

Understanding Australia's population dynamics

Peter McDonald

Australian Centre for Population Research

In the limited space available to me, my contribution to the debate is constrained to one demographic message. The message is that any debate about population futures must be conducted with an understanding of basic population dynamics. Colin Butler's report (p. 26) states that 'environmental scientists would also benefit from collaboration with demographers, thereby avoiding egregious errors in constructing population scenarios.' He does not explain why environmental scientists have made egregious errors, but the reason is that there has been a tendency among at least some environmental scientists in Australia to see population simply as a number, the size of the total population. This ignores the importance of population dynamics, or the ways in which populations change in size.

The core component of population dynamics is reproduction. Reproduction is the extent to which one generation replaces itself in the next generation. When one generation of women has on average one daughter who lives to the age of the mother when she gave birth, exact replacement of the generation occurs. With no migration and no change in mortality, such a population would have zero growth in the long term and a constant age structure. Because of very low mortality rates at younger ages, the rate of reproduction in Australia is determined almost solely by fertility (the number of children that women have). The complete elimination of deaths under the age of 50 would have almost no effect on the rate of reproduction.

Assuming mortality is constant and there is no migration, a fertility rate below an average of two children per woman, sooner or later, leads to a declining population with all of the decline occurring at the young ages. Across generations, this decline would be multiplicative. For example, if the fertility rate were to be sustained at a level of one child per woman, after three replacements of the generation (about 90 years), the fourth generation would be one eighth the size of the first generation. Such a trend is obviously unsustainable in the long term, and even in the shorter term, a large deficit of young workers is very likely to threaten economic competitiveness. Again sooner or later, any population that does not welcome its own demise would have to get its reproduction rate back up to the replacement level.

If human fertility rates could be turned on and off by some kind of biological mechanism, we could let fertility remain at a very low level for a long period of time and then turn it back up again when we wanted to stabilize the population at some desired level. This is not the way that human fertility works. There are numerous countries now engaged in attempts to increase their fertility rates because they consider that their existing rates are unacceptably low. While there is broad agreement that the principal problem is the difficulty for parents, particularly mothers, of combining work and family, there have been few examples of policy success. Indeed, there is recent evidence from Germany that the continuation of very low fertility rates over a long period of time (about 30 years) has

led to the emergence of ‘child-unfriendly’ social environments that have in turn lowered the desired family size of many young German women to zero or one child. Furthermore, in Australia, allowing fertility to fall to and remain at a very low level would be ignoring the fact that, at least at present, most young Australian women prefer to have around two children on average but are prevented from doing so by the ways in which Australian society is organized. There are human rights involved here.

As already mentioned, lower mortality would have virtually no impact on reproduction. The main effect of lower mortality in the future will be to add numbers at the older ages, particularly at ages 80 and over. The important uncertainty at present is how far and how rapidly mortality will fall and hence how many additional people there will be at older ages in the future. Thus, lower mortality increases population size but with a very distinctive type of person, one that is less likely to be engaged in the paid labour force or to be familiar with the latest technology with which most ten-year olds will be proficient. Increase in the population aged 80 and over will also put pressure upon health budgets. The additional person at age 85 cannot be considered to be substitutable with a person aged 25 as is the implication when account is taken only of the population size and not its age structure. Over the next 40 years or so, Australia’s population will grow to about 25-26 million if the current demographic trends continued. All of the increase in the size of the population will be at ages 50 and over. Almost all of these future older people are already with us. Barring increasing their mortality or sending them out of the country (In *Future Dilemmas*, Foran and Poldy do make the completely unrealistic assumption that vast numbers of older Australians will leave the country in future, p. 328 – an egregious demographic error, I would say), their numbers will increase by at least 6 million. If we wanted to maintain Australia’s population size at the current 19-20 million, then this could only be done by decreasing the population by 6 million at ages younger than 50 implying very low fertility rates and the associated difficulties already described.

The effects of migration are more complex. We hear that postwar migration has kept Australia’s population young, however, Kippen and McDonald have demonstrated that this conventional wisdom is largely false. Postwar migration added vastly to the size of Australia’s population but had a minimal impact on its age structure. However, when fertility falls to very low levels, migration does have an effect on age structure. The mechanism is the difference in the mean age of the population and the mean age of the migrants and their children. When fertility is near replacement level, the mean age of the standard age distribution of net migration to Australia and their subsequent children is only a little younger than the mean age of the existing population. Accordingly, migrants have little impact on the age structure of the population. However, as fertility falls, the mean age of the existing population rises and migrants and their children begin to have a significant effect on the population’s age structure. However, as an increasing flow of migrants brings down the mean age of the population, that mean age again approaches that of the migrants and subsequent migrants no longer have an effect on the age structure of the population. Given present demographic trends in Australia, net migration of 50-100,000 per annum has a beneficial impact on slowing the ageing of the population.

The best environmental (low population) result is a soft landing at zero population growth. This is reached more rapidly and at a lower population total if it is achieved through a combination of relatively high fertility and low migration than the reverse. If fertility were to rise immediately to two children per woman and net migration was zero, Australia's population would reach zero growth at around 21 million people (except for a gradual increase in numbers at older ages as mortality continues to fall). However, if fertility fell to one child per woman and zero population growth was achieved through increased net migration, the population would eventually reach zero growth at around 35 million. Despite this well-publicised dynamic, many environmental scientists continue to celebrate the fall in fertility and one has even called for a one-child family for Australia. This again is egregious error.

My final comment is that the range of likely future population scenarios for Australia is relatively narrow, somewhere in the range of 25-30 million people by 2050. Until evidence emerges to the contrary (eg. the unlikely events of a new baby-boom or a mass exodus into or out of Australia), we should gear environmental planning to this likelihood. If we conclude that the first priority for environmental planning in Australia is to stop the growth of Australia's population at its present size, we shall never reach the second priority. This consideration is no more urgent than in planning for Sydney's future population.

The following website contains a large number of papers written by McDonald and Kippen on Australian population dynamics:

<http://demography.anu.edu.au/Publications/popfutures.shtml>