



# Population Ageing in a Nutshell

Speaker Notes Series  
No 1

Demographic  
Analytical Services  
Unit

## A phenomenon in four dimensions

**Natalie Jackson**

### Introduction

A recent rise in Australia's birth rate has generated speculation that the nation's population ageing may have been resolved. To understand why this is not so it is necessary to understand the four technical dimensions of the phenomenon. They are: numerical ageing (the absolute increase in the *numbers* of elderly), structural ageing (the increasing *proportion* of the population that is old), natural decline (which occurs when deaths exceed births) and absolute decline (which occurs when migration is insufficient to replace the 'lost' births and increased deaths). These remarkable trends—which are unfolding more or less inexorably—are outlined in more detail in the following pages.

First however, it is necessary to have an appreciation of the 'historical moment' in which we are observing these trends. Once this broader context is understood it is easy to understand why today's demography is as it is, and approximately how it will unfold in the future. To get to this understanding demographers refer to a long-term process known as 'The Demographic Transition'

### The Demographic Transition

The demographic transition refers to the global shift from high to low birth and death rates, and the one-off growth that accompanies the trends. Prior to the transition (which began in the now-developed world in the mid 1700s), birth and death rates are high; they essentially cancel each other out, resulting in zero or very low levels of population growth (ZPG). At the end of the transition birth and death rates converge at low levels, and ZPG is again reached. But *during* the transition, population grows explosively. This is because birth and death rates do not begin to decline at the exact same moment or do so at the same speed. If death rates—particularly infant and child death rates—decline first, which is precisely what has happened in most countries (and is still happening in most developing countries), more babies live, and the population begins to grow. It also becomes 'younger' because a greater proportion of the population is at the younger ages. When these additional babies become parents themselves, a few decades later, death rates have fallen further and even more of their own children survive, and population growth compounds. It is this phenomenon, called *transitional growth*, that caused the doubling of the world's population in the second half of the 20th Century, and created the subject matter for Paul Ehrlich's famous book *The Population Bomb* (i). By contrast, it is the subsequent shift to low birth rates that is causing the world's population to become structurally 'older', because it is causing the proportion of the population at the younger ages to *decrease*—and concomitantly, the proportion at the older ages to *increase*. Eventually (already in many developed countries) the combined trends see deaths exceed births, ushering in a shift from natural increase to natural decline which, in all probability, will cause the world's population to stop growing and begin to decline in size, around the end of this century (ii, and note p4).

*Population ageing has four key dimensions: numerical ageing; structural ageing; natural decline; and absolute decline*

### Inside this issue:

Numerical Ageing 2

Structural Ageing 2

Natural Decline 3

Absolute Decline 3

Premature Ageing 3

Key Points for practitioners 4

### Contact:

A/prof Natalie Jackson  
Director  
Demographic Analytical Services  
Unit  
School of Sociology and Social  
Work  
Private Bag 17  
University of Tasmania  
Hobart 7001

Ph: +61 3 6226 2943  
Natalie.Jackson@utas.edu.au

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## Numerical Ageing

*Numerical ageing is 100 per cent guaranteed*

**Numerical ageing** refers to the absolute increase in the numbers of elderly. The increase is primarily due to improvements in life expectancy. During the early stages of the demographic transition the changes drove a massive reduction in infant and child mortality and

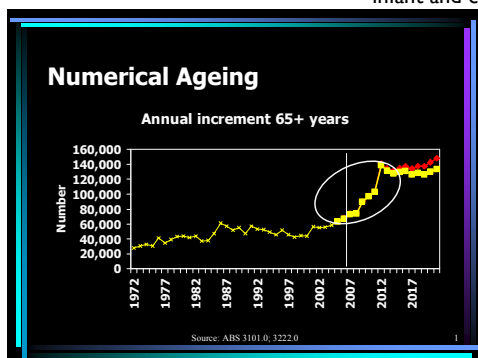
The improvements of the past 80-odd years are now beginning to show up in a sizeable increase in the numbers reaching old age. In the year 2000 a little over 2,000 Australians were aged 100 years and over; today (in 2007) there are over 6,000.

certainly there is minimal difference in the projected numbers of elderly between the Australian Bureau of Statistics (ABS) high, medium and low projection series. As the accompanying figure shows, numerical ageing is also now beginning to escalate. Currently there are around 2.6 million Australians aged 65+ years. The annual increment is currently 73,000, but this will increase to 80,000 by 2009 and almost 140,000 by 2012, following which it will remain above 130,000 for the following two decades. The trend is remarkably similar across Australia's states, territories and local government areas.

dramatically increased the probability of people surviving to old age. Since the 1980s, particularly in the developed countries, equally significant gains have been seen at the upper middle and older ages.

Numerical ageing is 100 per cent guaranteed: those who will be 65+ in ten years time are already 55+; we know how many there are and the rate at which they die (and migrate). Current birth rates and trends will have no effect on numerical ageing for 70-80 years.

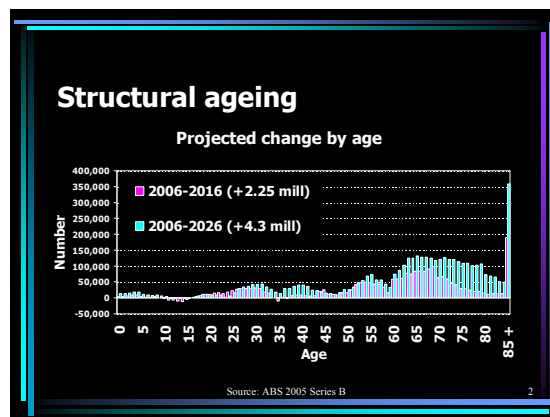
Reflecting this high degree of



## Structural Ageing

**Structural ageing** refers to the increase in the *proportion* of the population that is elderly. It is primarily caused by declining birth rates which decrease the proportion of the population that is young and thereby increase the proportion that is old.

Structural ageing has been occurring across the developed world since the late 1800s, when birth rates first began to decline, but it was interrupted for a period during the baby boom (in Australia 1946-65). The additional babies born during the baby boom caused the population to grow younger during those years; the declining birth rates since have caused it to grow older.



*The extent to which structural ageing will continue—and deepen—is primarily dependent on the birth rate*

The extent to which structural ageing will continue and deepen is primarily dependent on what happens with the birth rate. Demographers agree that it is unlikely that fertility will ever return to its previous (baby boom) levels. The conditions that facilitated that boom have changed fundamentally; and it is actually quite a big ask to get an average of 3 or more births per women. Nor can migration substantially reduce the future proportion that will be old; migrants also grow old, and today have low fertility (iii). The result, as projected in the accompanying graph, is that while Australia's population will grow some 2.25 million by 2016 and 4.3 million by 2026, almost all of the growth will occur at the older ages. Between now and 2026 the proportion aged 65+ will grow by around 90 per cent, but all other age groups combined will grow by a mere 11 per cent.

## Bringing the two dimensions together

Numerical and structural ageing thus have quite different causes—at least from a technical perspective. A population will not age numerically if it has high death rates, nor structurally if it has high birth rates. However in experiential terms the two dimensions will soon come together. In 2007 the baby boomers are aged 42-61 years. As they move through the age structure they will add to *both* the proportions and the numbers of elderly. The high birth rates when they were born set in motion a large population wave; improvements in life expectancy since have greatly added to the numbers that will make it to old age.

## Natural Decline

Numerical and Structural ageing usher in the third dimension of population ageing. Once a population contains more elderly than children it is a short step to it having more deaths than births, and to a situation of **natural decline**, the reverse of what we have known for most of modern history.

A point of clarification is often needed when this dimension is outlined: if life expectancy is increasing, why is it that deaths will increase? The answer is simply a numbers game—life expectancy has indeed in-

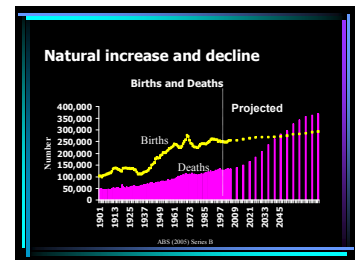
creased, and is still doing so, but people cannot live forever: more elderly eventually means more deaths.

Natural decline is expected to occur in Australia by mid century—even with annual net migration gains of 110,000. However it will occur much earlier in the nation's older states, South Australia and Tasmania—and ahead of the national average even in New South Wales with its disproportionate gain of Australia's international migrants. Natural decline is already extant in 7

per cent of Australia's local government areas (iv).

Natural decline is also already the situation across the European continent and Japan, primarily the result of those countries' very low birth rates. Astonishingly the trend is anticipated to occur in populous China before Australia, the result of China's One Child Policy.

*Once a population contains more elderly than children it is a short step to it having more deaths than births*



## Absolute Decline

Where there is insufficient migration to replace the 'lost' births and increased deaths associated with natural decline, as is expected in structurally old South Australia and Tasmania within a few decades, we can expect those populations to enter **absolute decline**. At a national level this arguably profound shift is not projected to begin before the end of present century, although this depends on annual net international migration remaining around 110,000, and the birth rate remaining around 1.7. While the latter may be achievable, international competition for migrants—particularly skilled migrants—is increasing, with those countries which previously sent migrants to Australia themselves now seeking migrants and competing with Australia for them. Indeed we can again look to our counterpart countries for evidence that absolute decline is something we will almost certainly have to contend with. The phenomenon has already begun in Eastern Europe, Germany and Japan and is at Italy's door. Absolute population decline is also expected to begin at a global level from around the end of this century. The fact that this coincides with its onset in Australia—a highly developed country—is a reflection of the high per capita ratio of Australia's migration program to its 'stock' population, and its relatively high birth rate (1.8). The two dynamics see Australia's population currently growing at a rate above the global average (1.3 per cent per year compared with 1.2 per cent), and well above that for other developed countries (0.2 per cent per year).

*Insufficient migrants to offset the 'lost' births and increased deaths means an absolute decline in population size*

## Premature Ageing

One further point of clarification is important. A population can in fact age for four reasons: low fertility, increased life expectancy, migration-driven gains at the older ages, and migration-driven losses at the younger ages. Because the latter pertains to the main 'reproductive age' population, there is a double impact because of the loss of the children those people have taken with them and/or would have had. The trend has been termed 'premature ageing' (v).

It is this form of ageing that is the primary reason for Tasmania's status as Australia's sec-

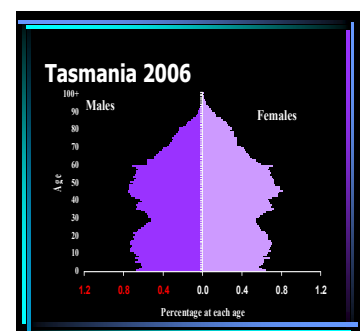
ond-oldest region. During the 1990s the state experienced a profound loss of people in the 18-38 year age group (and smaller but equally significant gains at older ages). Although Tasmania's migration has been positive since 2002, the 'bite' in the age structure as a result of that loss remains profound—and will continue to have an impact on the state's demography for decades to come. In fact Tasmania's birth rate is presently close to replacement level (2.1), and is the second highest in the country.

By contrast, Australia's other 'elder' state, South Australia, is

'old' primarily because of its low birth rate (1.8). The state has also experienced significant net migration losses at the younger ages, but not to the same extent as Tasmania. As a result of these different drivers, South Australia has significantly greater proportion aged 65+ years than does Tasmania, even though the two states now have identical median ages.

Notably almost half of Australia's local government areas have prematurely ageing age structures. Understanding the local 'driver' of population ageing is thus critical for planning.

*Understanding the local 'drivers' of population ageing is critical for planning.*



Demographic Analytical Service Unit  
School of Sociology and Social Work  
Private Bag 17  
University of Tasmania  
Phone: +61-3-6226-2943  
Fax: +61-3-6226-2279  
E-mail: [Natalie.Jackson@utas.edu.au](mailto:Natalie.Jackson@utas.edu.au)

<http://www.taspop.tasbis.com/44415/html/page.html>

### Key Points for Practitioners

*The primary cause of the current increase in the numbers of elderly (numerical ageing) is increasing life expectancy.*

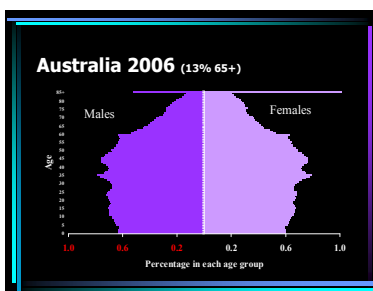
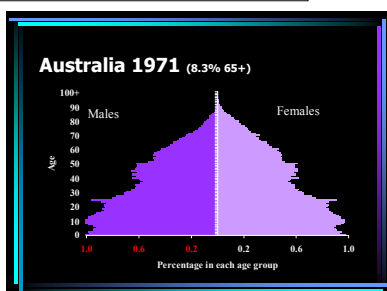
*At the same time, low/declining birth rates since the end of the baby boom (1965) are driving an increase in the proportion of the population to be found at older ages (structural ageing).*

*Numerical and structural ageing thus occur independently of each other; have different causes and different implications. However they will come together as the baby boomers age.*

*Once a population contains more elderly than children it is a short step to it having more deaths than births (and shifting from a long term situation of natural increase to one of natural decline).*

*Where there are insufficient migrants to offset natural decline, absolute decline will follow.*

### The Structural Ageing of the Australian Population 1971-2026



#### References

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- (ii) Lutz, W., Sanderson, W. and Sherbov, S. (eds) (2004) *The End of World Population Growth in the 21<sup>st</sup> Century. New Challenges for Human Capital Formation and Sustainable Development*, London and Sterling, VA, The International Institute for Applied Systems Analysis/Earthscan.
- (iii) Kippen, R. and McDonald, P. (2004) Can increased immigration be a substitute for low fertility? *People and Place*, 12(3): 18-27.
- (iv) Australian Bureau of Statistics (ABS) (2006) *Deaths*, cat. No. 3302.0.
- (v) Jackson, N.O. and Kippen, R. (2001) Whither Tasmania? A note on Tasmania's population 'problem', *People and Place*, 9 (1): 27-37.

### Notes

*One factor not discussed in this paper is the 'momentum effect'. The momentum effect refers to the growth potential that remains in an age structure for 3-4 decades after the birth rate has fallen below the level required to replace the population (2.1 births per woman). It is this factor that will generate most of the remaining growth in the world's population, taking it to a peak of around 9 billion around the end of the present century (reference ii). The momentum effect is all but over in Australia.*