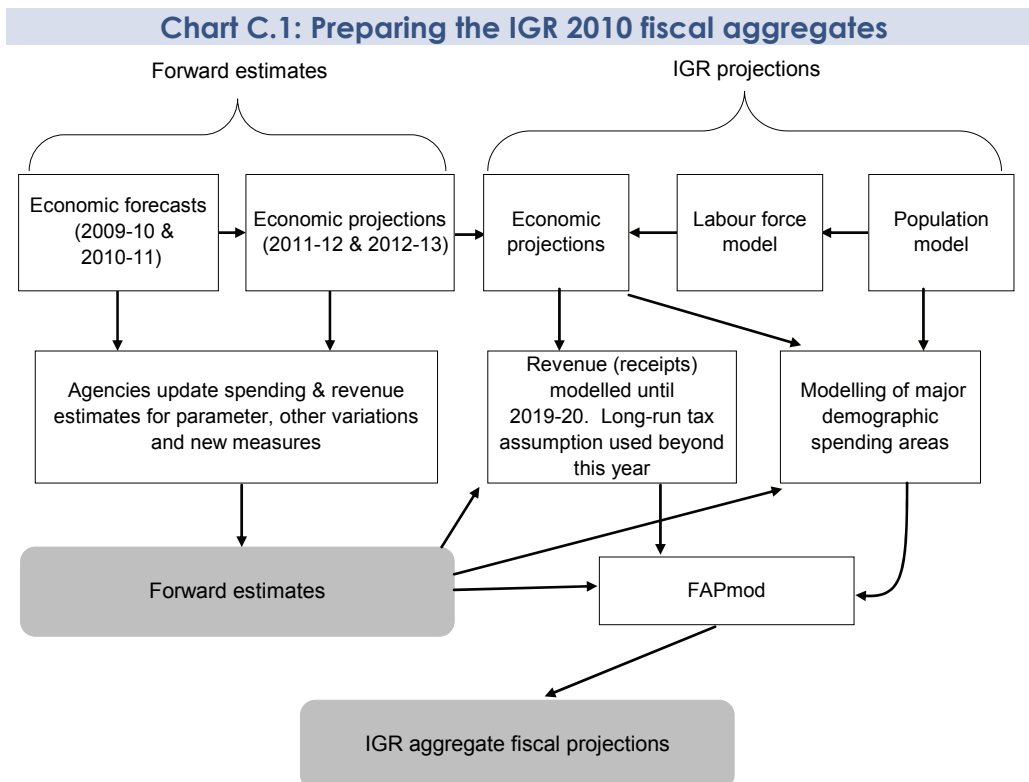


## Appendix C: Methodology

### C.1 Aggregate fiscal projections

The fiscal aggregate projection model (FAPmod) used to prepare the aggregate fiscal projections reported in IGR 2010 draws together the outputs of a wide range of separate but consistent models (Chart C.1).



For IGR 2010, FAPmod takes the fiscal and economic forward estimates published in the *Mid-Year Economic and Fiscal Outlook 2009–10* as its starting point. Beyond the forward estimates, the fiscal projections draw together the population and economic projections developed within the ‘3Ps’ framework that underlies the IGR 2010. These projections, in turn, underpin the separate but related models of revenue, health, income support payments, education and training, aged care, major defined superannuation benefit schemes for public sector employees and defence. Consistent

with previous IGRs, this involves up to eight models that produce projections under the guidance of a senior Treasury steering committee designed to ensure internal consistency and legitimacy of assumptions.

FAPmod is designed to replicate an internally consistent cash and accrual accounting system so that all fiscal aggregates can be produced. This means the operating statement, the cash flow statement and the balance sheet are interconnected with changes in one statement affecting the other statements.

By capturing the interactions between flow concepts such as the budget balance and stock concepts such as debt, FAPmod provides the capacity to model a broader range of fiscal aggregates than in previous IGRs. This allows for a more detailed assessment of the long-term fiscal outlook.

By providing for a more detailed treatment of interest payments and receipts, FAPmod has enabled long-run projections of the underlying cash balance to be reported for the first time in IGR 2010. Interest payments on Commonwealth Government Securities (CGS) are modelled as a function of the projected level of CGS in FAPmod over the projection period.

In FAPmod, the financing of the headline cash deficit and the refinancing of maturing debts are assumed to incur interest at the rate of 6 per cent per annum beyond the forward estimates period (2013–14 onwards). When the budget is in headline cash surplus, it is assumed that those funds will be used to retire any outstanding CGS and thereafter will accumulate in term deposits. The 6 per cent interest rate assumption is consistent with the Long-Term Cost Reports prepared by the Australian Government Actuary. The same interest rate also is applied to the Government's term deposits in FAPmod.

## C.2 Revenue projections

### C.2.1 Overview

IGR 2010 assumes a constant tax-to-GDP ratio of 23.5 per cent (the historical average) from 2019–20. This methodology is similar to that used in previous IGRs.

Prior to 2019–20, tax revenue is allowed to recover, in line with economic recovery, from the impacts of the global financial crisis. This is consistent with the Government's medium-term fiscal strategy.

The constant tax-to-GDP ratio recognises that tax revenues are broadly correlated with the size of the economy. Analysis suggests that the impact on aggregate growth of the economy is expected to be the most significant way in which demographic change impacts on tax revenues.

## C.2.2 Historical trends and drivers

Australian government revenue is derived from taxation and non-taxation sources.

Taxation receipts averaged 23.5 per cent of GDP over the nine years from 2000–01 (the year the GST was introduced) to 2008–09 and accounted for 94 per cent of total Australian government receipts. Over this period:

- income taxes accounted for 71 per cent of taxation receipts;
- indirect taxes amounted to 29 per cent of total taxation receipts; and
- within indirect taxation, GST accounted for 15 per cent of total taxation receipts.

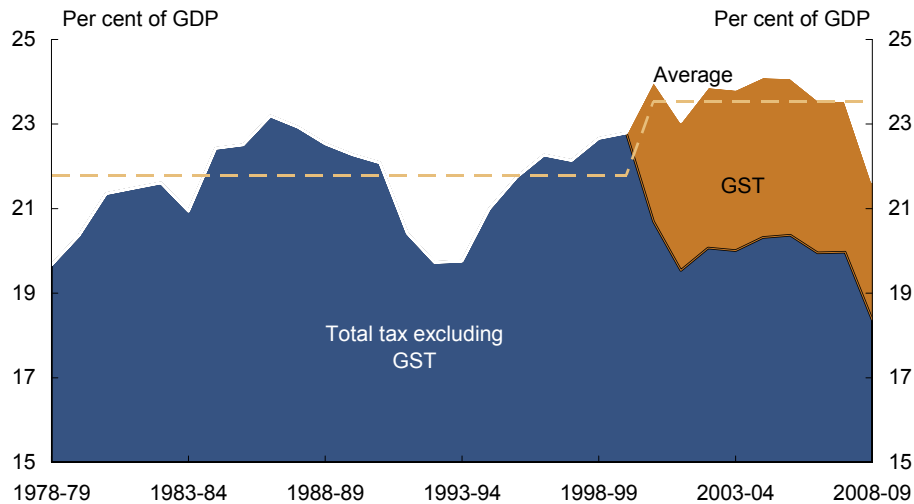
Non-taxation receipts include sales of goods and services, interest, dividends, petroleum royalties and seigniorage from circulating coin production. Non-taxation receipts averaged 1.5 per cent of GDP over the period 2000–01 to 2008–09 and accounted for 6 per cent of Australian government receipts.

Over time, taxation receipts are broadly correlated with nominal economic activity. Most tax bases correspond broadly to major elements of nominal GDP (such as compensation of employees, gross operating surplus and nominal consumption).

In the 20 years prior to the introduction of the GST, the ratio of Australian government taxation receipts to GDP fluctuated between 19.7 and 23.2 per cent and averaged 21.8 per cent.

In 2000–01, the introduction of the GST and associated changes in Commonwealth-State financial arrangements resulted in proportionately more tax revenue being levied by the Australian government and less by the States and Territories. The impact of this change can be seen in the upward step in the Australian government's tax-to-GDP ratio in 2000–01 (Chart C.2).

**Chart C.2: Total Australian government taxation receipts  
1978–79 to 2008–09**



Source: *Mid-Year Economic and Fiscal Outlook 2009–10*.

### C.2.3 Medium- and long-term revenue projections

IGR 2002 and IGR 2007 both adopted an assumption that total Australian government receipts as a proportion of GDP would remain constant for the projection period following the end of the four year 'forward estimates' period. This assumption was largely based on:

- an observation that the tax-to-GDP ratio had remained relatively stable over the past 30 years, and that such stability was observed widely in developed economies;
- that a strict no-policy-change scenario was unrealistic as it would imply constantly increasing average tax rates on personal income; and
- the emphasis of the reports rested on pressures that demographic change was likely to impose on future government spending rather than the way these spending pressures may be financed (such as through increasing revenues or raising debt).

Similarly, IGR 2010 also assumes an unchanged tax-to-GDP ratio in the long term.<sup>1</sup>

IGR 2010 builds off the projections and methodology in the *Mid-Year Economic and Fiscal Outlook 2009–10*. With the economic downturn associated with the global financial crisis, the tax-to-GDP ratio is expected to decline from 24.1 per cent of GDP

<sup>1</sup> The comparable long-run tax-to-GDP ratio (that is, as if GST receipts had been included and had the GDP revisions been known) used in IGR 2002 was 23.9 per cent and in IGR 2007 was 23.8 per cent.

in 2005–06 to 20.4 per cent of GDP in 2009–10. Such effects are largely cyclical and, with recovery of the economy, revenues are expected to recover.

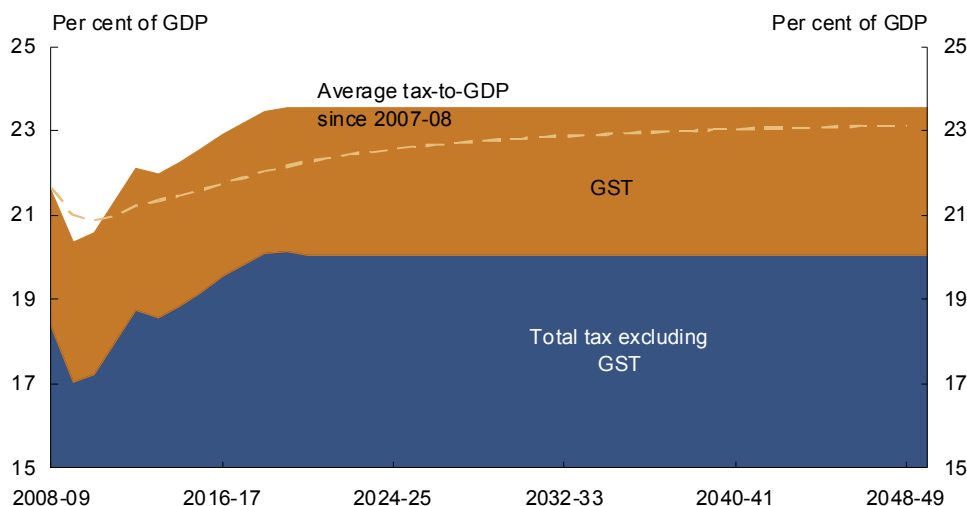
The Government's fiscal strategy provides that as the economy recovers and grows above trend, the return to budget surpluses will be assisted by allowing the level of tax receipts to recover naturally while maintaining the Government's commitment to keep taxation receipts as a share of GDP below the 2007–08 level (of 23.6 per cent of GDP) on average.

Consistent with the medium-term projections published in the 2009–10 Budget and MYEFO, tax receipts are assumed to recover with economic recovery. The tax-to-GDP ratio is projected to rise from 20.4 per cent of GDP in 2009–10 to 23.5 per cent of GDP in 2019–20 (Chart C.3).

The average tax-to-GDP ratio over the period 2008–09 to 2049–50 is 23.1 per cent of GDP, well inside the Government's commitment to maintain tax receipts as a share of GDP below the 2007–08 level of 23.6 per cent on average.

Non-tax revenues are relatively small and have not varied significantly over time. With the exception of interest receipts, IGR 2010 retains the assumption that non-tax receipts remain constant as a share of GDP. Non-tax receipts (excluding interest) are assumed to be 1¼ per cent of GDP.

**Chart C.3: IGR tax receipt assumptions**



Source: *Mid-Year Economic and Fiscal Outlook 2009–10* and Treasury projections.

## C.2.4 Policy assumptions

The relative overall stability of the historical tax-to-GDP ratio is largely the result of policy adjustments, particularly periodic adjustments to the personal income tax scale. Under strict no-policy-change assumptions (including no change to personal income tax scales), tax collections would rise faster than GDP (and be reflected in higher tax to GDP ratios). This mainly reflects the progressivity of the personal income tax system.

The projections from the end of the forward estimates period out to 2019–20 are based on a strict ‘no policy change’ scenario, allowing for the natural recovery of revenues after the downturn to be dedicated to improving the budget position and eliminating net debt. Beyond 2019–20, the estimates are prepared using a ‘top-down’ approach, as described earlier, assuming a constant tax-to-GDP ratio of 23.5 per cent. Within the overall long-run assumption, GST is assumed to comprise 3.5 per cent of GDP.

The aggregate constant tax to GDP ratio is not intended to imply that different types of revenue will remain constant as a share of GDP. In the absence of policy adjustments, the current structure of the tax system will lead to some types of revenue not remaining constant as a share of GDP. The following explores some of these in more detail.

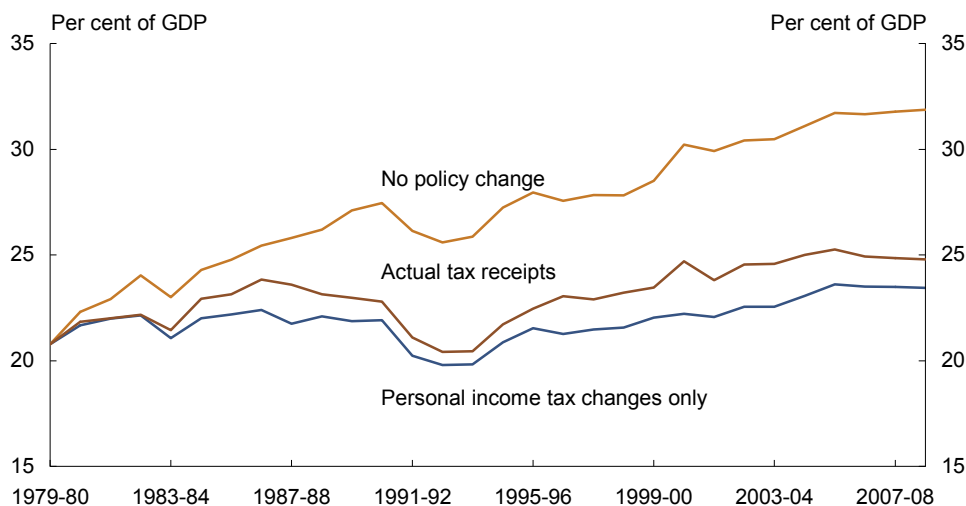
### Progressivity of the nominal personal tax system

Under a strict no-policy-change assumption tax collections would have risen much faster than GDP over the period from 1979–80 to 2008–09, resulting in a tax-to-GDP ratio considerably higher than actually occurred — more than 6 percentage points higher in 2008–09 (Chart C.4). This reflects increasing tax rates on personal income over time owing to the progressivity of the personal income tax scale and the fact that the personal income tax thresholds are set in nominal terms.

If individual taxpayers in 2006–07 had been taxed under the personal income tax scales of 1979–80, more than 60 per cent would have faced the top marginal tax rate of 61 per cent and 90 per cent would have faced a marginal rate of over 47 per cent, higher than today’s highest rate.

History shows that in practice governments make substantial periodic adjustments to the personal income tax scale. The impact of these adjustments is reflected in the difference between the strict no-policy-change scenario and the bottom line of Chart C.4, which illustrates what the tax-to-GDP ratio would have looked like if the only policy changes since 1979–80 had been those made to the personal tax scales.

**Chart C.4: Impact of policy change on Australian government tax receipts, 1979–80 to 2008–09<sup>(a)(b)</sup>**



- (a) Wholesale Sales Tax (WST) has been included in all three series on the basis of actual collections, as a no-policy-change series for this tax is not available.
- (b) The impact of policy changes in this analysis was calculated between pairs of sequential years and then aggregated. As the analysis period increases, there is an increased level of uncertainty with the total policy impact since 1979–80.

Source: Australian Bureau of Statistics cat. no. 5206.0; Australian Government Budget Paper No. 1, various years.

### Capital gains tax

The capital gains tax (CGT) is not yet 'mature' because all assets acquired before 1985 and not subsequently disposed of remain exempt. The CGT asset base will grow relatively more quickly as pre-1985 assets enter the CGT base through a change of ownership. This effect matures when all pre-1985 CGT assets are in the CGT base. A constant tax-to-GDP ratio assumption implies that other taxes fall in relative terms until the CGT system matures.

### Volumetric taxes

Some tax bases are defined in volume terms rather than value terms, such as fuel excises that have been fixed at a nominal amount per litre since price indexation was abolished in 2001. On a no policy change basis, and an IGR assumption of 2.5 per cent inflation per annum, after 40 years fuel excise is expected to contribute around one third of its current share of total tax (that is, a fall from more than 5 per cent of total tax in 2008–09 to less than 2 per cent in 2049–50). A constant tax-to-GDP ratio implies that other taxes would increase as a share of total tax.

## Superannuation

There are two offsetting effects on tax revenues stemming from the superannuation and taxation system.

First the superannuation system is still maturing. Superannuation contributions and earnings, and associated taxes, will grow significantly faster than GDP, particularly earlier in the IGR period, until the system approaches maturity. According to current projections, the superannuation system will mature at about the same time as the old-age dependency ratio stabilises.

Superannuation income is, in general, taxed at a lower rate than other income. As the population ages and a greater share of income is earned through superannuation funds, the overall average tax rate will decrease and tax revenues will grow slower than nominal GDP.

The longer term net impact of these is difficult to determine. Initially the first effect will continue to outweigh the second, though as the superannuation system matures the second effect will grow in influence.

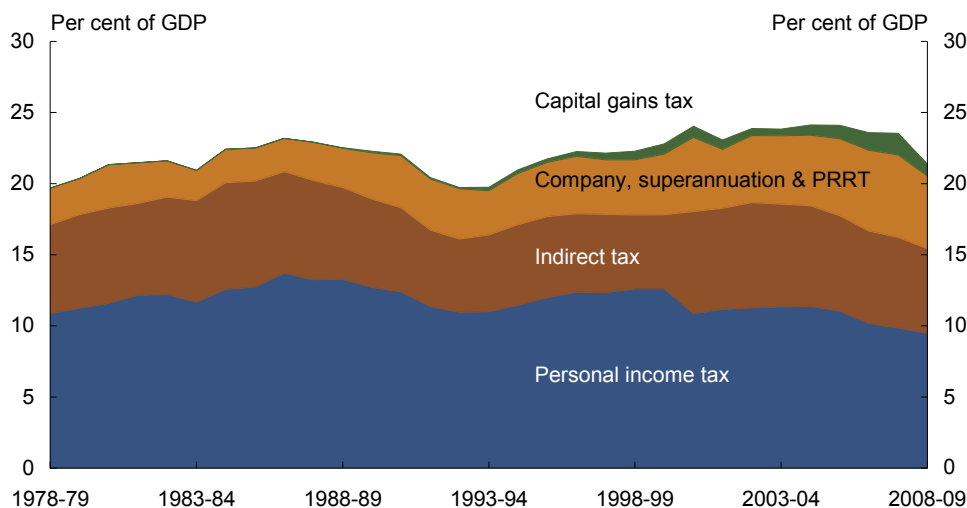
### C.2.5 Demographic change and revenue composition

While demographic influences clearly have an impact on aggregate GDP, they may also impact on the composition of GDP — such that the various tax bases do not grow in line with GDP — and, hence, generate either more or less revenue than assumed by the constant tax-to-GDP ratio.

The composition of taxation revenue has been relatively stable over the past 30 years (Chart C.5) despite demography-related changes such as increasing female workforce participation and an increasing fraction of persons aged over 65. Most of the compositional changes are explained by policy changes rather than demographic change (for example, the introduction of the GST) and, more recently, by rising terms of trade. These changes, which have tended to increase taxes, have been largely offset by reductions to personal income tax.

The following section considers three scenarios where compositional changes might be expected to have a significant effect on the tax-to-GDP ratio. While accounting for the compositional impacts of demographic change on tax revenues is inherently difficult, preliminary indications from the analysis are that the impact of these changes is either ambiguous or likely to be small.

**Chart C.5: Changing composition of the tax base from 1978–79 to 2008–09**



Source: Treasury projections.

### Lower saving rates among older persons

As a greater proportion of the population becomes older, there may be an increase in consumption relative to gross disposable income. This could occur as older persons run down previously saved assets to fund retirement.

Within the IGR assumptions, with the level of aggregate nominal GDP unchanged, an increase in household consumption would need to displace other domestic economic activity (investment and government spending) or be sourced through greater imports. In either case, the tax-to-GDP ratio will most likely increase because a component of GDP which is more heavily taxed — consumption — would increase compared to components of GDP which are more lightly taxed — investment and government spending.

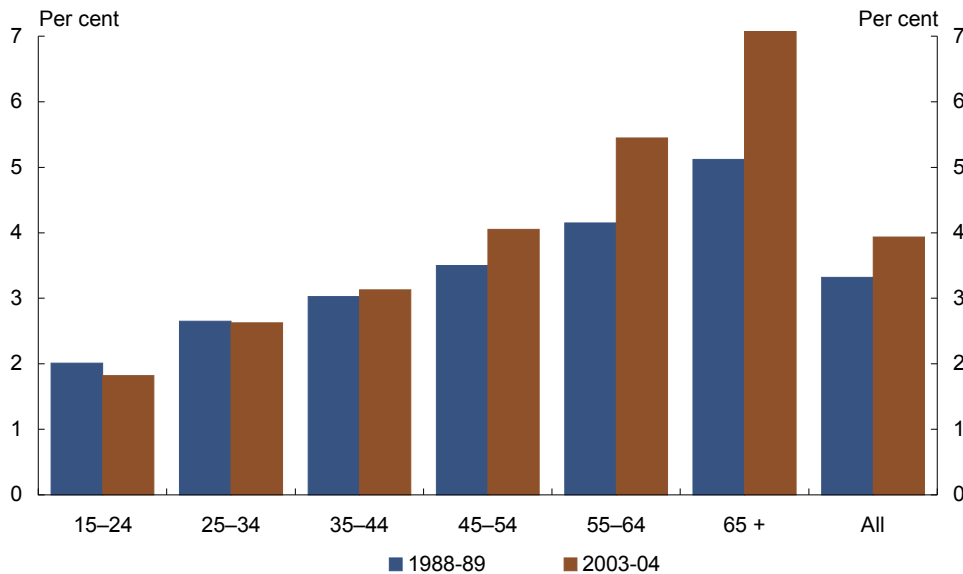
This scenario is complicated, however, by the fact that a future decrease in saving would be preceded by a build up in savings suggesting that over the longer term there may be little average impact on tax revenues.

### *Changed consumption patterns*

As the population ages, the composition of consumption across the economy is likely to change. For example, older people spend a greater proportion of their income on health services than the average, and this proportion has been rising over time (Chart C.6). An ageing population will increase the overall average proportion of income spent on health, hence decreasing GST (as health services are GST-free). At the same time, however, an ageing population will also decrease the overall average proportion of income spent on education, which is also GST-free.

Assuming that the consumption behaviour of each age cohort remains at 2003–04 percentages, changes in the composition of consumption from population ageing are estimated to subtract less than 0.1 percentage point from the tax-to-GDP ratio at the end of the IGR period.

**Chart C.6: Expenditure on medical care and health expenses as a percentage of total household expenditure, by age of reference person**



Source: *Household Expenditure Survey*, ABS cat. no. 6530.0.

### *Changed labour-capital ratios*

The labour-capital ratio may trend in a particular direction affecting the relative taxes on wages and capital. For example, a change to saving rates or the composition of expenditure will affect the composition of income between wages and profits as the economy shifts its production.

The impact on taxes will depend on the difference between tax rates on wages and profits. Historically, both rates range between 24 and 28 per cent, depending on the year and definitions used.<sup>2</sup> The small range of these rates suggests that a very large compositional change between wages and profits would be required before there was a significant effect on tax revenues.

For example, between 1959–60 and 2008–09 corporate profits increased from 36.5 per cent of total wages to 51.3 per cent of total wages. Even with the effective tax rate for profits assumed to be 5 percentage points higher than for wages, the

2 For effective corporate tax rates see Box 5.2 of 2007-08 Budget Paper No. 1. Effective tax rates on wages depend on how items such as the Medicare Levy and various offsets are treated.

tax-to-GDP ratio would have increased by only 0.2 percentage points as a result of the compositional change.

While there is considerable uncertainty in quantifying such scenarios over 40 years or more, the considerations above provide some support for believing that the impact on tax revenues from an ageing population will be largely captured through the effect on the aggregate size of the economy rather than compositional changes in the economy.

## C.3 Spending projections

### C.3.1 Health

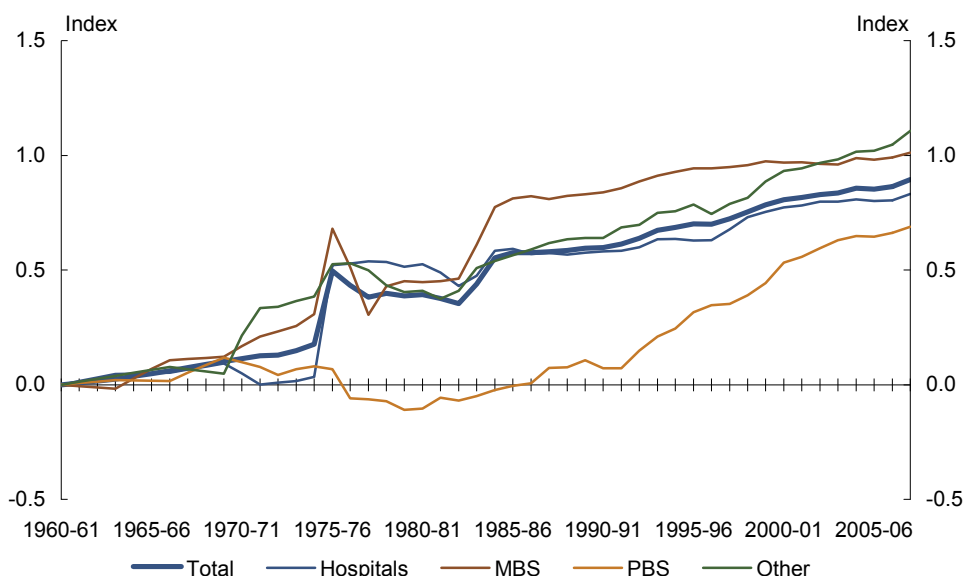
#### Primary model

Projections of health spending over the next 40 years are based on trends in the cost of health services per head of population by age and gender, combined with projected population changes.

For the past 50 years, aggregate Australian government health expenditure has grown steadily outside periods of major reform. The historical variability in growth for components of health spending poses challenges for projecting health expenditure over a 40-year period (Chart C.7). It means that while modelling components separately (using so-called component models) provides useful policy insight in the short to medium term, this may be less robust to technology-induced changes in the composition of health care than using a model of total health care expenditure (a so-called aggregate model).

In previous IGRs, health expenditure has been projected on the basis of component models. This was useful to illustrate the different trends in the components of health expenditure and the long-term impacts of these trends, such as highlighting the rapid increase in spending on pharmaceuticals through the 1990s and early 2000s. In more recent years, growth in spending on pharmaceuticals has moderated but remains a significant component of health expenditure. On the other hand, expenditure on private health insurance is becoming a bigger driver of Australian government health expenditure. Given that shares and trends can change significantly over the longer term, moving to an aggregate model is likely to provide a more robust long-term projection of Australian government health expenditure.

**Chart C.7: Historical growth in health component spending**



Note: The index is the logarithm (base 10) of real per capita spending, set to zero in 1960–61. An increase of one unit in the index thus implies a ten-fold increase in real per capita spending. The slope of a line gives an indication of the (exponential) non-demographic growth rate at that point in time, with a linear trend reflecting a relatively steady (exponential) non-demographic growth rate.

Source: Australian Institute of Health and Welfare health spending database.

The challenge with long-term projections is predicting for how long these trends in expenditure on components are likely to continue. To balance the desire for policy insight with the need for long-term stability in projections, this report projects the main components of health spending separately for ten years beyond the end of the forward estimates. This allows different growth rates for medical benefits, pharmaceutical benefits, private health insurance, hospitals and other health spending over this period.

From 2023–24 onwards, this IGR uses a model of total Australian government health spending that assumes that non-demographic growth trends towards the historical growth rate for health spending by all levels of government over the longer term. Projections of spending on individual components are not produced beyond 2023–24.

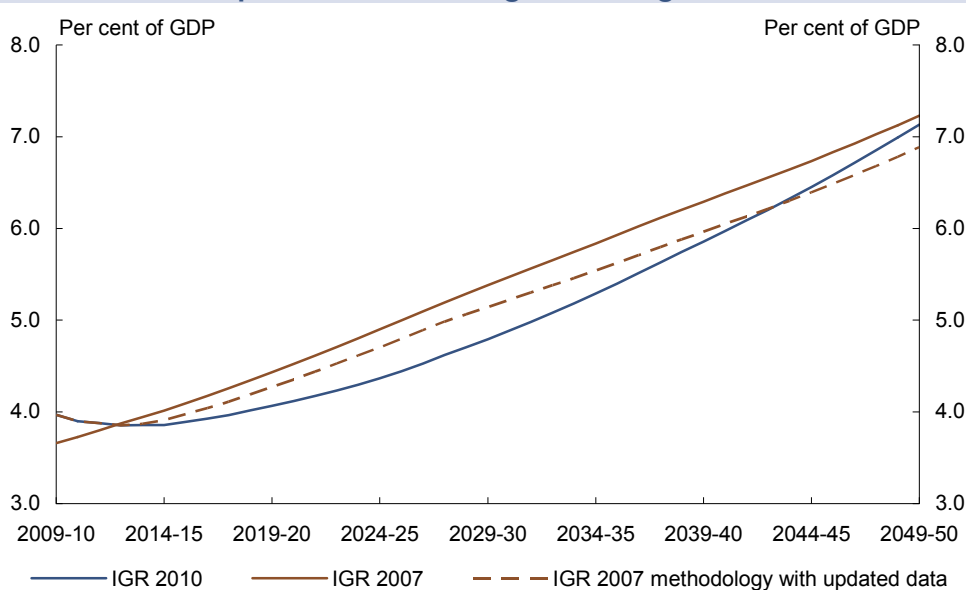
Since IGR 2007, component projection methodologies have also been refined to reflect new data and policy developments. Major changes include:

- using a linear model for non-demographic growth in pharmaceutical benefits, based on the change in growth in this area of expenditure;
- using the indexation formula for the National Healthcare Specific Purpose Payment for growth in hospital expenditure, which was agreed in 2008 as part of the reforms to federal financial relations; and

- assuming other expenditure (not including expenditure on veterans) remains a constant proportion of GDP over the projection period, bringing its treatment into line with all other non-modelled expenditure in the IGR.

These changes result in higher projections for hospital expenditure and lower projections for other expenditure than would occur if the projection methodology for IGR 2007 was used. The new methodology gives slightly higher health expenditure in 2049–50 than would have been predicted using the IGR 2007 methodology with updated data (Chart C.8).

**Chart C.8: Impact of methodological changes since IGR 2007**



Source: Treasury projections.

### Further detail

In general, projections are derived by first applying non-demographic growth to current, age-specific spending rates per person. These estimates are then increased by the projected population and CPI to derive nominal projections of spending.

The non-demographic growth rates for each component, and total government health expenditure (used to calculate the growth rate for total Australian government expenditure on health) are derived from trends in the historical data. This is done by first adjusting historical spending data for CPI growth and changes in the size and age structure of the population to derive a series of real age-adjusted spending per person.

The non-demographic growth rates are then determined by fitting trends to these series (Table C.1) and, where possible, calculating non-demographic growth by age group. For medical and pharmaceutical benefits, a linear trend fits the historical data

more closely, so non-demographic growth is projected forward as a constant real dollar increase in spending. For expenditure on private health insurance and total government health expenditure, an exponential trend fits the data more closely, so non-demographic growth is projected as a percentage increase in spending each year.

**Table C.1: Components and modelling approaches for health projections**

| Component  | Modelling approach (to 2022–23)  | Non-demographic growth form and rates(a)   |
|--|--|--|
| Pharmaceutical benefits  | Spending per person by age and gender.<br>Separate growth rates for each age and gender.   | Linear growth form.<br>Age gender specific growth varies from \$0.00 per annum to \$53.16 per annum. Where in some age groups non-demographic growth is negative, real per capita expenditure is assumed to remain constant. |
| Medical benefits   | Spending per person by age and gender.<br>Separate growth rates for each age and gender.   | Linear growth form.<br>Age gender specific growth varies from -\$0.10 per annum to \$54.18 per annum.  |
| Hospitals  | Projected using the National Healthcare Specific Purpose Payment indexation rate (includes a technology growth factor, health price index and an age-weighted population index). | Includes a technology growth factor of 1.2 per cent.   |
| Private health insurance   | Spending per person by age and gender.<br>Same growth rate for all ages.   | Exponential growth form; 4.5 per cent per annum.   |
| Other health spending(b)   | Veterans spending not elsewhere included is on a per person basis.<br>Remainder assumed to remain a constant proportion of GDP.  |  |
| <b>Modelling approach in aggregate model (2023–24 to 2049–50)</b>              |  | <b>Non-demographic growth form and rates(a)</b>  |
| Spending per person by age and gender.<br>Same growth rate for all age groups. |  | Exponential growth form; 1.8 per cent per annum trending up to 3.2 per cent per annum.   |

(a) Per person real age adjusted.

(b) Other health spending includes population health and safety, workforce initiatives and non-Medical Benefits Scheme payments to GPs (including for infrastructure, training and the Practice Incentive Program), medical research, and veterans' health spending not elsewhere modelled.

Different age groups have different relative per person spending rates (Table C.2 and Chart C.9). For all components of spending, per person spending rates are higher for older age groups than for younger age groups. This is most notable for pharmaceutical benefits and hospital spending. Spending rates tend to peak at age 75 to 84 years for most spending components, except for hospitals where the peak is for those over 85 years.

As the population grows and ages more people will fall into the age groups that are the most frequent users of the health system. From 2009–10 to 2049–50, real spending on

those aged over 65 years is expected to increase around seven-fold. Real spending on those aged over 85 years is expected to increase around twelve-fold.

Nevertheless, nearly half the increase in expenditure over the projection period is on those under 65 years of age, indicative of the important role non-demographic growth plays in increasing health expenditure.

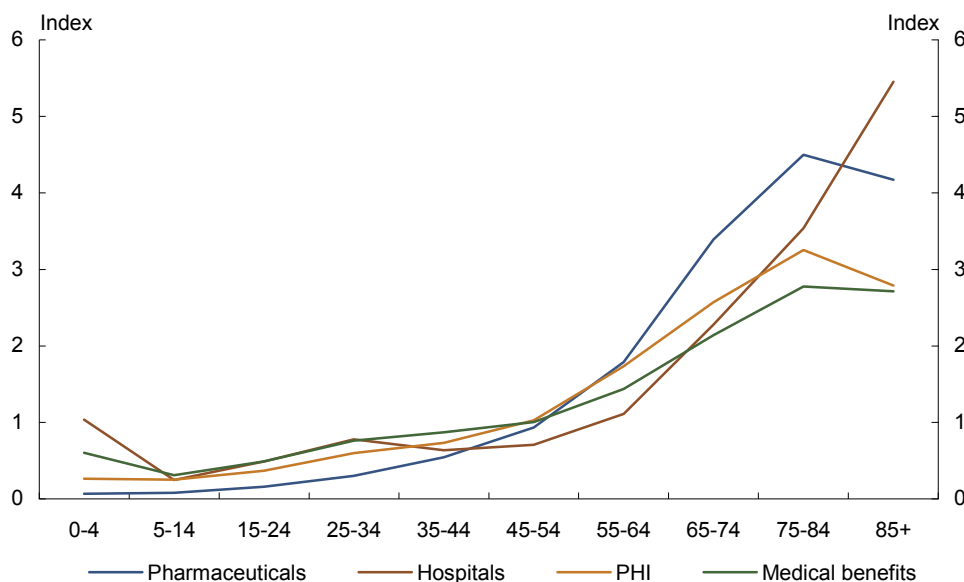
**Table C.2: Index of the 2008 age profile of health spending per person**

| Age group         | Pharmaceutical benefits | Medical benefits | Hospitals   | Private health insurance |
|-------------------|-------------------------|------------------|-------------|--------------------------|
| 0-4               | 0.07                    | 0.60             | 1.04        | 0.26                     |
| 5-14              | 0.08                    | 0.31             | 0.25        | 0.25                     |
| 15-24             | 0.16                    | 0.49             | 0.49        | 0.37                     |
| 25-34             | 0.30                    | 0.76             | 0.78        | 0.60                     |
| 35-44             | 0.54                    | 0.87             | 0.64        | 0.73                     |
| 45-54             | 0.93                    | 1.01             | 0.71        | 1.03                     |
| 55-64             | 1.79                    | 1.44             | 1.11        | 1.74                     |
| 65-74             | 3.39                    | 2.14             | 2.28        | 2.57                     |
| 75-84             | 4.50                    | 2.78             | 3.54        | 3.25                     |
| 85+               | 4.17                    | 2.71             | 5.45        | 2.79                     |
| <b>All people</b> | <b>1.00</b>             | <b>1.00</b>      | <b>1.00</b> | <b>1.00</b>              |

Source: Treasury estimates based on data from the Department of Health and Ageing, Department of Veterans' Affairs, Medicare Australia, Australian Institute of Health and Welfare, and Private Health Insurance Administration Council.

**Chart C.9: Index of the age profile of health spending per person**

(Weighted average of all people = 1)



Source: Treasury estimates based on data from the Department of Health and Ageing, Department of Veterans' Affairs, Medicare Australia, Australian Institute of Health and Welfare, and Private Health Insurance Administration Council.

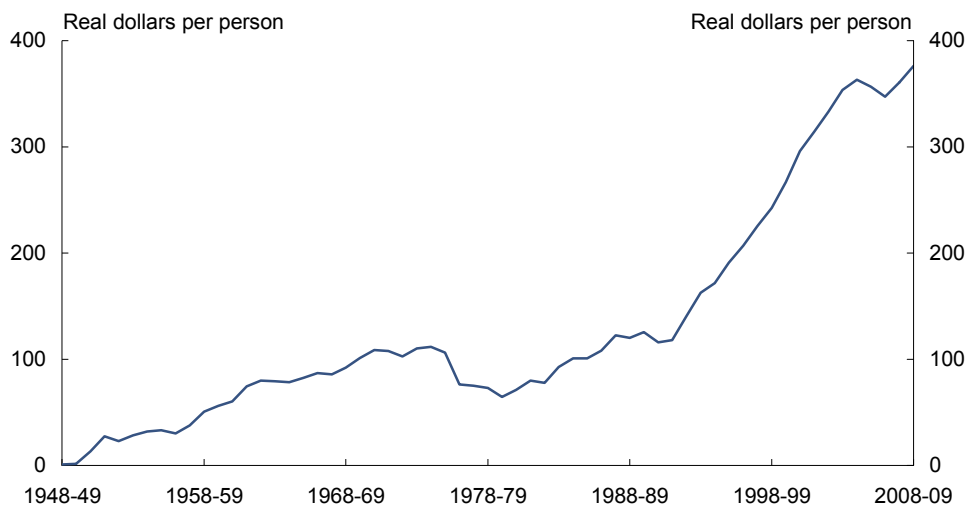
*Pharmaceutical benefits*

The pharmaceutical benefits model covers spending under the Pharmaceutical Benefits Scheme (including the Highly Specialised Drug Program) and the Repatriation Pharmaceutical Benefits Scheme.

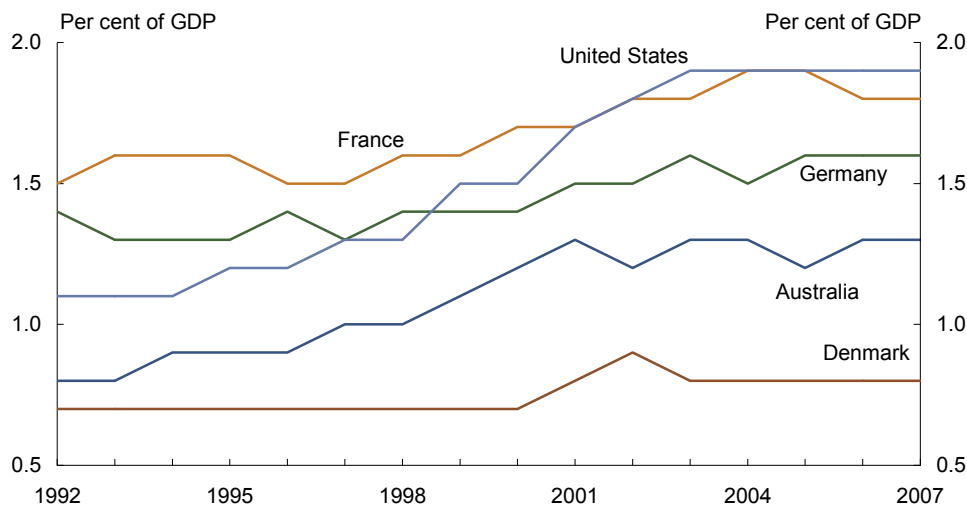
There was rapid growth in real per capita PBS expenditure between 1991–92 and 2004–05 (Chart C.10). This was mainly driven by the listings of high-volume drugs such as lipid-modifying agents (cholesterol-reducing drugs).

The rapid growth in drug spending as a share of GDP appeared in many countries, with differing systems, but has flattened out in recent years (Chart C.11). Notwithstanding this, the PBS remains a significant component of overall health costs, and will need to be monitored closely in case high growth trends re-emerge.

**Chart C.10: Age-adjusted pharmaceutical spending per person (2009–10 dollars)**



Source: Department of Health and Ageing and Medicare Australia, and Department of Veterans' Affairs annual reports.

**Chart C.11: Pharmaceutical spending in selected OECD countries**

Source: OECD Health Data 2009, June 2009.

Since IGR 2007, new data has become available from Medicare Australia to determine a more accurate age/gender profile of spending per person. Trends in this data, particularly in real per capita expenditure by age and gender, support a change to a linear functional form as a better fit for the longest sample of consistent historical data, 1983–84 to 2008–09.

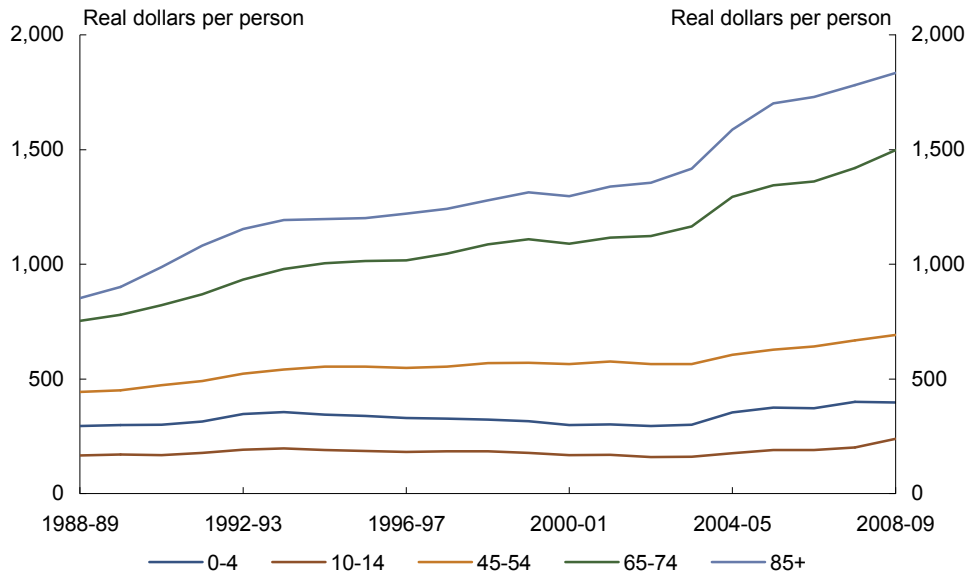
### *Medical benefits*

The medical benefits model includes spending under the Medicare Benefits Schedule and equivalent age-specific and gender-specific spending rates for veterans.

The data on medical benefits allows for the calculation of different non-demographic growth for men and women in a given age range. To calculate accurate real per person spending rates, the historical population series used removes veterans, who receive medical services under separate arrangements to the Medicare Benefits Schedule. Because of limitations in the availability of veteran population data, the historical series used covers 1988–89 to 2008–09 (Chart C.12).

Fitting trends to these spending series indicates that non-demographic growth in medical benefits historically has followed a largely linear trend. Projections for medical benefits are based on these observed trends in non-demographic growth. Calculated growth is very low for age groups below 65 and highest for men aged 75 and over.

**Chart C.12: Real medical benefits spending per person  
(in 2009–10 dollars)**  
Selected age groups



Source: Department of Health and Ageing.

### Hospitals

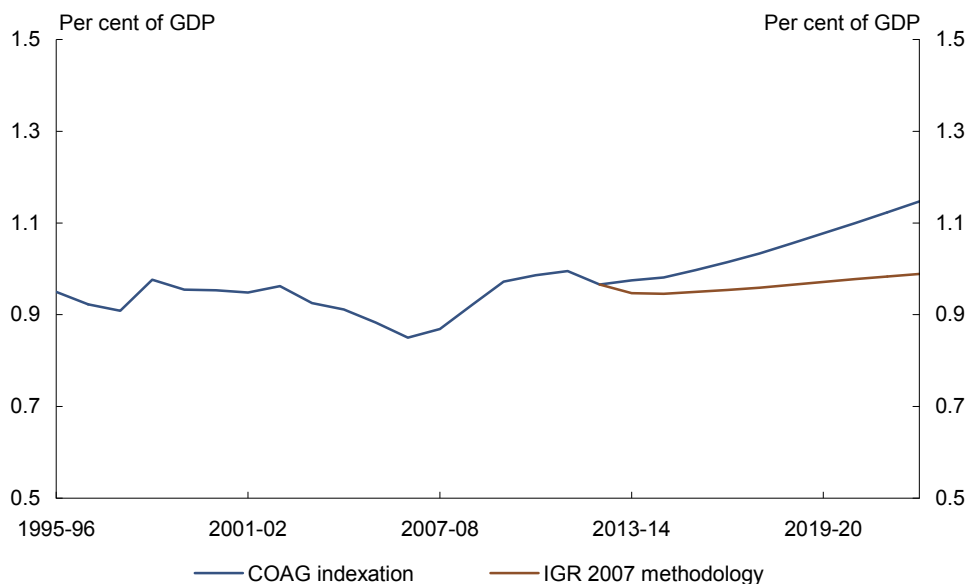
The hospitals model projects spending under the National Healthcare Specific Purpose Payment (SPP) and equivalent age-specific and gender-specific expenditure for veterans. In November 2008, the Council of Australian Governments agreed to a new indexation rate for the National Healthcare SPP under the new federal financial framework.

This new indexation rate, which is around 7 per cent, is used as the basis for projecting Commonwealth hospital expenditure. The indexation rate is a composite index that reflects age-weighted population growth, growth in health prices as measured by the Australian Institute of Health and Welfare and a health technology growth factor of 1.2 per cent.

Funding for veterans is included by adjusting the forward estimates expenditure for the National Healthcare SPP to include equivalent age-specific and gender-specific expenditure for veterans. The indexation rate is then applied to this higher base, and thus equivalent expenditure on veterans is included in the projection.

As shown in Chart C.13 the new methodology projects higher expenditure on hospitals than the methodology used in IGR 2007, consistent with the Government's increased funding commitment for hospitals.

**Chart C.13: Projected hospital spending: comparison of IGR 2010 and IGR 2007 methodology**



Source: Treasury projections and Department of Health and Ageing.

### *Private health insurance*

The private health insurance model incorporates spending on the private health insurance rebate introduced on 1 January 1999. The rebate increased from 30 per cent to 35 per cent for people aged 65 to 69 years and to 40 per cent for people aged 70 years or more from 1 April 2005. From 1 July 2010, the rebate will remain unchanged for people with income for surcharge purposes below \$75,000 per annum for singles and \$150,000 per annum for families, but will be progressively reduced for people with income above these amounts — phasing out above \$120,000 for singles and \$240,000 for families. The private health insurance surcharge rate also will increase progressively for people with income above \$90,000 for singles and \$180,000 for families.

Age-specific and gender-specific spending rates were calculated by using the age and gender profile of benefits paid out by private health insurers per person. This age profile is used to indicate the impact of ageing on private health insurers' costs which affects premiums and thus the rebate.

Historical information is compiled on the nominal total cost of the rebate each year, with 2000–01 chosen as the start year for the analysis. This start date excludes the rapid growth in spending in 1999–2000 related to the initial uptake of the rebate and effect of the introduction of Lifetime Health Cover on 1 July 2000.

An exponential trend for non-demographic growth was found to provide the greatest explanatory power, and was fitted to the real per person age-adjusted spending series,

resulting in a growth rate of 4.5 per cent a year. As the historical spending data do not fully reflect the recent increase in the rebate for older Australians, this growth rate is likely to be conservative.

#### *Other health spending*

Other health spending includes all other Australian government health spending but does not include administration expenses. Major components of other health include:

- health workforce programmes, including payments to GPs for infrastructure, training and support, and the Practice Incentive Program;
- population health and safety programmes, including funding of essential vaccines;
- health and medical research; and
- spending on veterans' health care.

Spending on veterans' health care included in the other health model represents additional Australian government spending on this group compared to other Australians. Spending is projected in a linear form based on trends in real spending per person from 1993–94 to 2004–05. These were then combined with population projections from the Department of Veterans' Affairs and CPI assumptions.

Remaining spending in the other health model is assumed to remain as a constant proportion of GDP. This approach is consistent with how other payments are modelled in the rest of the report.

IGR 2007 modelled other spending using a linear trend as a proportion of GDP. Under the new approach, other spending is projected to be lower by 2022–23 than in IGR 2007.

#### *Aggregate model*

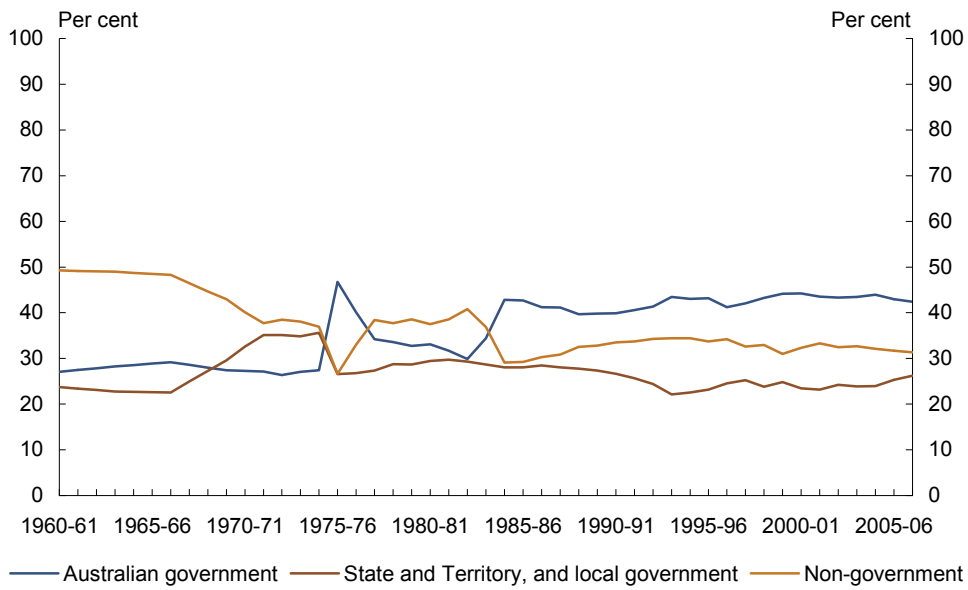
Historical trends suggest that the components of health spending will grow at different rates in the short to medium term. History also suggests that these differences are unlikely to be maintained over the long term. For this reason, the IGR transitions to an aggregate model of health expenditure from 2022–23. It does this by growing the projected real per capita spend in each age and gender group by an aggregate non-demographic growth rate.

The non-demographic growth rate is calculated from the growth in real, age-adjusted per capita spending from all government sources — Australian, State and Territory, and local governments. This is equivalent to assuming long-term stability in funding shares between levels of government. The data shown in Chart C.14 suggests that this is a reasonable assumption; with the exception of major reform periods, funding shares

have been relatively stable. The growth rate is calculated from after the introduction of Medicare — the last major reform to have a pronounced impact on funding shares.

To aid a smooth transition between models, non-demographic growth in the aggregate model starts out at the rate implied by the component models at the end of their projections — around 1.8 per cent. This is transitioned up to the all-government growth rate of 3.2 per cent using a logistic curve.

**Chart C.14: Shares of total health expenditure**



Source: Australian Institute of Health and Welfare health spending database.

### Table C.3: Health spending data sources

#### Pharmaceutical benefits

##### Age-cost profiles

Average of age-cost profiles from 2002–03 to 2008–09. Data includes all Pharmaceutical Benefits Scheme and Repatriation Pharmaceutical Benefits Scheme spending administered by Medicare Australia sourced from Medicare Australia. An age-cost profile was imputed for some special arrangements pharmaceutical spending which is not administered by Medicare Australia and for which an age-cost profile is unavailable.

##### Historical programme spending

Pharmaceutical Benefits Scheme data from Department of Health and Ageing website and Medicare Australia website. Repatriation Pharmaceutical Benefits Scheme data from Department of Veterans' Affairs annual reports and Medicare Australia website.

#### Medical benefits

##### Historical programme spending by age and gender

Data sourced from Table D.2 — Benefits Paid, Medicare Statistics, Department of Health and Ageing website. Veterans' population data supplied by the Department of Veterans' Affairs.

#### Hospitals

##### Age-cost profiles

Public hospital spending ratios supplied by Australian Institute of Health and Welfare. Veterans' population data supplied by the Department of Veterans' Affairs.

##### Historical programme spending

Public Hospital spending data from Department of Health and Ageing and the Australian Institute of Health and Welfare health spending database.

#### Private health insurance

##### Age-cost profiles

Average of Private Health Insurance Administration Council hospital and ancillary benefits paid data from 2002–03 to 2008–09.

##### Historical programme spending

Private Health Insurance Rebate spending data from the Department of Health and Ageing.

#### Other health

##### Historical programme spending

Computed from annual report data compiled by the Department of Health and Ageing, covering spending by that department, the Department of Veterans' Affairs and the Australian Taxation Office. Veterans' population data supplied by the Department of Veterans' Affairs.

#### Aggregate model

##### Historical government spending

Computed using data on health expenditure by all government sources from the Australian Institute of Health and Welfare health spending database.

## C.3.2 Aged care

These projections are based on current spending per person receiving aged care services (indexed for growth in costs) and the projected number of older people. The projection combines base participation rates by age and gender for the main aged care programs with the projected population by age and gender. Together with assumed growth in the average (government) cost per participant, this provides a base projection. The projection method is very similar to the one used in IGR 2007 and adapts and extends the aged care model used by the Productivity Commission (2005).

The dominant factor in aged care spending is the number of people aged 85 and over, as the proportional use of formal aged care services increases rapidly for both men and women beyond this age. As noted elsewhere, the number of people aged 85 and over is expected to more than quadruple over the projection period. Thus, ageing will exert substantial pressure on aged care spending.

The projections directly allow for factors influencing the participation rate by program (such as the trend to increased community care and the availability of carers). The model also reduces cost to government by increasing private contributions in line with the growing real income and wealth of the users of aged care services.

## Changes in the unit cost of care

### *Labour costs*

Labour costs, representing around three-quarters of total residential costs and a slightly higher proportion of the cost of community care services, dominate the cost of aged care (Hogan 2004). Real unit costs have grown and will continue to grow in aged care, reflecting quality improvements, increasing frailty of users and workforce pressures, counterbalanced by improvements in productivity in the sector. In these projections, real unit costs are assumed to grow at 1.6 per cent per annum. This parallels the approaches taken in previous IGRs.

### *Disability rates*

The proportion of the population likely to seek long-term aged care is correlated with the numbers classified as having severe or profound levels of disability. Thus reductions in rates of severe disability among older age groups, and the greater use of technology to allow people to live independently, could partially offset the greater demand for aged care coming from increased numbers of older people.

The Australian Bureau of Statistics surveys and Australian Institute of Health and Welfare analyses continue to suggest a relatively stable prevalence rate of severe disability among older Australians. Accordingly, the base projections presented here do not assume any change in severe disability rates. This assumption is an important one; if disability were to fall at the rate used in the Hogan Report the base projections would fall by around 0.2 per cent of GDP.

## Change in the care mix and role of informal care

Most older people wish to remain and be cared for in the community for as long as possible. Reflecting both current trends and policy, these projections incorporate some change in care mix away from low-level residential care to community care over the medium term.

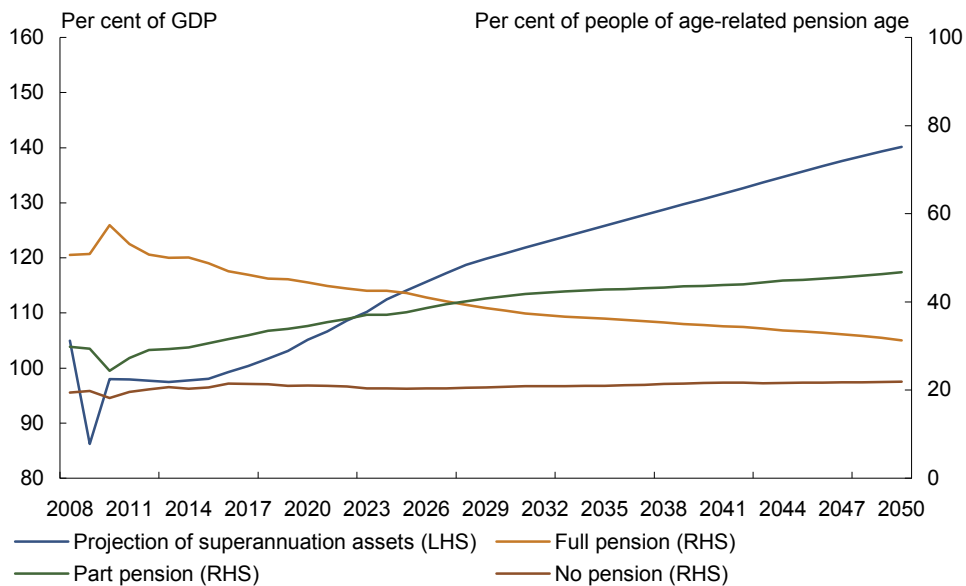
## Impact of a wealthier aged population

Treasury’s RIMGROUP model underlies the projections of age-related pensions and projects the increasing income and wealth of successive cohorts of retirees. This modelling incorporates the maturing of the Superannuation Guarantee arrangements and other Government policies, such as the Better Superannuation package and other recent changes such as the legislated change to Age Pension age.

The established trend of higher private incomes and wealth interacts with means tests to constrain future spending on age-related pensions. Similarly, extensive means tests apply in aged care, and the aged care projections include the reduction in Australian government costs as the increasing income and wealth of participants generates higher private contributions.

Chart C.15 shows that superannuation assets are projected to rise from 100 per cent of GDP to around 140 per cent by 2049–50. Importantly, superannuation assets are not projected to decline as the baby boomers retire and withdraw their assets but asset growth relative to GDP is projected to slow. The impact of higher wealth is shown in the projected decline of full-rate pensioners and in the projected rise in part-rate pensioners and non-pensioners in the chart.

**Chart C.15: Projections of superannuation assets and age-related pension coverage and type**



Source: Treasury projections.

### C.3.3 Income support payments

#### Comprehensive policy models

RIMGROUP is a comprehensive cohort projection model of the Australian population, which starts with population and labour force models, tracks the accumulation of superannuation, estimates non-superannuation savings and calculates pension payments and the generation of other retirement incomes (after all taxes). Thresholds and withdrawal levels associated with income and assets tests are modelled in detail.

The model is consistent with current policy and also includes known future policy changes such as increases to the superannuation preservation age and, importantly, the raising of the eligibility age to receive the Age Pension from 65 to 67 progressively from 2017.

RIMGROUP's ability to estimate improvements in retirement income and assets make it superior to trend projections of age-related pensions or those using a coverage rate approach. It projects in detail the higher retirement incomes of Australian retirees as the superannuation system matures and reflects this as a restraining influence on Australian government spending on age-related pensions over time.

The usual approach to testing such models is to see how they track history and to check their predictive ability. Testing on RIMGROUP has shown good results in respect of both tracking history and predicting likely outcomes from policy changes. The projections have been benchmarked to the forward estimates.

In addition to including the pension reforms announced in the 2009–10 Budget, IGR 2010 includes an increase in age-related pension payments in the form of Carbon Pollution Reduction Scheme (CPRS) compensation.

#### Coverage trend models

Coverage trend models were used when spending was strongly related to participation rates for a payment and the unit cost growth was linked to a price index. These models were used to project spending on Disability Support Pension, Parenting Payment Single, Parenting Payment Partnered, Newstart Allowance, Youth Allowance (Student and other), Austudy, Wife Pension, Carer Payment, Family Tax Benefit, Child Care Benefit and Baby Bonus.

The approach takes historical data on coverage or participation (in a payment or service) and extracts the trend to give a coverage or participation projection for the future, usually by age and gender. This projection is used with the population (or unemployment) projections and a standard unit cost to project the future level of expenses. The standard unit cost is usually independent of age or gender and assumed to grow in the future in line with either wages or CPI growth (or a mixture).

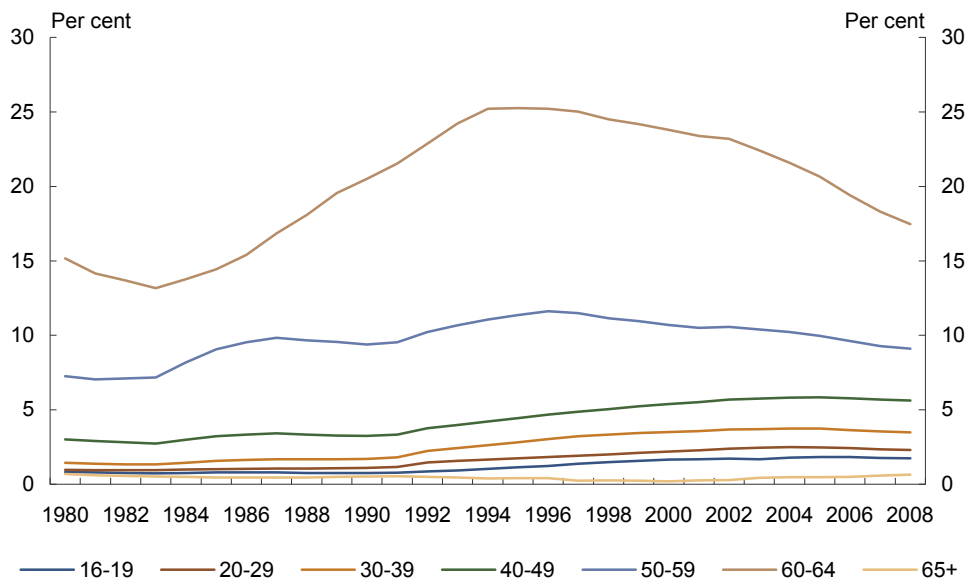
The projection of coverage often involves non-linear techniques such as logistic functions.

The modelling for the Disability Support Pension (DSP) illustrates the process. DSP uptake has grown strongly from 220,000 recipients in 1983 to 732,400 recipients in 2008 (Chart 4.12). The upward trend in DSP recipients has started to flatten since IGR 2007, except for women aged 60 to 64 (Charts C.16 and C.17).

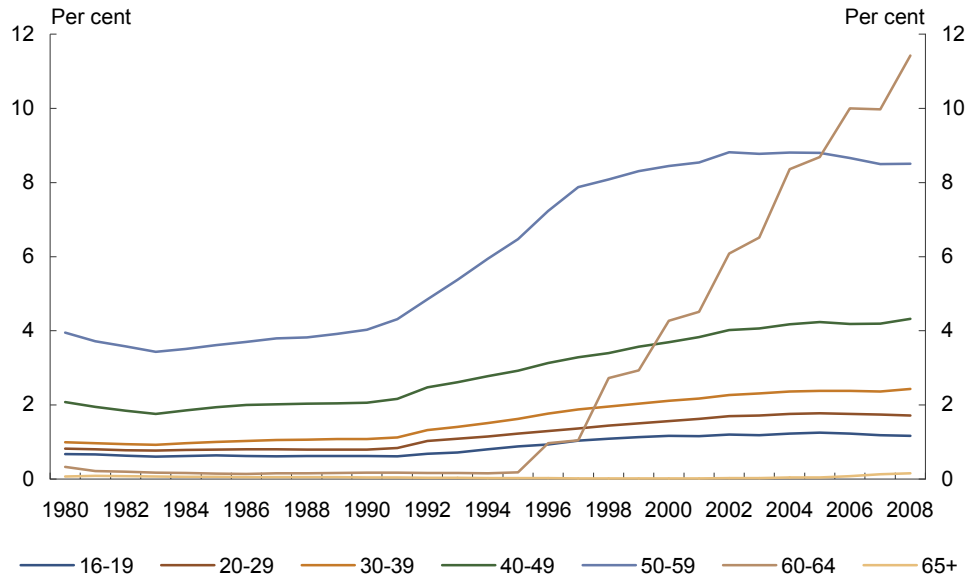
DSP coverage rates are projected based on historical trends for seven age groups, with growth being gradually slowed. The number of DSP recipients in the future is expected to decrease with potential new recipients being required to go onto Newstart Allowance if they are assessed as able to work 15 hours or more per week at award wages. To project the number of recipients for a given year, these rates were multiplied by the population in each age group. An average rate of payment was calculated for DSP and indexed by wages (MTAWE) for future years. Projected nominal spending was derived by multiplying the projected recipient numbers and the indexed rate per recipient, and benchmarked to the forward estimates. Lastly, the GDP projection was used to calculate the projections as a proportion of GDP.

While the increase in the Age Pension age announced in the 2009–10 Budget will reduce the number of people eligible to receive the Age Pension, it is assumed that a proportion of those who would otherwise have been eligible to receive a pension when they turn 65 will remain on other benefits. Coverage rates for DSP and Newstart Allowance have been upwardly adjusted to account for the increase in the Age Pension age.

**Chart C.16: Disability Support Pension coverage rates, males by age**



Source: Treasury modelling.

**Chart C.17: Disability Support Pension coverage rates, females by age**

Source: Treasury modelling.

IGR 2010 projects spending on Paid Parental Leave, a measure announced in the 2009-10 Budget, using the methodology adopted by the Productivity Commission in recommending the introduction of such a scheme (Productivity Commission, 2009). As parents taking Paid Parental Leave are ineligible to receive the Baby Bonus, the number of recipients receiving the Baby Bonus have been adjusted to take into account the number of recipients of Paid Parental Leave.

The Child Care Rebate, previously known as the Child Care Tax Rebate, was not modelled in IGR 2007 as it was previously a tax rebate and not an income support payment. Because of an absence of historical data, it could not be modelled using a coverage trend model. After 2012-13, expenditure on the Child Care Rebate is assumed to increase at the same rate as expenditure on the Child Care Benefit.

Table C.4 summarises both the coverage ratio and standard unit cost methods used in modelling payments to individuals using coverage trend models.

**Table C.4: Summary of income support payment projection methodology**

|                             | <b>Coverage rates</b>                              | <b>Future trends</b>  | <b>Unit cost growth</b> |
|-----------------------------|--|---|-------------------------|
| Disability Support Pension  | Derived for seven age groups for men and women     | Logistic curves used to taper growth                            | MTAWE                   |
| Parenting Payment Single    | Derived for seven age groups for men and women     | Logistic curves used to taper growth                            | MTAWE                   |
| Newstart Allowance          | Derived for six age groups                         | Coverage based on recent recipient to unemployed persons ratios | CPI                     |
| Parenting Payment Partnered | Derived for six age groups                         | Coverage based on recent recipient to unemployed persons ratios | CPI                     |
| Carer Payment               | Derived for eight age groups for men and women     | Logistic curves used  | MTAWE                   |
| Wife Pension                | Total  | Linear regression   | MTAWE                   |
| Youth Allowance Student     | Derived for three age groups for men and women     | Coverage based on recent average                                | CPI                     |
| Austudy                     | Derived for three age groups for men and women     | Coverage based on recent average                                | CPI                     |
| Family Tax Benefit          | Average per child for FTBA and per family for FTBB | Coverage based on recent average                                | CPI                     |
| Child Care Benefit          | Average per child                                  | Coverage based on female labour force participation             | CPI                     |
| Baby Bonus                  | Average per child                                  | Projected number of births                                      | CPI                     |

IGR 2010 includes an increase in payments to individuals in the form of CPRS compensation. This applies to the following payments: DSP, Parenting Payment Single, Parenting Payment Partnered, Newstart Allowance, Youth Allowance (Student and other), Austudy and Family Tax Benefit. In modelling CPRS compensation, the average payment per recipient is indexed with CPI and then multiplied by the number of recipients to calculate the amount of compensation paid.

### C.3.4 Education

Projections of education spending over the next 40 years are based on current Australian government spending combined with projections of total student numbers incorporating demographic change and economy-wide cost growth. Average costs per student in the different sectors have been indexed by wages. For IGR 2010, expenditure projections are done separately for each of government and non-government schools and specific funding for schools, vocational education and training (separately for apprentices and other) and higher education.

Reflecting the stability in school-age participation rates, they are projected to remain at an average of the annual rates since 1994. An important contributor to increasing

school expenditure is the ratio of non-government to government school attendance. This ratio has increased linearly for many years so that by 2008, about 35 per cent of girls and 33 per cent of boys were attending non-government schools. This increasing trend is projected to continue and there is a separate calculation of student numbers attending government and non-government schools out to 2049–50.

University participation rates for males aged 17 to 21 years and females aged 17 to 25 years are projected to increase allowing for previously unmet demand to be accommodated. For the same reason, for males aged 22 years and over and females aged 26 years and over, participation rates are held at around current levels, rather than being allowed to fall further in line with recent trends. Only students in Australian government supported places are included in the projections.

Vocational education and training participation rates for apprentices are projected to increase for males aged 14 to 28 years and females aged 14 to 18 years in line with recent trends. Apprentice participation rates for older people are held at around current levels rather than being allowed to fall further. For other vocational education and training, participation rates for males and females aged 15 to 18 years are projected to increase, while for people aged over 18 years, rates are held at around current levels.

Total education spending to 2012–13 reflects the forward estimates. From 2013–14, average Australian government contributions per student were calculated for each component separately; this average cost is then indexed for projected increases in inflation and wages growth, and multiplied by the projected student populations to obtain nominal spending for each sector. These are aggregated and total nominal spending as a proportion of projected GDP is calculated.

This methodology projects future Australian government education funding based on the current Australian government spending combined with projections based on demographic change and economy-wide cost growth, rather than modelling spending as a continuation of current funding arrangements.

### **C.3.5 Government employee superannuation**

Projections of Australian government spending on defined benefit superannuation over the next 40 years are based on official actuarial valuations using data to 30 June 2008 and published in the 2008 Long Term Cost Reports. The reports rely on economic assumptions which differ slightly from those underpinning the IGR. The impact of this inconsistency is not considered to be material.

The valuations project the unfunded liabilities and Commonwealth outlays associated with the four major defined benefit superannuation schemes: the Commonwealth Superannuation Scheme, the Public Sector Superannuation Scheme, the Defence Force Retirement and Death Benefits Scheme and the Military Superannuation and

Benefits Scheme. These schemes account for almost all of the Australian government's unfunded superannuation liability.

Superannuation costs in relation to civilian employees who are members of fully funded accumulation plans, such as the Public Sector Superannuation Scheme Accumulation Plan (PSSap), are not separately modelled. For the purposes of this report, such superannuation spending is included in 'other' government spending. It is worthwhile noting that, during the process of transition from unfunded defined benefit schemes to funded accumulation arrangements, the superannuation costs associated with civilian employees who are members of the fully funded schemes will increase significantly faster than other departmental operating expenses such as salaries.

### C.3.6 Defence

Whereas IGR 2007 included defence spending as part of the 'other spending' criterion, IGR 2010 has modelled Defence funding based on the long-term 2009 Defence White Paper commitment. The White Paper funding commitment extends from 2009–10 to 2029–30 and provides for:

- 3 per cent average real growth in the Defence budget to 2017–18; and
- 2.2 per cent average real growth in the Defence budget from 2018–19 to 2029–30.

In addition, the White Paper included a provision for fixed indexation of 2.5 per cent for the period to 2030. Previously defence funding had been indexed by the non-farm GDP deflator. The fixed indexation arrangement will remove the need to adjust defence expenditure parameters to short-term fluctuations in the broader economy.

A number of adjustments have been made to the White Paper funding profile to account for two 2009–10 Budget decisions to move funding across years.

The first adjustment will deliver savings of \$2 billion over three years from 2010–11 which will be returned to the Defence budget beyond 2015–16. This aims to ensure defence funding is consistent with large capital acquisitions set out in the White Paper.

The second adjustment reflects the transition to the new Defence White Paper long-term funding path over 2013–14 and 2014–15. Defence funding will be \$1 billion below the new long-term funding path in 2013–14 and \$500 million lower in 2014–15 as higher funding levels are phased in. These amounts will be added back to the Defence budget from 2016–17 onwards.

The White Paper funding profile does not include funding for future international operations because of the inherent difficulty in anticipating future operational requirements. Consistent with this, funding for operations agreed in the 2009-10 Budget has not been included in Defence funding.

The model assumes defence funding is held constant at the 2029–30 share of GDP of 1.8 per cent from 2030–31 to 2049–50.

### C.3.7 Other spending

Other government spending includes GST payments to the States and Territories, purchases of non-financial assets and 'other payments'. These areas of spending generally do not have a clear link with demographic factors. Consequently these spending categories are not modelled separately.

#### *GST payments*

As the GST is entirely passed on to the States and Territories, GST payments are assumed to equal GST receipts, which in turn are modelled as a revenue head to 2019–20 (see Section C.2). Beyond then, GST is assumed to remain constant as a share of GDP at 3.5 per cent of GDP.

#### *Purchases of non-financial assets*

Purchases of non-financial assets account for a relatively small proportion of other spending (around 2.7 per cent in 2009–10). They include purchases of fixed assets such as property, plant and equipment from outside the government sector, and prepayments. This category is held fixed at 0.1 per cent of GDP from 2012–13 onwards.

#### *Other payments*

Major components of other payments include spending on the environment, transport and communications infrastructure, core government services such as departmental operating expenses and housing and community amenities.

Reflecting the Government's fiscal strategy, real annual growth in total Government spending is constrained to 2 per cent in years of above-trend growth until the budget is projected to return to surplus in 2015–16. For those years, the overall spending constraint is met by compressing growth in 'other payments'. This is a technical assumption that allows the underlying spending pressures (particularly those which are demographically sensitive such as health, aged care, age-related pensions and education) to be evident.

As a result of this approach, 'other payments' are projected to fall by around one percentage point of GDP. To the extent that savings to implement the fiscal strategy come from faster growing areas, they may yield larger long-term benefits than allowed for in these projections.

Once the budget is projected to be in surplus, other payments are held constant as a proportion of GDP.

## C.4 Carbon Pollution Reduction Scheme

IGR 2010 is based on the *Mid-Year Economic and Fiscal Outlook 2009–10* released on 2 November 2009, and reflects all Government policies announced up to that time. Consequently IGR 2010 incorporates the CPRS as reintroduced to the Parliament in October 2009, before the amendments announced on 24 November 2009.

Consistent with the treatment of all other revenue heads, the IGR models CPRS receipts to 2019–20 then incorporates them into the long-term assumption of a fixed tax-to-GDP ratio based on the historical average. CPRS-related compensation payments are incorporated into modelled income support payments.

Consistent with the methodology adopted for previous IGRs, the growth rates for economic parameters in IGR 2010 are based on the 3Ps framework. As such, the economic impacts of individual policy measures such as the CPRS are not specifically modelled. The modelling reported in the Government's *Australia's Low Pollution Future: the Economics of Climate Change Mitigation* report suggests that the economic impacts from climate change mitigation policies would be modest.