

Trends & issues

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Foreword | *Official crime statistics suggest that young people aged 24 years and under make the greatest contribution to a population's overall crime levels. A decline in the proportion of the population aged 24 years or under should therefore reduce the population's crime levels. Yet the impact of structural ageing—the shift in population age structure from 'young' to 'old'—in Australia is 'one frequently overlooked influence on long-term crime trends' (Weatherburn 2001: 2). This paper is one of two AIC publications (see also Rosevear forthcoming) that investigates the impact of structural ageing on crime patterns. A case study of the South Australian population is provided; a state where the relevant data was available to investigate how the declining proportion of younger people and increasing proportion of older people in the population has reduced past crime levels and should reduce future crime levels. While the South Australian population is ageing at a greater rate than some other jurisdictions, this paper has national relevance as the populations in all states and territories are ageing to some degree and as this occurs, the impact on crime levels should be evident throughout Australia.*

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The impact of structural ageing on crime trends: A South Australian case study

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Background

Crime statistics suggest a strong association between age and offending. A disproportionate level of criminal activity is committed by 15–24 year olds (Braithwaite 1989), with individual offending

starting at an early age, rising to a peak in the late teens, and then dropping rather slowly to almost zero at a late age (Blumstein 2005: 244; also see Farrington 2003; Laub & Sampson 2003; Mukherjee, Carcach & Higgins 1997; Steffensmeier et al. 1989).

Based on these age-related offending patterns, it could be expected that a change in the proportion of people at each age in the general population (the population age structure) will influence crime trends (Easterlin 1987; Foot 1998; South & Messner 2000). If the proportion of young people in a population is large, high total offence levels can be anticipated for the population. Alternatively, if the proportion is small then lower total offence rates can be anticipated. The latter scenario is indicative of a population that has aged structurally as the result of a demographic transition (Caldwell 1976; Coale 1973; Jackson 2001; Teitelbaum 1975). This is where levels of births and deaths fall from high to low, so the proportion of the population that is old (around 65 years and over) increases and the proportion that is young (around 25 years and under) declines. Decreasing birth rates will contribute to such trends (Jackson 2007).

Internationally, Ferdinand (1970) determined that 12 percent of the increase in all apprehensions—ranging from 5.5 percent for homicide to 47 percent for forcible rape—between 1950 and 1965 was due to the UK's progressively youthful age structure. In the United States, Steffensmeier and Harer (1991) determined that the entire reported decline in the overall Crime Index of Uniform Crime Reports between 1980 and 1988 was due to structural ageing. Despite a reported decline of around 17 percent, there would have been an increase of around four percent had the proportion of young people in the general US population not fallen. However, when the Uniform Crime Reports Crime Index was divided into person and property offences, it was apparent that the age-related decline in the overall index was primarily due to property offences. Such offences actually declined by around six percent, but would have increased by this amount without age-structural change. By contrast, the increase in person offences was roughly the same regardless of structural ageing (a crude increase of 24% compared with an age-adjusted increase of 28%).

Similar studies have not previously been conducted in Australia. However, based on known criminological and demographic trends outlined below, it is reasonable to expect that structural ageing would lower or limit growth in total apprehension levels.

In regard to criminological trends, analyses by the Australian Institute of Criminology (AIC) (2011) confirm that 15–19 year olds were the most commonly apprehended age group in Australia for the period 2008–09. The offending rate for this age group was almost four times that of the general population (6,550 per 100,000 relevant population compared with 1,822 per 100,000 population). Interestingly, the offence rate for over 25 year olds had increased 22 percent since the 1996–97 period. Assault, motor vehicle theft, robbery, unlawful entry with intent and other offences were most commonly committed by individuals aged 15–19 years for the period 2002–03; sexual assaults were also most commonly associated with 15–19 year old males (AIC 2005). Homicide and fraud, and deception-related offences over the same period, however, were most commonly committed by those aged 20–24 years.

Demographically, the Australian population has aged structurally (Jackson 2001; McDonald & Kippen 1999). The emergence of structural ageing in Australia gathered momentum after total fertility rates peaked in 1961. The progression of this ‘baby boom’ cohort through their lifespan resulted in an increase in the number of women reaching reproductive age so that, despite a decline in total fertility rates, the actual number of births peaked in 1971 (this being the ‘baby bust’ cohort). Because all post-baby bust cohorts have been smaller than their parental cohorts, the proportion of older people in the population has continued to increase while the proportion of younger people has continued to fall. This trend is expected to continue; by 2026, the proportion of the Australian population aged 65-plus years will have grown by around 90 percent compared with 11 percent for all other age groups combined (Jackson 2007). This means that current structural ageing is substantial and can be expected to influence both past and future offence levels.

Methodology

The findings from two types of recognised comparative analyses—standardisation and decomposition—are discussed here in order to demonstrate the influence that age—structural change has had, and will have, on overall and offence-specific apprehension levels in South Australia for males and females for the periods 1987–1997, 1998–2004 and 2004–2051. These periods were selected for analyses due to the availability of the relevant South Australian data.

Standardisation involves making populations ‘mathematically comparable’—or the same—so that they are directly comparable (see Carmichael 1995; Jackson 2006; Kitagawa 1964, 1955; Rowland 2003). A singular, standard set of compositional attributes (in this instance, population age structure) for one year is applied to the age-specific ratios of the subject of interest for subsequent years (offence trends for this analysis). This process indicates what the total ratio or number of the variable of interest would have been had population structure not changed over time. The difference between the actual and standardised levels of crime in these analyses therefore indicate the extent to which structural ageing has changed offence levels.

Decomposition analysis is a variation of standardisation analysis (Carmichael 1995). Here, the objective is to determine the ‘real’ change in crime levels over time. The difference between two measures of the subject of interest is broken down into the amount that is due to change in the population age structure and change in non-structural factors (eg crime-related factors such as surveillance and reporting levels).

The retrospective analyses are conducted for two periods to account for changed counting rules in the apprehension data (from OCSAR 1988–2005). Analyses involved the 1987 and 1998 age structures of the South Australian population (males and females, from ABS 2005a) being applied to actual total and offence-specific apprehension ratios for each year across the respective periods 1987–1997 and 1998–2004. This process indicates what offence numbers would have been had the population not aged structurally. Data for

the first and last year of each period is subsequently decomposed, calculating the component of change in crude apprehension ratios that can be attributed to age structure and crime-related factors.

The prospective analyses use a two-step ‘simple decomposition’ process that applies the 2004 total and offence-specific South Australian apprehension levels to projected age compositions for the period 2004–2051 to create a series of projections. In the first step, crude and age-weighted projections are calculated for the 2004–2051 period. The crude projections are based on changing population size one, the age-weighted projection on the combined effect of changing size and age composition, and the size-standardised projection on age composition only. The difference between the age- and size-weighted projections highlights the impact of changing size, while the difference between the crude and age-weighted projections demonstrates the effect of changing age structure.

Apprehension data (from OCSAR 1988–2005) were categorised for all analyses as follows:

- offences against property (including shop theft, motor vehicle theft, receiving stolen goods, unlawful possession of property, property damage and serious criminal trespass);
- offences against the person (including aggravated and non-aggravated assault, and murder);
- fraud and misappropriation (including fraud, forgery, obtaining money by false pretences counterfeiting and misappropriation);
- sexual offences (including indecent assault, rape and unlawful sexual intercourse); and
- robbery and extortion (including armed and unarmed robbery, and extortion).

Historical apprehension trends 1987–1997 and 1998–2004

Males

Figure 1 shows what apprehension numbers would have been had the population not aged structurally for two periods, 1987–1997 and 1998–2004, and shows how these age-standardised numbers differ to

actual numbers. For the earlier period, the data show that the actual number of apprehensions increased from 15,004 to 23,622 (by 57%), having grown rapidly between 1989 and 1993, but then subsequently levelled off. The age-standardised data for the same period show that the decline in the proportion of young people in the population age structure lowered apprehension numbers in 1997 by 10 percent. Therefore, numbers would have been higher than observed (with 26,277 apprehensions by 1997) had the 1987 age structure remained constant. With regard to the latter period, there were 21,504 apprehensions in 1998 compared with 18,108 in 2004—a reduction of 16 percent—although numbers did increase between 1999 and 2002. The difference between the actual and age-standardised apprehension numbers for the 1998–2004 period similarly suggest that numbers would have been somewhat higher (by 3.8%) without structural ageing, with 18,790 apprehensions in 2004.

The decomposition analysis can provide insight into how the age of a population influences trends in apprehension ratios. Overall, the analysis shows that apprehension ratios go up when a population is younger and go down when it is older. When the crude 1987 apprehension ratio (2.76 apprehensions per 100 males aged 14–80 years) is standardised to the (older) 1997 age structure, the ratio declines to 2.43, just as the crude ratio for 1998 falls from 3.71 to 3.59 when it is standardised to the (older) 2004 age structure. Conversely, standardising the crude 1997 ratio (4.10) to the (younger) 1987 age structure increases it to 4.56, while the crude 2004 ratio increases from 3.00 to 3.11 when standardised to the (younger) 1998 age structure.

Specifically, the difference between the 1987 and 1997 apprehension ratios demonstrates that, because of structural ageing, apprehension levels did not increase as much as would otherwise have occurred. While non-structural ageing factors, which cannot be explained by this investigation, increased the difference of 1.34 percentage points by 1.73 percentage points, structural ageing reduced it by 0.40 percentage

points. For the latter period (1998–2004), both apprehension and age structure components made negative contributions; therefore, structural ageing permitted levels to fall even further than would otherwise have occurred. The observed drop in the crude ratio of 0.71 percentage points is the result of respective contributions of 0.60 and 0.12 percentage points from non-structural and structural change.

Females

Females commit a minority of all crime, but ageing effects can still be expected to be evident. Equivalent analyses for females produced similar findings, suggesting that structural ageing has also reduced growth in their apprehension levels. Actual numbers increased from 4,439 in 1987 to 6,652 in 1997 (by 50%), but there would have been 9.3 percent more apprehensions in 1997 (with 7,338) had the female population not aged structurally. Actual apprehension numbers between 1998 and 2004 declined by 21 percent (from 6,023 to 4,673), while there would have been 3.9 percent more by 2004 (with 4,681) without structural ageing.

Apprehension ratios fell when age-standardised to older age structures, from 0.81 to 0.74 per 100 females aged 14–80 years when standardising the 1987 ratio to the 1997 age structure and from 1.03 to

0.99 when standardising the 1998 ratio to the 2004 age structure. Ratios also grew when age-standardised to younger age structures, from 1.14 to 1.25 when standardising the 1997 ratio to the 1987 age structure and from 0.77 to 0.80 when standardising the 2004 ratio to the 1998 age structure.

When the difference of 0.33 percentage points between the 1987 and 1997 ratios is decomposed, it appears that while non-structural factors increased the difference by 0.42 percentage points, structural ageing reduced it by 0.09 percentage points. The difference of -0.26 percentage points for the 1998–2004 period is mainly due to an underlying decline in apprehension levels (which reduced it by 0.23 percentage points compared with 0.09 percentage points by structural ageing).

Offence categories

Analyses also consistently showed that apprehension numbers for certain offence categories were lower than would have occurred in the absence of structural ageing (see Table 1). The effect was generally greatest for offences against property, as well as robbery and extortion for males. No real effect on sexual offences for males was evident. Women commit very few sexual or robbery and extortion offences, so any

Table 1 Change in male and female apprehension numbers, observed and as a result of structural ageing, 1987–1997 and 1998–2004 (%)

	1987–1997		1998–2004	
	Between 1987 and 1997 numbers	Reduction from observed 1997 number due to structural ageing	Between 1998 and 2004 numbers	Reduction from observed 2004 number due to structural ageing
Males				
Against property	19.0	-13.0	-11.0	-3.6
Against the person	65.0	-8.5	-10.0	-3.9
Fraud and misappropriation	471.0	-6.1	-57.0	-4.3
Sexual offences	56.0	-1.4	25.0	0.4
Robbery and extortion	69.0	-14.0	-38.0	-3.8
Total	57.0	-10.0	-16.0	-3.8
Females				
Against property	-5.9	-11.0	-18.0	-3.7
Against the person	137.0	-10.4	-18.0	-3.6
Fraud and misappropriation	369.0	-6.8	-43.0	-5.4
Sexual offences	n/a	n/a	n/a	n/a
Robbery and extortion	n/a	n/a	n/a	n/a
Total	50.0	-9.3	-21	-3.9

analysis of such was likely to be unreliable. This suggests that structural ageing may generally be more influential for offence categories characteristic of younger offenders than those of older offenders (see earlier discussion).

Anticipating apprehension trends 2004–2051

Males

Using a 'simple decomposition' method, Figure 2 clearly shows that structural ageing could be expected to reduce apprehension numbers for South Australian males between 2004 and 2051, with the impact increasing over time. If the 2004 crude apprehension ratio (3.0 apprehensions per 100 males aged 14–80 years) remains constant across the period 2004–2051, and allowing for projected population growth, there would be an increase of only 0.5 percent from the number observed in 2004 (18,108), with around 18,190 apprehensions by 2051. However, if the population ages as projected, numbers in 2051 would actually be lower than in 2004, falling by 18 percent to 14,996 apprehensions by 2051; a further 0.5 percent reduction could be expected should population size not change as projected, with 14,929 apprehensions by 2051. Therefore, structural ageing can be expected to substantially reduce future apprehension levels regardless of change in population size.

Females

Although accounting for a much smaller proportion of offences committed, structural ageing should also reduce female apprehension numbers considerably between 2004 and 2051. There would be little change in apprehension numbers (4,673 in 2004) if the 2004 crude apprehension ratio (0.77 apprehensions per 100 females aged 14–80 years) remained constant and population size changes as projected, with 4,559 apprehensions by 2051 (a small decline of 2.4%). Alternatively, if the population also aged as projected, apprehension numbers would decline steadily, falling to 3,817 apprehensions by 2051, or 18 percent (742) fewer apprehensions than suggested by the crude projection at that time. There would be an additional 95 fewer apprehensions (a difference of 2.4%) should there be no change in population size over time.

Offence categories

The potential future impact of structural ageing on apprehension levels is also generally sizeable across offence categories, for both sexes. Again, however, the findings suggest that it will be most influential in relation to the offence category with the youngest age distribution of offenders (offences against property) and least influential for one of the offence categories

with an older age distribution of offenders (sexual offences by males; see Table 2). In this respect, and as for past trends, the marginal difference in the prospective impact of age structure change across offence categories appears to be driven by differences in the underlying age distribution of offenders. Nonetheless, regardless of offence category, and as for overall apprehension levels, future apprehension numbers for both men and women should be reduced by structural ageing.

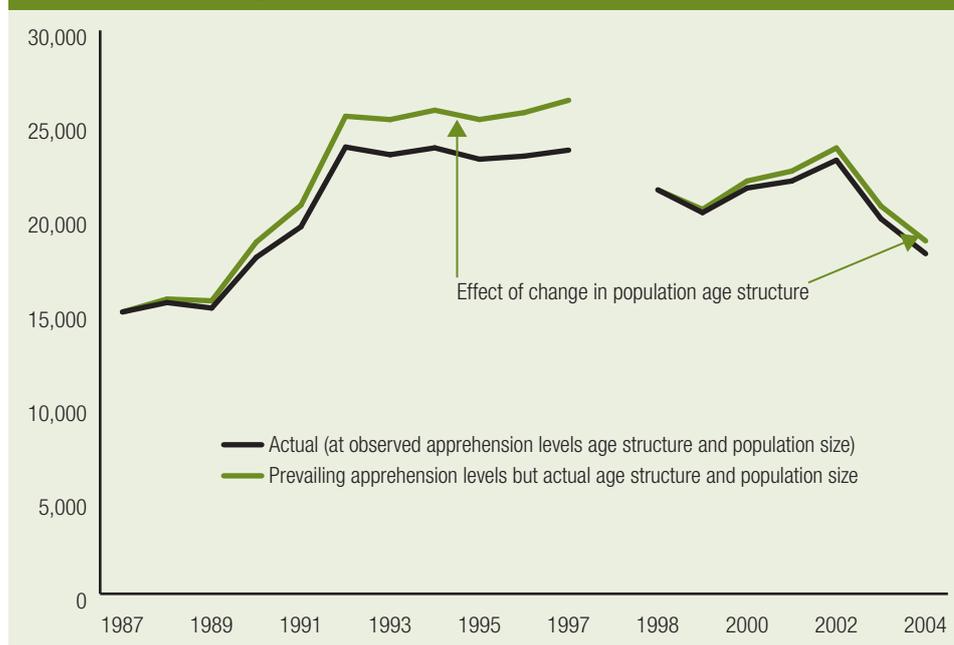
Conclusion

Analysis of South Australian apprehension trends suggests that structural ageing has reduced, and should continue to reduce, apprehension levels for both males and females. Without a decline in the proportion of young people in the population age structure, apprehension levels would have been higher than observed. Assuming that the population ages as projected, apprehension levels are estimated to be lower than projections would otherwise suggest.

However, the influence of structural ageing was seen to differ across the various periods examined. It is highly likely that this is indicative of the level of change in the proportion of younger people in the general population that occurred, or is expected to occur, during the periods of analysis. The proportion of young people (males and females) in the South Australian population declined by approximately 18 percent between 1987 and 1997, compared with less than one percent between 1998 and 2004 (ABS 2005a). On this basis, it is not surprising that age structural change was seen to have had a greater influence on apprehension levels across the earlier period. Similarly, proportions of young male and female South Australians are expected to fall considerably between 2004 and 2051—by around 22 and 19 percent respectively (ABS 2005b). This trend may explain why the predicted impact of age structural-change on apprehension levels for the 2004–2051 period is greater than that identified for the 1998–2004 period.

Furthermore, the impact of age structural-change was not the same for each offence

Figure 1 Male South Australian apprehensions: Observed and age-standardised numbers, 1987–1997 and 1998–2004



Source: ABS 2005a; OCSAR 1988–2005

category in either the retrospective or prospective analyses. Where analyses of offence categories for both males and females were undertaken, the effect of structural ageing was generally the same for both sexes; this is despite males accounting for more crime than females. Sexual offences for males showed the least impact from age structural change (having no real influence on observed numbers); this is an offence category which generally has an older age distribution of offenders than many other offences. The greatest effect was evident for offences against property (reducing observed numbers by as much as 13%). It should be noted that offences against property will have made the greatest contribution to change in overall apprehension levels, because it is both the largest offence category in the analyses and the category most characterised by youthful offending.

Although not examined in this paper, it is possible that there would be some variation in the level of age structural change across the offences falling under the broad categories analysed here (eg break and enter compared with offences against property). Analyses of trends in the United States have found some evidence of such variation (see Steffensmeier & Harer 1991, 1987).

All Australian states and territories have experienced structural ageing; despite this paper focusing on South Australia, offence levels for all jurisdictions can therefore be expected to have been influenced by this demographic phenomenon. However, the onset of structural ageing has not been homogenous across Australia. For example, the population of the Northern Territory is much younger, and the populations of South Australia and Tasmania somewhat older, than the national population (Jackson 2004). In this regard, the impact of structural ageing on crime could not be expected to be the same across the nation. Previous analyses indicated that structural ageing has had a greater impact on reducing prison population size for the younger Northern Territory population than for the older South Australian population (20.9% compared with 13.8%; Rosevear 2007).

Similarly, due to differences in the age structure of ethnic groups in Australia, the

level of age structural change may vary by population group. One example in this respect is the Indigenous population, which has a somewhat younger age structure than the overall Australian population.

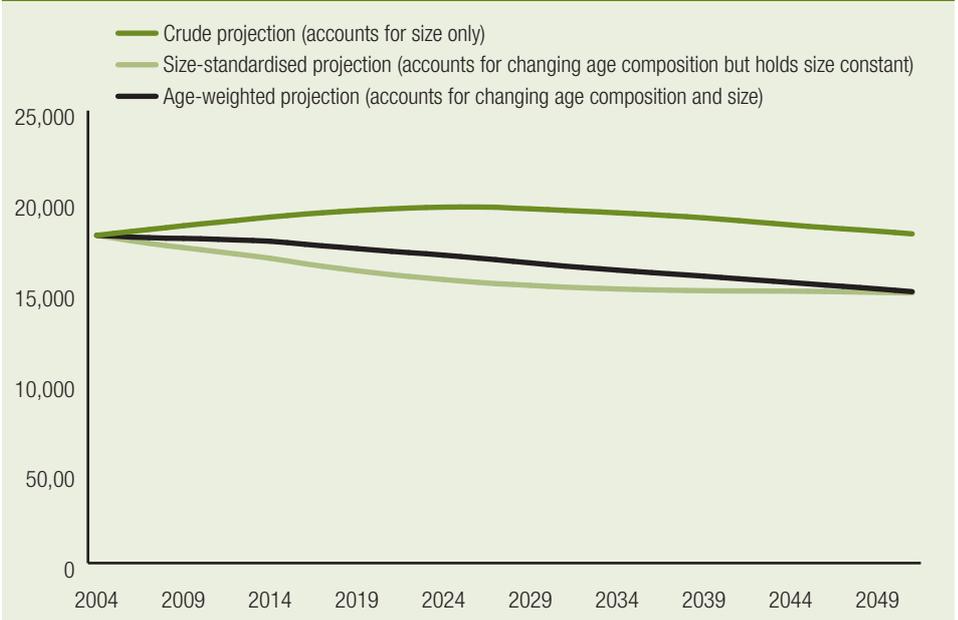
More recent data than that used in the analyses presented here are now available, but the level of reduction in apprehension levels attributed to structural ageing should not be very different.

The findings presented in this analysis should prove useful to police, criminal courts

and correctional facilities for evidence-based policymaking (see Banks 2009); for example, in planning for the number of people who are likely to come into contact with the criminal justice system in the future.

Regardless of whether actual numbers have increased or declined over time, numbers would have been higher in the absence of structural ageing and this trend can be expected to continue. Further, by identifying the impact of structural ageing on apprehension trends, this analysis may contribute to broader debates about the

Figure 2 Projected male South Australian apprehensions (at 2004 rates): Crude, age-weighted and size-standardised numbers, 2004–2051



Source: ABS 2005b; OCSAR 1988–2005

Table 2 Projected change from 2004 apprehension numbers for males and females by 2051

	2004	2051	
	Actual (n)	Crude (%)	Due to structural ageing (%)
Males			
Against property	11,017	0.5	19.0
Against the person	5,143	0.5	17.0
Fraud and misappropriation	1,007	0.5	16.0
Sexual offences	97	0.5	6.0
Robbery and extortion	320	0.5	19.0
Total	18,108	0.5	18.0
Females			
Against property	3,040	2.4	16.0
Against the person	1,016	2.4	17.0
Fraud and misappropriation	568	2.4	16.0
Sexual offences	n/a	n/a	n/a
Robbery and extortion	n/a	n/a	n/a
Total	4,673	2.4	18.0

Note: n/a refers to a category that could not be included in the analysis because of a low number of offences

Source: ABS 2005b, OCSAR 2005

reasons for changes in apprehension rates and the effectiveness of crime control strategies. The importance of recognising underlying causes of change in crime levels was illustrated in the 'zero tolerance' policing policy (see Banks 2009). Improved policing was initially applauded as the main cause for falling crime rates in New York City in the 1990s, but when declines became more widespread across the United States (including areas where policing had not altered), further analysis revealed that abortion liberalisation was a more likely cause. In Australia, declines in crime rates have been attributed to various changes in criminal justice policy, when in fact the decline would have occurred to some extent regardless of policy because of structural ageing.

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