POPULATION AGEING IN AUSTRALIA: POLICY IMPLICATIONS OF RECENT PROJECTIONS

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Recent projections published by the Australian Bureau of Statistics set out a range of possible demographic futures for Australia. This article examines 12 of these which all share the same life expectancy assumptions, but which differ in their assumptions for fertility and net overseas migration. It shows that all of the projection series that include net migration entail considerable population growth, but have a minimal effect on the age structure. In contrast the projection series that assumes near replacement fertility (a total fertility rate of 2.0) and nil net migration leads to modest growth. It also leads to a younger age structure than series which combine immigration with a lower fertility rate of 1.6.

SMALLER FAMILIES, LONGER LIVES, AND AN OLDER AGE STRUCTURE

During the baby boom after WWII annual fertility was high. In 1961 the total fertility rate (TFR) reached a peak of 3.54, but then soon began to decline, eventually falling below the replacement level of 2.1 in 1976.[1] From the late 1990s the TFR has been hovering around 1.8.[2] Thus the last thirty years have seen a significant change in the number of children born to Australian families. Even during the 1930s depression fertility did not fall below 2.1.[3]

This reduction in family size has been echoed in other developed countries. Over a rather longer time period, mortality has fallen as well. During the first decade of the twentieth century male life expectancy at birth was 55 years and female life expectancy 59 years.[4] By 2007 male life expectancy at birth was 79.0 years and that of females 83.7 years.[5]

Fewer children and longer lives inevitably mean an older age structure. The only way to maintain a stable stationary population with a youthful age structure is to return to the demography of the past where many children were born and most people died young.

Good health, small families and a long life go together with an older age structure. But ever since fertility fell below replacement in the late 1970s people have worried about the social and economic consequences of this transformation. Some have agued that immigration could maintain a youthful age structure despite demographic change,[6] an argument that seems to have influenced public attitudes to immigration. In 2005 respondents to the Australian Survey of Social Attitudes who were particularly concerned about the ageing of the population were less likely to say they wanted fewer migrants than were respondents who did not share this concern.[7]

The claim that immigration helps forestall demographic ageing is often advanced as a justification for a large intake. The new Labor Government is a case in point. At the same time as it has boosted the migrant intake to record levels, the Minister for Immigration, Senator Chris Evans, has drawn on the argument about ageing to help justify the policy,[8] as have other high migration supporters.[9]

But this claim is not supported by systematic research. Such research has consistently shown that immigration, even when run at high levels, has a minimal effect on the median age. By contrast, it has a considerable effect on the overall size of the population, including the elderly population.[10]

RECENT POPULATION PROJECTIONS

The recent series of population projections published by the Australian Bureau of Statistics (ABS)[11] allow us to look at the numbers in some detail. This is because the ABS has not only published its three key national projections series (series A, B and C), but also 21 others, combining different assumptions regarding fertility, migration and life expectancy. (There are in fact 72 series, as each of the 24 national assumptions includes three different series of assumptions for interstate migration.)

This article will examine the 12 different national projections which use the ABS medium life expectancy assumptions, where life expectancy at birth rise from its current (2007) level of 79.0 years at birth for males and 83.7 years for females to 85 years for males and 88 year for females (the other 12 use higher life expectancy assumptions but are otherwise the same).[12] These 12 projection series are set out in Table 1. Their assumption vary by level of fertility (from a TFR of 1.6 to one of 2.0) and by level of annual net overseas migration (NOM) (from zero to net 220,000 per year). The TFR in 2007–08 was 1.935 and NOM was 213,500.[13]

Two of the three projections which the ABS highlights, B and C, are shown in Table 1. The third, series A, is the same as series 5, but with higher life expectancy. The present article uncovers interesting properties of series 59, and it is referred to here as the stable stationary series, or series 59S, for ease of recognition.[14] (Stable and stationary is a slight misnomer; to be truly stable and stationary it would need a TFR of 2.1 rather than 2.0.)

Five of the series identifying in Table 1 are shown in Figure 1, together with population data for 1901 to 2007. These five series have been selected for illustration because they span the full range from the highest (series 5) to the lowest (series 71).

Figure 1 shows the extent of variation in the future size of the population according to which of the five series we follow. The three which include immigration take the population to very much higher figures than the two which do not and, in the case of series 5 and 29B, population growth shows no sign of easing by 2101. In contrast, the stable stationary series, 59S (total fertility rate 2.0 with nil net migration), shows the population levelling off at around 22 to 23 million. The low-fertility series 71 (total fertility rate 1.6 and nil net migration) shows a population decrease after 2032.

Table 1: Medium-life-expectancy projection series, ABS, 2006 to 2101 by identifying number and letter codes, 2008

	Total fertility rate (TFR)		
Net overseas migration (NOM), p. a.	1.6	1.8	2.0
0	71	65	59(S)*
140,000	54(C)	47	41
180,000	35	29(B)	23
220,000	17	11	5

Source: *Population Projections, Australia, 2006 to 2101*, Catalogue no. 3222.0, ABS, Canberra, 2008, pp. 3, 11

Notes: The series are identified by number and, in the case of the three that the ABS highlights, by letter as well. All of the 12 series set out here assume 'medium life expectancy' at birth. This rises from 79.0 years for males and 83.7 years for females in 2007 to 85 years for males and 88 year for females. The two series labelled 29(B) and 54(C) are part of the three highlighted by the ABS. The third is series 1(A). This is the same as series 5 except for the fact that it assumes high life expectancy at birth. See endnote 12.

*Series 59(S) is called the stable stationary series in this article.

Table 2 makes it clear that Australia has the choice of a wide range of population futures. *Choice* is the appropriate term as net overseas migration, the one demographic variable which is most clearly affected by political decisions, is the variable which makes the strongest difference.

If we compare the stable stationary series with series 71—both of which assume nil net migration, but with the former assuming a TFR of 2.0 instead of 1.6—we find that the additional fertility adds an extra 7.5 million by 2101. In contrast if we compare series 5 with series 71—both of which assume a TFR of 1.6, but with the former assuming a NOM of 220,000 a year and the later assumes nil net migration—we find that the migration intake in series 5 adds an extra 42 million people.

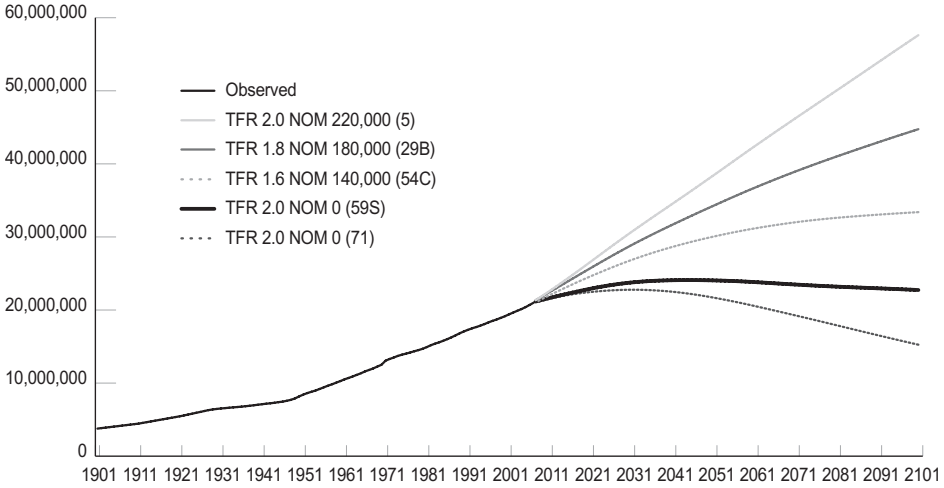
Table 2 shows the total population in 2056 and 2101 under all 12 assumptions. It also shows the extra numbers added for all 11 of them relative to the lowest projection in the series, series 71.

This reinforces the picture sketch in Figure 1; net overseas migration makes a big difference to the size of the population. The following section examines the effect of the different series on the age structure in more detail.

FERTILITY, MIGRATION, AND DEMOGRAPHIC AGEING

What effect, then, do the different series have on the age structure? Series 5 adds nearly 42 million more people than series 71, but does it have a correspondingly dramatic effect on the median age? Table 3 sets out the median age of the population, a statistic which provides a useful summary of the overall age structure. Table 3 shows the median age from 1901 to 2007, and as projected for each of the 12 series to 2056. Table 4 takes the projections on to 2101.

Figure 1: Population of Australia from 1901 to 2007 and to 2101 under five different projection assumptions



Sources: Data for 1901 to 2007, *Australian Historical Population Statistic*s, Catalogue no. 3105.0.65.001, ABS, 2008. (The excel fill function has been used for data for the years 1902 to 1910 and 1912 to 1920.) Data for the projections are from files published online with *Population Projections, Australia, 2006 to 2101*, ABS, Catalogue no. 3222.0, 2008 <www.abs.gov.au>.

Three points are clear from the data in these tables. First, if the total fertility rate is 2.0 rather than 1.6, the returns in the fall in the median age in both 2056 and 2101 are much higher than they would be with any variation in the migrant intake.

Second, the stable stationary series in fact produces a lower median age in 2056 than does series 54C (TFR 1.6, NOM 140,000), and than do any of the series combining a TFR of 1.6 with any migration level in 2101. In the long term the two-child family is a more effective anti-ageing agent than low fertility plus migration.

Third, while high migration combined with a TFR of 1.8 or 2.0 does reduce the median age relative to the low fertility series with nil net migration, it does so at a high demographic cost.

Table 3 shows that increasing the TFR from 1.6 to 2.0 shaves five years off the median age in 2056, and that it does this at a cost of 0.5 million extra people for each year by which that median age is reduced. In contrast, holding the TFR at 1.6 but running a migration intake of net 220,000 per year would reduce the median age in 2056 by six years but at the demographic cost of 2.5 million extra people for every year by which that median age was reduced. This is a demographic cost five times greater than that of increasing the TFR to 2.0 while holding net migration at zero.

Table 2: Population by size as projected for 2056 and 2101

TFR	NOM pa	Projection series	June 2006	June 2056	June 2101	June 2056: Extra people relative to series 71	June 2101: Extra people relative to series 71
1.6	0	71	20,697,880	21,180,572	15,254,121	na	na
1.8	0	65	20,697,880	22,546,923	18,736,860	1,366,351	3,482,739
2.0	0	59(S)*	20,697,880	23,968,510	22,736,097	2,787,938	7,481,976
1.6	140,000	54(C)	20,697,880	30,906,094	33,700,336	9,725,522	18,446,215
1.6	180,000	35	20,697,880	33,554,734	38,872,308	12,374,162	23,618,187
1.6	220,000	17	20,697,880	36,203,531	44,044,447	15,022,959	28,790,326
1.8	140,000	47	20,697,880	32,706,348	39,058,921	11,525,776	23,804,800
1.8	180,000	29(B)	20,697,880	35,469,971	44,744,809	14,289,399	29,490,688
1.8	220,000	11	20,697,880	38,233,745	50,430,948	17,053,173	35,176,827
2.0	140,000	41	20,697,880	34,572,146	45,115,856	13,391,574	29,861,735
2.0	180,000	23	20,697,880	37,453,414	51,364,448	16,272,842	36,110,327
2.0	220,000	5	20,697,880	40,334,696	57,613,015	19,154,124	42,358,894

Source: Files published online with *Population Projections, Australia, 2006 to 2101*, ABS, Catalogue no. 3222.0, 2008 <www.abs.gov.au>

Notes: Additions to the population are calculated against a base figure for June 2006.
TFR stands for total fertility rate, NOM stands for net overseas migration. All of the 12 projections assume 'medium life expectancy' at birth. This rises from its 2007 level of 79.0 years at birth for males and 83.7 years for females to 85 years for males and 88 year for females.
* Series 59(S) is referred to as the stable stationary series in the text.

Table 3: Median ages based on projections for 2056

TFR	NOM pa	Series	June 2006	June 2056		
			Median age	Median age	Fall in median age relative to series 71	Demographic cost: population increase needed to reduce the median age of series 71 by 1 year
1.6	0	71	36.63	49.71	na	na
1.8	0	65	36.63	47.19	2.53	540,706
2.0	0	59(S)	36.63	44.63	5.09	548,021
1.6	140,000	54(C)	36.63	45.22	4.50	2,162,513
1.6	180,000	35	36.63	44.44	5.28	2,345,423
1.6	220,000	17	36.63	43.79	5.93	2,535,183
1.8	140,000	47	36.63	43.08	6.63	1,738,985
1.8	180,000	29(B)	36.63	42.39	7.32	1,952,198
1.8	220,000	11	36.63	41.82	7.90	2,159,743
2.0	140,000	41	36.63	41.03	8.69	1,541,655
2.0	180,000	23	36.63	40.42	9.29	1,752,074
2.0	220,000	5	36.63	39.92	9.79	1,956,599

Source: Median ages calculated from sources given for Table 2

Table 4: Median ages based on projections for 2101

TFR	NOM pa	Series	June 2006	June 2101		
			Median age	Median age	Fall in median age relative to series 71	Demographic cost: population increase needed to reduce the median age of series 71 by 1 year
1.6	0	71	36.63	51.74	na	na
1.8	0	65	36.63	48.05	3.69	944,519
2.0	0	59(S)	36.63	44.73	7.01	1,067,739
1.6	140,000	54(C)	36.63	46.67	5.07	3,640,652
1.6	180,000	35	36.63	46.14	5.60	4,216,367
1.6	220,000	17	36.63	45.74	6.00	4,796,060
1.8	140,000	47	36.63	44.25	7.49	3,180,181
1.8	180,000	29(B)	36.63	43.83	7.91	3,726,662
1.8	220,000	11	36.63	43.50	8.24	4,269,513
2.0	140,000	41	36.63	41.92	9.82	3,041,367
2.0	180,000	23	36.63	41.58	10.16	3,555,421
2.0	220,000	5	36.63	41.32	10.42	4,066,440

Source: Median ages calculated from sources given for Table 2

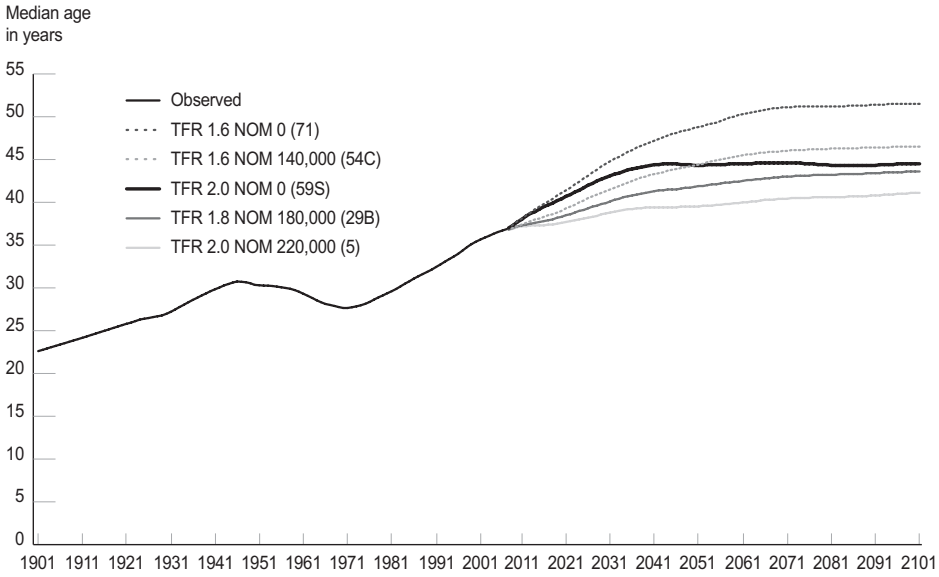
when the time line is pushed out to 2101 the payoff in reductions to the median age for every million people added diminishes; it takes far more extra people to accomplish the same anti-ageing effect as it did in the first 50 years. For example, in the time span of 2006 to 2056 series 5 reduced the median age by one year (relative to the low fertility, nil net migration series 71) for every two million people added. Over the 2006 to 2101 period the same effect required an additional four million people. Thus, as in many other human projects, the law of diminishing returns applies.

Figure 2 takes the five series illustrated in Figure 1 and shows the different effects that these five have on the median age year by year in graphic form. It also shows changes in the median age from 1901 to 2007 to provide a comparative perspective. It reinforces the picture provided by Tables 3 and 4; when the demographic cost is taken into account the stable stationary series has a more beneficial effect on the age structure than any of the other series.

In the long run the stable stationary series offers a good outcome for Australia. But what of the more immediate future? There is, for example, the question of the numbers of likely new entrants to the labour force. Table 5 looks at the projected numbers of young people aged 22 to 34 by selected years for the five projection series illustrated in Figures 1 and 2. It shows, as might be expected, that these rise in a dramatic fashion for series 5, with its high fertility and high migration. However the increases in people in this age group in series 54C (low fertility plus NOM of 140,000 p.a.) is not particularly marked.

In the stable stationary series, which is in fact slightly below replacement fertility, there is a mild decline, but it does not being until after 2016—the slight decrease in females aged 22 to 34 being more than offset by the slight increase in the number of males. The very low fertility nil net

Figure 2: Median age of the Australian population from 1901 to 2007 and to 2101 under five different projection assumptions



Source: Median ages are calculated from sources given for Figure 1.

migration series also does not produce a decline in this age group until after 2016, but by 2056 the difference between this series and the stable stationary sereis is marked.

Any concerns about the numbers of new entrants to the labour market could be met by supporting fertility at the 2.1 level, and by increasing labour force participation rates among older people. For example, at the 2006 census, while 83 per cent of men aged 45 to 54 were in the labour force only 64 per cent of men aged 55 to 64 were in the labour force, as were 46 per cent of women.[15] The Australian labour market could be making much better use of the people it already has.

The data from the 12 ABS projections analysed here make it clear that high immigration has very little effect on the age structure of Australia's population. If our goal is to reduce the median age of that population, high net migration is extraordinarily inefficient. In contrast helping Australian parents to have the two-child families that most of them want would be an effective policy. The stable stationary model is clearly the most effective route to the youngest possible age structure without costly population growth.

The stable stationary series is particularly effective compared to a laissez-faire policy of allowing the TFR to fall to 1.6 or lower, as it well could in difficult economic times. Such an outcome would lead to a higher median age and, in the absence of high migration, to population decline.

Should policy makers be concerned about below replacement fertility? Some easing of population pressures on Australia's environment and its poorly serviced, overstretched cites could be welcome. But it is time to distinguish between benign demographic ageing, where the median age rises but the population stabilises, and hyper demographic ageing. In the latter case, with

Table 5: Numbers of males and females aged 22 to 34 by projection series and year

			Males 22 to 34				
TFR	NOM	Series	2006	2016	2026	2056	2101
2.0	220,000	5	1,899,741	2,318,494	2,517,437	3,439,754	4,701,390
1.8	180,000	29(B)	1,899,741	2,257,917	2,393,536	2,901,226	3,525,295
1.6	140,000	54(C)	1,899,741	2,197,357	2,269,680	2,389,562	2,535,050
2.0	0	59(S)	1,899,741	1,930,855	1,808,218	1,781,846	1,703,067
1.6	0	71	1,899,741	1,930,855	1,808,215	1,420,642	1,009,994
			Females 22 to 34				
TFR	NOM	Series	2006	2016	2026	2056	2101
2.0	220,000	5	1,879,477	2,242,875	2,422,454	3,302,257	4,500,555
1.8	180,000	29(B)	1,879,477	2,181,800	2,300,326	2,784,549	3,376,762
1.6	140,000	54(C)	1,879,477	2,120,731	2,178,205	2,292,399	2,429,686
2.0	0	59(S)	1,879,477	1,853,524	1,723,586	1,695,633	1,619,676
1.6	0	71	1,879,477	1,853,524	1,723,587	1,351,948	960,578

Sources: See Table 2.

very low fertility, the age structure can indeed become unbalanced and, in the worst case scenario, the population could spiral into exponential decline.[16]

CONCLUSION

Australia is fortunate to be in a position to decide its demographic future. But whatever we chose one thing is clear. The only way to return to the youthful age structure of the past is by having very large families and dying young. We do not want to do this. This means that, just as individuals have to adjust to personal ageing, so do developed societies have to adjust to demographic ageing.

References

1 The TFR in 1976 was 2.06: Bureau of Immigration Research, *Australia's Population Trends and Prospects, 1990*, Australian Government Publishing Service, Canberra, 1991, p. 14. The TFR is 'based on the average number of children that would be born to a population of women if they were to pass through their childbearing years conforming to the age-specific birth rates of a given year'. See A. Haupt and T. T. Kane, *Population Handbook: International Edition*, Population Reference Bureau, Inc., Washington, 1980, p. 13.

2 See *Australian Demographic Statistics*, Catalogue no. 3101.0, Australian Bureau of Statistics (ABS), Canberra, various issues. The officially recorded TFR did drop below 1.8 in the late 1990s but it seems that this was more a consequence of failures in the birth registration system than of changes in actual fertility. See P. McDonald, 'Has the Australian fertility rate stopped falling', *People and Place*, vol. 13, no. 3, 2005, pp. 1–5, and *Births Australia 2005*, Catalogue no. 3301.0, ABS, Canberra, 2006, chapter 5.

3 For the TFR in the 1930s see *Australian Demographic Trends*, 1997, ABS, Catalogue no. 3102.0, Canberra, 1997, pp. 41–42.

4 ibid., p. 57.

5 *Deaths Australia 2007*, Catalogue No. 3302.0, ABS, Canberra, 2008, p. 10

6 See for example A. Reid, 'How Australia may become a senile country', *The Bulletin*, 25 September 1976, p. 25; Tony Berg (Business Council of Australia), quoted in B. Birnbauer, 'A land half-full', *The Age* (News Extra), 14 March 1998, p. 4; G. Barns, 'Why we need more migrants', *The Age*, 13 December 2001; arguments for immigration used by Jeff Kennett in B. Birnbauer, 'Kennett in call to lift migration', *The Age*, 16 March 1998, pp. 1, 6 and in B. Nicholson and M. Shaw, 'Clash on migrant limits', *The Age*, 8 March 1999, and in Australian Associated Press, 'Aust population should double within 60 years—Kennett', 20 April 1999.

7 K. Betts, 'The ageing of the population and attitudes to immigration', *People and Place*, vol. 14, no. 2, 2006, pp. 26–38

8 'More broadly we have an ageing population. My inclination is not to do reviews, but get on with it'. Evans quoted in P. Kelly, 'Rudd taps global labour pool—Labor promises massive increase in migration', *The Australian*, 17 May 2008, p. 1

9 In response to the Rudd Government's immigration program *The Australian* wrote: 'It is in line with a pattern of rising immigration established by the Howard government, which was well aware of the need to boost immigration as one response to the problems posed by Australia's ageing population'. Editorial, 'More workers are a positive force', *The Australian*, May 19 2008, p. 9.

10 See Productivity Commission, *Economic Implications of an Ageing Australia: Productivity Commission Research Report*, 24 March, Productivity Commission, Melbourne, 2005; R. Kippen, 'A note on aging, immigration and the birth rate', *People and Place*, vol. 7, no. 2, 1999, pp. 18–22; C. Young and L. Day, 'Australia's demographic future: determinants of our population', Australian Academy of Science, *Population 2040: Australia's Choice*, Canberra, 1994. In 2000 the ABS wrote: 'Even large differences in the level of net overseas migration will have a relatively small impact on the age distribution. With net overseas migration of 50,000 per year, the median age of the population in 2051 would be 47.2 years, compared to 44.6 years when 150,000 net overseas migrants are added to the population per year, a difference of 2.6 years'. *Projections of the Populations of Australia, States and Territories: 1999–2101*, Catalogue no. 3222.0, ABS, Canberra, 2000, p. 2.

11 See *Population Projections, Australia, 2006 to 2101*, Catalogue no. 3222.0, ABS, Canberra, 2008, together with associated projection series available at <www.abs.gov.au> in electronic files.

12 The 12 high life expectancy series assume life expectancy at birth rising to 93.9 years for males and 96.1 for females. If any of these scenarios were to come to pass the median age of the population would be higher, but the

relative differences between the them and the 12 series which assume 'medium' life expectancy would be similar.

13 *Demographic Statistics*, June Quarter 2008, ABS, Catalogue no. 3101.0, 2008, pp. 30, 11

14 Demographers label a population stable if it is growing or declining at a steady and predictable rate. A population that is neither growing nor declining is a type of stable population, hence the label, stable and stationary. In fact series 59S is not quite in this category as the TFR is only 2.0 not 2.1, the level required for replacement. See D. T. Rowland, *Demographic Methods and Concepts*, Oxford University Press, Oxford, 2003, pp. 302, 241.

15 *2006 Census Community Profile Series*, Australia, Catalogue no. 2001.0 <www.abs.gov.au>

16 See Rowland., 2003, op. cit., p. 53