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Population Futures for Australia and New Zealand: An Analysis of the Options

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Introduction

In 1999 we prepared a trilogy of papers relating to population futures for Australia. The central paper (McDonald and Kippen 1999b) makes the argument that the long-term prospect of below-replacement fertility greatly reduces the range of viable population futures for Australia. This argument has been made in a context where, on one hand, some environmentalists have been calling for an Australia with a population considerably smaller than its present level (6-12 million) while on the other hand, some with a development orientation have called for a population considerably larger than the present level (50-100 million). These extremes, as we have stated, are sheer demographic nonsense. To reach 50 million in 50 years, Australia would need net migration of almost half a million persons every year for the next 50 years. The average over the past decade and over the past five decades has been 80,000 per year. The maximum level ever was about 150,000 (a level approached only twice in Australia's history, both times for only 1-2 years). To reach 12 million in 50 years, 100,000 Australians would be required to leave Australia every year for the next 50 years.

We argue that it is not sensible to aim for population decline in the context of below-replacement fertility because all of the decline would be concentrated at the young ages. The result would be substantial absolute falls in the size of the labour force and the creation of a momentum for future population decline which would be difficult to reverse. We also argue that

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substantial population growth would also be out of the question because, as discussed above, it would imply levels of
immigration considerably higher than any Australia has ever experienced and would have the capacity to absorb. Thus, after the positive momentum of Australia's present relatively young age structure is exhausted (about 20 years), the viable options for population growth range from zero growth to low positive growth; low, that is, relative to Australia's experience over the past 50 years.

The level of understanding of the powerful effect of below-replacement fertility upon population growth is low. Former Prime Minister Malcolm Fraser has said, "Australia's population has grown two and a half times since 1945. There is no reason at all why we could not grow two and half times again by the middle of the next century" (Malcolm Fraser, Weekend Australian, 3-4 May 1997).

There is a reason, and that reason is that Australia's fertility rate is now only half the level it was in the two decades after the Second World War. If natural growth is negative, as it will be in Australia in about 20 years time, then the only way Australia can grow two and a half times in 50 years is through massive immigration.

As fertility sinks further below replacement level, increasingly higher levels of annual net migration will be required to maintain a target of even zero population growth. Based on the present likely trends in fertility and mortality, a net migration level of 80,000 per annum is now required to achieve long-term zero growth of the Australian population. Traditional immigrant receiving countries, especially those with somewhat smaller populations sizes, are in the favourable situation that they can employ immigration in this way; that is, as a policy mechanism to avoid falling numbers in the working ages as the numbers in the retirement ages increase.

The other two papers in the trilogy both relate to aspects of population ageing. The first is an overview of the social and demographic dimensions of ageing in Australia; the second is a technical examination of the potential effects of immigration on retardation of population ageing (McDonald and Kippen 1999a,1999c).

A feature of the three papers is that they cover time frames of up to 100 years. When discussing population policy and ageing of the population, a long-run view needs to be taken. For example, ageing in the third and fourth decades of the next century is the result primarily of fertility rates 70-80 years beforehand. Our work demonstrates that some outcomes of quite different demographic scenarios can look much the same after 50 years but, soon afterwards, diverge dramatically.

Our purpose in this paper is to extend some of the analyses that we

have carried out for Australia to New Zealand and, in so doing, to draw attention to some of the differences in the population futures of the two countries. Besides some differences in their current age structures, the main current demographic differences between Australia and New Zealand are that:

- New Zealand's fertility rate is considerably higher than Australia's (TFR of 2.00 versus 1.76 in 1998)
- New Zealand has a much more irregular age pattern of migration due to the high negative migration in age group 20-24.

High and Low Populations for New Zealand

While we have not been able to find New Zealanders who have made statements about future population that are quite as foolish as those that have been made in Australia, we have modelled similar scenarios. First we consider what level of immigration would be required for New Zealand to achieve a population two and half times bigger than its present population over a 50-year period; that is, 10 million by 2047. In this projection, we assume that the TFR of New Zealand will fall over the next decade to 1.85 and then remain at that level. The projection also assumes that life expectancy will rise by 10 years over the next century. Once New Zealand reaches a population of 10 million, net migration is varied to keep the population size constant.

The results of this projection (and of the other scenarios) are presented in a series of diagrams (Figure 1) which show the projected numbers in five-year age groups up to 85 + at six points in time over 100 years.

The constant annual net number of immigrants required to reach 10 million in 50 years is 88,000. This is clearly above any level of immigration that could be realistically achieved. Once 10 million had been reached in 2047, New Zealand would require a period of negative migration in order to avoid overshooting the 10 million mark.

Figure 2 shows the outcome of a projection in which the aim is to achieve a population of 2 million over a period of 50 years. The fertility and New Zealand's age pattern of migration makes this a particularly dramatic scenario.

Like the equivalent scenarios for Australia, these are not viable scenarios for New Zealand. The range of future options for New Zealand is much more limited.

Figure 1: Selected New Zealand age pyramids 1997-2097. Population of 10 million in 50 years

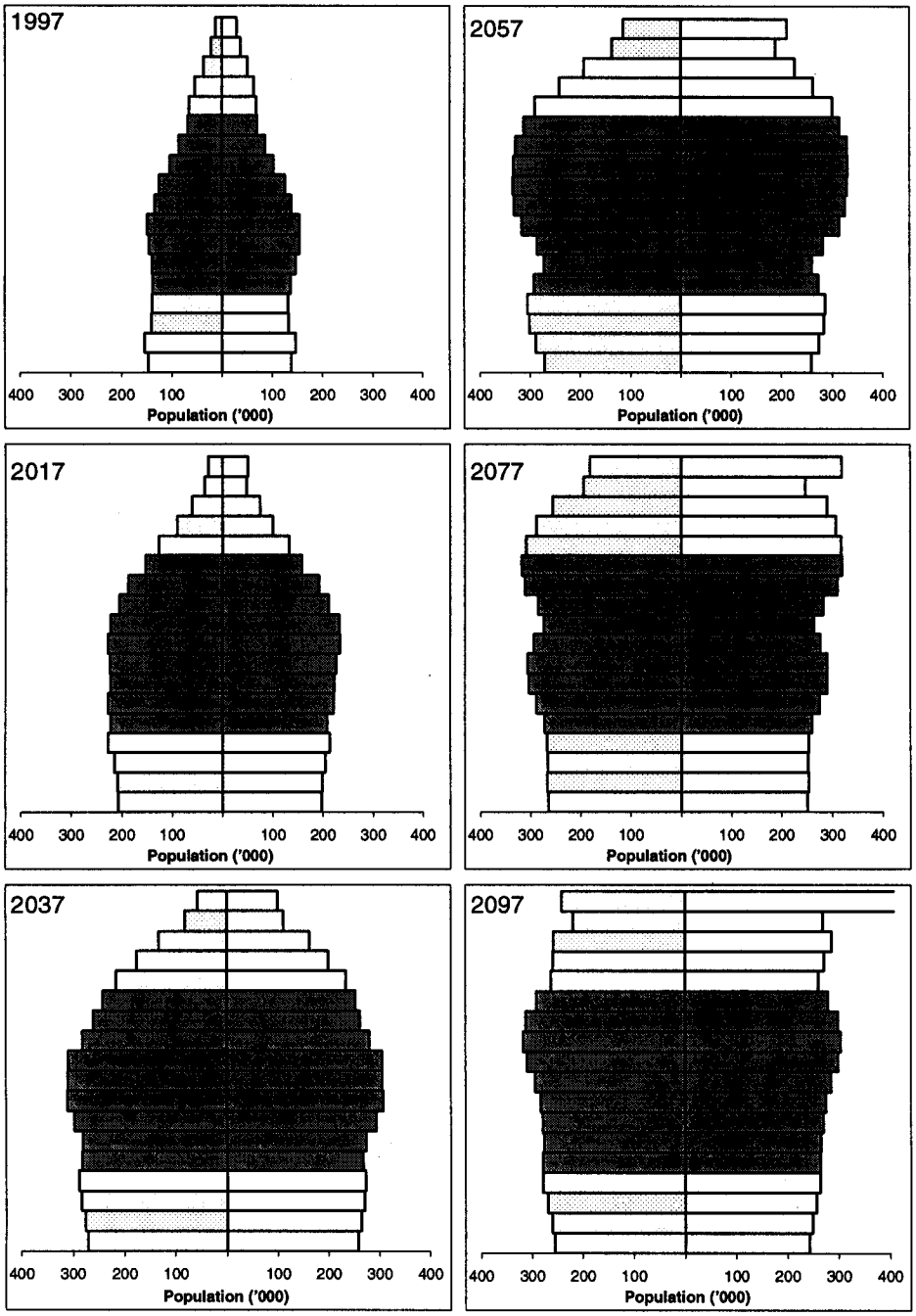
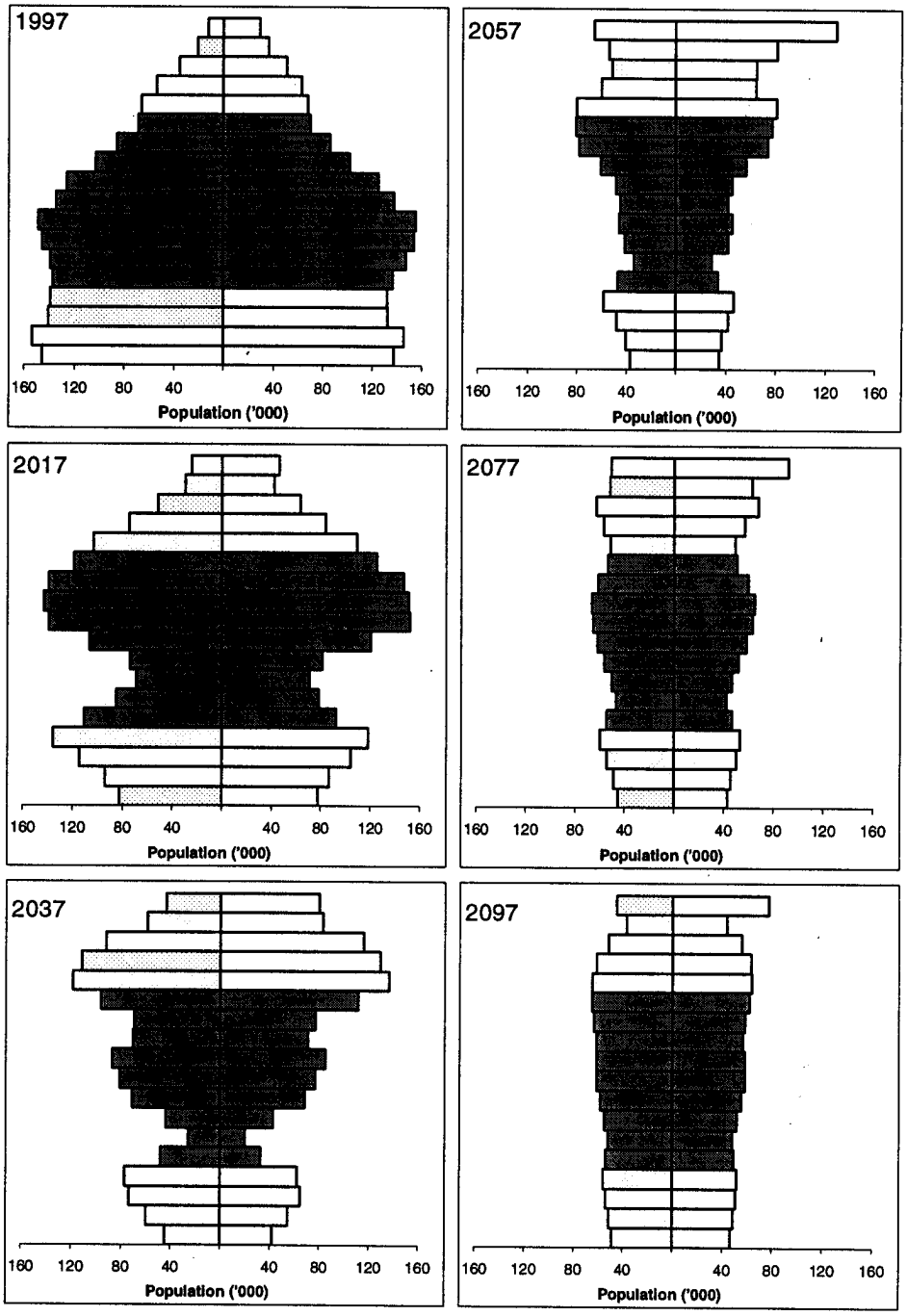


Figure 2: Selected New Zealand age pyramids 1997-2097. Population of 2 million in 50 years



The Effect of Zero Net Migration

Australia

Many commentators and some of the political parties in Australia have called for a zero net migration policy for Australia. Figures 3 and 4 show the impact of a net migration of 80,000 per annum in comparison with zero net migration. Both scenarios assume that fertility will fall over 10 years to 1.65 and then remain at that level and that expectation of life will increase by 10 years over the next century. The projection with 80,000 will be called the standard.

Both scenarios add large numbers at the older ages reflecting the ageing of the current age distribution, but, the standard projection in Figure 3 maintains the numbers at younger ages (50 and under) while the zero migration projection in Figure 4 leads to substantial falls in the absolute numbers of people in the younger ages, including the peak working ages. The standard leads to long-term zero population growth, while the zero migration projection leads to long-term, and compounding population decline.

Figure 5 shows the trajectory for total population size. With zero migration, Australia's population would rise very slowly to just over 20 million in the 2020s and then begin a sharp decline, falling below 14 million by the end of the next century. In the standard projection the population rises to 25 million by the middle of the next century and remains at about that level.

The zero migration projection leads to a significantly older population than that of the standard projection. Our previous work has shown that, in the context of below-replacement fertility, moderate levels of immigration can offset, but not prevent, population ageing.

Figure 3: Selected Australian age pyramids 1998-2098. Annual Net Migration (ANM) = 80, 000

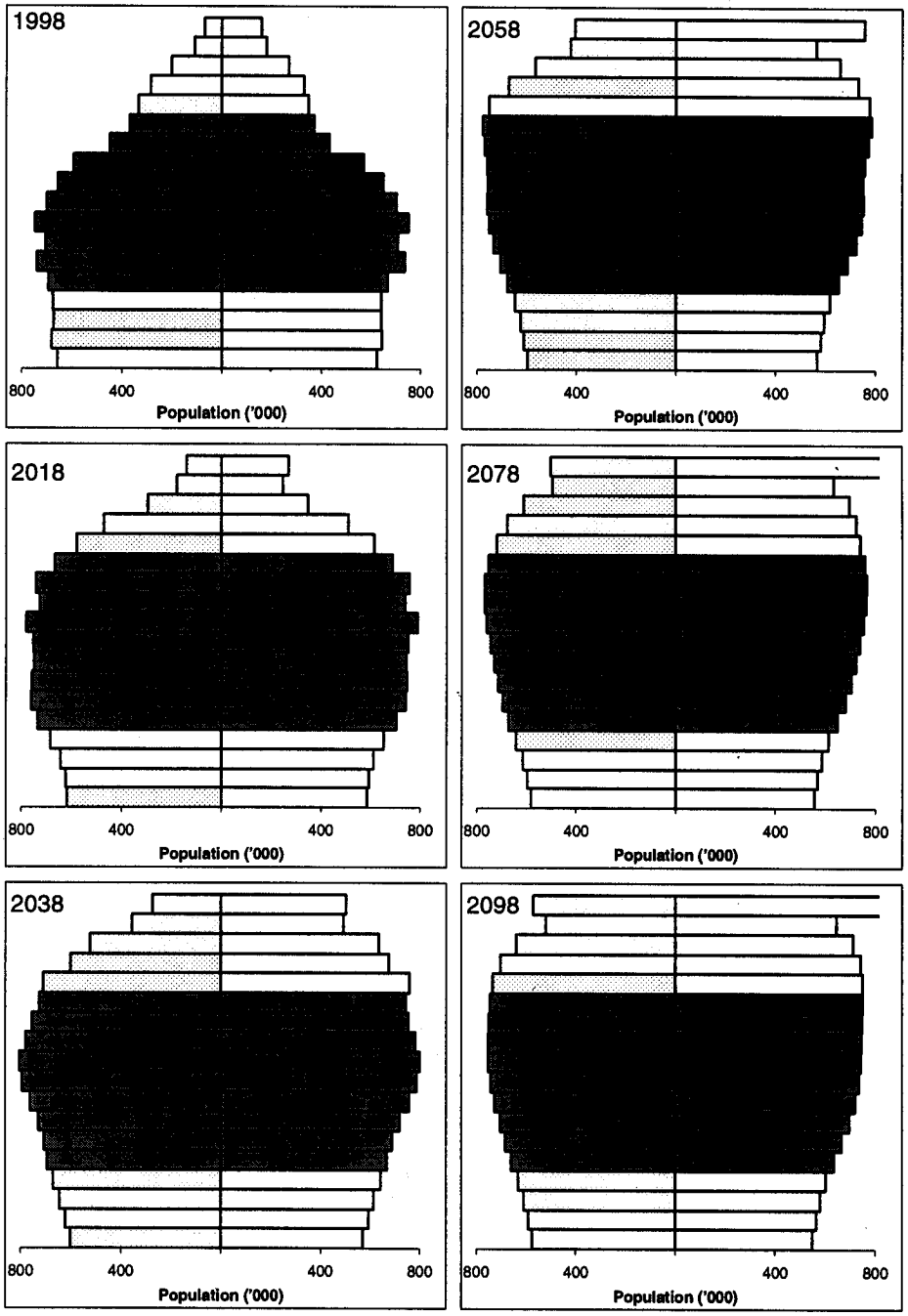


Figure 4: Selected Australian age pyramids 1998-2098. Annual Net Migration (ANM) = 0

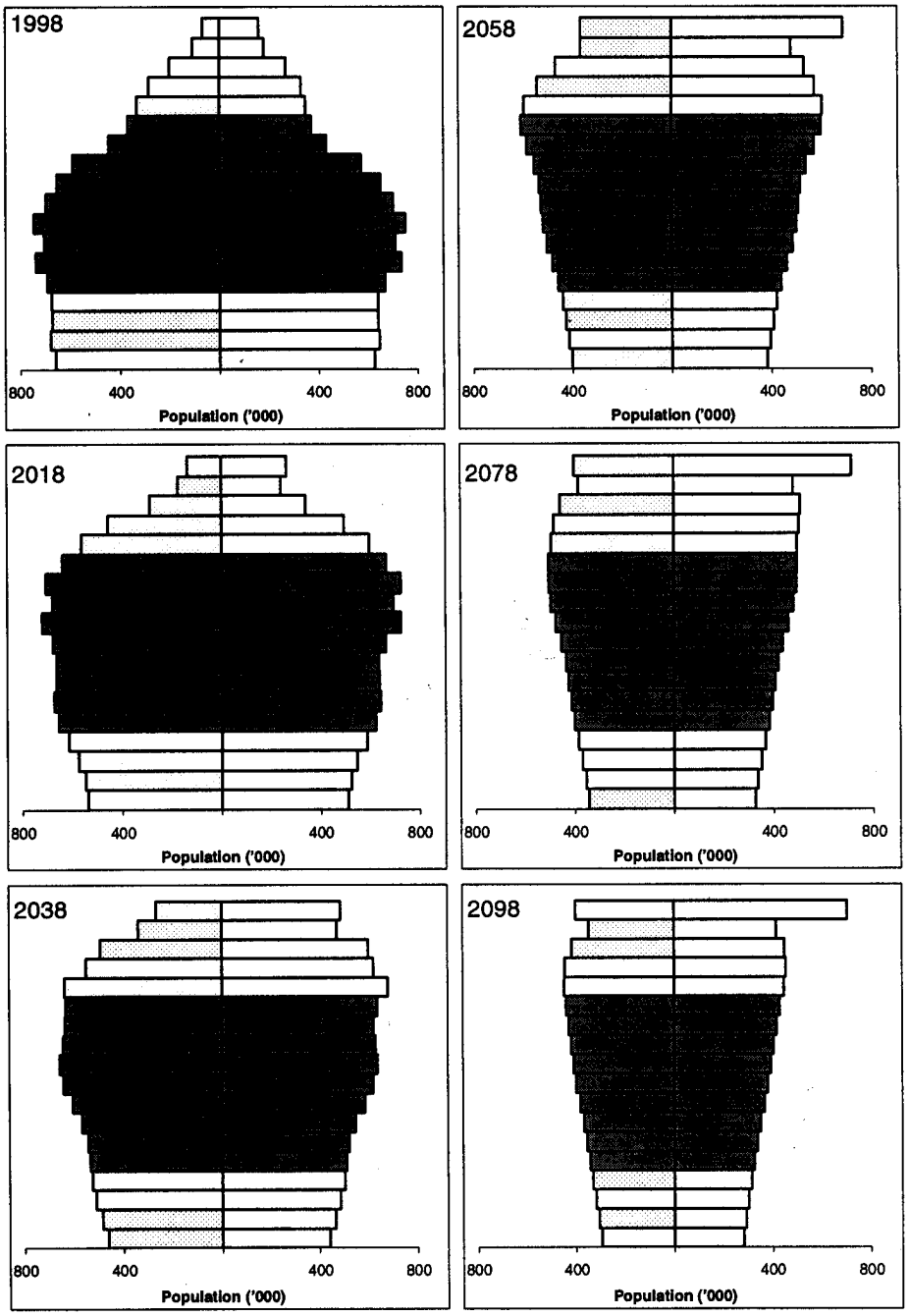
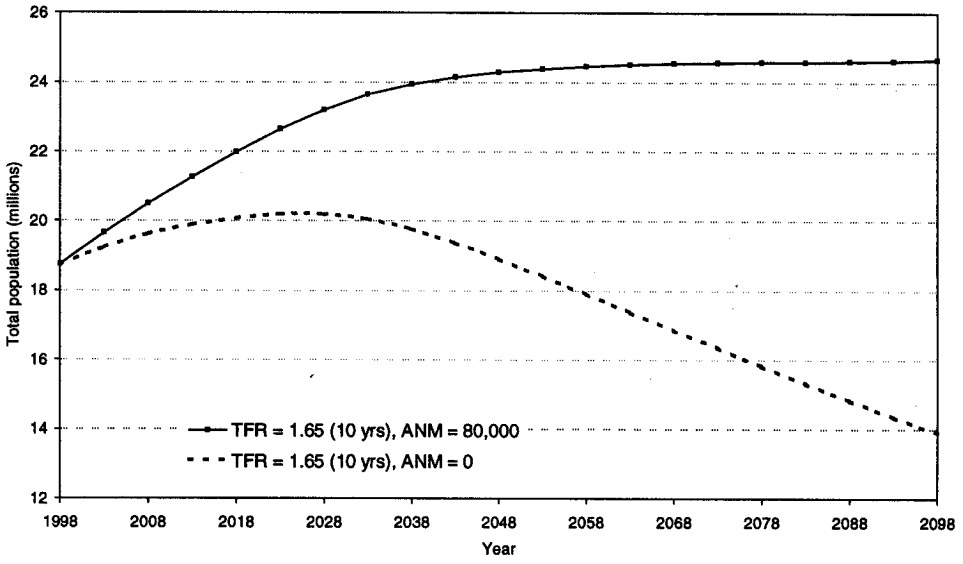


Figure 5: Population projection, Australia 1998-2098



New Zealand

We now apply the same scenarios to New Zealand. It is assumed that the difference in fertility between Australia and New Zealand will continue and that New Zealand's TFR will fall only to 1.85 and remain at that level. But, like Australia, expectation of life is assumed to rise by 10 years over the next century. Under these assumptions, New Zealand's standard, the projection leading to long-term zero population growth, would have annual net migration of 10,000.

The results of these projections are shown in Figures 6 and 7. The comparison of New Zealand's standard projection with a zero migration projection provides much the same results as those shown for Australia. One difference is that the deficits at the younger ages with zero migration take longer to appear and are not as severe as in Australia. This is due to higher fertility in New Zealand. Another difference is that the emerging age distributions under both projections are less regular because of the age pattern of migration in New Zealand. But the principal conclusions are the same: zero migration leads to substantial falls in the numbers at the youngest ages including the peak working ages, while numbers at the older ages increase.

Figure 6: **Selected New Zealand age pyramids 1997-2097. Annual Net Migration (ANM) = 10,000**

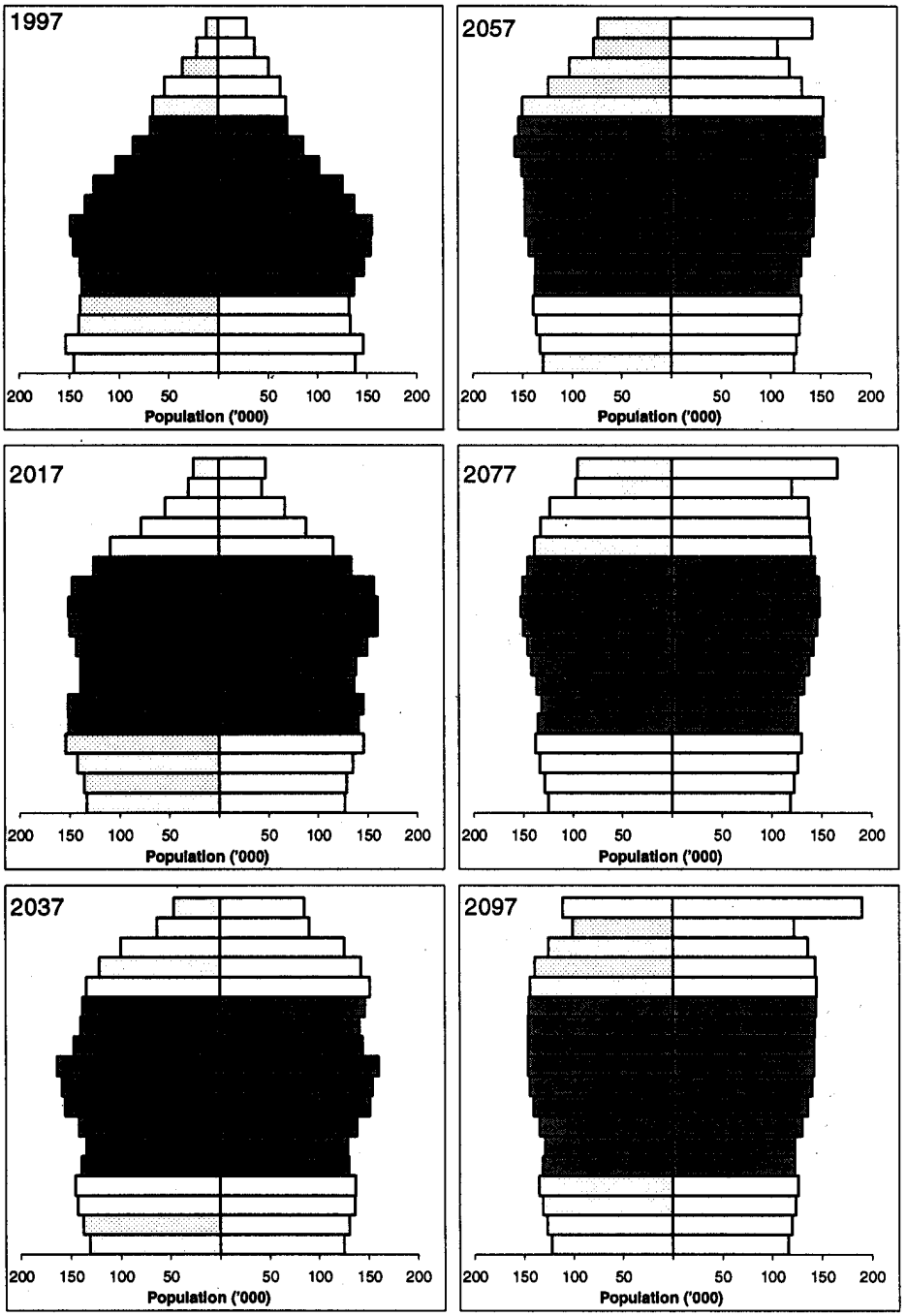


Figure 7: Selected New Zealand age pyramids 1997-2097. Annual Net Migration (ANM)=0

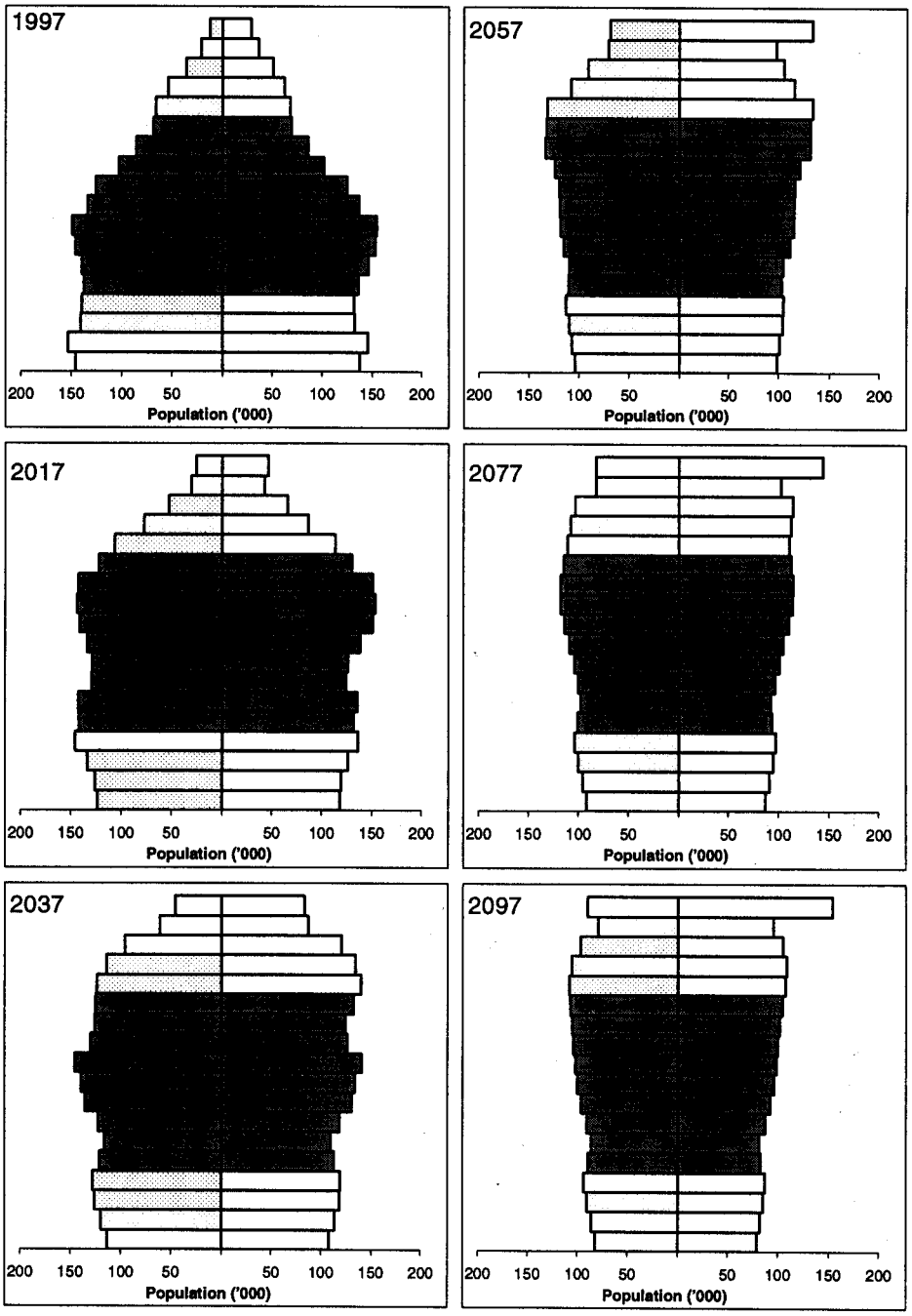
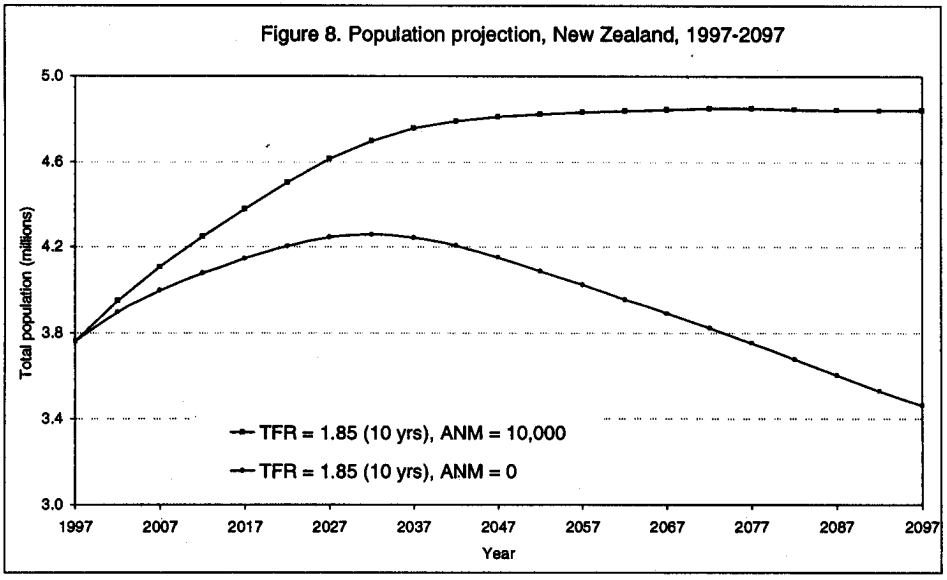


Figure 8 shows the trajectory of total population. With zero net migration, New, Zealand's population would rise into the 2030s but decline thereafter, falling to about 3.5 million by the end of the next century, and continuing to fall at about 0.7 per cent per annum. The New Zealand outcome is not as dramatic as that for Australia because of the higher assumed fertility.

Figure 8: Population projection, New Zealand, 1997-2097

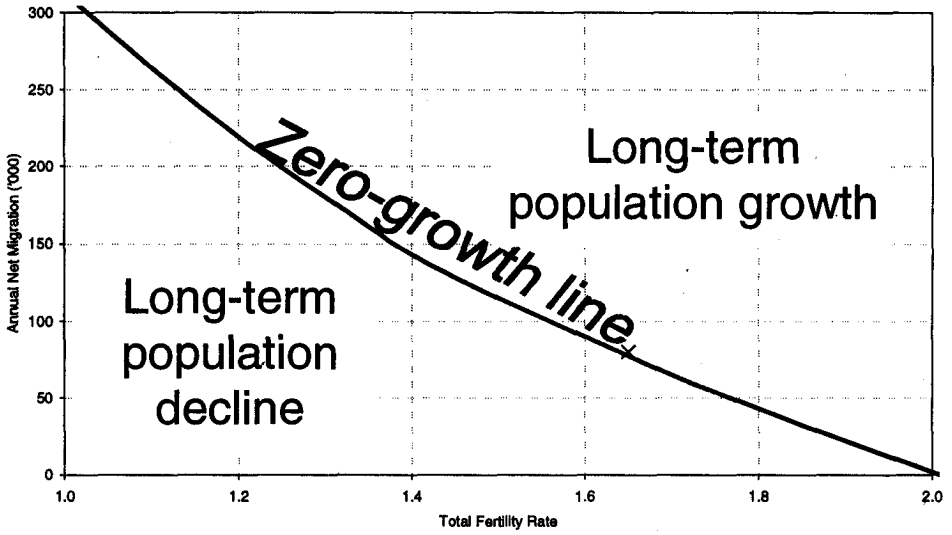


The Balance of Fertility and Migration

Australia

In a situation of constant below-replacement fertility, a constant annual number of migrants will eventually produce a stationary population (assuming also that the age structure of migrants is constant, mortality is constant and the migrants have constant fertility and mortality). Figure 9 shows the combinations of below-replacement fertility and net migration levels that would lead to zero population growth for Australia. The Australian standard (TFR = 1.65 and ANM = 80,000) is marked by X. Above the zero-growth line are combinations which lead to long-term positive growth of the population and below the line are combinations that lead to population decline.

Figure 9: Australian population growth outcomes according to combinations of fertility and migration



In Australia, business groups are lobbying for higher levels of migration, but, at the same time, they have displayed no interest in the continuing downward slide in the birth rate. Indeed, it can be argued that the fall in the birth rate is at least partially related to the less than family-friendly work policies of business, and the lobbying of business to reduce government expenditure on programs that support families with the costs of children. Even the last bastion of publicly-funded primary school education has been brought under attack. Some groups have recently called for net migration levels around 120,000 per annum, but if fertllity fell to around 1.5 births per woman, this level of net migration would produce only zero population growth. If fertility in Australia fell to the levels now applying in southern European and Germanic countries, the levels of net migration required simply to achieve zero population growth would be well beyond levels ever experienced in Australia's history. In sum, those who are interested in continued population growth in Australia cannot continue to ignore the fall in fertility.

New Zealand

Figure 10 shows the combinations of fertility and migration that would lead to long-term zero population growth for New Zealand. The standard

(TFR = 1.85 and ANM = 10,000) is again marked by X. If fertility in New Zealand fell to the long-term level assumed for Australia (TFR = 1.65), then net migration in New Zealand would need to be 20,000 per annum to produce zero population growth.

The different combinations of fertility and migration that produce zero population growth do not produce the same population sizes. Figure 11 shows the different population sizes that result from combinations of fertility and migration which are consistent with zero population growth. The standard combination leads to a New Zealand population of 4.8 million. This would rise to over six million if zero growth came about through a combination of TFR = 1.4 and ANM = 36,000. This provides a lesson for those who are interested in restricting population size while achieving zero growth; that is, the lowest-sized, zero-growth populations are those based on combinations with somewhat higher fertility and lower migration.

Figure 10: New Zealand population growth outcomes according to combinations of fertility and migration

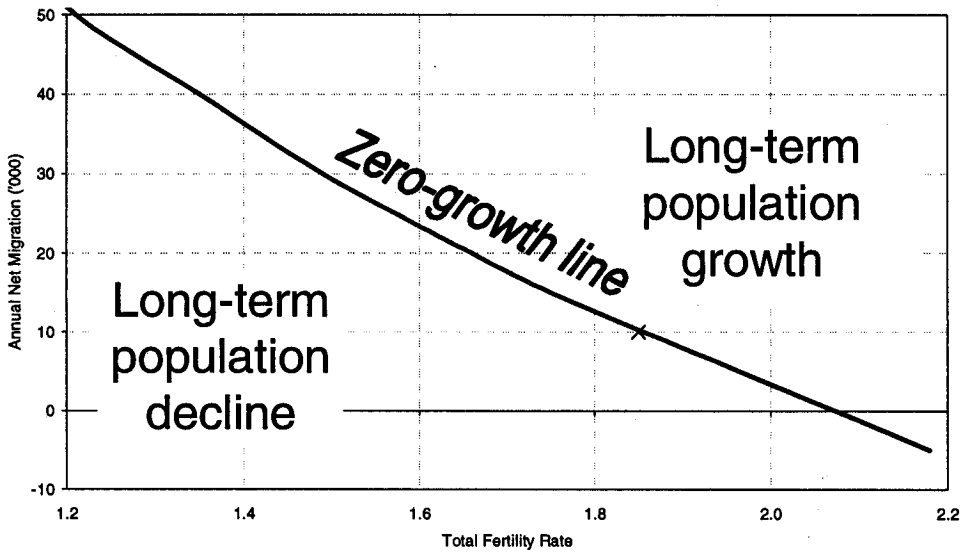
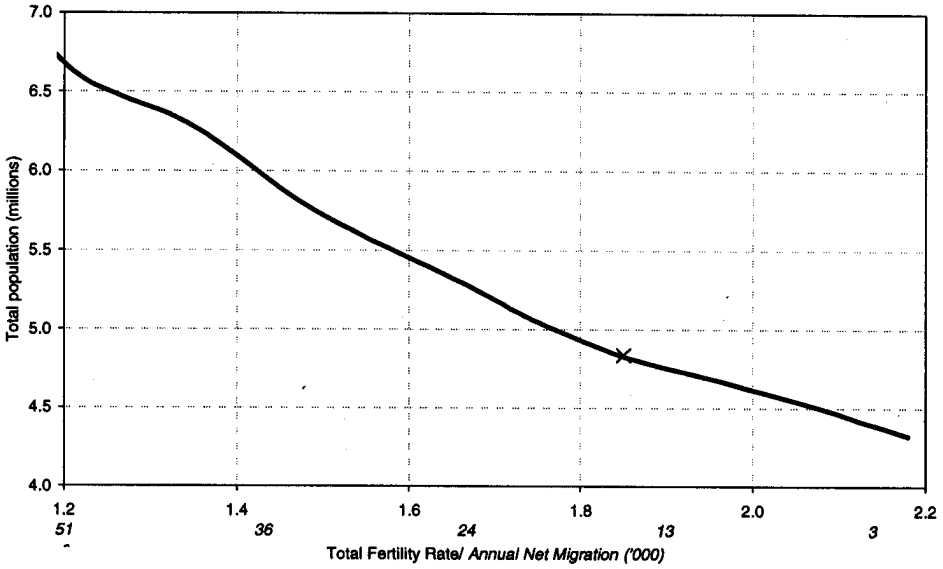


Figure 11: New Zealand stationary population size outcomes according to combinations of fertility and migration



Thus, low fertility is not in the interests of those who want higher population growth, nor is it in the interests of those who wish to restrict population size to the lowest possible constant level.

The Impacts of Different Levels of Fertility, Mortality and Migration Upon Population Ageing

In this section we consider the impact on future ageing in New Zealand of differing levels of fertility, mortality and net migration. The index of ageing used is the proportion of the population aged 65 years and over. Other possible measures show similar trends.

Figure 12 shows the impact on ageing in New Zealand of different levels of fertility. In these projections, annul net migration is assumed to be constant at 10,000 per annum and expectation of life is assumed to increase by 10 years over the next century. Note that the widely varying future levels of fertllity would have very little impact on the ageing of the population over the next 40 years. At the end of 40 years, the aged proportion would have risen from just below 12 per cent today to between 21 and 25 per cent. Beyond that time, however, the outcomes start to diverge dramatically. This demonstrates the point made earlier that, in

considering ageing in the context of population policy, 50-year projections are too short.

Figure 12: Percentage of the New Zealand population aged 65+ under different fertility assumptions

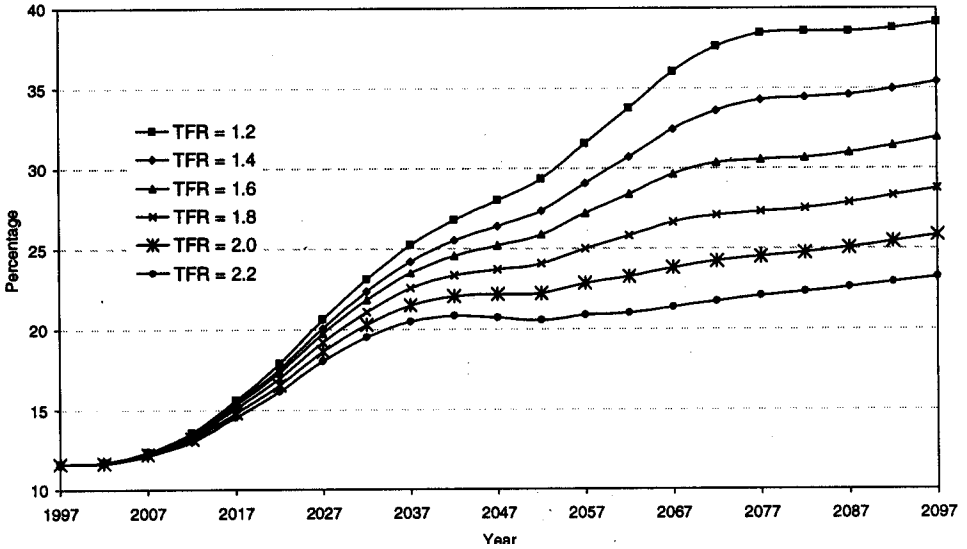


Figure 13: Percentage of the New Zealand population aged 65+ under different mortality assumptions

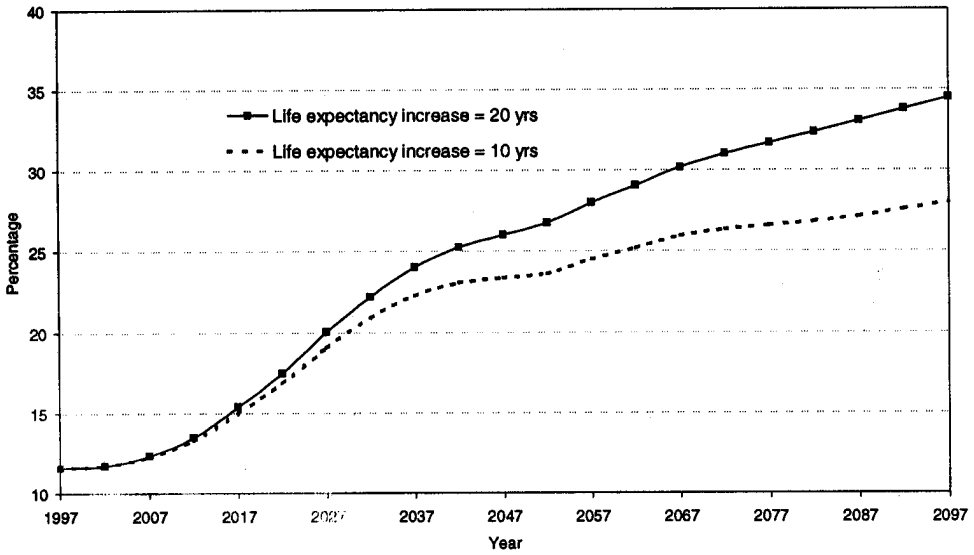
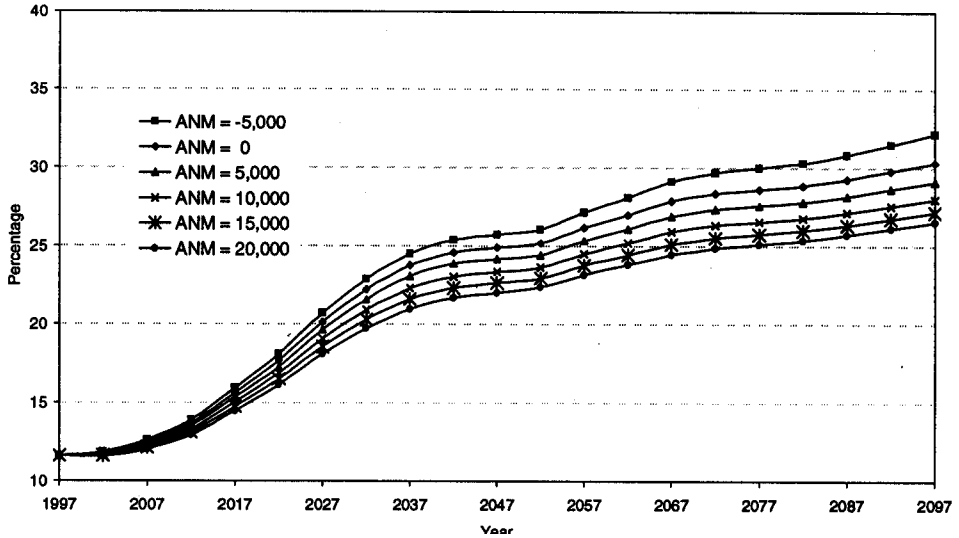


Figure 14: Percentage of the New Zealand population aged 65+ under different migration assumptions



To this point we have used a standard assumption about future mortality levels; that expectation of life will rise by 10 years over the next century. This could be seen as a conservative projection given that expectation of life has risen by 20 years during the twentieth century and by five years in the past two decades. In Figure 13 we contrast the standard projection with a projection in which expectation of life rises in the next century by 20 years. Again, the chart shows that there would be very little impact on ageing over the next 40 years (22 per cent versus 24 per cent aged 65+ in 2037), but again, the impact becomes more dramatic in the longer term (28 per cent versus 34 per cent by 2097).

A continuing controversial issue in Australia, and one to which we have devoted one of our trilogy of papers, is the impact of varying levels of migration on population ageing. We consider net migration levels for New Zealand ranging from -5,000 to 20,000. Again, the impact in the intermediate time frame (40 years) is relatively small. The principal message, however, is in the long-term effects. Figure 14 shows that each successive 5,000 increase in net migration contributes about half as much to the reduction of ageing as the previous 5,000 increase. That is, there are diminishing returns attached to the use of migration as a policy to reduce ageing. In the case of New Zealand, worthwhile reductions in

ageing are brought about by migration levels up to about 10,000 net per annum. After this, the impact of further immigration upon ageing is marginal.

The Past and Future of Our Age Structure

Both Australia and New Zealand are currently experiencing fundamental changes in their age structures. Throughout their histories, they have had pyramid-shaped age structures; the result of fertility rates that were well above replacement level. The shift to below replacement levels of fertility leads to fundamental shifts in age structure - the pyramid shape disappears.

Figure 15 shows the pyramid-shaped age structure of Australia in 1971. By 1998, as a result of falling fertility, the pyramid had gone and Australia's population was concentrated in the working ages.

From this point in time Australia has two choices of future age structure, one we call the beehive, the other we call the coffin (Figure 15). It is probably not difficult to guess which of these we favour. The beehive is produced by combinations of fertility and migration which produce at least zero population growth. The coffin is produced by combinations that produce population decline. Here, the standard with TFR = 1.65 and ANM = 80,000 is used to produce the beehive, while TFR = 1.50 and zero migration is used to produce the coffin.

We show the same projections for New Zealand in Figure 16. The initial age structure of New Zealand is a little more bumpy than that of Australia but, like Australia, New Zealand's population in the late 1990s was concentrated in the working ages.

The New Zealand beehive is produced using the New Zealand standard of TFR = 1.85 and ANM = 10,000, while the coffin is produced with TFR = 1.70 and ANM = 0. New Zealand's age pattern of migration leads to a bumpier beehive and bumpier coin but the general outcome is the same as for Australia.

Figure 15: Selected Australian age pyramids 1971-2098. Beehive andCoffin scenarios

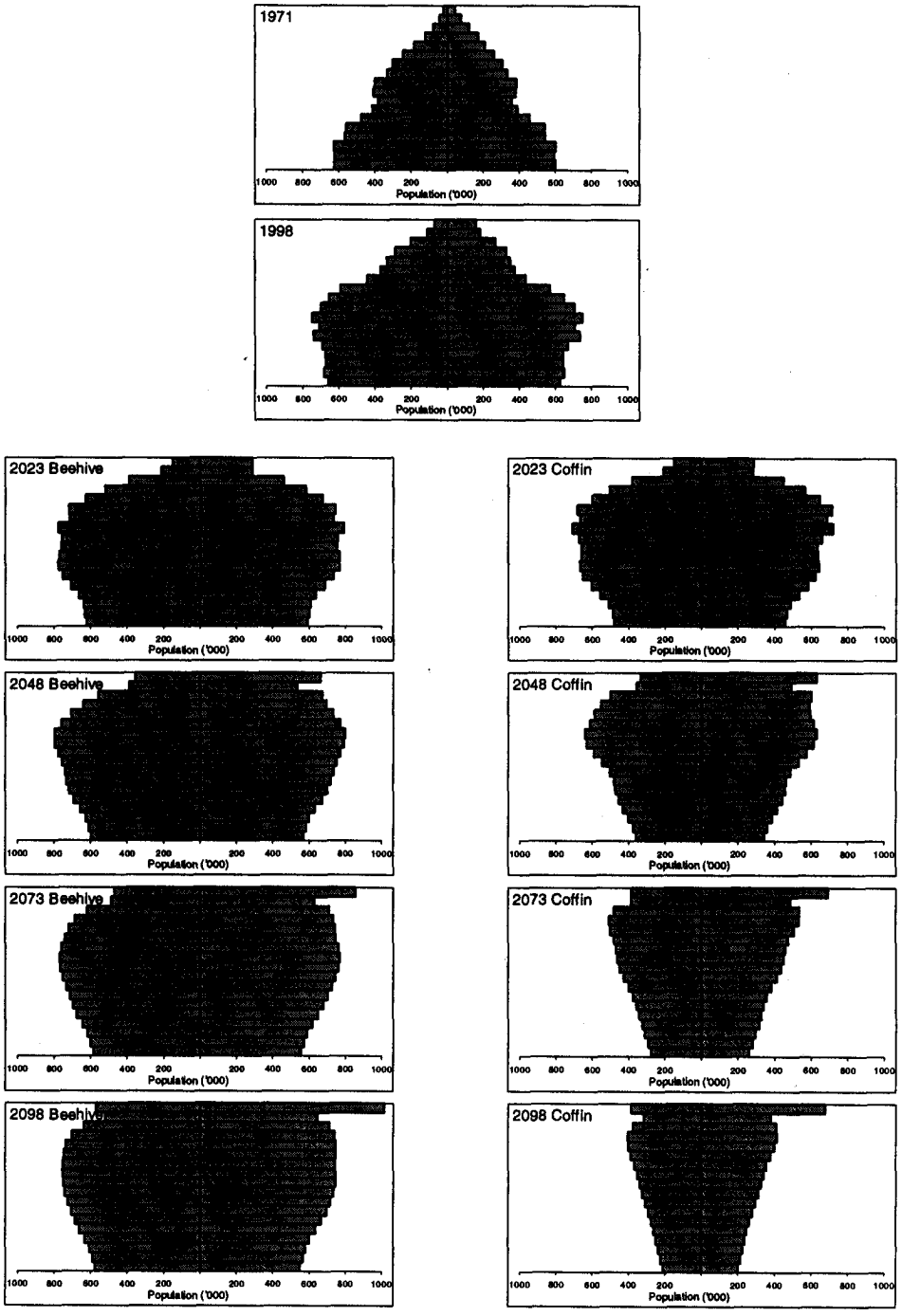
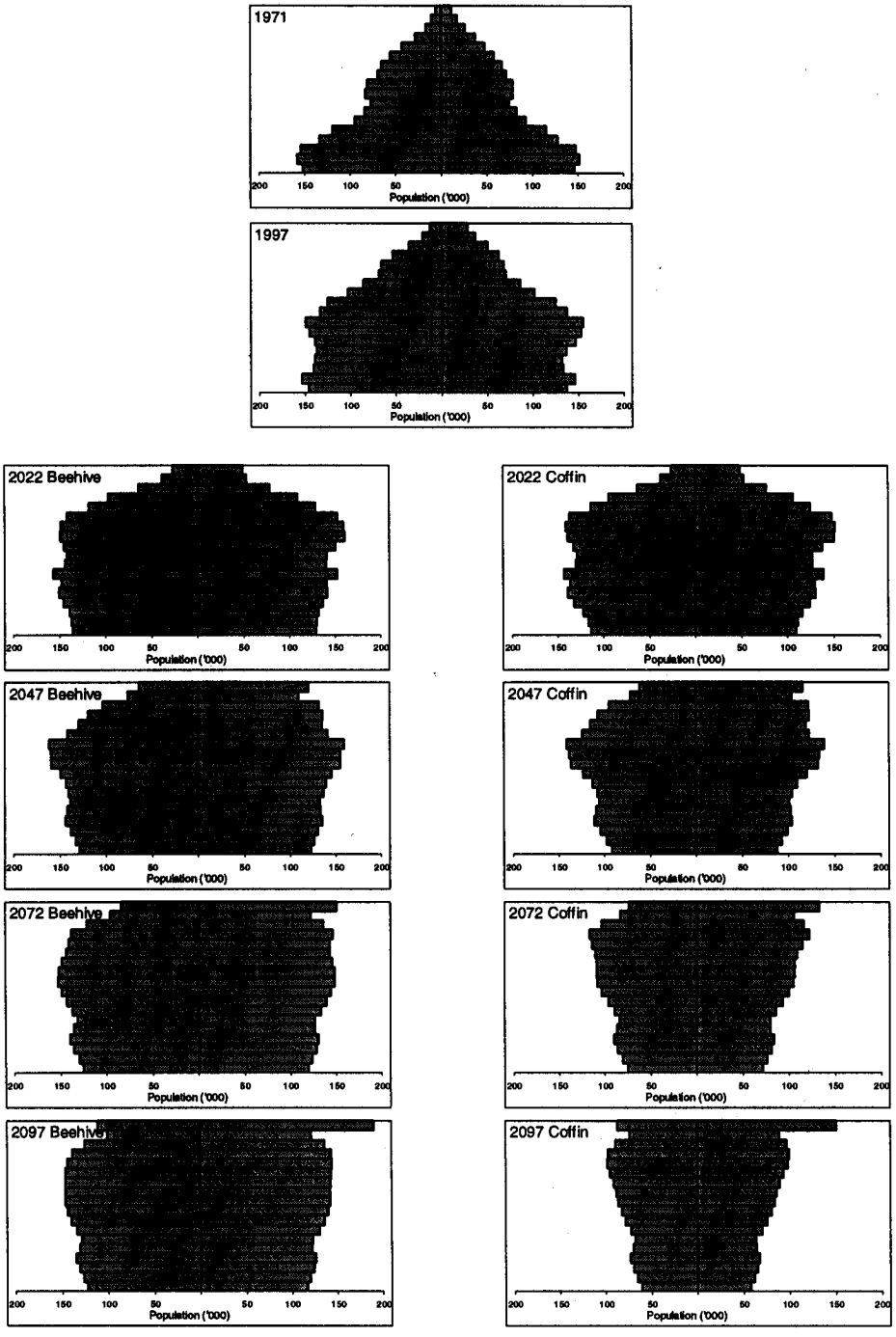


Figure 16: Selected New Zealand age pyramids 1971-2097. Beehive and Coffin scenarios



Conclusion: Implications for Population Policy

The range of future options is small and the days of rapid population growth are over.

Both Australia and New Zealand can obtain relatively favourable outcomes through preventing further large falls in fertility and by using immigration as a policy tool to balance below replacement fertility.

Relatively favourable population outcomes result from age structures which take on the beehive shape, with a concentration of population in the working ages and with similar-sized workforces to those we have at present. This would be an even more favourable result if future generations were to reverse the trends of early retirement or early retrenchment from the labour force that have occurred for male workers aged 45 and over during the past 20 years.

Issues

- How do we stop fertility falling to European levels?
- Will we be able to recruit skilled migrants when the European countries become more desperate about their population declines? Indeed, will they be recruiting our native-born?
- As the population concentrates in the later workforce ages, will employers reduce the level of discrimination that they apply to older workers?

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