevitable, its extent will partly depend on future levels of the three components of population change: fertility, mortality and migration. The following sections discuss possible future trajectories of fertility, mortality and migration in Australia, and the impact of different levels of these components on projected population ageing. The extent of ageing is measured by the percentage of the population aged 65 and over, and the projections extend 100 years from the year 2000. Although it is impossible to predict with any certainty levels and directions of fertility, mortality and migration over so long a period, these long-term projections illustrate the fact that ageing is a long-term process. Changes in the demographic components over the next few years will influence the extent of population ageing more than 50 years from now.

The future of fertility

Most commentators did not anticipate that the rapid fall in fertility around the developed world after the Baby Boom would result in sustained below-replacement fertility. Demographic transition theory postulated that fertility would fall, in line with mortality, and in the long term would stabilize at around replacement level. Clearly this has not occurred. Many countries, including Australia, have now had below-replacement fertility for more than twenty years, with no indication of a rebound. The consensus is that fertility in Australia is unlikely to increase in the future, at least in the short term.

Recently, several estimates have been made of the likely future level of fertility in Australia. In their latest population projections for Australia, the Australian Bureau of Statistics (ABS 2000b) uses 'high' and 'low' fertility assumptions. The 'high' assumption assumes that the TFR will remain constant at 1.75. The ABS argues that this may occur given that fertility has 'ranged between 1.9 and 1.7

babies per woman since 1979'. Under the 'low' assumption the TFR continues its recent decline, stabilizing at 1.6 in 2008.

The Retirement Income Modelling Unit of the Federal Treasury (Bacon 2000) has projected age-specific fertility rate trends using curve fitting, resulting in a gradual decline in the TFR to 1.65 in 2010 and 1.56 by 2050. McDonald and Kippen (1999) have projected fertility of 1.65 births per woman by 2008. They state that this seems justified based on current levels of fertility in other industrialized countries, many of which have fertility rates lower than Australia's, and fertility rates in Australian capital cities, which averaged around 1.65 in 1998.

The impact of changes in fertility

In the following projections the impacts on population ageing of four fertility assumptions are considered:

1. TFR = 1.3. The TFR falls to 1.3 by 2015 and then remains constant.
2. TFR = 1.5. The TFR falls to 1.5 by 2010 and then remains constant.
3. TFR = 1.7. The TFR falls to 1.7 by 2005 and then remains constant.
4. TFR = 1.9. The TFR increases to 1.9 by 2010 and then remains constant.

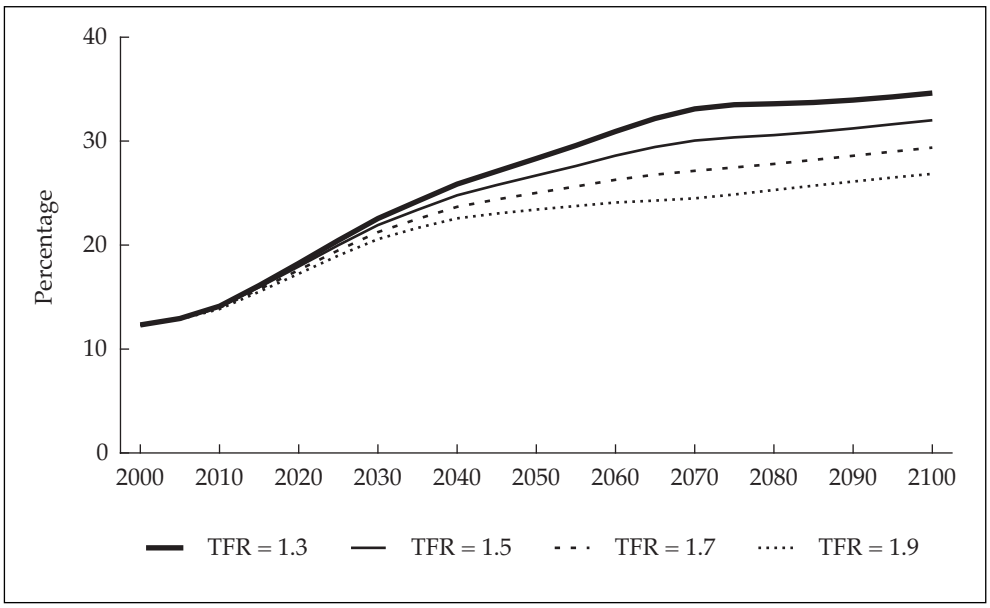
These assumptions encompass what could reasonably be expected to happen to Australian fertility in the longer term. Underlying each projection are the further assumptions that life expectancy increases by one year every ten years, and that annual net migration is constant at 90,000. The age structure of net migration is taken to be that of Australia in the 1990s, and migrants are assumed to exhibit the fertility and mortality levels of the general population once in Australia.

The percentage of the population aged 65 and over resulting from each projection is shown in Figure 1. Different levels of fertility make very little difference to ageing within the first 30 years of the projection period. In all scenarios the percentage aged 65 and over increases from 12 per cent in the year 2000 to more than 20 per cent by 2030, with less than two percentage points between the highest and lowest projections. After 2030, there is much greater variation in the projections. Seemingly small shifts in the TFR, as little as 0.2 births per woman, result in substantial differences in the extent of population ageing over the longer term. For example, allowing the TFR to fall to 1.5 births per woman would result in an increase in the proportion aged 65 and over of 1.7 percentage points by 2050, and almost 3.0 percentage points by 2070, in comparison with maintaining fertility at around 1.7 births per woman. At the extremes, the difference between the TFR falling to 1.3 or increasing slightly to 1.9 results in an ageing difference of 4.9 percentage points by 2050, and a massive 8.6 percentage points by 2070.

The future of mortality

Australians today are, on average, living 25 years longer than Australians of 100 years ago. Expectation of life at birth currently stands at 76 years for males and 82 years for females (ABS 2000a). Most of the increase in life expectancy over the past century has been due to falls in mortality at younger ages, particularly under age one, where mortality has fallen a staggering 95 per cent since 1900. Mortality at all ages below 50 years is now very low. Even if nobody died before reaching age 50, less than three years would be added to current average life expectancy. Therefore, any significant gains to future life expectancy will come from falls in mortality at ages 50 and over.

Figure 1 Percentage of population aged 65 and over under different fertility assumptions, 2000–2100



Source: Author's projections.

The question then arises: how likely are substantial falls in older age mortality in the future? There are two schools of thought. Some analysts argue that the biological limits of ageing will soon be reached, resulting in plateauing of mortality rates and expectations of life (Olshansky and Carnes 1994). Others believe that mortality decline may continue apace, and even accelerate, in the future (Ahlburg and Vaupel 1990).

Proponents of the first viewpoint argue that recent falls in older-age mortality are historically anomalous and unlikely to continue in the long term. Deaths in old age largely result from causes linked to the ageing process. Since senescence is inevitable, some causes of death will never be eliminated, and older age mortality rates will not fall below some somatically determined level. One problem with this argument is that those who have used it in the past have consistently underestimated future declines in mortality and increases in life expectancy at older ages. For example, the maximum life expectancies estimated by Bourgeois-Pichat (1978) of 73.8 years for males and 80.3 years for females have now been exceeded in a number of countries, including Australia. Secondly, a soon-to-be-reached lower mortality limit implies a decelerating rate of mortality decline as the limit is approached (Wilmoth 1997). This is not occurring. Personally conducted calculations indicate that the rate of mortality decline at older ages in Australia has remained reasonably stable over the past two decades.

A position that has gained greater currency in recent years is that life expectancy may increase indefinitely, as cures are found for age-related conditions such as heart disease, as new genetic and cellular technologies allow the ageing process to

be retarded, and as the links between longevity and particular lifestyles are clarified. If these things occur, then mortality at older ages may decline faster than is anticipated in most official population projections, resulting in much greater ageing than is currently projected. For example, the ABS typically makes a single mortality assumption in its population projections, in which mortality declines at a slower rate than presently and stabilizes around 2050. If this turns out to be incorrect, then its projections may underestimate the future ageing of the Australian population.

The impact of changes in mortality

In the following projections, three levels of future mortality are considered. These are:

1. e_0 = 85 years. Life expectancy increases to 83 years for males and 87 years for females by 2051 and then remains constant. This is the mortality assumption used in the latest ABS population projections (ABS 2000b). It implies a ceiling to life expectancy, which will be reached in 50 years.
2. e_0 = 90 years. Expectation of life for both males and females increases by one year every ten years, giving life expectancy of 87 years for males and 93 years for females in 2100. This could be achieved if, for example, age-specific mortality rates fell by around 1 per cent per annum. In the period 1978–80 to 1997–99, mortality rates at all ages (except 25–38 years for males and 26–32 years for females) declined by considerably more than this.
3. e_0 = 100. Life expectancy increases by one year every five years to 97 years for males and 103 years for females in 2100. This implies an accelerated pace of mortality decline in the future compared to the recent past.

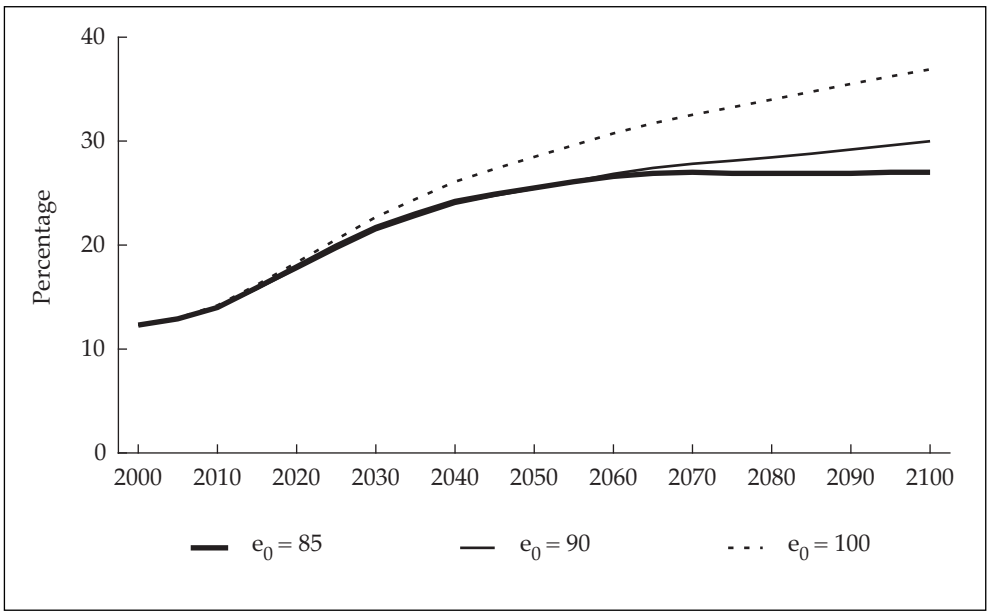
Figure 2 shows the impact on population ageing of these three mortality assumptions. Each projection has an underlying TFR of 1.65 births per woman (attained by 2010) and annual net migration of 90,000. As with fertility, changes in the level of mortality make very little difference to population ageing in the short term. In the first thirty years the extent of ageing between the high and low mortality assumptions differs by just over one percentage point. In all three projections the percentage of the population aged 65 and over exceeds 25 by 2050. Perhaps the surprise is the difference a more rapid increase in expectation of life makes in the longer term. An increase in life expectancy at birth to 100 years, compared to the ABS-assumed levelling off at 85 years, adds 3 percentage points to the population aged 65 and over by 2050 and 10 percentage points by 2100. It arguably also calls for redefinition of the population considered to be 'aged' – perhaps from 65 and over to 75 and over.

The future of migration

Net migration to Australia has averaged around 90,000 per annum over the past 50 years and over the past 10 years. Contrary to popular belief, immigration to Australia in the past had virtually no impact on Australia's age structure (Kippen and McDonald 2000). This is because the average age of migrants has been about the same as the average age of the general population, and migrant fertility in Australia is comparable to that of the Australia-born population. However, as the population becomes older, moderate levels of net migration will have a greater impact in reducing ageing.

Neither major political party has an explicitly expressed net migration target.

Figure 2 Percentage of population aged 65 and over under different mortality assumptions, 2000–2100



Source: Author's projections.

However, the Coalition government has stated that 'current immigration policy settings are likely to result in average net migration of around 60,000 per annum' (Ruddock 1999), and more recently has observed that annual net migration of 75,000 could form part of a 'sustainable population future' (Ruddock 2000). The Australian Labor Party favours some (as yet unstated) higher level of net migration than has prevailed recently (Beazley 2000; Sciacca 2000).

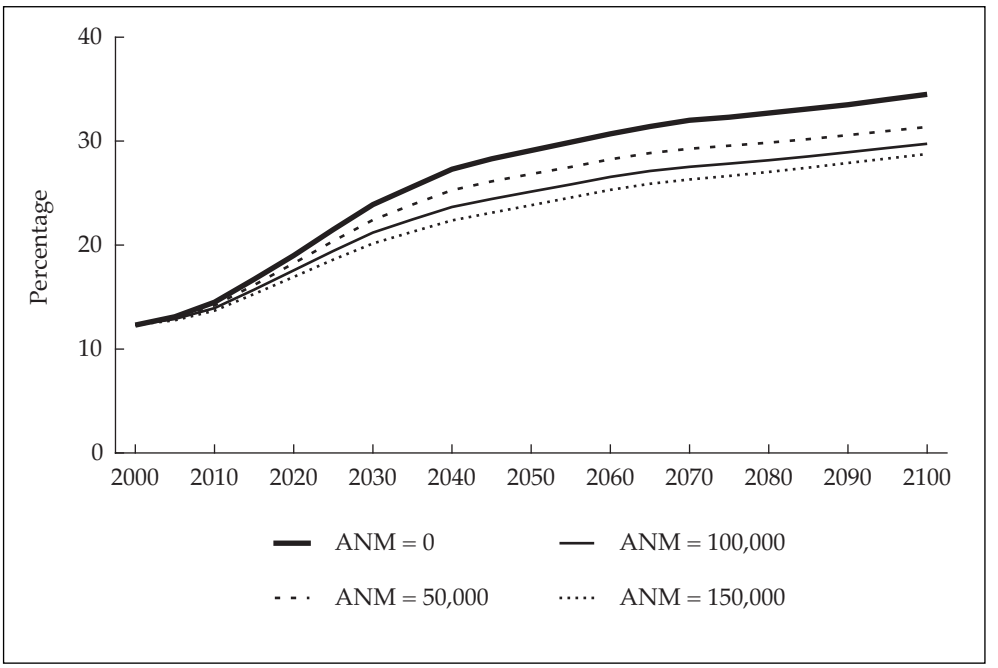
The impact of changes in migration

In the following projections, net migration levels ranging from zero to 150,000 per annum are considered. These limits are outside the range of future likely experience for Australia. It is unlikely that Australia will have zero or very low net migration in the future. All major political parties now support some level of positive net migration, with the Democrats and Greens changing from zero net migration policies in the late 1990s. Net migration of 150,000 per annum or above is also unlikely. Australia has only experienced net migration of around 150,000 in two of the last 50 years. It is probable that such a high level of migration would be unsustainable, both economically and politically, over the longer term.

The following levels of net migration are considered, in conjunction with assumptions that fertility falls to 1.65 births per woman by 2010, and life expectancy increases by one year every ten years:

1. Annual net migration = 0.
2. Annual net migration = 50,000.

Figure 3 Percentage of population aged 65 and over under different migration assumptions, 2000–2100



Source: Author's projections.

3. Annual net migration = 100,000.
4. Annual net migration = 150,000.

Figure 3 shows that a higher level of net migration results in a lower proportion of the population aged 65 and over. However, the effect is subject to diminishing returns. Each additional 50,000 net migrants have approximately half the impact of the previous 50,000 on ageing over the longer term. For example, shifting from zero to 50,000 net migrants reduces the proportion of the population aged 65 and over in 2100 from 34.5 per cent to 31.4 per cent, a difference of 3.1 percentage points. However, moving from 50,000 to 100,000 net migrants reduces ageing by only a further 1.6 percentage points, and an additional increase to 150,000 net migrants subtracts only one more percentage point. Thus, in a future older population, moderate levels of annual net migration, in the order of 50,000 to 100,000, would make a substantial difference to population ageing. Higher migration would have very little impact on the age structure while adding millions of people to the total population.

Conclusion

The above projections illustrate that while population ageing in Australia is inevitable, the degree of ageing in the long term will be highly dependent on future levels of fertility, mortality and migration. These components of population change are not immutable, and it is important that governments take a proactive approach

to them in the context of ageing. They should work to ensure that hyperageing is prevented by introducing policies aimed at preventing further large falls in fertility and sustaining moderate levels of migration. Moreover, given the significant impact of alternative mortality assumptions on population ageing demonstrated here, the Australian Bureau of Statistics should consider introducing two or more mortality assumptions to its published projections.

Notes

1. Based on 1970–72 mortality rates, with 68 per cent of males and 81 per cent of females reaching the age of 65, and life expectancies at age 65 of 12.2 years for males and 15.9 years for females.
2. Based on 84 per cent of males and 90 per cent of females reaching the age of 65, and life expectancies at age 65 of 16.6 years for males and 20.2 years for females.

References

Ahlburg, D.A. and J.W. Vaupel. 1990. Alternative projections of the U.S. population. *Demography* 27(4):639–652.

Australian Bureau of Statistics (ABS). 1976. *Australian Life Tables 1970–1972*. Reference No. 4.31. Canberra.

Australian Bureau of Statistics (ABS). 2000a. *Deaths 1999*. Catalogue No. 3302.0. Canberra.

Australian Bureau of Statistics (ABS). 2000b. *Population Projections Australia 1999–2101*. Catalogue No. 3222.0. Canberra.

Bacon, B. 2000. Projecting the decline in fertility. Paper presented at Workshop on Declining Fertility in Australia: Policy and Research Issues, Australian Institute of Family Studies, Melbourne.

Beazley, K. 2000. Radio interview, ABC Radio 2BL, Sydney, 17 April.

Bourgeois-Pichat, J. 1978. Future outlook for mortality decline in the world. *Population Bulletin of the United Nations* 11:12–41.

Kippen, R. and P. McDonald. 2000. Australia's population in 2000: the way we are and the ways we might have been. *People and Place* 8(3):10–17.

McDonald, P. and R. Kippen. 1999. Ageing: the social and demographic dimensions. Pp. 47–70 in Productivity Commission and Melbourne Institute of Applied Economic and Social Research (eds), *Policy Implications of the Ageing of Australia's Population Conference Proceedings*. Canberra: Ausinfo.

Olshansky, S.J. and B.A. Carnes. 1994. Demographic perspectives on human senescence. *Population and Development Review* 20(1):57–80.

Ruddock, P. 1999. Population options for Australia. *People and Place* 7(1):1–6.

Ruddock, P. 2000. A sustainable population future for Australia. Paper presented to Australian Population Association Biennial Conference, Melbourne.

Sciacca, C. 2000. Untitled address to Migration Institute of Australia Annual Conference, Sydney. www.alp.org.au/media/0300/csspmia170300.html.

Wilmoth, J.R. 1997. In search of limits. Pp. 38–64 in K.W. Wachter and C.E. Finch (eds), *Between Zeus and the Salmon: The Biodemography of Longevity*. Washington DC: National Academy Press.