

FERTILITY, MIGRATION, AND THE AGEING OF THE POPULATION — AN ANALYSIS OF THE OFFICIAL PROJECTIONS

■ Katharine Betts

As we move through the demographic transition, an older age structure is inevitable but future possible scenarios vary. Official Australian Bureau of Statistics (ABS) population projections for Australia show that, depending on varying assumptions for fertility and migration, the population in 2051 could be large and growing or the same size as it is today and declining. But an analysis of these same projections confirms earlier work which finds that migration has a minimal effect on the age structure.

The paper analyses nine different population projections produced by the ABS, four in 1996 and five in 1998. The highest projection (fertility 1.85 and net migration 100,000) adds an extra ten million people by the year 2051 while the lowest (fertility 1.6 and nil net migration) adds none. This is a dramatic difference. But the effects of different fertility and migration assumptions on the median age in 2051 are also marked; changes in fertility have a strong effect while changes in migration have a weak effect. The projection which produces the lowest median age in 2051 for the least 'cost' in extra people added is the series which holds fertility at 1.85 and net migration at zero.

Previous work shows that replacement fertility and nil net migration would be even more effective than this series. However, this combination of assumptions has not been used by the ABS.

The world's population has grown significantly over the last two hundred and fifty years. Growth has been particularly rapid over the last fifty years. But, as far as we know this condition of sustained growth is unusual. During the long span of human history fertility has been moderately high but growth has been held in check by high mortality. From around 1750 in the West, and post World War II elsewhere, mortality has fallen and it is this, rather than higher fertility, which has led to our recent history of growth. However, in many areas of the world fertility has now fallen and growth is easing.

Many populations have passed from a demographic regime characterised by high mortality and high fertility to a regime characterised by low mortality and low fertility. Those which have completed this journey are said to have passed through the demographic transition.¹ Most observers welcome this. While there is debate about the absolute number of people that the Earth can support in a sustainable fashion, even the

most sanguine of optimists acknowledge that growth must cease at some point. And all humanitarians would prefer that lower fertility applied the brake rather than higher mortality.

A stationary population maintained by low fertility and low mortality is desirable but, if we compare such a population with one characterised by high fertility and high mortality, there is one inevitable difference between them. The latter has a more youthful age structure than the former. An unavoidable conclusion follows: unless we wish to return to the conditions of the past where many children were born and few of them lived to grow old, population stability and a mature age structure are inseparable.

Despite this, the prospect of an older population has caused considerable alarm in Australia and a number of public figures have, for twenty years or more, argued that we must increase the number of immigrants in order to forestall it. During the late 1970s and early 1980s, for example, the Fraser Government frequently argued that immigration was

necessary to offset an older age structure.² Demographic work such as Christabel Young's excellent research³ during the 1980s and 1990s showed that immigration was a weak anti-ageing tonic but, despite this, variants of the old immigration and ageing argument can still be heard to today.⁴

In the 1970s supporters of zero population growth hoped for a world in which fertility precisely matched mortality and growth came to a peaceful end with the two-child family — hence the slogan

'stop at two' (sometimes augmented with a subclause 'and start at thirty'). As in most Western nations, Australian fertility did fall dramatically during the 1970s but it did not stop at two. Rather it kept on falling and the total fertility rate (TFR) has been below replacement level (2.06) since 1977.⁵ This brings another element into the debate. Populations such as Australia's which have a relatively youthful age structure have a certain momentum. They can keep on growing from natural increase for several decades.

Table 1 Population by size and median age in 1996 and as projected in 2051

	TFR	Net migration	Population in millions	Median age
			<u>in 1996</u>	<u>in 1996</u>
1996 (actual figures)	1.8	98,800	18.3	33.5
			<u>in 2051</u>	<u>in 2051</u>
Series P 1997	1.6	0	18.3	48.7
Series G 1997	1.75	0	19.5	46.3
Series I 1995	1.85	0	20.1	44.6
Series Three 1997	1.6	70,000	23.5	46.2
Series D 1995	1.75	70,000	24.85	44.1
Series Two 1997	1.75	70,000	24.94	44.1
Series A 1995	1.85	70,000	26.1	42.6
Series One 1997	1.75	90,000	26.4	43.7
Series C 1995	1.85	100,000	28.3	42.2

Notes: Projections One, Two and Three for 1997 are labelled with Roman numerals by the ABS.

These labels are spelt out here to avoid confusion with series I 1995.

The two sets of projections depart from different base years— 1995 and 1997. As a comparison of series D 1995 and series Two 1997 shows, this has a minimal effect on the outcome in 2051. Data for 1996 are provided in Table 1 as an approximate 'common base year' for both sets of figures.

Assumptions for the projections:

1995: Fertility either remains at the 1994 level of 1.85 or declines to 1.75 in 2004 and then remains unchanged; net migration declines from 120,000 in 1995-96 to either 70,000 in 1998-99 or 100,000 in 1997-98 and then remains unchanged (projection I is included by the ABS for illustrative purposes only and assumes nil net migration throughout the projection period); mortality is the same for all the 1995 projections and assumes gradual improvements in life expectancy from 75.3 for males and 81.1 for females in 1996 to, eventually in 2051, 81.1 years at birth for males and 86.3 for females.

1997: Fertility falls to the assumed rate by 2005-6 and then remains unchanged, migration reaches the assumed levels in 1998-99 and then remains unchanged (projections P and G assume nil net migration throughout the projection period); mortality is similar to the 1995 series but expectation of life at birth for males rises to 81.97 for males in 2051, though only to 86.11 for females.

Sources: The 1996 figures are from *Australian Demographic Statistics*, Cat. no. 3101.0, Australian Bureau of Statistics (ABS), Canberra, June 1997. Net migration is 'net overseas migration' and the median age is derived from Table 13. The projections are from *Projections of the Populations of Australia, States and Territories: 1995-2051*, Cat. no. 3222.0, ABS, Canberra, 1996 and *Projections of the Populations of Australia, States and Territories: 1997-2051*, Cat. no. 3222.0, ABS, Canberra, 1998. Details of projection I 1995 and projections P and G 1997 are from unpublished data provided by the ABS.

But below replacement fertility does in the end mean population decline rather than population stability. Many environmentalists welcome the idea of a lower numbers but, as Rebecca Kippen and Peter McDonald pointed out in this journal earlier this year, very low fertility (a TFR of 1.65) and nil net migration sustained over a long period could lead to irreversible decline.⁶

Kippen and McDonald's objective was to explore the various pathways that Australia might take if policy makers wished to achieve a stationary population. They emphasised that the age distributions of possible different stationary populations produced by varying combinations of fertility, migration and mortality do not differ very much. They pointed out that the big difference is between our present age structure and any one of the future stationary structures which they model, not between the different future scenarios themselves.⁷

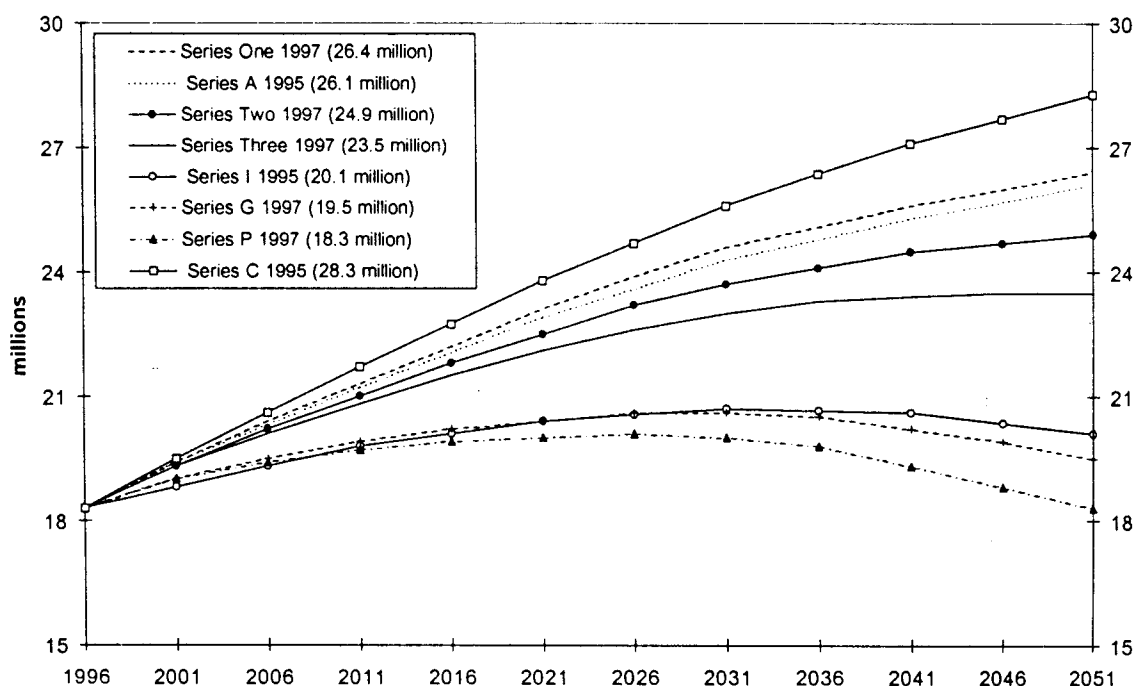
There is no reason why a nation without a population policy should achieve a stationary population by accident and

current projections produced by the Australian Bureau of Statistics are not built on the assumption that this will happen. Rather they simply take plausible assumptions for fertility, mortality and net migration and project these into the future. The purposes of this current note is to outline nine sets of recent projections (four produced in 1996 on a base year of 1995 and five produced in 1998 on a base year of 1996) and then ask: what are the outcomes of each scenario 53 years hence in the year 2051?

Table 1 shows that the different assumptions have a dramatic effect on the total size of the population in 2051. It may be either the same size as it was in 1996, for the year 2051 at least (series P 1997), or it may be more than half as large again (series C 1995). Figure 1 graphs the trajectory of eight of the nine series. (Series D 1995 is not shown because it is virtually identical to series Two 1997.)

Series Three 1997 and series I 1995 bear the closest appearance to 'stationarity'⁸ in Figure 1 and Table 1 shows that

Figure 1: Projections of the population of Australia, base years 1995 and 1997



series I has a marginally lower age structure (a median age of 44.6 years rather than 46.2). However, Table 1 does suggest that advocates who argue that immigration is an effective antidote for ageing may have a case. Series C 1995 has the highest migration assumption and the lowest median age in 2051. But this is achieved at a cost: series C produces the highest total population. How great is this cost? Table 2 quantifies this. It takes the lowest projection with the oldest age structure, series P 1997, as the base. It then shows the extra numbers added relative to P and the fall in the median age relative to P for each of the other projections. (Again, series D 1995 is omitted because of its similarity to series Two 1997). The final column shows the 'payoff'. How far does the median age fall for each extra million people added?

Advocates who simply press for extra numbers to ward off an older age structure do not ask this question. The criterion of efficiency rules many areas of public life — employment services, education, council libraries, parks and gardens — but this criterion is not often applied to demography. Table 2 provides a rough answer to the question: if we want to minimise the median age in 2051 which of the pathways sketched in the

official projections provides the most efficient route? It is clear that the answer is series I. Under the series I assumptions, one million extra people provides a larger payoff in terms of the years shaved off the median age in 2051 than under any other set of assumptions. All of the assumptions involving migration are less effective.

Table 2 reinforces Young's work. Immigration has a minimal effect on the age structure. In comparison, slight increases in fertility have a marked effect. Kippen and McDonald note that the pathway to a stationary population which yields the smallest possible final population is the one which combines replacement fertility with zero net migration. They do not consider this path to be feasible and mention its age structure only in passing.⁹ However their work shows that the smallest stationary population would also be the youngest. Replacement fertility and nil net migration would be even more effective than series I.

If Australia were to have an explicit population policy the question of population growth and the effects of different inputs on Australia's age structure would be analysed rigorously. Without such a policy ignorance, emotion and special pleading have more scope.

Table 2: Population projections and the median age in 2051: payoff in falls in median age per million people added for different mixes of fertility and net migration relative to projection P 1997

Projection Series	TFR	Net migration	Millions added relative to P 1997	Fall in median age relative to P 1997	Payoff: fall in median age per 1 million extra people
P 1997	1.6	0	-	-	-
G 1997	1.75	0	1.2	2.4	2.0
I 1995	1.85	0	1.8	4.1	2.3
three 1997	1.6	70,000	5.2	2.5	0.5
two 1997	1.75	70,000	6.6	4.6	0.7
A 1995	1.85	70,000	7.8	6.1	0.8
one 1997	1.75	90,000	8.1	5.0	0.6
C 1995	1.85	100,000	10.0	6.5	0.7

Source: Table 1

References

- ¹ See Weeks for a full account of the demographic transition: J. R. Weeks, *Population: An Introduction to Concepts and Issues*, Wadsworth, Belmont, 1996.
- ² See K. Betts, *Ideology and Immigration: Australia 1976 to 1987*, Melbourne University Press, Melbourne, 1988, pp. 122-4, 127.
- ³ See for example: C. Young, Submission to the Committee to Advise on Australia's Immigration Policies Unpublished paper, Department of Demography, Australian National University, Canberra, January 1988; *Australia's Ageing Population: Policy Options*, Australian Government Publishing Service (Bureau of Immigration Research), Canberra, 1990; 'The future population and the future labour force', *People and Place*, vol. 2, no. 4, 1994, pp. 15-21.
- ⁴ See the editorial in *The Age*, Melbourne, 16 March 1998, p. 14. The need to offset the ageing of the population was a strong theme in Kim Beazley's Address to Global Foundation luncheon 'Energising Australia: Population Issues for Australia in the 21st century', Monday 3 August 1998, Melbourne, though he did not explicitly claim that immigration would achieve this outcome.
- ⁵ Births in any one year are often summarised by a measure called the total fertility rate. This 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.
- ⁶ R. Kippen and P. McDonald, 'Achieving population targets for Australia: an analysis of the options', *People and Place*, vol. 6, no. 2, 1998, p. 22
- ⁷ *ibid.*
- ⁸ This is Kippen and McDonald's term. See *ibid.* p. 13.
- ⁹ See Table 2, *ibid.*, p. 17.