APPENDICES

A Submissions and consultations

A.1 Submissions received

The following table lists the 41 submissions received prior to publication of the draft report and 33 subsequently. These submissions are available on the Commission's website (www.pc.gov.au/study/ageing/subs/sublist.html#list).

Participant	*Submission number*
ABARE	DR50
ACOSS	27
ACROD Limited	DR63
ACT Government	21
Alzheimer's Australia	24, DR55
Australasian Centre on Ageing	9
Australian Chamber of Commerce and Industry	DR68
Australian Dental Association Inc.	3
Australian Government Department of Family and Community Services	DR61
Australian Local Government Association	18
Australian Nursing Federation	36, DR72
Australians for an Ecologically Sustainable Population Inc.	7
Brotherhood of St Laurence	11
Carers Australia	26
Catholic Health Australia	20
City of Salisbury	DR52
Combined Pensioners and Superannuants Association of NSW Inc.	DR56
COTA National Seniors Partnership	DR57
CPA Australia	13, DR60
Department of Employment and Workplace Relations	DR71
Department of Industry, Tourism and Resources	33
Department of Treasury and Finance (WA)	DR70
Engineers Australia	DR44
Fitzpatrick, Nigel	30, 31, 34, 37, 38, DR47 & DR48
GlaxoSmithKline	35
Gray, Mathew	10
Hall, Alan	DR51

Investment and Financial Services Association Ltd	DR73
Malabam Health Board	4
Medicines Australia	32
Mercer Human Resource Consulting	DR67
Municipal Association of Victoria	DR43
Murdoch Children's Research Institute	6
Nambucca Shire Council	1
National Centre for Vocational Education Research Ltd	19
National Healthcare Alliance	DR42
National Rural Health Alliance Inc.	12
Northern Territory Government	8, 15, DR58
NSW Commission for Children and Young People	DR64
NSW Government	DR45
Olsberg, Diana	DR54
Paterson, John	DR49
Pharmacy Guild of Australia	DR65
Queensland Government	17, DR66
Queensland Nurses' Union	DR59
Real Estate Institute of Australia Ltd	5
Richardson, Jeff — Monash University	16, DR74
Securities Institute	22
Shire of Campaspe	14
Social Market Economy Institute of Australia	25
South Australian Government	23, DR62
Spillane, Brian and Veronica	41
Tasmanian Government	40, DR69
Ure, Richard	DR46
Van Wyk, Richard	2
VicHealth	DR53
Victorian Government	29
Volunteering Australia	28
Western Australian Government	39

A.2 Consultations

The Commission hosted two workshops in Canberra, attended by officials from Australian, State and Territory governments, to discuss approaches to estimating the economic and budgetary impacts of population ageing and work-in-progress. The first, was held on 29 July 2004 and the second, on 15 December 2004 (after the release of the draft report).

The Commission also held an experts' meeting on demographic projection scenarios on 17 December 2004. The group comprised Peter McDonald and Rebecca Kippen of the Demography and Social Program, Australian National University and officers from the Australian Bureau of Statistics.

In addition to continued liaison with workshop attendees, including visits to different jurisdictions, discussions were also held with the following parties:

Access Economics
Australian Bureau of Statistics
Australian Institute of Health and Welfare
Australian Local Government Association
Booth, Heather (Demography and Social Program, Australian National University)
Centre for Burden of Disease and Cost-Effectiveness (School of Population Health, Queensland University)
Department of Family and Community Services
Department of Health and Aged Care
Dowrick, Steve (Faculty of Economics and Commerce, Australian National University)
Epidemiology Services Unit (Queensland Health)
GlaxoSmithKline
Kippen, Rebecca (Demography and Social Program, Australian National University)
McMillen, Jan (Australian National University)
Medicines Australia
Richardson, Jeff (Centre for Health Economics, Monash University)
Securities Institute
Sheehan, Peter (Centre for Strategic Economic Studies, Victoria University of Technology)

B Education and labour force participation

Education and skill are central in labour force participation — and, in theory, could offset the influence of ageing on participation rates. Overall labour participation rates are much higher in Australia for people with higher educational qualifications (chapter 3). For example, in 2001, the age-corrected average labour participation rate[1] of an Australian male (female) with a degree or higher was 14.2 (21.0) percentage points higher than for a person who had 10 or less years of schooling. The gap is present for both males and females and for all ages over 25 years. These participation gaps are common to most OECD countries (OECD 2003a).

This pattern is not surprising. Higher educational attainment is associated with better wages, more enjoyable jobs and with tasks that involve a lower risk of acquiring a disability. These traits tend to increase labour participation rates and defer retirement. Higher attainment levels are also consistent with the general shift towards more high skill jobs generally in the economy. This may insulate employees from risks of prolonged unemployment and eventual exit from the labour force that can occur for less skilled workers employed in declining industries. Higher attainment also shifts comparative advantage between unpaid work, such as housework, and paid work, which provides another avenue for educational attainment to affect female labour supply.

Levels of education have been strongly rising over time in Australia. For example, from 1981 to 2001, the incidence of a degree or higher qualification more than doubled for males and nearly increased fivefold for females.[2] The growth in attendance rates has meant that more recent cohorts have higher educational attainment rates than older ones. This leads to striking variations in educational

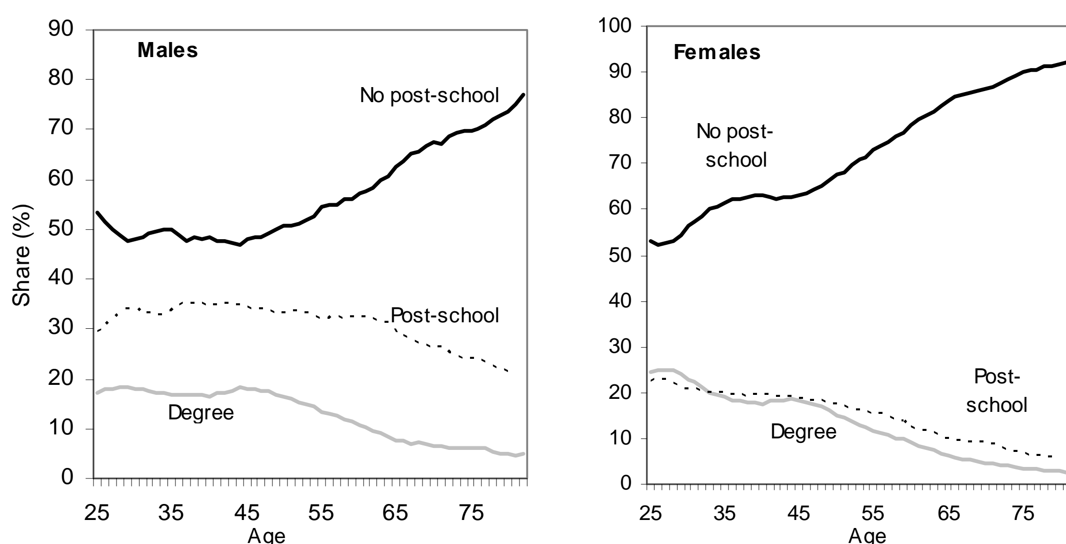
[1] Since old people have a higher likelihood of no post-school education and old people tend to have lower labour participation rates regardless of their educational attainment levels, it is important to age-correct the measure of the total participation rate. A measure similar to that of the Total Fertility Rate was used, namely the unweighted average of the participation rates of men and women aged from 15 to 65 years for degree holders and those with no post-school qualification.

[2] Up from 5.3 per cent to 12.5 per cent for males; and from 2.8 per cent to 13.3 per cent for females.

attainment rates by age in current cross-sections of the population (figure B.1). For instance, in 2001, only around 7.8 per cent of 65 year old males had a degree or higher qualification compared with 17.2 per cent of 25 year old males. The gap is even more significant for females (6.3 per cent for those aged 65 years compared with 24.4 per cent for those aged 25 years). The lower labour force participation rates of older people apparent now may, in part, reflect their lower average educational attainment.

Figure B.1 **Educational attainment rates by age**

Percentage rates, 2001



Data source: ABS Census data 2001 provided by the Australian Government Department of the Treasury.

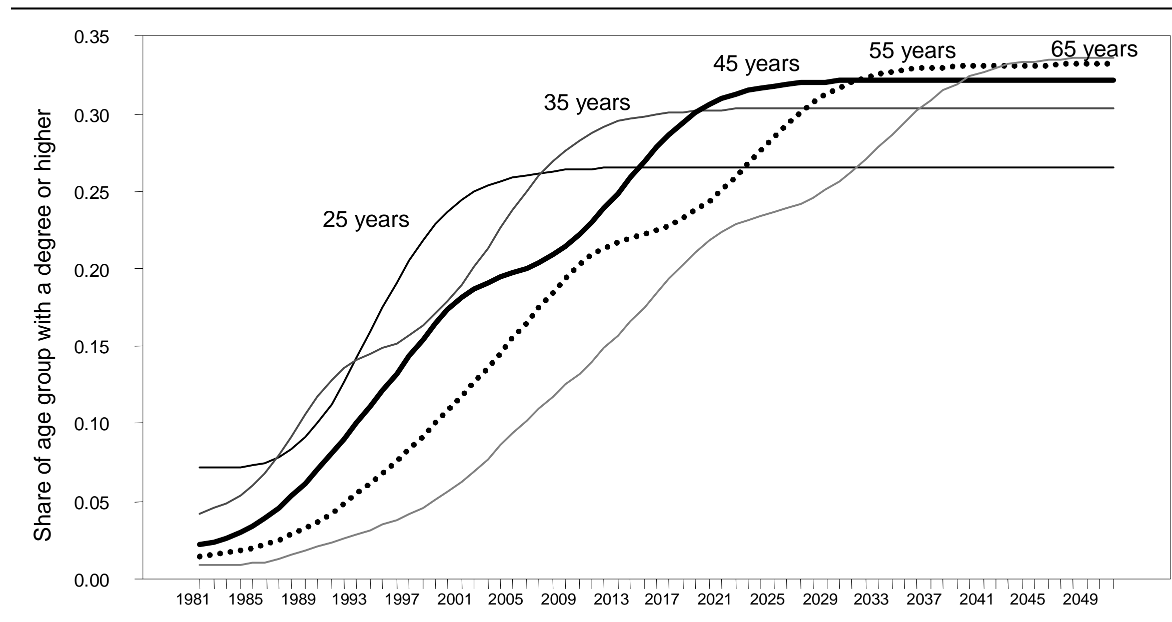
It is expected that average educational attainment will continue to rise among the workforce, particularly among older workers, if for no other reason that young cohorts with higher educational attainment will age and replace those with lower attainment. Moreover, while people often acquire tertiary educational qualifications when under 25 years, investment in education continues at older ages. The implication of this is that as tertiary entry rates for younger people stabilise, the current educational gap between older and younger people will narrow, then disappear and then reappear as a small educational premium for older people (figure B.2). For example, 55 year old females are projected to have higher educational attainment levels by 2023 than 25 year old females. And by 2032, 65 year old females will have higher educational attainment levels than 25 year old females.

The same pattern is apparent for males. But another implication of the patterns of entry by cohorts is that the current higher levels of educational attainment by males

of older ages compared with females of older ages will also be reversed in time (chapter 3). Since education is an important determinant of labour market outcomes, these long-term cohort shifts may affect the labour market experiences of older people generally, and of older females versus males.

It has been conjectured that the strong current relationship between educational attainment and labour force participation imply that future participation rates will rise — especially for older workers — as educational attainment in the population rises (Gruen and Garbutt 2003; Kennedy and Hedley 2003; Michigan State Department of Personnel 2000).

Figure B.2 **Share of females with degree or higher qualification**
1981 to 2051



[a] The data points for 1981, 1986, 1991, 1996 and 2001 are from the ABS population censuses. Between years were interpolated using a cubic spline. The projections from 2002 to 2051 were derived using cohort analysis. The analysis was based on age-specific entry rates into universities for ages from 15 to 90 year olds. The details of the method are in appendix 3. Similar analysis was undertaken for males and for post-school education that did not lead to a degree.

Data source: ABS Population Census data and Commission projections.

Gruen and Garbutt (2003, pp. 25-27) assess the impact of rising education on future labour participation by assuming that age-specific rates of labour participation by education stay at their current level. They then estimate the aggregate participation rates that result when education levels for older workers rises over time as the current educated young cohort ages. They find that labour participation rates increase for all ages and both sexes, with particularly large increases for people (and especially women) aged over 55 years.

However, future rises in educational attainment of older people may not increase their labour participation rates by as much as might be suggested by the current cross-sectional association between education and participation. While clearly a major effect of education is that it adds to the knowledge and skills of people, with benefits for wages, employment opportunity and productivity, there is evidence that at least *some* of these effects are spurious. One reason for this is because people selecting higher levels of education are different in innate ability from those who do not. People with more education do better in jobs and pay partly because they are, on average, innately more able people, rather than purely because of their higher educational levels.

The extension of higher education to many more people changes the mix of people who hold differing levels of educational attainment. For example, the one in 16 women aged 65 currently holding degrees mostly acquired their degrees in the 1960s, when entrance to university was difficult. The women concerned are likely to be more able as a group to the one in four women currently aged 25 who have a degree or higher.

On average, the innate ability of people with degrees or higher qualifications would be lowered by inflows of less able people. Simultaneously, the average innate ability of those with no post year 10 schooling is also lowered by outflows of people with greater ability. All other things being equal, this could be expected to dilute the effects of higher education on labour force participation and to exacerbate the labour market disadvantages associated with no post-school qualifications (box B.1). In considering the returns to education in Australia, Johnson and Wilkins (2003) conclude that 'the recent expansion in higher education is likely to be associated with a fall in future employment rates by age for degree-holders'.

Box B.1 How can changes in education produce spurious gains in labour participation?

An example illustrates how these spurious effects may arise. Say that there are only two qualifications (with and without a degree or ND and D) and two types of ability levels (high and low or H and L). Half the people have high innate ability (which is fixed over time). Altogether there are four groups representing the combinations of these two sets of characteristics — NDL, NDH, DL and DH. The labour participation rates for these four groups are, respectively 60, 80, 75 and 90 per cent.

At time t, say that 80 per cent of people of high ability take a degree and only 10 per cent of people with lower ability. Accordingly, the average labour participation rate of degree holders at this time is 88.33 per cent and of non-degree holders is 63.64 per cent (with an average for all people of 74.75 per cent).

Suppose that by time t+1 a further 10 percentage points of the H group take degrees and a further 30 percentage points of the L group. In that case, the average labour participation rate of degree holders at this time is 85.4 per cent and of non-degree holders is 62.9 per cent (with an average for all people of 77.5 per cent) — consistent with the dilution effects described in the main text.

Had it been assumed that participation rates by educational qualification stayed fixed over time (for example, 88.33 per cent for degree holders regardless of the proportions of people by innate ability), then the higher share of degree holders in year t+1 would have implied a spuriously high aggregate participation rate of 79.7 per cent. In this case, the spurious effect amounts to over 44 per cent of the actual change in participation rates (ie (79.7-77.5)/(79.5-74.75)-1).

It should be emphasised that the spurious effect does not rely on any assumption that returns to education are lower for people of lower ability or that they decline over time. Indeed, in this example, the percentage benefits from education in stimulating participation rates for people of low innate ability are double that of people with high innate ability. However, if they decline over time or are lower for people of lower ability then the spurious effect will be even greater.

Of course, showing that spurious effects *can* occur does not demonstrate that they *are* significant in reality.

Quite apart from the risk that the impacts of innate ability and education may be conflated when assessing the future effects of rising educational attainment, a range of other labour market trends need to be considered when looking at the link between education and labour participation.

- The continuing decline in the demand for low skill jobs — particularly for males — may accentuate the disadvantage associated with no post-school education, leading to even lower participation rates for these groups. The differential in labour participation rates between males with a degree or more and those with no post-school qualifications has increased for more recent cohorts. For

example, a male born in 1936, aged 45 and with a degree had a 6 percentage points premium in labour force participation over a peer with no post-school education. For the 1956 cohort, the differential was 17.9 percentage points.

- In contrast, for women, the labour participation advantage associated with a degree appears to be waning for more recent cohorts. For instance, a female born in 1936, aged 45 and with a degree had a 29.4 percentage points premium in labour force participation over a peer with no post-school education. For the 1956 cohort of the same age, the differential was 21.6 percentage points.
- More generally, OECD data suggests that the participation rate associated with a given level of tertiary attainment rate has fallen over time for both women and men of older ages (figure B.3). Continuation of this trend implies that the present relationship between participation rates and educational attainment will not give reliable indications of the future impacts of educational attainment.
- Some of the poor labour market participation rates of older people reflect transitions in the nature of the Australian economy over the past 25 years and the potentially scarring effects of major recessions. For example, the decline of labour intensive parts of manufacturing lowered the demand for blue-collar male jobs, which were disproportionately held by people without post-school qualifications. The disadvantages faced by this group were accentuated by several deep recessions that led to significant layoffs of mature workers who never got a job again. The corresponding group of older, less skilled males in the 2030s and 2040s will be in different industries and face different pressures.

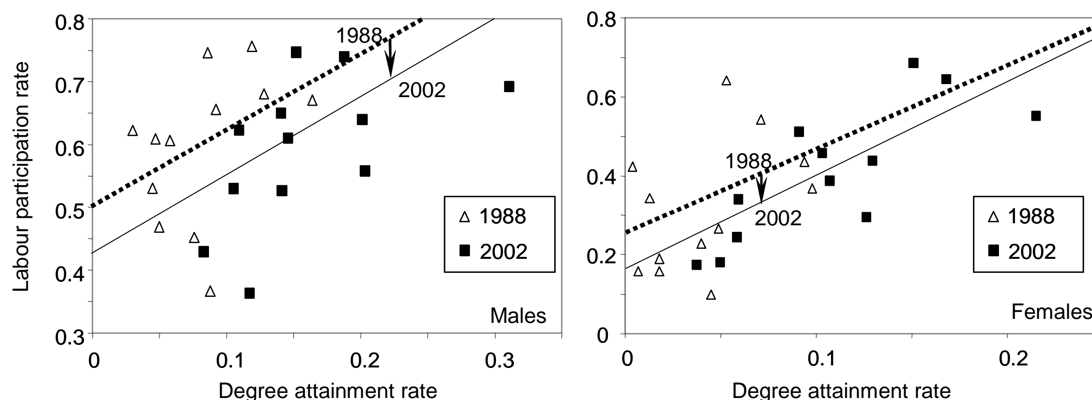
If the projection technique used by Gruen and Garbutt (2003) is applied to 1981 data, it suggests strong increases in participation rates for males and females by 2001. In fact, male participation rates generally fell across age groups from 1981 to 2001, and indeed the absolute size of the (negative) prediction errors from applying this technique were, on average, higher for those age groups where the percentage change in degree attainment rates were higher. In contrast, for females, participation rates increased by much *more* than suggested by changes in educational attainment alone. In this case, the positive prediction errors were highest for those where the percentage change in degree attainment rates were highest. So without controlling for other facets of the labour market and individuals that might be relevant,[3] this technique is likely to produce unreliable projections of labour participation rates.

Nevertheless, the key insight of Gruen and Garbutt is that rising educational attainment levels must rise significantly in the future old — and, all other things being equal, this will stimulate labour participation in these groups.

[3] Such as innate ability, the changing demand for skilled versus unskilled labour, changing attitudes to females in the labour market and the growing ascendancy of the service sector.

Figure B.3 Association between degree attainment rates and labour participation rates

55-64 year males and females, selected OECD countries, 1988 and 2002



[a] The graphs show the relationship between the labour participation rate for *all* 55-64 year olds (regardless of their educational qualifications) and the share of the 55-64 year olds who have a degree. This is a better way of assessing the labour supply impacts of a degree than looking at participation rates for degree holders compared with non-degree holders. This is because it resolves the selection bias problem and enables a judgment about whether the overall participation rate is stimulated by rising degree attainment rates (ie it takes account of the fact that non-degree holders' participation rates may fall as degree attainment rises). To see how the relationship changed over time, the relationship is shown for two years: 1988 and 2002. The degree rate for 2002 is derived from the attainment rates for tertiary type A and advanced research programs. The degree rate for 1988 is Level E (completed at least one university degree). All data relate to 55-64 year olds except the degree rate for 1988, which relates to 55 years and over. The lines are the ordinary least squares trend lines for the 1988 and 2002 samples (1988 is dotted). A fixed group of countries were used for the analysis (these being Australia, Belgium, Canada, Finland, Germany, Italy, Netherlands, Norway, Spain. Sweden, US and UK).

Data source: The labour participation rates for both years are from the OECD Labour Force Statistics database, as are the degree rates for 2002 (http://www1.oecd.org/scripts/cde/members/lfsdataauthenticate.asp). The degree rate for 1988 is from table 2.1 from the OECD www.oecd.org/dataoecd/63/52/3888221.pdf.

C Health expenditure projection methods and sensitivity analysis

C.1 Method

For this study, four categories of health expenditure (hospital, medical services (mainly Medicare), pharmaceutical and ‘other’ expenditure) and two levels of government (Australian Government and each of the State governments) have been projected separately and aggregated to estimate total government expenditure.

For Medicare, pharmaceutical and other expenditure, projections are based upon ‘traditional’ models, which combine the existing age profile of expenditure with projected population changes and changes in per capita costs. Hospital expenditure has been projected using an approach that incorporates costs incurred at the end of life.

Traditional approach

The data required to project Medicare, pharmaceuticals and other government health expenditure are the:

- age profile of expenditure for that component;
- projected growth and change in the age composition of Australia’s population (the PC-M projections have been used); and
- the non-demographic growth rate for that component — the change in per capita costs for each age group.

The projected expenditure for each component of health expenditure in year (t) is:

$$\sum_{age=0}^{85}\left(HCE_{age}(1+g)^{t}\,POP_{age}(t)\right)$$

Where:

HCE_{age}	age specific per capita health care expenditure
$POP_{age}(t)$	the number of persons of a given age in a given year
$age \in (0,85)$	the reference age for per capita health care expenditure and the population size
$t \in (0,T)$	the reference year of expenditure prediction, where the year 2001 is given by $t = 0$
g	the annual growth rate in per capita health care expenditures

Tables C.1 and C.2 contain the age profiles used in this study. Each profile is expressed as an index. In combination with population data, the index is calibrated to total expenditure for each component to calculate cost per person for each age group.

Table C.1 **Index of age structure of government hospital expenditure**

Age group	*Male*	*Female*
0-4[a]	100	100
5-9	17	14
10-14	15	16
15-19	20	28
20-24	23	46
25-29	24	62
30-34	24	57
35-39	27	45
40-44	30	38
45-49	39	40
50-54	50	49
55-59	74	68
60-64	103	90
65-69	153	131
70-74	207	173
75-79	247	227
80-84	295	299
85+	371	364

[a] Index 0-4 = 100

Source: Natsem (2003).

Expenditure for a particular age group in any year is the cost per capita for that age group multiplied by the population in that age group for that year. Total expenditure for that year is the summation of expenditure for each age group.

Table C.2 **Index of the age profile of government health expenditure**

Age group	*Medicare*[a]		*Pharmaceutical*[a]		*Other*[b]	
	Male	Female	Male	Female	Male	Female
0-4[c]	100	100	100	100	100	100
5-14	51	56	107	105	71	75
15-24	61	127	198	312	76	93
25-34	70	189	314	495	79	107
35-44	94	193	496	753	81	95
45-54	140	233	868	1,259	89	98
55-64	221	300	1,748	2,565	116	116
65-74	339	376	3,581	4,706	163	148
75-84	296	388	3,084	4,886	228	209
>=85	189	256	2,858	4,381	223	203

[a] Health Insurance Commission data. [b] A profile constructed by applying the age profile that most closely matches individual components of other expenditure (including a neutral age treatment for items such as research and administration). [c] Index 0-4 = 100.

Source: Health Insurance Commission (2004 and unpublished) and Commission estimates.

Incorporating the proximity to death in hospital expenditure

Chapter 2 concluded that while medical costs — particularly hospital costs — are higher at the end of life, they do not remove ageing as a source of expenditure pressure in the future. One reason for this is that in Australia, ageing will bring with it a higher number of deaths.

The projections of higher hospital expenditure over coming decades are derived from a model that incorporates hospital costs at the end of life. Under this approach, health expenditure has been divided into two types:

- the proportion of annual costs associated with those that die in that year; and
- costs related to the ongoing health needs of each age group.

Expenditure related to death is projected using the estimated number of deaths in each age group. Recurring health expenditure is projected in the same way as for the constant age cost projections above. Details on the method are provided in box C.1.

Box C.1 **Projecting hospital costs**

To project expenditure associated with costs incurred in the last year of life, the number of future deaths (by age) is multiplied by the cost of a death in each age group. However, estimates of the expenditure incurred in the last year of a person's life are not readily available for Australia.

The costs per death used in the projections are based on UK data contained in Gray (2004) and Seshamani and Gray (2004). These studies used longitudinal data from Oxfordshire in the UK to analyse the determinants of health costs. Gray (2004) presents the proportion of hospital expenditure related to death for different age groups. For instance, he calculates that of the total hospital expenditure on those over 85, 65 per cent is expenditure on those in the last year of life. These proportions are adjusted to account for different mortality rates in Australia and the UK. For example:

- in the UK 15.9 per cent of the population aged over 85 is in the last year of life, whereas in Australia it is around 13.5 per cent; thus
- instead of 65 per cent of expenditure being associated with the last year of life, in Australia it is assumed that this figure is 58 per cent (65*13.5/15.9).

Once these proportions for each age group are known, the cost per death can be estimated. The derived figures are as follows:

Age group	Dollars per death
0-4	77 626
5-15	9 922
16-44	2 223
45-64	31 000
65-74	44 203
75-84	35 280
85+	22 287

Future death related costs are projected by multiplying the cost per death (indexed at the same rate as per capita costs in other models) by the number of deaths in each age group.

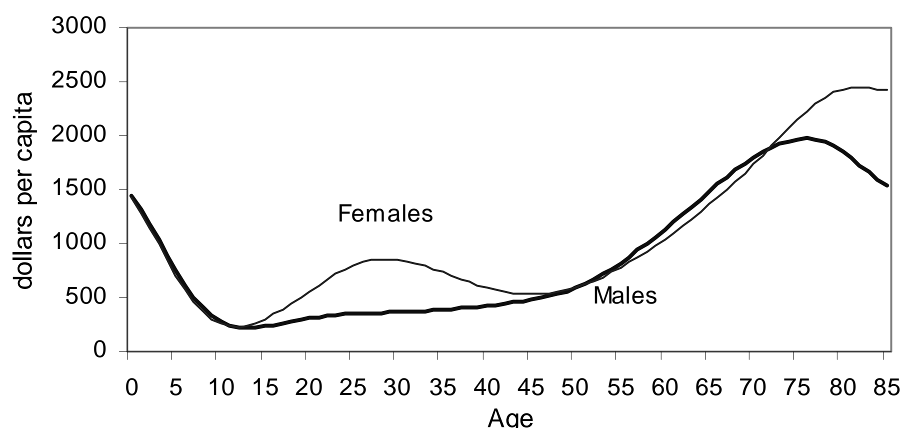
Ongoing, or recurrent, health expenditure in 2002-03 for each age group is calculated by deducting the estimated death-related expenditure for 2002-03 for each age group from the projected total expenditure for that age group. This is then divided by the number of people in each age group to derive an age profile of *recurrent* expenditure per capita for 2002-03. Significantly, this age profile still follows the normal upward sloping pattern for all but the oldest age groups (in itself a common pattern). Expenditure for a 75 year old is around 4.5 times that of a 45 year old (for both males and females) (figure C.1).

As in the traditional model, recurrent expenditure for each age group is projected by multiplying the residual recurrent per capita cost by the estimated population for that age group.

Total projected expenditure under this model is the sum of expenditure associated with death and recurrent expenditure.

Figure C.1 **Age profile of ongoing hospital expenditure after excluding costs in the last year of life** [a]

2002-03



[a] Smoothed using a Hodrick Prescott filter.

Data source: Commission estimates.

Sensitivity of results to the non-demographic growth rate

As noted by the Intergenerational Report, projection results are sensitive to the non-demographic growth rate. The Commission's projections are based upon a non-demographic growth rate, which is expressed as a premium above the projected growth in GDP per capita. The baseline projections in chapter 6 used a premium of 0.6 percentage points (for each component other than for pharmaceuticals). Table C.3 presents the results of using a non-demographic growth premia of 0.3 percentage points and 0.9 percentage points above the growth in GDP per capita.

Table C.3 **Projected government health expenditure as a proportion of GDP**

Under different non-demographic growth assumptions [a]

Growth in per capita health expenditure above per capita GDP growth	2002-03	2014-15	2024-25	2034-35	2044-45
	%	%	%	%	%
0.3 percentage points	5.7	6.7	7.8	8.6	9.1
0.6 percentage points	**5.7**	**6.9**	**8.3**	**9.4**	**10.3**
0.9 percentage points	5.7	7.2	8.8	10.3	11.6

[a] Growth assumptions apply to hospital, Medicare and other expenditure. Non-demographic growth in pharmaceutical expenditure is projected using a logistic function, which asymptotes to the growth in GDP per capita plus the relevant premium — appendix D.

Source: Commission estimates.

C.2 Alternative projection methods

Chapter 6 referred to the results for two alternative projection methods:

- a life expectancy adjustment; and
- the traditional approach where hospital costs, like other components of expenditure, are projected purely according to the age cost profile.

Details on the life expectancy adjustment are provided below.

Life expectancy adjustment

The life expectancy for all age groups is increasing as age specific mortality rates fall. Early work by Fuchs (1984) and Manton (1982, cited in Fuchs) have suggested that health care among the elderly is not so much a function of time since birth (age), but time to death. This is predicated on the view that most of the expected additional years of life will be healthy years of life. If this were to be the case, health care use of a 75 year old in 20 years time will not be the same as a 75 year old today. It may, say, be more likely to approximate that of say a 71 year old. This approach is sometimes also referred to as a 'proximity to death' method because a 75 year old in 20 years time is four years further away from death than the 75 year old today and hence, it is argued, will have lower health costs. Either way it is possible to adjust the constant age cost projections to take account of changes in life expectancy contained within demographic projections (box C.2).

This approach assumes that increases in life expectancy are costless to the health budget. But as described in chapter 6, there is growing evidence that increases in life expectancy are not costless. Rather, they arise partly because of increasing use of medical treatment across a wider range of conditions. Hence this approach has been presented as a sensitivity test rather than incorporated in the base projection.

Box C.2 **Life expectancy adjustment**

The method employed by the Commission to adjust for increases in life expectancy is based on Badham (1998) and involves a number of steps.

- Most profiles of expenditure by age are calculated by age bands — 65–69, 70–75 etc — with each person within the band assumed to have the same expenditure. To adjust for life expectancy it is necessary to have an estimate of costs by individual age. Piecewise linear adjustment approximations were used to generate this profile. As Badham (1998) says ‘Each piece of the linear function is defined by two points, given by average age … in an age band and the per capita cost for that age band’.
- This expenditure profile is then recalibrated so that the profile applied to the present population results in the current level of total expenditure.
- For each age group over 65, and for each year until 2044-45 an ‘effective age’ is calculated, by subtracting the increase in life expectancy predicted by the ABS (unpublished data) for that age from the current age. For example, a 70 year old male is projected to have an ‘effective age’ of 67 by 2024–25 and 66 by 2044-45.
- Total expenditure is estimated by multiplying the ‘effective age’ by the corresponding costs for that age group cost profile.

Adjusting for increased life expectancy under this method will always reduce expenditure. Taking the ABS data as given, the magnitude of the impact will depend on the age-cost profile. A profile where costs increase significantly with age will result in a larger impact than a ‘flatter’ profile.

Alternative projection results

Table C.4 compares the results of the baseline approach with simulations that include a life expectancy adjustment and those based purely on age cost profiles (that is, excluding death-related costs from hospital costs).

Compared with the baseline, the adjustment for increased life expectancy results in slightly lower expenditure, while the traditional simulations result in a slightly higher level of expenditure. However, under each method expenditure is projected to increase significantly in real terms and as a percentage of GDP between 2002-03 and 2044-45. Indeed, the differences between each method are less than the impact of small variations in the non-demographic growth rate.

Table C.4 **Projection methods compared**

Total government expenditure, 2002–03, 2024–25 and 2044–45

	2002–03		*2024–25*		*2044–45*	
	$ billion	% GDP	$ billion	% GDP	$ billion	% GDP
Baseline projection (Incorp. costs of death in hospital)	43.1	5.7	111.3	8.3	211.2	10.3
Life expectancy adjusted	43.1	5.7	104.3	7.7	202.5	9.9
Traditional approach	43.1	5.7	115.3	8.6	221.6	10.8

Source: Commission estimates.

As discussed above, the baseline projections were based on UK data from Gray (2004) on the costs incurred before death. It should be noted that for the UK, Gray finds a more significant difference between the traditional projection method and one incorporating costs incurred before death than those contained in table C.4 for Australia. In Gray's analysis the traditional method is about 50 per cent higher than the proximity to death projection to 2026.

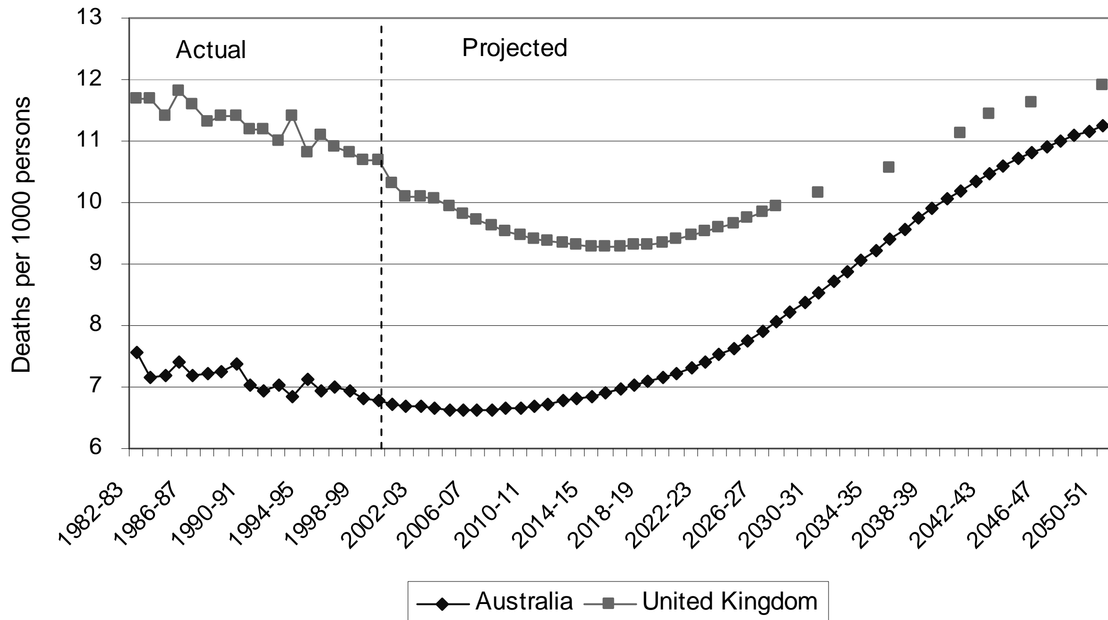
The Australian projections are high relative to those of the UK because of differences in demography. As shown in figure C.2, in Australia the crude death rate increases by around 20 per cent between now and 2026-27 (Gray's projection period), whereas in the UK it is projected by the Government Actuary Department to be virtually the same as it is now (after declining to 2015).

The impact of demographic differences (both age structure and deaths) between Australia and the UK on projected hospital expenditure is shown in figure C.3. Two indexes are provided for the UK.

- To achieve a like with like comparison, the UK index represented by the dotted line combines UK demography with the same cost profile of expenditure used in the Australian projection. Thus, the substantial difference between the two is solely attributable to demography.
- The smooth UK index of expenditure uses both UK demography and a UK age profile of hospital expenditure. The relevance of this projection is that it closely reproduces that contained in Gray (2004) for the UK.

Figure C.2 **Actual and projected crude death rates in Australia and the UK**

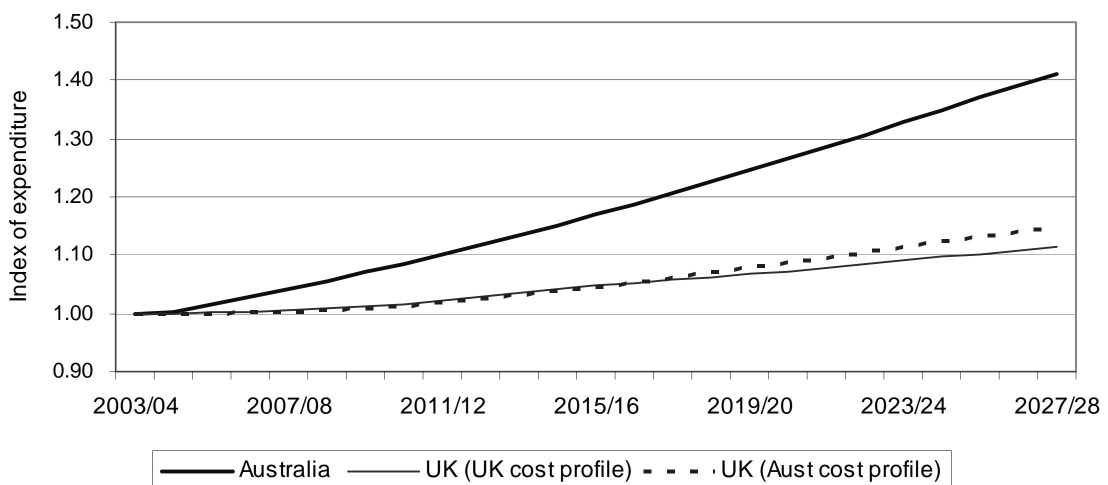
1982 to 2051



Data source: ABS (2003b); ABS (2002d); UK Government Actuary Department: 2003-based Principle Projections, UK Office of National Statistics Data set PD1013.

Figure C.3 **Index of projected Australian and UK hospital expenditure** [a]

Incorporating costs incurred in the last year of life



[a] All non-demographic growth is excluded from the comparisons.

Data source: Commission estimates.

These results illustrate that the ageing impact on health expenditure is not likely to be uniform across all countries.

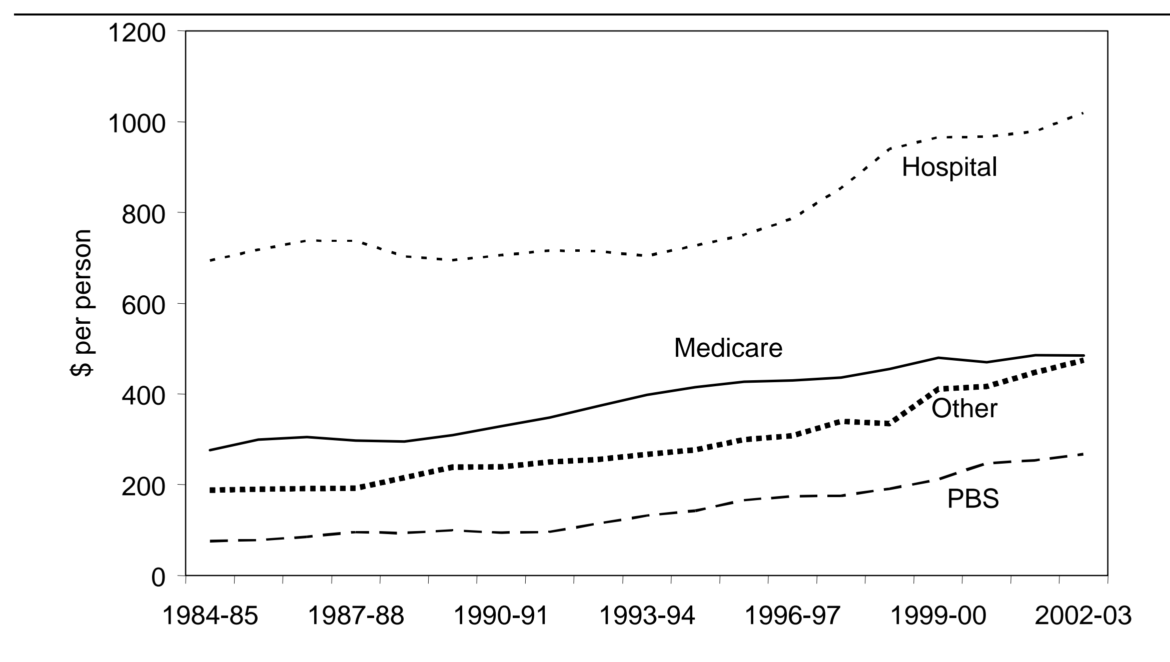
Although more work — particularly on the costs incurred at the end of life in Australia would be useful — the Commission's analysis suggests that, for Australia at least, using other projection methods does not qualitatively alter the expected impact. The ageing of the Australian population will place considerable upward pressure on health expenditure.

D Non–demographic growth in health expenditure

Real government expenditure per person has increased substantially over the last 20 years for all components of health expenditure (figure D.1).

Figure D.1 **Real government health expenditure per person**

1984-85 to 2002-03



Data source: AIHW expenditure data cube (www.aihw.gov.au).

A significant part of this growth has occurred because of non-demographic factors. Non-demographic growth is the real increase in per person costs that is not attributable to changes in the age structure of the population or population growth. It comprises:

- increases arising from the introduction of new technology;
- increased demand from consumers arising from greater wealth or changing community expectations;
- changing patterns of demand arising from increased prevalence of conditions; and

- any excess health inflation (where health prices rise at a greater rate than general prices).

Projections of health expenditure are sensitive to assumptions about the non-demographic growth rate.

Expenditure projections are usually based on the assumption that future expenditure will bear some relation to past expenditure patterns and growth. However, there are a range of issues associated with interpreting past trends and it is important not to be locked into a mechanistic approach. This appendix discusses the factors important to determining the growth rates used in the projections in chapter 6.

Cost of disease burden

The future prevalence and treatment of major diseases will have a significant bearing on future health costs. The major burden of disease in Australia arises from long-term conditions such as cardiovascular diseases, cancers, mental illness and nervous system disorders.

Aggregate data on past trends of disease burden are not always a sound guide to future costs because 'cohort effects' are very important in determining the prevalence of disease. For example, smoking rates have declined, particularly among men, so smoking related diseases are unlikely to be the same burden in the future as past costs would indicate.

According to the AIHW (2004a):

- Cardiovascular disease is still the leading cause of death for both males and females despite a marked drop in death rates since the 1960s.
  - The decline in deaths associated with these diseases is related to environmental and behavioural (largely reduced smoking) factors as well as better treatment for cardiovascular diseases.
  - The range and quality of drugs available for preventing or treating cardiovascular disease have improved over the last 10 to 15 years. The use of drugs to lower cholesterol have quadrupled since 1996. Similarly use of Angiotensin–Converting Enzyme (ACE) inhibitors to lower blood pressure has more than tripled between 1990 and 2000.
- Cancer is the second leading cause of death — although overall death rates fell between 1992 and 2002 it now kills more middle-aged people than cardiovascular disease.

- Dementia is a major cause of severe and profound disability. Dementia overwhelmingly affects people over 65 years. Alzheimer's Australia (2005) presents projections by Access Economics estimating that there will be around 730 000 people with dementia by 2050.
- Type II diabetes prevalence has more than doubled over the past two decades and is estimated to affect around one million Australian adults. Obesity — one of the main risk factors for type II diabetes — has also doubled over the past two decades. About one in five Australians are now obese.

The non-demographic growth rate is an amalgam of the prevalence and the future costs of treatment per person for the major disease categories. Researchers from the School of Population Health at the University of Queensland and the AIHW (Vos et al. 2005) provide projections of both these elements for eight major diseases until 2031. The diseases are cardiovascular diseases, cancer, mental disorders, sense organ disorders, musculoskeletal diseases, diabetes, chronic obstructive pulmonary disease and neurological disorders. The study finds there is likely to be a continuation of many existing trends. For example between 2001 (the reference year) and 2031:

- the incidence of stroke is projected to decline by over 50 per cent for both men and women;
- the incidence of coronary heart disease is projected to decline by 55 per cent and 57 per cent for males and females respectively;
- the prevalence of diabetes is expected to increase by more than 100 per cent for men, and by over 70 per cent for women;
- the incidence of lung cancer is expected to decline for men by 27 per cent but remain broadly stable for women (smoking rates for women have not shown the same decline as for men); and
- dementia rates are projected to remain stable throughout the period.

Notwithstanding the substantial decreases in rates of disease for some conditions, the number of cases in the population is projected to increase for all diseases. Ageing of the population and to a lesser extent general population growth account for the increase.

The Study concludes that 'a large rise in health costs is expected over the next 30 years'. The ageing of the population comprises the largest component of the increase (box D.1).

The Study also noted a number of changes in treatment practice that are likely to affect future costs, including:

- an increase in the proportion of people with a disease who are treated;
- changes in the pattern of treatment with a shift in emphasis from hospital to medical and pharmaceutical services;
- changes in the pattern of service delivery, especially in the provision of more services to older people who are starting to receive similar levels of health services as the middle aged with similar diseases; and
- changes in technology such as new drugs, new procedures and application of old drugs in new ways.

Box D.1 **Projection of disease occurrence and health care expenditure in Australia from 2001 to 2031 (Vos et al 2005)**

Vos et al (2005) concluded that a large rise in health costs can be expected over the next 30 years, notwithstanding falls in the incidence of some major diseases such as cardiovascular disease and tobacco related cancers. Excluding aged care, health expenditure is projected to increase by $19.3 billion or nearly 160 per cent by 2030-31. Ageing and population growth accounted for two thirds of this increase ($8.9 billion and $5.6 billion respectively). If the incidence of some diseases had not been projected to decline, the increase would have been $2.4 billion higher.

It is difficult to directly compare the results of this Study with the Commission's projections. Vos et al (2005) examined government and private health costs for the diseases in question, which comprise 43 per cent of total health costs. In contrast the Commission has projected all government health expenditure (but not private expenditure). Different population projections have also been used.

Nevertheless, the Commissions results are generally higher than in the Study. The Commission projects that real expenditure will be around three times higher in 2030-31 than in 2002-03. The major source of difference appears to relate to the impact of demand and technology health costs rather than the shifts in disease prevalence.

- In Vos et al (2005) ageing is the largest factor in the expenditure increase. In the Commission's projections, ageing is significant, but non-demographic factors remain the largest component of the expenditure increase.

Source: Vos et al (2005)

A link between growth in health expenditure and GDP?

The Intergenerational Report projected non-demographic growth in health expenditures using stand-alone growth rates. A threshold issue is whether the non-demographic growth rate is expressed as an absolute number (such as 2.0 per cent a year), or as a premium over the expected growth in GDP per capita (say, 0.6 percentage points above the increase in GDP per capita).

This issue arises because there appear to be links between growth in health expenditure and economic growth.

- Economy-wide productivity changes will raise wage rates throughout the economy, including the health sector. To the extent that labour productivity growth in the health sector is lower than the economy generally, this implies that the overall health costs associated with any given service level will rise. To the extent that labour productivity in the health sector is the same or higher than the economy as a whole, then costs fall relative to service levels. However, unlike some other sectors — such as agriculture — the nature of many productivity gains in the health sector means that they cannot be realised as reduced inputs for the same service provision. The gains are often part and parcel of improved quality of outputs, which cannot then be reduced. It is somewhat akin to computer technology. New computers are very much more powerful and productive than older ones, but consumers do not have the option of purchasing a very cheap 286 computer.
- A range of studies have found that a country's GDP per capita is a strong predictor of its health expenditure (technical paper 5). Indeed, as a country's wealth increases, it tends to devote an increasing share of national income to health. Studies show that the income elasticity of demand for health care consistently exceeds one at the national level (Getzen 2000).
  - Technology is likely to play a significant role in the relationship between national income and health expenditure. Health care is not a fixed product through time. It is a continuously evolving set of treatments. As an effective treatment is developed — for example, for a particular cancer that was untreatable up to that point — it becomes a necessity for those with the disease. As such, there is a high willingness by governments to fund such treatments. If technology did not change, and hence the range of available treatments did not expand, it is unlikely that over time there would be a high income elasticity observed between national income and health expenditure.[1]

It should be noted that even with these links, in practical terms the basis for expressing the non-demographic growth rate would not matter if future GDP per capita performance was expected to be the same as past performance. If this were the case, whether the non-demographic rate was expressed as a stand-alone rate or a premium over GDP per capita would yield the same result. However, as discussed in chapter 5, it is uncertain that Australia can reproduce the same productivity

[1] This also partly explains why health expenditure has an income elasticity more associated with a luxury good than with a necessity. Medical technology develops new treatements that are necessities for those with the condition. The impact of this stream of new necessities on health expenditure gives it a high income elasticity and the appearance of a luxury.

performance that it experienced over the recent past. Ageing is also likely to have an impact on GDP per capita through reduced workforce participation. In this context, using stand-alone rates derived from past expenditure trends may overstate somewhat future non-demographic growth because those trends were partly dependent on a higher GDP performance. Thus, it would appear to be appropriate to:

- examine trends in health expenditure as a premium over the growth in GDP per capita; and
- based on these rates, project non-demographic growth as a premium over projected GDP performance.

This approach has been adopted in the projections in chapter 6.

While the choice of approach will affect the results, it should be recognised that expenditure projections are characterised by a high degree of uncertainty. Uncertainty about future growth rates is likely to outweigh the impact of choice of the projection base. No matter which approach is adopted, sensitivity analysis using different growth rates is critical (appendix C).

Over what time period should past growth trends be estimated?

Growth in government health expenditure has been greater over some periods than others. The components of health expenditure have also increased at different rates over different periods. Year on year growth rates fluctuate dramatically, but average annual (or compound) growth rates also vary significantly depending on the time period selected for measurement.

Two opposing factors influence the time period over which to base the non-demographic growth rate. On one hand, the period should extend back long enough to constitute a clear trend and abstract from one–off factors. On the other hand, a trend based on a more recent period is likely to incorporate more recent influences on policy and expenditure. It is recent developments that are likely to most heavily influence future expenditure.

Bearing in mind the need for a clear trend, the Commission considers that at least 10 years of data are necessary. However, relevance of the data would tend to rule out of consideration the volatile changes in health expenditure of the 1970s. While a significant element of judgment is required, the policy influences embodied in the trends from 1984–85 onwards (after the introduction of Medicare) are likely to constitute a broad indication of long–term growth in health expenditure.

The Intergenerational Report, for example, used a range of periods as a basis for the non-demographic growth rate. Medicare and hospital projections were based on the trend over the last decade while the pharmaceuticals rate was based on the trend over the last two decades. In its alternative modelling of aggregate Australian Government expenditure Treasury used growth rates that reflected the trend over the mid to late 1980s. This approach reflects that the past trends do not generate a definitive non-demographic growth rate and significant judgment is required.

Removing the effect of past ageing

Past growth rates *include* the effects of ageing on expenditure over the last 20 years. This effect must be removed in order to project future expenditure (otherwise the effect of ageing would partially be double counted through the growth rate and through the population projections).

It is not possible to directly observe and isolate the effect of ageing from previous increases in expenditure. However, under the assumption that the present age profile of expenditure applied in the past (which the available data tend to indicate is the case), the effect of ageing can be imputed. The age profile of expenditure is used to project expenditure backwards using past years' demographic profiles. The change in expenditure each year is a combination of population change and ageing. The change attributable to population is deducted from the total leaving the change attributable to ageing.

Under this method the past increase attributable to ageing is around 0.5 per cent to 0.6 per cent per annum. These figures are consistent with previous studies such as AIHW (1999) and the Intergenerational Report.

Component growth rates or an aggregate growth rate?

Individual components of health expenditure have grown at different rates over the last 20 years. The Commission has projected each component of health expenditure separately. This raises the issue of whether the non–demographic growth rate for each component should reflect its past growth, or the aggregate growth rate for total government health expenditure.

For short-term projections, the growth rate for each component should be used since there is statistical evidence of persistence. In the short term, expenditure for each component is most likely to reflect its past growth path.

Over a 40 year projection period, however, adopting different growth rates for components within the same broad class of expenditure can be problematic. Even

fairly small differences in growth rates over such a long period will lead to significant changes in the share of expenditure of each component, which may not be credible. For example, depending on the period selected, the age adjusted compound hospital premium over GDP has either been negative (from 1984-85 to 2002-03) or up to 0.8 per cent (table D.1). Thus it is not certain that observed differences in growth *between* components at any point in time will persist for long periods in the future. While some shifts in shares could be expected, dramatic shifts are unlikely unless there are very different past growth paths.

Table D.1 **Real per capita age-adjusted compound growth in government health expenditure less per capita GDP growth**

Selected periods

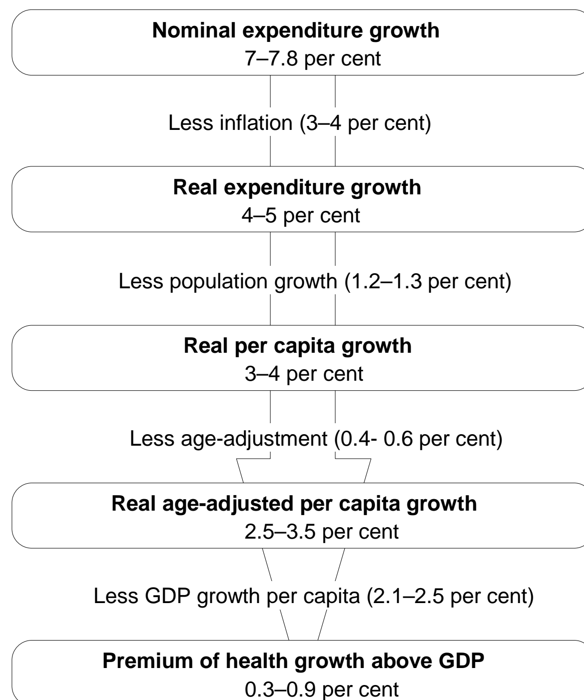
	1984-85 to 2002-03	*1989-90 to 2002-03*	*1993-94 to 2002-03*
	%	%	%
Hospitals	-0.4	0.3	0.8
Medicare	0.5	0.9	-1.1
Pharmaceuticals	4.6	5.2	4.9
Other	2.6	2.8	3.3

Source: PC calculations.

With the exception of pharmaceutical expenditure, the Commission has used the same growth rate (expressed as a premium above the GDP growth rate) for each component of health expenditure, and for State and Australian government expenditure. The rate used is 0.6 percentage points above the projected growth in GDP per capita. Box D.2 shows the derivation of this growth rate and the observed ranges for each variable. With respect to these ranges, it is worth reiterating the point made earlier that examining past trends does not yield a definitive growth rate. Sensitivity analysis has been conducted with premia of 0.3 percentage points and 0.9 percentage points above the growth in GDP per capita.

Box D.2 **Derivation of the non-demographic growth rate[a]**

Average annual compound growth in government health expenditure (excluding PBS) from over various periods to 2002-03



[a] The final premium health growth rate range is not determined by direct subtraction of sequential range values since these range boundaries did not occur simultaneously.

Source: AIHW Expenditure data cube and Commission calculations.

Pharmaceutical expenditure is treated differently because it has displayed a significantly higher growth over the last 20 years — and particularly over the last 10 years — than all other health expenditure.

Pharmaceutical growth per capita

Pharmaceutical expenditure under the PBS has increased at a real age–adjusted average annual per capita growth rate between 1984-85 and 2001-02 of over 6.5 per cent (a premium of 4.9 percentage points over GDP growth per capita). This is more than double total government health expenditure (with the pharmaceutical component removed) over the same period. A divergence on this scale justifies a different treatment of non-demographic growth.

One approach is to use a constant non-demographic pharmaceutical growth rate throughout the projection period. This approach was adopted in the

Intergenerational Report.[2] It found that expenditure under the PBS would increase from 15 per cent to 41 per cent of total Australian Government expenditure. As discussed above, a growth rate above that of other components results in a significant rise in the share of expenditure attributable to that component.

However, since the Intergenerational Report was released there have been a number of developments, which indicates that very high rates of growth may not be sustained:

- there has been a slowing in the growth of PBS expenditure over the last two years;
- the Pharmaceutical Benefits Pricing Authority is increasingly incorporating risk sharing arrangements into its agreements with drug companies to minimise the expenditure implications of drugs being more widely prescribed than for their intended indications; and
- a number of high cost, widely prescribed drugs such as statins are due to come off patent in the next few years (Medicines Australia, sub. 32, p. 2).

In the light of these developments, another approach is to initially have a significantly higher growth rate for pharmaceutical expenditure than for other components, but for the rate to trend down over time to the general growth rate. This also results in a shift in the share of expenditure towards pharmaceuticals, but not to the same extent as under the first approach. Underpinning this view is that while shares of individual components of health expenditure may gradually change they are unlikely to fundamentally alter their relationship with one another.

The latter approach has been used in the projections. Non-demographic growth is initially set at a premium of over 4 percentage points above growth in GDP per capita and trends, via a logistic function, to the growth rate for other components. The disadvantage of an essentially arbitrary logistic function is outweighed by the advantage of retaining long-run balanced growth between different components of health expenditure.

Figure D.2 compares the results of both approaches (a logistic function and the constant Intergenerational Report growth rate). The results of both approaches are similar until 2020. However, after that time they diverge dramatically. While a constant growth rate is acceptable for short-term projections, the exponential rate of growth in figure D.2 demonstrates that it may be unrealistic for longer term projections.

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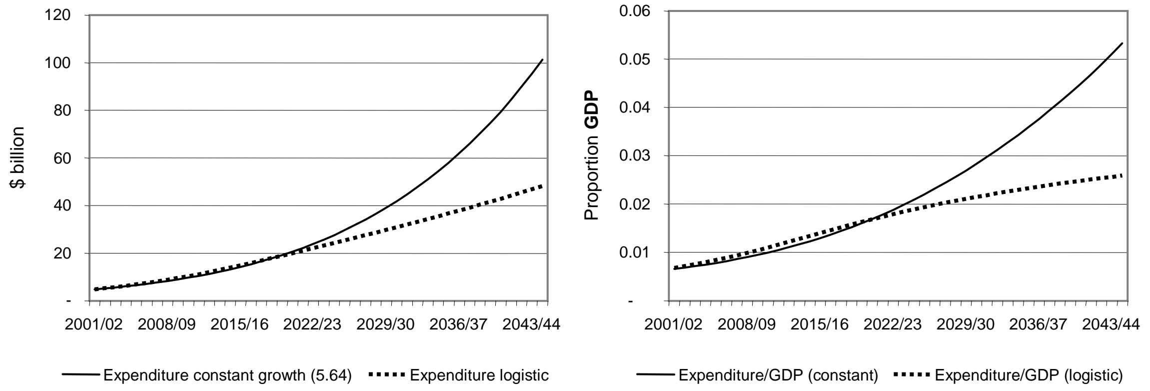
[2] The Intergenerational Report used a real per capita age adjusted non-demographic growth rate of 5.64 per cent: the rate calculated from 1983-84 to the end of the (confidential) forward estimate period.

Figure D.2 **Effect of logistic vs constant non-demographic growth rate on government pharmaceutical expenditure**

2001-02 to 2044-45



Data source: Commission estimates.

E Voluntary work

Older people make a valuable contribution economically and socially through participating in a range of unpaid activities including volunteering, informal caring of children and the aged and providing help to families and communities. Informal caring of the aged was examined in chapter 7. This appendix looks at volunteering. It explores the relationship between volunteering and age and examines the likely trends in volunteering over the next 40 years.

E.1 Volunteers

Volunteers work across many sectors of the community including health and welfare, emergency services, community services, conservation, sport and recreation, education, overseas aid, religion, animal welfare, and early childhood development. Volunteering includes formal unpaid work through an organisation or program, as well as informal volunteering such as doing favours for family, friends, or neighbours.

Volunteering through organisations

In 2000, 32 per cent of Australians aged 18 years and over were engaged in voluntary work through an organisation, contributing over 700 million hours of unpaid work (ABS 2000, Cat. no. 4441.0).

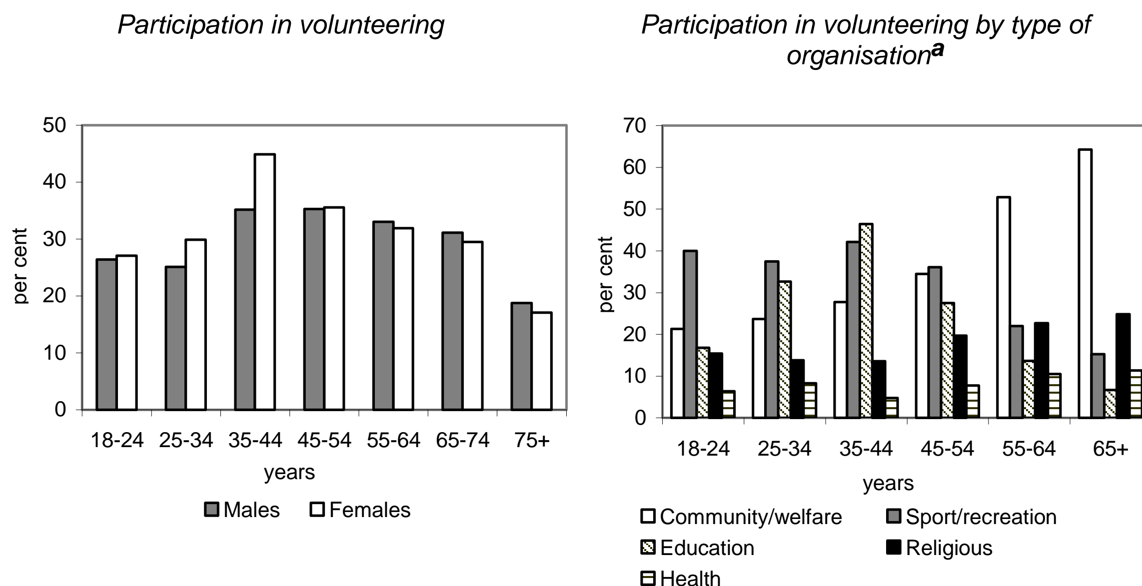
Formal volunteering is increasing. In 1995, participation in voluntary work and time spent volunteering was lower at 24 per cent and 512 million hours respectively.

Rates of volunteering are highest for the middle aged and in particular, for women aged 35 to 44 years (figure E.1). Age is also a determining factor of the type of voluntary work undertaken:

- young age groups volunteer predominantly in the area of sport and recreation;
- the 35 to 44 year age group participates mainly in education; and
- older age groups (above 55) volunteer predominantly in the areas of community and welfare and religion (figure E.1).

Figure E.1 **Voluntary work through organisations**

2000, by age group



[a] Education comprises education, training and youth development; data does not sum to 100 because some volunteers participate in more than one sector.

Data source: ABS (2000, *Voluntary Work*, Cat. no. 4441.0).

Participation in volunteering is highest in South Australia and the ACT. In all States and Territories participation is higher in regional areas than metropolitan areas, peaking at 45.8 per cent for females in Western Australia (table E.1).

Table E.1 **Participation in voluntary work through organisations**

By State and Territory, 2000, per cent

	Males		*Females*		*Total*	
	Metropolitan	*Regional*	*Metropolitan*	*Regional*	*Metropolitan*	*Regional*
New South Wales	22.3	35.7	27.0	39.4	24.7	37.6
Victoria	29.3	42.1	28.5	45.5	28.9	43.8
Queensland	28.2	29.4	32.2	34.8	30.2	32.1
South Australia	33.8	43.7	37.6	45.2	35.8	44.5
Western Australia	29.0	43.4	27.4	45.8	28.2	44.6
Tasmania	35.0	33.6	28.3	37.8	31.5	35.7
Northern Territory	32.7	31.3	30.3	32.7	31.6	32.0
ACT	36.2	-	36.3	-	36.2	-
Australia	**27.5**	**36.1**	**29.4**	**40.0**	**28.4**	**38.1**

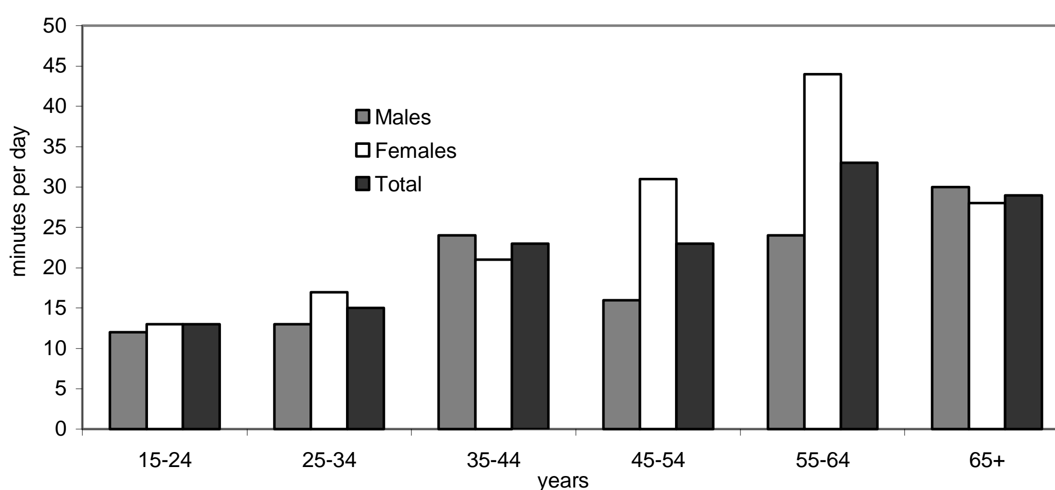
Source: ABS (2000, *Voluntary Work*, Cat. no. 4441.0).

Informal volunteering

Volunteering also exists outside formal organisations. The ABS time use survey measures voluntary work as unpaid work for community organisations as well as caring for an adult and doing favours for family and friends outside the home. The last survey (1997) was conducted over four, 13 day periods using a diary approach.

In 1997, 23 per cent of women and 16 per cent of men spent time volunteering or caring for an adult. Women aged 55 to 64 years and men over 60 years figured particularly prominently (figure E.2).

Figure E.2 **Average time spent volunteering or caring for an adult, 1997**



Data source: ABS (1997, *How Australians Use Their Time*, Cat. no. 4153.0).

The value of volunteering

Volunteering — while not counted as part of Gross Domestic Product — produces substantial gains for Australian society. Estimates of the economic value of volunteering range from $11 billion to $42 billion annually. The differences can be attributed to the definition of volunteering and the method of estimation employed. For example:

- the ABS (1997, cat. 5240.0) define volunteering as formal volunteering through an organisation, doing favours for family and friends outside the home and caring for an adult. Using alternative approaches, the ABS estimates that the economic value of volunteering is between $21 billion and $30 billion annually; and
- Ironmonger (2000) broadens the definition of volunteering to include support for other children and estimates that the value of volunteering is $42 billion a year.

De Vaus et al. (2003) uses ABS time use survey data and ABS estimates of unpaid work (Cat. no. 5240.0) to estimate the value of volunteering and other forms of unpaid work by age group and gender.

Based on these estimates, the annual value of volunteering (which excludes adult care and child care), is $11.5 billion. As a group, the total value of volunteering is highest for the 25-44 years age group (table E.2). However, the maximum average value of volunteering occurs at 45-54 years for females ($1 114 per person) and 65-74 years for males ($1 394 per person).

Table E.2 **The value of volunteer work by age group**

1997 (2002-03 dollars)

	Females		Males	
Age	Average $ per annum, per person	Total value $000	Average $ per annum, per person	Total value $000
15-24	423	540 345	422	556 274
25-44	697	1 963 697	754	2 090 323
45-54	1 114	1 307 898	644	750 787
55-64	1 073	854 975	965	825 769
65-74	912	873 679	1 394	1 113 613
75+	766	425 855	639	246 609
Total	**783**	**5 966 450**	**746**	**5 583 373**

Source: De Vaus et al. (2003, p. 14), data converted to 2002-03 prices using GDP implicit price deflator, estimates of total value of volunteering based on ABS population data for 1997.

E.2 Volunteering in an ageing population

Participants in this study were generally optimistic about the impact of population ageing on volunteering. For example, the ACT Government (sub. 21, p. 18) commented:

> Volunteering is likely to be one of several areas in the community that will benefit from an ageing population in the ACT. The Territory currently has one of the highest rates of volunteering among the States and Territories, and the rates of volunteering among the growing number of retirees are expected to continue to grow over the next two decades.

This section examines the implications of an ageing population on the pool of volunteers and the value of volunteering over the next 40 years.

The pool of volunteers

Data on participation rates in volunteering were applied to demographic projections to project the number of volunteers by age and gender over the next 40 years. While conceptually the most appropriate measure of volunteering includes volunteering through informal routes, as well as through organisations, information on this basis is very dated. Accordingly, the Commission used more recent (and better measured) ABS data on voluntary work through organisations only (Cat. no. 4441.0) as the basis for estimation of the number of future volunteers (box E.1).

Box E.1 **Some limitations**

Voluntary work survey data

ABS data on voluntary work through organisations does not include data on informal volunteering. However, the data are more recent than the time use survey (2000 rather than 1997) and have information on the type of volunteering work undertaken by age group.

The Commission used participation rates in volunteering rather than time spent volunteering as a basis for projections. Time spent volunteering would be a more accurate measure of the total contribution each age group makes to volunteering. However, survey data on participation rates are a more reliable measure of volunteering than survey data on time spent volunteering.

Age-specific participation rates may not be stable

One of the drawbacks of the method used by the Commission in undertaking these projections is that it fixes age-specific volunteering rates at their year 2000 values. However, it is uncertain how rates of volunteerism will change with an ageing population or with other social and economic factors. The Victorian Government (sub. 29, p. 51) and the Western Australian Government (sub. 39, p. 32) suggested that different cohorts may behave differently. For example:

> The high participation rates of those currently aged 35-44 and 45-54 years suggest that as these cohorts age, volunteerism among older age groups (65+) may be higher than that today, as the healthier, more active older people of the future continue their volunteer activity (Victorian Government, sub. 29, p. 51).

Changes in the need for volunteers might also be expected to influence people's willingness to volunteer. For example, the large projected increase in the number of lone old people may prompt other adults to volunteer for their (part) care.

Were age-specific participation rates to rise as a result of these effects, then the Commission's estimates of the number of volunteers would be underestimated.

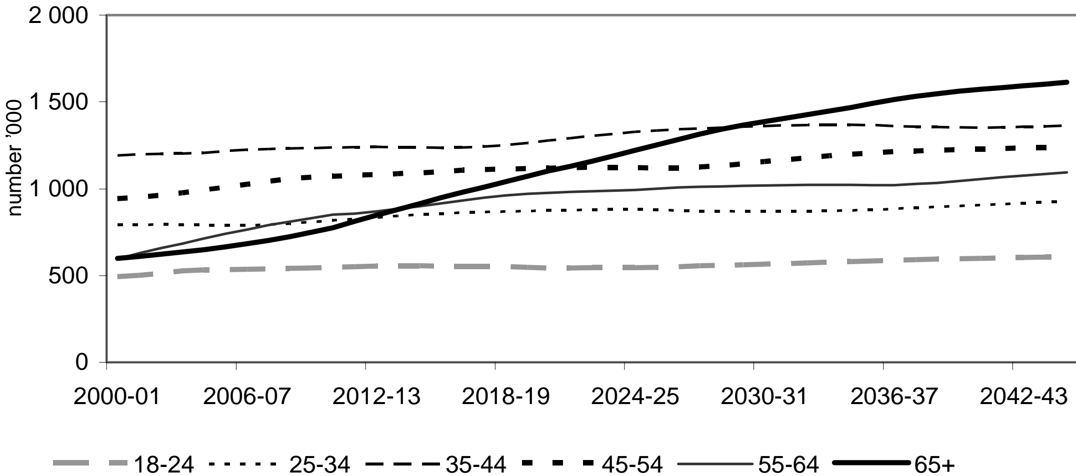
The Commission projects that the number of volunteers over time will increase from 4.75 million in 2002-03 to over 6.84 million in 2044-45, an increase of

44 per cent. If the population were not to experience ageing the number of volunteers would be marginally lower, growing to about 6.77 million in 2044-45. However, as discussed in chapter 3 if ageing were not to occur the age structure of volunteers would be significantly different.

Over the next 40 years growth in volunteers will primarily occur in the 65 and over age group, reflecting their greater share in the population:

- The number of volunteers in the 65 and over age group is projected to more than double, from 598 000 volunteers in 2000-01 to 1.6 million in 2044–45.
- The number of volunteers in the 45–54 years and 55–64 years age groups are also expected to increase — by 31 per cent and 84 per cent respectively.
- In contrast, no growth is expected in the number of volunteers for younger age groups (figure E.3).

Figure E.3 **Projected number of volunteers working for organisations**
2000-01 to 2044-45



Data source: Commission estimates.

These trends result in shifts in the shares of volunteers by age group. Over the next 40 years, the share of volunteers aged over 45 is projected to increase from 46 per cent in 2001-02 to 58 per cent in 2044-45. Over the same period, the share of volunteers aged less than 45 years is projected to fall from 54 per cent in 2001-02 to 42 per cent in 2044-45.

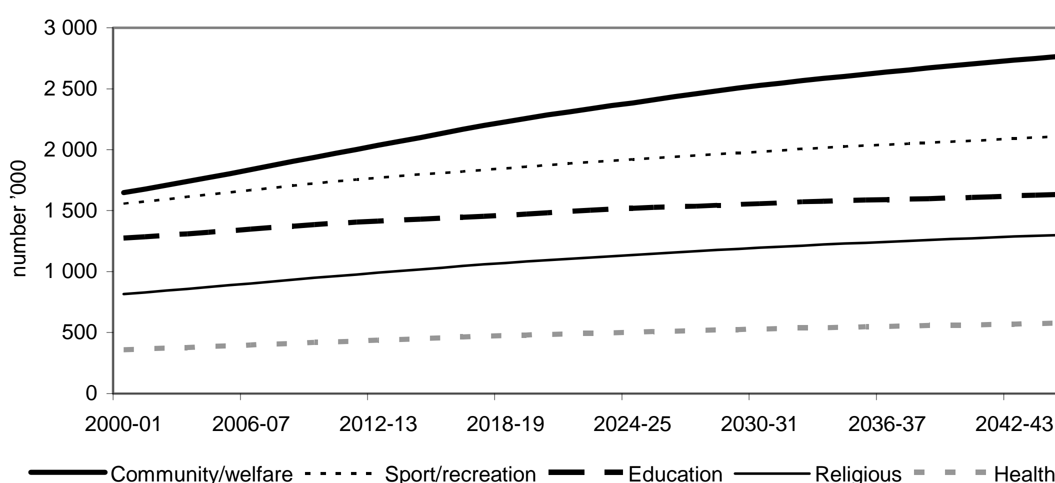
This will have implications for organisations that rely on younger volunteers. For example, Volunteering Australia (sub. 28, p. 6) commented:

> Some of the challenges of an ageing population for volunteering may be associated with particular types of organisations. The 65 and over age groups are strongly represented in the community/welfare, religious and health areas of volunteer work.

Conversely, this age cohort is underrepresented in the areas of sport and recreation and education/training/youth development. These types of organisations may experience difficulty in attracting volunteers as the population ages.

The Commission's projections also suggest that, over the next 40 years, growth in the number of volunteers is expected to be significantly lower in the areas of sport and recreation and education (figure E.4).

Figure E.4 **Projected number of volunteers by type of organisation**[a]
2000-01 to 2044-45



a Projections assume that the participation rates by organisation will remain constant over time. However, in the future older people may increasingly volunteer in non-traditional areas to prevent any shortfalls that may occur in particular organisations.

Data source: Commission estimates.

Further, the Victorian Government (sub. 29, p. 52) cite emergency services, which rely on a relatively 'young' volunteer base (capable of meeting the physical demands of service provision), as an area where shortfalls in volunteering may occur.

In addition, several participants commented that maintaining a volunteer base will be a challenge in rural and regional areas, which are ageing faster than the total population. For example, Volunteering Australia (sub. 28, p. 9) said:

> Volunteering is more common in rural and regional areas, with the rate of volunteering around 10 per cent higher in the rural and regional areas of Australia than the capital cities. However, the types of volunteering that are most common are also those dominated by the young and middle age cohorts. In rural and regional areas, 39.2 per cent of involvements are in sport/recreation, and 24.5 per cent are in education/training and youth development. Any decline in these areas raises concerns for the recreational and developmental opportunities for younger people in these

communities and the social capital that these areas of volunteering accrue for the entire community.

The value of volunteering

The Commission used estimates by de Vaus et al. (2003 p. 14) of the average value of volunteer work by age group as a basis for projections on the value of voluntary work. These estimates include both the value of volunteering through an organisation and informal volunteering.[1] It was assumed that the value of voluntary work increased in line with average weekly earnings (assumed 1.75 per cent annually).

Over the next 40 years, the value of volunteering is expected to rise from 1.8 to around 2.1 per cent of GDP (table E.3).

Table E.3 **The value of volunteering by age group, projections**
per cent of GDP

Age (years)	*2002-03*	*2008-09*	*2014-15*	*2024-25*	*2034-35*	*2044-45*
15-24	0.17	0.16	0.16	0.15	0.15	0.15
25-44	0.62	0.58	0.57	0.57	0.56	0.55
45-54	0.35	0.35	0.34	0.34	0.35	0.34
55-64	0.30	0.34	0.36	0.38	0.37	0.39
65-74	0.23	0.24	0.30	0.36	0.39	0.39
75+	0.12	0.13	0.15	0.20	0.27	0.31
Total	1.80	1.82	1.88	2.00	2.09	2.13

Source: Commission estimates.

[1] The Commission also considered including estimates of unpaid work for adult care and projecting the value of volunteering and caring for adults (as the ABS does). However, estimates of adult care for non-family outside the household ($11 per person each year for females and $9 for males, sub. 10, p. 15) are small relative to the value of volunteer work and therefore would not have any significant effect on projections.

F Fiscal risks for governments

F.1 The vertical fiscal imbalance and fiscal pressure

The evidence on revenue and spending suggests that all jurisdictions will face fiscal pressures and risks as a result of an ageing population in Australia. However, the incidence of these risks and pressures is complicated by the financial dependence of States[1] on the Australian Government. Changes in the payments made by the Australian Government to the States as a result of ageing pressures can shift budget pressures between the different tiers of government. For example, Access Economics (2002) identified this as a risk of contagion from Federal to State finances.

A brief picture of Federal financial relations is needed in order to analyse the likelihood and size of any such shifts in fiscal pressure.

The Australian Government raises more revenue than it directly spends, reflecting its role as the principal tax collector within Australia's federal system. Its major tax revenue sources are income taxes, the Goods and Service tax (explicitly collected on behalf of State governments), and excises.[2]

The GST revenue is distributed to the States. The Australian Government also makes several other payments to State and local governments (figure F.1). The most important of these are special purpose payments (SPPs), which are tied grants covering a broad range of areas, such as health, education and housing. The bulk are paid to the States for their own spending purposes, though some are also paid *through* the States for local government and other purposes. A small share is paid directly to local government.

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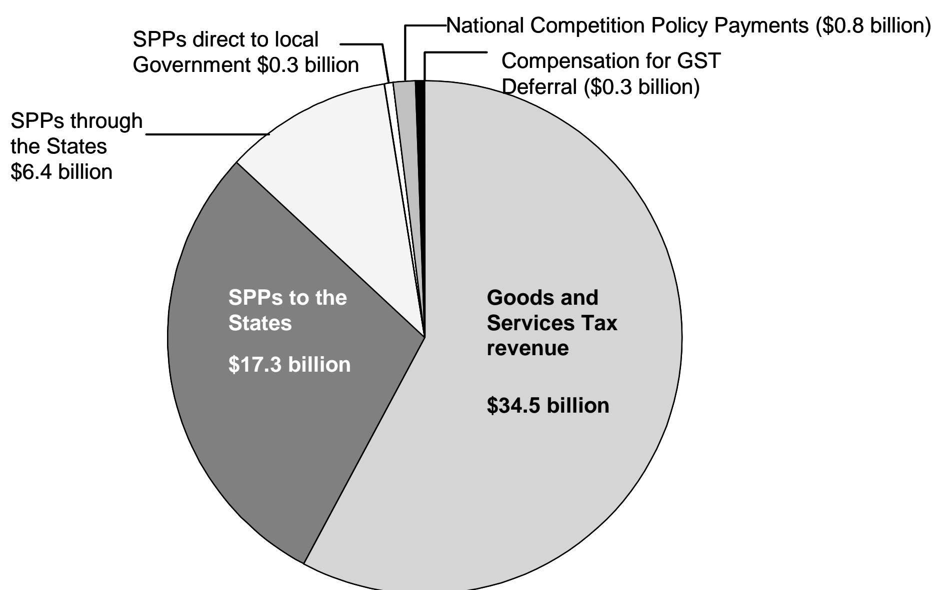
[1] In this appendix, 'States' refers to the States of Australia, the Northern Territory and the Australian Capital Territory.

[2] Income taxes levied on businesses and individuals comprise the biggest single source of taxation revenue in Australia, amounting to $131.3 billion in 2002-03, or 55 per cent of total taxation revenue collected by all tiers of Australian governments. In comparison, the GST amounted to $31.3 billion and Australian Government excise tax was $20.8 billion (ABS, 2004, *Taxation Revenue, Australia*, Cat. no. 5506.0).

When supplemented by their own-source revenue, these grants and payments are the means by which the States fund expenditure, such as hospitals and schools. The transfers are large as a share of the total revenue available to State and local governments (panel A of table F.1).

Figure F.1 **Payments by the Australian Government to State and local government**

2004-05 estimated



Data source: Australian Government (2004, *Federal Financial Relations 2004-05*, 2004-05 Budget Paper no. 3, Canberra).

F.2 What payments are at risk?

The GST is effectively a state tax that is collected by the Australian Government. Accordingly, while population is likely to erode GST revenues as a share of GDP (and therefore produces fiscal pressures for the States — chapter 11), there is little risk that the revenue will be withheld by the Australian Government.

SPPs, on the other hand, are discretionary and partly conditional transfers to the States.[3] The Queensland Government (sub. 17, p. 44) emphasised that SPPs are not within the control of State governments and so present budget risks:

[3] For example, they may require dollar for dollar matching for eligibility and that certain performance criteria be met for continued funding. At various times, the Australian Government has discontinued its funding of programs established as SPPs.

Special purpose payments are largely at the discretion of the Commonwealth Government such that there is significant uncertainty surrounding the growth of SPPs relative to GDP.

SPPs represent a significant source of revenue for all States, but, relative to own-source tax revenue, they figure particularly prominently for Tasmania, the Northern Territory and Western Australia (table F.1). Due to the large relative magnitude of SPPs to States' own-source tax revenues, divergent assumptions about the future size of these payments can make a sizeable difference to fiscal risks faced by the different tiers of government.

Table F.1 **State and local government dependence on payments from the Australian Government**

2002-03

	NSW	*VIC*	*QLD*	*SA*	*WA*	*TAS*	*NT*	*ACT*	*Total*
Revenue of State and local governments[a]									
A Share of total revenue (%)									
Own-taxation revenue	38.1	36.3	28.6	29.8	31.5	21.6	11.8	29.0	33.5
Other own-source income	23.4	25.7	29.7	24.8	26.7	25.7	15.9	29.4	25.5
Current grants and subsidies	38.5	38.0	41.7	45.4	41.8	52.7	72.3	41.6	41.0
Total revenue	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Payments to State governments[b]									
B Ratio to own-source taxation revenue									
SPPs	0.37	0.41	0.52	0.53	0.59	0.72	1.20	0.39	0.45
GST revenue	0.64	0.69	1.05	1.18	0.86	2.21	6.15	0.90	0.84
Other payments	0.06	0.04	0.02	0.06	0.03	0.09	0.03	0.03	0.05
All payments	1.07	1.14	1.60	1.77	1.48	3.01	7.38	1.32	1.33

[a] This relates to the consolidated finances of States and local government. Current grants and subsidies are mainly SPPs from the Australian Government and GST revenue, paid to State and local governments, either directly or indirectly. For example, it includes SPPs paid *through* States for local government and other uses (such as private schools). [b] This excludes SPPs paid through State governments and SPPs paid directly to local government. Other payments includes Budget Balancing Assistance and National Competition payments. Own-source taxation revenue used in panel B is only for States, thus excluding local government (cf. panel A).

Source: ABS (2004), *Government Finance Statistics, Australia*, Cat. no. 5512.0, April (for consolidated data in panel A); Australian Government (2003), 2003-04 Budget, Budget Paper no. 3 (for data on payments to States only); and ABS (2004), *2002-03 Taxation Revenue, Australia*, Cat. no. 5506.0, April (for own-source State taxation revenue used as the denominator for data in panel B).

F.3 Fiscal pressures for the 'Combined States' compared with the Australian Government

How SPPs are viewed shapes how they are projected. There are two broad perspectives on their role:

- SPPs may be seen as hypothecated payments made by the Australian Government — payments dedicated to produce certain social and economic outcomes. From this perspective, they will respond to changing service needs.
- SPPs may be seen as a revenue source to help meet various service expenses, but one that is not guaranteed to grow at the same rate as those services.

SPPs as *hypothecated* payments

To the extent that SPPs are viewed as hypothecated payments, they are not mere discretionary income transfers, but payments that are tied to certain objectives, such as a well functioning hospital system. From this perspective, the payments are not constrained by thresholds in GDP shares or real per capita amounts, but by service needs.

The appropriate projection method in this context is to establish a constant price funding amount in a base year for those expenditures that are age-related — health, education and aged care — and to project future trends in these on the basis of population, ageing effects and non-demographic factors. This was the way in which the Intergenerational Report projected all age-related Australian Government spending, including those that are funded through SPPs. The Governments of Victoria (sub. 29, p. 16) and South Australia (sub. 23, p. 24) considered this as one possibility among several, when exploring the fiscal pressures for States.

The most important single expenditure item in SPPs are the health care grants (around $7.5 billion in 2003-04). Aside from the short-term deviations introduced by Health Care Agreements,[4] it can be expected that ageing, population and non-demographic factors[5] will significantly increase this base value over time. Overall,

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[4] Health Care Agreements provide a contingent level of funding from the Australian Government to the States for public hospitals. The AIHW (2004, p. 246) notes that in the first year of any agreement, the Australian Government's share of total funding tends to increase, while over the remainder of the agreement's period the States increase their funding share. Accordingly, the 'trend' over the life of any particular health agreement is misleading.

[5] It is assumed that the values of these factors are the same regardless of the funding source. In theory, it would be possible to use a different non-demographic rate for different funding sources were the funding shares to be changing. The long-run evidence suggests that, if anything, the Australian Government has accounted for a rising share of the total costs of public hospitals. This

it is expected that public hospital funding contributed by both State governments and the Australian Government will rise relative to GDP. Implicit in this projection methodology is that there is no shift in the *share* of total funding given by either level of government after the base year. In the case of health care grants given by the Australian Government to the States for public hospitals, it could be expected that the ratio of grant values to GDP will increase by around 60 per cent from 2002-03 to 2044-45.

Of course, other SPPs are expected to fall relative to GDP — such as those paid to education. However, all other things being equal, SPP to GDP ratios could be expected to rise overall, because ageing pressures on services are likely to increase the Australian Government's health SPPs by more than they decrease their education SPPs. The point to emphasise is that using this methodology, the relevant SPP to GDP ratios are the *outcome* of the projections, rather than a financing constraint imposed by the Australian Government on the States.

It is also worth noting that under this approach not all sub-components of the SPPs are modelled. As in the rest of this study, the focus of projections is on those expenditure items that are affected by population ageing. For example, the Commission has not undertaken detailed modelling of defence spending at the Australian Government level. Similarly, SPPs on land care and other environmental projects are not projected. The Commission has, however, broadly examined trends in Governments' spending in non-age related areas to assess whether they might exacerbate or relieve fiscal pressures associated with age-related spending (technical paper 8). After considering broad spending trends, the Commission's base case assumption is that, in aggregate, these residual areas of government spending are roughly maintained as a share of GDP. This assumes there are no direct feedbacks from ageing fiscal pressures on environmental, defence and other non-ageing government expenditures. Of course, it is possible that one method by which governments may fund the rising costs of ageing is to cut back on these other spending items, but this should not be modelled implicitly as a forgone conclusion.

SPPs as an uncertain revenue source

The alternative view is that SPPs do not need to rise with service needs. Rather, they are like other government transfer payments, and are constrained by similar conditions, such as dependency on tax revenues.

would suggest a higher non-demographic growth rate for health care grants from the Australian Government than public hospital funding from State governments. However, given the recent stability of the funding share, the Commission's projections are based on the assumption of a fixed future funding share, and consequently on the same non-demographic rate for both funding sources.

There is a floor to the risks borne by the combined States as a result of variations in SPP revenue. As part of the 1999 *Intergovernmental Agreement on the Reform of Commonwealth-State Financial Relations* (Clause 5(v)), the Commonwealth indicated that it:

- will continue to provide SPPs to the States; and
- has no intention of cutting aggregate SPPs as part of the ongoing process of tax reform.

This commitment is seen as, at least, requiring that the Australian Government maintain *real* SPPs *per capita* over time. But it does not require SPPs to be maintained as a share of GDP or to meet the growing service needs for which they are provided. This was a source of potential concern to many States:

> … State budgets will be heavily influenced by the level of Commonwealth funding for Specific Purpose Payments (SPPs). If SPPs are only maintained in real terms (the only position the Commonwealth has agreed to), and not adjusted for growth in demand for services, State budgets will have significantly higher deficits. (ACT Government sub. 21, p. 18)
>
> Historical precedent suggests that Commonwealth funding to States, whether in the form of general or specific purpose funding, will struggle to keep up with, let alone outpace, economic growth. (Queensland Government, sub. 17, p. 44)
>
> Current arrangements also do not suggest a Commonwealth policy of escalating SPPs in line with service needs … Our experience is also that the Commonwealth is seeking to reduce the need to grow SPPs by imposing increasingly stringent conditions on States to receive SPPs. (Western Australian Government, sub. DR70, p. 2)
>
> It is conceivable that Commonwealth priorities could be re-aligned through resource allocation decisions which involve a reduced relative commitment to programs which are currently jointly resourced by the Commonwealth and the States. (South Australian Government sub. DR62, p. 2)
>
> The States … will face significant fiscal pressures should the Commonwealth choose not to increase SPPs in line with the demand for these services. (Tasmanian Government, sub. DR69, p. 3)

Accordingly, some States' baseline projections for future fiscal pressures assumed no real growth in per capita SPPs (such as the ACT and South Australian Governments).[6] However, the ACT Government also observed that 'in all likelihood, this scenario will not hold', while the South Australian Government also considered an alternative scenario, in which SPPs grow more rapidly than this. For example, if it were assumed that the Australian Government maintains SPPs at their current shares of State spending in each portfolio, then the South Australian

[6] Sub. 21, p. 12 and sub. 23, p. 24 respectively. The Victorian Government (sub. 29, p. 28) also considered this scenario, but not as their base case.

Government estimated that combined States' SPP revenue improves by $30 billion in 2041-42, while the Australian Government balance worsens by $30 billion. (The Commission estimates that this is around 1.6 per cent of GDP in 2041-42).

Another perspective is that Australian taxation revenue will generally rise with GDP — and that this will allow SPPs to rise in per capita real terms. Accordingly, some State governments modelled SPPs as a fixed share of GDP. For example, the Queensland Government explored ten long-term fiscal scenarios, in which nine presupposed that SPPs grew at the same rate as gross state product (GSP when cumulated across States is equal to GDP), while one assumed that SPPs grew slower than GSP.

These various projection scenarios for SPPs are consistent with the usual ways of projecting income payments more generally in the economy. For example, welfare transfers are often projected as growing with population numbers and prices, while taxation revenue is often modelled as a roughly fixed share of nominal GDP.

Historical trends in intergovernmental payments

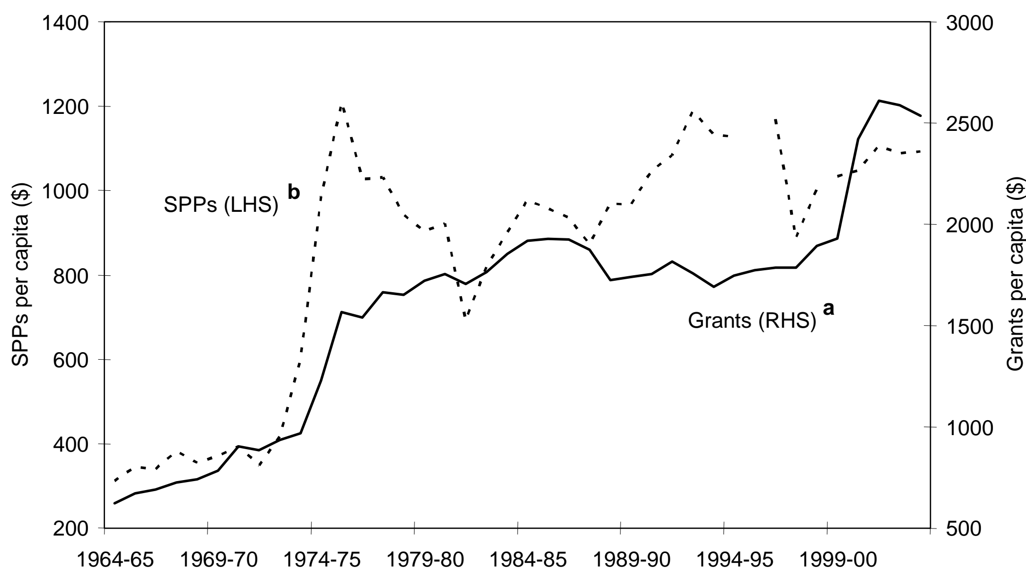
Accordingly, there are three broad approaches for projecting SPPs. They could grow with:

- prices and population;
- GDP; or
- service needs.

A starting point for the assessment of which of the three broad approaches above is most credible is the historical pattern of transfers from the Australian Government to the States.

Gauging this historical pattern is bedevilled by changes in intergovernmental spending and taxing policies. But a broad view can be obtained by looking at various measures of grants made by the Australian Government to other levels of government (figures J.2, J.3 and J.4).

Figure F.2 **What has happened to real per capita grants to the States?**
1964-65 to 2003-04, Per capita real value (2002-03 prices)



[a] Grants comprise Commonwealth current grants to State and local general government. They include untied grants that are recommended by the Grants Commission and SPPs (they do not include capital grants). Data are from the ABS (*National Accounts*, Cat. no. 5206 for 1972-73 to 2003-04) and from Foster and Stewart (1991, for 1961-62 to 1971-72). Data for the period from 1948-49 to 1960-61 are estimated as a fixed proportion of total Commonwealth capital and current grants to States and local government (from Foster and Stewart). There are some significant changes in the series. Australian Government grants to the States fell in 1971-72 when the Australian Government transferred payroll taxes to the States. The increase in the late 1990s reflects the introduction of the GST. The grants were converted to real values using the GDP implicit price deflator (from ABS National Accounts) and to per capita terms by dividing by a moving average of end of fiscal year populations. [b] Special purpose payments are those 'to and through' the States, but exclude payments made directly to local government and advances. Over the period covered by the data, the Northern Territory and ACT have been included and there have been major policy shifts involving universities and public hospitals, amongst others, that will have affected the magnitude of the payments. Data from 1999-2000 are based on accrual accounting and are not directly comparable with past data.

Data sources: ABS (*National Accounts* Cat. no. 5204.0 and 5206.0) and Foster and Stewart (1991) and data supplied by the Department of Finance.

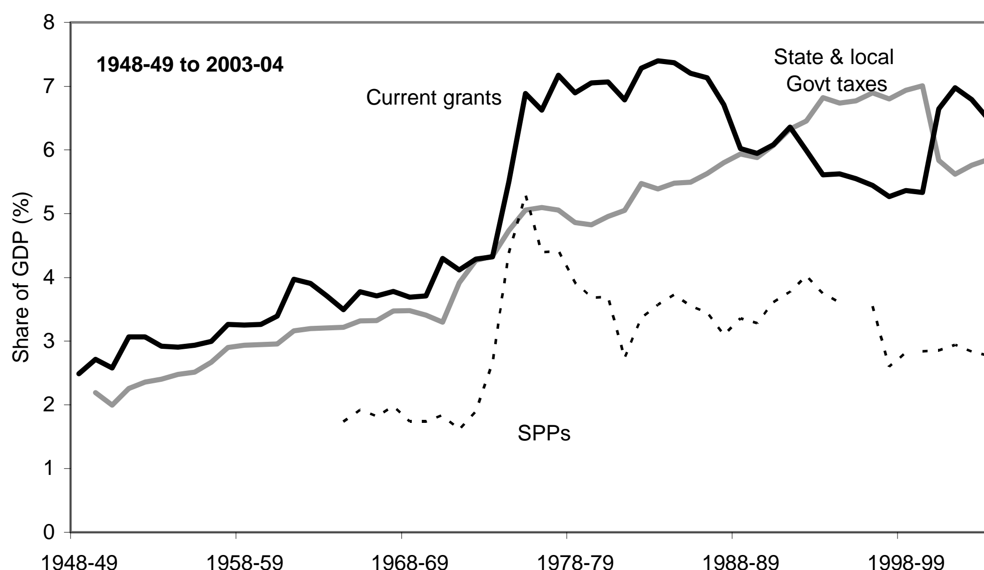
The data imply that:

- While volatile from year to year, current grants to all levels of government[7] and SPPs 'to and through' the States have generally increased in real per capita terms (figure F.2). This suggests that the assumption of maintenance of real per capita SPPs over the next 40 years — while reasonable over short periods — would represent a break from past long-run trends.

[7] That is, including grants made directly to local government or through States to local government and other parties. However, these exclude capital grants, which have generally decreased in importance from the 1970s (Mathews and Grewal 1995). It is important to look at total grants as well as SPPs since funding can shift between them.

- Over the post-WWII period, current grants increased as a share of GDP — broadly in line with the greater role of Australian governments in the economy generally (figure F.3). However, after rising steeply when new spending initiatives were instituted by the Whitlam Government in the early 1970s[8], the grant share has no longer climbed steadily. Indeed, from 1983-84 to 1997-98 the grant share fell steadily from around 7.4 to 5.2 per cent of GDP. This reflected severe pressures on the Australian Government's budget and the capacity to reduce payments while States could successfully increase their own-source revenue (such as conveyancing and gambling revenue). With the introduction of the GST, and the replacement of a range of State taxes, the grant share of GDP again increased significantly and has been roughly stable since. SPPs have also faced large swings, but have exhibited a slow decline as a share of GDP since the early 1980s.
- Current grants fell slowly as a share of State spending over the past 30 years, until the introduction of the GST (figure F.3). SPPs, on the other hand, have been roughly stable as a share of States' spending from the early 1980s, after large swings in the prior decade.

Figure F.3 **Have grants kept pace with GDP?[a]**



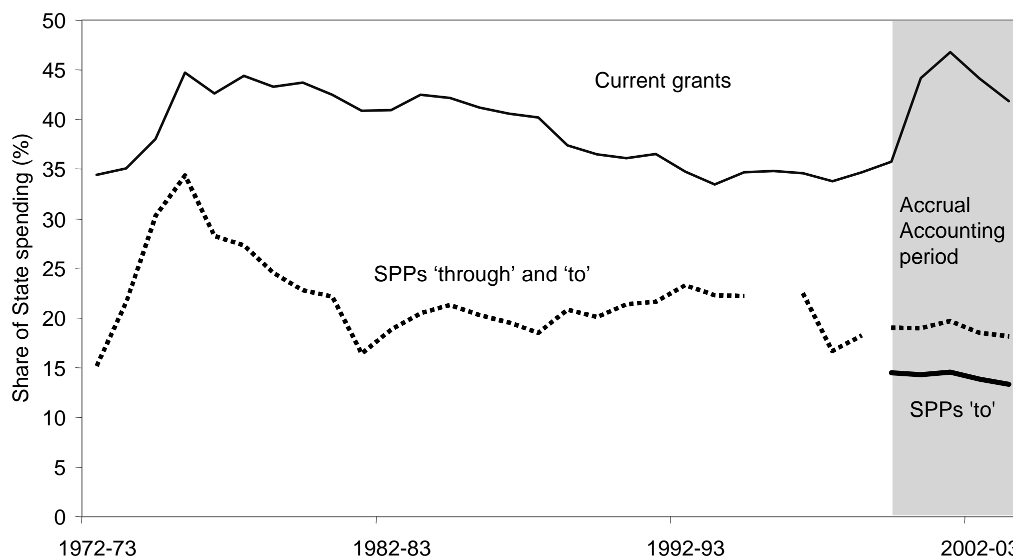
[a] The derivation and definition of SPPs and current grants is described in figure F.2. All items are expressed as a share of GDP in current prices. The GDP data are from the ABS (*Australian National Accounts*, Cat. no. 5204.0 and 5206.0) for 1959-60 to 2003-04. GDP data for previous years were estimated from the relationship between the present GDP measure and the old GDP(I) measure published in the National Accounts. State & local government taxes include all taxes, fees and fines for these two tiers of government (from ABS Cat. no. 5206.0 for 1972-73 to 2003-04 and spliced from Foster and Stewart for past data).

Data sources: As in figure F.2.

[8] Mathews and Grewal 1995; James 2001.

Figure F.4 **Have grants kept pace with State spending?[a]**

1972-73 to 2003-04 (share of State spending)



[a] State and local government spending is measured as 'Total use of gross income' less 'Net savings' from the National Accounts (Cat. no. 5206.0). SPPs and current grants are defined in figure F.2.

Data source: As in figure F.2.

While the historical trends do not support the view that SPPs are likely to only keep pace with population and price movements, it is hard to distinguish either of the other two possibilities raised previously. Either way, the trends confirm that the States can face fiscal risks associated with flagging Commonwealth payments over a span of years.

In any case, it should be emphasised that the projection methodology used by the Commission is based on maintaining broad policy settings. However, many of the changing past trends in total current grants or its sub-component, SPPs, reflect significant policy shifts or different social/economic circumstances to those of the present or likely future:

- Relatively little population ageing has occurred, so there is little scope to explicitly identify the impacts of ageing on SPPs in past data.
- The role of SPPs have changed. In 1964-65, around 40 per cent of SPPs were applied to transport and communication, while in 2003-04 this had fallen to below 5 per cent. In contrast, education and health have grown strongly (for example, health from 3.7 per cent in 1964-65 to 36.4 per cent in 2003-04).
- Until the introduction of the GST, there was a tendency over time for the Australian Government to shift payments between recurrent spending and untied

grants to SPPs (which are tied grants).[9] This would have had the effect of maintaining the SPP to GDP (and State spending) ratios, even while overall payments fell relative to GDP. In the future, this trade-off will not be possible.

As a consequence, the historical trends may not be a reliable indicator of future growth patterns in SPPs.

Judging the different funding scenarios by their likely outcomes

Another way of assessing the most appropriate projection methodology for SPPs is to weigh up their likely outcomes against each other. Figure F.5 represents the range of outcomes that lie between three broad scenarios:

- Case C (the base case) assumes that SPPs by the Australian Government for public hospitals, home and community services, government schools and vocational education increase (or decrease) with the associated service needs in the States (box F.1). This is the approach used by the Commission in its projections throughout this report. Case C is represented as a zero line in the diagram because our interest is not in total fiscal pressure associated with each scenario, but the *difference* in fiscal pressure between them. To reveal that difference, the common fiscal pressure associated with the three cases has been netted out.
- In case A, the Australian Government fixes SPPs in real per capita terms, while States have to fund *all* of the spending on the age-related areas under their operational control (public hospitals, home and community services, government schools and vocational education) in line with service needs. Since GDP still grows in per capita real terms, such a scenario implies that SPPs fall as a share of GDP. By 2044-45, SPPs would only constitute 1.1 per cent of GDP, compared with a current level of around 2.1 per cent (and a projected level of 2.7 per cent were SPPs to keep up with service pressures, as under case C). And, given continuation of trends, SPPs would account for less than 0.5 per cent of GDP by 2100-01. This case produces bigger fiscal pressures for State governments because they have to meet the age-related costs associated with the entire public hospital system, without a compensating increase in SPPs from the Australian Government.
- Case B is the same as case A, except that the revenue constraint posed by SPPs is relaxed somewhat. It is assumed that the Australian Government fixes the ratio of nominal SPPs to GDP at just over 2 per cent (the estimated ratio in 2003-04).

[9] Thus, using the data from Mathews and Grewal (1995), the share of recurrent payments accounted for by untied grants fell from 81 per cent in 1972-73 to 51 per cent in 1993-94.

Box F.1 **Different models of state spending**

This is a simplified picture of the budget circumstances of the States, which helps to illustrate the different ways of modelling federal fiscal relations and ageing.

Suppose that there is only one age-related expenditure (say, public hospitals). Public hospital spending (A) is partly funded directly by the States and partly by public hospital SPPs from the Australian Government (PHSPP). All terms are in constant prices. States also spend on non-age related services (N) and again these are partly funded directly by the State governments and partly through non-age related SPPs (NASPP) made by the Australian Government. States receive revenue from own-state revenue (R), GST payments and SPPs (comprising PHSPP and NASPP).

So net expenditure by State governments is: $E_t = A_t + N_t - R_t - GST_t - PHSPP_t - NASPP_t$

The three different views of how PHSPP and NASPP may change after the base year are:

In case A, SPPs are maintained in real per capita terms at their 2003-04 values so that:

$$(\mathrm{PHSPP_t} + \mathrm{NASPP_t}) = (\mathrm{PHSPP_{2003\text{-}04}} + \mathrm{NASPP_{2003\text{-}04}}) / \mathrm{POP_{2003\text{-}04}} \times POP_t = \lambda POP_t$$

In case B, SPPs comprise a fixed share of GDP, so that:

$$(\mathrm{PHSPP_t} + \mathrm{NASPP_t}) = (\mathrm{PHSPP_{2003\text{-}04}} + \mathrm{NASPP_{2003\text{-}04}}) / \mathrm{G}DP_{2003\text{-}04} \times GDP_t = \phi GDP_t$$

In case C, SPPs are set so that they maintain the base year share of total State spending on age and non age-related items, so that:

$$\mathrm{PHSPP_t} = (\mathrm{PHSPP_{2003\text{-}04}} / \mathrm{A_{2003\text{-}04}} \times \mathrm{A}_t = \alpha \mathrm{A}_t \quad \textit{and}$$

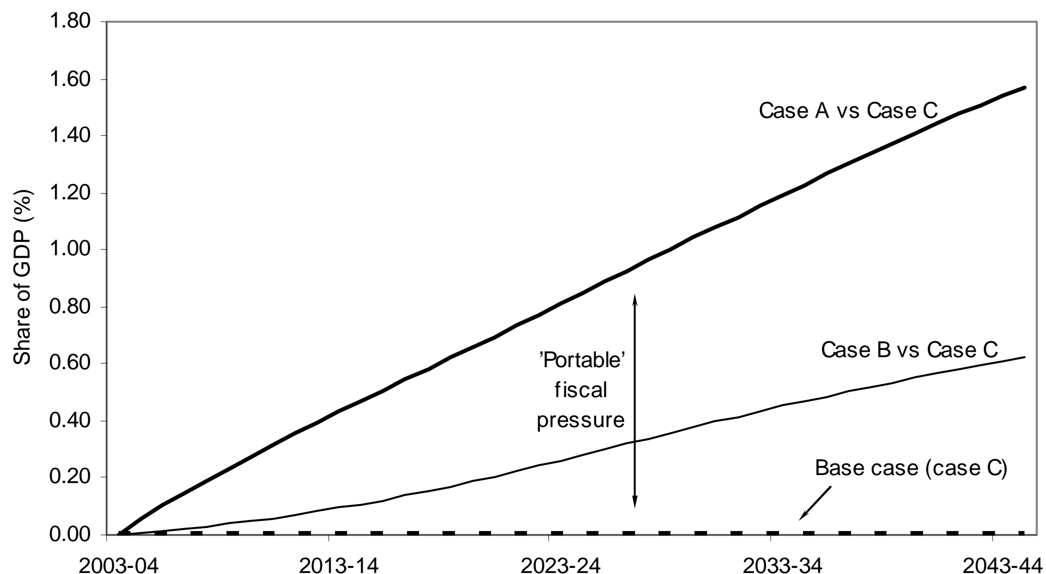
$$\mathrm{NASPP_t} = (\mathrm{NASPP_{2003\text{-}04}} / \mathrm{N_{2003\text{-}04}} \times \mathrm{N}_t = \beta \mathrm{N}_t$$

Under Case C, SPPs by the Australian Government keep up with service pressures. Indeed, if case C holds, State net spending can be re-written as: $E_t = (1-\alpha)A_t + (1-\beta)N_t - R_t - GST_t$. In this instance, forecasts of fiscal pressure for the States require projections of State-funded spending only (not including SPPs).

Values of net spending corresponding to these three cases can then be calculated (E_A to E_C). The effect of the three alternative assumptions on fiscal pressure can be appraised by taking the difference between the net spending measures (noting that most terms cancel). Accordingly, the effect on fiscal pressure of case A relative to case C is $E_A - E_C = \alpha A_t + \beta N_t - \lambda POP_t$, while the effect of case B relative to C is: $E_B - E_C = \alpha A_t + \beta N_t - \phi GDP_t$. It is clear that $E_A - E_C$ will get large over time because A and (to a lesser extent) N grow faster than the population over time. Similarly, $E_B - E_C$ will also grow over time (albeit less rapidly) because A grows as a share of GDP over time. Thus the fiscal pressure measures will be much larger for case A versus C and modestly greater for case B versus case C.

In the data shown in figure F.5, the above model is elaborated to take account of the four most important age-related areas of spending by States.

Figure F.5 **Portable fiscal pressure [a]**



[a] SPP data for the base year (2003-04) is from the 2004-05 Budget Papers. The three lines shown are the differences in fiscal outcomes associated with the three alternative assumptions for SPPs — and are derived by subtracting the net spending outcomes E_A-E_C, E_B-E_C and (as the base case) E_C-E_C — as described in box F.1. The GDP share was calculated for two scenarios.

Data sources: PC estimates; Australian Government (2004, *2004-05 Budget*, Budget Paper no. 3) and data from the Australian Government Department of Finance.

The economic and policy implications of case A (vis a vis case C) would be:

- By 2044-45, an additional deficit to the States of about 1.6 per cent of GDP. The shortfall in 2044-45 would be $32 billion or around $1 100 per capita (in 2002-03 prices). The *accumulated* shortfall in State finances from 2004-05 to 2044-45 would be $540 billion in 2002-03 prices.
- These transfers would provide relief from fiscal pressure for the Australian Government. In effect, tax receipts would rise in line with GDP, while outlays to the States would fall. There would be a corresponding need for States to find other revenue sources, cut spending or to borrow. These financing methods all face some limitations:
  - Borrowing to meet the deficit would not be sustainable in the long run.
  - Were the deficit to be tax-financed, it would require that the States increase their tax share of GDP by around 1.6 per cent above the counterfactual. Since currently their taxes are around 4.5 per cent of GDP, this would imply significant increases in State tax *rates*. States do not have the same degree of tax policy flexibility as the Australian Government (which is the reason for the vertical fiscal imbalance that leads to Commonwealth payments to the States in the first place). Accordingly, tax financing by the States might lead

to economically inefficient taxes, a point also noted by Access Economics (2002) in its analysis of fiscal concerns for the States and by the Tasmanian Government (sub. DR69, p. 3).

- Were the overall supply of services to only stay fixed in real per capita terms, then this would imply that State spending would fall relative to GDP. This would permit States to run surpluses, despite falling SPP to GDP ratios. However, real per capita demand for some key services operated by the States, such as public hospitals, home and community services and disability services, will increase with population ageing. Moreover, many of the services provided by the States — health care, education and law and order — are ones for which public expectations of increased quality and quantity rise as our national income grows.[10] Consequently, failure to provide increased services per capita would probably be perceived unfavourably as progressively more severe rationing.
- More private funding for services could be sought. However, for the most important service for which States are funded by the Australian Government, public hospitals, pricing is outside the control of the States.[11] Australian Government policy is for free access by Australians to public hospitals.

- Other than the case where State governments reduce the funding of services relative to GSP, the first scenario pre-supposes an increased role for the States in funding social services, such as hospitals and home and community care. By extension, this would also represent a substantial diminution of the role of the Australian Government, and, therefore, a transformation in the historical responsibilities of these different tiers of government.

Implications

Overall, while case A is possible, it pre-supposes a complete shift in long-run fiscal relations, and significant — quite possibly inefficient — policy initiatives to deal with the resulting deficits. For that reason, it is probably not a realistic depiction of the likely fiscal pressures that will be borne by State governments.

But what of the counterfactual — case C? It recognises that the Australian Government has wider tax and other policy options to meet the fiscal pressures of

[10] And in any State services where productivity growth is less than the assumed 1.75 per cent per annum, real costs per capita would rise as real wages rose. This implies that the supply of such services would have to contract were there a requirement for State costs to stay constant in real per capita terms.

[11] Health care grants from the Australian Government to the States accounted for nearly half of Australian Government funding 'to' States in 2003-04.

ageing. It also seems broadly consistent with the long-run pattern of federal fiscal relations.

However, its realism also depends on the capacity for the Australian Government to increase SPPs from around 2.1 to 2.7 per cent of GDP over the next forty years — a time when population ageing will have also increased spending in other areas, such as pharmaceuticals, Medicare and Age Pensions. Under case C, the degree of fiscal burdens associated with ageing experienced by State governments are relatively modest compared with the Commonwealth. Accordingly, if the Australian Government attempts to share the fiscal burdens more widely, State governments do face a risk that SPPs may not grow as fast as under case C. Nevertheless, the Commission has interpreted such an Australian Government response as a shift in long-run policy settings. The point of the modelling exercise is to consider fiscal outcomes associated with no change in long-run policy settings, and in that context, the preferred base case for modelling is case C.

That said, it may be useful to distinguish fiscal *risks* for the States from fiscal *pressures*. Such risks pick up the possibility that case C will not hold — or that growth in SPPs are moderated in response to the fiscal pressures borne by the Australian Government under case C. While case A is probably too extreme a measure of that risk over the long run, the intermediate assumption — case B — appears more plausible. The implications for State finances are significant. The economic implications of case B (vis a vis case C) would be an additional deficit to the States of about 0.6 per cent of GDP by 2044-45. The shortfall in 2044-45 would be $13 billion or around $450 per capita (in 2002-03 prices). The *accumulated* shortfall in State finances from 2004-05 to 2044-45 would be $194 billion in 2002-03 prices.

It is also important to note that even were case C to characterise the 'average' policy setting, States still might be exposed to fiscal risks associated with the ebbs and flows of Australian Government payments over the short run. It is clear, for example, that the recent health agreements did not increase Australian Government spending in line with GDP over the life of the agreement. However, this should be seen as a short-term phenomenon, and should be placed in the context that this was a period in which State gains from GST revenue exceeded expectations. In the short run, case A is probably a reasonable scenario for evaluating fiscal risks to the States.

Finally, as shown above, the fiscal position of different tiers of government is sensitive to varying assumptions about the rate of growth of SPPs, whereas the fiscal position of combined governments is not. The immediate implication of this is that *aggregate* fiscal pressure borne by collective Australian governments is the best single measure of the fiscal consequences of ageing.

F.4 Relative fiscal risks for individual States compared with each other

The bulk of the fiscal risks to States occur for the States as a group. Nevertheless, chapter 2 indicates that population ageing is stronger in some States than others. In the absence of mechanisms that took account of these variations, States that face more population ageing, such as Tasmania and South Australia, would be disadvantaged in the distribution of SPPs and GST revenue. In fact, Australian governments have developed a complex mechanism administered by the Grants Commission — horizontal fiscal equalisation (HFE) — which takes accounts of factors that advantage and disadvantage States, including differing age structures.

The Grants Commission estimates socio-demographic composition (SDC) disabilities for each State. These reflect differences in the characteristics of State populations on the use of services and/or the cost of each unit of service. States with greater SDC disabilities are the recipients of greater payments. SDC disabilities are highly disaggregated by factors, including age, that create cost differences. Of 23 State services, only two (public housing maintenance and public housing user charges) did not have 'use weights' that varied with age. While there remain differences between State governments about how to fully measure and account for disadvantage in different populations, in the latest review of the SDC disabilities, these related to factors like indigeneity, location and cultural and linguistic diversity, not ageing (CGC 2003). Figure F.6 illustrates the possible extent of HFE required to share fiscal pressure equally between the States by 2044-45. They suggest Western Australia, South Australia, Tasmania and the Northern Territory might ultimately need bigger shares of total GST revenue as a result of demographic pressures.

HFE limits the likely fiscal risks associated with ageing for individual States. Accordingly, the South Australian Government argued that:

> Since HFE equalises the capacity of State Governments to deal with differing demographic budget trends, there is little value in … exploring the fiscal impacts of population ageing between individual State Governments (sub. 23, p. 19).

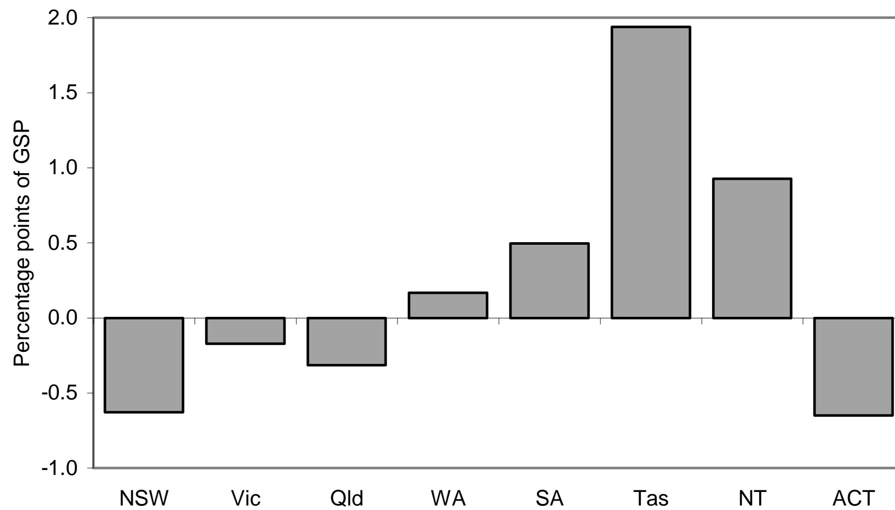
On the other hand, the Tasmanian Government (sub. DR69, p. 5) argued that HFE was an imperfect process and that the objective of equalisation might not be fully met. To the extent this is true, this would act as a source of additional fiscal risk for individual jurisdictions.

These risks cannot be precisely enumerated given the complexity of the models used by the Grants Commission and the lack of a clearly superior alternative by which risks could be judged. Overall, the Commission's judgment is that the

ageing-related risks posed by any defects associated with HFE are likely to be small. Moreover, given the ongoing evaluation of models used by the Grants Commission and the development of better datasets to calibrate them, it is likely that these risks will diminish over time. Since the Grants Commission also takes account of SPPs to individual States in its recommendations for allocating GST revenue, HFE is also likely to deal with most ageing related risks posed by individual State SPPs.

Figure F.6 **How much horizontal fiscal equalisation might be needed to compensate for ageing?** [a]

2044-45 relative to 2003-04



a The first step in estimating the potential role for HFE associated with ageing was a calculation of the fiscal pressure facing States *before* GST revenues had been distributed. This fiscal pressure was calculated as the net fiscal position of each State relative to its position in 2003-04, or N_t-$N_{2003\text{-}04}$, where N_t (net fiscal position in year t) is defined as R_t - E_t, where R_t and E_t are age-related revenue to GDP and expenditure to GDP respectively (excepting GST). Then the net fiscal position of each State was subtracted from the combined States net position (including GST revenue) for 2044-45 to give a picture of the extent to which each State would need additional or less GST revenue than others. The effect of such a re-distribution would be that each State would face the same fiscal pressure as every other State. A positive (negative) number means that a State should be a beneficiary (loser) from HFE. The high value for the Northern Territory reflects assumptions about investments in health care for the Indigenous population and demographic projections for that sub-population.

Data source: Commission estimates.

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