

# Appendix A: Projections summary

**Table A.1 Economic and fiscal projections**

	2014-15	2024-25	2034-35	2044-45	2054-55
<b>Economic projections</b>					
Real GDP growth (%)	2.5	2.8	2.8	2.6	2.3
Real GDP per person (\$)	67,800	79,500	91,500	106,400	121,900
Real GDP per person growth (%)	0.8	1.3	1.5	1.5	1.3
Real GNI per person (\$)	66,400	76,100	87,900	102,300	117,300
Real GNI per person growth (%)	-1.9	1.4	1.5	1.5	1.3
Total participation rate 15-64 (%)	76.2	78.2	78.8	79.1	79.3
Total participation rate 15+ (%)	64.6	64.9	64.0	63.4	62.4
Male 15+	70.8	70.7	69.8	69.1	68.1
Female 15+	58.5	59.1	58.4	57.7	56.8
<b>Fiscal projections (% of GDP) (a)</b>					
Underlying cash balance	-2.5	0.8	1.3	1.4	0.5
Primary balance	-1.8	1.2	1.4	1.0	0.0
Net debt	15.2	6.7	-4.0	-13.2	-15.0
Net financial worth	-21.6	-5.4	10.4	23.0	27.7
Net worth	-14.3	1.3	17.3	30.0	34.8

(a) Based on the 'proposed policy' scenario.

Source: Treasury projections.

**Table A.2 Demographic projections**

	2014-15	2024-25	2034-35	2044-45	2054-55
<b>Population (millions)</b>					
0-14	23.9	28.0	32.0	35.8	39.7
15-64	4.5	5.3	5.9	6.3	6.9
65-84	15.8	17.8	19.9	22.1	23.8
85 and over	3.1	4.3	5.2	5.9	7.0
85 and over	0.5	0.6	1.0	1.5	1.9
<b>Life expectancy at birth (years) (a)</b>					
Male	91.5	92.6	93.5	94.4	95.1
Female	93.6	94.5	95.3	96.0	96.6
Total fertility rate	1.9	1.9	1.9	1.9	1.9
Dependency ratio (b)	4.5	3.7	3.2	3.0	2.7
Net overseas migration (% total population)	1.0	0.8	0.7	0.6	0.5

(a) Life expectancy figures are calculated using the cohort method.

(b) The dependency ratio refers to the number of people of traditional working age (15-64) for every person over 65. These figures use year average population numbers rather than end of year population numbers.

Source: Treasury projections.

**Table A.3 Projections of major components of Australian Government spending (per cent of GDP)**

	2014-15	2024-25	2034-35	2044-45	2054-55
<b>Health</b>	4.2	3.9	4.0	4.6	5.5
<b>Aged care</b>	0.9	1.1	1.3	1.4	1.7
<b>Age and Service Pensions</b>	2.9	2.5	2.5	2.6	2.7
<b>Other income support</b>					
Disability Support Pension	1.1	0.9	1.0	1.0	1.0
Assistance to families					
Family Tax Benefit	1.3	0.9	0.7	0.6	0.5
Child Care Benefit and Rebate	0.4	0.4	0.4	0.3	0.3
Parenting Payment Single	0.3	0.2	0.2	0.1	0.1
New start Allowance	0.6	0.4	0.4	0.3	0.3
Youth Allowance and Austudy	0.3	0.2	0.2	0.2	0.1
Carers Payments and Wife Pension	0.5	0.6	0.7	0.8	0.8
Parenting Payment Partnered	0.1	0.0	0.0	0.0	0.0
<b>Total other income support</b>	4.5	3.7	3.5	3.3	3.2
<b>Education</b>					
Schools	1.0	0.9	0.8	0.7	0.6
Tertiary Education(a)	0.8	0.6	0.6	0.5	0.4
<b>Total education</b>	1.7	1.6	1.4	1.2	1.0
<b>National Disability Insurance Scheme</b>	0.0	0.7	0.8	0.8	0.9
<b>Public Sector Superannuation(b)</b>	0.4	0.4	0.3	0.3	0.2
<b>Defence</b>	1.8	2.0	2.0	2.0	2.0
<b>Total modelled payments</b>	19.8	19.4	19.2	19.5	20.4
<b>Total payments</b>	25.9	25.0	24.6	25.0	25.9
<b>Total payments (excluding interest)</b>	25.0	24.1	23.9	24.2	25.1

(a) Includes Higher Education and Vocational Education and Training. These figures do not take into account the significant increase in lending to students through the higher education and vocational education and training loan schemes.

(b) Refers to the government's superannuation spending associated with the public sector defined benefit schemes. The projections of public sector superannuation payments are from the 2011 Long Term Cost Report. The Report relies on economic assumptions which differ slightly from those underpinning this report. The impact of this inconsistency on the above proportions is not considered to be material.

Figures may not add due to rounding.

Source: Treasury projections.

**Table A.4 Projections of major components of Australian Government spending (real spending per person, 2014-15 dollars)**

	2014-15	2024-25	2034-35	2044-45	2054-55
<b>Health</b>	2,800	3,000	3,500	4,700	6,500
<b>Aged care</b>	620	830	1,100	1,400	2,000
<b>Age and Service Pensions</b>	2,000	1,900	2,200	2,700	3,200
<b>Other income support</b>					
Disability Support Pension	710	700	830	980	1,200
Assistance to families					
Family Tax Benefit	900	660	630	600	590
Child Care Benefit and Rebate	280	330	320	310	310
Parenting Payment Single	190	150	150	140	140
New start Allowance	410	310	340	340	350
Youth Allowance and Austudy	190	160	160	160	160
Carers Payments and Wife Pension	320	470	630	780	940
Parenting Payment Partnered	40	30	30	30	30
<b>Total other income support</b>	3,100	2,800	3,100	3,400	3,700
<b>Education</b>					
Schools	660	710	720	700	690
Tertiary Education(a)	530	470	490	490	480
<b>Total education</b>	1,200	1,200	1,200	1,200	1,200
<b>National Disability Insurance Scheme</b>	20	500	670	840	1,000
<b>Public Sector Superannuation(b)</b>	280	290	300	290	230
<b>Defence</b>	1,200	1,500	1,800	2,000	2,300
<b>Total modelled payments</b>	13,500	14,800	16,800	19,900	23,900
<b>Total payments</b>	17,600	19,000	21,600	25,400	30,300
<b>Total payments (excluding interest)</b>	17,000	18,300	20,900	24,600	29,400

(a) Includes Higher Education and Vocational Education and Training. These figures do not take into account the significant increase in lending to students through the higher education and vocational education and training loan schemes.

(b) Refers to the government's superannuation spending associated with the public sector defined benefit schemes. The projections of public sector superannuation payments are from the 2011 Long Term Cost Report. The Report relies on economic assumptions which differ slightly from those underpinning this report. The impact of this inconsistency on the above proportions is not considered to be material.

Figures may not add due to rounding.

Source: Treasury projections.

# Appendix B: Sensitivity analysis of long-run economic and spending projections

Projections in this report have been developed using a range of assumptions. These assumptions are detailed in Table B.1. There are significant uncertainties around these assumptions. As such, this report should not be viewed as a forecast.

This appendix contains analysis of how variations to assumptions related to population, participation and productivity may impact on the proposed policy projections. The results show that the proposed policy results are robust to variations in underlying assumptions.

**Table B.1 Assumptions underlying sensitivity analysis**

	Lower	Proposed policy	Higher
<b>Economic</b>			
Total labour force participation rate (15+) (%)	61.5 (a)	<b>62.4</b>	63.3 (b)
Unemployment rate (%)	4.0	<b>5.0</b>	6.0
Labour productivity growth (%)	1.4	<b>1.5</b>	1.6
<b>Demographic</b>			
Net migration (no. of people per year)	180,000	<b>215,000</b>	250,000
Fertility (total fertility rate)	1.7	<b>1.9</b>	2.1
Life expectancy at birth (years)			
Males in 2054-55	84.7 (c)	<b>88.1</b>	90.7 (d)
Females in 2054-55	87.9 (c)	<b>90.6</b>	92.6 (d)

(a) The lower labour force participation sensitivity assumes that total participation decreases by 1.5 per cent by 2054-55 which is factored in from 2018-19 across all age and gender groups.

(b) The higher labour force participation sensitivity assumes that total participation increases by 1.5 per cent by 2054-55 which is factored in from 2018-19 across all age and gender groups.

(c) Lower life expectancy uses the ABS's Medium Series which assumes that male and female life expectancy increases from 2009-2011 levels by 0.25 and 0.19 years per year respectively, until 2015-16 and then increases at declining rates. Life expectancy figures are calculated using the period method reflecting ABS figures.

(d) High life expectancy uses the ABS's High Series which assumes that male and female life expectancy increases from 2009-2011 levels by 0.25 and 0.19 years per year respectively until 2054-55. Life expectancy figures are calculated using the period method reflecting ABS figures.

Source: Treasury projections.

**Table B.2 Sensitivity analysis results**

	Proposed policy in 2054-55	Participation		Unemployment		Productivity	
		Low	High	Low	High	Low	High
<b>Economic</b>							
Real GDP (growth rate)(a)	2.78	-0.04	0.04	0.03	-0.03	-0.10	0.10
Real GDP per person (growth rate)(a)	1.48	-0.04	0.04	0.03	-0.03	-0.10	0.10
Real GDP per person(b)	\$ 121,900	-\$ 1,800	\$ 1,800	\$ 1,300	-\$ 1,300	-\$ 4,300	\$ 4,500
Real GNI (growth rate)(a)	2.74	-0.04	0.04	0.03	-0.03	-0.10	0.10
Real GNI per person (growth rate)(a)	1.43	-0.04	0.04	0.03	-0.03	-0.10	0.10
Real GNI per person(b)	\$ 117,300	-\$ 1,800	\$ 1,800	\$ 1,300	-\$ 1,300	-\$ 4,300	\$ 4,500
Labour force participation(c)	62.4	-0.93	0.93	0.00	0.00	0.00	0.00
Labour force size(d)	20,340,000	-148	148	0.00	0.00	0.00	0.00
<b>Dependency ratio (e)</b>	2.7	0.00	0.00	0.00	0.00	0.00	0.00
<b>Spending (per cent of GDP) (c)</b>							
Health	5.5	0.06	-0.06	-0.05	0.05	0.14	-0.14
Aged care	1.7	0.02	-0.02	-0.02	0.02	0.07	-0.07
Age and Service Pensions	2.7	0.05	-0.05	-0.03	0.03	0.03	-0.03
Payments to individuals	3.2	0.04	-0.04	-0.10	0.10	0.07	-0.07
Education	1.0	0.02	-0.01	-0.01	0.01	0.04	-0.04
	Proposed policy in 2054-55	Fertility		Life expectancy		Migration	
		Low	High	Low	High	Low	High
<b>Economic</b>							
Real GDP (growth rate)(a)	2.78	-0.08	0.07	-0.02	0.01	-0.14	0.14
Real GDP per person (growth rate)(a)	1.48	0.04	-0.04	0.03	-0.02	-0.02	0.02
Real GDP per person(b)	\$ 121,900	\$ 1,700	-\$ 1,700	\$ 1,300	-\$ 1,200	-\$ 900	\$ 1,100
Real GNI (growth rate)(a)	2.74	-0.08	0.08	-0.02	0.01	-0.15	0.15
Real GNI per person (growth rate)(a)	1.43	0.03	-0.03	0.03	-0.02	-0.03	0.03
Real GNI per person(b)	\$ 117,300	\$ 1,500	-\$ 1,500	\$ 1,200	-\$ 1,100	-\$ 1,200	\$ 1,300
Labour force participation(c)	62.4	-0.34	0.32	0.86	-0.73	-0.58	0.61
Labour force size(d)	20,340,000	-3.07	3.08	-0.79	0.25	-5.28	5.42
<b>Dependency ratio (e)</b>	2.7	-0.09	0.09	0.18	-0.13	-0.12	0.11
<b>Spending (per cent of GDP) (c)</b>							
Health	5.5	-0.03	0.01	-0.14	0.15	0.02	-0.05
Aged care	1.7	0.05	-0.05	-0.11	0.10	0.08	-0.08
Age and Service Pensions	2.7	0.08	-0.08	-0.19	0.19	0.03	-0.12
Payments to individuals	3.2	-0.05	0.05	0.01	0.00	-0.02	-0.03
Education	1.0	-0.06	0.06	0.01	0.00	0.00	-0.02

(a) Represents the percentage point difference in the average annual growth rate for the period 2014-15 to 2054-55, compared to proposed policy.

(b) Represents the real dollar value difference in 2054-55 compared to proposed policy.

(c) Represents the percentage point change in 2054-55 compared to proposed policy.

(d) Represents the percentage change in the size of the labour force by 2054-55 compared to proposed policy.

(e) Represents the difference in the number of people aged 15-64 years to support people aged 65 years and above, compared to proposed policy.

Source: Treasury projections.

Table B.2 contains results of the sensitivity analysis. Lower unemployment, higher migration and higher labour force participation increase the proportion of the population in the workforce at a particular time. This generally leads to decreased government spending. Higher migration, for example, increases participation by 0.6 percentage points in 2054-55 compared to proposed policy. This results in lower spending as a per cent of GDP on Age and Service Pensions by around 0.12 percentage points in 2054-55.

Factors that increase participation also increase growth and incomes. For example, under the higher participation assumption, the annual average growth rates of real GDP per person and real GNI per person both increase by 0.04 points. This highlights that encouraging and valuing greater workforce participation, in particular amongst older age groups and females, presents an opportunity to further lift economic and income growth.

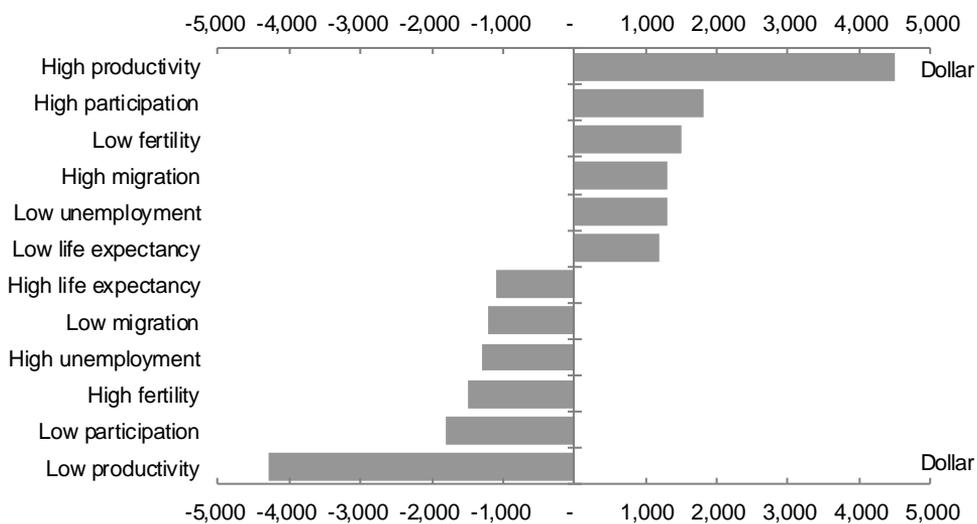
Higher fertility and life expectancy lead to lower levels of real GDP per person and real GNI per person. This is because the corresponding increases in the population are greater than the increases in real GDP and real GNI. Higher fertility and higher life expectancy lead to increases in government spending as a per cent of GDP because the oldest and youngest people in the population tend to participate less in the labour force and utilise more government support programs and services. Government spending on payments to individuals and education are concentrated on these two groups. Spending on aged care and Age and Service Pensions decreases as a per cent of GDP when fertility is higher because the older cohorts are a smaller proportion of the population. The full impact of higher fertility on the labour force is not seen within the 40-year projections due to the delay before the young reach working age.

Real GNI per person is affected the most by productivity. Whereas the sensitivity analysis of the other underlying assumptions projects increases and decreases in real GNI per person of between \$1,100 and \$1,800, higher productivity would lead to a projected increase of \$4,500 and lower productivity would lead to a decrease of \$4,300 (Chart B.1).

Variations in the growth of productivity have the most significant direct effect on the economy. For every 0.1 percentage point increase in the productivity assumption over the projection period, a corresponding change to real GNI per person of \$4,500 would be projected. A 1.7 per cent productivity assumption would be expected to increase real GNI per person by \$9,000 and likewise a productivity growth rate of 1.3 would be expected to decrease real GNI per person by \$8,600 in 2054-55.

This sensitivity analysis highlights the importance of increasing productivity to driving income growth over the coming decades. If productivity growth slows then growth in living standards will be at risk. If productivity growth is lifted through economic reform then future growth in living standards can also be lifted substantially.

**Chart B.1 Change in real GNI per person in 2054-55 compared with proposed policy**



Source: Treasury projections.

# Appendix C: Methodology

This appendix outlines the modelling methodology underpinning the projections in this report.

## C.1 Demographic and economic projections

### Population projections

Treasury population projections are undertaken using the ‘cohort-component’ method. This is a standard approach which is also used, for example, by the ABS and the Productivity Commission. It involves age-specific assumptions about future fertility and age-sex-specific assumptions about future mortality and migration being applied year by year to the population broken down into groups or ‘cohorts’. With the Treasury projections, these cohorts are males and females broken down by single year of age. The base data for the projections are ABS data on the current Australian population and patterns of fertility, mortality and net overseas migration.

**Table C.1 Population projection assumptions**

	Assumptions				Projected population June 2050 Million persons
	Total fertility rate	Net overseas migration	Period life expectancy at birth in year 2050		
	Children per woman	Persons	Males	Females	
			Years	Years	
Intergenerational Reports					
IGR 4 (2015)	1.9	215,000	87.5	90.1	37.8
IGR 3 (2010)	1.9	180,000	87.7	90.5	35.9
IGR 2 (2007)	1.7	110,000	87.6	90.2	28.5
IGR 1 (2002)	1.6	90,000	83.2	88.2	25.7
Australian Bureau of Statistics (2013)					
Series A	2.0	280,000	89.4	91.5	41.9
Series B	1.8	240,000	84.4	87.7	37.6
Series C	1.6	200,000	84.4	87.7	34.3
Productivity Commission (2013)	1.85	180,000	87.8	90.1	35.3

(a) Period life expectancy is reported here for comparability between reports and series.

(b) Life expectancy figures are presented in calendar years for comparability.

Source: ABS cat. no. 3222.0, Productivity Commission 2013 and Treasury projections.

### Box C.1 Period and cohort life expectancy methodology

Period life expectancy at a given age is the average number of years a person will live if the age-specific mortality rates at that point in time, given the person's gender, were to apply for the rest of the person's life. It is the measure used by the ABS when reporting life expectancy in its annual publication 'Life Tables, Australia', and used for reporting in previous intergenerational reports.

In reality, mortality rates are likely to improve in the future, as advances are made in medicine and technology, so period life expectancy is likely to underestimate the number of years someone could actually expect to live. A more realistic measure of how long a person of a given age and gender can expect to live is 'cohort' life expectancy. Instead of being based on the mortality rates for all ages in a given year (the period life expectancy approach), the cohort life expectancy approach takes the age-specific mortality rate year-by-year for the particular year in which the person would be that age. Cohort life expectancy thus takes better account of likely future improvements in mortality rates.

Using the period method, the life expectancy of a male born in 2014-15 is described as 80.7 years and for a female 84.8 years. If expected improvements in mortality rates during the lifetime of a child born in 2014-15 are taken into account, the life expectancy of a male born in 2014-15 is projected to be 91.5 years and for a female 93.6 years. That is, expected improvements in mortality rates over their lifetimes are expected to add 10.8 years for males and 8.8 for females to the life expectancy of persons born in 2014-15.

**Table C.2 Australians' projected life expectancy — period method (years)**

	2014-15	2024-25	2034-35	2044-45	2054-55
Life expectancy at birth					
Men	80.7	82.9	84.9	86.6	88.1
Women	84.8	86.4	87.9	89.3	90.5
Life expectancy at age 60					
Men	23.8	25.5	27.0	28.3	29.5
Women	26.8	28.1	29.3	30.4	31.4
Life expectancy at age 70					
Men	15.7	17.0	18.1	19.2	20.2
Women	18.1	19.2	20.2	21.1	22.0

Period life expectancy at a given age is the average number of years a person will live if the age-specific mortality rates at that point in time, given the person's gender, were to apply for the rest of the person's life. Source: Treasury projections.

### Participation rate projections

Trend participation rates are broadly consistent with the 2010 report's methodology. For each five-year age group, gender and employment status (full-time and part-time) cohort, a participation rate is projected from the historical trend. The historical trend is determined as the ratio of the historical trends of the labour force and working age population.

Projected trend participation rates by age, gender and employment status are compared to maintain relativities between age groups, between genders, and between full-time and part-time status. The projected trend total participation rate is the sum of the projected trend participation rates across age groups, genders and employment statuses weighted by their share of the total working age population.

For youth (15-24 years of age), participation rate projections are held constant at the most recent historical trend value. This reflects limited historical information about how these cohorts will behave. For mature age workers (aged 60-64 and over), projected trend participation rates are modelled using cohort analysis, based broadly on the methodology described by the Productivity Commission.<sup>14</sup> Following the Productivity Commission approach,<sup>15</sup> labour force participation rates for the remaining cohorts are projected using Richards' curves.

## **Economic projections**

### **Economic projections framework**

Long-run projections of economic growth take short-term forecasts and medium-term projections as a base. This report is based on the forecasts and projections set out in the 2014-15 Mid-Year Economic and Fiscal Outlook (MYEFO). Details on these forecasts and projections can be found in the 2014-15 MYEFO, with the methodology to construct medium-term and long-run projections discussed in a recent Treasury Working Paper 2014-02.<sup>16</sup> The 2014-15 MYEFO forecasts and projections extend until 2024-25. Using the same projection methodology, this report extends these projections to 2054-55.

### **Nominal GDP, prices and wages**

Output prices are a volume-weighted average of the price received for goods and services sold domestically and internationally.

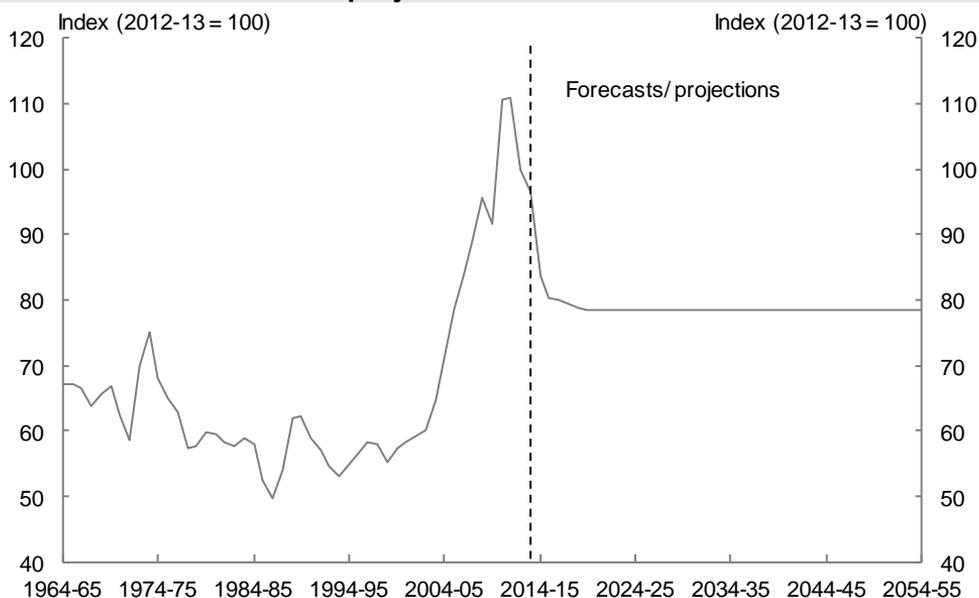
Treasury has undertaken detailed modelling to project export prices, which was outlined in Treasury Working Paper 2014-01. Based on global demand and supply models for Australia's key commodity exports, this analysis suggests that even over the long-run, the real prices received for Australia's key commodity exports are likely to remain elevated compared with prices received in the early 2000s. The export price projections from this modelling underpin the 2014-15 MYEFO and this report, and indicate that Australia's long-run terms of trade will settle at the level observed in 2005-06 by 2019-20.

---

14 Productivity Commission (2005) *Economic Implications of an Ageing Australia*, Research Report, Productivity Commission: Canberra (Technical Paper No. 3: Cohort Analysis).

15 Productivity Commission (2005) *Economic Implications of an Ageing Australia*, Research Report, Productivity Commission: Canberra (Technical Paper No 2: Growth Curves).

16 Commonwealth Treasury (2014) Treasury's medium-term economic projection methodology, Treasury Working Paper 2014-02, The Treasury, Canberra.

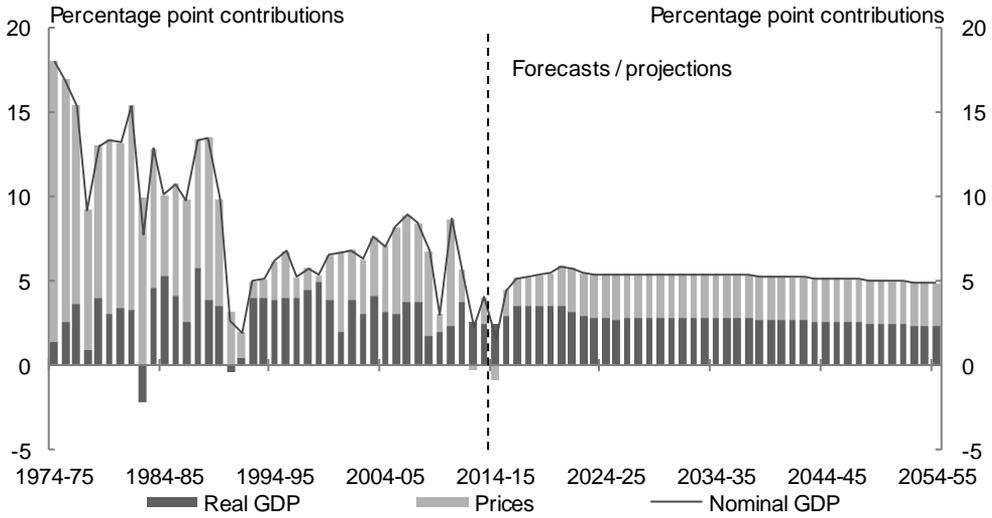
**Chart C.1 Terms of trade projections**

Source: ABS cat. no. 5206.0 and Treasury projections.

Under the framework outlined in Treasury Working Paper 2014-02, domestic price growth is driven by growth in wages. Over the cyclical adjustment period, spare capacity in the economy leads to below-trend wage growth. Below-trend wage growth helps to facilitate sufficient employment growth to transition unemployment back to its trend rate. Over the long-run, domestic prices grow by 2½ per cent per annum, consistent with Australia's medium-term inflation target, and wages grow at around 4 per cent, consistent with domestic inflation and productivity growth of 1.5 per cent.

Over the cyclical adjustment period, the declining terms of trade and below-trend wage growth mean that output prices growth is modest (Chart C.2). Modest output price growth leads to subdued nominal GDP growth over the cyclical adjustment period, notwithstanding the above trend real GDP growth that is required to close the output gap. Over the long run, output prices grow at their constant trend rate of 2½ per cent. Variations in long-run nominal GDP growth are therefore driven only by changes in potential output growth.

### Chart C.2 Nominal GDP projections

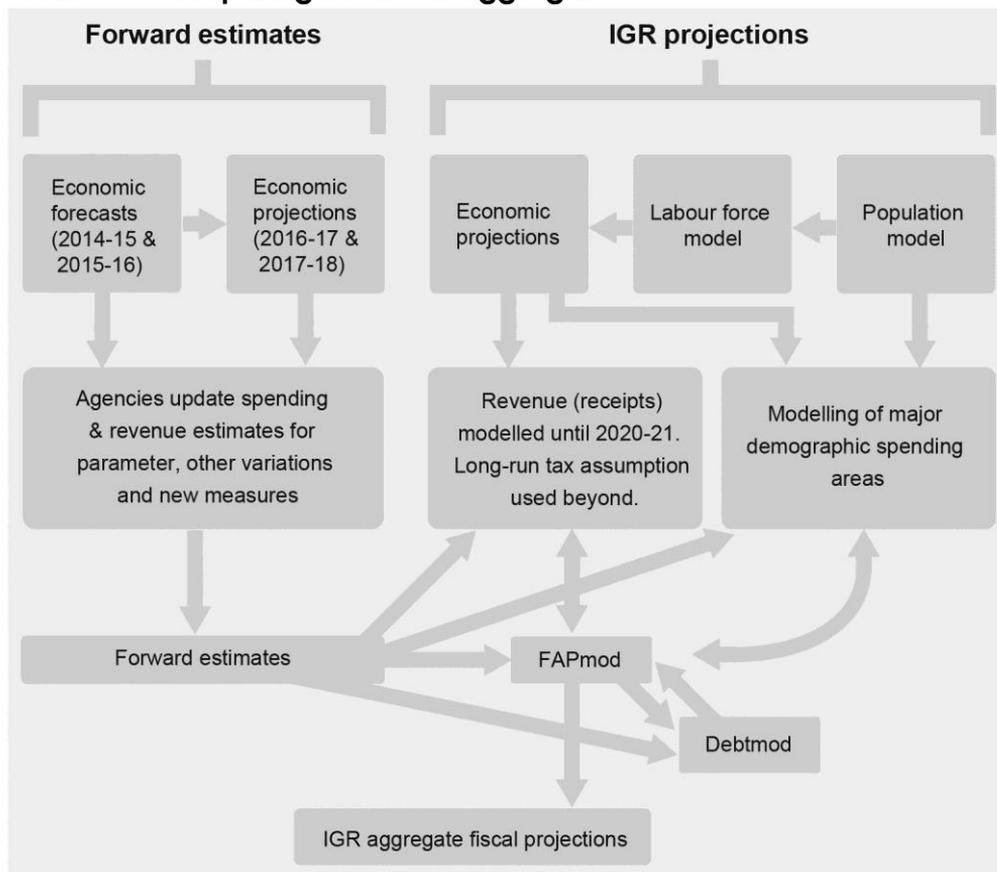


Source: Treasury projections. Projections assume trend economic growth from 2021-22 to 2054-55.

## C.2 Aggregate fiscal projections

### Fiscal aggregate projection model

The fiscal aggregate projection model (FAPmod) used to prepare the aggregate fiscal projections reported in this report draws together the outputs of a wide range of separate but consistent models (Chart C.3).

**Chart C.3 Preparing the fiscal aggregates**

For this report, FAPmod takes the updated fiscal and economic forward estimates and medium-term projections published in the 2014-15 MYEFO 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 this report. 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 personnel. Consistent with previous reports, this involves various 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.

FAPmod provides the capacity to model a broad range of fiscal aggregates. It was first developed to model the medium-term fiscal projections published in the

2009-10 Budget (for further information, see The Australian Treasury's fiscal aggregate projection model, Economic Roundup Issue 3, 2009). Since then, improvements in how modelling captures the interactions between flow concepts, such as the budget balance, and stock concepts, such as debt, has allowed for a more detailed assessment of the long-term fiscal outlook.

## **Debt model**

This report builds on the debt modelling of previous reports by incorporating more detailed modelling of the face and market value of Commonwealth Government Securities (CGS) on issue (commonly referred to as gross debt) and the interest payments on CGS, known as public debt interest.

CGS on issue and public debt interest are modelled in a separate model — DebtMod. The key inputs to this model are the financing task in each year, the level of CGS at the end of the forward estimates and the assumed CGS yield curve in each year.

The financing task in each year is an output of FAPMod, and is comprised of the underlying cash balance excluding interest payments on CGS (which is an output of DebtMod), plus other financing requirements, for example investments in financial assets.

To model debt and public debt interest over the 40-year projection period, the yield curve used for the 2014-15 MYEFO forward estimates is used as the base yield curve. Outside the forward estimates, the yield curve is assumed to converge towards a fixed long-term yield curve with the gap being reduced each year by a quarter. The long-term yield curve is based on an assumption that the long-term yield on 10-year CGS is 6 per cent. This is consistent with the Long-Term Cost Reports prepared by the Australian Government Actuary.

DebtMod assigns new debt to specific bond lines in each year to meet the Government's projected financing needs. These bond lines are priced over time using the Treasury Bond and Treasury Indexed Bond pricing formulae and the assumed yield curve. This allows both the market and face value of CGS to be calculated.

Public debt interest on CGS issued in the past is calculated using the weighted average issuance yield for each individual bond line and debt issued over the projection period is calculated each year using the assumed yield to maturity for each individual bond line.

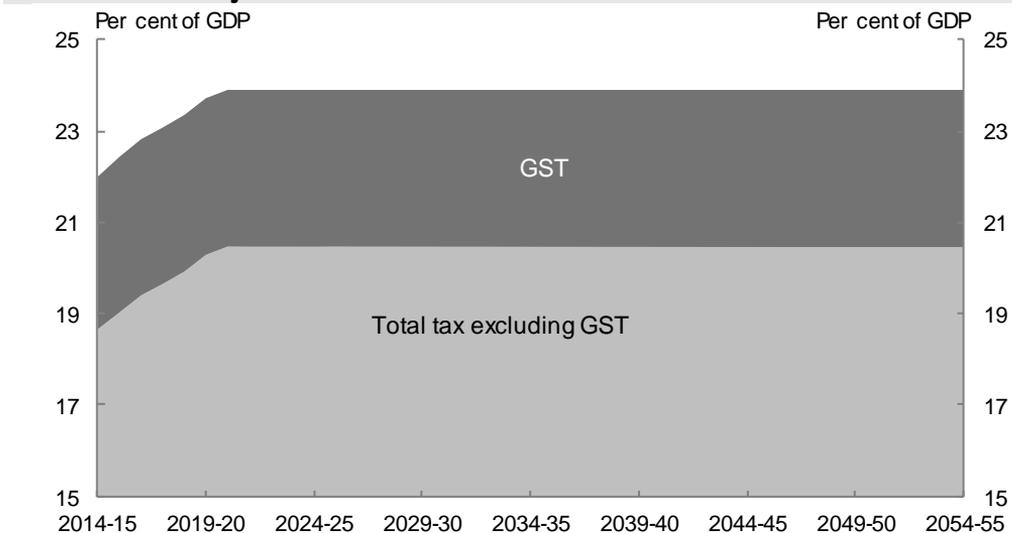
Debt modelling assumes that a floor on CGS on issue is maintained at 13 per cent of GDP. This is consistent with the policy and practice of governments since the 2003-04 Budget to support bond market liquidity by maintaining a minimum amount of CGS on issue, with the latest review in 2011 recommending a floor be set at 12-14 per cent.

### C.3 Revenue projections

This report assumes, in the long-run, a constant tax-to-GDP ratio of 23.9 per cent. This rate is based on the average tax-to-GDP ratio of the years following the introduction of the GST and prior to the global financial crisis (2000-01 to 2007-08 inclusive). This methodology is similar to that used in previous reports.

Tax receipts continue to recover from the global financial crisis and are projected to increase as a proportion of GDP to 2020-21, when they reach the tax-to-GDP ratio assumption. The projected path is shown in Chart C.4. The increase in the tax-to-GDP ratio, until the tax-to-GDP ratio assumption is reached, is largely driven by increases in taxes on individuals reflecting 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.

**Chart C.4 Projected tax-to-GDP ratio**



#### Historical trends and drivers

Australian Government receipts are derived from taxation and non-taxation sources.

Taxation receipts averaged 23.9 per cent of GDP over the eight years from 2000-01 (the year the GST was introduced) to 2007-08 and accounted for 94.1 per cent of total Australian Government receipts. Over this period:

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

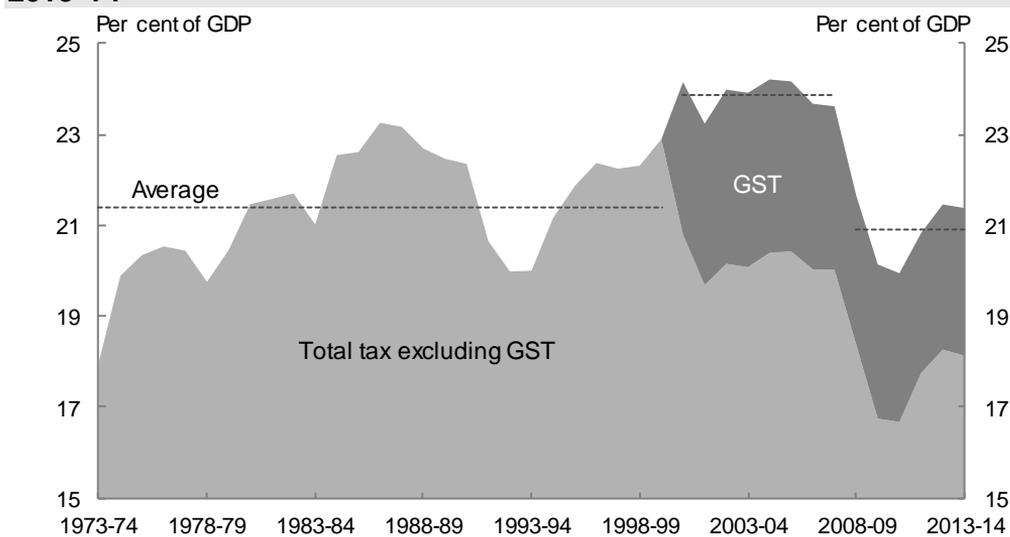
Non-taxation receipts include sales of goods and services, interest, dividends, petroleum royalties and seigniorage from circulating coin production. Non-taxation receipts averaged 1.5 per cent of GDP over the period 2000-01 to 2007-08 and accounted for 5.9 per cent of Australian government receipts.

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 20.0 and 23.3 per cent and averaged 21.9 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.5).

**Chart C.5 Total Australian Government taxation receipts, 1973-74 to 2013-14**



### Medium and long-term revenue projections

Previous reports have adopted an assumption that total Australian Government receipts as a proportion of GDP would remain constant at some point 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, this report also assumes an unchanged tax-to-GDP ratio in the long-term and builds off the projections and methodology in the 2014-15 MYEFO. The tax-to-GDP ratio is projected to rise from 22.0 per cent of GDP in 2014-15 to 23.9 per cent of GDP in 2020-21 (Chart C.4).

Non-tax revenues are relatively small, rising from 1.6 per cent of GDP in 2014-15 to 2.5 per cent in 2054-55.

## **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 2020-21 are based on a strict 'no policy change' scenario, allowing for the natural recovery of tax receipts revenues to be dedicated to improving the budget position and eliminating net debt. Beyond 2020-21, the estimates are prepared using a 'top-down' approach, as described earlier, assuming a constant tax-to-GDP ratio of 23.9 per cent. Within the overall long-run assumption, GST is assumed to comprise around 3.4 per cent of GDP.

The aggregate constant tax-to-GDP ratio is not intended to imply that different types of receipts 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 receipts not remaining constant as a share of GDP.

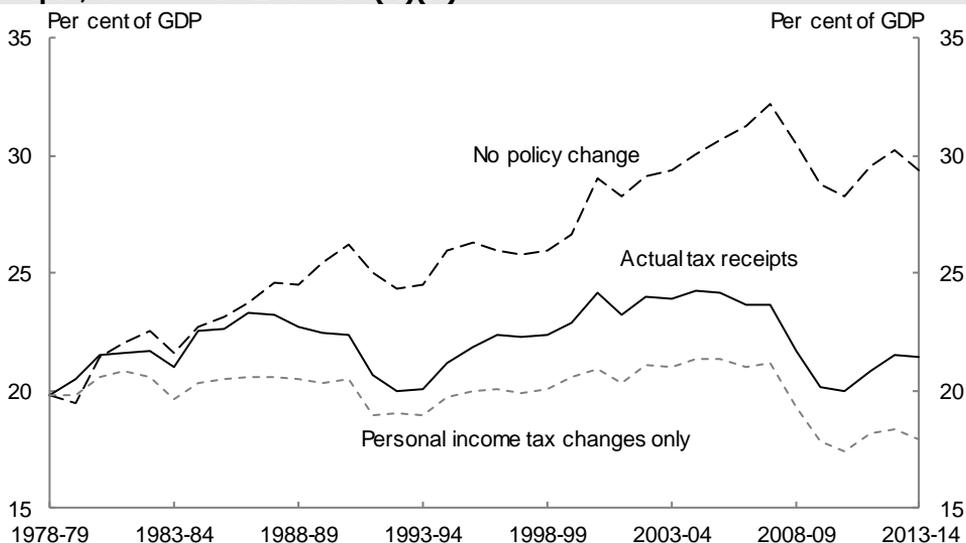
## **Progressivity of the nominal personal tax system**

With no policy change tax collections would have risen much faster than GDP over time, resulting in a tax-to-GDP ratio considerably higher than actually occurred. 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.

History shows that in practice governments make substantial periodic adjustments to the personal income tax scale.

**Chart C.6 Impact of policy changes on Australian Government tax receipts, 1978-79 to 2013-14 (a)(b)**



(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 1978-79.

Source: ABS cat. no. 5206.0 and Budget Paper No. 1 (various years).

If individual taxpayers in 2011-12 had been taxed under the personal income tax scales of 1980-81, over half would have faced the then top marginal tax rate of 60 per cent and over 75 per cent would have faced a marginal rate of 46 per cent.

## C.4 Spending projections

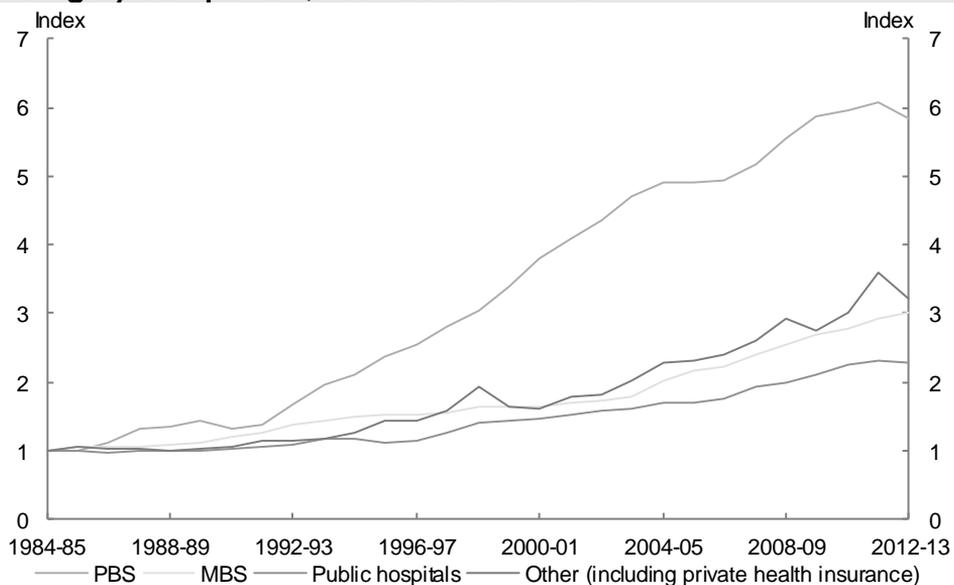
### C.4.1 Health

#### General methodology

As with previous reports, health expenditure beyond the forward estimates is projected initially on the basis of individual component models for public hospitals, pharmaceutical benefits, medical benefits and private health insurance rebates. Expenditure not captured in the component models, such as veterans' health, public health programs and medical research, is held constant as a percentage of nominal GDP. This report has also made projections for the Medical Research Future Fund.

Consistent with the 2010 report, this report uses these component models to project the cost of health services per person for the first ten years beyond the forward estimates. The use of component models for this period seeks to balance the desire for more detailed projections against the uncertainty as to whether recent trends in individual components of government health expenditure will be representative of longer term trends. Over the past 30 years, growth for components of health spending has been variable which poses challenges for projecting health expenditure over a 40-year period (Chart C.7).

**Chart C.7 Historical real growth in Australian Government health spending by component, 1984-85 to 2012-13**



Note: Spend in 1984-85 = 1. Other health expenditure includes expenditure on the private health insurance rebate as the rebate commenced in July 1997 and therefore no index can be calculated independently over this time frame.

Source: Department of Health, Australian Institute of Health and Welfare and the Commonwealth Government Budget papers.

The uncertainty around the distribution of health expenditure between the components of health spending increases with the length of the projection. Because of this, from 2027-28 onwards, an aggregate model is used to project total Australian Government health spending, and assumes non-demographic growth trends towards the historical non-demographic growth rate for health spending by all levels of government over the longer term. This approach is consistent with that used in the 2010 report.

An alternative approach would be to project Australian Government health spending based on component models over 40 years. This methodology would assume that long-term growth in Australian Government health expenditure would occur at the historical rates relating only to those components.

The share of health spending made up by each component has changed significantly over time. For example, a shift in the composition of health care away from acute care and towards early intervention through pharmaceuticals and primary care has increased the Australian Government's exposure to the growth in all government health spending. In 1984-85, spending on the Pharmaceutical Benefits Scheme was approximately 7 per cent of Australian Government spending on health, but by 2013-14 this had risen to around 15 per cent.

The aggregate projection methodology is considered more likely to provide a more robust projection in the long-term than a component based methodology. In particular, long-term modelling on a component basis would risk underestimating future spending pressures on the health budget, which are driven by a variety of factors including technological changes, demographic changes and income growth.

## **Main changes to methodology since the 2010 report**

Since the 2010 report, projection methodologies have been refined to reflect data availability and policy developments. Major changes include:

- using an exponential trend model (to replace the previous linear trend model) for medical benefits expenditure to align projections more closely with historical trends;
- projecting Australian Government hospital funding in accordance with current government policy on funding for hospitals, which was announced in the 2014-15 Budget;
- projecting private health insurance expenditure on the basis that, from 1 April 2014 onwards, private health insurance rebates are indexed annually by the lesser of the consumer price index (CPI) or the actual increase in premiums charged by insurers;

- including health departmental expenses as health spending rather than including it as residual government spending — this approach is consistent with the classification of health expenditure in Commonwealth budget papers; and
- technical amendments to the treatment of veterans' health expenditure to make the projections more consistent with other areas of health spending.

## **Medical Benefits**

The medical benefits component model includes spending under the Medicare Benefits Schedule.

Projections are derived by first applying non-demographic growth to current spending on medical benefits per person for each age group in each gender. Population (excluding the veterans' population) and CPI projections are then applied to derive nominal projections of spending. The historical population series removes the veterans' population, as they receive medical services under separate arrangements from the Medicare Benefits Schedule. Spending on medical benefits for veterans has been included as other health spending (methodology described below) to ensure consistency with government budget presentation.

The non-demographic growth rate is derived from trends in historical Medicare Benefits Schedule expenditure data. This is done by adjusting historical spending data for CPI growth and changes in the size and age structure of the population to derive real age-adjusted spending per person. The non-demographic growth rate is determined by fitting an exponential trend to this series. Non-demographic growth is applied as a constant percentage increase in spending each year across all age groups.

The age profile of medical benefits spending shows that spending per person is higher for older age groups than for younger age groups (Table C.3). Spending per person on medical benefits peaks for those aged between 80 and 84 years for both males and females.

**Table C.3 Index of the age profile of medical benefits spending per person, 2013-14**

Age group	Male	Female
0-4	0.60	0.53
5-9	0.39	0.35
10-14	0.38	0.40
15-19	0.39	0.63
20-24	0.34	0.71
25-29	0.35	0.87
30-34	0.44	1.12
35-39	0.54	1.17
40-44	0.62	1.10
45-49	0.74	1.11
50-54	0.89	1.22
55-59	1.10	1.35
60-64	1.45	1.60
65-69	1.88	1.92
70-74	2.28	2.23
75-79	2.81	2.64
80-84	3.15	2.80
85+	3.03	2.70
<b>Weighted average</b>	<b>0.85</b>	<b>1.15</b>

Note: Index of average cost per person = 1.

Source: Treasury estimates based on data from the Department of Health.

## Pharmaceutical Benefits

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

Projections are derived by applying non-demographic growth to current spending on pharmaceutical benefits per person for each age group in each gender. Population and CPI projections are then applied to derive nominal projections of spending. As expenditure through the Repatriation Pharmaceutical Benefits Scheme is included in the projection there is no need to remove veterans from the historical population (in contrast to projections of medical benefits expenditure). The age profile of spending for veterans is assumed to be the same as that for the general population.

The non-demographic growth rates are derived from trends in historical data on pharmaceutical benefits expenditure. This is done by adjusting historical spending by age group for CPI growth to derive real spending per person for each age group in each gender. As a linear trend fits the historical data better than an exponential trend model, the non-demographic growth rate is determined by fitting a linear trend to these series. Non-demographic growth is projected forward as a constant real dollar increase in spending each year for each age group in each gender. Where historical spending

for a particular age and gender-specific group has a negative linear trend, the model assumes that non-demographic growth for that group is zero.

The age profile of pharmaceutical benefits spending shows that spending per person is higher for older age groups than for younger age groups (Table C.4). Spending per person on pharmaceutical benefits peaks for those aged between 80 and 84 years for females and those aged 85 years and over for males.

**Table C.4 Index of the age profile of pharmaceutical benefits spending per person, 2013-14**

Age group	Male	Female
0-4	0.07	0.05
5-9	0.08	0.06
10-14	0.12	0.08
15-19	0.15	0.16
20-24	0.19	0.23
25-29	0.26	0.29
30-34	0.38	0.41
35-39	0.53	0.57
40-44	0.68	0.73
45-49	0.88	0.88
50-54	1.08	1.10
55-59	1.33	1.34
60-64	1.83	1.83
65-69	2.71	2.60
70-74	3.46	3.22
75-79	4.20	3.84
80-84	4.66	4.19
85+	4.69	4.14
<b>Weighted average</b>	<b>0.97</b>	<b>1.03</b>

Note: Index of average cost per person = 1.

Source: Treasury estimates based on data from the Department of Health.

## **Hospitals**

Significant policy changes to hospitals funding have occurred since the 2010 report and the modelling methodology has been amended to reflect these changes. From 2017-18 onwards, funding in each year is calculated by increasing the previous year's funding by the product of the population growth factor and the CPI growth factor.

Spending on hospital services for veterans has been included in the other health spending category (methodology described below) to ensure consistency with government budget presentation.

## **Private health insurance rebates**

From 1 April 2014, the Government's contribution to an individual's private health insurance rebate is indexed annually by the lesser of the CPI or the actual increase in the premium charged by insurers. Reflecting this policy, the private health insurance rebate model projects spending based on growth in the CPI and population. This assumes that premiums will generally rise faster than the CPI, as has occurred historically.

The current proportion of private health insurance holders in each five-year age cohort is assumed to remain constant beyond the forward estimates. This model therefore assumes zero non-demographic real growth, as increases in price are capped at the CPI and increases in demand are assumed to be primarily driven by demographic factors.

The proportion of individuals holding private hospital cover is higher for children than for those aged between 20 and 29 years, and increases until it peaks for those aged between 60 and 64 years for both genders (Table C.5). From this age onwards the proportion of individuals holding private hospital cover falls.

**Table C.5 Proportion of population holding private hospital cover, by age, June 2014**

Age group	Male	Female
0-4	0.42	0.42
5-9	0.47	0.47
10-14	0.46	0.46
15-19	0.45	0.45
20-24	0.33	0.36
25-29	0.29	0.35
30-34	0.43	0.49
35-39	0.48	0.51
40-44	0.48	0.52
45-49	0.50	0.52
50-54	0.52	0.55
55-59	0.55	0.57
60-64	0.57	0.59
65-69	0.55	0.58
70-74	0.53	0.53
75-79	0.50	0.50
80-84	0.49	0.47
85+	0.40	0.39
<b>Weighted average</b>	<b>0.46</b>	<b>0.48</b>

Source: Private Health Insurance Administration Council.

## Medical Research Future Fund Contributions

Consistent with other spending areas, the policy assumption in this report for the Medical Research Future Fund (the Fund) is that of the 2014-15 MYEFO. It is assumed that the capital of the Fund is to be preserved in perpetuity. The annual rate of return is assumed to be equal to the 10-year Australian Government bond rate. Payments of the Fund's net interest earnings commence in 2015-16 and in a given year are assumed to be available in the following year to fund medical research priorities. These assumptions are consistent with government policy announced in the 2014-15 Budget. The investment of funds collected from health expenditure savings make a positive contribution to reducing projections of government net debt insofar as they are comprised of cash or debt or debt-like securities.

## Other health spending

Other health spending includes all other Australian Government health spending. Major components of other health spending include:

- health workforce programs, including payments to general practitioners for infrastructure, training and support, and the Practice Incentive Programme;
- population health and safety programs, including funding for essential vaccines;

- health and medical research; and
- spending on veterans' health care.

Other health spending excluding veterans' health care is assumed to remain constant as a proportion of GDP.

This approach is consistent with how other non-demographic payments, other than public debt interest, are modelled.

#### *Veterans' health care*

Veterans' health care includes all spending on veterans' health care administered by the Department of Veterans' Affairs except spending on the Repatriation Pharmaceutical Benefits Scheme, which is included in the pharmaceutical benefits projections.

As veterans' health care spending per person is higher than that of the general population, veterans' spending is projected in two steps.

Firstly, veterans' spending per person is modelled as if expenditure per person was equivalent to spending for the general population. For medical benefits, per person spending on veterans is assumed to be at least equivalent to that derived for the general population in the medical benefits model.

For veterans' hospital services, per person Australian Government spending is assumed to be at least equivalent to per person spending on public hospitals by all levels of government for the general population. This requires the use of age-cost profiles for the general population based on public hospital expenditure by all levels of government.

The age profile of hospitals spending shows that spending per person is higher for older age groups than for younger age groups (Table C.6). Spending per person on hospitals peaks for those aged 85 years and over for both males and females.

Secondly, residual veterans' health spending per person (the part of veterans' health expenditure higher than the general population) is projected as a constant proportion of GDP per person.

**Table C.6 Index of the age profile of hospital spending per person by all levels of government, 2012-13**

Age group	Male	Female
0-4	0.84	0.68
5-9	0.21	0.17
10-14	0.20	0.19
15-19	0.34	0.44
20-24	0.38	0.60
25-29	0.37	0.82
30-34	0.43	1.03
35-39	0.50	0.91
40-44	0.58	0.73
45-49	0.71	0.74
50-54	0.91	0.86
55-59	1.19	1.02
60-64	1.64	1.33
65-69	2.21	1.73
70-74	2.85	2.30
75-79	3.71	2.91
80-84	4.51	3.52
85+	5.42	4.15
<b>Weighted average</b>	<b>0.97</b>	<b>1.03</b>

Note: Index of average cost per person = 1.

Source: Department of Health.

## 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 remain consistent over the long term. For this reason, the projection transitions to an aggregate model of health expenditure from 2027-28. It does this by growing the projected real spend per person 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 spending per person from all governments.

The growth rate is derived from the series of all government health spending over the past 29 years, adjusted for CPI growth and changes in the size and age structure of the population. As an exponential trend fits the historical data more closely, the non-demographic growth rate is determined by fitting an exponential trend to the series. The historical series was chosen to be 29 years, rather than 30 years, as this allows the growth rate to be calculated using only data for the period after the introduction of Medicare — the most recent 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 0.7 per cent. This is transitioned up to the all-government growth rate of 2.9 per cent using a logistic curve.

### **Box C.2 Health expenditure and national income**

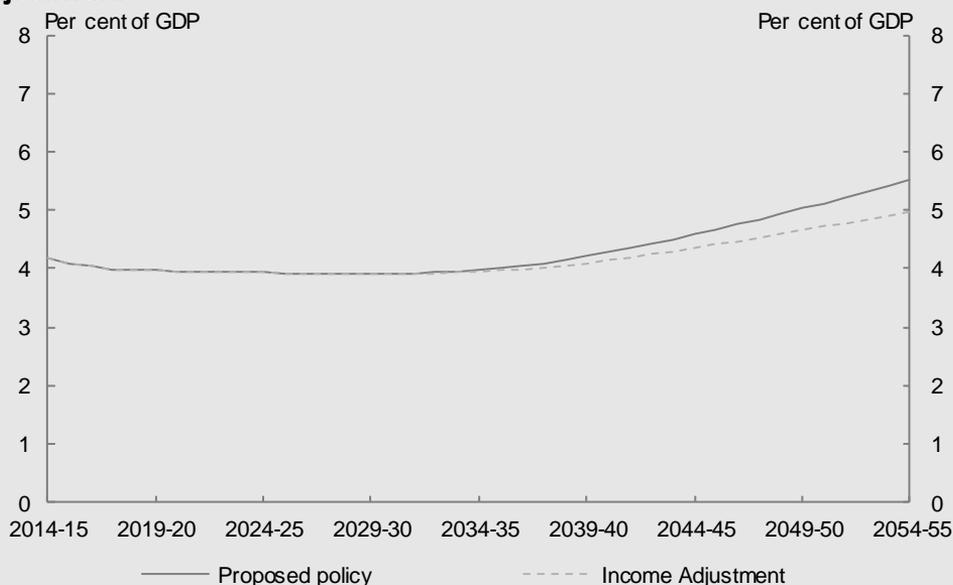
Generally, with higher incomes, individuals demand more, and higher quality, health care services. Over the past 30 years Government expenditure on health services has grown rapidly alongside fast growth in national income. This expansion in Government expenditure on health programs has, in part, been facilitated by changes to government policy over this period.

In the medium to long term, growth in national income is expected to slow, compared with income growth over the past 40 years. For growth in government health spending to decelerate in line with national income, Government would need to make significant changes to the funding of health care programs.

Given that a change in policy action would be necessary to adjust health expenditure growth in line with national income growth, the methodology of this report (as with previous reports) does not take into account the effect of slowing growth in national income on health expenditure. If policy action were taken to manage growth in health expenditure such that it was linked to income growth, long-term projections of health expenditure would be substantially lower than those projected under the 'proposed policy' scenario.

Incorporating an income adjustment with an elasticity of one (based on GNI per person) into the health modelling methodology would cause Australian government health expenditure projections to fall from 5.5 per cent to 5.0 per cent of GDP in 2054-55, as shown in Chart C.8 below.

**Chart C.8 Australian Government health spending — income adjustment**



Source: Treasury projections. Projections assume trend economic growth from 2021-22 to 2054-55.

Methodologically, an income adjustment would split the estimation of the non-demographic growth rate used in the 'proposed policy' scenario methodology into income growth and a residual growth rate. In this sense, the residual growth rate represents the growth above income growth per person (and is equivalent to adjusting for income growth with an elasticity of 1). Health projections would then be calculated by applying projected future income growth and the residual growth rate to age-specific spending rates per person.

GNI per person rather than GDP per person is the preferred measure of income, because GNI excludes foreign owned income, and is therefore more closely correlated with tax collections and public health expenditure.

## **Table C.7 Health spending data sources**

### Pharmaceutical benefits

---

#### **Age-cost profiles**

Five year age-cost profiles by gender from 2002-03 to 2013-14. Data includes all Pharmaceutical Benefits Scheme and Repatriation Pharmaceutical Benefits Scheme spending administered by the Department of Human Services and sourced from the Department of Health. Where expenditure was not attributed it was imputed to have been distributed according to the profile of expenditure which was attributed.

#### **Historical program spending**

Pharmaceutical Benefits Scheme and Repatriation Pharmaceutical Benefits Scheme data from the Department of Health.

---

### Medical benefits

---

#### **Age-cost profiles**

Five year age-cost profiles by gender from 1984-85 to 2013-14. Data includes Medicare Benefits Schedule paid by the Department of Human Services and sourced from the Department of Health. Where expenditure was not attributed it was imputed to have been distributed according to the profile of expenditure which was attributed.

#### **Historical program spending**

Medicare Benefits Schedule data from the Department of Health.

---

### Hospitals

---

#### **Historical program spending**

Australian Government funding for public hospitals from the Australian Institute of Health and Welfare.

---

### Private health insurance

---

#### **Proportion of individuals holding hospital cover**

Calculated using coverage by age data from the Private Health Insurance Advisory Council.

#### **Historical program spending**

Private Health Insurance Rebate spending data from the Department of Health and the Australian Taxation Office.

---

### Other health

---

#### **Age-cost profiles for hospitals spending**

Five year age-cost profiles by gender for 2012-13 provided by the Department of Health. Data includes expenditure on hospitals by all levels of government.

#### **Historical program spending**

Healthcare spending on veterans from Commonwealth budget papers and Department of Veterans' Affairs Annual Reports.

#### **Veterans' population**

Veterans' population historical data and projections supplied by the Department of Veterans' Affairs.

---

## **C.4.2 Aged care**

Aged care expenditure projections are based on projections of Commonwealth funding levels per occupied Commonwealth aged care place and the number of occupied Commonwealth aged care places.

The average (Commonwealth) costs per occupied Commonwealth aged care places are indexed to reflect policies and other relevant factors including growth in cost of service, wages and frailty of recipients. Occupied Commonwealth aged care place numbers for the main aged care programmes are combined with population projections to calculate the projected number of occupied Commonwealth aged care places. The

per-occupied Commonwealth aged care place costs are then combined with place numbers to provide a base projection.

The projections directly allow for factors influencing the participation rate by programmes as well as the cost of administering the programs. The model also includes reductions in costs to government owing to increased private contributions in line with the tightening of means testing announced in April 2012.

### **Drivers of aged care spending**

The growth in aged care spending is driven by both increasing provider costs and growth in the number of people aged 70 and over (the eligible age for most aged care programs). The relative impact of recipient growth falls over the projection period and the growth in costs becomes the dominant factor in aged care spending growth. This is a result of the decreased growth in the number of people aged 70 and over as the smaller cohort following the baby boomers move into aged care eligibility age.

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

The projected higher private incomes and wealth interacts with tighter means tests to constrain future spending on aged care, with projections including the reduction in Australian Government costs in line with higher private contributions.

### **C.4.3 National Disability Insurance Scheme**

The National Disability Insurance Scheme (NDIS) model projects spending on certain NDIS services as well as the National Injury Insurance Scheme (NIIS). Spending on the NDIS is apportioned between the Australian Government and State and Territory governments in accordance with the NDIS Heads of Agreement.

There is limited data available on the NDIS as it is still in the early stages of implementation. The NDIS model is therefore largely based on the findings in the Productivity Commission's 2011 inquiry report into Disability Care and Support (PC Report), with some variations for more recent data.

The cost of the NDIS is calculated as the sum of total Tier 3 costs (access to individualised supports for people with significant care and support needs), Tier 2 costs (information and referral services to people with a disability), the National Disability Insurance Agency (NDIA) costs and non-agency costs. Those who are cared for by the NIIS will not need to call on NDIS services, so the cost of the NIIS is subtracted from the above total to derive the total cost of the NDIS.

The number of participants in the NDIS is expected to increase rapidly until 2019-20 as the scheme progressively expands to cover all eligible individuals. During the transition phase projections for the NDIS are estimated by the Department of Social Services based on expected participant numbers.

## **Participant numbers**

The projections assume no change in age-specific disability rates. As a result, from 2020-21 the number of Tier 3 participants aged under 65 increases in line with the population growth rates for those age cohorts, with around 440,000 participants aged under 65 expected to benefit from the scheme in 2019-20. To calculate the NDIS population over 65, assumptions are made about mortality rates and numbers of people turning 65 each year.

Not all people with disability will be funded by the NDIS. Some of those who suffer a catastrophic accident will be covered by the NIIS (which is premium-funded, rather than government-funded). NIIS participant numbers are based on the figures in the PC Report, and grow more quickly in the early years, reflecting that the NIIS only applies to accidents that occur after the implementation of the scheme. This initial higher growth rate tapers down so that in the longer term the number of participants in the NIIS increases in line with population growth.

## **Package costs**

From 2020-21, Tier 3 package costs are assumed to grow in line with wages (Average Weekly Earnings). This reflects cost growth pressures for attendant care, which the PC estimated to be the largest component of Tier 3 packages. The Department of Social Services' estimate of average package costs in 2019-20 (around \$43,700 for those aged under 65) is used as a starting point for projections. The average NIIS package cost is assumed to grow at the same rate as aggregate Tier 3 average package costs.

Tier 2, NDIA and non-agency costs are assumed to grow at a constant rate.

Total Tier 3 cost is calculated by multiplying the Tier 3 population and the average package costs for the different age cohorts.

## **C.4.4 Income support payments**

### **Comprehensive policy models**

RIMGROUP is a cohort projection model of the Australian population, which starts with population and labour force models. The model tracks accumulation of superannuation, estimates non-superannuation savings and calculates pension payments and the generation of other retirement incomes (after taxes).

The model is consistent with proposed policy and includes announced future policy changes such as increases to the superannuation guarantee rate, changes in indexation of the Age Pension, and the raising of the eligibility age to receive the Age Pension from 65 to 70 progressively commencing in 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 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.

### **Coverage trend models**

Coverage trend models are used where spending is strongly related to participation rates for a payment and the unit cost growth was linked to a price index. These models are 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, Carer Allowance, Family Tax Benefit, Paid Parental Leave, Child Care Benefit and Child Care Rebate.

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

Increases in the Age Pension age announced in the 2009-10 Budget and the 2014-15 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 an Age Pension will receive other benefits. Coverage rates for other payments such as the Disability Support Pension, Carer Payment and Newstart Allowance have been upwardly adjusted to account for increases in the Age Pension age.

**Table C.8 Summary of income support payment projection methodology**

	Coverage rates	Future trends	Unit cost growth outside forward estimates
Disability Support Pension	Based on age and gender	Logistic curves used to taper growth	CPI to 2028-29 and AWE thereafter
Parenting Payment Single	Based on age and gender	Logistic curves used to taper growth	CPI
New start Allowance and Youth Allowance (Other)	Based on age and gender	Based on current take-up ratios	CPI
Parenting Payment Partnered	Based on age	Based on current take-up ratios	CPI
Carer Payment	Based on age and gender	Logistic curves used to taper growth	CPI to 2028-29 and AWE thereafter
Carer Allowance	Based on total population	Linear regression	CPI
Wife Pension	Based on total population	Linear regression	CPI to 2028-29 and AWE thereafter
Youth Allowance (Student)	Based on age and gender	Based on current take-up ratios	CPI
Austudy	Based on age and gender	Based on current take-up ratios	CPI
Family Tax Benefit	Based on age	Based on current take-up ratios	CPI
Child Care Benefit	Based on age	Based on current take-up ratios	CPI
Child Care Rebate	Based on age	Based on current take-up ratios	CPI

### C.4.5 Education

Projections of Australian Government expenditure on education are based on projections of average funding amounts per student and total student numbers.

Following changes introduced in 2014-15 Budget, average Australian Government funding amounts per student for schools and higher education are indexed by inflation (CPI) from 1 January 2018. For vocational education and training, average funding amounts per student are indexed by wages.

Student numbers are calculated by combining current participation rates and population projections by age.

While school-age participation rates are projected to remain relatively stable over the projection period, the trend towards enrolments in non-government schools and away from government schools is an important factor influencing expenditure. This trend has been incorporated into the projections.

University participation rates for both males and females have been increasing steadily since 2009-10. This effect has been included in the projections after an initial slow down following recent changes to university funding arrangements. Only students in Australian Government supported places are included in the projections.

Vocational education and training participation rates for apprentices and students are projected to increase in line with recent trends. Apprentice participation rates for younger cohorts increase at a greater rate than older cohorts whose participation rates remain relatively constant.

Average Australian Government contributions per student were calculated for each component separately, and were then indexed for projected increases in inflation and wages growth, and multiplied by the projected student populations to obtain nominal spending for each sector.

### **Higher Education Loans Program (HELP)**

Projections of the HELP receivable rely on a model of incomes and repayment parameters using data on the income of current and former HELP debtors provided by the Australian Taxation Office. The model simulates future incomes for each individual with an outstanding HELP debt based on the incomes, if any, reported to date and a limited number of demographic variables. The simulated income profiles allow future repayments against the outstanding debt to be estimated.

Under the 'previous policy' scenario, the repayment pattern generated by the model for debt incurred in the most recent financial year is applied to debt that is expected to be incurred in future years. This approach implicitly assumes that any growth in the aggregate debts being incurred, over and above normal indexation in charge rates, is the result of increased numbers of students rather than higher average debts in real terms. For the 'proposed policy' scenario, adjustments are made to allow for policy changes announced as part of the Government's higher education reforms.

There is considerable uncertainty attached to the modelling of future incomes of HELP debtors. The model relies on historical income profiles to project what might happen in the future. Over recent years, there has been a substantial change in the composition of those taking out loans both as a result of the move towards a demand-driven funding system for higher education and the extension of income-contingent loans to vocational training through the VET system. There are indications that the repayment characteristics for new debt may be significantly different from those for the debt incurred in the past. At this stage, the quantum of difference is unknown, so the model does not attempt to adjust for these changes.

### **C.4.6 Government employee superannuation**

Projections of the unfunded defined benefit superannuation liabilities over the next 40 years are based on actuarial valuations using membership data to 30 June 2013 and the demographic and economic assumptions from the 2011 Long Term Cost Reports. The economic assumptions used in those reports differ slightly from those underpinning the intergenerational report. The impact of this inconsistency is not 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.

The projected decline in the liabilities as a percentage of GDP and, from 2040-41, in nominal dollar terms, is primarily a function of the move away from unfunded defined benefit schemes to funded accumulation arrangements.

### **C.4.7 Defence**

This report projects defence expenditure to increase from 1.8 per cent of GDP in 2014-15 to 2 per cent of GDP by 2023-24 and then remain at 2 per cent of GDP from 2023-24 onwards. This approach holds the proportion of defence expenditure spent on non-financial assets constant at 33 per cent as provided in the 2014-15 Budget.

This aligns with the Government's pre-election commitment to increase defence expenditure to 2 per cent of GDP by 2023-24 which was included in the 2014-15 Budget. As a defence expenditure profile for the years beyond 2023-24 will be agreed in the 2015 Defence White Paper and the 2015-16 Budget, defence expenditure is held constant at 2 per cent of GDP from 2023-24 onwards. This enables defence expenditure to reflect changes in national income without representing a significant change in policy.

Projections of defence expenditure do not include funding for future international operations because of the inherent difficulty in anticipating future operational requirements.

### **C.4.8 Other spending**

Other government spending includes GST payments to the States, 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, GST payments are assumed to equal GST receipts, which in turn are modelled as a revenue head to 2020-21 (see Section C.2). Beyond then, GST is assumed to remain constant as a share of consumption, which equates to 3.4 per cent of GDP on average over the projection period.

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

Purchases of non-defence, non-financial assets account for a relatively small proportion of other spending (around 0.2 per cent of GDP in 2014-15). They include purchases of fixed assets such as property, plant and equipment from outside the government sector, and prepayments. This spending falls to 0.1 per cent of GDP in 2017-18, and is held fixed from that year 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.

#### **Future Fund modelling**

The Future Fund was established by the Australian Government in 2006 to provide for Commonwealth unfunded superannuation liabilities. For modelling purposes, drawdowns from the Fund are assumed to commence in 2020-21 and be equal to the Commonwealth's annual unfunded superannuation payments, consistent with the intent of the Fund's establishment.

The Future Fund is modelled over two separate periods, 2014-15 to 2019-20, the period prior to the commencement of annual drawdowns; and 2020-21 to 2054-55 following the commencement of drawdowns. Modelling assumes that the holdings of the Fund are allocated between two financial asset classes: investment (cash and other liquid assets such as interest-bearing liabilities) and equity holdings, with the asset portfolio weighted towards investment products. This is consistent with the current asset allocation of the Fund.

In the period 2014-15 to 2019-20, the assumed target rate of return is consistent with the Future Fund Investment Mandate Directions 2006 and the Fund's investment strategy. The investment mandate states that the benchmark annual average return is to be equal to at least the Consumer Price Index + 4.5 to + 5.5 per cent per annum over the long term.

Once drawdowns commence in 2020-21, it is assumed for modelling purposes that the Future Fund's asset allocation shifts further towards a more conservative and liquid portfolio of investment products with a lower assumed target rate of return. This reflects the requirement for greater liquidity following the commencement of annual drawdowns.

Between 2014-15 and 2019-20, annual net earnings (interest and dividends less operating expenses) of the Future Fund are excluded from the Australian Government underlying cash balance. This is consistent with the treatment in Commonwealth budget updates since the Fund was established in 2006. Once drawdowns commence in 2020-21, net earnings are included in the underlying cash balance, reflecting that the Fund's earnings are available to finance government liabilities from that date.

## **C.5 Fiscal scenario modelling**

This report includes fiscal projections under three scenarios:

### **Previous policy**

This scenario projects spending, revenue and fiscal aggregates based on the policy environment that existed immediately prior to the 2014-15 Budget. That is, a scenario that projects the fiscal position assuming that the measures contained in the 2014-15 Budget are never implemented.

The projections in this alternative scenario are based off the 2014-15 MYEFO projections (as with the 'proposed policy' scenario), with the impacts of the measures introduced in the 2014-15 Budget reversed. The underlying economic and demographic assumptions are those of the 'proposed policy' scenario, with economic projections adjusted by removing from the participation rate the impact of the increase in the Age Pension eligibility age.

This allows for variations in underlying parameters between the 2014-15 Budget and MYEFO to be included (for example, updates to nominal GDP growth forecasts) and therefore isolates the impacts of policy change. In turn, this allows for the direct comparison of projections made in this scenario with those of the 'proposed policy' and 'currently legislated' scenarios.

## **Currently legislated**

This scenario reflects the number of 2014-15 Budget measures that are still pending legislation or implementation, including elements of the Government's reforms to health, income support and education. This scenario uses the same methodology as the 'previous policy' scenario to project spending, revenue and fiscal aggregates, but adjusts projections to account for those pending measures. This scenario therefore shows what would happen if pending measures, or measures of equivalent value, are never implemented.

## **Proposed policy**

This scenario presents spending, revenue and fiscal aggregates on the basis of announced policy (as taken to the 2014-15 MYEFO), and assumes all outstanding measures, or measures of equivalent value, are implemented. This scenario follows the usual practice of projecting fiscal aggregates based on the full implementation of the policies of the Government of the day, and the *Charter of Budget Honesty Act 1998* requirement that the Intergenerational Report model current government policy.

## Appendix D: Age specific participation rates

The age-specific participation rates for both men and women are projected to increase or stabilise in all age groups to 2054-55 (Chart D.1).

While total labour force participation is projected to decline as the population ages, based on recent trends, some age groups are expected to experience rising labour force participation rates.

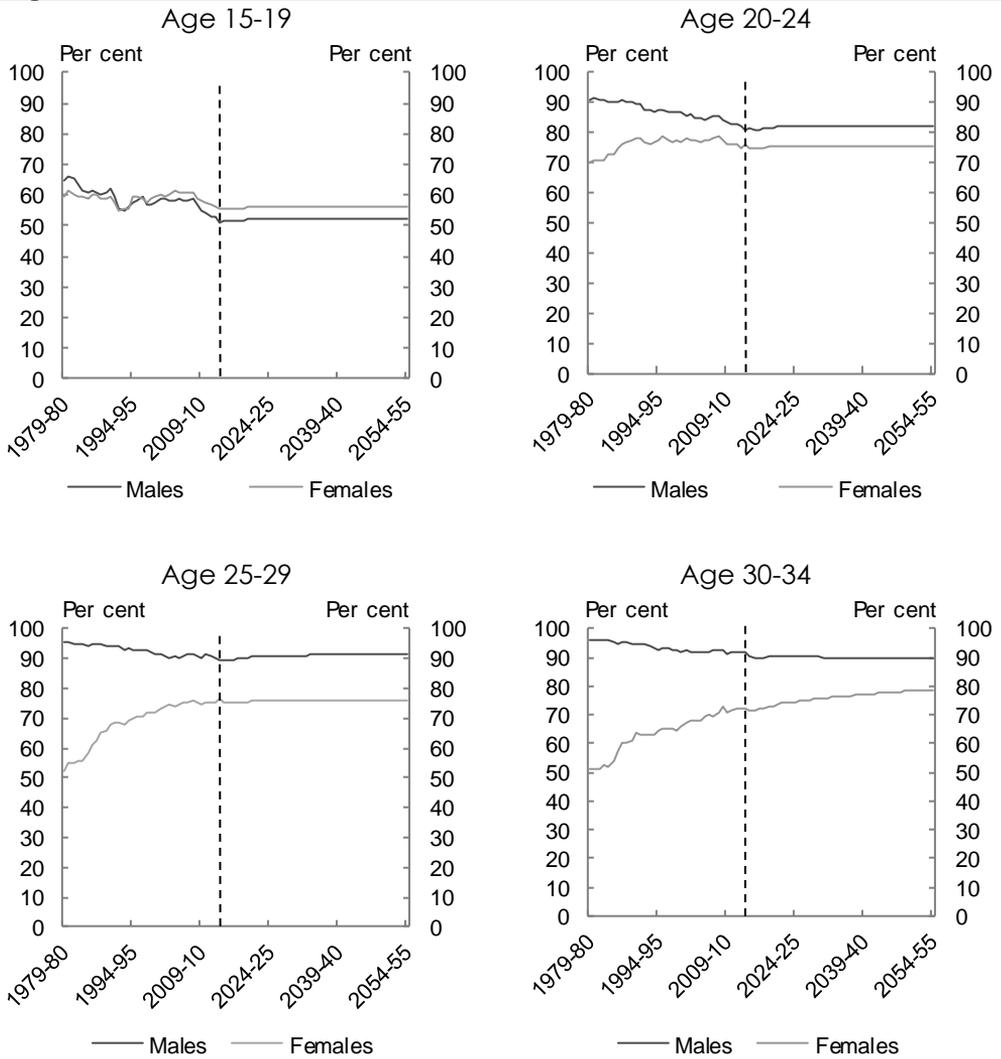
Labour force participation rates for females in most age groups have increased significantly over the past 20 years, and are expected to continue increasing over the projection period. This is attributed to the increased levels of educational attainment among women and continued better access to childcare services and more flexible work arrangements.

For all age groups (other than those aged 15-19 years) the total participation rate for men is higher than for women. In 2013-14, around 71 per cent of men, compared to 58.6 per cent of women, participated in the labour force. This trend is projected to continue, with 68.1 per cent of men and 56.8 per cent of women in the labour force in 2054-55.

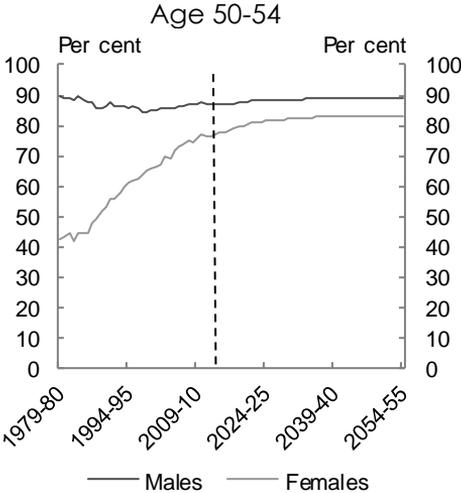
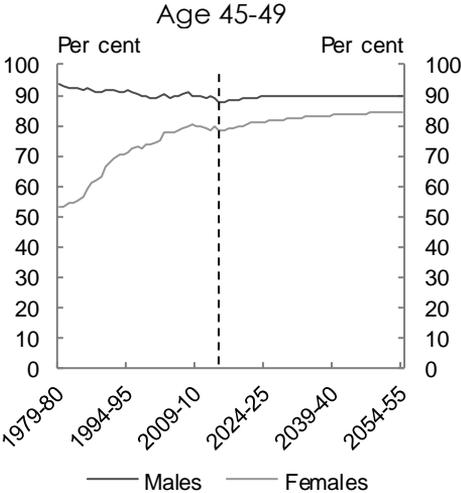
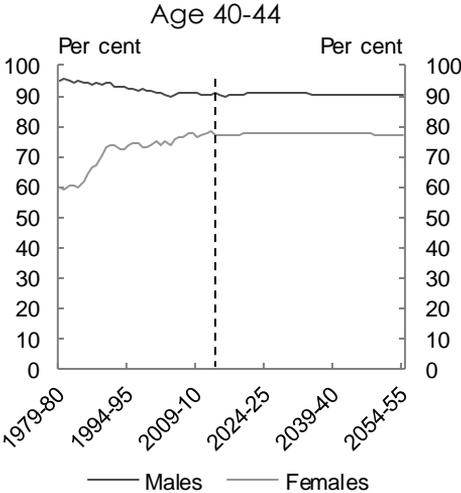
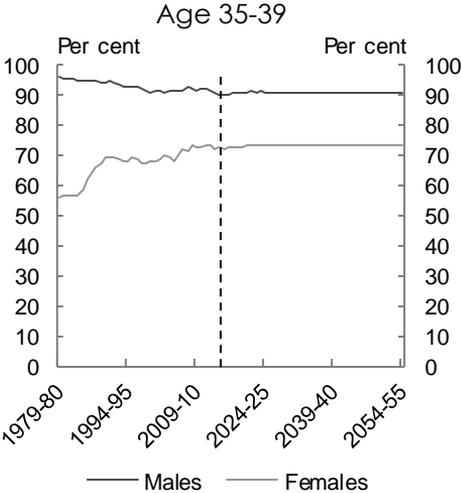
Participation rates of older age groups (aged 55+) have risen in recent years, a trend that is expected to continue as life expectancy increases and the availability of less physically demanding work rises.

Participation rates for men and women are projected to increase significantly for those aged 60-69 years. This is partly associated with the gradual increase in the Age Pension eligibility age from 65 to 70 years between 2017 and 2035.

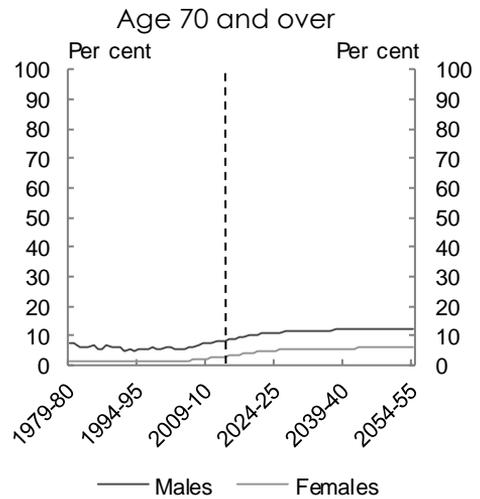
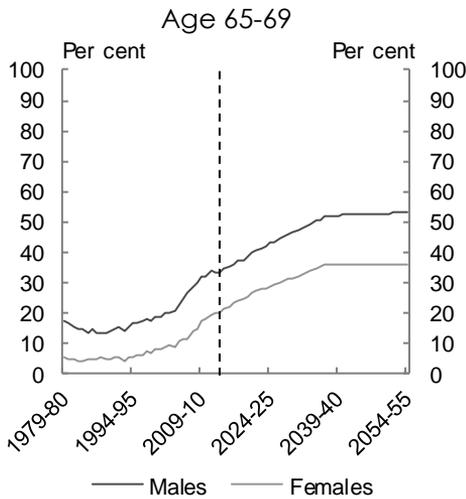
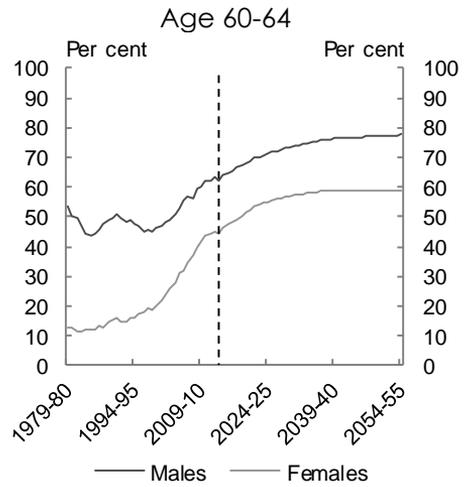
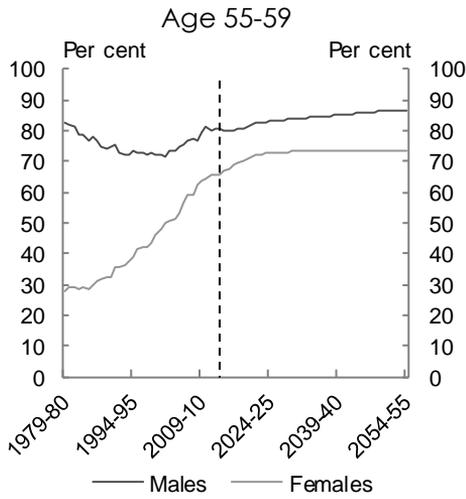
**Chart D.1 Participation rates — history and projections by age group and gender**



Note: Dashed line is placed over 2013-14 to distinguish history from projections.  
 Source: ABS cat. no. 6291.0.55.001 and Treasury projections.



Note: Dashed line is placed over 2013-14 to distinguish history from projections.  
 Source: ABS cat. no. 6291.0.55.001 and Treasury projections



Note: Dashed line is placed over 2013-14 to distinguish history from projections.  
 Source: ABS cat. no. 6291.0.55.001 and Treasury projections.