# The ageing of the Australian population: triumph or disaster?

*A report prepared for the Monash Centre for Population and Urban Research*
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## Table of contents


**Executive Summary** **i**

**1 Introduction** **1**

**2 The labour force: participants and non-participants** 3

Figure 1: The population of Australia, median age, June 1901 to June 2013 3
Figure 2: Labour-force participation rates, Australia, as percentage of the civilian population aged 15 and over, August 1966 to January 2014 4
Figure 3: Labor-force participation rates, males and females, aged 25 to 54, Australia, February 1978 to January 2014 5
Figure 4: Labour-force participation rates, males and females aged 55 and over, Australia, February 1978 to January 2014 6

*Participants, non-participants, and dependency* 6
Figure 5: Ratio of those aged 15 plus and not in the labour force to those 15 plus in the labour force, Australia, February 1978 to January 2014 7
Figure 6: Labour-force participation as a percentage of the total population, Australia, 1966 to 2013 8

*Projecting future levels of participation* 8
Figure 7: Labour-force participation as percentage of the population aged 15 plus, by age structure, 31 OECD nations, 2012 10

**3 Baby boomers and age-based discrimination** **11**

Figure 8: Baby boomers (aged 51 to 66) and Australia's population by sex and age, 2012 11

**4 The tax base and social welfare** **13**

**5 Health-care costs** **16**

Figure 9: Health-care expenditure as a percentage of GDP by proportion aged 65 plus, 31 OECD countries, 2011 16

**6 Older people's voluntary labour, within families and in the community** **20**

**7 Avoiding hyper-ageing** **20**

**8 Mass immigration as a cure for ageing** **21**

Figure 10: Australia, population growth, 2012 to 2101, selected projections series 22
Figure 11: Australia, changes in the median age, 2012 to 2101, selected projection series 23
Table 1: Australia, median age in 2061, six projections, the demographic cost in population growth needed to reduce the median age by one year, relative to projection series 68 23
Table 2: Australia, median age in 2101, six projections, the demographic cost in population growth needed to reduce the median age by one year, relative to projection series 68 24

**9 Productivity, ageing and population growth** **25**

Figure 12: Growth in labour productivity by population growth, 32 OECD countries, 2009-2012 26

**9 Conclusion** **28**

**Appendix A** **29**

Table A1: Disability rates by age and sex, Australia, 2003, 2009 and 2012 29
Table A2: People in residential care, by age, Australia June 1999 and 2012, numbers and residents in care as a percentage of the population aged 65 plus 30

**Appendix B** **31**

Table B1: Australia, median age and total population, 2061 and 2101, 12 projections, high-life-expectancy projection series 31
Table B2: Australia, median age and total population, 2061 and 2101, 12 projections, medium-life-expectancy projection series 31

**Acknowledgments and author note** **32**

**Notes** **33**

Erratum: In the original the final sentence on p. 22 read: 'Indeed projection series 14 (TFR 1.6 and NOM 280,000) leads to a population of 45.4 million in 2101…' The population for this series in 2101 is 55.5 million. The typographical error has been corrected in this corrected version

## Executive Summary

### Introduction

Many people are anxious about Australia's ageing population. Others are optimistic. So is demographic ageing good for Australia or bad for Australia? This paper considers the positive and the negative case under five headings: labour-force participation, baby-boomers (and age-based discrimination), the tax base and social welfare, health-care costs, and older people's voluntary work. It also contains a brief note on hyper-ageing, asks whether mass immigration can cure demographic ageing, and then explores the effects of the population growth that such immigration would induce on economic productivity.

### The labour force

Australia's average (median) age increased from 28.9 in 1978 to 37.3 in 2013 but, despite this, the proportion of the population aged 15 plus in the labour force has grown. It rose by 2.5 percentage points from 61.7 per cent to 64.2 per cent in January 2014. (Calculated as a percentage of the total population it rose from 44.7 per cent to 53.6 per cent.)

This increase is partly because Australia is going through a demographic sweet spot, enjoying the demographic dividend of relatively fewer children than in the past and relatively fewer older people than will be the case in future. But it is also because of increased age-specific levels of labour-force participation, especially among women and among older people of both sexes. Consequently levels of dependency of non-participants on those who are in the labour force have fallen.

This section goes on to apply today's labour-force participation rates to a stable stationary population projection for 2061 (that is, a projection that neither grows nor contracts once its numbers have stabilised). In such a population between 44 and 46 per cent of the total population would be in the labour force. This is lower than in 2013, but the proportions are comparable with those of 1978 and higher than the 42 per cent of the mid 1960s. Even higher rates may be achieved. Data on 31 OECD countries in 2012 show no association between the proportion of the population aged 65 plus and the proportion aged 15 plus in the labour force. These data also show that a number of countries with older populations than Australia's (such as Switzerland and the Netherlands) have higher labour-force participation rates than ours.

### Baby boomers and age-based discrimination

The baby boomers (aged 51 to 66 in 2012) are a larger cohort than the people aged 67 to 82, but the cohorts younger than them are larger still. Baby boomers do not form a unique bulge in the population pyramid.

In a stable stationary population it will be normal for proportionally more people to be entering the older age-group categories than in the past.

Age-based discrimination in the work place is widespread; indeed 10 per cent of employers are happy to say openly that they practice it. Some opinion makers are also happy to deride baby boomers. This does not help older people cope with discrimination. In a more positive social environment labour-force participation rates for older people would be even higher.

### The tax base and social welfare

Fears that dwindling numbers of workers will have to support larger numbers of aged pensioners dominate the ageing debate. Yet labour-force participation rates among older people are rising and the greater part of government revenue (61 per cent) does not come from taxes on paid labour. Currently cash payments for welfare to older people constitute just over a third of government expenditure on such payments.

Concerns about the future capacity of governments to pay for the welfare costs of an ageing population are belied by the recent liberality of the Commonwealth Government. It has

abolished income tax on superannuation payments, increased access to the age pension, and lifted the level of benefits. While the cost of the age pension has grown faster than GDP over the last decade, demographic ageing is not the cause; rising costs have been due to discretionary policy changes.

Even low rates of per capita economic growth should allow governments to continue to pay aged-pension costs, an outcome that would be even more readily achieved if some of the extraordinarily liberal provisions for middle-class retirees were reformed.

**Health-care costs**

There are two main theories about the effects of demographic ageing on health-care costs: the *failure of success* model and the *compression of morbidity* thesis. The former maintains that, in developed countries, modern science is keeping more people alive for longer, but in a decrepit state. In contrast the latter maintains that people are living longer because they are healthier and that serious illness (morbidity) is being compressed into the last two years of life. So far the evidence favours this second theory: longitudinal studies in America and Europe show that the physical health of older people is improving and that rates of dementia are falling.

Data on 31 OECD countries also show that there is no statistically significant association between the proportion of the population aged 65 plus and health-care expenditure as a percentage of GDP.

In Australia disability rates across almost all age-groups fell between 2003 and 2012 and, from 1999 to 2012, the proportion of people aged 65 plus who were in residential care fell in all age-group categories. (Overall, in 2012, just five per cent of the population aged 65 plus were in residential care.)

**Older people's voluntary labour, within families and in the community**

In 2012 49 per cent of children receiving child care were looked after by their grandparents, and in 2003 more than twice as many children lived with their grandparents as lived with foster parents.

Australians aged 65 plus also play a major role in looking after people with disabilities; between 19 and 21 per cent of them act as carers for someone with a disability, usually a family member. This is in comparison to 14 per cent of people aged 18 to 64 who acted as carers. Older people also volunteer in organisations outside the family; in 2010 33 per cent of those aged 65 to 84 worked as volunteers as did 12 per cent of those aged 85 plus.

**Avoiding hyper-ageing**

A total fertility rate (TFR) of 2.0, high life expectancy (and nil net migration) lead to a stable population structure and normal demographic ageing. This would be manageable, even beneficial, for Australia. But if the TFR were allowed to fall to 1.6 the situation could change and the median age would become very high. We can call this *hyper-ageing* and it is reasonable to consider policies which might prevent it.

**Mass immigration as a cure for ageing**

Demographic ageing is caused by lower fertility (for example a TFR of 2.0, instead of an average family size of 6.5) and longer life expectancy. High net overseas migration (NOM) makes little difference to the median age but a considerable difference to the size of the population, including the size of the population aged 65 and over.

If we want to avoid the hyper-ageing associated with very low fertility the most cost-effective way to do this is to support the two-child family. Combining low fertility with high NOM is not only extremely costly, it also leads to an older age structure than does a TFR of 2.0 and nil net migration.

**Productivity, ageing and population growth**

The Productivity Commission report on ageing points out that the infrastructure spending needed to manage population growth over the next 50 years will be five times the total that was needed over the last 50 years. This investment in capital widening must seriously weaken Australia's capacity to invest in the capital deepening that would boost productivity.

Despite this, Treasury continues to emphasise its 'three Ps': population, participation and productivity. While Treasury treats these three variables as if they were independent some commentators argue that population growth has a positive effect on productivity. But there is a contrary argument. Population growth imposes pressures on infrastructure and adds to congestion; in so doing it depresses productivity.

International comparisons show that there is no association between population growth and growth in per capita GDP. This is not surprising as comparative data on 32 OECD countries show no positive association between population growth and growth in labour productivity.

**Conclusion**

An older age structure has many benefits. Besides, the only way to avoid it on a long-term basis is to have large families and die young. We have tried hard to escape from this way of life and, now that we have, we can reap the benefits. Frantic efforts to make Australia younger by making it bigger are no more rational than a middle-aged person trying to look younger by gaining 40 kilos.

There may be some clouds over our demographic future — no real story has a totally happy ending. But the prospect of long life and stability is far more pleasing than either a return to the nineteenth century or a journey to an overcrowded future blighted by demographic obesity.

An older age structure is no disaster. Like other advances in human wellbeing, it is one of our triumphs.

## 1 Introduction

For over 35 years Australian commentators have been worrying about the ageing of the population and, for the most part, turning to high immigration as an antidote.[1] Politicians, for example, expressed alarm at the 1975 projections in the Borrie Report,[2] one saying that if these projections were to be taken as our destiny it 'would be an acceptance of national suicide. It would be a readiness to lie down and die'.[3] Here they were focusing on defence; how could an ageing population protect itself from others hungry for its resources?[4] This was the key fear. Later more domestic concerns about the labour force, economic growth and welfare costs predominated.

Pamela Kinnear lists a number of publications dating from the 1990s[5] which centred on these misgivings and, in the early 2000s, politicians, bankers and business people continued to warn of the economic costs of ageing.[6] For example in 2004 Bernard Cronin, executive director of the Australian Institute of Management, said that the graying population, together with the declining birth rate, was a time bomb and that very soon we would 'start to run out of skilled workers'[7] while journalists talked of our 'potential blue-rinse economic disaster'.[8] By 2010 some of the commentary had become extreme. Robert Skeffington, a Melbourne-based writer, likened older people to zombies, saying: 'Granted we will face an army of the not-yet-dead as opposed to the formerly-dead-but-now-undead, but it's still a scary prospect'.[9] Others wrote of Australia becoming 'God's waiting room',[10] and warned of the 'looming demographic disaster of an ageing population'[11] or prophesied that, as the baby boomers retire, they will rise 'like a monster from an otherwise indistinguishable retirement swamp'.[12] To stop seniors from voting themselves privileges maybe 'pensioners could be deprived of the right to vote after 75 or 80'.[13] And in 2013 Carla Wilshire (CEO of the Migration Council Australia) claimed that, without immigration, 'by 2050 roughly half of us would be over the age of 65 and we'd essentially be one gigantic floating nursing home somewhere in the Pacific'.[14]

These decades of ageing anxiety have had an effect. For example, in 2005 respondents to the Australian Survey of Social Attitudes (AuSSA) were asked to chose which were the first and second most important problems facing Australia. The researchers gave them a list of 18 problems (including terrorism, crime, drugs and the lack of affordable housing). The highest proportion (15.1 per cent) said health care and hospitals, followed by taxation (12.1 per cent), but 'an ageing population' came a close third at 11.5 per cent. Terrorism and crime were nominated by only 5.1 and 5.0 per cent respectively.[15] In the 2010 AuSSA only a minority thought Australia needed more people (27.9 per cent), but twenty per cent of these gave the need to 'counteract the ageing to the population' as a reason.[16]

Were these respondents right to be so anxious? This paper will look for answers both in our present situation and in what projections based on present trends can tell us.

But first, why are we facing this challenge? The answer is simple. Demographic ageing is a consequence of birth control and better health. Families no longer have to cope with multiple unplanned pregnancies, most children live to grow up, and most of us will live on into our mid eighties. Our great great grandparents were not so lucky. In the late nineteenth century married women in Australia had an average of 6.5 children with one in 12 dying in their first year.[17] Overall, life expectancy at birth was 51 years for men and 55 years for women.[18] This pattern of fertility and mortality leads to a youthful population and, if child mortality eases a little, a youthful population that is growing.

Today, with an average family size of two and high life expectancy, together with nil net migration (balanced migration),[19] we could achieve a stable stationary population.[20] (The Australian Bureau of Statistics [ABS] included such a projection in the series published in November 2013—I will refer to as the *stable projection*.)[21] A stable stationary population would be good for the environment, including our congested cities, but there's no denying that smaller families, good health and longer life spans make for an older population. (Section 8

shows that mass immigration does not make much difference. It is also true that Australia does not face this demographic transformation alone. Most other developed societies are also ageing, and less developed societies will do so too in time. Maturity is going global.)

Children who are born as wanted babies and who go on to live longer lives are a blessing for individuals and families but are they good for society? Clearly many opinion leaders think they are not. We should consider their arguments; we need to know if we are going to be mired in a morass of elderly parasites or if we are heading for the sunny uplands of history.

Currently the pessimists take their cue from the Department of Treasury while optimists are found among environmental scientists, medicos, and some economists and demographers. For example, John MacInnes and Julio Pérez Díaz describe the shift from the old pattern of high fertility and high mortality to the current pattern as a reproductive revolution, one just as beneficial to human welfare as were the agricultural and industrial revolutions. Modern populations can reproduce themselves at lower costs (in work, suffering and grief) than ever before and thus have far more material and emotional resources for other projects.[22]

So what factors do the two sides of the debate take into account?

On the positive side proponents argue that labour-force participation is not something fixed by chronological age; it can rise. They also claim that even low rates of per capita economic growth will provide enough resources to meet new challenges, and that old age does not have to mean ill health. Longer life spans, less taken up with essential childrearing tasks, also allow more people to make a range of contributions to the common good.

On the negative side a key argument is that an ageing population will reduce the proportion of paid workers in the population. This will mean fewer workers paying income tax who will have to carry the burden of more and more old-age pensioners. Health costs, too, will rise if the older population needs more medical care. If observers see the change in this light it is logical for them to try to find remedies. Most look to mass immigration for a way out. Some also claim that this will make the Australian economy more productive.

## 2 The labour force: participants and non-participants

First there is the factor that may work for either the positive or the negative side: labour-force participation.

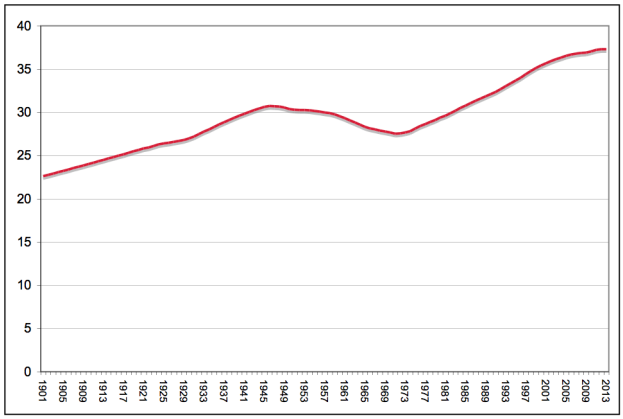
Here pessimists focus on the numbers of people of so-called working-age, those aged 15 to 64,[23] arguing that they are the key tax-paying contributors to public revenue.

The nature of the tax base and the possible effects of ageing on it are considered in section 4. But as the *Financial Review* points out, depending on their age-group, between 28 and 56 per cent of people aged 15 to 64 pay no tax at all. In some cases this is because they earn too little but in most cases it is because, despite their age, they are not in paid work. (Proportions of non-taxpayers are high in the 18 to 24 age group, and among those aged 60 to 64; they are much lower among those aged 25 to 54.)[24] Not all people of conventional working age both work and pay income tax. So if we want to see the effects of demographic ageing on paid labour, and thus on income-tax revenue, we have to look at labour-force participation rather than just at simple demographics.[25]

The possible fall in total revenue, plus rising pension and health-care costs, are the foundation of the negative case. These problems might eventuate, but what is the evidence so far? There is a wealth of data on the population's age structure and on labour-force participation rates; these provide a window on the recent past. A clear point for the positive side is that over the last 111 years Australia has aged by 14.7 years and, by almost any measure, has become richer, healthier, and able to pay a lot more tax.

Figure 1 traces Australia's passage along this ageing path. The journey started with a median age of 22.6 in 1901, rising to 28.9 in 1978 and 37.3 in 2013.[26]

**Figure 1: The population of Australia, median age, June 1901 to June 2013**

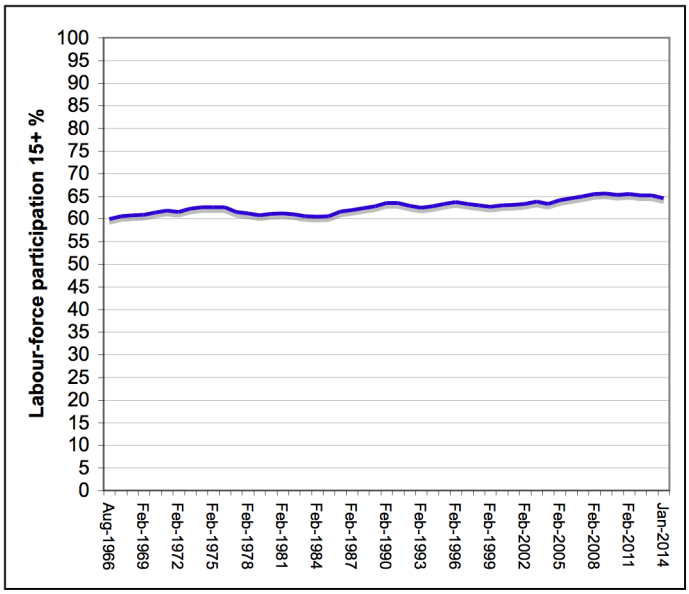



Sources: Calculated from 3105.0.65.001 Australian Historical Population Statistics, Table 4.1 Population(a), age and sex, Australia(b), 30 June, ABS, 2008 (for years 1901 to 1970), and from 3101.0 Australian Demographic Statistics: Table 59, Estimated resident population by single year of age, Australia, electronic file, ABS 2013 (for years 1971 to 2013).

Figure 2 sets out the overall labour-force participation rate for the civilian population aged 15 plus from August 1966 (when data collected on a national basis were first published) to January 2014.[27] Initially these data were published quarterly and the participation rate then, as now, was based on the number of people aged 15 plus who were either employed or who were not employed but actively looking for work—that is they include people who meet the ABS definition of being unemployed. (From February 1978 the data have been collected, and published, monthly.)

In 1966 the participation rate for the population aged 15 plus was 59.9 per cent and in January 2014 it was 64.5 per cent. During the period covered in Figure 2 it was always below 65 per cent except for the six and a half years between January 2007 and July 2013. The recent slight fall coincides with an increase in the unemployment rate, from an average of 5.0 per cent during January 2007 to July 2013 to an average of 5.8 per cent in period from August 2013 to January 2014. (Participation rates fall as unemployment rises; the January 2014 unemployment figure stood at 5.9 per cent, 0.2 percentage points higher than the figure for June 2013. This figure would have been inflated by the number of school leavers.)[28]

**Figure 2: Labour-force participation rates, Australia, as percentage of the civilian population aged 15 and over, August 1966 to January 2014**



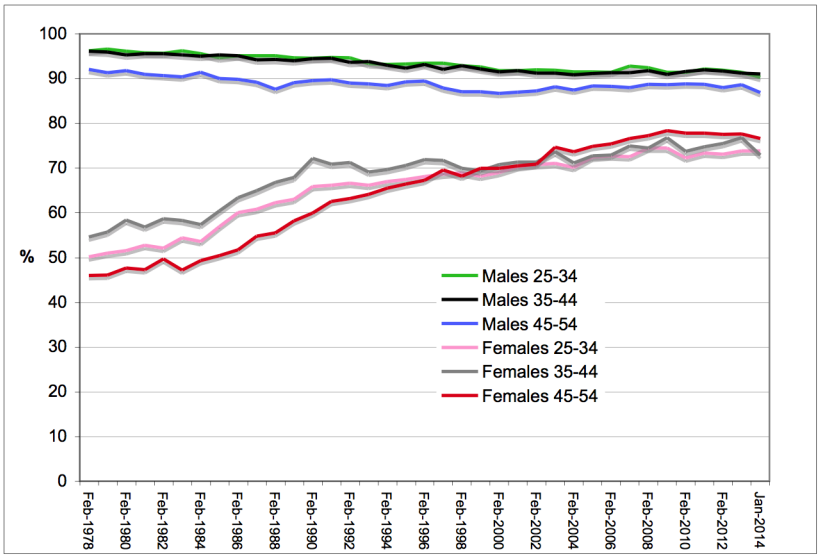

Sources: Data for August 1966 to February 1977 are from 6204055001TS0001 Labour Force Historical Time Series, Australia—Labour Force Status by Sex and Marital Status, Table 4: Labour Force Status of the Civilian Population aged 15 years and over—1966-1977, ABS April 2007. Data for February 1978 to January 2014 are from 6202.0 Labour Force, Australia, Table 01, Labour force status by Sex—Trend ABS, Time Series Workbook (January 2014).
Note: People aged 15 and over are participating in the labour force if they are in paid work or are actively looking for it; consequently the data include the unemployed. The base on which the rates are calculated here is the population aged 15 plus, not the total population.
The ABS only began to collect comparable labour-force data for Australia as a whole in mid 1966. See ABS, 'Fifty years of the labour force: now and then', *Year Book Australia, 2012, Catalogue no. 1301.0*, 2012.

The data collected post February 1978 are now available in detail online. So subsequent analysis draws on the period from February 1978 to January 2014. During this period the median age increased by 8. 4 years and the overall participation rate for those aged 15 plus grew from 61.7 per cent to 64.2 per cent, an increase of 2.5 percentage points.[29]

When the pattern is looked at as a whole there seems to have been a fairly constant participation rate over this period, with a small overall rise. But the picture changes when the data are disaggregated by age and sex; here some of the changes are dramatic. Figure 3 shows participation rates by sex and age for people aged 25 to 54, those of prime working age. Here rates for men fell slightly from a range of 92 to 96 per cent in February 1978 to a range of 87 to 91 per cent in January 2014, but they rose sharply for women.

As the reproductive revolution freed more women from full-time domestic labour their paid labour-force participation rates climbed. These rose from a range of 46 to 55 per cent in February1978 to a range of 74 to 77 per cent in January 2014. The older women, those aged 45 to 54, showed the steepest increase in participation, from a rate of 46 per cent in 1978 to one of 77 per cent in 2014.

**Figure 3: Labor-force participation rates, males and females, aged 25 to 54, Australia, February 1978 to January 2014**



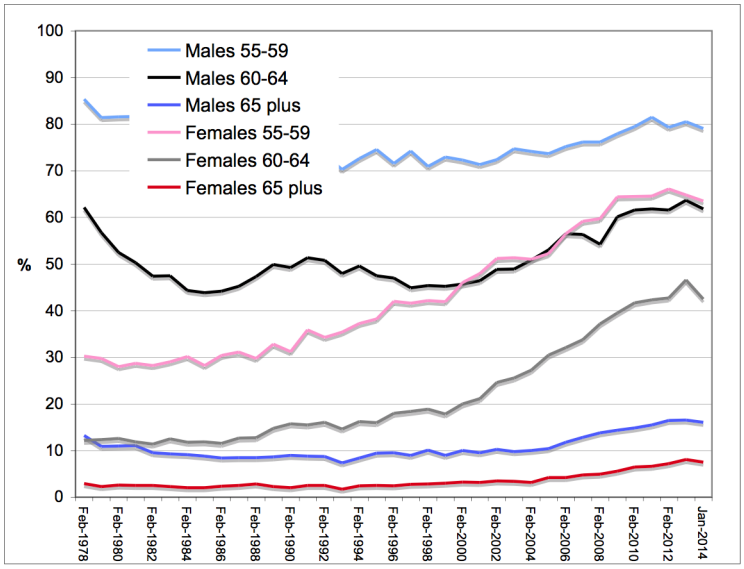

Source: *Labour Force, Australia, Detailed—Electronic Delivery*, Table 01, Catalogue no. 6291.0.55.001, ABS

Labour-force participation out-paced population growth. The number of all labour-force participants aged 25 to 54 grew by 1.9 per cent per year over this period, while the number of people in that age group grew by 1.6 per cent per annum.[30] Even though male participation rates dropped slightly in this group, numbers of all participants aged 25 to 55 were growing faster than the civilian population.

Figure 4 shows participation rates for people aged 55 and over. These too have risen, mainly in the last 11 or 12 years,[31] especially for women aged between 55 and 64. During the 1980s men over the age of 55 tended to retire early; by the early 2000s this trend had completely reversed. But participation rates also grew among retirement-age people of both sexes. The rate for men aged 65 plus grew from 8.5 per cent in the late 1980s to 16.0 per cent in January 2014.[32]

Increases for women aged 55 to 59 and 60 to 64 were equally dramatic, rising from 30.2 and 12.2 per cent respectively in February 1978 to 63.5 and 42.5 per cent in January 2014. Women aged 65 plus were also more likely to stay in (or join) the labour force. Their participation rate rose from around 2.5 per cent in the late 1980s to 7.5 per cent in January 2014.[33] (The rates for people aged 65 to 69 were 34 per cent for men and 20 per cent for women.)[34]

**Figure 4: Labour-force participation rates, males and females aged 55 and over, Australia, February 1978 to January 2014**




Source: See Figure 3.

More than half of the demographic ageing plotted in Figure 1 occurred in the last 35 to 36 years (between 1978 and 2014) but the numbers of people in the labour-force grew strongly. Rather than drifting away into early retirement many older people have stayed at work or gone back to work. During this period Australia has traveled the first main stage of the journey to an older population. It has not just weathered the transition, its levels of labour-force participation have improved.

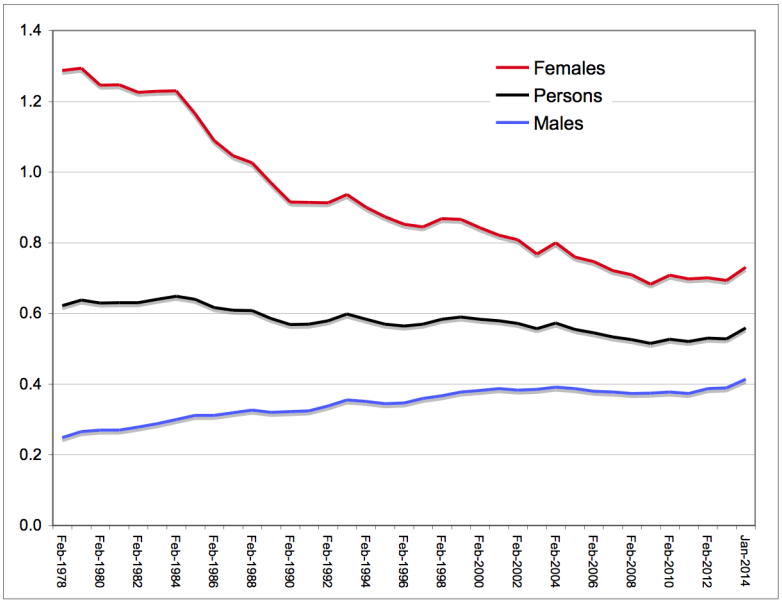
*Participants, non-participants, and dependency*

Figure 5 provides a different view of long-term changes in labour-force participation. It shows ratios of non-participants (aged 15 plus) to participants. In February 1978 there were 6.2 people aged 15 or more who were not in the labour force for every ten people who were in it. Such a ratio is normally divided by 10 so we can speak of 0.62 dependents for every paid worker (or would-be worker—remembering that the term *labour-force* includes the unemployed).

By January 2014 the ratio had fallen to 0.56. This fall more than offset the increase in the share of the population aged 65 and over.[35] Though some supporters of the negative case persist in basing their argument on overall age-group categories,[36] the ratio of non-participants in the labour force (aged 15 plus) to participants represents the dependency burden as it is most often used in public debate. We can call this the conventional measure, or the first measure of the dependency burden. (The second, and more valid, measure of financial dependence is the ratio of all non-participants, babies and children as well as people aged over 15, to participants.)

Figure 5 shows the overall trend according to the first measure. Over the last 35 years, despite the increase in the median age, the dependency burden, so measured, has fallen.[37] A drop from 0.62 to 0.56 is 0.06, or in terms that are easier to visualise, the assumed tax burden of non-participants aged 15 plus on 10 participants declined from 6.2 people to 5.6, more than half a whole person. (The tax burden can only be described as *assumed* because not all participants would earn enough to pay tax and some would be unemployed.)

**Figure 5: Ratio of those aged 15 plus and not in the labour force to those 15 plus in the labour force, Australia, February 1978 to January 2014**

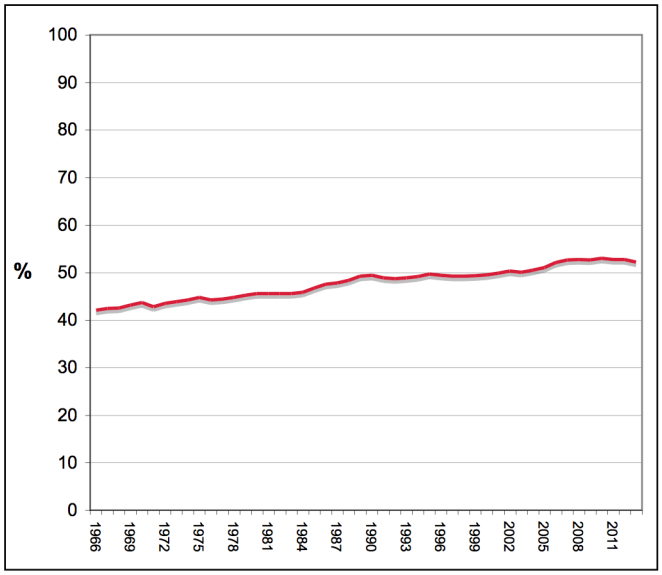



Source: See Figure 3

But that is only dependency as it is conventionally defined. If the second more valid measure is used and children aged 0 to 14 are included in the numbers of non-participants this produces a total labour-force dependency ratio. It falls from 1.2 in February 1978 to 0.89 in July 2013.[38] In 1994 Christabel Young published data on this ratio showing that that it was around 1.35 in 1947 and peaked at 1.43 in 1961. By the early 1990s it had fallen to just over one and Young projected that it would fall to 0.97 or 0.96 in 2001 to 2011. (This underestimated the eventual drop.) She also estimated that it might rise to 1.16 in 2041 though, since 1994, labour-force participation rates have risen (as have life expectancy and population projections).[39]

Dependency can also be calculated as the number of people in the labour force as a percentage, rather than as a ratio. This allows us to see participants as a percentage of the total population (a variant of the second measure). Overall, the percentage of the total population who were in the labour force grew by 10.1 percentage points from 42.1 per cent in November 1966 to 52.2 per cent in December 2013. (See Figure 6.)

**Figure 6: Labour-force participation as a percentage of the total population, Australia, 1966 to 2013**




Sources: Labour force data for 1966 to 1977 are from 6204055001TS0001 Labour Force Historical Time series, Australia—Labour Force Status by Sex and Marital Status. Data for 1978 to 2013 are from 6202.0 Labour Force, Australia, Table 01, Labour force status by Sex—Trend. Population data for 1966 to 1978 are from. J. Shu, S. E. Khoo, A. Struik and F. McKenzie, *Australia's Population Trends and Prospects 1993*, (BIR), AGPS, Canberra 1994; data from 1978 on are from *Demographic Statistics*, ABS, Catalogue no 3101.0 (various issues).
Note: The labour-force data are for November from 1966 to 1977, and for December thereafter. The population data are for December, but the population total for 2013 is an estimate based on the June 2013 data, plus the observed increase for the last two quarters of 2012.

So far we have just looked at the side of the ledger where the potential for gathering income tax can be found and so far rising participation rates have brought benefits. We have not only tolerated our extra 8.4 years, older Australians have increased their contribution to the labour force. But Australia is still in the demographic sweet spot, a transient period of relatively few children and relatively few older people.[40] This is often called enjoying the demographic dividend, a passing phase where the proportion of the population who are children, and the proportion who are elderly, are both relatively small.[41] Many proponents of the negative case about ageing are unaware of this process, but it is part of the reason why the percentage of the total population who are in the labour force is currently high. Even so, Figures 3 and 4 have shown it is far from being the only reason. Age-specific participation rates have risen, especially among women and among older people.

*Projecting future levels of participation*

Irrespective of whether we use the first, conventional, measure or the second more valid measure, it is clear that financial dependency on the wage-earning population has fallen. But in time we will move through the sweet spot. What will happen then? In 1994 Young had projected a labour-force dependency ratio of 1.16 for 2041, or a figure of around 46.3 per cent of the total population in the labour force. But life expectancy, current and projected, has risen since 1994.[42] The population has also been distended by both natural increase and by years of high migration. If we take the same labour-force participation rates as recorded in June 2013[43] and apply them to the ABS's stable projection, demographic ageing would mean that the labour-force participation rate for the total population would fall from its current level of 53.0 per cent to 44.4 per cent in 2061.[44] (It would be 47.0 per cent in 2041, a figure similar to

Young's projection for that year.)

This drop seems significant, but it would be a fall from the unusually high level enabled by the demographic dividend. Would having just 44.4 per cent of the total population in the labour force drain Australia's capacity to thrive? Almost certainly not. As Figure 6 illustrates, in 1966 the proportion of the total population in the labour force was lower (it was 42.1 per cent). By today's standards, the economy was prosperous.[45] Unemployment was less than two per cent,[46] most jobs (92 per cent) were full time,[47] and only 7.7 per cent of Australians lived in poverty. In contrast, in 2010 the estimate for people in poverty was 12.8 per cent.[48] Housing also was much more affordable then,[49] and in 2013 only 69 per cent of jobs were full time.[50] Despite the level of dependency in 1966, the average person's standard of living and quality of life were high. Should we really expect conditions in 2061 to be worse?

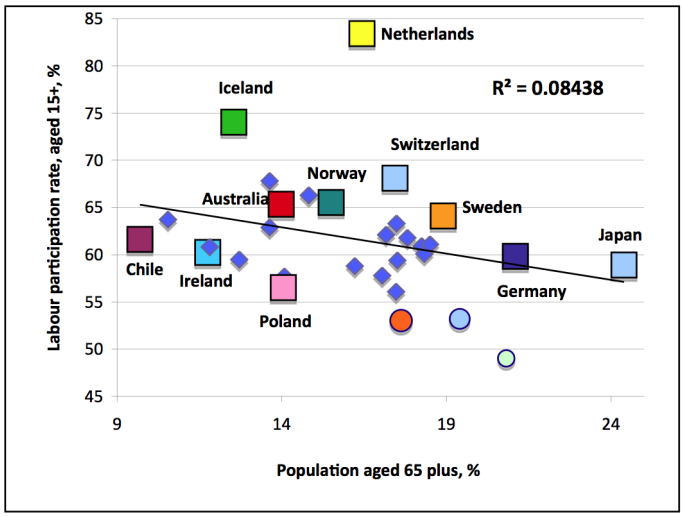
They may be, but if the age structure is the cause there is scope for change. If, for example, in 2061 Australia achieved the participation rates that Sweden had already arrived at in 2005, the percentage of the total population in the labour force would be 46.1 per cent.[51]

It is more than likely that these rates, or higher, will be achieved. For example, OECD data on 34 member countries show the percentage of the population in 2012 who are aged 55 to 64 and employed. The average (mean) is 55.6 per cent. Australia, at 61.4 per cent, ranks number 11 but Iceland, New Zealand, Sweden, Norway and Switzerland are all above 70 per cent.[52] There is ample scope for the labour-force participation rates of older Australians to rise, including those of people aged 65 plus.[53] (Section 8 explores the contribution of high migration to the country's age structure. But here, where we are discussing labour-force participation, it is worth remembering that, controlling for age and sex, migrants are less likely to participate in the labour force than are the Australian-born.)[54]

At present, in developed countries, there is no association between a country's age structure and the proportion of the population aged 15 plus who are in the labour force. Jane O'Sullivan's recent work, based on the old-age dependency ratio, shows this plainly.[55] Figure 7 builds on her research by presenting labour-force participation, as a percentage of the population aged 15 plus, by the proportion of the population aged 65 plus in 31 developed, OECD countries. There is a slight negative association but as the measure of correlation, R squared, is only 0.08438 it is not statistically significant.

Countries with more youthful populations than Australia (Poland, Ireland and Chile) have lower participation rates than us, while some with an older age structure have higher rates, such as the Netherlands and Switzerland. Canada and Norway both have slightly older populations than Australia and also have slightly higher participation rates. (By 2013 the labour force participation rate for people in Japan aged 65 and over was 20.5 per cent, compared to 12.4 per cent for Australia.)[56]

**Figure 7: Labour-force participation as percentage of the population aged 15 plus, by age structure, 31 OECD nations, 2012**




Source: World Bank data bank, from <http://databank.worldbank.org/data/views/variableselection/> accessed 28 January 2014

Note: The 31 countries are Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States.

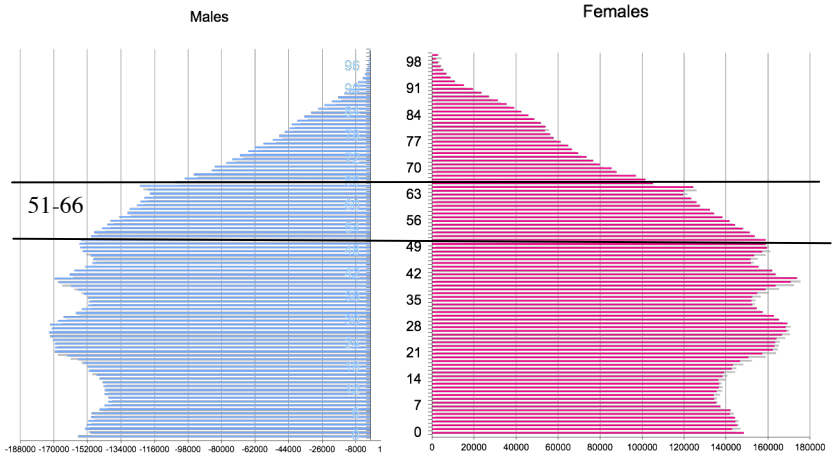
Few jobs in developed countries now require muscle power and more people are completing the higher levels of education needed for white-collar and knowledge-based work. Moreover, as section 5 shows, the health and cognitive abilities of older people are better today than they were among older people in the past. All of these changes mean that a shortage of tax-paying workers does not have to cloud our future.

## 3 Baby boomers and age-based discrimination

Demographic maturity means putting relatively straight sides on the population pyramid. Some authors worry that the baby boomers — those born in the 16 years between 1946 and 1961 — are an especially large cohort. Perhaps we could manage when people born in the years after 1961 grow old, but how can we cope with the flood of boomers 'shuffling away in their jeans and leather jackets to rock 'n' roll away their children's inheritances'?[57] Bernard Salt, for example, says that from 2011 more baby boomers will exit the workforce than people of generation Y will enter it. He suggests extending the retirement age to 70 and adds that 'with any luck most boomers will drop dead just short of the line'.[58] (Stephen King also thinks that waiting for the 'selfish generation to expire' might be a strategy.)[59]

Salt's demographic prognosis is based on the premise that the baby-boomer cohort is especially large. Is this correct? In 2012 the baby boomers were aged 51 to 66 and numbered 4.3 million. In the 16-year age-group category just younger than them — people aged 35 to 50 — there were 5.0 million. In the next 16-year age-group category — aged 19 to 34 (possibly Salt's generation Y) — there were 5.2 million. Yes, the baby boomers are a larger group than those aged 67 to 82 (2.2 million) but they are not a unique bulge in the population python.[60] See Figure 8. So Salt's premise is false and thus his prognosis is wrong. The cohorts following the baby boomers are larger, so even existing age-specific rates of labour-force participation will mean growing numbers in the paid labour force.

**Figure 8: Baby boomers (aged 51 to 66) and Australia's population by sex and age, 2012**




Source: Australian Demographic Statistics, Table 59, Estimated Resident Population by single year of age, Australia, Catalogue no. 3101.0, ABS, 2013 (electronic file)

In a stable stationary population it will be normal for the cohorts approaching retirement to be proportionally larger than they were in 1901, but it will not be normal for them to be larger than the cohorts coming up behind them. If we look at the age distribution of the stable projection in 2101 and divide those aged less than 60 into three 20-year age blocks (0 to19, 20 to 39, and 40 to 59) each block contains an average of 21.1 per cent of the population. The people aged 60 plus account for the remaining 36.6 per cent, including those aged 60 to 79 (20.6 per cent) while those aged 80 plus account for just 16 per cent.[61] To have slightly more than a fifth of the population (aged 40 to 59) heading towards the over-60 age bracket is a normal feature of a stable population, and slightly more than a fifth of the population (aged 20 to 39) will be coming up behind them.

Baby boomers may be an especially self-centred and unpleasant group. Or perhaps they have just become a fashionable target for sneers and abuse. Whatever the reason for this trend, the sneers and abuse have consequences. The 2008 and 2010 Household, Income and Labour Dynamics in Australia (HILDA) studies show that older people are much more likely to be affected by age-based discrimination in the work place than are ethnic groups by racial discrimination.[62] This is not surprising given the negative attitudes to older people purveyed in the serious media, including not only the instances cited in this paper but, for example, whole issues of *The Economist*.[63]

Survey data in 2012 found that 67 per cent of people aged 54 to 65 had experienced age-based discrimination in applying for jobs, as had 50 per cent of those aged 66 plus. Some employers are open about this. In one study 10 per cent said that they had a policy of not recruiting older people; by this they usually meant people over 50.[64]

Negative stereotypes may be the main reason for this discrimination, though it could also be the case that some older job applicants have poor computer skills or, indeed, have some physical disability. If so the former could be remedied by retraining and the latter should be no more of a barrier to employment than is disability among younger applicants. But there is also anecdotal evidence that some employers are reluctant to employ older workers because younger managers do not want to manage people older than themselves.

Attitudes such as these block older people's efforts to stay in the labour force. This is a problem which can only be compounded by institutional disincentives such as income tests on the age pension, tax rates and tax thresholds, and the design of other social welfare programs. These are outlined in the recent Productivity Commission report on demographic ageing.[65]

Because they were too late to benefit from compulsory superannuation many older people have low incomes and would like to work. As of June 2012 there were 550,000 people on Newstart. Of these 19 per cent (104,500) were aged 50 to 59 and 9.1 per cent were aged 60 to 64 (50,000).[66] Without institutional disincentives and without age-based discrimination the labour-force participation rates of these baby boomers would be even higher and the critics of ageing parasites would have fewer grounds for complaint.

## 4 The tax base and social welfare

Despite the efforts of many older people to engage in paid work, baby boomers, and the rest of us, are growing older, slipping away from the days of wine and roses. Oddly enough this seems to bring more happiness than sorrow,[67] but what will it mean for fiscal costs and social welfare?

In 2010-11 Australian governments (federal and state/territory) spent around $119.4 billion on welfare. Of this $90 billion (75 per cent) was for cash payments (including unemployment benefits) and $29.4 billion (25 per cent) was for welfare services. Of the $90 billion in cash payments, just over a third ($36.3 billion) was for older people and just over 28 per cent ($25.5 billion) was for families and children.[68] Currently Australia is facing a structural budget deficit but research by the Grattan Institute makes it clear that demographic ageing is not the cause. It has had very little effect on age-pension costs and very little effect on health-care costs.[69]

As we have seen, labour-force participation is rising and higher proportions of older Australians are in paid work today and even more may be in paid work in the future. This is important for their own welfare. It is also important for the contribution that they can make as taxpayers to the welfare of those not in paid work. But income tax is not the only source of revenue; taxes on paid work currently account for less than forty per cent of all taxes paid.

In 2011-12 all three levels of government in Australia (federal, state/territory, and local) raised $390 billion in taxes. Of this, 39 per cent came from income taxes levelled on individuals and five per cent from payroll tax paid by employers.[70] Some of the tax on individuals' incomes would have been on returns from investments and capital gains but the majority, around 87 per cent, came from paid labour.[71] Thus around 34 per cent of all taxes in 2011-12 derived from individual income tax on paid labour, to which we can add the five per cent from payroll tax.

This gives a total of 39 per cent raised from paid labour. (Taxes on enterprises contributed 19 per cent, the GST 13 per cent, property eight per cent, while excises, levies and other taxes made up the remainder.[72] None of these sources of revenue are sensitive to demographic ageing.) Income tax is clearly an important contributor to revenue but, equally clearly, it is not all important. And its contribution could be larger were it not for tax concessions granted mainly to high-income earners, such as those derived from negative gearing and family trusts. If these policies were changed tax revenue could rise by $8 billion, or 2.05 per cent.[73]

A number of tax cuts and welfare changes since 2006 are hard to understand if governments really are worried about the costs of demographic ageing. For example, the federal government abolished income tax on superannuation payments in 2007 and increased access to the age pension (and lifted its base rate) between 2006 and 2009.[74] The level of assets that people could own and still be eligible for the age pension was lifted again in September 2013.[75] As of November 2013 an elderly couple owning their own home, with other assets of up to $1.1 million and an annual income of $71,000 would still be eligible for a part age pension.[76] The home is not included in the assets test,[77] so even if it is worth one or two million the couple's eligibility is not affected. The cash value of the actual pension that such a couple would receive would be low, but it would entitle them to a range of deductions on rates, pharmaceuticals, medical bills, public transport and power bills.[78]

For other older people whose incomes are too high for them to qualify for the age pension there is the Seniors Health Care Card. This offers similar discounts on health care to those afforded to age-pensioners. It was introduced in 1994 with no assets tests (though there is an income test),[79] and people who hold the card are entitled to a range of other benefits.[80] Most untaxed superannuation payments do not count as income for the income test,[81] and the Abbott Government went to the 2013 election promising to liberalise the income test for those who are still constrained by it.[82]

The Grattan Institute reports that the costs of the age pension grew faster than GDP between 2002-3 and 2012-13 but says 'demographic ageing was *not* the prime cause' (italics in original). It was 'a result of deliberate policy choices to increase Age Pension spending. … [and was] entirely due to discretionary changes…'[83] The Institute also estimates that, excluding the value of the family home, around 80 per cent of 'mature households' with a million dollars in net assets receive welfare benefits.[84]

Generous provisions for older people with substantial assets look like a misallocation of resources and would have contributed to the increase in the number of age pensioners over the last decade.[85] But this increase is less than the increase in the number of elderly people. The number of age pensioners grew by 25.5 per cent between 2002 and 2012 while the number of people aged 65 plus grew by 30.5 per cent, [86] so other factors must be at play including higher levels of labour-force participation and higher incomes among older people.

In sum, the tax and welfare system now treats older people much more liberally than in the recent past. We should also remember that the Howard Government reduced overall income tax, a decision endorsed by the Rudd Government; both decisions have made it harder to fund services of all kinds.[87] Recent research at the National Centre for Social and Economic Modelling (NATSEM) finds that: 'The budget impact of the large personal income tax cuts through the last 10 years is much greater than that of the welfare budget impact, with a structural revenue reduction of $21.5bn, which roughly equates to Australia's existing structural budget deficit'.[88]

Despite these tax cuts, and despite the loopholes and handouts, anxiety about ageing focuses on an assumed decline in income tax (from lower proportions of paid workers), together with fears of increasing demands on revenue. Treasury, for example, believes that costs induced by demographic ageing will lead to a gap between tax revenues and expenditure of around 2.75 per cent of GDP by 2049-50.[89] This is the basis for the oft-told story of fewer taxpayers struggling to fund higher pension and other age-related costs, particularly higher health-care costs. But with the increases in labour-force participation that have already occurred and which are almost certain to continue the story loses much of its power to frighten. For example, we are often warned to avoid Japan's alleged demographic decline, but labour-force participation rates in Japan are high (including the rate of 20.5 per cent for people aged 65 plus documented in section 2) and, between 2001 and 2010, Japan's per capita economic growth was higher than that of either the United States or the Euro zone.[90]

Economic growth may slow a little as Australia grapples with the many challenges that the future holds, but shortages of money of the kind that Treasury claims to fear should not be a problem. For example, if we assume that per capita GDP continues to grow between 2013 and 2050 at the same rate as did from 2003 to 2013, that is at an average of 1.4 per cent per year,[91] it will have increased by 67 per cent in 2050 (and by100 per cent in 2063).[92] The Productivity Commission reports that real disposable income is likely to grow by 1.1 per cent from 2012-13 to 2059-60, a lower rate than that observed from 1993 to 2012.[93] But an annual growth of 1.1 per cent compounds to an increase of 67 per cent by 2063. And in any case extraordinarily liberal access for affluent seniors plays a part in inflating costs. This part could be moderated without inflicting hardship on those less well off.

In 2002 Ross Guest and Ian McDonald put it like this:

*In recent years a number of commentators have argued that living standards of Australians in the future are threatened by prospective demographic change. Our research suggests that these fears are unwarranted. Under a wide range of assumptions about future demographic trends, we show that there will be a substantial increase in living standards in the future, almost doubling in the next 50 years.*[94]

Treasury's third intergenerational report estimated that age-related pension costs would increase from 2.4 per cent of GDP in 2008-09 to 3.9 per cent of GDP in 2049-50.[95] But in an odd counter to the increasing liberality in access to the age pension, the eligibility age for the

pension is being raised, contributions to superannuation are not only encouraged, they are mandatory at a basic level, and there is scope to increase taxes, or at least to stop cutting them. There is also scope for adjusting the assets test for the age pension. Despite these possible economy measures, a rise in costs of 1.5 percentage points of GDP for age pensions does not, on the face of it, suggest an unmanageable challenge, especially in view of probable future increases in both GDP and, more importantly, in per capita GDP.

But there are concerns about the cost of health-care.

## 5 Health-care costs

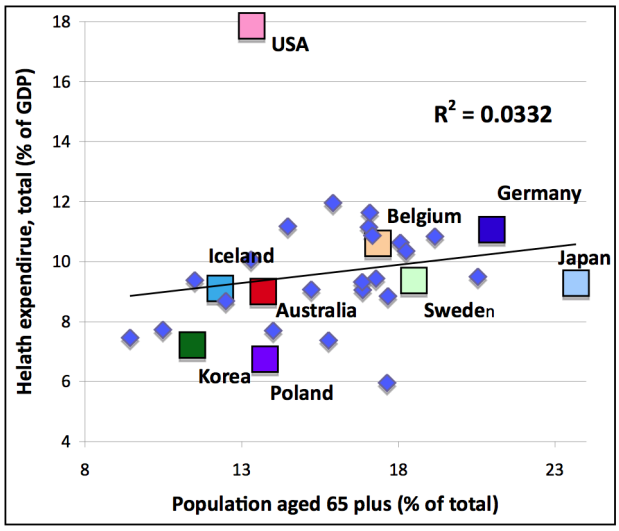
Health-care costs are rising, but demographic ageing is not the sole cause, or even the main cause. The Grattan Institute shows that health-care costs to Australian governments rose by $41.5 billion between 2002-03 and 2012-13. Irrespective of demography, improved services and more services per person accounted for around $29 billion of this increase (or 70 per cent) and health inflation above the CPI for $2 billion (five per cent). As far as demography is concerned population growth, independent of ageing, accounted for $7.5 billion (or 18 per cent) while ageing itself accounted for around $3 billion (or just over seven per cent).[96] Thus improvements in care are the main cause of the increase and, where demography does enter the equation, population growth has more than twice the impact of ageing.

Other reports from researchers at the Grattan Institute emphasise that the greater part of rising health care costs to date is due to increases in the use of expensive medical technology.[97] For example, Stephen Duckett and Cassie McGannon write that: 'Together, population growth and the ageing population structure accounted for only a quarter of government expenditure growth [on health care] above CPI since 2002-2003'.[98]

In Australia the association between health-care costs and demographic ageing is, so far, weak. This is also true when we look at data on health-care costs and ageing across a range of comparable countries. In 2009 Michael Coory used data for the year 2000 drawn from 26 OECD countries and showed that there was no association between expenditure on health as a percentage of GDP and the proportion of the population aged 65 plus.[99]

Figure 9 updates this work for 2011. It shows health expenditure as a percentage of GDP by the proportion of the population aged 65 plus for 31 OECD countries. The situation Coory observed has not changed. While there appears to be a slight positive relationship between the two variables it is well below the level of statistical significance (R squared equals 0.0333). The country with the highest proportion over 65 (Japan—23.7 per cent) spends 9.3 per cent of its GDP on health, just below the median value of 9.4 per cent. By contrast the United States spends the highest proportion of its GDP on heath care, but has a proportion elderly of only 13.3 per cent, well below the 2011 median for the OECD (16.9 per cent).

**Figure 9: Health-care expenditure as a percentage of GDP by proportion aged 65 plus, 31 OECD countries, 2011**




Source: World Bank data bank

Many medical authorities argue that the highest health-care costs are incurred in the last two years of a person's life, irrespective of the age at which death occurs[100] a finding that is supported by other research.[101] This is known as the 'compression of morbidity' thesis, and is based on research initiated by James Fries in 1980.[102] The term *compression of morbidity* means that, as the overall health of the population improves and more people live into their eighties, serious illness (morbidity) is compressed into the last year or two of life. This hypothesis predicts that serious chronic conditions that sap people's vigour and deplete health-care budgets over the very long-term are relatively rare. It was developed as a counter to its alternative: *the failure of success* model. This model proposes that science is keeping people alive for longer, but in a state of prolonged, and expensive, decrepitude.[103] The Productivity Commission appears to subscribe to this model, arguing that older people make more demands on the health care system than others for many years before their death.[104] Which theory is closer to the truth?

Much of Fries's thesis rests on lifestyle changes. He argues that people's natural life span is unlikely to extend to any marked degree but that the onset of morbidity can be postponed, hence the proposition that morbidity is likely to be compressed into the final year or so of life. Since 1980 a number of 20-year longitudinal studies in the United States have been completed. These show that lifestyle differences do indeed affect outcomes and that the onset of morbidity is delayed among tertiary-educated people who exercise and have other healthy habits. But the studies also include two large-scale longitudinal surveys of the broader population: the National Long-Term Care Survey (1982-2004) and the National Health Interview Study (1982-1999). These both show declines in rates of disability, declines which happened at a greater rate than declines in mortality, thus confirming the compression of morbidity thesis.[105] (Possible reasons include increased levels of education across the whole population, not just among graduates, better nutrition, more exercise, less smoking, and greater moderation in drinking. But the studies were chiefly concerned with documenting the prevalence of morbidity, and the time interval between its onset and the person's death, rather than in finding causes.)[106]

The American work on the compression of morbidity offers some explanation for the lack of association between health-care costs and age structure shown in Figure 9. Older people today are healthier than they used to be. But there are added grounds for optimism based on other research; not only is physical health improving, so is mental health. A recent Danish study found improvements in the cognitive abilities of older people who were born more recently, relative to those who had reached old age in the past. In 2013 Christensen *et al*. published a review of research on Danish nonagenarians born 10 years apart (in 1905 and 1915). The cohort born in 1915 achieved significantly higher scores on cognitive tests than did the cohort born in 1905 (and had significantly higher scores on matters concerned with daily living). The authors conclude that 'more people are living to older ages with better overall functioning'.[107] This conclusion is echoed by a recent English study which found that, between 1991 and 2011, the incidence of dementia among people aged 65 and over had declined by 24 per cent. (Like the Americans the authors did not focus on reasons for the changes, though they suggest that better prevention of cardiovascular disease together with higher levels of education may be important.)[108] Other research in developed countries confirms this decline, including a major study based on the very old in the United States. This observed 'progressive delay in the age of onset of physical and cognitive function impairment': people who lived to be over 104 showed an even greater compression of morbidity, including of dementia, than those who merely survived to 100 to 104.[109]

Australia shows similar improvements. For example in 2009 the ABS survey of disability and ageing found that 47 per cent of people aged 65 plus had no disability at all. The ABS also found that the overall prevalence of disability had fallen by 1.5 percentage points between 2003 and 2009 and that, after removing the effects of different age structures, the total disability rate had fallen by 2.1 percentage points.[110] In 2012 the proportions aged 65 plus with profound or

severe limitations on their core activities in 2012 were the same as in 2009, 20 per cent, with 47 per cent still disability free.[111] Over the period 2003 to 2012 the rates fell for almost all age-groups, including the elderly (except for women aged 85 to 89). See Appendix A, Table A1.

These improvements in the health of elderly people are reflected in the age-specific rates for the proportions aged 65 plus in residential care in Australia. All of these rates were lower in 2012 than they had been in 1999. For example 21 per cent of people aged 85 to 89 were in residential care in 1999 compared to 17 per cent in 2012, and 40 per cent of those aged 90 plus in 1999 compared to 35 per cent in 2012. (The overall proportion of people aged 65 plus in residential care only dropped from 5.5 per cent in 1999 to 5.0 per cent in 2012 because, by 2012, a greater proportion of the elderly were in the more vulnerable 80 plus age-group categories.) See Appendix A, Table A2.

Thus, on a range of measures, older people in developed countries have become healthier over a relatively short space of time. Whatever the causes, these changes underline the point that MacInnes and Pérez Díaz make: it is a mistake to see the elderly of the near future as carbon copies of the elderly of yesterday.[112] Medical experts rightly point to outdated stereotypes of the elderly which are 'distorting public opinion and skewing policy debates'.[113]

For example, research published in *Science* in 2010 and drawing on data from a range of European countries, as well as the United States, focused on actual abilities rather than on chronological age. It found that most people aged 65 plus are fit and well. The authors construct an adult disability dependency ratio (ADDR) defined as the number of adults at least 20 years old with disabilities, divided by the number of adults at least 20 years old without them. The ADDR for the United States shows very little difference between 2005-10 and 2045-50. By this standard the authors report that there will not be much change in real dependency over the next 40 years.[114]

While it is true that we lack a good time series reaching back far into the past on older people's health, Jeroen Spijker and John MacInnes have found a way to surmount this problem. They use increases in life expectancy as a surrogate measure of health at older ages, arguing that the dramatic increase we have seen (in this case in the UK) represents an increase in health. They write that a remaining life expectancy of 15 years or less should be seen as the threshold of real dependency, not chronological age. (Using this measure they conclude that, in real terms, the UK population has effectively been getting younger.)[115] This is a cheering conclusion but 15 years is a longer time period than the one or two years proposed by the compression of morbidity thesis.

Australian data show that, undeniably, older people use health care services at a higher rate than do younger people. If we calculate this use in terms of rates per 1000 in various age-group categories, people aged 65 plus visit GPs more frequently[116]and are treated in hospitals more frequently.[117] But data of this kind cannot tell us whether the compression of morbidity thesis is confirmed or not. For that we would need to measure use of health-care services and the nature of the treatment (palliative or curative) in relation to time of death. This would require special studies. After all, it is possible that timely health care is keeping older people well, rather than merely ministering to their decline.

But as the population ages it is inevitable that death rates per 1000 will rise. Even if the compression of morbidity thesis holds true, health-care costs will increase as a higher proportion of the population faces their final years of life.

While the contest between the compression of morbidity thesis and the failure of success model does not yet show an undisputed winner, as more research emerges, the former is gaining credibility. What we do know today is that demographic ageing accounts for only a minor proportion of the increasing cost of health care. Evidence from countries further along the ageing trajectory than Australia, such as Japan, Sweden, Germany and Belgium, also demonstrates that there is no necessary association between growing maturity and escalating

health-care costs. Clearly there is room to improve the way in which people of all ages maintain their health and in so doing keep the public costs manageable. Reducing sugar consumption, for example, could do much to mitigate levels of metabolic syndrome, the collection of conditions that increase a person's risk of heart disease, stroke and type two diabetes.[118] It could also decrease the risk of dementia.[119]

In summary, international comparisons show that demographic ageing is not associated with higher spending on health care, and international research shows that the health of older people is improving. Some older people in the last years of their lives are dependent on others, due to illness and frailty. But most people aged 65 and over are not. What is more, many elderly people are taking care of those who are dependent (see section 6). In contrast all young children really are dependent on others and thus are an unavoidable cost to society, a cost in unpaid labour and forgone opportunities for carers, as well as in cash. We need them and love them, but the reproductive revolution means that we do not have to be overwhelmed by them. And where in the past there may have been older siblings to help care for them, today there are grandparents, often all four of them.[120]

## 6 Older people's voluntary labour, within families and in the community

Those who take the positive side in the ageing debate point to changes in labour-force participation and to the improved health of elderly people. But they also focus on older people's unpaid work in families and in the community.

In 2011 49 per cent of children under the age of 12 who were receiving child care (including after-school care) were looked after by their grandparents.[121] Where total year-round care is concerned, in 2003 more than twice the number of children under 15 lived with their grandparents as lived with foster parents, and Judith Healy's research shows that in-home child care by grandparents is just one example: up until the age of 75, net transfers of money and help flow from the old to the young.[122]

As well as looking after grandchildren, older people also care for others who have disabilities. In 2009, 19 per cent of all people aged 65 and over were acting as a carer for someone with a disability (compared with 14 per cent of people aged 18 to 64).[123] In 2011-12, 21 per cent of people aged 65 to 74 were acting as carers.[124] Older people also do voluntary work for organisations outside the family: in 2010, 12 per cent of people aged 85 plus were volunteers, as were 33 per cent of people aged 65 to 84.[125]

Supporters of the positive case emphasise the voluntary work of older Australians. Advocates for the negative case may also acknowledge this work, but can temper their acknowledgement with derision. As one of them writes: 'have you noticed how boomers have elevated the notion of volunteering to something akin to sainthood?'[126] Most people who offer a gift, whether of goods, money or time, are warmed by a little appreciation. This does not render their gift worthless. Appreciation helps social engagement thrive; ridicule depletes it.

Volunteering is good but it's not everything. We need to make sure that as many people who want to do paid work can in fact do so, unhindered by discrimination or lack of work. And we need to make sensible policy decisions about health care and prevention.

## 7 Avoiding hyper-ageing

While normal ageing, as set out in the stable population projection, looks manageable, even attractive, we may want to try to avoid the hyper-ageing that would accompany very low levels of fertility. For example, if Australian life expectancy at birth should continue to improve (to 92.1 years for males and 93.6 years for females), and net overseas migration (NOM) be held at zero, and the total fertility rate (TFR) should fall to 1.6 and stay at that level until 2101, the proportion aged 65 plus would then be 39.0 per cent. This is in contrast to 31.4 per cent aged 65 plus in 2101 that would eventuate with the same life expectancy and immigration assumptions plus a TFR of 2.0.[127] The median age would also be much higher in 2101, 55.5 years as opposed to 47.7 years (see Appendix B, Table B1).

But here we are talking of the normal ageing associated with a stable stationary population. This is not a demographic disease. Indeed, if we look beyond the stereotypes, the future of a more mature population is promising. As the proportion of infants eases and that of capable elders grows, there will be more real human resources for work, for caring, and for building strong communities.

## 8 Mass immigration as a cure for ageing

Despite the strong case put forward by the positive side, negative images are hard to shift and negative voices have been loud in the debate. These voices have long called for high immigration as a cure for ageing.[128] So, assuming we wanted to make the age-structure younger, would high immigration work?

To find out we can compare two population projections published by the ABS in November 2013, the stable stationary projection and one we can call *high growth* (the ABS calls them projection series 56 and series 1A). As we have seen, *stable* assumes a TFR of 2.0 and nil net migration. *High growth* also assumes a TFR of 2.0 but adds in net migration of 280,000 a year. The ABS has produced two entire sets of projections, 12 with high life expectancy at birth (the increase to 92.1 and 93.6 years mentioned in section 7) and 12 with medium life expectancy. This paper draws only on the ones with high life expectancy,[129] an assumption shared by both the *stable* and *high growth* projections. For commentators who fear demographic ageing this is the worse case scenario. For those who welcome the reproductive revolution, the 'historically unrepeatable shift in the efficiency of human reproduction',[130] it is the better case scenario.

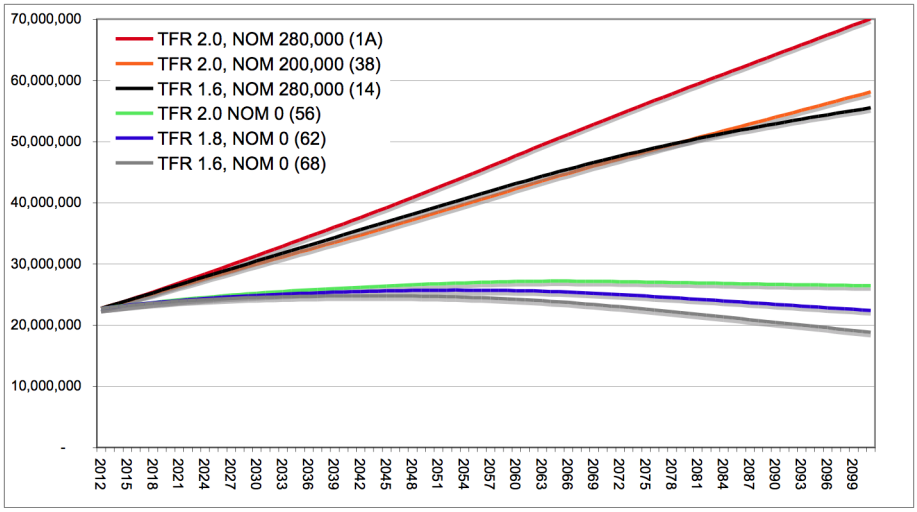
If we were to follow the stable path the population would grow from 22.7 million in 2012 to just over 27 million in 2066 and stay at around 26 to 27 million thereafter. The median age would rise from 37.3 in 2012 to around 47 in 2063 and then stabilise.

But so far we are not heading down this path. Instead governments have opted for immigration-fuelled population growth. From 2003 to 2012 the TFR has averaged 1.9[131] but immigration has ballooned to record levels. The average (mean) annual net intake from December 2006 to December 2012 was 228,343. In the penultimate projection series published by the ABS in 2008 a NOM of 220,000 per annum was the high-growth migration assumption.[132] Ironically it is now close to the low-growth assumption (NOM 200,000), and a NOM of 280,000 is the current high-growth assumption. Though NOM has only hit, or surpassed, this projected figure on one occasion in the six years from 2006 to 2012 (it was 315,700 in 2008), the current average figure for NOM is unprecedented. During the so-called high-migration years of the 1950s and 1960s the average net intake was just under 90,000 a year.[133]

Some analysts prefer to express net migration figures as a percentage of the previous year's population. If the absolute number for net migration remains constant, this percentage measure will always show a decline year-on-year, because the base population on which it is calculated will have grown. Indeed if net migration expressed as a percentage were to remain constant the base population would be growing exponentially. In fact if we express net migration to Australia as a percentage from 1950 to 2012, not only has the figure not declined, it has increased. In percentage terms the increase in population from net migration averaged 0.9 per cent from 1950 to 1969. From 2006 to 2012 it averaged 1.06 per cent. Thus the intake is not only now much higher in numerical terms, it is higher in percentage terms, and if it were to remain at this percentage level (or at any constant level in percentage terms) the nation would indeed be growing exponentially.[134]

Figure 10 shows six of the projections from the 2013 series. All assume high life expectancy but the fertility and migration assumptions vary in such a way that the six projections form two sets. The three in the first set assume nil net migration (balanced migration — number of arrivals equals number of departures),[135] but different levels of fertility. The three in the second set include one with a TFR of 2.0 and 'low' NOM while the other two both have high NOM and different levels of fertility. Comparing the two sets demonstrates that high levels of NOM, whether they be 200,000 per year or 280,000, make an enormous difference to the eventual size of the population. Indeed there is no end to expansion; the three projections in the second set are still growing briskly in 2101.

**Figure 10: Australia, population growth, 2012 to 2101, selected projections series**




Source: Projection series published online with *Population Projections, Australia, 2012 to 2101*, Catalogue no. 3222.0, ABS, 2013

Note: All of the six projection series shown assume high life expectancy, that is life expectancy at birth rising gradually from the 2009-2011 levels of 79.8 years for males, and 84.2 years for females to 92.1 years for males and 93.6 years for females.

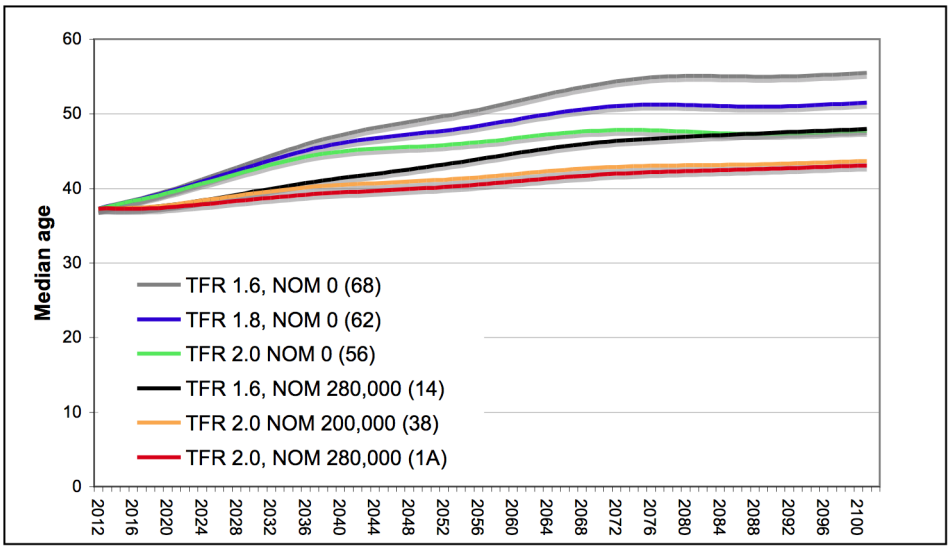
In the key TFR stands for total fertility rate and NOM for net overseas migration per year. The number in brackets is the number used by the ABS to label the projection series.

Australia is getting bigger but, if governments maintain these levels of immigration, are we going to get younger? Up to a point, yes. If we embraced the *stable* projection (series 56) the median age would rise from 37.3 in 2012 to 46.8 in 2061 and then stabilise between 47 and 48. But if we were to stay on the path mapped out by the *high-growth* projection (series 1A) the median age would rise to 43 in 2101 though it would still be increasing then, albeit slowly.

High net migration does make us a few years younger: a median age of 43 instead of 47. But like most magic spells there is a catch. This is massive population growth, including many more older people. For example, in 2061 *high growth* would result in 48 million people. The size of the population aged 65 plus would also have risen from 3.2 million in 2012 to over 18 million in 2101. And the numbers of older people and the total population would both still be growing. (The *stable* projection has the numbers aged 65 plus in 2101 holding steady at 8.3 million.)

Figure 11 illustrates the consequences for the median age of each of the six projections shown in Figure 10. A comparison of the two graphs shows that, while the positive NOM series produce high growth, they make only a marginal difference to the median age. Indeed projection series 14 (TFR 1.6 and NOM 280,000) leads to a population of 55.5 million in 2101, but one that is marginally older than the *stable* projection of series 56 (and, of course, one that is still growing).

**Figure 11: Australia, changes in the median age, 2012 to 2101, selected projection series**




Source and notes: See Figure 10

Projection series 68, which assumes a TFR of 1.6 and nil net migration is the one that produces the highest median age, 51.8 in 2061 and 55.5 in 2101. Assuming that we do not want to have a population with a median age as high as this, that we do want to avoid hyper-ageing, what is the most efficient way of arriving at a more youthful median age?

Table 1 takes series 68 as the benchmark and shows the relative effects of other fertility and migration assumptions on the median age in 2061. Table 2 sets out the same analysis for 2101.

**Table 1: Australia, median age in 2061, six projections, the demographic cost in population growth needed to reduce the median age by one year, relative to projection series 68**

| Assumptions and projection series | Median age in 2061 | Fall in median age, in years, relative to series 68 | Population in 2061 | Difference in size relative to series 68 | Population growth, relative to series 68, needed to reduce the median age by one year |
|---|---|---|---|---|---|
| TFR 1.6, NOM 0 (68) | 51.8 | — | 24,128,647 | — | — |
| TFR 1.6, NOM 200,000 (50)* | 46.0 | 5.78 | 38,405,766 | 14,277,119 | 2,468,513 |
| TFR 2.0, NOM 0 (56) | 46.8 | 5.00 | 27,130,131 | 3,001,484 | 599,936 |
| TFR 1.6, NOM 280,000 (14) | 44.8 | 7.00 | 43,528,018 | 19,399,371 | 2,771,295 |
| TFR 2.0, NOM 200,000 (38) | 42.0 | 9.84 | 42,704,395 | 18,575,748 | 1,887,133 |
| TFR 2.0, NOM 280,000 (1A) | 41.0 | 10.83 | 48,264,035 | 24,135,388 | 2,229,008 |

Source: calculated from the projection series published online with *Population Projections, Australia, 2012 to 2101*, Catalogue no. 3222.0, ABS, 2013

Notes: All six of the series shown assume high life expectancy. See note to Figure 10.

* Tables 1 and 2 include projection series 50 (TFR 1.6, NOM 200,000) and omit the projection series 62 shown in Figures 10 and 11. This is because the former is more appropriate for showing the effects of NOM on the median age than the latter, which is a nil-net-migration projection, intermediate between series 68 and 56. (The data for series 62 are shown in Table B1.)

**Table 2: Australia, median age in 2101, six projections, the demographic cost in population growth needed to reduce the median age by one year, relative to projection series 68**

| Assumptions and projection series | Median age in 2101 | Fall in median age, in years, relative to series 68 | Population in 2101 | Difference in size relative to series 68 | Population growth, relative to series 68, needed to reduce the median age by one year |
|---|---|---|---|---|---|
| TFR 1.6, NOM 0 (68) | 55.5 | | 18,815,594 | | |
| TFR 1.6, NOM 200,000 (50)* | 48.8 | 6.66 | 45,370,354 | 26,554,760 | 3,988,661 |
| TFR 2.0, NOM 0 (56) | 47.7 | 7.76 | 26,420,621 | 7,605,027 | 979,875 |
| TFR 1.6, NOM 280,000 (14) | 47.9 | 7.55 | 55,501,015 | 36,685,421 | 4,861,626 |
| TFR 2.0, NOM 200,000 (38) | 43.7 | 11.82 | 58,084,029 | 39,268,435 | 3,321,398 |
| TFR 2.0, NOM 280,000 (1A) | 43.1 | 12.41 | 70,056,682 | 51,241,088 | 4,128,126 |

Source and notes: See Table 1

In both Tables 1 and 2 it is clear that reducing the median age by one year via high migration is expensive in terms of numbers of extra people, with all their added pressure on infrastructure, cities, services and resources. By 2101 the *high-growth* series (1A), which assumes a TFR of 2.0 and a NOM of 280,000 per year, costs up to 4.1 million extra people per one year shaved off the benchmark age of series 68. In contrast, series 56 (the *stable* projection) costs only 0.98 million extra people per extra year of youthfulness. It is also a much more cost-effective method of reducing the median age than is projection series 14, with a TFR of 1.6 and NOM of 280,000. Series 14 leads to an older median age in 2101 than does the *stable* projection series but nonetheless adds 4.8 million extra people for every year shaved off the age of the benchmark series.

The message from the 2013 set of projections is clear. If policy makers genuinely want to minimise demographic ageing at the least cost, the most effective way of doing this is to support the two-child family and minimise net migration.

Appendix B sets out the median age in 2061 and 2101 for all 24 projections, the 12 assuming high life expectancy and the 12 assuming medium life expectancy. The stable stationary projection for the medium-life-expectancy group is series 59; it produces a median age of 44.6 in 2061 and 44.8 in 2101. See Table B1 and B2.

## 9 Productivity, ageing and population growth

A major concern of the recent Productivity Commission report on demographic ageing is funding the investment that will be needed to provide the infrastructure for a rapidly growing population (as well as for an older one). The Commission estimates that this population growth will place considerable pressure on Australia's cities — for example Sydney and Melbourne may, they believe, grow by around three million each over the next 50 years. The total public and private investment required over that period is five times the total that was required over the last 50 years.[136] The Commission does not report what this figure would be if the population-growth component in their projections were to be moderated. But the prospects of achieving the capital deepening needed for enhanced productivity must be severely weakened by the need to invest so much in the infrastructure required for capital widening.

As we have seen, labour-force participation rates are already rising and, controlling for sex and age, immigrants have lower participation rates than do the Australian-born. (This is not to deny that their actual age structure at the time of arrival is younger than that of the host of population, and could therefore have a temporary effect on participation.) But what of productivity?

Treasury argues that: 'Productivity is the key to higher economic growth in the face of an ageing population' and that a 'growing population assists in managing the pressures of an ageing population and provides the skills needed for continue economic growth'.[137] But its 3Ps approach to Australia's future economic welfare—enhancing population growth, labour-force participation and productivity—does tend to treat the three variables as if they were independent of each other.

Leaving aside the costs of congestion, duplication of infrastructure, and declining amenity, Bob Carr's panel report to the Gillard Government's inquiry into a sustainable population for Australia has already established that there is no relationship between population growth and economic growth as defined by growth in per capita GDP.[138] But for various reasons advocates of the negative case on ageing may be more interested in overall growth in GDP than in per capita growth. For example, some economists claim that population growth leads to economies of scale and that it can foster the productivity-enhancing use of new technology. Against this is the contrary argument that any increase in productivity derived from these causes could be nullified by the diseconomies of scale produced by congestion and strained infrastructure.

Treasury does acknowledge that the population growth it advocates will add to pressures on infrastructure, services and the environment.[139] But groups that adopt the negative position on ageing tend to ignore these caveats and claim that immigration-boosted population growth will in itself increase productivity; the former is causally linked to the latter and thus can help pay for the costs that they believe ageing will impose.[140] These claims rest on conjecture. In contrast an empirical analysis of the effects of an emphasis on city building to accommodate an expanding population shows that, in Melbourne at least, population growth is linked to a sharp relative decline in productivity.[141]

A recent paper by Peter McDonald and Jeromey Temple uses mathematical modeling to estimate the effect of immigration on growth in per capita GDP.[142] When it comes to the key findings they do not to base their model on empirical work. Rather they begin with the assumptions that migrant workers are either as productive, or more productive, than Australian-born workers.[143] (It is also taken as given that the migrant population's more youthful age-structure will lead to higher levels of labour-force participation.)[144]

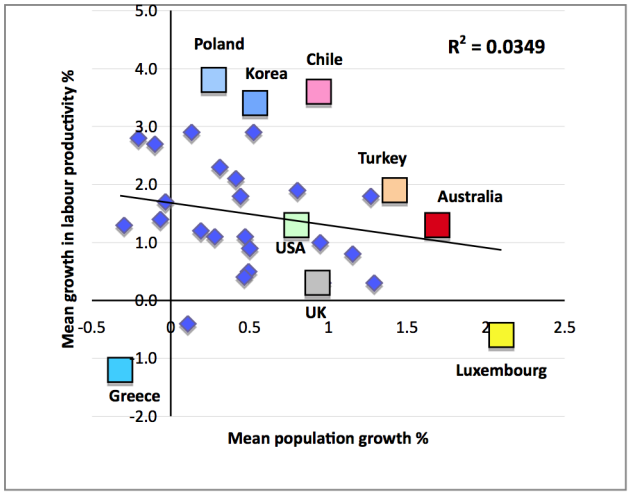
There is a wealth of empirical data on the difficulty that even skilled migrants with university degrees have in finding any work, let alone work that is commensurate with their qualifications.[145] So these assumptions about migrant workers' productivity are puzzling. The model also makes no allowance for infrastructure costs, or for increased demand for services, or for the impact of population growth on congestion and pollution.[146]

Despite these starting assumptions, McDonald and Temple's model finds only a miniscule difference in growth in per capita GDP between different levels of NOM. For example when they compare the rate of this growth between a scenario with a NOM of 100,000 per annum with one of 180,000, by 2023, their model predicts an annual increase in growth in per capita GDP of 0.1 per cent or less, with even smaller gains by 2053.[147] This is at the cost of adding an extra five million people should the higher level of NOM be pursued.[148]

Proponents of immigration-fuelled population growth who claim that this will increase productivity are short on evidence. Just as international comparisons have found no association between a country's age structure and rates of labour-force participation, so do such comparisons show no association between population growth and growth in labour productivity. This is not surprising. It would be illogical to expect a policy that strains infrastructure and increases congestion to boost output per hour of labour at the same time (unless there were powerful countervailing forces).

Figure 12 draws on international comparisons and shows a slight (statistically insignificant) negative association between population growth and growth in productivity. There is no sign of the positive association that the proponents of population growth assume.

**Figure 12: Growth in labour productivity by population growth, 32 OECD countries, 2009 to 2012**




Sources: OECD.StatExtracts for labour productivity and for population growth except for Australian population growth. The 32 countries were: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand , Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Turkey, United Kingdom, United States.
Notes: The OECD defines labour productivity as GDP per hour worked.
ABS data were used for Australia's population growth rate as the OECD data had not been recalibrated in the light of the 2011 census.

Assertions that immigration-fuelled population growth will boost productivity remain conjectural. There is no empirical evidence that such growth in an advanced economy increases productivity. This means that advocates of population growth are left with the argument that it should be pursued in order to reduce the average age of the population. It may do so, to a limited degree, but adopting this strategy represents a considerable effort for a minor reduction in the median age. This costly benefit would also be fleeting. As no population can grow for ever, the median age of 47.5 would still be waiting for us when we slowed down.

In contrast the balanced migration route of the stable projection (series 56) would lead to a stable number of older people: around 8.3 million out of a 26.5 million. We would have turned 47.5 faster, but with much less stress.

## 9 Conclusion

Labour-force participation rates are rising, especially for women and for older people of both sexes. Given lower levels of age-based discrimination and more job opportunities they could well rise even higher. Nevertheless as Australia gradually moves through its current phase of enjoying the demographic dividend the proportion of the total population in the labour force will fall. But it will not fall to levels as low as those experienced in the 1960s, and even modest increases in per capita economic growth will mean that demographic ageing is affordable.

Medical research also shows that the physical and mental health of older people is improving, and that only seven per cent of Australia's recent increase in health-care costs is due to aging.

Calculations based on recent projections published by the ABS show that, in most instances, projected increases in the median age are manageable. They also show that even very high levels of net overseas migration have a limited effect on the median age while adding large absolute numbers to the elderly population. If policy makers want to minimise demographic ageing, supporting the two-child family is a far more cost-effective approach than running large immigration programs.

An older age structure has many benefits. Besides, the only way to avoid it on a long-term basis is to have large families and die young. We have tried hard to escape from this way of life and, now that we have, we can reap the benefits. Frantic efforts to make Australia younger by making it bigger are no more rational than a middle-aged person trying to look younger by gaining 40 kilos. It might smooth out some wrinkles but the behaviour would be bizarre, the cost would be high, and the effects would not last.

There are serious points to consider in the negative case, but it is odd that so many of its proponents are so uncivil. It is many decades since misanthropes have suggested that it would be a blessing if some unpopular minority could be diluted by a superior sort of person or, better still, die off. Older Australians are more than pulling their weight and, though we don't need any more speech taboos, rather more courtesy from the negative side would make for a kinder ambience. Such an ambience would also be conducive to further increasing older people's participation in the workplace and the wider society.

As we practice our civility we could also contemplate our liberation from the demography of the past. There may be some clouds over the sunny uplands — no real story has a totally happy ending. But the prospect is far more pleasing than either a return to the nineteenth century or a journey to an overcrowded future blighted by demographic obesity. An older age structure is no disaster; like other advances in human wellbeing, it is one of our triumphs.

## Appendix A

**Table A1: Disability rates by age and sex, Australia, 2003, 2009 and 2012**

| *Age group* | *2003 males %* | *2003 females %* | *2009 males %* | *2009 females %* | *2012 males* | *2012 females* |
|---|---|---|---|---|---|---|
| 0–4 | 4.7 | 3.9 | 3.9 | 2.8 | 3.7 | 3.5 |
| 5–14 | 12.4 | 7.5 | 11.4 | 6.1 | 11.2 | 6.2 |
| 15–24 | 8.9 | 9.0 | *6.7 | *6.6 | 7.8 | 8.0 |
| 25–34 | 11.7 | 9.7 | *8.8 | 8.5 | 8.5 | 8.9 |
| 35–44 | 14.5 | 13.9 | 12.8 | 12.9 | 11.2 | 11.7 |
| 45–54 | 21.6 | 21.5 | *17.2 | *18.8 | 17.5 | 18.6 |
| 55–59 | 28.7 | 31.9 | 26.7 | 28.7 | 26.4 | 25.6 |
| 60–64 | 40.6 | 37.1 | *35.0 | 36.9 | 32.5 | 33.0 |
| 65–69 | 42.6 | 38.6 | 42.2 | 38.0 | 39.9 | 39.2 |
| 70–74 | 49.5 | 49.8 | 48.5 | 47.7 | 43.5 | 44.7 |
| 75–79 | 60.1 | 57.2 | 55.2 | 51.8 | 56.2 | 55.2 |
| 80–84 | 72.9 | 68.6 | 66.6 | 64.1 | 66.7 | 66.5 |
| 85–89 | 75.0 | 78.9 | 80.4 | 76.1 | 77.1 | 79.9 |
| 90 and over | 90.9 | 92.6 | 90.0 | 87.7 | 89.1 | 84.6 |
| *Total* | *19.8* | *20.1* | **18.1* | **18.9* | *18.0* | *19.0* |
| *Total, age standardised* | *20.4* | *19.1* | **18.1* | **17.3* | *NA* | *NA* |

Sources: 44300DO001_2009 Disability, Ageing and Carers, Australia: Summary of Findings, ABS, 2009; 44300DO001_2012 Disability, Ageing and Carers, Australia: Summary of Findings, 2012, Table 3.1 (electronic files)
Note: * Indicates that difference between the 2003 and 2009 rates is statistically significant.
The disabilities recorded include all types of disability: those that limit core activities either profoundly, severely, moderately or mildly, and those that impose no specific limitations, or which affect only schooling or employment. See ABS, *Disability, Ageing and Carers: Summary of Findings, Australia 2009, Catalogue no. 4430.0*, ABS, Canberra, 2010, p. 4. These criteria did not change between 2009 and 2012, see 4430.0—Disability, Ageing and Carers, Australia: Summary of Findings, 2012, explanatory notes, point 7
<http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4430.0Explanatory+Notes5002012#Chapter4>
The 2012 data have not been analysed for tests of significance, and total age-standardised rates are not available.

**Table A2: People in residential care, by age, Australia June 1999 and 2012, numbers and residents in care as a percentage of the population aged 65 plus**

| *Age groups* | *1999* *Population* | *Residents in care* | *Residents as %* | *2012* *Population* | *Residents in care* | *Residents as %* |
|---|---|---|---|---|---|---|
| 65–69 | 675,852 | 4,576 | 0.68 | 1,023,673 | 5,705 | 0.56 |
| 70–74 | 624,163 | 9,824 | 1.57 | 755,398 | 9,603 | 1.27 |
| 75–79 | 490,129 | 18,783 | 3.83 | 572,867 | 16,916 | 2.95 |
| 80–84 | 293,944 | 28,657 | 9.75 | 445,809 | 32,504 | 7.29 |
| 85–89 | 164,613 | 35,134 | 21.34 | 279,684 | 46,305 | 16.56 |
| 90 plus | 72,925 | 29,504 | 40.46 | 140,624 | 49,751 | 35.38 |
| Total 65 plus | 2,321,626 | 126,478 | 5.45 | 3,218,055 | 160,784 | 5.00 |

Sources: Calculated from Residential aged care facilities in Australia 1998, A statistical overview, Table 2.2 < http://www.aihw.gov.au/publication-detail/?id=6442467053>, and Residential and community aged care supplementary data <https://www.aihw.gov.au/aged-care/residential-and-community-2011-12/data/> and 3101.0 Australian Demographic Statistics, Table 59, Estimated resident population by single year of age, Australia (electronic file).
Note: People aged 80 plus (n=531,482) constituted 22.0 per cent of the population aged 65 plus in 1999 and 26.9 per cent in 2012 (n=866,117).

## Appendix B

**Table B1: Australia, median age and total population, 2061 and 2101, 12 projections, high-life-expectancy projection series**

| *TFR* | *NOM pa* | *Projection series* | *Median age in 2061* | *Population in 2061* | *Median age in 2101* | *Population in 2101* |
|---|---|---|---|---|---|---|
| 1.6 | 0 | 68 | 51.8 | 24,128,647 | 55.5 | 18,815,594 |
| 1.6 | 200,000 | 50 | 46.0 | 38,405,766 | 48.8 | 45,370,354 |
| 1.6 | 240,000 | 32 | 45.4 | 40,967,843 | 48.3 | 50,436,661 |
| 1.6 | 280,000 | 14 | 44.8 | 43,528,018 | 47.9 | 55,501,015 |
| 1.8 | 0 | 62 | 49.3 | 25,595,846 | 51.5 | 22,375,800 |
| 1.8 | 200,000 | 44 | 44.0 | 40,513,164 | 46.2 | 51,375,030 |
| 1.8 | 240,000 | 26 | 43.4 | 43,183,485 | 45.8 | 56,883,502 |
| 1.8 | 280,000 | 8 | 42.9 | 45,851,744 | 45.5 | 62,389,477 |
| 2.0 | 0 | 56 | 46.8 | 27,130,131 | 47.7 | 26,420,621 |
| 2.0 | 200,000 | 38 | 42.0 | 42,704,395 | 43.7 | 58,084,029 |
| 2.0 | 240,000 | 20 | 41.5 | 45,485,266 | 43.3 | 64,071,641 |
| 2.0 | 280,000 | 1A | 41.0 | 48,264,035 | 43.1 | 70,056,682 |

Source: Data published online with *Population Projections, Australia, 2012 (Base) to 2101*, Catalogue no. 3222.0, ABS, November 2013
Note: 'High life expectancy at birth (continued improvement) is assumed for male and female life expectancy, with increases from 2009-11 levels of 0.25 and 0.19 years respectively [ie from 79.75, males, and 84.21, females see *ibid*. p. 19], until 2060-61. Based on this assumption, male life expectancy would reach 92.1 years in 2060-61 and female life expectancy would reach 93.6 years' (*ibid*. p. 9).

**Table B2: Australia, median age and total population, 2061 and 2101, 12 projections, medium-life-expectancy projection series**

| *TFR* | *NOM pa* | *Projection series* | *Median age in 2061* | *Population in 2061* | *Median age in 2101* | *Population in 2101* |
|---|---|---|---|---|---|---|
| 1.6 | 0 | 71 | 49.6 | 22,714,123 | 51.8 | 17,117,492 |
| 1.6 | 200,000 | 54C | 44.5 | 36,775,636 | 46.2 | 42,385,964 |
| 1.6 | 240,000 | 35 | 43.9 | 39,304,246 | 45.8 | 47,214,296 |
| 1.6 | 280,000 | 17 | 43.4 | 41,830,945 | 45.5 | 52,040,592 |
| 1.8 | 0 | 65 | 47.1 | 24,176,853 | 48.2 | 20,610,565 |
| 1.8 | 200,000 | 47 | 42.5 | 38,876,797 | 43.8 | 48,298,282 |
| 1.8 | 240,000 | 29B | 42.0 | 41,513,375 | 43.5 | 53,564,333 |
| 1.8 | 280,000 | 11 | 41.4 | 44,147,914 | 43.3 | 58,828,088 |
| 2.0 | 0 | 59 | 44.6 | 25,706,389 | 44.8 | 24,585,106 |
| 2.0 | 200,000 | 41 | 40.5 | 41,061,581 | 41.5 | 54,909,681 |
| 2.0 | 240,000 | 23 | 40.1 | 43,808,462 | 41.3 | 60,650,629 |
| 2.0 | 280,000 | 5 | 39.7 | 46,553,214 | 41.1 | 66,388,953 |

Source: See Table B1
Note: 'Medium life expectancy at birth (declining improvement) is assumed for male and female life expectancy at birth, with increases of 2009-11 levels by 0.25 and 0.19 years respectively until 2015-16. After this, life expectancy will continue to increase at declining rates. Based on this assumption, male life expectancy at birth is expected to reach 85.2 years in 2060-61 and female life expectancy to reach 88.3 years' (ABS, 2013, op. cit., p. 9).

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## Notes

[1] See for example Alan Reid, 'How Australia may become a senile country', *The Bulletin*, 25 September 1976, p. 25.

[2] See W. D. Borrie, *First Report of the National Population Inquiry*, The Government Printer of Australia, Canberra, 1975, pp. 275, 296, 400. Borrie himself professed no alarm about demographic ageing. See W. D. Borrie, 'Population and our society: some demographic and social interactions', *Journal of the Australian Population Association*, vol. 1, no. 1, 1984, p. 7.

[3] Peter Johnson (member for Brisbane), *Commonwealth Parliamentary Debates: House of Representative*s, 29 April 1976, p. 1798

[4] See for example *Commonwealth Parliamentary Debates: House of Representative*s, Alan Jarman (member for Deakin), 5 October 1976, p. 1501; William Wentworth (member for Mackellar), 22 March 1977, p. 444; Frank O'Keefe (member for Paterson), 19 April 1977, p. 931; Michael MacKellar (member for Warringah and Minister for Immigration), 19 April 1977, pp. 948-9.

[5] See P. Kinnear, *Population Ageing: Crisis or Transition? Discussion Paper No. 45*, The Australia Institute, Canberra, 2001, pp. 1, 19.

[6] See 'Ageing population will add strain to economy—RBA', Australian Associated Press Financial News Wire, 21 July 2005; 'Builders in migration boost call', *The Daily Telegraph*, 4 October 2005, p. 13; H. McDonald, 'Costello signals switch to unskilled migrants', *The Sydney Morning Herald*, 17 October 2005, p. 4; D. Uren, 'Skilled migrants are one solution—Our ageing challenge', *The Australian*, 26 November 2004, p. 4; D. Bassanese, 'Growing pains: Australia fades to grey', *The Australian Financial Review*, 5 September 2003, p. 73; M. Cole, 'Big migration lift to offset ageing nation', *The Courier-Mail*, 24 April 2002, p. 1; T. Walker, 'More action needed to prevent population crisis', *The Australian Financial Review*, 8 May 2002, p. 6; K. Nicholls, 'Immigration only answer to declining population—Hardgrave', *Australian Associated Press General News*, 2 October 2002; M. Steketee, 'Fresh blood keeps the country young', *The Australian*, 6 September 2001, p. 11.

[7] Quoted in L. Gettler, 'Australia faces massive labour shortfall', *The Age*, 19 June 2003, p. 3

[8] S. Balogh and L. McIlveen, 'Greying nation facing huge bill', *The Courier-Mail*, 25 November 2004, p. 1

[9] R. Skeffington, 'The Old and the Deathless: Australia is bracing for a tide of centenarians', *The Wall Street Journal (Online and Print)*, 23 April 2010, p. W15

[10] P. Goers, 'C'mon Aussie, the more the merrier', *Sunday Mail*, 9 May 2010, p. 34

[11] J. Hewett, 'Promises aplenty but pollies ignore looming crisis, a shortage of workers', *The Australian*, 24 October 2007, p. 48

[12] B. Salt, 'The inexorable rise of the opinionated boomer retiree', *The Australian*, 24 May 2012, p. 29

[13] A. Kaletsky, 'Retirement revolution to shake world', *The Australian*, 3 June 2010, p. 11

[14] Carla Wilshire, 'Mongrel Nation', Radio National, broadcast 4 August 2013, transcript at <http://www.abc.net.au/radionational/programs/mongrelnation/a-big-australia/4779942#transcript> accessed 11 September 2013. Australian Bureau of Statistics (ABS) projections published in 2008 which would have been available to Wilshire show that this demographic outcome could only happen if the total fertility rate (TFR) were maintained at 1.6 and if life expectancy rose to 93.9 years for men and 96.1 for women (and if net overseas migration [NOM] were held at zero). See Series 68, published online with *Population Projections, Australia, 2006 to 2101, Catalogue no. 3222.0*, ABS, Canberra, 2008. The TFR (for 2012-13) was 1.951, life expectancy at birth (for 2011) was 79.7 for males and 84.2 for females, and NOM (for 2012) is 235,900. See *Australian Demographic Statistics*, June 2013, Catalogue no. 3101.0, published December 2013, p. 46, and *Deaths, Australia, 2011*, ABS, Catalogue no 3302.0, on line. Wilshire has taken the most extreme of the 24 projection series published by the ABS in 2008. (These have been superceded by a new series published in November 2013, see section 8 this paper.) Even if Wilshire's chosen projection came to pass only 2.5 per cent of the population (five per cent of 50 per cent) would be in nursing homes. See data in Table A2 this paper.

[15] Data calculated from S. Wilson *et al*., Australian Survey of Social Attitudes, 2005, [computer file] Canberra: Australian Social Science Data Archive, The Australian National University, 2006 (unweighted data)

[16] The only reason outranking this was 'economic growth' (35.4 per cent). Data calculated from The Australian Survey of Social Attitudes [Computer file], Canberra: Australian Social Science Data Archive, The Australian National University, 2010, final-release data. Data are weighted.

[17] *Deaths Australia 2010*, Catalogue no. 3302.0, ABS, 2011, p. 16

[18] Borrie, *First Report of the National Population Inquiry*, 1975, op. cit., pp. 46, 40 (data for numbers of children born to unmarried women not available)

[19] In 2012-13 91,761 former residents left Australia permanently. See *Australian Demographic Statistics, June Quarter 2013*, December 2013, ABS, Catalogue no. 3101.0, p. 52. This means that in that year Australia could have accepted an equal number of permanent immigrants and still have achieved nil net migration.

[20] K. Betts, 'Population ageing in Australia: policy implications of recent projections', *People and Place*, vol. 16, no. 4, 2008, pp. 43-51

[21] It is series 56, published online with *Population Projections, Australia, 2012 (Base) to 2101*, Catalogue no. 3222.0, ABS, Canberra, November 2013.

[22] J. MacInnes and J. Pérez Díaz, 'The reproductive revolution', *The Sociological Review*, vol. 57, no. 2, 2009, pp. 262-284

[23] See for example B. Salt, *The Big Tilt*, Hardie Grant Books, Melbourne, 2011, pp. 7-20.

[24] See 'Infographic: Australians who don't pay tax—what would Romney say?' *The Australian Financial Review*, 25 September 2012 . This is based on the 2011 census. See <http://www.afr.com/p/national/infographic_australians_who_don_IiBi6f6xdQiVcDGLGsQJWM> accessed 7 February 2014.

[25] Unfortunately labour-force participation rates can't tell us if the participants are earning enough to also be net tax payers, and some are in fact unemployed.

[26] The median is used instead of the mean because age distributions have been skewed towards youth, and can also be distorted by a handful of very old people.

[27] For a history of the collection of the statistics see 'A brief history of the labour force survey', *Fifty Years of Labour Force Statistics: Now and Then (from Australian Social Trends, Dec 2011, Catalogue no. 4102.0)*, ABS, 2011.

[28] From January 2000 to January 2014 participation rates were negatively correlated with unemployment rates: based on monthly data, R squared for the period is 0.5446 so the negative association was strong. Calculated from data in 6202.0 Labour Force, Australia, Table 01, Labour force status by Sex—Trend ABS, Time Series Workbook (January 2014).

[29] *ibid*.

[30] Calculated from data for February in *Labour Force, Australia, Detailed—Electronic Delivery*, Table 01, Catalogue no. 6291.0.55.001, ABS, January 2014 (January data used for 2014)

[31] In 2009 Ernest Healy documented the sharp increase in labour-force participation for people aged 55 plus, especially women. See E. Healy, 'Population ageing and the employment surge among older Australian workers', *People and Place*, vol. 17, no. 2, 2009, p. 5.

[32] See *Labour Force, Australia, Detailed—Electronic Delivery*, January 2014, op. cit.

[33] *ibid*.

[34] The data for people age 65 to 69 are for 2012. See *Australia's Welfare 2013*, Australian Institute of Health and Welfare, Canberra, 2013, p. 251.

[35] Those aged 65 plus were 9.2 per cent of the population aged 15 plus in June 1978 and 14.2 per cent in June 2012. The figure for 1978 is calculated from Australian Demographic Statistics Table 9, estimated resident population by single year of age, Australia, electronic copy, Time series workbook, Catalogue no. 3101.0. The figure for June 2012 is calculated from *Australian Demographic Statistics, December 2012*, Catalogue no. 3101.0, published June 2013, ABS, p. 64 (provisional estimate).

[36] See Salt, *The Big Tilt*, 2011, op. cit.

[37] Median ages calculated from *Australian Demographic Statistics*, Catalogue no. 3101.0, ABS, various issues

[38] The ratios including children are approximate because, in the case of the 1978 data, the estimates for children aged 0-14 are for June 1978 not February, and those for 2013 are for June 2012 not July 2013 (sources *Australian Demographic Statistic*s, Catalogue no. 3101.0, ABS, June 1999 and December 2012, together with ABS Catalogue no. 6291.0.55.001, op. cit.). During the period February 1978 to June 2012, while the proportion of Australians aged 65 plus grew from 8.3 per cent to 14.2 per cent, the proportion of children aged 0 to 14 fell from 28.7 per cent to 18.9 per cent.

[39] C. Young, 'The future population and the future labour force', *People and Place*, vol. 2, no. 4, 1994, pp. 15-21

[40] See W. Smith, 'Ageing population and mining: a tale of two booms', *The Conversation*, 11 September 2013, Figure 1 <http://theconversation.com/ageing-population-and-mining-a-tale-of-two-booms-17953> accessed 19 October 2013.

[41] D. E. Bloom, D. Canning and J. Sevilla, *The Demographic Dividend: A New Perspective on the Economic Consequences of Population Change*, Rand, Santa Monica, 2003

[42] In 1993-95 life expectancy at birth for males was 75.0 and for females 80.8; in 2008-10 it was 79.5 for males and 84.0 for females. *Deaths 2010*, Catalogue no. 3302.0, ABS, 2011, p. 43

[43] The rates for June 2013 have been used here rather than those for January 2014 as the latter are depressed by the school-leaver phenomenon.

[44] If the first, conventional, measure is used, the rate for the population aged 15 plus in 2061 would be 52.8 per cent. The figures are based on applying the actual June 2013 participation rates to the population by age and sex as projected in series 56 published online with *Population Projections, Australia, 2012 to 2101*, November 2013, op. cit. Series 56 approximates to an eventual stable stationary population with high life expectancy. It assumes TFR 2.0, NOM 0, and high life expectancy, where life expectancy at birth rises from its 2009-11 level of 79.75 years at birth for males and 84.21 years for females to 92.1 years for males and 93.6 years for females. (The high life-expectancy figures used in the projections published by the ABS in 2013 were not as high as the ones published in 2008. See note 14.)

[45] The number in the labour force in 1966 was 4,856,455 and the population was 11,550,462. If labour-force participation is calculated as the percentage of the population aged 15 plus in 1966 the participation rate is 59.5 per cent. Calculated from the 1966 census, Volume 1: Population: Single Characteristics; Part 1. Age, and Volume 2: Population: Related Characteristics, Part 4. The Work Force. See <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/2106.01966?OpenDocument>.

[46] *Measures of Australia's Progress, 2010,* Catalogue no. 1370.0, ABS

[47] Calculated with data for 1966 from 6204055001TS0001 Labour Force Historical Timeseries, Australia—Labour Force Status by Sex and Marital Status, Table 4: Labour Force Status of the Civilian Population aged 15 years and over—1966-1977.

[48] The 1966 data on poverty are from Ronald Henderson, quoted in P. Mendes, *Australia's Welfare Wars Revisited*, University of New South Wales Press, Sydney, 2008, p. 24; they refer to households. The 2012 data refer to individuals: see *Poverty in Australia: ACOSS Paper 194*, Australian Council of Social Service, 2012, p. 7.

[49] This is on an index where 1972-75 equals 100: the cost of housing rose from 90 (in 1972) to 250 in 2007. See R. Battellino (Deputy Governor of the Reserve Bank), *Background Notes for Opening Remarks to Senate Select Committee on Housing Affordability in Australia. Melbourne – 24 April 2008*, 2008, Chart 1, p. 2.

[50] Strictly speaking it is 69 per cent of employment that was full-time; a full-time worker might also have had a part-time job. Figure calculated from *Labour Force, December 2013*, Catalogue no. 6202.0, ABS, p. 1.

[51] Labour-force participation by the first, conventional, measure would be 54.9 per cent of the population aged 15 plus in 2061. The 2005 Swedish participation rates, by age and sex, are from B. Birrell, E. Healy, K. Betts and T. F. Smith, *Immigration and the Resources Boom Mark 2*, Centre for Population and Urban Research, Monash University, July, 2011, p. 46. The projection is ABS November 2013 series 56, op. cit.

[52] Calculated from OECD data at oecd.org—country snapshots, employment to population ratio, older workers (% population aged 55-64), accessed 24 January 2014

[53] Deloitte present findings on the likelihood of this, and the economic benefits that would flow from such a further increase. See Deloitte Access Economics, *Increasing participation among older workers: The grey army advances—Report prepared for the Australian Human Rights Commission*, Deloitte Access Economics Pty Ltd, Barton, ACT, 2013.

[54] M. Cully, 'Adding migrants to the mix: the demography of the labour force participation rate, 2000 to 2010', *Australian Bulletin of Labour*, vol. 39, no. 2, 2013, pp. 2-12. Cully finds that migrants aged 15 plus have a lower labour-force participation rate than the Australian-born. In 2010, controlling for age and sex, the gap was around 5.9 percentage points for men and 7.3 percentage points for women. See Table 1, p. 7. See also B. Birrell and E. Healy, *The Impact of Recent Immigration on the Australian Workforce*, Centre for Population and Urban Research, Monash University, 2013 (February).

[55] See J. O'Sullivan 'Ageing paranoia, its fictional basis and all too real costs', in J. Goldie and K. Betts (Eds), *Sustainable Futures—Linking Population, Resources and the Environment*, CSIRO Publishing, Canberra (2014 forthcoming). This paper was initially delivered at the Fenner Conference for 2013, sponsored by the Australian Academy of Science, Canberra, 10-12 October 2013.

[56] For Japanese data see Table 14: Labour force participation by age, Labour force survey, December 2013 <http://www.stat.go.jp/english/data/roudou/results/month/index.htm> accessed 26 February 2014. See also NKRP, 'Japan leads world in elderly employment', *Nikkei Report*, 18 February 2014 (Factiva data base, accessed 26 February 2014). The Australian data are for July 2013 and come from the ABS Time series workbook 6291.0.55.001 Labour Force, Australia, Detailed—Electronic Delivery. July 2013.

[57] See 'The baby boomers are the single biggest generational cohort ... The generation that follows them is much smaller, as is the one after that' in P. Van Onselen, 'Pollies are blind to the bigger picture', *The Australian*, 14 May 2011, p. 14. Boomers 'shuffling away..' in Editorial, 'Challenges of the "baby bust"', *The Australian*, 18 October 2010, p. 15.

[58] B. Salt, 'Inconvenient truth on ageing', *The Australian*, 4 February 2010, p. 33

[59] S. D. King, *When the Money Runs Out: The End of Western Affluence*, Yale University Press, New York, 2013, p. 243

[60] Data calculated from Australian Demographic Statistics, Table 59, Estimated Resident Population by single year of age, Australia, Catalogue no. 3101.0, ABS, 2013 (electronic file)

[61] The actual proportions are as follows: 0-19 20.75%, 20-39 21.01%, 40-59 21.63 %, 60-79 20.64%, 80 plus 15.98%. See projection series 56 published on line with ABS 2013, op. cit.

[62] Age discrimination was also more prevalent than discrimination on the basis of gender. M. Hahn and R. Wilkins, *Perceived job discrimination in Australia: its correlates and consequences (Working Paper No. 9/13)*, Melbourne Institute of Applied Economic and Social Research, Melbourne, 2013, pp. 7, 21

[63] See R. Martin, C. Williams and D. O'Neill, 'Retrospective analysis of attitudes to ageing in *The Economist*: apocalyptic demography for opinion formers?' *British Medical Journal, doi: 10.1136/bmj.b4914*, vol. 339, 19-26 December 2009, pp. 1435-1437.

[64] *Fact or fiction? Stereotypes of older Australians*, Australian Human Rights Commission, Sydney, 2013, pp. 5, 8

[65] See Figure 6.1, *An Ageing Australia: Preparing for the Future*, Productivity Commission, Melbourne, 2013, p. 178.

[66] Australian Law Reform Commission, *Grey Areas—Age Barriers to Work in Commonwealth Laws: ALRC Discussion Paper 78*, Commonwealth of Australia, Canberra, 2012, p. 126

[67] See D. G. Blanchflower and A. J. Oswald, 'Is well-being U-shaped over the life cycle?' *Social Science and Medicine*, vol. 66, no. 2008, pp. 1733-1749.

[68] *Australia's Welfare 2013*, Australian Institute of Health and Welfare, Canberra, 2013, p. 388

[69] J. Daley, *Budget pressures on Australian Governments*, Grattan Institute, Melbourne, 2013, pp. 20, 16.

[70] See *Taxation Revenue, Australia, 2011-12*, Catalogue no. 5506.0, ABS, April 2013 ('Total taxation revenue—summary' and 'Major components of total taxation revenue').

[71] Researchers working for the Productivity Commission describe the former as capital income and the latter as labour income. In 2009-10 average individual income from capital was around $165 per week compared with an average of around $1100 per week from labour. (These sums give a weekly total of $1265, and $1100 is 87 per cent of this total.) See J. Greenvill, C. Pobke and N. Rogers, *Trends in the Distribution of Income in Australia: Productivity Commission Staff Working Paper*, Productivity Commission, Melbourne, 2013, pp. 50, 51.

[72] *Taxation Revenue, Australia, 2011-12*, Catalogue no. 5506.0, ABS, April 2013, op. cit.

[73] Peter Martin presents figures showing that, in 2011-12, negative gearing of property diminished revenue by $5 billion. Reducing tax advantages for family trusts would offer a saving of $1 billion and re-imposing income tax on superannuation payouts would save a further $2 billion. Thus reforming these three policies could add $8 billion to taxation revenue, an increase on $390 billion of 2.05 per cent. See P. Martin, 'Negative gearing losses a key drain on revenues', *The Sydney Morning Herald*, 1 May 2013, p. 8.

[74] See Daley, *Budget pressures on Australian Governments,* 2013, op. cit., p. 20

[75] See 'Age Pension: Assets test thresholds rise 20 September 2013' <http://www.superguide.com.au/how-super-works/age-pension-when-are-the-thresholds-for-the-assets-test-increased> accessed 26 February 2014.
[76] See Department of Human Services <http://www.humanservices.gov.au/customer/services/centrelink/age-pension> accessed 27 November 2013. See also the Centrelink Age Pension Calculator at <http://yourpension.com.au/APCalc/index.html>.
[77] See 'Assets that are assessed under the assets test …the value of any real estate, including holiday homes, you own (this does not include your principal home)' <http://www.humanservices.gov.au/customer/enablers/assets> accessed 26 February 2014. See also P. Karvelas, 'Pension hike sees seniors join ranks of middle class', *The Australian*, 19 February 2014, p. 5. (This article is accompanied by a photo of a cheerful pensioner couple seated by the pool outside their Gold Coast mansion.)
[78] See Department of Human Services, Pensioner Concession Card <http://www.humanservices.gov.au/customer/services/centrelink/pensioner-concession-card>.
[79] See <http://www.humanservices.gov.au/customer/services/centrelink/commonwealth-seniors-health-card> accessed 11 March 2014. See also Trish Power, 'Are you eligible for the Commonwealth Seniors Health Card' at <http://www.superguide.com.au/how-super-works/are-you-eligible-for-a-commonwealth-seniors-health-card> accessed 11 March 2014.
[80] See <http://www.humanservices.gov.au/customer/services/centrelink/seniors-supplement> accessed 11 March 2014.
[81] See Trish Power, op. cit., and L. Wilson, 'Seniors health card "is safe"', *The Australian*, 10 March 2014, p. 4.
[82] See <http://www.liberal.org.au/latest-news/2013/08/25/coalitions-policy-index-commonwealth-seniors-health-card> accessed 11 March 2014
[83] Daley, *Budget pressures,* 2013, op. cit., pp. 19-20
[84] J. Daley, *Balancing budgets: Tough choices we need*, Grattan Institute, Melbourne, 2013 (November), p. 37
[85] See Table 1 in Department of Social Services, *Income support customers: a statistical overview 2012: statistical paper no. 11*, Commonwealth of Australia, 2013, p. 2. Age pensioners also made up a larger proportion of all people receiving income support in 2012 than they had in 2002 — 45 per cent as opposed to 37 per cent. (But this is partly explained by a decrease in the relative number of people on other types of benefits.)
[86] Pension data from Table 1 in *ibid*.; population data from 3101.0 Australian Demographic Statistics: Table 59: Estimated resident population by single year of age, Australia
[87] See W. Smith, 'Ageing population and mining: a tale of two booms', *The Conversation*, 11 September 2013. (The Abbott Government intends to continue the first round of income tax cuts introduced by the Gillard Government in July 2012, though not the second round. See S. Maher, 'PM locks in death of carbon tax', *The Australian*, 16 October 2013, pp. 1, 2.)
[88] Ben Phillips, principle researcher at NATSEM, quoted in P. Karvelas, 'Tax cuts fail to spark surge in working hours', *The Australian*, 6 February 2014, p. 4. See also B. Phillips, 'Tax and transfer policy in Australia during the boom years: Presentation ot PPN Conference—31 January 2014', 2014.
[89] *Australia to 2050: Future Challenges (Third Intergenerational Report)*, Department of Treasury, Canberra, 2010, p. 39
[90] 'Whose lost decade?' *The Economist*, 19 November 2011, p. 11
[91] Data on average GDP per capita over the period 2003 to 2013 are from the IMF, quoted in G. Jericho, 'Australia is rich and on top of the world: is it time to pop the champers?' *The Guardian*, 14 October 2013 <http://www.theguardian.com/business/grogonomics/2013/oct/14/australia-wealth-top-world> accessed 16 November 2013.
[92] Calculated with the compound interest formula on the assumption that 2013 equals 100 and that growth per annum is 1.4 per cent.
[93] *An Ageing Australia: Preparing for the Future*, Productivity Commission, Melbourne, 2013, pp. 9-10
[94] R. Guest and I. M. McDonald, 'Prospective demographic change and Australia's living standards in 2050', *People and Place*, vol. 10, no. 2, 2002, pp. 6-15
[95] *Australia to 2050: Future Challenges (Third Intergenerational Report)*, Department of Treasury, Canberra, 2010, p. 59

[96] See Daley, Budget *pressures on Australian Governments,* 2013 op. cit. (The numbers here are approximate because they have been read off a graph. See Figure 9, p. 16.)
[97] S. Duckett and C. McGannon, 'Tough choices: how to rein in Australia's rising health bill', *The Conversation*, 24 April 2013
[98] *ibid*.
[99] M. Coory, 'Ageing and healthcare costs in Australia: a case of policy-based evidence?' *Medical Journal of Australia*, vol. 180, no. 2004, pp. 581-583
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[101] See P. Zweifel, S. Felder and A. Werblow, 'Population ageing and health care expenditure: new evidence on the "red herring"', *The Geneva Papers on Risk and Insurance*, vol. 29, no. 4, 2004, pp. 652-666; J. Spijker and J. MacInnes, 'Population ageing: the timebomb that isn't?' *British Medical Journal, doi:10.1136/bmj.f6598*, vol. 347, 12 November, 2013, p. 1; M. Coory, 'Ageing and healthcare costs in Australia: a case of policy-based evidence?' *Medical Journal of Australia*, vol. 180, 2004, pp. 581-583.
[102] J. F. Fries, 'Aging, natural death, and the compression of morbidity', *The New England Journal of Medicine*, vol. 303, no. 2, 1980, pp. 130-135; A. Swartz, 'James Fries: healthy aging pioneer', *American Journal of Public Health'*, vol. 98, no. 7, 2008, pp. 1163-1166, doi: 10.2105/AJPH.2008.135731
[103] For an overview of both models see Swartz, 'James Fries: healthy aging pioneer', 2008, op. cit.
[104] See G. Banks, *Health costs and policy in an ageing Australia: Health Policy Oration at the Australian National University*, 2008 <http://www.pc.gov.au/speeches/gary-banks/cs20080328> accessed 12 August 2013.
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[109] S. L. Andersen, Paola Sebastiani, D. A. Dworkis, L. Feldman and T. T. Perls, 'Health span approximates life span among many supercentenarians: compression of morbidity at the approximate limit of life span', doi:10.1093/gerona/glr223, *Journal of Gerontology, Biological Sciences*, vol. 67A, no. 4, 2012, pp. 395-405; see also E. B. Larson, K. Yaffe and K. M. Langa, 'New insights into the dementia epidemic', doi: 10.1056/NEJMp1311405, *New England Journal of Medicine*, vol. 369, no. 24, 2013, pp. 2275-7.
[110] See *Disability, Ageing and Carers: Summary of Findings, Australia 2009*, Catalogue no. 4430.0, ABS, Canberra, 2010, together with accompanying spreadsheet.
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[112] J. MacInnes and J. P. Díaz, 'The reproductive revolution', *The Sociological Review*, vol. 57, no. 2, 2009, p. 277
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apocalyptic demography for opinion formers?' *British Medical Journal, doi: 10.1136/bmj.b4914*, vol. 339, no. 2009, pp. 1435-1437.

[114] W. C. Sanderson and S. Scherbov, 'Remeasuring Aging', *Science*, vol. 329, no. 2010, pp. 1287-1288

[115] J. Spijker and J. MacInnes, 'Population ageing: the timebomb that isn't?' *British Medical Journal, doi:10.1136/bmj.f6598*, vol. 347, 12 November, 2013

[116] *Older Australians at a Glance, 4th edition*, Australian Institute of Health and Welfare, 2007, 'Use of health and aged care services', p. 105 (Table 30.1). People over 65, however, accounted for only 26 per cent of visits to GPs.

[117] B. Birrell, L. Hawthorne and V. Rapson, *The Outlook for Surgical Services in Australasia,* Centre for Population and Urban Research, Monash University, Melbourne, 2003, p. 29 (Table 11). Nevertheless, in 2000-01 people aged 65 plus accounted for only 31.2 per cent of hospital procedures.

[118] Fries's research points to the importance of non-smoking, exercise and weight control as explanations for the compression of morbidity. See Fries *et al*., 'Compression of morbidity 1980-2011: a focused review of paradigms and progress', 2011, op. cit. But evidence is also mounting for the independent role of dietary sugar. See Credit Suisse, *Sugar: Consumption at a crossroads*, Credit Suisse Research AG, Research Institute, Zurich, 2013; A. Malhotra, 'The dietary advice on added sugar needs emergency surgery', *British Medical Journal, 10.1136/bmj.f3199*, 21 May 2013.

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[120] MacInnes and Díaz, 'The reproductive revolution', 2009, op. cit., p. 268

[121] 4211.0, Education and Training Newsletter, October 2012, Snapshot: child care by grandparents, ABS

[122] J. Healy, *The Benefits of an Ageing Population: Discussion Paper Number 63*, The Australia Institute, Canberra, 2004, pp. 20-21, 19

[123] Calculated from *Disability, Ageing and Carers: Summary of Findings, Australia 2009, Catalogue no. 4430.0*, ABS, Canberra, 2010, p. 10

[124] *A Juggling Act: Older Carers and Paid Work in Australia*, Productive Ageing Centre: National Seniors Australia, 2013, p. 6

[125] Calculated from Table 1, 44410do001_2010 Voluntary Work, Australia, ABS, 2010, released 1 December 2011

[126] B. Salt, 'Cashing in on boomer plans', *The Australian*, 11 February 2010, p. 33

[127] Calculated from projection series 68 and series 56, published on line with ABS November 2013 op. cit.

[128] See, for example, property developer Gerry Karidis, quoted in M. Owen, 'Crean believes in Big Australia', *The Australian*, 29 September 2012, p. 7, or the chief executive of the Property Council, Peter Verwer, quoted in S. Lunn, 'Population policy "risks wealth"', *The Australian*, 14 May 2011, p. 6, or the President of the Business Council of Australia, Graham Bradley, 'Nation needs population strategy', *Herald Sun*, 1 March 2011, p. 33.

[129] The high-life-expectancy assumption assumes 'increases from 2009-11 levels of 0.25 and 0.19 years respectively [ie from 79.75 years for males, and 84.21 for females], until 2060-61. Based on this assumption, male life expectancy would reach 92.1 years in 2060-61 and female life expectancy would reach 93.6 years'. The medium life-expectancy assumption is that male life expectancy at birth rises to 85.2 years in 2060-61 and to 88.3 years for females. See *Population Projections, Australia, 2012 (Base) to 2101, Catalogue no. 3222.0*, Australian Bureau of Statistics, Canberra, 2013, pp. 9, 19.

[130] MacInnes and Díaz, 'The reproductive revolution', 2009, op. cit.

[131] Calculated from the ABS spreadsheet 33010DO012_2012 Births, Australia, 2012

[132] See *Population Projections, Australia, 2006 to 2101, Catalogue no. 3222.0*, Australian Bureau of Statistics, Canberra, 2008, pp. 3, 11.

[133] Calculated from *Overseas Arrivals and Departures, Australia*, ABS, Catalogue no. 3404.0 (various years). Net immigration here means net total immigration, all arrivals of what ever type minus all departures. The net overseas migration (NOM) measure was not in use at the time.

[134] It is useful to express natural increase as a percentage of a country's population because this is the population whose members are at risk of giving birth and of dying. But they are not at risk of migrating to their own country. The numbers migrating to a small population will always be higher, expressed as a percentage of that country's population, than the numbers migrating to a large country. After all, the second person to step ashore from the First Fleet in 1788 increased the European population by 100 per cent.

[135] In 2012-13 91,761 former residents left Australia permanently. This means the country could have taken in 91,000 permanent migrants that year and still have met the nil net migration assumption. See *Australian Demographic Statistics (June Quarter 2013)* Catalogue No. 3101.0, ABS, December 2013, p. 52.

[136] *An Ageing Australia: Preparing for the Future—Overview*, Productivity Commission, Melbourne, 2013, p. 2. See also *An Ageing Australia: Preparing for the Future*, Productivity Commission, Melbourne, 2013, pp. 3, 33, 53.

[137] *Australia to 2050: Future Challenges (Third Intergenerational Report)*, Department of Treasury, Canberra, 2010, p. 21

[138] See B. Carr (Chair), *Sustainable Development Panel Report: An Appendix to A Sustainable Population for Australia Issues Paper*, Department for Sustainability, Environment, Water, Population and Communities, Canberra, 2010 (December), pp. 20-21, 33-35. See also B. Birrell, E. Healy, K. Betts and T. F. Smith, *Immigration and the Resources Boom Mark 2*, Centre for Population and Urban Research, Monash University, July, 2011, pp. 6-8.

[139] *Australia to 2050: Future Challenges*, 2010, op. cit., p. 21

[140] See for example the Property Council of Australia quoted in S. Lunn, 'Call to link future immigration levels to productivity goals', *The Australian*, 5 April 2011, p. 2; K. Waller, 'Can we afford a "small Australia"?' *CEO Forum Group*, October 2010. Michael Stuchbury writes of immigration as 'a productivity policy', see 'Resources boom sounds a warning to immigration sceptics', *The Australian*, 10 April 2010, p. 1; and Jessica Brown says that 'our immigration program provides a boost to our productivity and our workforce participation rate—two vital components, along with population growth, of the efforts to meet the cost of population ageing' in 'Big or small, same old story: Australia's real challenge is population ageing', *The Age*, 23 August 2010, p. 8.

[141] Birrell et al., *Immigration and the Resources Boom Mark 2*, 2011, op. cit., p. 44

[142] See P. McDonald and J. Temple, *The long term effects of ageing and immigration upon labour supply and per capita gross domestic product: Australia 2012-2062*: Report prepared for the Department of Immigration and Citizenship, 2013.

[143] *ibid*., pp. 3, 8

[144] ibid., pp. 5-6

[145]Birrell and Healy found that, in 2011, 69.3 per cent of Australian graduates aged 25-34 had managerial or professional work and only 9.5 per cent were not employed. In contrast only 30.9 per cent of non-English-speaking-background migrants of the same age, who were graduates and had arrived between 2006 and 2011, had managerial or professional work, and 31.1 per cent were not employed. See B. Birrell and E. Healy, *The Impact of Recent Immigration on the Australian Workforce*, Centre for Population and Urban Research, Monash University, Melbourne, 2013, p. 10, Table 6. See also B. Birrell and E. Healy, 'How are skilled migrants doing?' *People and Place*, vol. 16, no. 1 (supplement), 2008, pp. 1-19.

ABS survey data show that, from January 1998 to November 2007, 24 per cent of permanent migrants (aged 15 plus) came from the main English-speaking-background countries and 76 per cent from other countries.

Overall, 81 per cent lived in households where the main source of income was wages and 19 per cent in households dependent on welfare or other income. Households where the main applicant had a skilled visa did best, but proficiency in English was crucial. Among migrants where English was not spoken at home, 75 per cent of those who spoke English 'very well' were employed, followed by 62 per cent of those who spoke English 'well', followed by 37 per cent of those who did not speak English well or at all, or whose proficiency was unknown. Calculated from pp. 24, 23, 3, *Labour Force Status and Other Characteristics of Recent Migrants, November 2007, Catalogue no. 6250.0*, ABS, 2008

See also Cully's work cited above on migrants' lower levels of labour-force participation: 'Adding migrants to the mix', 2013, op. cit.

[146] McDonald and Temple, 2013, op. cit., p. 4

[147] See *ibid.,* Figure ES2, p. 9. The increases is around 0.1 per cent per year if higher productivity among migrant workers is assumed, less if it is assumed that their productivity is the same as existing workers. The data in Figure ES2 are also in Figure 17, p. 55.

[148] The model's data on population growth are at *ibid.,* Figure 2, p. 39.