Australian Government

Productivity Commission

Tax and Transfer Incidence in Australia

Productivity Commission
Commission Working Paper

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Acknowledgments

Abbreviations

ABS	Australian Bureau of Statistics
ATO	Australian Taxation Office
CPI	Consumer Price Index
CURF	Confidentialised Unit Record File
DSS	Department of Social Services
DVA	Department of Veterans' Affairs
EATR	Effective average tax rate
EMTR	Effective marginal tax rate
GST	Goods and services tax
HES	ABS Household Expenditure Survey
OECD	Organisation for Economic Cooperation and Development
PC	Productivity Commission
PTR	Participation tax rate
SIH	ABS Survey of Income and Housing
SSC	Social security contribution
VAT	Value added tax
VRR	VAT revenue ratio

Glossary

CAPITA	Microsimulation model of Australia's income tax and transfer system, provided by the Australian Treasury. The model was augmented and used by the Commission in its analysis.
Churn	When families simultaneously pay income taxes and receive transfers.
Concentration coefficient	Measures the degree to which taxes or transfers are distributed between people on different incomes.
Effective average tax rate	The total amount of tax paid less the total amount of transfers received divided by private income.
Effective marginal tax rate	Additional tax paid less the amount of transfer payments forgone for each extra unit of private income.
Final income	Private income adjusted for transfer payments, taxes on personal income, taxes on goods and services and in-kind services (such as health and education).
Gini coefficient	Measures how much the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution.
Income taxes	Taxes on income levied by the Australian Government, including personal income tax, company income tax, superannuation fund taxes and fringe benefits tax.
Indirect taxes	Indirect taxes levied by the Australian Government, including the GST, excises (for example, on fuel, beer and tobacco), customs duties, wine equalisation tax and the luxury car tax.
Marginal tax rate	The additional tax paid on an extra unit of taxable income.
OECD-10	Australia, Canada, Ireland, Japan, the Netherlands, New Zealand, Spain, Switzerland, the United Kingdom and the United States.

Private income	Income before any taxes, transfers or in-kind services are taken into account. This includes all income from wages, salaries and unincorporated businesses, income from superannuation, private pensions and annuities, investment income including dividends and other non-government income.
Progressivity	Under a progressive tax, the percentage of income paid as tax increases as income rises. In the case of personal income taxes, people with lower income pay a lower percentage of that income in tax than do those with higher income.
Participation tax rate	Additional tax paid less the amount of transfer payments forgone for an extra unit of income, where the unit of income is equivalent to the amount that someone would receive if they entered paid work.

1   What is this paper about?

1.1   The purpose of this paper

The purpose of this paper is to shed light on how Australia's tax and transfer system functions to distribute income across the population and over lifetimes. This work is not intended as an evaluation of current policies. Rather, it presents a descriptive analysis of tax and transfer incidence to inform public debate about the distributive impacts of the tax and transfer system in the lead up to the development of the Australian Government's Tax Options and White Papers.

Specifically, the Commission has endeavoured to:

- provide a descriptive analysis of the flow of major taxes (personal income tax and GST) and transfers between families under existing policy settings in a single year

- examine the direct impact of the tax and transfer system on returns to paid work

- examine how families contribute to taxes and benefit from transfer payments over the course of their lives assuming that policy settings, wealth, income and demographic factors such as family structures are held constant into the future.

The analysis is underpinned by a model of the Australian tax and transfer system. The model is based on a development version of the CAPITA microsimulation model developed by the Australian Treasury, which the Commission has augmented (appendix B). It uses data from the ABS Survey of Income and Housing and the ABS Household Expenditure Survey to derive the taxes paid and transfers received by representative families (including couples and singles, with and without children). These results are complemented by analysis of data from other sources.

1.2   Why analyse taxes and transfers together?

The tax system and the transfer system are administered independently by separate agencies and differ in many important ways (chapter 2). Nonetheless, it is common to analyse these systems together — and refer to the whole as the 'tax and transfer system' — because taxes and transfers are interrelated and interacting. Taxes and transfers function together to redistribute income, and in doing so, they alter incentives to work, save and invest in ways that can be reinforcing or offsetting.

Consider, for example, a two-parent family with school-age children and only one parent in the paid workforce. If the second parent were to enter the paid workforce, not only

would they be liable to pay additional personal income tax, but the family may not be eligible for the same level of family payments. In part, the financial incentive for the second parent to enter the workforce would depend on the combined effects of the tax system and the transfer system.

This paper examines the contribution of the tax and transfer system to the distribution of post-tax income, and assesses circumstances where this system may not be operating as effectively or efficiently as it could be — for example, where interactions between taxes and transfers discourage workforce participation.

In analysing the tax and transfer system as a whole, it is also important to keep in mind that taxes and transfers can have separate and sometimes competing objectives. While the redistribution of income is a key role shared by the tax system and the transfer system, the primary role of the tax system is to raise revenue to fund public expenditure, of which transfer expenditure is just a subset.

1.3   Why take a life cycle perspective?

As people progress through life, their income, wealth and personal circumstances change. This has implications for the amount of tax they pay and the transfers they receive. Often, people are net recipients from the tax and transfer system at some stages of their lives and net contributors to the tax and transfer system at other stages. In other words, for any given individual, tax and transfer flows vary across the life cycle.

In this paper, the incidence of the tax and transfer system is examined from a single-year perspective and a lifetime perspective. Analysing incidence from a lifetime perspective is a novel way of examining the tax and transfer system that has rarely been applied in Australia. It offers insights into the functioning of the tax and transfer system that a single-year perspective could not provide by itself.

For example, from a single-year perspective, the Australian tax and transfer system appears to redistribute income from people (or families) with high annual incomes to people (or families) with low annual incomes. However, from a lifetime perspective, income redistribution can be shown to take two forms: intrapersonal and interpersonal. Intrapersonal redistribution or 'piggy banking' occurs when the taxes a person pays in one time period are effectively reimbursed to them through transfer payments in another period. To the extent that the tax and transfer system results in intrapersonal distribution it serves to smooth a person's consumption over time.[1] Interpersonal redistribution or 'robin hood redistribution' refers to the proportion of a person's taxes that are distributed to other people (through transfer payments or lower taxes) over the life cycle (Barr 2004; Whiteford 2006). The balance between interpersonal and intrapersonal redistribution depends on how the tax and transfer system responds to changes in personal circumstances over the life cycle.

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[1]   Outside of the tax and transfer system, government expenditure on services such as education, healthcare and aged care can also serve to smooth consumption over time.

Understanding how the tax and transfer system functions to distribute income across lifetimes can help to inform future analysis and policy design. While not the focus of this paper, a lifetime perspective could also be useful for gaining an understanding of the effect of the tax and transfer system on intergenerational equity. This is likely to become an important area of analysis as the population ages.

1.4 Research questions considered in this paper

The primary question considered is:

- how does the tax and transfer system distribute income across the population and over the life cycle?

In answering this question, a number of research questions are addressed.

- What are the relative sizes of different taxes and transfers? (chapter 2)
- How do tax and transfer flows vary across different groups with different levels of income and wealth? (chapter 4)
- To what extent do people contribute to taxes and benefit from transfers at different ages and in different family types? (chapter 4)
- What proportion of people pay taxes and receive transfers at the same time (described as 'churn') and which policies contribute most to this? (chapter 4)
- How do effective marginal tax rates vary across different cohorts? (chapter 5)
- How do different groups contribute to taxes and benefit from transfers over the course of a lifetime? (chapter 6)
- How could population ageing and income growth affect tax and transfer flows in the future? (chapter 6)

1.5 Structure of the paper

Chapter 2 provides an overview of the tax and transfer system in Australia, and develops a conceptual framework for examining income redistribution via the tax and transfer system.

Chapter 3 looks at the existing state of evidence on the incidence of taxes and transfers on both annual and life cycle bases. This includes a review of existing literature on: tax 'churn'; effective average and effective marginal tax rates; and the annual and life cycle distribution of taxes and transfers from Australia and overseas.

Chapter 4 analyses the results of the Commission's estimates of taxes paid and transfers received by different groups in a single year. It examines how tax and transfer flows vary with income, wealth and age and how different policies contribute to these flows.

Chapter 5 examines the effective marginal tax rates and participation tax rates faced by different groups.

Chapter 6 uses simple, illustrative approaches to investigate how the current tax and transfer system redistributes income over lifetimes and to explore how income growth and population ageing could affect tax and transfer flows in the future.

The taxes and transfers included in the modelling results presented in chapters 4, 5 and 6 are outlined in table 1.1.

Table 1.1	**Taxes and transfers included in modelling**			
	Chapter 4	*Chapter 5*	*Chapter 6*	
	Single-year incidence	*Effective marginal tax rates*	*Lifetime incidence*	*Tax and transfer projections*
Personal income tax	✓	✓	✓	✓
GST	✓	✗	✗	✗
Childcare payments[a]	✓	✗	✗	✗
Other transfer payments[b]	✓	✓	✓	✓

a Child Care Rebate and Child Care Benefit. **b** See appendix A for a complete list of the transfers included in modelling.

2   Framework for analysis

This chapter sets out a framework to analyse the role of taxes and transfers in altering the distribution of income and changing behaviour. It begins with an overview of Australia's tax and transfer system (sections 2.1 and 2.2). These sections, and the paper as a whole, consider a subset of the taxes and transfers administered by the Australian Government. The Australian Government accounts for about 80 per cent of all tax revenue and about 99 per cent of transfer expenditure[2] across Australia's three levels of government (ABS 2015a).

It then examines two important aspects of the tax and transfer system which are the focus of this paper: tax and transfer incidence (section 2.3) and the effects of taxes and transfers on incentives to undertake paid work (section 2.4). Finally, section 2.5 builds a case for examining tax and transfer incidence from a life cycle perspective — and how the system contributes to consumption smoothing over a lifetime.

This paper focuses on the incidence of the tax and transfer system across society. However, the redistribution of income is not the only concern of the tax and transfer system. Taxes, for example, are used to raise revenue to fund government services or to influence certain behaviours (like smoking). Further, all taxes and transfers have efficiency costs and administrative costs. A more holistic consideration of the tax and transfer system would encompass the objectives of equity, efficiency and simplicity. This is beyond the scope of this paper.

2.1   Taxation in Australia

The Australian tax system is composed of a large number of taxes of varying importance to government revenue. Definitional issues make it difficult to count the number of taxes precisely, but one recent estimate is that Australians pay 'at least 125 different taxes', 99 of which are levied by the Australian Government (Treasury 2008, p. 10).

Taxes can be grouped and classified in numerous ways. One key distinction is between income taxes and indirect taxes. Income taxes levied by the Australian Government include personal income tax, company income tax, superannuation fund taxes and fringe benefits tax. Indirect taxes levied by the Australian Government include the GST; excise on alcohol, tobacco and fuel; customs duties; wine equalisation tax; and the luxury car tax.

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2   This estimate includes some in-kind transfers such as public transport concessions. Elsewhere in this paper, the term 'transfers' refers exclusively to personal cash transfers.

All taxes, regardless of whether they are levied on enterprises or individuals, are ultimately paid out of individual earnings from labour, capital or land (see discussion of economic incidence below). However, due to data limitations, the focus of this paper is on two major taxes — personal income tax and the GST.

In 2013-14, the Australian Government raised $352 billion in taxation revenue, equivalent to 23 per cent of Australia's GDP (ABS 2015a). Eight out of every ten dollars in tax revenue raised came from just three taxes: personal income tax, company income tax and the GST. Personal income tax is by far the largest tax, accounting for almost half of all Australian Government tax revenue (figure 2.1).

Figure 2.1   **Revenue from Australian Government taxes**
2013-14
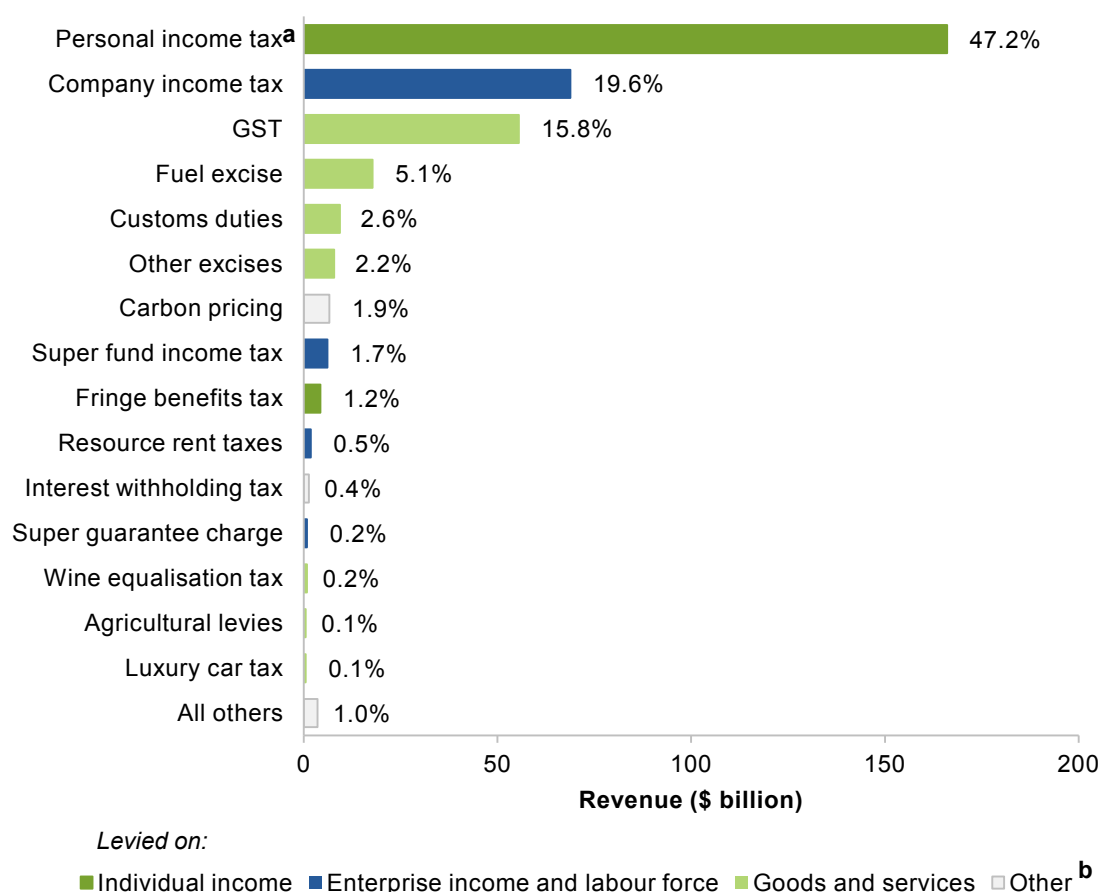
a Includes the Medicare levy and Medicare levy surcharge. **b** Includes taxes levied on property, non-resident income, the use of goods and the performance of activities.

Sources: ABS (*Taxation Revenue, Australia, 2013-14*, Cat. no. 5506.0); Treasury (2015a).

The largest share of tax revenue comes from individuals. In 2013-14, Australian Government revenue from income taxes levied on individual residents totalled $170 billion

— 48 per cent of total Australian Government tax revenue. A further $102 billion was received from taxes on goods and services, including $56 billion from the GST; $26 billion from excises on products such as petroleum, alcohol and tobacco; and $21 billion from a number of smaller taxes such as customs duties, carbon pricing, agricultural production levies and the luxury car tax (ABS 2015b).

A detailed breakdown of Australian Government taxes and offsets is provided in appendix A.

2.2 Transfer payments in Australia

Transfer payments are defined in this paper as cash payments provided by governments to individuals and families. All cash payments are administered by the Australian Government and financed from general government revenue (ABS 2015a; DSS 2014b). Most are only available to Australian residents,[3] with eligibility determined by income and assets tests. Most payments have tapered withdrawal rates — rates of payments decline with each additional dollar of income earned above a specified level. This system makes the Australian system unusual by international standards (chapter 3).

The basis for assessing income for transfer eligibility is different from that used to assess tax liability. Transfer payments tend to be assessed on the basis of fortnightly family income, whereas taxes are mostly assessed on the basis of yearly individual income (Treasury 2008).

In the Australian system, cash transfers come in four basic forms:

- pensions
- allowances
- supplementary payments
- family payments.

Pensions and allowances are the two main forms of income support payments and are aimed at providing recipients with a minimum adequate standard of living.[4] Pensions are indexed more generously, paid at higher rates, and have more generous income and assets tests than allowances. This is because pensions are designed as longer term payments than allowances (Treasury 2008). The lower rate of payment for allowances is also intended to provide a stronger incentive to pursue paid employment.

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[3] An Australian resident is a person who is living in Australia and is either an Australian citizen, a permanent visa holder, or holds a protected Special Category Visa. The latter covers New Zealand citizens who were in Australia on 26 February 2001 and were in Australia for 12 months in the two years immediately before this date (DHS 2015).

[4] What constitutes a 'minimum adequate standard of living' is not defined in any government document.

Supplementary payments are provided in addition to basic pensions and allowances depending on the circumstances of the recipient. Supplementary payments are provided to help cover expenses such as rent, pharmaceuticals, utilities, and education and training.

Family payments are provided to assist with the costs of raising children. Families may be eligible for these payments even if they are not eligible for pensions or allowances.

Transfers can also be categorised according to payment group (figure 2.2). The major payment groups include: retirees, students, carers, people with a disability, people who are unemployed and families. In absolute dollar terms, the major payment groups are retirees and families.

Figure 2.2   **Major transfer payments[a]**
By form of payment and payment group

	Retirees	People with disabilities	Carers	Students	People who are unemployed	Payments for families
Pensions	Age Pension Veterans' service pensions Defence widow/ers pensions	Disability Support Pension Veteran's disability pensions	Carer Payment			Child Care Benefit Child Care Rebate Family Tax Benefit Part A Family Tax Benefit Part B Parental Leave Pay Parenting Payment Schoolkids Bonus
	Wife Pension					
Allowances	Widow Allowance		Carer Allowance	ABSTUDY Austudy	Newstart Allowance	
				Youth Allowance		
Supplementary payments	Seniors Supplement		Carer Supplement Child Disability Assistance Payment	Income Support Bonus		
	Pension Supplement					
	Mobility Allowance Rent Assistance[b]					

a Includes all current payments with expenditure exceeding $100 million in 2013-14. **b** Rent Assistance is also available to Family Tax Benefit recipients who receive more than the base rate of payment.

In 2013-14, transfer expenditure by the Australian Government totalled $125 billion, equivalent to 8 per cent of Australia's GDP (ABS 2015a). As a proportion of tax revenue, transfer expenditure has grown over time (figure 2.3).

Figure 2.3   **Transfer expenditure as a proportion of tax revenue**
Australian Government, 1973-74 to 2013-14

Annual GDP growth below trend (3 per cent)   -------- Linear trend
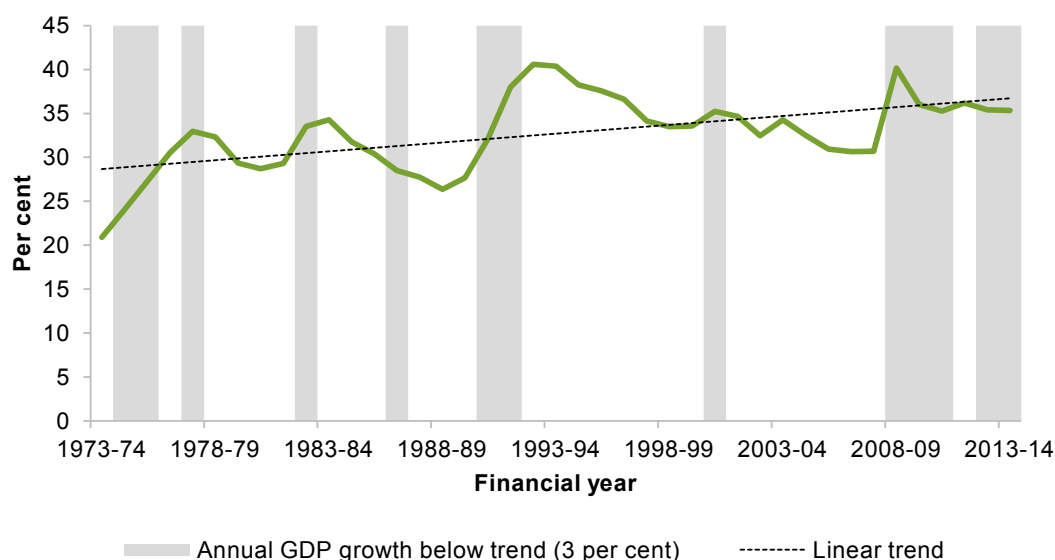
Source: ABS (*Australian National Accounts: National Income, Expenditure and Product, Dec 2014*, Cat. no. 5206.0).

In 2013-14, transfer expenditure was equivalent to 35 per cent of total tax revenue, though it can be quite volatile over the short run. For example, in recent years this figure has dipped as low as 31 per cent (2007-08) and climbed as high as 40 per cent (2008-09). Transfer payments tend to grow as a proportion of tax revenue when the economy is weak and shrink when the economy is strong. This effect is a combination of reduced tax revenue, and increased expenditure on transfer payments related to unemployment and lower income growth.[5]

The five largest payments — the Age Pension, the Disability Support Pension, Family Tax Benefit Parts A and B, and the Newstart Allowance — accounted for two thirds of all transfer expenditure in 2013-14 (figure 2.4). The modelling results discussed later in this paper include these five payments and a further 35 payments.[6] This includes 19 of the 20 largest transfer payments by total expenditure.

A detailed breakdown of Australian Government transfers is provided in appendix A.

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[5] This acts to 'automatically stabilise' the business cycle and is sometimes referred to as nondiscretionary fiscal policy.

[6] A total of 40 transfer payments are included in single-year incidence modelling. For the modelling of effective marginal tax rates, lifetime incidence, and tax and transfer projections, only 38 payments are included because childcare payments (Child Care Benefit and Child Care Rebate) are excluded.

Figure 2.4   **Expenditure on Australian Government transfer payments**
2013-14
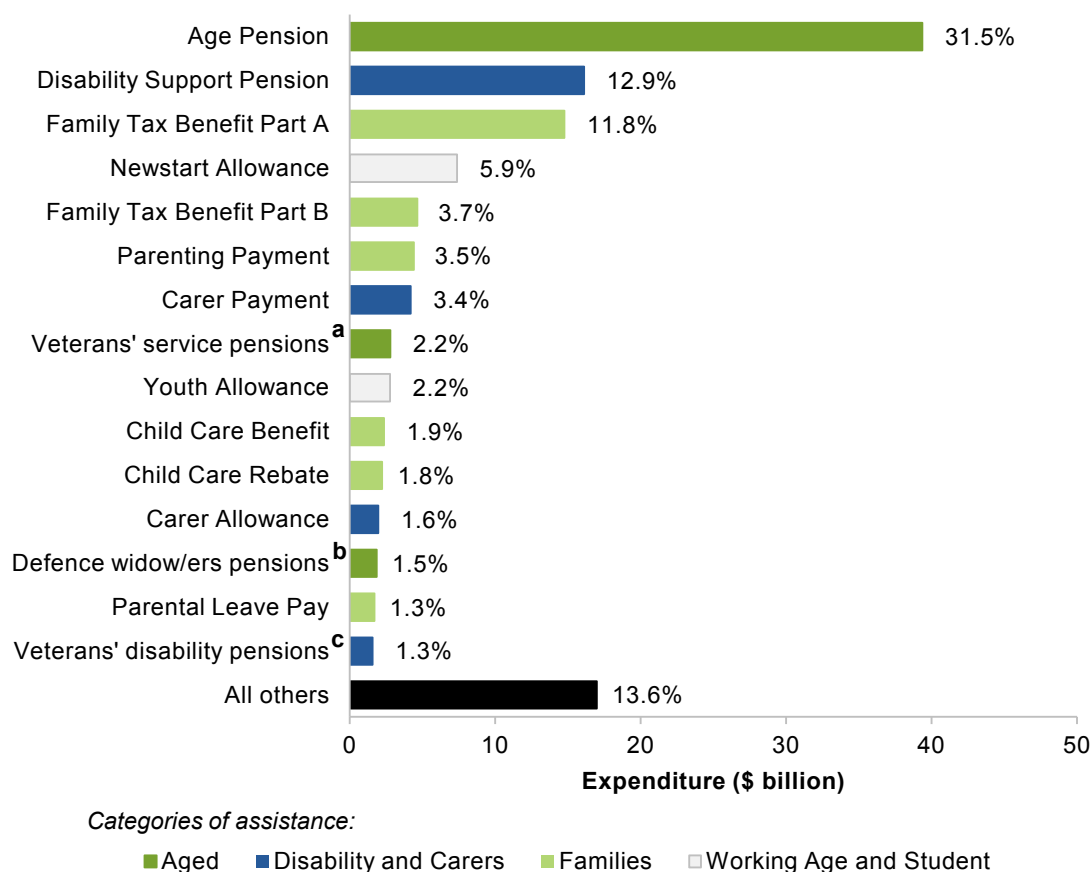
a Includes Service Pension (Age), Invalidity Service Pension, Partner Service Pension and the Income Support Supplement for war widow/ers. **b** Includes war widow/ers and Defence pensions, allowances and special purpose assistance to the dependants of veterans under the *Veterans' Entitlements Act 1986* (Cwlth) and related legislation including the payment of war widow/ers claims for compensation. **c** Includes all disability pensions under the Veterans' Entitlements Act.

Sources: Department of Education (2014); DSS (2014a); DVA (2014).

2.3   How do taxes and transfers redistribute income?

The redistribution of income is a primary role of the Australian tax and transfer system (Treasury 2008). Who benefits from this redistribution depends on the incidence of taxes and transfers. Incidence can be defined in two ways: statutory and economic. The statutory incidence of a tax refers to who is legally required to pay the tax (or in the case of transfers, who is legally identified as the recipient). The economic incidence of a tax refers to who ultimately bears the burden (or who ultimately receives the benefit in the case of transfers). Statutory incidence is an 'accounting' view of incidence. By contrast, economic

incidence accounts for the behavioural response of consumers and producers to the presence of a tax or transfer (box 2.1).

In analysing the distribution of taxes and transfers on individuals, this paper follows the approach of the ABS (2013a). Personal income tax, GST and personal transfers are treated as incident on families (that is, as if they were paid directly by or to families). With the exception of the GST and some transfers related to childcare, this is equivalent to statutory incidence.

Box 2.1 Economic incidence

The simplest way to assess economic incidence is to look at the impact of a tax on a single market in isolation. The figure below shows the supply and demand for a good in a market with a specific tax (such as fuel excise) where the statutory incidence falls on the consumer. As the tax increases the purchaser's price, consumers reduce their demand — the demand curve shifts downwards, reducing the quantity demanded at a given price. Because the supply curve is upwards sloping, the equilibrium price falls. So the tax introduces a wedge between the (tax-inclusive) price paid by consumers and the price received by producers. As a result, the tax burden is shared between consumers and producers. How the burden is shared depends on how responsive consumers and producers are to price changes.
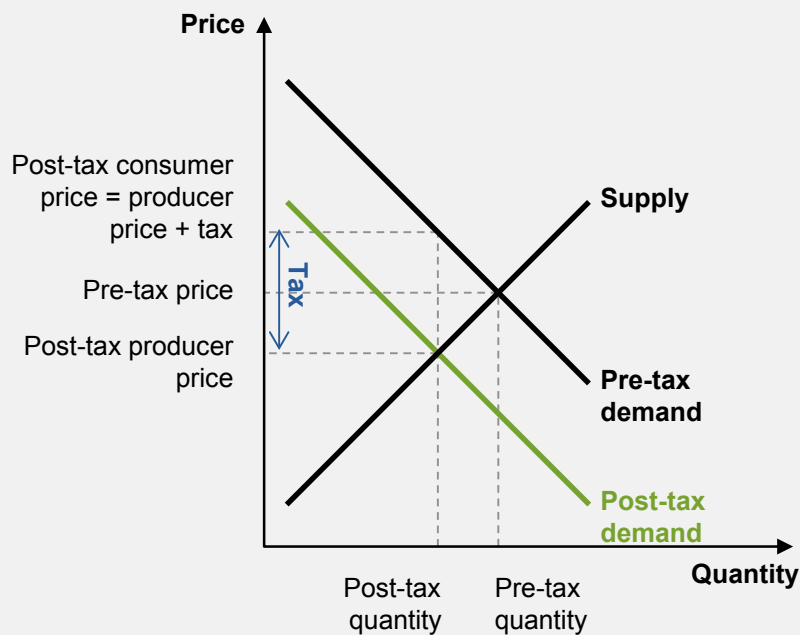
In reality, measuring economic incidence can be much more complicated (Musgrave and Musgrave 1989). Economies are interdependent systems in which all prices are related to each other. The larger the tax, the more likely it will have meaningful 'second-round effects' in related markets. In response to the tax, consumers may demand more substitute goods and less complementary goods, and producers may demand less labour or other inputs. As a consequence, part of the burden of a tax (or the benefit of a transfer) may be shifted onto consumers and producers in other markets. When markets are regulated or less competitive, or when the responsiveness of consumers and producers to a change in price varies with time, measuring economic incidence becomes more complicated.

The role of the tax and transfer system in changing family incomes can be illustrated by breaking down income into its components (figure 2.5). Transfers add to income while income taxes and indirect taxes subtract from income. The net effect of the tax and transfer system on family income is the difference between 'private' income and 'post-tax' income.

Some studies take a wider view of income (chapter 3) — for example, by taking account of 'in-kind' transfers through the government provision of social services. Redistribution could also occur through other, less direct, means — for example through market regulations such as a mandated minimum wage. Redistribution via social services and market regulation is beyond the scope of this paper.

Figure 2.5   **Income concepts and components**
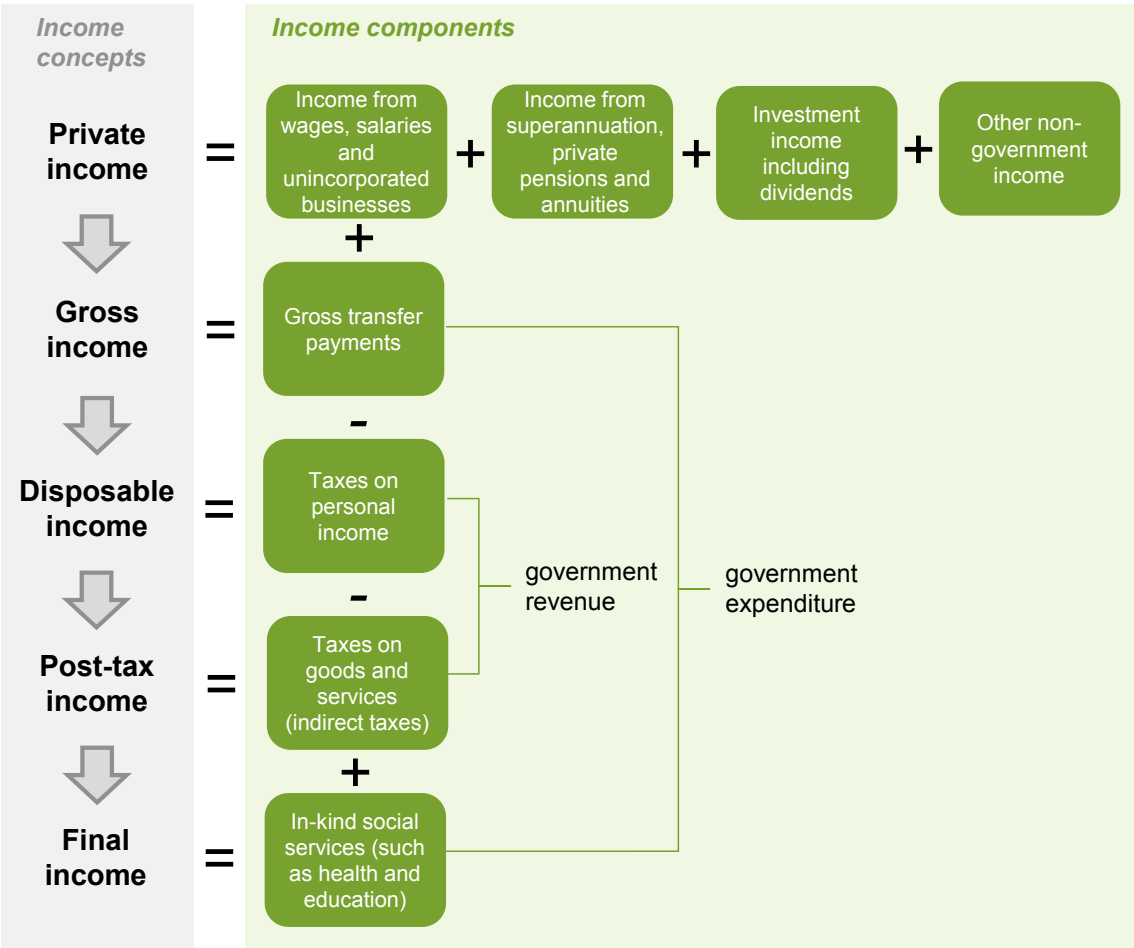
Source: Based on ABS (*Household Income and Income Distribution, Australia, 2011-12*, Cat. no. 6523.0).

Under the Australian system, how much a family pays in taxes and receives in transfers in any period depends on a number of factors.

- Private income — with a progressive income tax system and income-tested transfer payments, families with higher private incomes tend to face higher average tax rates and receive less in transfer payments.

- Wealth — many transfers are subject to assets tests so families with more wealth tend to receive less in transfers.

- The composition of private income — income from some sources (such as capital gains on shares, superannuation and the family home) is generally taxed at a lower rate than income from labour.

- The split of private income between earners — a single-income family will pay more tax than a double-income family with the same private income as personal income tax rates are progressive and assessed on an individual basis rather than a family basis.

- The proportion of income devoted to consumption — the higher the proportion of income devoted to consumption, the higher the proportion of income that tends to be paid in indirect taxes.

- The composition of consumption — some goods and services are exempt from the GST while others are subject to additional excises and taxes.

- Personal and family circumstances — transfer payments are designed to cater for a range of different circumstances when a person may require income support or other assistance. Eligibility for some tax offsets also depends on personal and family circumstances.

Catering for all these factors may help to satisfy some interpretations of vertical and horizontal equity (box 2.2), but it will increase the likelihood that some or many families pay taxes and receive transfers simultaneously. There is some debate about the extent to which this 'churn' is a problem (Humphreys 2009; Saunders 2007; Whiteford 2006). Simultaneously paying taxes and receiving transfers can be administratively costly for governments, and can increase compliance costs for families dealing with multiple agencies. However, this apparent inefficiency may be unavoidable in a tax and transfer system designed to meet multiple, sometimes competing objectives.

2.4 How do taxes and transfers change incentives?

Taxes and transfers can affect a variety of incentives, most prominently, incentives to undertake paid work and incentives to save and invest. This is because taxes and transfers affect the post-tax returns to these activities. In the case of paid work, the tax and transfer system influences whether to enter the workforce, whether to work part-time or full-time, how many hours to work, and whether to obtain more highly paid jobs. In the case of saving and investment, the tax and transfer system influences whether to save and invest,

when to save and invest, how much to save and invest, how long to save and invest for, and what asset classes to invest in.

Incentives to save and invest are particularly affected by policies related to retirement income such as Age Pension eligibility and taxation arrangements for superannuation.[7] While the incentives on saving and investment are likely to be important — particularly from a life cycle perspective (box 2.3) — they are more difficult to measure than incentives to undertake paid work. The focus of this paper is on paid work.

Box 2.2   **Equity in the tax and transfer system**

Equity is a key consideration in the design of any tax and transfer system. Two commonly cited principles of equity are 'horizontal equity' and 'vertical equity'.

- The principle of horizontal equity asserts that people in the *same* circumstances should be treated *equally* by the tax and transfer system.

- The principle of vertical equity asserts that people in *different* circumstances should be treated *differently*.

These principles can be difficult to apply in practice because they rely on agreement about which circumstances matter. Should older people be treated differently from younger people? Should couples be treated differently to singles? Should people living in cities be treated differently to people living in rural areas?

Vertical equity is often translated as 'ability to pay', a crude measure of which is the ratio between tax paid and private income, which has led public finance economists/analysts to group systems as follows.

- Under a **progressive tax**, the percentage of income paid as tax *increases* as income rises.

- Under a **proportional tax**, the percentage of income paid as tax is *constant* as income rises.

- Under a **regressive tax**, the percentage of income paid as tax *decreases* as income rises.

These terms are used in this paper to describe empirical outcomes and do not denote any particular normative stance.

Source: Baumol and Blinder (2011).

For any given individual, the effect of a change in tax rates or transfer payments on their labour market decisions can be difficult to discern. On the one hand, an increase in tax (or a decrease in transfer payments) *increases* the incentive to undertake paid work because it reduces the amount of income that would otherwise be available to spend (the *income effect*). On the other hand, an increase in tax (or a decrease in transfer payments) *decreases* the incentive to undertake paid work because it makes unpaid activities relatively more attractive (the *substitution effect*). Most empirical work indicates that the substitution effect tends to dominate (Mirrlees et al. 2011).

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[7] These policies also impact on incentives to undertake paid work.

Furthermore, taxes and transfers are just one of many factors influencing work decisions. Other factors such as travel costs, job security, prospects for career advancement and the enjoyment of work may also figure prominently. In many jobs, people also have limited discretion over the hours that they work. Nonetheless, there is evidence that when disincentives to work arising from the tax and transfer system are sufficiently strong they can affect labour market outcomes (Dockery, Ong and Wood 2011).

Box 2.3   Effects of the tax and transfer system on saving

According to the life cycle hypothesis, people's consumption is a function of their lifetime income rather than their income in a single year. That is, people attempt to smooth their consumption over their lifetime. Because workforce participation is not constant over a lifetime (young people study while older people retire), this requires people to save during their prime earning years (typically middle age) and dissave during retirement. In addition to consumption smoothing, people also save for precautionary reasons, to cover lumpy expenditure and to fund bequests.

While this paper primarily looks at the impact the tax and transfer system has on incentives to work, the tax and transfer system can also distort saving decisions. The presence of safety net transfers, like the Age Pension, reduces uncertainty about lifetime incomes, and therefore reduces the need for private saving. Means-tested transfers can particularly affect incentives to save among people with low lifetime incomes (Henry 2009; Hubbard, Skinner and Zeldes 1995).

Furthermore, an income tax system can result in high effective marginal tax rates on savings (Treasury 2015b). When a person earns income, some percentage of that is removed as tax. The remainder can be used for present consumption, or can be saved. Abstracting from transfers, the effective marginal tax rate on income used for present consumption is straightforward to calculate — it is exactly equal to the marginal tax rate the individual faces. However, the effective marginal tax rate on savings (future consumption) is higher: not only is tax taken from the present income, but interest is forgone on the value of the tax taken initially, and tax continues to be taken from future interest income earned. This compounding effect results in effective marginal tax rates on savings that are larger (in some cases considerably larger) than income tax schedules (even abstracting from inflation). This can create substantial distortions away from savings (particularly long-term savings) and towards present consumption (Treasury 2009).

Disincentives to undertaking paid work are a particular concern in the Australian context. Australia's tax and transfer system — with progressive income taxation and means-tested transfer payments — can lead to very high 'effective marginal tax rates' (box 2.4). In extreme cases, this can lead to 'poverty traps' where some groups find themselves financially better off not pursuing additional work at all.

2.5 How do taxes and transfers affect incomes over lifetimes?

As personal circumstances (including income and wealth) change through life, the amount of tax a person pays and the amount of transfers they receive can also change (chapter 1). Whether a tax and transfer system serves mainly to smooth incomes over time (intrapersonal income redistribution) or transfer income from the lifetime wealthy to the lifetime poor (interpersonal income redistribution) depends on how much personal circumstances change over the life cycle (and how the tax and transfer system responds to these changes). The more that circumstances change, the greater the tendency for a single-year perspective to overstate the degree of interpersonal income redistribution and the stronger the case for taking a lifetime perspective (Roantree and Shaw 2014).

Box 2.4   Which tax rate?

Tax rates can be measured in a variety of ways, each providing a different perspective on the effects of the tax and transfer system. In this paper, three measures are used: effective average tax rates, effective marginal tax rates and participation tax rates.

Effective average tax rates measure the total amount of tax paid less the total amount of transfers received divided by private income. As defined here, effective average tax rates are primarily useful as an overall summary measure of statutory tax and transfer incidence. In a progressive tax and transfer system, the effective average tax rate rises as private income rises, whereas under a regressive tax and transfer system, the effective average tax rate declines as private income rises.

Effective marginal tax rates measure the sum of the additional tax paid and the amount of transfer payments withdrawn as private income increases by one unit. Holding other factors that affect the cost of employment constant (such as the costs of travel and equipment), effective marginal tax rates measure the return to earning additional income from working extra hours or moving to a more highly paid job.

Effective marginal tax rates can look very different depending on the increment of income over which they are measured. As applied in chapter 5, effective marginal tax rates are measured over increments of $5000 (equivalent to half a day's work per week on the median individual income). Defining effective marginal tax rates over an increment of this size means that they are not as volatile as would be the case if defined over smaller increments. Using this size increment also better reflects real-world decisions about work which tend to involve jumps in income rather than small changes.

Participation tax rates measure the additional amount of tax paid and transfers forgone when a family member moves from non-employment to employment. Participation tax rates are thus calculated in a similar way to effective marginal tax rates, but are concerned with the returns to entering employment rather than the returns to working more hours or changing jobs.

It is possible to gain a sense of how personal circumstances vary over lifetimes by looking at the age profile of these circumstances.[8] Three important circumstances that affect how much a person pays in taxes and receives in transfers are private income, consumption and family composition.

Private income (which is related to how much personal income tax a person pays) has a distinct age profile for both men and women (figure 2.6). For men, mean private income tends to rise in early age groups, peak in the early-to-mid forties and then decline as retirement age approaches. For women, mean private income also increases in early age groups, but at a slower rate. The mean private income of women is relatively flat between the ages of about 30 and 50 and declines closer to retirement age.

Figure 2.6   **Mean private income by age and gender**[a]
2011-12
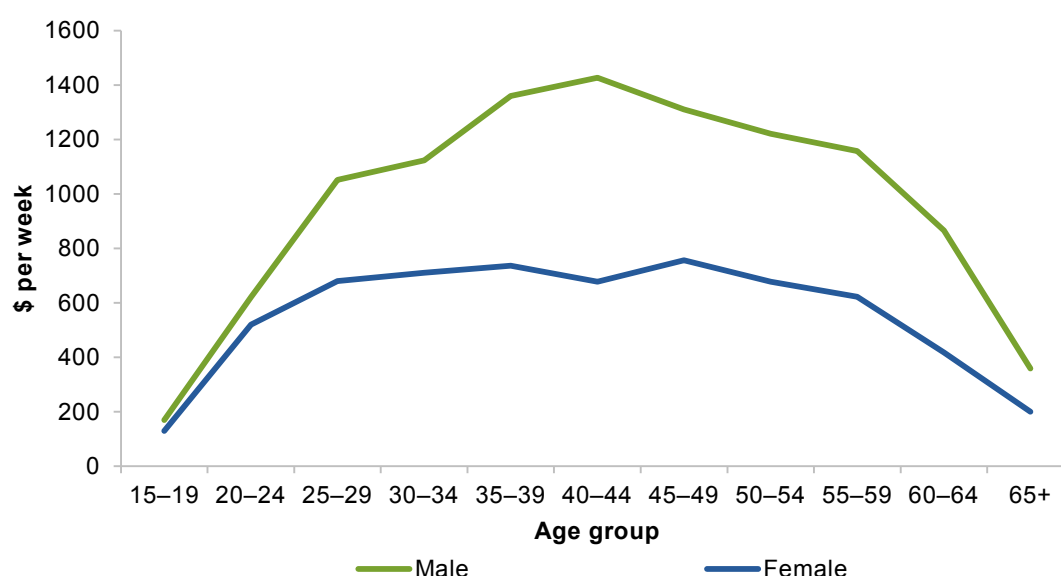
a This figure is a cross sectional representation of private income by age. Cross sections are often used as a reasonable approximation of a person's income across their lifetime (Shapiro 2015).

Source: ABS (*Microdata: Income and Housing, Australia, 2011-12*, Cat. no. 6541.0).

On the other hand, consumption (which is related to how much a person pays in GST and other taxes on goods and services) exhibits a much flatter age profile. This reflects the tendency to borrow money in early life stages, save and accumulate wealth during working life and dissave during retirement. Self-initiated consumption smoothing through saving

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8   It should be kept in mind that, because these are not longitudinal data, some age-related differences may be due to cohort effects — such as changes in government policy, demographics and social attitudes.

and borrowing may be supplemented by the provision of government services (such as healthcare, education and aged care) and progressive income tax and transfer policies.[9]

Family composition (which relates to eligibility for a range of transfer payments) has a pattern closely related to age (figure 2.7). In early adulthood, singles and couples without dependants are the most common type of family. By middle age, couples with dependent children are most common, and as retirement age approaches, couples without dependants become predominant.

Figure 2.7   **Family composition by age[a]**
2011-12
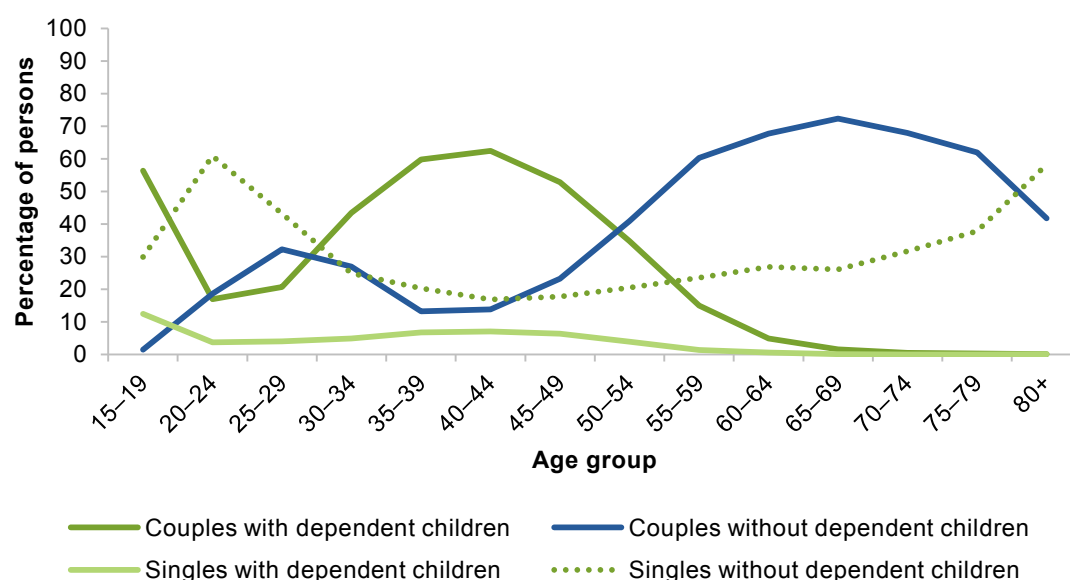
a Calculated based on the total number of people (including dependent children) forming a given family type in each age group.

Source: ABS (*Microdata: Income and Housing, Australia, 2011-12*, Cat. no. 6541.0).

Many other personal characteristics that affect transfer payments are also strongly related to age. Students and people who are unemployed are over-represented in younger age groups, while recipients of disability income support are over-represented in older age groups (figure 2.8).

This cursory analysis suggests that many of the circumstances that affect the amount a person pays in taxes and receives in transfers vary strongly over the course of a lifetime. This illustrates the value of looking at tax and transfer incidence from a lifetime perspective rather than just a single-year perspective.

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9 Self-initiated consumption smoothing can also be supplemented by intergenerational transfers, for example, when parents support children through periods of study or when children support parents in old age.

Figure 2.8   Selected personal characteristics by age

Percentage of population, 2011-12
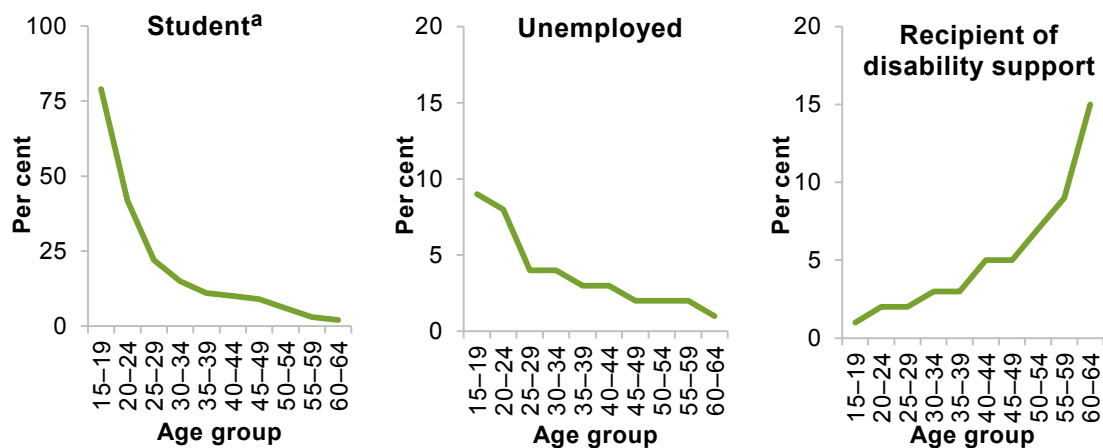
a Includes full-time and part-time students.

Source: ABS (*Microdata: Income and Housing, Australia, 2011-12*, Cat. no. 6541.0).

3 State of evidence

Key points

- This chapter discusses the evidence on tax and transfer incidence in Australia and overseas. International comparisons are made with selected OECD countries. These countries have the most comparable tax and transfer systems to Australia, and there is a rich source of data which can be drawn upon (albeit that any comparisons are difficult because of data differences). Comparisons with other parts of the world would likely yield different results.

- When considering total revenue collected at all levels of government, compared with other OECD countries, Australia has a:

  – relatively low rate of taxation as a share of GDP. However, this comparison does not control for the different tax treatment for similar types of employee and employer payments across countries, which partly explains why other countries have higher ratios of taxation to GDP. With regards to specific taxes, Australia has a smaller share of tax revenue sourced from consumption taxes, but a higher share from personal income and corporate tax

  – low level of transfers as a share of GDP. It spends a larger share of transfer expenditure on incapacity payments and less on old age payments.

- Some people simultaneously pay income taxes and receive transfer payments. The degree to which such 'churn' occurs varies across groups. Households in the middle of the income distribution experience the highest degree of churn. While difficult to measure, the extent of churn in Australia appears low compared to the OECD.

- Australia's tax and transfer system is progressive, meaning that income is redistributed from high to low income households.

  – Many studies suggest that the Australian tax and transfer system performs well in reducing income inequality. However, different measures of income, as well as differences in which taxes, transfers and in-kind services are included, can influence Australia's ranking.

- Households can be net recipients or net contributors to the tax and transfer system at different points in their lifetime. Thus net taxes and transfers tend to be 'smoothed' over the life cycle, particularly when in-kind services are included. Looking at various cohorts at a point in time, in aggregate terms for Australia:

  – people in their prime working age years pay more in taxes than they receive in transfers

  – most people are net recipients when they are older — mainly due to the Age Pension and in-kind health services.

- When considering income taxes, effective marginal tax rates have declined in recent times in Australia.

  – However, some groups (particularly those receiving transfer payments) face relatively high effective marginal tax rates.

This chapter discusses existing evidence on tax and transfer incidence in Australia and overseas, noting first some methodological challenges (section 3.1). Section 3.2 examines studies on the annual incidence of taxes and transfers. These show that, on average, the level of taxation as a proportion of GDP is lower in Australia than in other OECD countries (although the OECD's tax treatment of certain employer and employee payments raises the reported tax in most other countries). Australia's tax and transfer system is also highly targeted and progressive (although the amount of net redistribution that occurs is low). In section 3.3, a comparison of the incidence of taxes and transfers across age groups shows that, at a point in time, younger people pay more in taxes than they receive in transfers, while older people are net recipients, on average. Changes in tax and transfer policies over time make it difficult to determine whether people are net recipients or contributors over the course of their lives. The chapter concludes with a summary of results and implications for analysing tax and transfer incidence (section 3.4).

3.1   General methodological challenges

Analysis of tax and transfer systems is complicated by a number of factors, such as the complexity of these systems and data availability. These issues, discussed below, should be kept in mind when interpreting the findings of studies discussed in this chapter. Other challenges that are specific to studies on particular issues, such as effective tax rates, are discussed within the subsections of those topics. In addition, some of the studies are somewhat dated. As tax and transfer systems change over time, some caution should be used when making inferences from only these older studies.

Complexity of tax and transfer systems

Tax and transfer systems are complex, making it difficult for researchers to model all aspects of these systems and their interactions. Complexities include exemption rules and offsets on various taxes, and differences in payment amounts, eligibility criteria, and withdrawal rates for transfers over different income ranges. These rules can change over time and, where state taxes and concessions are concerned, can differ between states.[10]

Policies such as 'working credits' for some income support recipients also add to the complexity of the system and are difficult to factor into research.[11] Another area that is difficult to include is the use of tax concessions such as fringe benefits tax exemptions. Most studies in Australia focus on the major tax and transfer types by value.

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[10] The term 'states' is used throughout as shorthand for states and territories.

[11] Job-seekers on Youth Allowance or Newstart Allowance can build up working credits when they are on very low incomes and then use the credits to retain more of their transfer payment after they start working. Similarly, the Work Bonus allows people who receive the Age Pension to retain some of their income from short periods of work with no, or little, effect on their pension.

Data availability and quality

The limited availability of data restricts what can be analysed. Some data sources based on employer surveys contain information only on earnings and direct taxes on wages (for example, data in OECD (2014d)). In some cases, direct taxes may not be available, but earnings data can be used to obtain a reasonably accurate estimate of taxes on wages.

Data from household surveys contain more information on other income sources (such as investment income and cash transfers), but they do not cover all taxes paid by households. This is because households do not always know how much tax they pay, particularly where indirect taxes are concerned. Also some surveys may not have information on all people in a household, which is often required to determine eligibility for transfer payments (for example, whether a person has dependent children determines Family Tax Benefit eligibility).

Some indirect taxes and in-kind services can be imputed from available data. For example, in its fiscal incidence studies, the ABS uses household expenditure survey data and input-output tables within the Australian System of National Accounts to impute the final incidence on households of 'production' taxes, including the GST, import duties, payroll tax, stamp duties, recurrent taxes on land and a variety of other taxes (ABS 2012). Household survey data can be affected by sampling error, non-response biases and misreporting. For example, households tend to underreport consumption of items such as alcohol and tobacco, and thus the actual tax paid on these items is likely to be higher than estimated.

Another data issue concerns changes in methodology over time. For example, changes in the types of income sources or taxes included in the data, or the way that they were calculated, mean that data collected from the same institution can vary in quality and coverage over the years (ABS 2012; Whiteford 2014).

Limitations of international comparisons

A major difficulty in comparing international tax and transfer systems is the extent to which data from different countries are comparable. This can be affected by differences in the composition and design of taxes and transfers, and differences in data methodology.

Differences in the composition of taxes and transfers

The redistributive impact of government interventions depends on all taxes, transfers and services. However, the composition of taxes, transfers and services differs considerably across countries. For example, consumption taxes tend to be higher in countries with relatively low personal income tax rates (Warren 2008). Households in countries with lower disposable incomes may experience similar living standards as those in countries with higher disposable incomes if the government in that country spends more on services

or has fewer indirect taxes (OECD 2014d). Therefore, robust comparisons of the impacts of tax and transfer systems across countries should consider all types of taxes and benefits, but this is difficult to do in practice.

Differences in the design of tax and transfer systems

Governments tend to structure their tax and transfer systems to perform a combination of two roles — to provide insurance for individuals (including for periods of unemployment and sickness and for retirement) and to redistribute income from higher to lower income families (Whiteford 2010). The relative importance of these roles can affect the size and design of tax and transfer systems and the comprehensiveness of survey data collected in different countries.

A chief example relates to the treatment of employer social security contributions (SSCs) which exist in most OECD countries outside of Australia (box 3.1). As the statutory incidence of these taxes is on the employer, they are not included in household survey data, even though they are likely to be partially passed onto employees through lower wages. Employee SSCs, on the other hand, are included in household surveys because they are paid by households. If employer SSCs were included in private income it would likely increase the estimated degree of redistribution of the tax and transfer systems in countries with these schemes (Whiteford 2014).

Differences in methodology

Differences in statistical tools, data sources, income definitions and fiscal years can affect the reliability of international comparisons (Australian Government 2006; Warren 2008). There have been some recent initiatives to improve comparability of household income data across countries — for example, work done by the Canberra Group (United Nations 2011) and the Luxembourg Income Study (LIS 2015).

> **Box 3.1   Australia's transfer payment system is different from most other countries**
>
> Transfer payments provided by the Australian Government are financed entirely from general revenue (DSS 2014b). This makes Australia unusual by international standards. In most developed countries, payments related to old age, disability, sickness and unemployment are at least partially funded through 'social security contributions' (SSCs) from employees, employers or both. Of the 34 countries in the OECD, only Australia and New Zealand fund unemployment and sickness payments entirely from general revenue (SSA 2014a, 2014b, 2015).
>
> In contrast to most OECD countries, in Australia eligibility for payments does not depend on a person's employment record and the rates of payment are flat and means-tested, rather than being at least partially linked to a person's earnings. Australia is one of only six countries in the OECD that does not link old age income support to prior earnings. Of these six countries, only Australia, New Zealand and Iceland provide the same payment regardless of the recipient's prior employment record (SSA 2014a, 2014b, 2015).
>
> Another distinctive feature in Australia (relative to most other countries) is the classification of superannuation contributions. Compulsory employer superannuation contributions in Australia are analogous in many respects to employer SSCs in other countries. However, compulsory employer superannuation contributions are not considered a tax because they are not paid to government. In contrast, the OECD deems that employer SSCs (which are paid in most countries) be considered as a tax because, as 'compulsory payments to general government they clearly resemble taxes.' (OECD 2014c, p. 319)
>
> The OECD (2014b) also reports on the incidence in OECD countries of non-tax compulsory payments (NTCPs) that do not qualify as taxes or SSCs in relation to the labour activity of employees. In 2014, 23 OECD member countries had NTCPs (including Australia, due to its Superannuation Guarantee scheme). This illustrates the difficulties in making comparisons of taxes and NTCPs with Australia and other, similar OECD countries. (Box 3.2 lists those OECD countries deemed most similar to Australia.) For example, in the Netherlands compulsory contributions are paid by employees and employers to privately-managed pension funds. Employee pension premiums are considered employee NTCPs rather than SSCs. In Switzerland, occupational pension funds are mandatory for persons earning a salary, and employers have to make family allowance contributions. In addition, many OECD countries require employers to privately insure their employees against work-related accidents and occupational diseases.

3.2   Annual tax and transfer incidence

This section presents evidence for Australia and comparisons with other OECD countries on the following elements of the tax and transfer system (as defined in chapter 2):

- composition of taxes and transfers
- the degree to which a household simultaneously receives transfers and pays taxes
- progressivity and redistribution of taxes and transfers
- effective marginal and average tax rates.

The income terminology used in this chapter broadly follows that described in figure 2.5 in chapter 2. Differences are noted where relevant. The main countries used in international comparisons in this paper are the 'OECD-10' (box 3.2). Australia is also compared with the OECD average.[12] This analysis excludes most Asian countries. Comparisons with Asian countries are difficult because there is a lack of comparable data for many countries and the systems are very different (Australian Government 2006). Tax revenue and government expenditure as a share of GDP is generally much lower in most Southeast Asian countries than it is in Australia (Australian Government 2006; Treasury 2008). Many of these countries are still developing and are more reliant on non-tax revenues, such as land sales and official development assistance, and have a more limited role of government (Treasury 2008).

Box 3.2   The OECD-10 comparator countries

In an international comparison of Australia's taxes, nine OECD countries were selected to compare with Australia (Australian Government 2006). The OECD-10 consists of Australia (AUS), Canada (CAN), Ireland (IRL), Japan (JPN), the Netherlands (NED), New Zealand (NZL), Spain (ESP), Switzerland (SUI), the United Kingdom (UK) and the United States (USA).

Eight of these countries were deemed to have both a tax system designed to deliver broadly similar levels of revenue as Australia (as measured by taxation revenue to GDP ratios) and a similar size and role of government (as measured by expenditure to GDP ratios). A ninth country — the Netherlands — was chosen because, of the remaining countries with the closest share of expenditure and revenue relative to GDP with Australia, the Netherlands had:

- the highest bilateral direct investment flow with Australia

- a similar sized economy

- an interesting approach to taxing capital income. (Most taxable capital income is calculated based on a deemed rate of return. For instance, income from owner-occupied dwellings is based on a deemed rental value.)

This group of countries has also been used in subsequent international comparisons of Australia's tax and transfer system (for example, Treasury 2008) and is used in most of the cross-country comparisons in this paper.

International comparison of incidence

Level and composition of taxes

Australia's taxation revenue as a share of GDP is below the OECD average (27.3 per cent compared with 33.7 per cent in 2012) (figure 3.1). Australia has a relatively high share of personal income and corporate income taxes in its revenue mix, compared with other OECD-10 countries. However, this comparison is complicated by the fact that some

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[12] In some cases, comparisons with only the OECD average are made because the studies cited did not report information for specific countries.

benefits provided by employers (for example, employer superannuation contributions) are not measured as a tax in Australia but are part of SSCs in other countries (box 3.1). SSCs and payroll taxes have some similarities (they are both compulsory payments paid by employers and/or employees to government) and are grouped together in figure 3.1. Were SSCs and payroll taxes[13] excluded from the analysis, then taxation revenue as a share of GDP from all other sources would be higher in Australia than the OECD average. The fact that Australia does not have SSCs might partly explain its higher reliance on income taxes (because governments might use some income tax revenue to fund payments that other countries use SSCs for).

Figure 3.1   Taxes as a share of GDP in OECD-10 countries[a,b,c]

2012
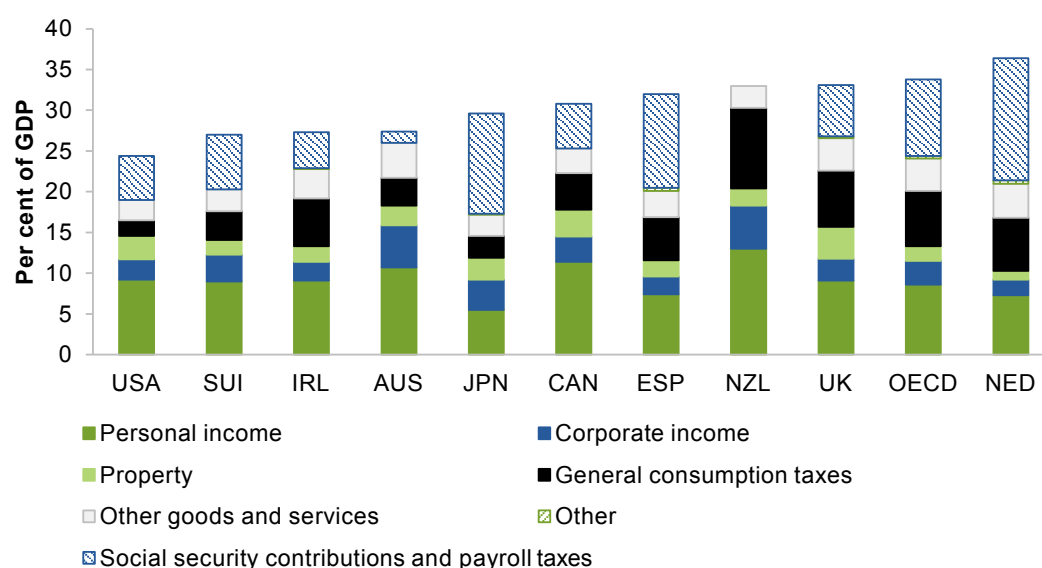
a Includes state and local government taxes. **b** The OECD amount is an unweighted average for all 34 countries in the OECD (not only those presented in the figure). **c** Other taxes include EU customs duties. Payroll taxes also includes other workforce taxes. General consumption taxes include value added tax and sales taxes. Other goods and services taxes include taxes such as excises and levies.

Source: OECD (2014c).

Australia relies less on consumption taxes than other comparable (OECD-10) countries, with the exception of Japan and the United States (figure 3.1). There are two factors explaining this result. The main factor is that Australia's GST rate is relatively low (figure 3.2).

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13 Australia, Canada and Ireland were the only OECD-10 countries with payroll taxation revenue.

Figure 3.2   **Value added tax rates in OECD-10 countries[a,b]**

As at 1 January 2014
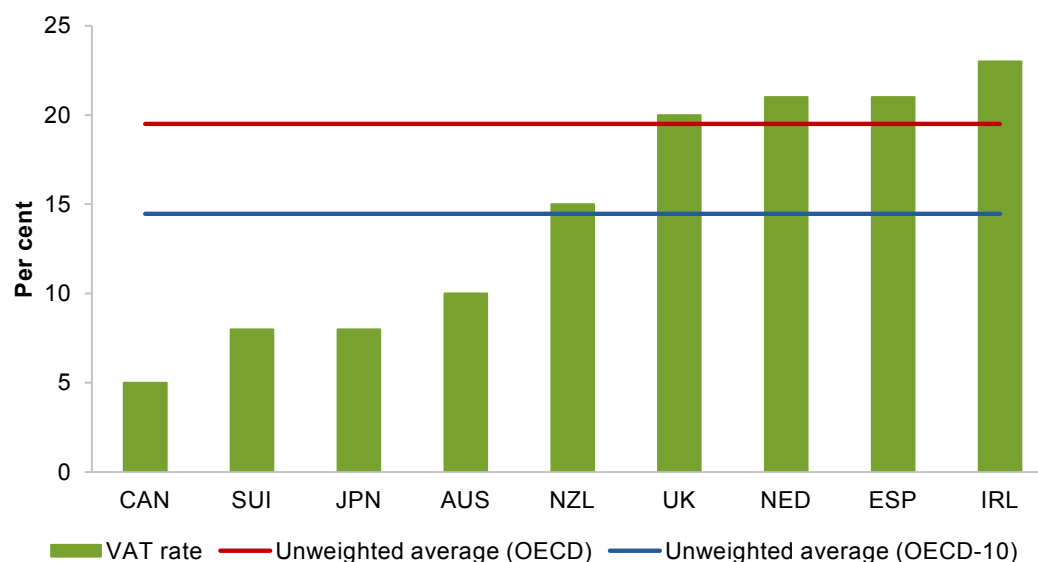
a The United States is not included because it does not have a value added tax (VAT). However, there are retail sales taxes in most states. Some Canadian provinces also apply a sales tax in addition to the VAT. **b** The rate for Japan increased from 5 per cent to 8 per cent on 1 April 2014.

Source: OECD (2014a).

Another factor is that Australia exempts some large expenditure categories from the GST (including some food and beverage items, most health and medical expenses and some education expenses). While other countries also exempt or have lower tax rates for some items, the potential GST revenue Australia collects (for example, if the GST applied across all goods and services, and there was full compliance) is slightly lower than the OECD average. To compare the effects of exemptions, lower value added tax (VAT) rates for some goods and non-compliance, the OECD has derived an index called the VAT revenue ratio (VRR). The VRR measures the difference between the VAT revenue collected and what would theoretically be raised if a VAT was applied at the standard rate to the entire potential tax base in a 'pure' VAT regime (OECD 2014a).[14] Although the OECD advises that the VRR must be interpreted with care,[15] across the OECD the unweighted average VRR was estimated at 0.55 in 2012, meaning that a substantial portion of potential VAT revenue — 45 per cent — was not collected. Nearly half of the countries in the OECD had a ratio below 0.50.

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[14] Factors which affect the tax base include whether some goods are subject to a reduced rate or exempt. Furthermore, some small businesses might not be registered to collect VAT. Other factors include the efficiency of the tax collection and compliance levels. See OECD (2014a) for more details of other influences.

[15] Measurement issues which affect the VRR calculation are explained in detail in OECD (2014a).

In Australia, the VRR was 0.47, below the OECD average (figure 3.3). The VRR in Australia has declined from 0.54 in 2006, indicating that a growing proportion of consumption expenditure is going towards items that are exempt from GST. Daley et al. (2013, p. 51) reported that between 2008-09 and 2011-12 households 'spent relatively more on GST-exempt categories' (for example, health and education).

Figure 3.3   **Estimated VAT revenue ratios in OECD-10 countries[a]**
2012
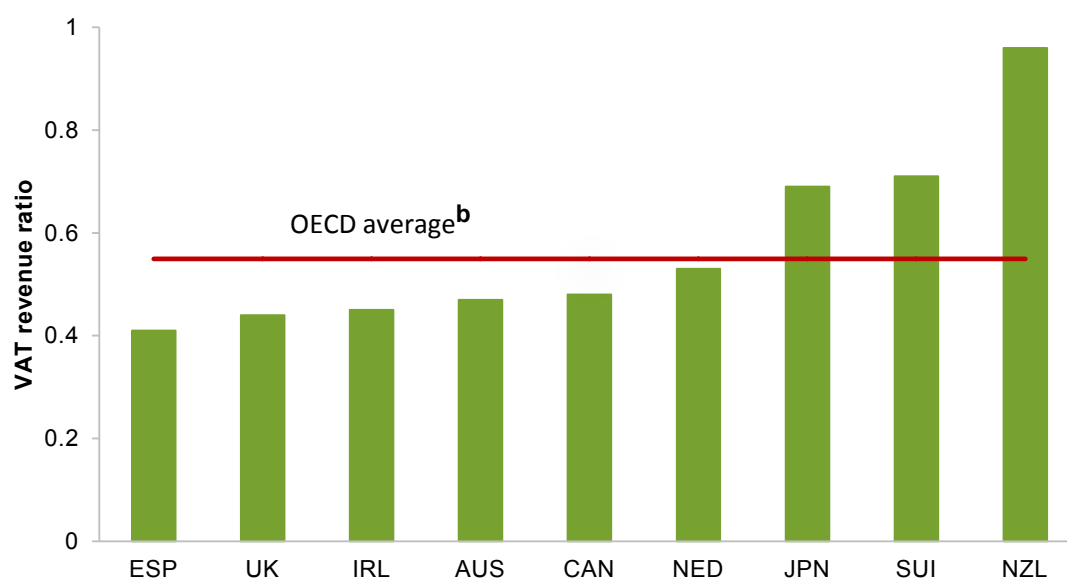
a United States is not included because it did not have a VAT. **b** The OECD average is an unweighted average for the 33 OECD countries that had a VAT.

Source: OECD (2014a).

In summary, Australia has both a low VAT rate and a somewhat lower VAT revenue ratio, compared with other OECD countries. Both of these factors contribute to Australia having a relatively low amount of revenue sourced from consumption taxes.

Level and composition of benefits

Governments provide benefits to households through transfers and in-kind services. Australia spends a relatively low amount on transfers to households. They amounted to 8 per cent of GDP compared with an OECD average of 12 per cent in 2011 (figure 3.4). The role of compulsory superannuation, which sits outside Australia's tax and transfer system, partly explains the different level of expenditure on transfers in Australia. Compulsory superannuation plays an income smoothing role similar to that which SSCs perform within the tax and transfer system of most other OECD countries.

While Australia's level of transfers is well below the OECD average (and below that of other OECD-10 countries), its level of in-kind services is slightly above the OECD average (figure 3.4).

Figure 3.4   **Government transfers and services in OECD-10 countries[a]**
2011
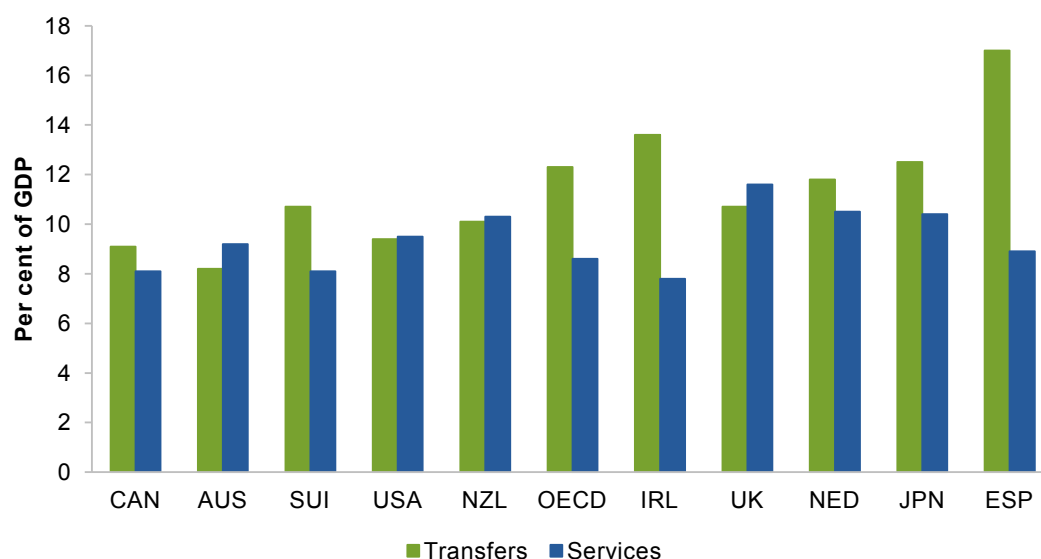
a The OECD amount is an unweighted average of 33 OECD countries and Estonia. Countries are ordered from lowest total benefits (transfers plus services) to highest total benefits.

Source: OECD (2015b).

There are also *compositional* differences of benefits provided between Australia and other countries, particularly in the case of transfers (figure 3.5).

The share of transfers to elderly people is relatively low in Australia (42 per cent of all transfers, which is less than the OECD average of 56 per cent). There are two factors which may explain this result:

- Australia has a relatively low proportion of the population aged 65 years and over, which should be kept in mind when making international comparisons (OECD 2015a).

- Australia has a means-tested pension rather than an earnings-related pension, as applies in most other OECD countries (box 3.1).[16]

In contrast, Australia has the largest share of transfers to people with incapacity, accounting for one quarter of transfers, compared to just 15 per cent across the OECD.

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16   This is also the case for unemployment benefits (Newstart Allowance), although the payment rate is much lower than that for the Age Pension.

Australia's share of transfers on family payments is above the OECD average, but is in line with countries such as New Zealand, the United Kingdom and Ireland.

Figure 3.5   Transfers as a share of GDP in OECD-10 countries[a]
2011
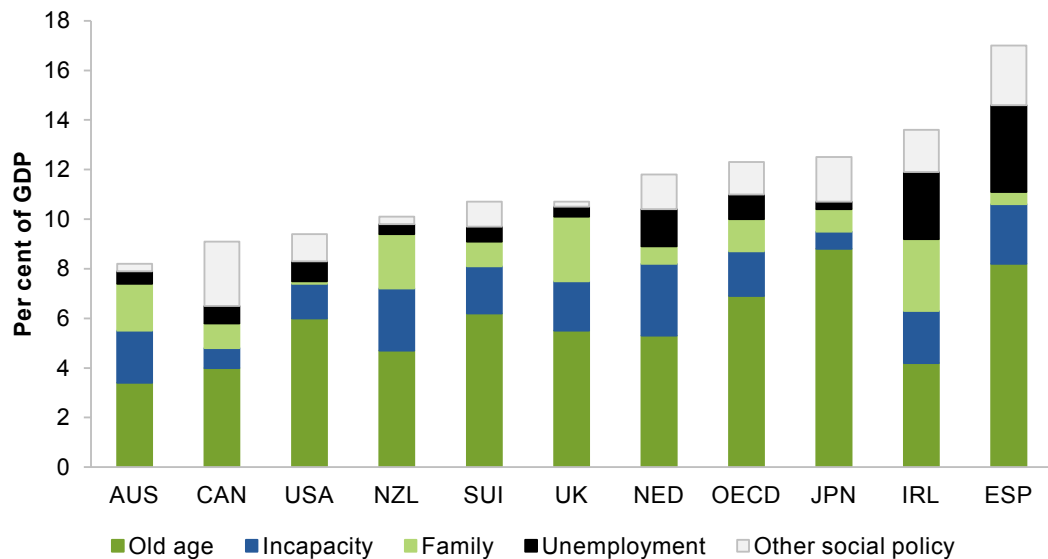
a OECD is an unweighted average of 33 OECD countries and Estonia.
Source: OECD (2015b).

The composition of services is not shown here. However, the vast majority of services are provided for health in each OECD-10 country and for the OECD as a whole (OECD 2015b).

Tax and transfer churn

Tax and transfer churn refers to the simultaneous payment of income taxes and receipt of transfers to the same families (chapter 2). Estimates of churn for Australia generally indicate that it is largest for households in the middle of the income distribution. For example, Buddelmeyer, Herault and Kalb (2008) found that churn was greatest in the fifth income decile (figure 3.6). Another study, by Humphreys (2009), came to the same conclusion.

A limitation to these studies is that they estimate churn within income bands. Some of the measured churn may have been redistribution between different households within the same income band and, therefore, these measures of churn should be taken as upper estimates. A more accurate estimate of churn would require an analysis of individual

households rather than averages across income quantiles.[17] Changes to income tax schedules and transfer payments since the time of these studies (2009) may also mean the magnitude of churn is different now. Chapter 4 contains estimates of churn for Australia in 2014-15.

Figure 3.6   **Average tax and transfers by income decile[a,b]**
2008-09
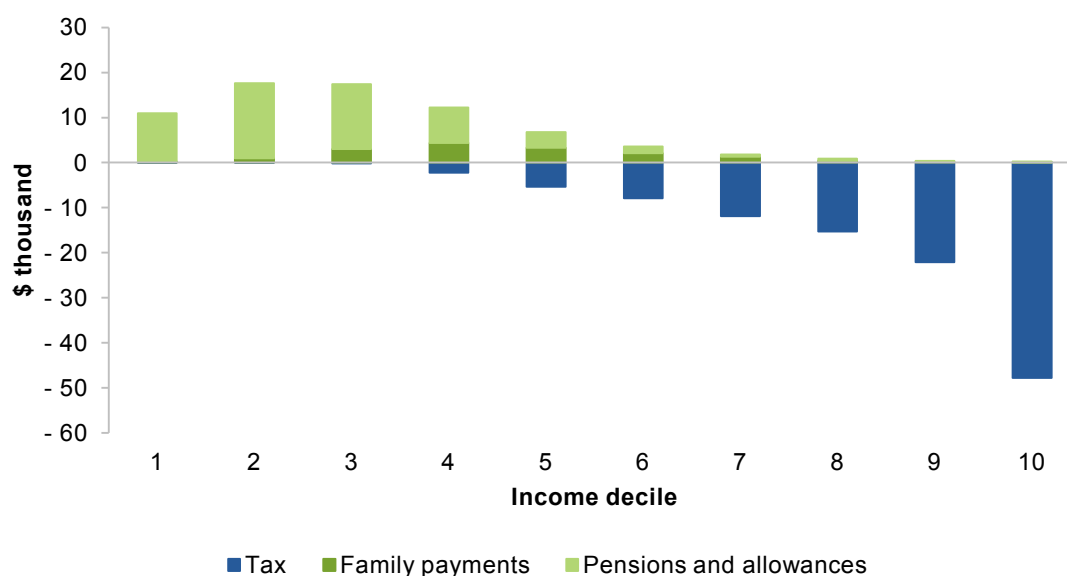
a Tax includes personal income taxes and Medicare levy, net of rebates. **b** Income deciles based on equivalised income of income units. An income unit consists of a single adult or a couple and their dependent children.

Source: Buddelmeyer, Herault and Kalb (2008).

Whiteford (2006) found that in 2000[18] Australia had the lowest level of churn among 19 OECD countries for which data were available. Factoring in only direct taxes[19] and transfers received by income deciles, churn was estimated to be 23 per cent of direct taxes in Australia, compared with an OECD average of 52 per cent. This is the result of Australia's highly targeted tax and transfer system, where low-income households pay a low share of direct taxes and high-income households receive a small share of transfers.

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[17] In this section and the next (which respectively discuss churn, and progressivity and redistribution) studies that report results by income quantiles (usually deciles or quintiles) typically use 'equivalised' income. Income is equivalised by applying different weights to a household depending on how many people are in it, and their age. The number of people increases the weighting and dependent children have a lower weighting than adults. The results presented in subsequent chapters of this paper do not use equivalised income and therefore are not directly comparable to the results discussed in this chapter.

[18] Or the nearest year for which data were available.

[19] The direct taxes mentioned in studies in this chapter usually include only personal income taxes. However, some studies also include other taxes.

Various studies have also estimated the degree to which different age cohorts pay taxes and/or receive transfers (discussed in section 3.3).

Progressivity and redistribution of taxes and transfers

In general, in Australia and in some other similar countries, personal income taxes and transfers are highly progressive, whereas indirect taxes and services tend to be less progressive or even regressive. The combined effect of taxes and transfers in Australia is usually found to be progressive.

Based on data for 2009-10, the ABS (2012) estimated the effects of income taxes, indirect taxes and government benefits (including transfers and in-kind services such as education, health and housing) on the distribution of income among Australian households.[20] Income taxes were found to be progressive. Private income for the highest income quintile was about 2.5 times that of the middle income quintile. However, the average amount of income tax paid by the highest income quintile was about 4.5 times that paid by the middle income quintile. In contrast, taxes on production (including the GST component) were regressive. Overall, the tax and transfer system was progressive and redistributive, as can be seen in figure 3.7. After taxes and benefits, final income is higher than private income for people in the lowest three income quintiles, but lower for people in the highest two income quintiles. That is, the net impact was to redistribute income from the top 40 per cent of households to the bottom 60 per cent.

These findings are consistent with an earlier study by Harding, Lloyd and Warren (2004), who examined the progressivity of Australia's tax and benefit system using a microsimulation model[21] for 2001-02. That study included a similar range of taxes, transfers and services to those included by the ABS (2012). The authors also found that income tax was progressive, and indirect taxes (GST and excise duties) were regressive. The combined effect of income taxes and indirect taxes remained progressive. Cash transfers were found to be highly progressive. Expenditure on government services was less progressive, but lower income quintiles still received a much larger share as a percentage of gross income than did higher income quintiles.

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[20] Government taxes and expenditure that do not relate directly to household expenditure were excluded (for example, corporate taxes and spending on defence, transport and communications).

[21] Appendix B explains what a microsimulation model is and what it can be used for.

Figure 3.7   **Average household income by income stage and income quintile[a],[b]**

2009-10
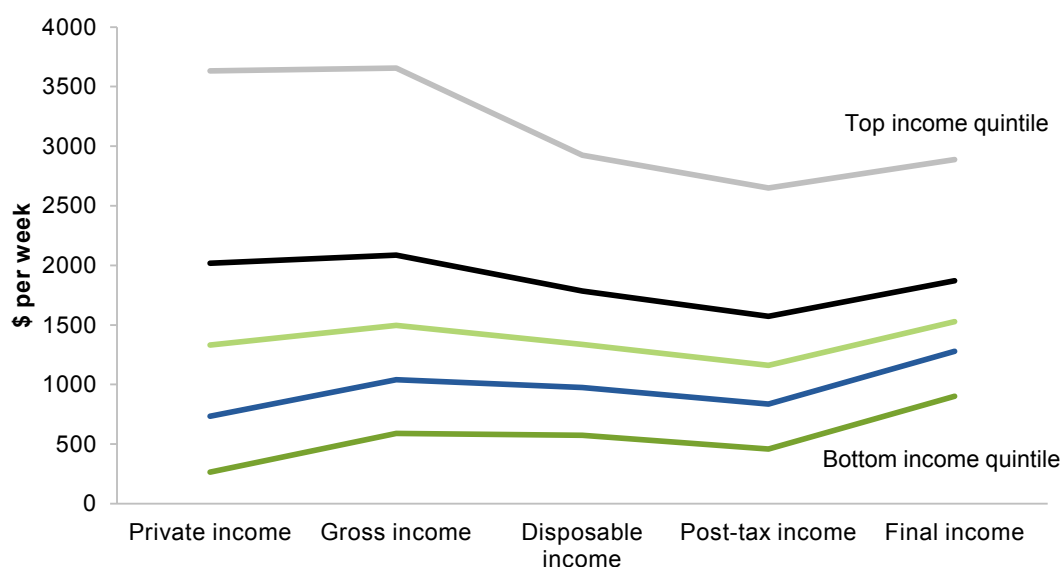
a Income stages are defined in figure 2.5 **b** Quintiles are ranked by the equivalent disposable household income and they are person weighted.

Source: ABS (2012).

International comparison of progressivity and redistribution

Other country-specific research studies have also found that tax and transfer systems in similar countries to Australia are progressive and redistributive (for example, Chamberlain and Prante (2007) for the United States, and ONS (2014) for the United Kingdom). This section evaluates how progressive and redistributive Australia's system is relative to other OECD countries.

Progressivity

When considering only direct taxes and transfers, Australia's highly targeted transfer system and the low amount of income taxes paid by low-income groups make it one of the most progressive among OECD countries. There are many different measures of progressivity. One measure is the ratio of transfers paid to the lowest quintile compared to those paid to the highest quintile. This ratio was over 12 for Australia in 2005 — well above the OECD average of about two (figure 3.8, LHS). Another measure is the ratio of transfers to taxes for the lowest income quintile. This was over 30 for Australia — well above the OECD average and other OECD-10 countries, except Ireland (figure 3.8, RHS).

Figure 3.8   **Progressivity of tax and transfers in OECD-10 countries[a]**
2005

Ratio of transfers paid to lowest quintile
to those paid to highest quintile

Ratio of transfers to direct taxes for
lowest quintile
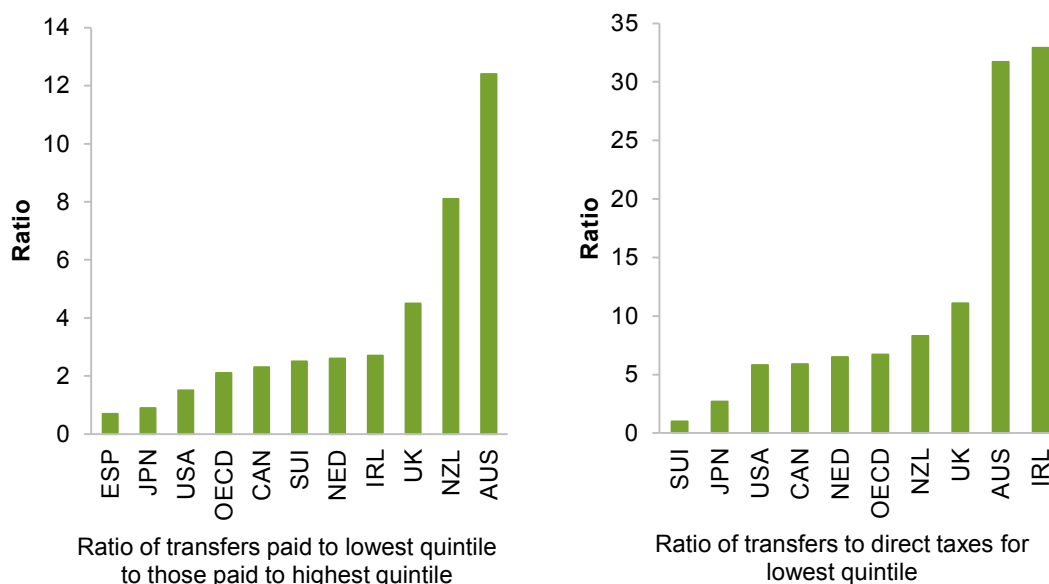
a Data on the ratio of transfers to direct taxes were not available for Spain. The ratios for OECD are calculated as an unweighted average of OECD countries.

Source: Whiteford (2010).

Direct taxes and transfers are also very progressive when measured using concentration coefficients (see box 3.3 for a discussion of measures of income equality) (OECD 2008). Using this measure, Australia had the most progressive system of transfers among OECD countries, and taxes that are more progressive than the OECD average. More recent studies also find that Australia's tax and transfer system has a high degree of progressivity, when measured in terms of tax wedges at different income levels[22] and with after-tax income elasticities[23] (OECD 2014d).

Redistribution

The redistributive impact of a tax and transfer system depends not only on how progressive the system is, but also on the *volume* of redistribution that it effects. A system can be highly progressive, but have a low impact on overall inequality, if the volume of tax and expenditure being transferred is small. As shown in figures 3.1 and 3.4 above, taxes and social expenditure in Australia are lower than the OECD average.

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[22] Measured in terms of the progression of tax wedges across income intervals ranging from 50 per cent to 500 per cent of the average wage for singles without children.

[23] Defined as the percentage increase in net income when gross wage earnings increase by one currency unit. As such this is similar to what an effective marginal tax rate measures, which is the additional amount of tax paid and transfers foregone when earnings increase by one unit.

Many research studies have found that Australia redistributes more to lower income households than other countries (Whiteford 2006, 2010). In contrast, more recent studies using other measures of redistribution suggest that Australia's tax and transfer system is less redistributive than other countries. The level of inequality in household disposable income in Australia was found to be higher than the OECD average, despite its highly progressive taxes and transfers (OECD 2012). Furthermore, based on 2010 data, the impact of Australia's direct taxes and transfers on inequality reduction was the seventh lowest in the OECD, as indicated by the difference between Gini coefficients measured from private income and disposable income (Whiteford 2014) (see box 3.3 for a definition of Gini coefficients).

However, there are issues in making international comparisons. Unlike most other countries, Australia's transfer payments are flat-rate, means-tested and continue indefinitely for as long as individuals remain entitled (box 3.1). This overall structure leads Whiteford (2014) to claim that Australia is one of the strongest examples of a country using a 'Robin Hood' tax and transfer system. Whiteford (2014) also states that Australia is likely to be relatively more effective in reducing income poverty than it is in reducing income inequality as measured by changes in the Gini coefficient. This is because transfers in Australia are more targeted to the lower half of the income distribution than in any other OECD country. However, the Gini coefficient is most sensitive to changes in the middle of the income distribution, meaning that it is reduced less in Australia than in other countries.

The above international comparisons do not consider indirect taxes or services. These factors might be important when assessing the overall impact of tax and transfer systems across countries, because countries rely on consumption taxes and use services to different extents. Consumption taxes generally have a regressive impact on the distribution of household disposable income (Warren 2008). Public services are found to reduce inequality between households, although the size of the reduction is generally lower than the combined effect of direct taxes and transfers (OECD 2008). As noted above, Australia has a lower reliance on consumption taxes in its tax mix (figure 3.1), and a greater share of government expenditure on services (figure 3.4) compared with most of the other OECD-10 countries (and with the OECD average). While inclusion of consumption taxes would be expected to increase income inequality, this is likely to be by less in Australia than across the OECD. Similarly, including services would be expected to reduce income inequality for the OECD-10, but by more in Australia. This is observed in the data. Although income inequality in Australia was calculated to be similar to the average of 24 OECD countries for which data were available when based only on disposable income, it was lower than the average when services or consumption taxes were also considered (figure 3.9).

Box 3.3   Measuring the distributions of income, taxes and transfers

Two indicators used to measure the distributions of income and of taxes and transfers, respectively, are the Gini coefficient and concentration coefficient.

The **Gini coefficient** measures how much the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution. It is calculated from a 'Lorenz curve', which plots cumulative shares of the population, ordered from those with the lowest to highest incomes, against the cumulative share of income that each individual or household in the population receives (see example in figure below).

- The Gini coefficient is the ratio of the area between the Lorenz curve and the line of equality (A), relative to the total area under the line of equality (A+B):

$$Gini = \frac{A}{A + B}$$

- A Gini coefficient of zero indicates perfect equality — each individual or household gets the same share of income.

- A Gini coefficient of one indicates perfect inequality — all income goes to a single individual or household.
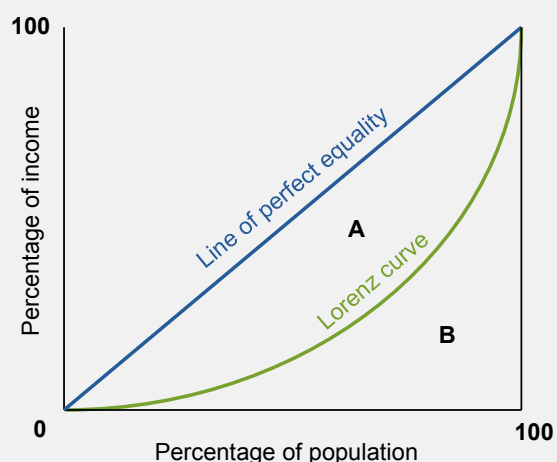
A **concentration coefficient** measures the degree to which taxes or transfers are distributed between people with different incomes. It is calculated in a similar way to the Gini coefficient, and involves plotting cumulative shares of the population (ranked by *disposable incomes*) against the cumulative share of taxes paid or transfers received. Because the population is ordered from those with the lowest to highest disposable incomes, rather than from those with the lowest to highest taxes paid or transfers received, the concentration coefficient can range between plus and minus one.

- A concentration coefficient of zero indicates that all income groups receive an equal share of transfers or pay an equal share of taxes.

- Negative concentration coefficients of transfers (taxes) indicate that those with lower incomes receive a higher share of transfers (pay a higher share of taxes) than their share of disposable income.

- Positive concentration coefficients of transfers (taxes) indicate that those with higher incomes receive a higher share of transfers (or pay a higher share of taxes) than their share of disposable income.

Sources: OECD (2008); Whiteford (2010).

Figure 3.9 **The impact of consumption taxes and services on income inequality in OECD-10 countries[a,b,c,d]**
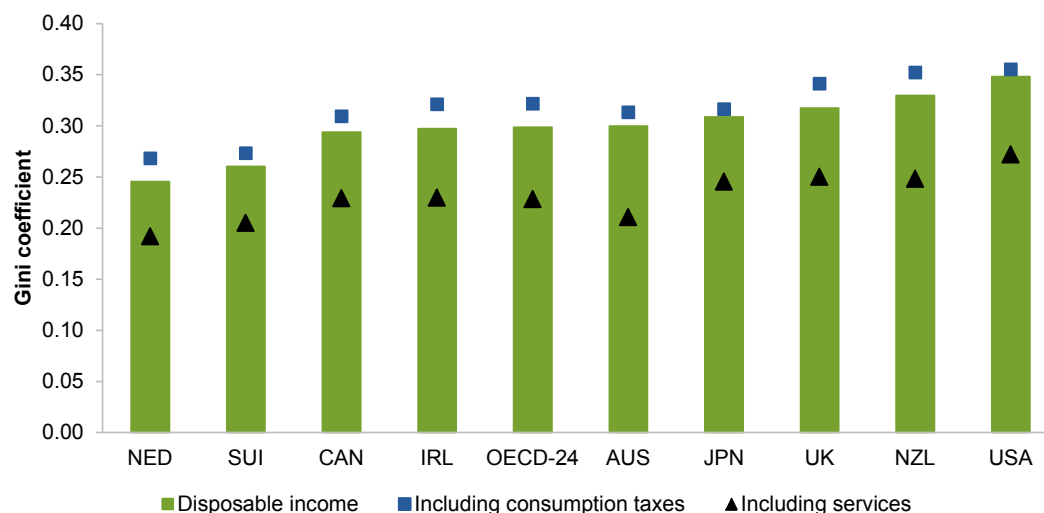
a The estimated impacts of services are based on imputing the value of services to income deciles rather than to individuals. **b** The estimated impacts of consumption taxes are illustrative only. They are based on applying findings on the incidence of consumption taxes in Australia to the tax structures and income distributions of other OECD countries (Warren 2008). **c** Spain and the OECD-10 are not presented because data were not available for Spain. OECD-24 is an average of the 24 countries for which data were available. **d** Year was not reported. Likely to be in the mid-2000s and varies across countries.

Source: OECD (2008).

Effective average and marginal tax rates

Australia's progressive tax system and targeted transfer system can produce high effective marginal tax rates (EMTRs) for some groups, particularly those receiving transfers. As discussed in chapter 2, these EMTRs can influence individuals' decisions regarding hours worked.

Using microsimulation modelling, Harding et al. (2009) calculated the distribution of EMTRs faced by individuals in 1996-97 and 2006-07. Their methods involved increasing the private income of the individual, or their partner, by one dollar[24] and examining the effect on the disposable income of the income unit. The impacts of income tax, transfers, Medicare and Commonwealth Rent Assistance were taken into account. The study estimated that about 7 per cent of working-age individuals faced a 'high' EMTR of over 50 per cent in 2006-07, down from almost one-fifth in 1996-97 (figure 3.10). Somewhat offsetting this however, was that the proportion of people that faced an EMTR of

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24 Although a one dollar margin is used in some studies, in practice it abstracts from decisions to increase labour supply, which are based on larger amounts (see discussion in this section below and appendix B).

30–40 per cent increased — suggesting that some of the people facing high EMTRs transitioned into the 30–40 per cent EMTR bracket.

Figure 3.10 **Estimated distribution of EMTRs for working-age Australians[a]**
1996-97 and 2006-07
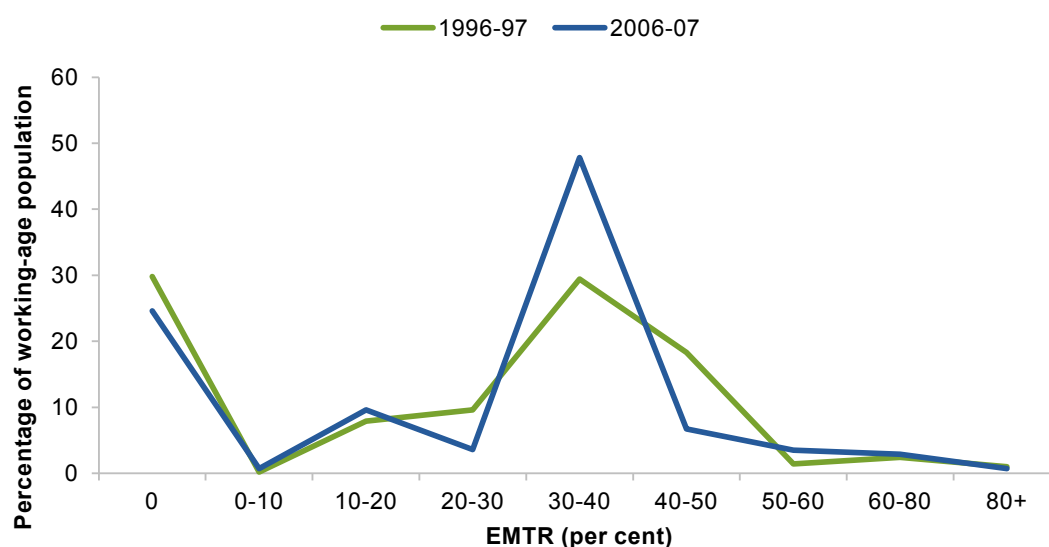
a Working-age Australians are those individuals aged 15–64.
Source: Harding et al. (2009).

Many changes to tax and transfer policy, which were designed to reduce EMTRs, occurred over this period. For example, the top marginal income tax rate (which was reduced over the period) applied to a taxable income of $50 000 in 1996-97 (1.3 times average weekly full-time male earnings) compared with $150 000 in 2006-07 (2.5 times average weekly full-time male earnings). The taper rates for some transfer payments were also reduced, which lowered the EMTRs for many people.

At the other end of the distribution, about one quarter of working-age Australians had an EMTR of zero in 2006-07. This suggests that they were below the threshold for paying income tax and not affected by social security or Family Tax Benefit income tests. Sole parents were more likely to face high EMTRs than partnered parents. Average EMTRs faced by people across each disposable income decile generally rose as income increased, from 2 per cent for those in the bottom income decile, peaking at 35 per cent in the middle income deciles, and remaining above 30 per cent for higher income deciles.

An individual's choice of work hours tends to be 'lumpy', as hours are typically increased in blocks of time. Therefore, EMTRs evaluated over larger increases in income (as opposed to a dollar) are likely to be more telling of employment behaviour (appendix B). Harding et al. (2006) examined EMTRs for various hypothetical cameos, where family

members increased paid work hours by half and full day increments in 2006-07. The study found that the highest EMTRs were generally faced by secondary earners who were on the minimum wage and whose partner was also on the minimum wage. EMTRs also increased as the number of children increased, due to increases in the amount of Family Tax Benefit paid and assumptions about increased paid childcare requirements.

The above results do not account for withdrawals in other forms of assistance, such as childcare assistance and the effects of public housing rent setting.[25] Recent research suggested that, for some second income earners who return to work and use childcare, the reduction in childcare assistance at higher income levels, in combination with the withdrawal of family payments and progressive income tax rates, can lead to EMTRs approaching 100 per cent (PC 2014). Public housing rent-setting also leads to EMTRs being higher than they would be otherwise, but the withdrawal of the main income support payment is still the primary driver of EMTRs (PC 2015).[26]

The financial incentive to be in paid work at all can be different from the financial incentive for someone already in work to earn a little more, and these incentives can be measured by the participation tax rate (PTR) and EMTR, respectively (Mirrlees et al. 2011). Comparing the differences between EMTRs and PTRs can be useful when formulating policy. For example, if the aim is to encourage greater workforce participation (and increase income equality at lower income levels) then a tax and transfer system with PTRs lower than EMTRs at low wage levels might be desirable.

PTRs were calculated in Mirrlees et al. (2011) by determining how net income changes when a person stops work. It was found that, for workers in the United Kingdom in 2009-10, EMTRs tended to be highest at low levels of earnings as means-tested support is withdrawn, then fall at moderate-to-high levels of earnings. In contrast, PTRs were relatively low on average for low-paid workers (mainly because tax-free income tax allowances and National Insurance contributions thresholds cover a large fraction of their total earnings). The distribution of EMTRs was more concentrated than for PTRs. For example, half of the workers in the United Kingdom faced a PTR of between 40 and 60 per cent, whereas three quarters of workers faced an EMTR of between 40 and 60 per cent.

Chapter 5 examines EMTRs across the Australian population and PTRs for selected family types.

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[25] Public housing rents are set as a proportion of income (usually 25 per cent). Therefore increases in earned income lead to increases in rent, hence adding to EMTRs.

[26] The research into childcare (PC 2014) examined EMTRs over an additional day of paid work and they were generally found to be highest when increasing work hours from three to four days a week, because of the cap on the child care subsidy. In the housing assistance paper (PC 2015), EMTRs were based on dollar increases in annual income and high EMTRs were found across incomes of about $14 000 to $25 000 for transfer recipients in public housing.

International comparisons of effective marginal and average tax rates

Harding et al. (2009) compared Australian microsimulation modelling results with broadly comparable results for ten European countries and found that Australian average EMTRs (for a three per cent increase in earned income) were about the same as the average of all eleven countries (although there were differences in the distribution of EMTRs between countries).

The effective average tax rate (EATR) (including personal income tax and employee SSCs, net of transfers) as a percentage of gross wage earnings for both childless singles and one-earner couples with two children was slightly lower in Australia, compared with the OECD average in 2013 (figure 3.11).

Couples with children generally had lower EATRs than those with no children across the OECD because many countries provide transfers to families with children. In Australia, the EATR faced by one-earner couples with two children was close to half that faced by singles with no children.

Figure 3.11 **Effective average and marginal tax rates in OECD-10 countries**[a,b,c,d]
2013
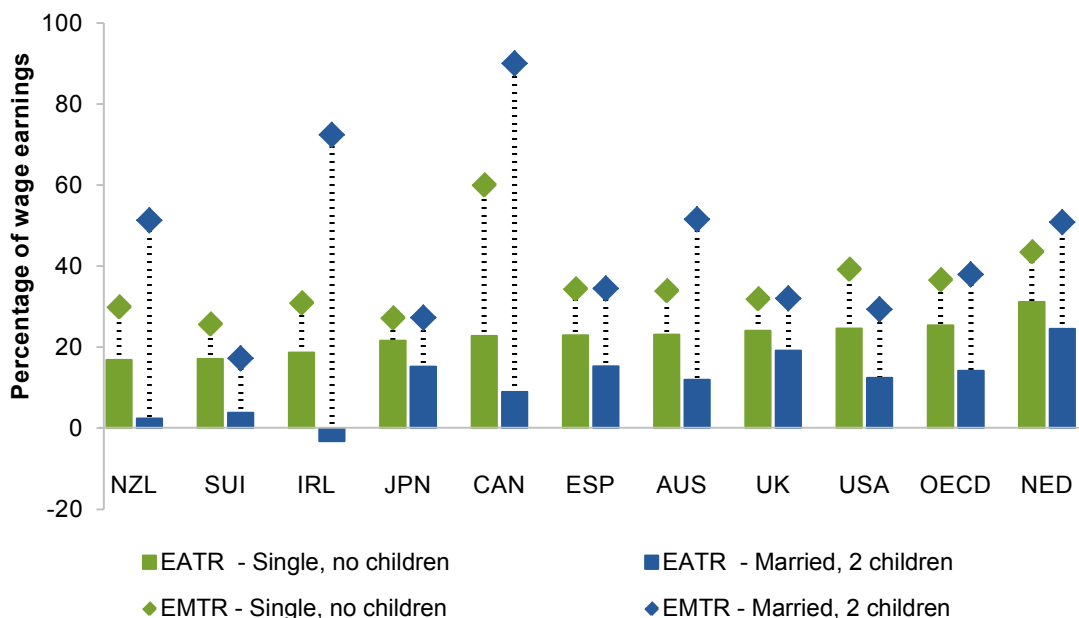
a EATRs include income tax, payroll tax and employee and employer contributions, net of cash transfers. EMTRs take into account tax rates and withdrawal of cash transfers. **b** Families with one income earner earning the average wage in the respective country. **c** EMTRs were calculated by increasing gross earnings by one currency unit. **d** Countries ordered from lowest to highest EATR for singles with no children. OECD is the unweighted average of OECD countries.

Source: OECD (2014d).

The EMTR for single wage earners in Australia was about 34 per cent, slightly lower than the OECD average (figure 3.11). In contrast, the EMTR for one-earner couples with two children was considerably higher, at about 52 per cent, exceeding the OECD average for the same family type by nearly 14 percentage points. Among the OECD-10, EMTRs for couples with children were also relatively high in New Zealand, Ireland, Canada and the Netherlands. These high EMTRs can be explained by the withdrawal of income-tested transfers in these countries, including Australia.

3.3   Incidence from a life cycle point of view

The analysis in section 3.2 considered various aspects of the tax and transfer system at a point in time. An analysis over the life cycle can inform the extent to which tax and transfers are redistributed across time (chapter 2).

There are some methodological challenges which make life cycle analysis difficult. As a result, studies that explore how tax and transfer incidence changes over the life cycle have typically used annual (snapshot) data, and compare the incidence of tax and transfers across different age groups. This is different to some studies which use dynamic modelling techniques, and to the lifetime modelling approach used in this paper (chapter 6). Methodological issues and a review of the literature are discussed next.

Methodological challenges

In addition to the challenges described in section 3.1, an analysis of tax and transfer incidence over the life cycle presents additional challenges, such as the effects of changes in tax and transfer policies over time and the lack of easily accessible longitudinal data. These challenges may result in conflating the effects of policy changes with the effects of ageing.

Scale of change in tax and transfer policy over time

Tax and transfer policies change over time. This complicates analysis of incidence over the life cycle. For example, tax and transfer incidence evaluated at a particular point in time for different age groups could be used to compare how the average incidence varies at different stages of a particular age cohort's lifetime. One could do this by estimating the taxes and transfers of a middle aged household now to approximate what an older household would have received in benefits and paid in taxes in the past. However, such a comparison does not allow for the fact that tax and transfer policies (and income) have changed over time. For example, there are many childcare and family tax payments which did not come into effect until recently, meaning that an older household today would not have received them in the past. Similarly, new taxes have been introduced (the GST) and

others removed (wholesale sales tax), while base and rate scale changes made to income tax can be very significant over time.

Lack of longitudinal data over the life cycle

A model of the lifetime incidence of taxes and transfers would ideally use longitudinal data. This would include, for example, data on lifetime incomes and consumption expenditure, as well as significant events during the life cycle (including whether a person marries, has children and any periods of absence from the labour force). There are no *longitudinal*[27] surveys that have a time series both long enough and with data rich enough to accommodate this for Australia.

An alternative approach is to extrapolate data from a cross-sectional dataset to project what the life cycle incidence of the current system of taxes and transfers would look like. Future trends regarding birth and death rates, income growth and predictions on events such as marriage and divorce, having children and labour force entry and exit can be combined with the tax and transfer system to simulate incidence over a life cycle. Dynamic microsimulation models can be used to do this (appendix B).

Projections of demographic trends, such as how the age profile is expected to change, are available. Predicting changes for other variables, particularly those related to household behaviour, are more difficult.[28] For example, plotting lifetime earnings profiles does not take into account that not all people stay constantly in the labour force for their entire working lives. Similarly, mature age participation in Australia has changed considerably and there are many reasons to expect that future increases are possible, including improved health, and social factors (Rice, Temple and McDonald 2014). Knowing the extent to which these social factors change behaviour (and therefore the subsequent analysis of life cycle incidence of taxes and transfers) is difficult. Such issues must also be borne in mind when interpreting results presented in chapter 6 that estimate tax and transfer incidence over the lifetime (appendix B).

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[27] A longitudinal survey follows the same people in each period the survey is conducted. In contrast, a cross-sectional survey measures the same things at different points in time, but surveys a different sample of people. One longitudinal survey in Australia with comprehensive data is the Household, Income and Labour Dynamics in Australia survey, but it only began in 2000.

[28] Tax and transfer policies might also change in the future. For example, although income tax rate thresholds are not legislated to change, they are typically raised over time. Assumptions regarding future income tax rates can have a large influence on projections for tax incidence (chapter 6).

Research findings

Taxes paid and transfers received vary across age groups and household types

Data from the ABS (2012) show that private incomes generally increase with each stage early in life (for example, as dependent children in families get older (figure 3.12, LHS)). Private incomes decrease in later life stages, particularly as household heads reach retirement age (figure 3.12, RHS). A comparison of gross incomes by group suggests that people aged 65 and over benefit the most from transfers (mainly due to the Age Pension), and couples with children also received a large amount (because of Family Tax Benefits) (ABS 2012). However, couples with children pay a relatively large amount in both direct and indirect taxes, such that their post-tax income is less than their private income. In contrast, those aged 65 and over pay relatively little in tax and receive more in transfers meaning that, for many, their post-tax income is higher than their private income. Couples with children and elderly households experience substantial increases in income after services are included. This is because families with children receive relatively large benefits in education, while older groups receive large health benefits.

The above analysis indicates that households face many different taxes and transfers at various stages of the life cycle, and depending on their family structure. Lloyd, Harding and Warren (2005, p. 21) found that, as a group, 'couples with children pay in taxes roughly the same as they receive in cash and non-cash benefits'. The authors explain that compared to younger cohorts without children, young couples with children receive large transfer amounts, which offsets most of the taxes paid by that group. Thus there is much churn between taxes paid and transfers received for these particular families, especially compared to younger singles (who are typically larger net tax payers) and older groups (who are typically larger net recipients). Despite this churn, the authors emphasise that the tax and transfer system is effective at redistributing income from high to low-income households, as well as from younger to older households.

In terms of the composition of taxes paid by different types of households and by age, Lloyd, Harding and Warren (2005) found that, for 2001-02, indirect taxes were only of greater magnitude than personal income taxes for households headed by an older person (65 plus years). Although estimated for 1996-97 (when there was a much different tax structure), Harding and Warren (1999) came to a similar conclusion. They found that taxes were relatively equally split between personal income tax and other taxes for most younger people. For older households, as children leave and the prevalence of retirement increases, income tax revenue falls and lower expenditure also results in reduced revenues from indirect taxes.

Figure 3.12   **Average household income by income stage and life cycle stage[a,b]**

2009-10, dollars per week

Early life stages

Later life stages

Income stage

Single aged under 35
Couple aged under 35
Couple, dep'nt children - eldest under 5
Couple, dep'nt children - eldest 5 to 14
Couple, dep'nt children - eldest 15 to 24

Couple, dep'nt & non-dep'nt children
Couple, non-dep'nt children only
Couple aged 55 to 64
Couple aged 65 and over
Single aged 65 and over
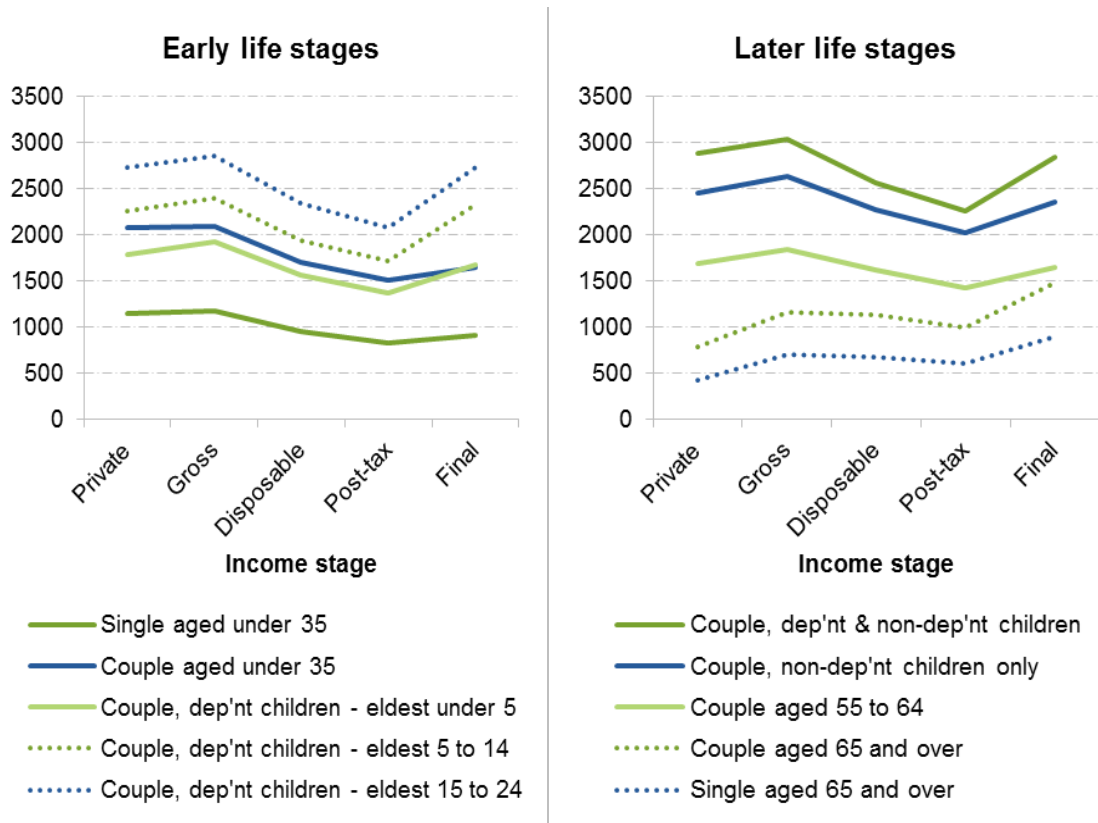
a Income stages are defined in figure 2.5. **b** For couple households, age is that of the household head.
Source: ABS (2012).

The OECD (2014e) looked at the distributional effects of consumption taxes from a lifetime perspective (however this study did not include Australia). The report claimed that current expenditure is likely to be a better base than income to measure the lifetime distributional effect of a VAT. There are two reasons for this. First, expenditure is likely to vary less over a person's lifetime than income, and hence is a better proxy for lifetime earnings. Second, the ability to borrow and save means that there is not necessarily any direct link between income earned and VAT paid in a particular year, and this can lead to misleading results if an income base is chosen.[29] The OECD (2014e) found that, while consumption taxes at a point in time (when compared to income) tend to be regressive, from a lifetime perspective, consumption taxes (when measured as a share of expenditure) in most countries are either roughly proportional or slightly progressive. Given that Australia was not included in the analysis, and that there can be large differences in the

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[29] For example, a low current income household that borrows to finance higher current consumption will appear to face a high VAT burden relative to its current income. However, in the future that household will need to pay back the borrowed money, at which time it will consume less and face a lower VAT burden.

coverage of VATs between countries (noted above), caution should be used when using the results from this OECD study to draw inferences for Australia. In chapter 4 results for Australia report GST paid as both a share of income and expenditure.

The tax and transfer system tends to redistribute from younger to older cohorts

Australian evidence suggests that on average, younger people, particularly those in prime working-age years, tend to pay more in taxes than they receive in transfers, whereas older people are net recipients. Data from the ABS (2012) show that the tax and transfer system (including in-kind services) redistributes income from the young to the old (figure 3.12). For example, final income is less than private income earlier in life; particularly for those aged under 35 with no children (LHS of figure 3.12, depicted by the solid lines). In contrast, later in life, where the household head is 65 or over (depicted by the dotted lines on the right hand side), final income is much higher than private income.

Similar conclusions have been made in other Australian studies. For example, Harding Lloyd and Warren (2004) using a microsimulation model based on ABS survey data, and Tapper, Fenna and Phillimore (2013) using data presented in ABS fiscal incidence studies over a 26-year period.

Using Australian data for 2009-10, Rice, Temple and McDonald (2014) constructed estimates of net taxes and transfers across specific ages. The results show a distinct pattern over the life cycle — with three different stages at which people are either net recipients or net contributors to the tax and transfer system. On average:

- people are net recipients up until their early 20s

- people aged in their early 20s to early 60s pay more in taxes than they receive in transfers

- older Australians (over mid 60s) are net recipients.

This pattern is also found in New Zealand and in the United Kingdom (Aziz, Gemmell and Laws (2013) and Cardarelli, Sefton and Kotlikoff (2000), respectively). Aziz, Gemmell and Laws (2013) used a non-behavioural microsimulation model to estimate the distribution of taxes, transfers and social spending for different age groups in New Zealand in 2009-10. Results were also decomposed by gender, which provided some notable differences. While men were predicted to become net contributors to the government budget once they reached their mid-20s, this did not occur for women, on average, until their mid-40s. The authors attributed this to a combination of lower workforce participation, higher health and education spending, higher income support payments received and lower direct and indirect taxes paid by women in these age groups. Both men and women again become net recipients at similar ages when they are older (which occurs at over 60 years for both).

The size of the net benefit to older people in Australia has also increased over time. Tapper, Fenna and Phillimore (2013) concluded that the redistribution towards elderly

households proceeded at a steady pace from 1984 to 2003-04, but accelerated after 2003-04, mainly due to increased benefits in health care and pensions.[30] Daley et al. (2014) reported that a household headed by someone over 65 received more than $8500 (in 2010 dollars) in additional government spending on health compared to two decades ago — by far the largest increase of any age group. A continuation of this trend could have important ramifications because of the ageing population (section 3.4).

Measuring redistribution over the life cycle

Rather than using annual data and comparing incidence for different age groups, some studies have estimated tax and transfer incidence for families over their lifetimes. Dynamic microsimulation models can include assumptions on family formation, labour force participation and income dynamics over the life cycle to simulate tax and transfer incidence over the lifetime of representative families. Australian studies that have used this approach have generally found that the distribution of taxes and transfers is more equal when examined on a lifetime basis rather than an annual basis (Creedy and Van De Ven 2001; Harding 1993). This suggests that the tax and transfer system redistributes income between the same people at different stages of their life. As people's circumstances change, they may be a net payer or net recipient of the tax and transfer system at different times in their lives. Indeed, the purpose of some employee SSCs is to provide income to the same people when they face different circumstances (for instance, unemployment or retirement).

These studies also found that taxes and transfers reduced lifetime income inequality, indicating that some redistribution between people also occurs. A comparison of tax and transfer systems in Australia and Britain, using comparable dynamic microsimulation models, found that the Australian system, with its greater emphasis on social assistance rather than social insurance, results in greater redistribution of income between individuals over a lifetime (Falkingham and Harding 1996).

The modelling in chapter 6 also includes estimates of tax and transfer incidence throughout the same people's lifetimes. However, unlike the studies cited here, a dynamic microsimulation model was not used (appendix B describes the modelling approach used specifically in this paper).

3.4   Lessons from the literature

The literature cited in this chapter, notwithstanding the measurement issues described above and that it is somewhat dated in parts, highlighted some consistent findings. Overall, most studies suggest that Australia's tax and transfer system is very progressive and targeted, leading to a redistribution of income from high to low income households —

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[30] However, the study does not discuss the potential implications of changes in the ABS' methodology over the study period, which could influence comparisons over time.

though the extent of redistribution is likely to be more muted if considered on a life cycle rather than snapshot basis. Part of the reason for this high progressivity, particularly when using a snapshot analysis, is Australia's relatively low reliance on consumption taxes.

One consequence of having such a targeted system is that there is a high degree of churn occurring for some groups of people (section 3.2), although Australia's churn is low compared to other countries. Churning may nevertheless be costly. Two costs from churning (Treasury 2008) are:

- separate administration of the tax and transfer system — can a similar outcome be achieved with less churn?

- compliance costs on individuals, who are subject to different information and compliance requirements from the combined effects of the two systems.

Reforms that, among other things, have been directed at reducing churn, have been proposed in Australia from time to time, including schemes with features of negative income taxes — Henderson (1975) is probably the most well-known.

Another consequence of a progressive and targeted system is the potential for unintended consequences, for example on the incentives to work, save and invest (chapter 2). As noted in section 3.2, research has shown that some low income households or those receiving transfer payments face high EMTRs (because transfer payments phase out as income rises).

While data limitations make it difficult to analyse tax and transfer incidence over the life cycle (studies typically compare age-cohorts by using cross-sectional data), some consistent findings emerge from the literature.

- Younger people (those aged up to their early 20s) are, on average, net recipients from the tax and transfer system (they receive more in transfers and services than they pay in taxes).

- On average, people in their prime working years are net contributors. Although for many people with children, transfers roughly offset taxes paid (mainly due to Family Tax Benefit payments).

- Older people are net recipients, on average, mainly due to the Age Pension and health services. In addition, concessional superannuation tax arrangements now allow people over 60 to materially reduce their income tax liability (Daley et al. 2014).

These findings are likely to be of growing importance in the future. Issues surrounding intergenerational equity (whether a demographic cohort receives more in transfers than taxes over their lifetimes) have recently been raised in the broader context of intergenerational wealth (not only income) by the Grattan Institute (Daley et al. 2014). A key finding from that report is that, while older Australians on average pay less in taxes than they receive in benefits (which is a longstanding occurrence), the size of the average real net transfer to older households has increased in the past few years. This is primarily a result of increased spending on health and the Age Pension, and limited taxes paid by this

cohort on the private income they receive at that stage of their lives. With life expectancies expected to rise (Australian Government 2015), the share of households that are net recipients of the tax and transfer system could increase, notwithstanding that the growing maturity of the compulsory superannuation system may partly mitigate this. This could have important implications for the fiscal sustainability of the tax and transfer system.

The above issues suggest that a thorough analysis of the tax and transfer system over the life cycle that incorporates future demographic trends will be useful for policymakers. The modelling results presented in chapter 6 take into account these two considerations.

4 Tax and transfer incidence

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Key points

- The Australian tax and transfer system redistributes income from high-income families to low-income families, from high-wealth families to low-wealth families and from working-age families to retirement-age families.

    - Nearly 20 per cent of families pay personal income tax and receive transfers at the same time. Due mainly to the structure of family payments, families with children account for 80 per cent of families that simultaneously pay personal income tax and receive transfers.

    - Average tax paid (personal income tax and GST) increases steadily with private income. Transfers are predominantly paid to families with private incomes of less than $25 000.

    - Average tax paid may increase with wealth but not consistently. As wealth rises, income tax generally increases, but the amount falls for families with $200 000 to $500 000 in net assets before increasing again.

    - Transfer payments are less strongly related to wealth, mainly because the family home is not included in assets tests. A significant proportion of transfers are paid to families with net assets of between $200 000 and $1 000 000. These are mostly Age Pension payments to families that own their own home.

    - Across the population, tax paid increases with age until it peaks in middle age and then declines as retirement age approaches. On average, families aged 60+ pay the least in taxes, receive the most in transfers and receive more in transfers than they pay in taxes.

    - Although some families aged 60+ have higher levels of wealth, average private income is much lower than among somewhat younger age groups.

- As private income increases, the effective average tax rate also increases, consistent with a tax and transfer system that is designed to transfer income from high-income to low-income families.

    - Effective average tax rates are negative for families with very low private incomes and for those with low wealth, indicating that they receive more in transfers than they pay in taxes.

- The composition of taxes paid and transfers received varies by income and age.

    - Average personal income tax and GST paid tend to increase with private income, and both peak in middle age.

    - Average GST paid as a proportion of disposable income and as a proportion of expenditure decreases slightly with private income. However, there is wide variation within private income groups.

    - Aged and disability payments represent the largest share of transfers to families with low private incomes, whereas family payments represent the largest share of transfers to families with middle incomes.

    - Transfer payments to students and people of working age are directed mainly towards younger age groups, family payments are mainly paid during middle age, disability and carers payments peak in later working-age groups, and aged payments are paid almost exclusively to families in the 60+ age group.

</div>

This chapter examines how the Australian tax and transfer system redistributes income between families, focusing on personal income tax, the GST and transfer payments. The chapter begins by briefly describing the modelling framework in the analysis (section 4.1). It then investigates how families are distributed by income, wealth, age and other demographic groupings (section 4.2). The incidence of taxes and transfers are then discussed, first by income and wealth (section 4.3) and then by age and family type (section 4.4). Finally, the chapter examines families that simultaneously pay taxes and receive transfers (section 4.5).

In the analysis of families in chapters 4 to 6, families are defined to include singles and couples, both those with and without dependent children (box 4.1).

4.1   Approach to analysing tax and transfers

The analysis of incidence in this chapter and chapters 5 and 6 is based on a model of the Australian tax and transfer system. The base model, called CAPITA, was provided by the Australian Treasury. This is complemented by modules for the GST, Child Care Benefit and Child Care Rebate developed by the Commission. This modelling framework allows the impacts of policies and individual circumstances on family incomes to be simulated (box 4.1).

Box 4.1	**Defining families and family age groups**

The Australian tax system and transfer system use different units of assessment (chapter 2). Taxable income is assessed mainly on an individual basis, whereas eligibility for transfer payments is assessed based on the income, wealth and circumstances of the individual, their spouse and any dependants that live in the same household. To allow tax and transfer flows to be analysed on a consistent basis, the unit of analysis in chapters 4 to 6 is the 'income unit' which includes spouses and dependants. For simplicity, income units are described as 'families' in the body of this paper. The term 'single families' refers to both single people and single parent families, and 'couple families' refers to both couples with and without children.

The age-related results reported are based on the average age of the primary and secondary income earners in a family. This means, for example, that taxes and transfers attributed to families in '15 to 29' age group do not account for tax and transfer flows to and from each and every 15 to 29 year old in the population. Many 15 to 29 year olds are dependent students living at home and would be counted in the same 'family' as their parents. In these circumstances, the average age of the parents would determine the age group in which the family is classified.

The model includes a range of tax and transfer policies administered by the Australian Government in 2014-15.[31] CAPITA incorporates the personal income tax system (including a range of tax offsets for particular transfer recipients, an approximation of tax deductions more generally and taxes on superannuation drawdowns) and 40 transfer

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[31] All results are expressed in 2014-15 dollars.

payments. However, other components of the tax and transfer system are not included in the framework, such as taxes and concessions on fringe benefits and superannuation contributions and earnings, some other tax concessions, duties and excises, company tax, and state taxes and concessions.

The amounts of tax paid and transfers received are imputed using detailed data on the incomes and demographic characteristics of individuals and families from the 2011-12 ABS Survey of Income and Housing (SIH). Imputation is required because:

- the SIH includes tax and transfer rates for 2011-12 only, not for 2014-15

- official tax and transfer records from the Australian Taxation Office and Centrelink were not available for this project.

As a result of the imputation method, taxes and transfers could be overestimated or underestimated in the analysis.

- Personal income taxes paid are based on statutory rates, rather than actual amounts paid. This may overestimate the amount of tax paid as not all tax concessions are taken into account. That said, some deductions are also imputed and the degree of overestimation is unlikely to be high.

- Transfer payments received are based on statutory rates, and are assumed to be paid to those families recorded as receiving the transfer in the SIH. The total amount of transfers could be understated if the receipt of transfers is underreported in the SIH.

- Only income testing of transfers is incorporated in the model (assets testing is not taken into account), which could lead to an overestimate of the level of transfers for those with a high level of wealth.[32] However, the model imputes transfers based on whether the family was recorded as receiving the transfer in the SIH, which partly corrects for the absence of assets testing.

These issues have potential impacts on the results, as discussed in the analysis in this chapter. However, the estimation errors are likely to be small. Aggregate transfer expenditure and personal income tax in CAPITA are very close to aggregates recorded in final Budget outcomes, but aggregate GST is underestimated by about 26 per cent. The discrepancy in GST could partly reflect the amount that is collected by the Australian Government but not attributed to households (for example, input-taxed goods and services). This may not explain all of the difference and so the absolute values of GST in this chapter may not be perfectly accurate, but the figures are meaningful in making relative comparisons between groups.

Further details on the modelling approach and its implications can be found in appendix B. Detailed tables of the results underlying the charts and analysis in chapters 4 to 6 are

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[32] At 1 July 2014, assets test limits allowed home owner couple families to receive a full pension if they had up to $286 500 in assets (aside from the family home), and a part pension if they had assets up to $1 134 000. In June 2015, the Australian Government passed legislation to tighten the targeting of the pension assets test and therefore reduce pension eligibility from 2017 (DSS 2015).

presented in appendix C. Appendix C also contains additional tables of results by income and wealth decile that are not presented in this chapter.

4.2 Income, wealth and demographics

Private income and wealth are important factors in determining tax and transfer flows between families. This section examines how private incomes and wealth are distributed across families and between different 'family age groups' (box 4.1). It also explores how income differs by family type.

Families at a glance

The analysis in this chapter considers a population of 12.1 million families that are headed by a person aged 15 years or over (table 4.1).[33] Over half of these are single families (either with or without children), whereas the remainder are couple families. About one-quarter of families have dependent children — predominantly couple families. Three-quarters of families are aged under 60.

How are families distributed across private income and wealth?

The distribution of families across private incomes is positively skewed — there are fewer families in the upper end of the distribution than in the lower end of the distribution. About 35 per cent of families have annual private incomes of $25 000 or less, including 12 per cent that have no private income at all (figure 4.1).[34] Only about 20 per cent of families have private incomes over $100 000.

A number of families have negative private incomes, mainly due to losses on unincorporated businesses. This outlying group makes up less than 0.5 per cent of all families and is excluded from the analysis below so as to avoid distorting the results.

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[33] The SIH collects information from usual residents of private dwellings, excluding those in very remote areas. This represents about 97 per cent of the Australian population. CAPITA includes a module to impute incomes and transfers for the remaining part of the population, but the module was not used in this project.

[34] In chapters 4 to 6, the $0 to $25 000 private income group consists of families that have private incomes greater than $0 and up to $25 000. The $0 private income group consists of families that have no private income.

Table 4.1   Families by demographic characteristic[a]

2014-15

	Number of families (million)	Percentage of all families
Total	**12.1**	**100**
Single families (including single people)	**6.2**	**52**
without children	5.7	48
with children	0.5	4
Couple families	**5.8**	**48**
without children	3.4	28
with children	2.4	20
All families without children	**9.2**	**76**
All families with children	**2.9**	**24**
Families by age group		
15 to 29	3.0	25
30 to 39	2.1	18
40 to 49	2.0	17
50 to 59	1.8	15
60+	3.1	26

a Totals may not add up due to rounding.

Source: Commission estimates.

Figure 4.1   Distribution of families across private income groups

2014-15
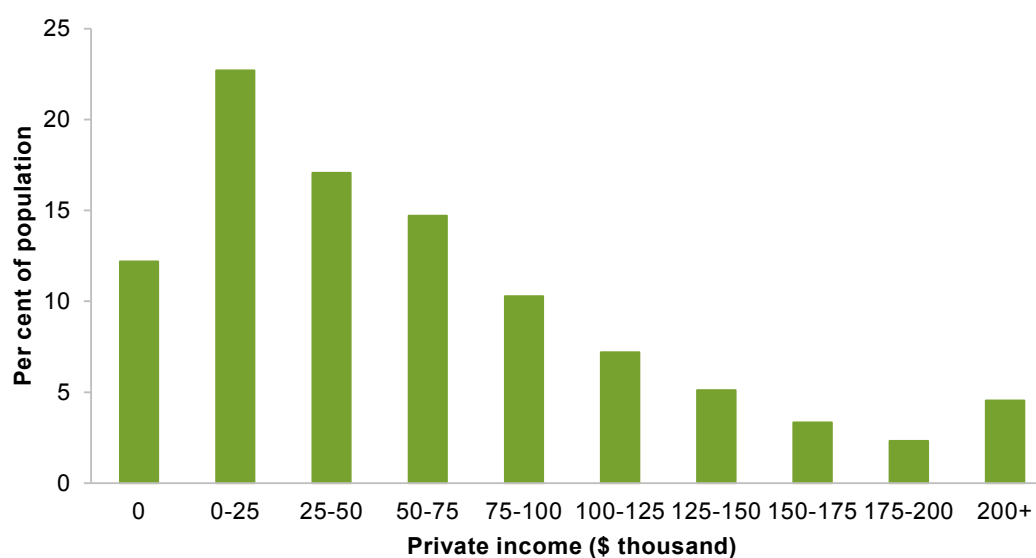
Source: Commission estimates.

When families are distributed by wealth (defined as assets less liabilities, including mortgage liabilities) two groups are clearly distinguishable — families with very low levels of wealth and families with moderate to high levels of wealth (figure 4.2). Among families that have less than $200 000 in wealth (about half of the population), most are not home owners. In contrast, about 80 per cent of families that have more than $200 000 in wealth do own a home (with or without a mortgage). The remaining 20 per cent in these moderate- to high-wealth groups do not own a home.

Figure 4.2   **Distribution of families across wealth groups^a**
2014-15
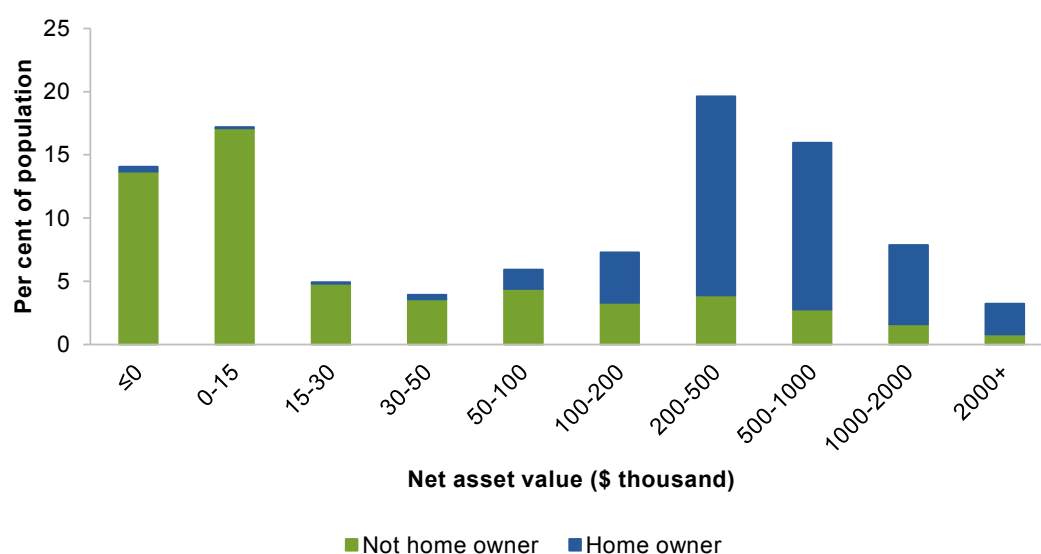
^a 'Home owners' include families with and without mortgages.

Source: Commission estimates.

How is private income distributed across age groups?

The average private income of families exhibits a distinct age profile (figure 4.3). Average private incomes rise across younger age groups, peaking in middle age (40 to 49) before declining as family income earners approach retirement. In the 40 to 49 age group, the average private income is $96 200 per year. By contrast, the average private income in the 60+ age group is only $31 100.

Figure 4.3   **Average private income by family age group**
2014-15
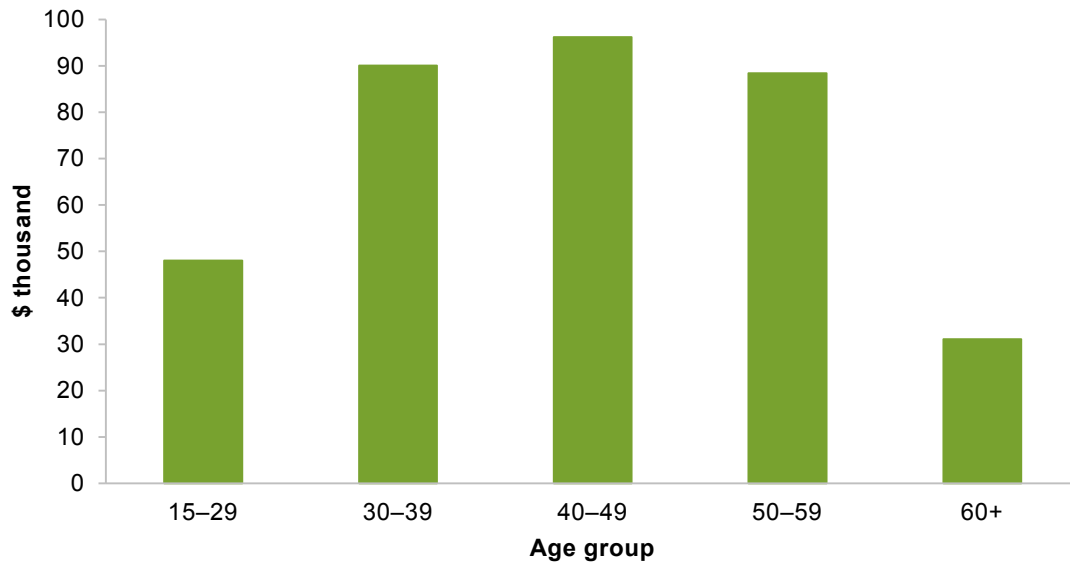
Source: Commission estimates.

Much of the difference in average private incomes reflects underlying differences in family composition (figure 4.4). In particular, the proportion of couple families is relatively high in the middle age groups. The average private income of couple families is substantially higher than that of single families across all age groups due mainly to the potential for multiple income earners. For example, in the 40 to 49 age group, the average private income of a couple family is $127 000 and the average private income of a single family is $44 500. Single families are more prevalent in younger and older cohorts, and therefore these cohorts have lower average private incomes.

Yet differences in family composition explain only part of the age profile of private incomes. When couple and single families are identified as separate groups, private incomes still vary with age within each group. Differences in average private incomes between age groups may also reflect differences in:

- work experience (as older people are likely to have more experience in the workforce)

- working arrangements (as young people and people nearing retirement are more likely to work part-time than full-time)

- employment opportunities (as young people are more likely to be unemployed).

Figure 4.4   **Relationship status and average private income**
2014-15

Relationship status by age group

Average private income by relationship status and age group

■Single ■Couple
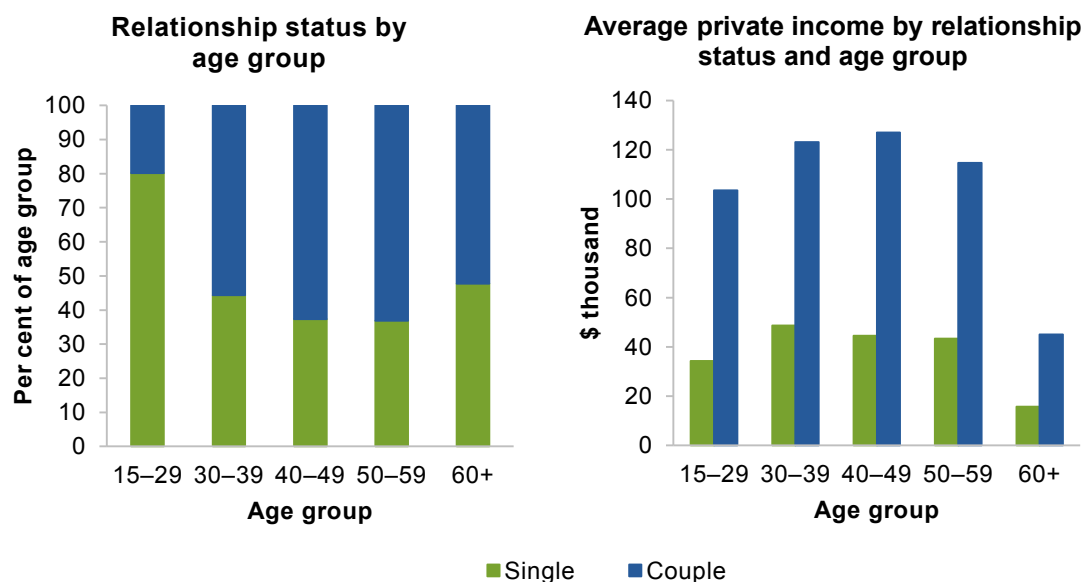
Source: Commission estimates.

Within each age group, private incomes vary widely. Private incomes tend to be more spread out in age groups where average private incomes are higher (figure 4.5). The middle 50 per cent of private incomes in the 15 to 29 age group has a range of $46 800. By middle age (the 40 to 49 age group), this range widens to $91 400.

Across all age groups, a significant proportion of families have low private incomes. Even among the 40 to 49 age group, nearly one-fifth of households have private incomes of less than $25 000. Although the average private income may rise with age and peak in middle age, in each age group there is a wide distribution of incomes and averages do not reflect the experiences of all families.

Figure 4.5   **Distribution of private income by family age group**[a]
2014-15
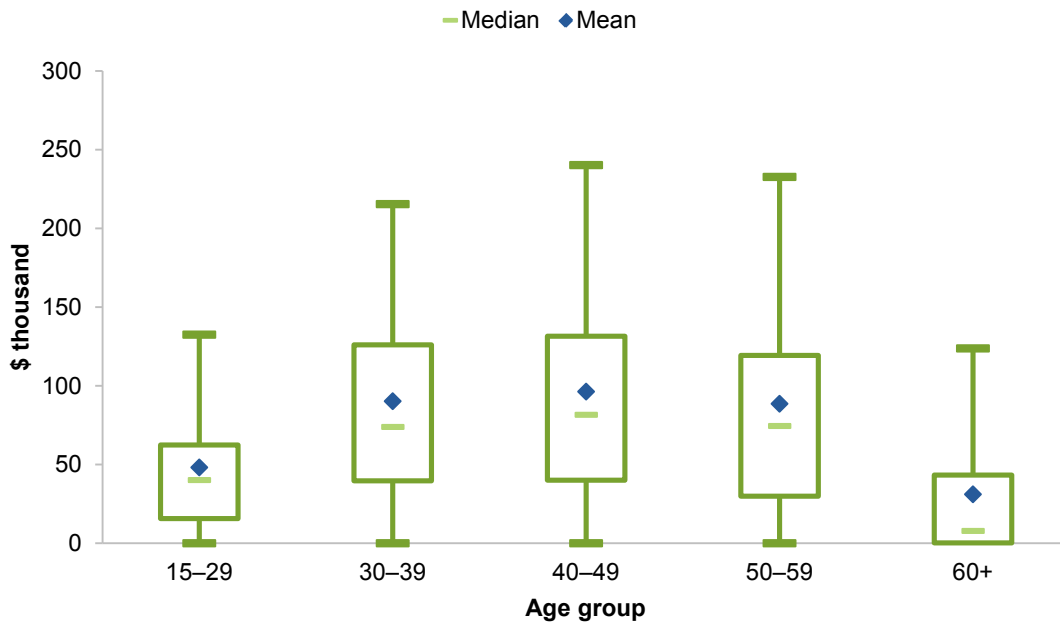
a The edges of the boxes represent income values between the 25th and 75th percentiles. The 'whiskers' extending out from the boxes show the values for the 5th and 95th percentiles.

Source: Commission estimates.

How is wealth distributed across age groups?

The average wealth of families (including the family home) increases with age, peaking in the 50 to 59 age group, before declining slightly in the 60+ age group (figure 4.6). This result is consistent with the idea that families tend to accumulate funds throughout their working lives and draw down these funds in retirement. The average wealth of families in the 50 to 59 age group is $728 100.

As with private income, the average wealth of single families is very different to that of couple families in each age group. In all age groups, the average wealth of single families is less than half that of couple families. The proportional difference in average wealth between single families and couple families decreases with age.

Figure 4.6   **Average wealth by family age group and relationship status**
2014-15

All family types

Net asset value ($ thousand)

1000
800
600
400
200
0
-200

15–29   30–39   40–49   50–59   60+

Age group

By relationship status

Net asset value ($ thousand)

1000
800
600
400
200
0
-200

15–29   30–39   40–49   50–59   60+

Age group

■ Single   ■ Couple

Source: Commission estimates.

The distribution of wealth changes considerably from one age group to the next. Among the working-age population, variance in wealth steadily increases with age (figure 4.7). The middle 50 per cent of families by wealth in the 15 to 29 age group has a range of $53 900. By the time income earners approach retirement age (the 50 to 59 age group), this range has widened fourteen-fold to $747 200.

Among the working-age population, the distribution of wealth also becomes increasingly skewed, with families concentrated below the average wealth level. The skew is strongest when average wealth is highest — in the 50 to 59 age group. In this age group, average wealth is $728 100, but median wealth is just $472 000. Further, many families still have relatively low total wealth. 28 per cent of families in the 50 to 59 age group have total wealth of less than $200 000 and 17 per cent of families in this age group have total wealth of less than $50 000.

In part, the variance in wealth within age groups is due to differences in wealth between families that own their home and those that do not. The proportion of home owners increases with age, and home owners tend to have higher wealth and higher variability in wealth than non-home owners.

Figure 4.7 **Distribution of wealth by family age group**[a]
2014-15
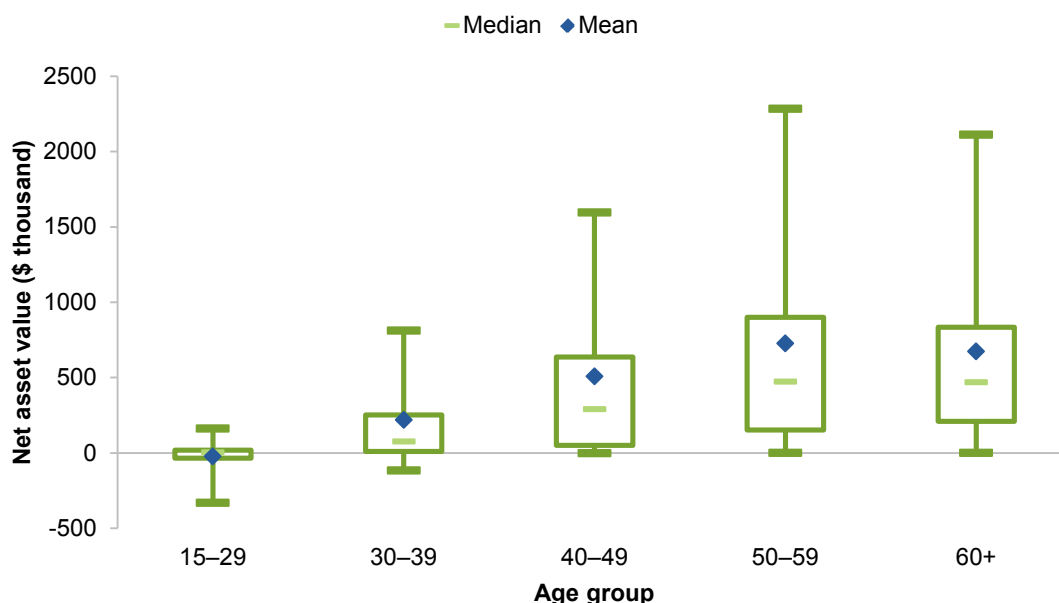
a The edges of the boxes represent wealth values between the 25th and 75th percentiles. The 'whiskers' extending out from the boxes show the values for the 5th and 95th percentiles.
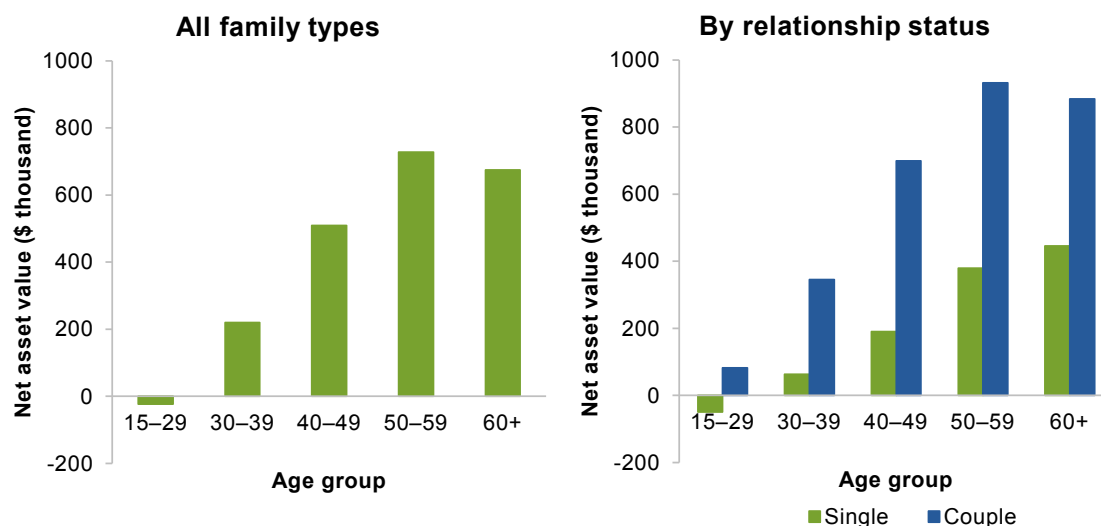
Source: Commission estimates.

How do private incomes differ by family type?

In terms of private incomes, in general, they tend to be higher among couple families than single families. Over half of all couple families have a private income over $75 000. In contrast, only about 10 per cent of single families have incomes greater than this threshold. There is also a greater spread in private incomes among couple families than among single families. These observations are consistent with many couple families having more than one income earner, whether partners and/or dependent children.

Families with dependent children also tend to have higher private incomes than those without children. Close to 60 per cent of all families with children have private incomes of over $75 000, whereas only about one-quarter of families without children have incomes within this range. This difference is explained in part by the link between relationship status and having children — families with children are more likely to be couples with two income earners. Families with children are also more likely to be of working age than those without children.

4.3   Tax and transfer incidence by income and wealth

This section analyses the amount and composition of taxes paid (including income tax[35] and GST) and transfers received by families, grouped according to their private income and wealth. Section 4.4 undertakes the same analysis for families grouped by age and type of family. All figures reported in this chapter are annual.

Who pays taxes and receives transfers?

Based on statutory rates, families earning more than $25 000 per annum in private income pay more in tax than they receive in transfers, whereas the opposite is true for families that earn less than $25 000 (figure 4.8).[36] 55 per cent of all taxes are collected from families with more than $125 000 in private income (about 15 per cent of the population). As a result of targeted means testing for many transfer payments, transfers are mainly directed towards the lowest income earners, with 77 per cent being received by families earning less than $25 000.

Figure 4.8   **Total and average taxes and transfers by private income**
2014-15
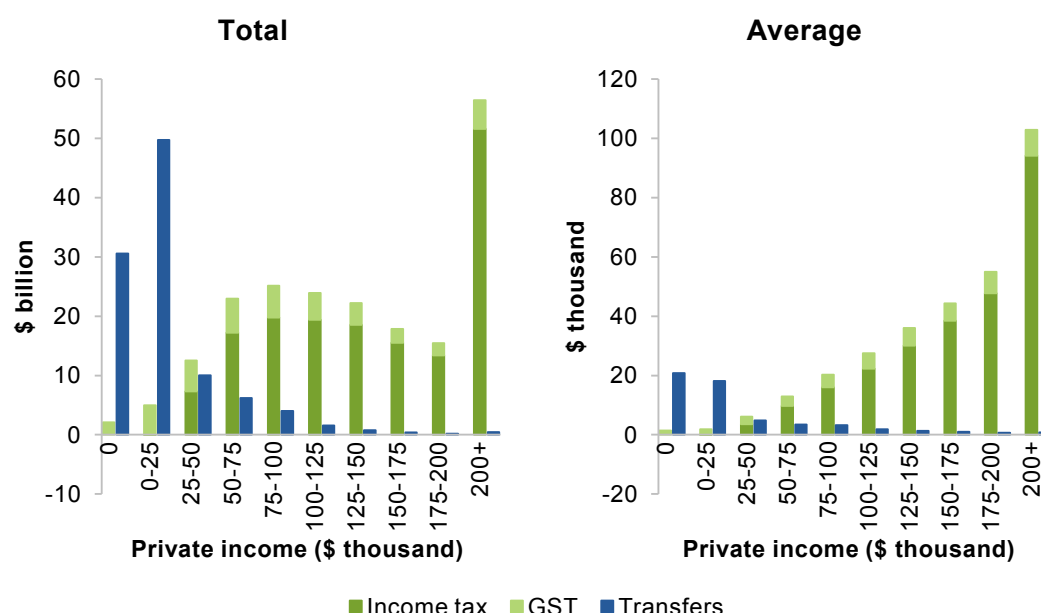
Source: Commission estimates.

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[35] The term 'income tax' in this chapter refers specifically to personal income tax.

[36] Families with $0 to $25 000 in private income have negative income tax of $7 on average. This is because some families (mainly older families) have franking credits worth more than their tax liabilities, and thus receive a refund amount equal to their excess franking credits.

The amount of tax paid tends to rise with private income, whereas the amount of transfers received tends to decline. Families with annual private incomes between $0 and $25 000 receive net cash transfers of $16 400 on average from the Australian Government. In comparison, families with annual private incomes of between $100 000 and $125 000 pay an average of $25 700 in net taxes. GST makes up the largest share of taxes paid by families with low private incomes, because they pay little income tax. The share of GST in total tax paid falls as private income rises because the increase in the amount of income tax paid is proportionally greater.

The composition of transfers received varies by income group (figure 4.9). Aged payments (including the Age Pension and associated supplements as well as payments to veterans and war widows[37]) are the largest share of transfers among the lowest income groups. They form 36 per cent of all transfers received by families with no private income and 61 per cent of transfers received by families with private incomes between $0 and $25 000. Disability payments (including the Disability Support Pension and associated supplements) are the second largest type of transfer received by families with no private income (31 per cent).

Figure 4.9   **Composition of total transfers by private income**[a]
2014-15
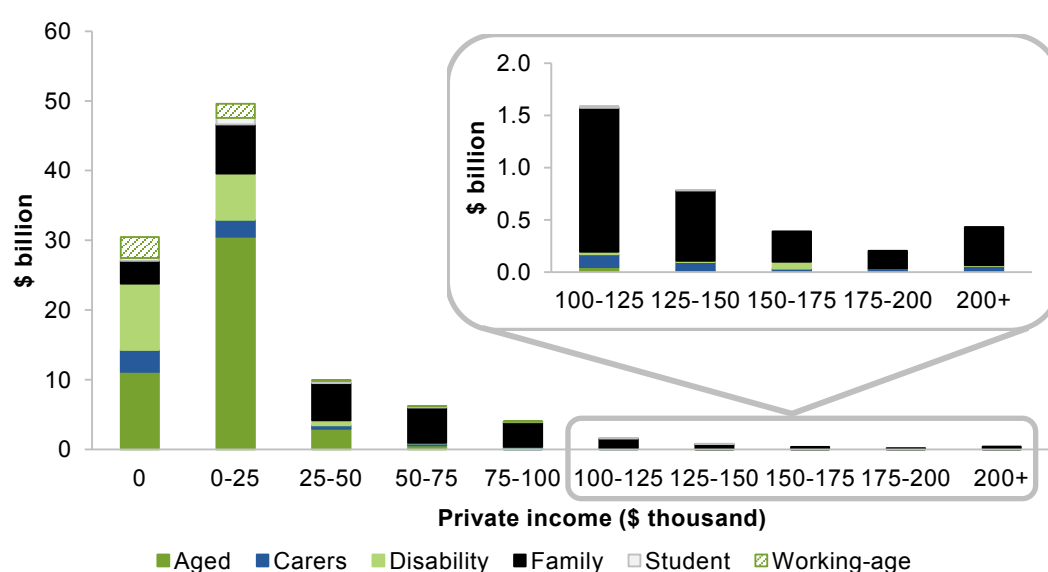
a Totals exclude uncategorised supplementary payments to income support recipients such as Utilities Allowance. These account for 0.3 per cent of total transfers.

Source: Commission estimates.

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[37] Pensions and allowances provided through the Department of Veterans' Affairs account for roughly 15 per cent of total aged payments.

Family payments (including Family Tax Benefit Parts A and B, childcare payments, parenting payments and some supplementary payments for families) are the largest share of transfers for families with private incomes greater than $25 000.

Carer payments (including Carer Payment, Carer Allowance and associated supplements), student payments (including Austudy, ABSTUDY and student Youth Allowance) and working-age payments (including Newstart Allowance and non-student Youth Allowance) represent a small proportion of total payments across all income groups. Most of these payments go to families earning less than $25 000.

The tax and transfer system also serves to redistribute income from high-wealth families to low-wealth families. In general, families with low wealth receive more in transfers than they pay in tax, and families with high wealth pay more tax than they receive in transfers (figure 4.10).

Figure 4.10   **Total and average taxes and transfers by wealth**
2014-15

Source: Commission estimates.

However, families with net asset values of $200 000 to $1 000 000 pay fewer taxes and receive more in transfers on average than those in some lower wealth groups. The break in

pattern is due to a cluster of older home owners with relatively low private incomes who pay little income tax (the family home is not included in assets tests for transfers).[38]

Decomposing taxes by wealth produces somewhat similar results to those for income. As for transfers, disability and family payments represent the largest shares among families with wealth of $15 000 or less (figure 4.11). Family payments feature more heavily in the share of transfers among low- to moderate-wealth groups. Aged payments are most prevalent among moderate- to high-wealth groups (which include a large proportion of families that are home owners) and make up about two thirds of all transfers received by families with net assets worth between $200 000 and $2 000 000. This suggests that, of the families receiving transfers and who have moderate- to high-wealth levels, a large proportion are retirees receiving aged payments.

Figure 4.11   **Composition of total transfers by wealth[a]**
2014-15
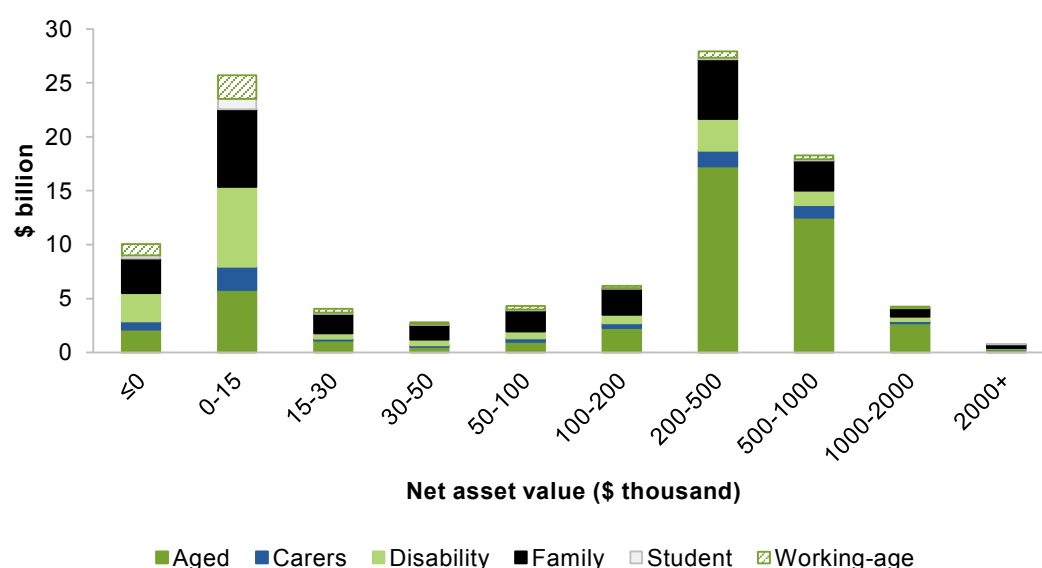
a Totals exclude uncategorised supplementary payments to income support recipients such as Utilities Allowance. These account for 0.3 per cent of total transfers.
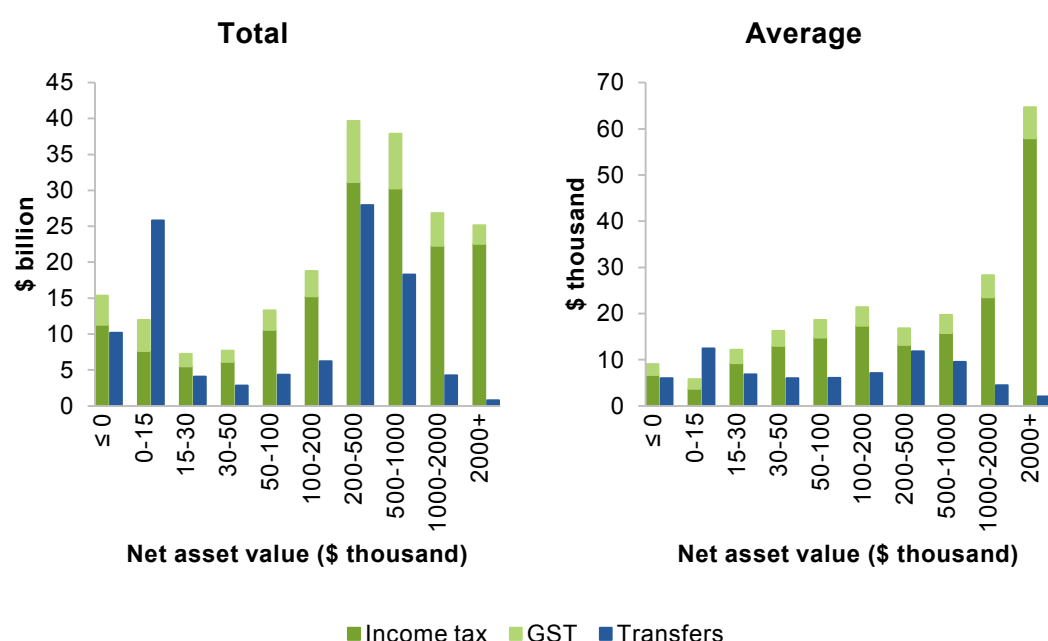
Source: Commission estimates.

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[38] This result (and some others discussed later in this section) may partly reflect the absence of assets testing in the model and the amount of transfers received by this group may be overestimated, though the degree of overestimation is likely to be low.

How do taxes and transfers differ between families as a proportion of income?

In proportional terms, private income has a positive relationship with income tax and a strong negative relationship with transfers (figure 4.12). These observations reflect the progressive income tax system and the targeting of transfers through means testing.

Figure 4.12 **Income tax and transfers as a proportion of private income, by private income group**
2014-15
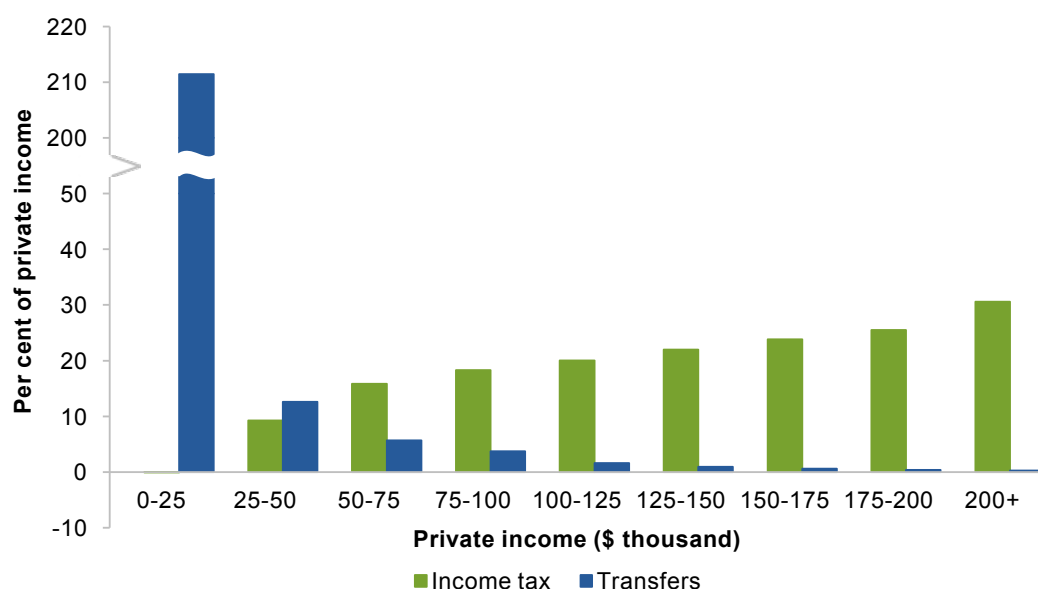
Source: Commission estimates.

The negative relationship between private income and transfers persists across all transfer categories (figure 4.13). The size of most transfer payments quickly drops as income increases, reflecting targeted income tests for these payments. For family payments, the drop is less steep. This is due to the higher income thresholds for certain family payments, such as Family Tax Benefits.

Figure 4.13   **Composition of transfers as a proportion of private income, by private income group**[a]

Per cent of private income, 2014-15

Aged[b]

130 per cent

Private income ($ thousand)

Carers

Private income ($ thousand)

Disability

Private income ($ thousand)

Family

Private income ($ thousand)

Student

Private income ($ thousand)

Working-age

Private income ($ thousand)
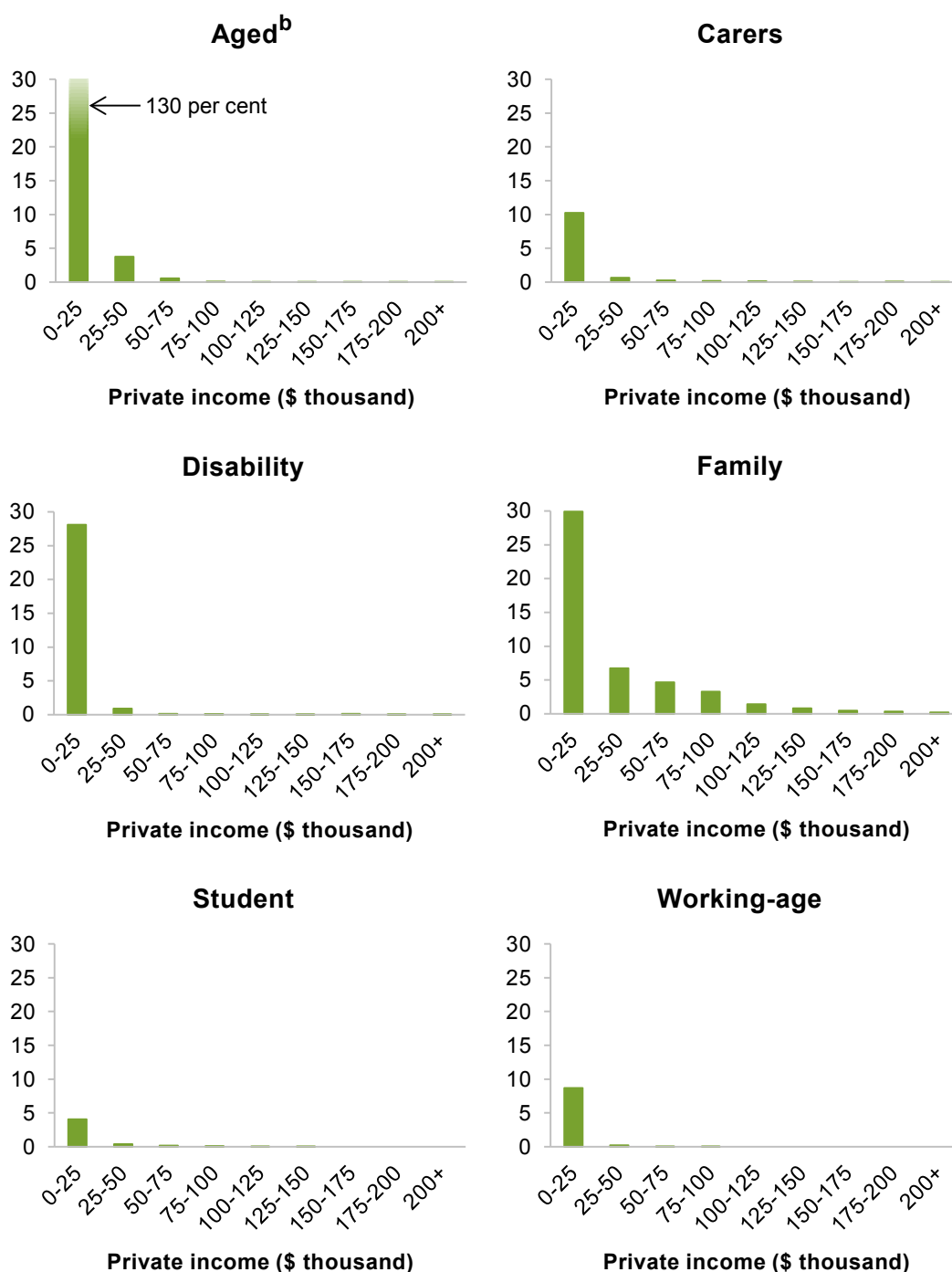
a The chart excludes uncategorised supplementary payments to income support recipients such as Utilities Allowance. These account for 0.3 per cent of total transfers. **b** The faded column indicates that the column extends above the vertical axis.

Source: Commission estimates.

GST is only a slightly larger proportion of disposable income for lower-income earners compared with other income groups (figure 4.14). For families with no private income, GST makes up about 7 per cent of disposable income on average. In contrast, for families with private incomes greater than $150 000, GST accounts for about 5 per cent of disposable income on average.

However, focusing on averages does not take into account the large degree of variation in GST paid as a proportion of disposable income, particularly within some lower-income groups. For some families, the proportion is over 10 per cent because of debt and dissaving. Families with no private income have relatively little dispersion in the upper end of the scale, with the 75th and 95th percentiles being equal at about 10 per cent. This may be because families with no private income have difficulties getting a loan and so are unlikely to spend more than they receive in transfers. In contrast, for families with $0 to $25 000 in private income, there is a difference of about 12 percentage points of disposable income between the 75th and 95th percentiles. This could be due to some families having irregular incomes that were able to access credit during previous higher income periods and/or families with low regular incomes that dissave (such as retirees). Although there are some families in low-income groups paying a large proportion of their disposable income in GST, many other families pay much lower amounts.

Figure 4.14   Distribution of GST as a proportion of disposable income, by private income group[a,b]

2014-15
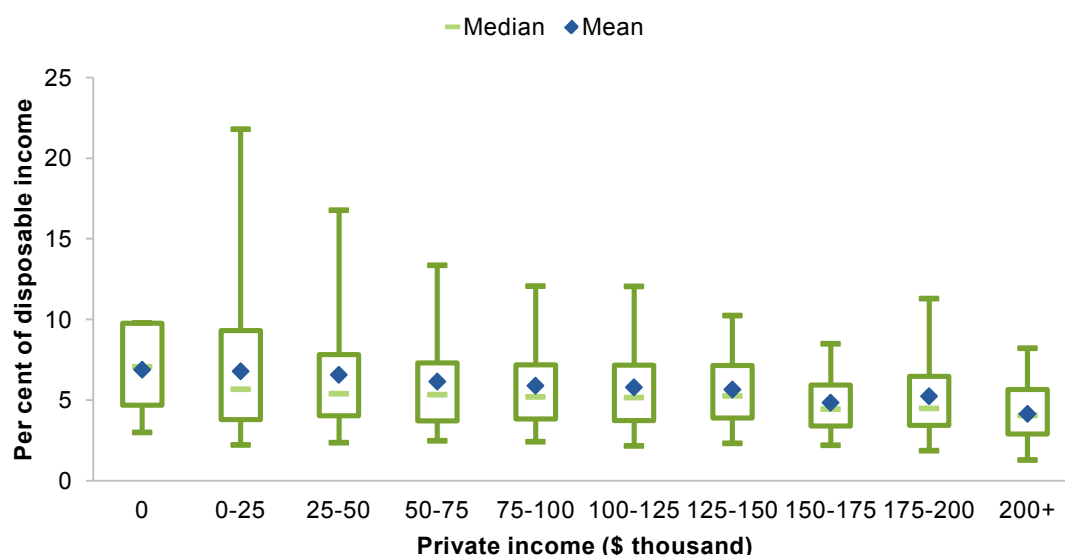
a The edges of the boxes represent values for the 25th and 75th percentiles. The 'whiskers' extending out from the boxes show the values for the 5th and 95th percentiles. **b** The matching process used to estimate GST (appendix B) means that the degree of dispersion may be underestimated in these figures.

Source: Commission estimates.

As a proportion of expenditure,[39] mean and median GST appear to decline slightly as private incomes rise (figure 4.15). The reason why GST may be lower as a proportion of expenditure for families with higher incomes could be because they are more likely to purchase GST-free items like private education and health services. However, there is wide variation within income groups, and the downward slope is not statistically significant.

Figure 4.15   **Distribution of GST as a proportion of expenditure, by private income[a,b]**

2014-15
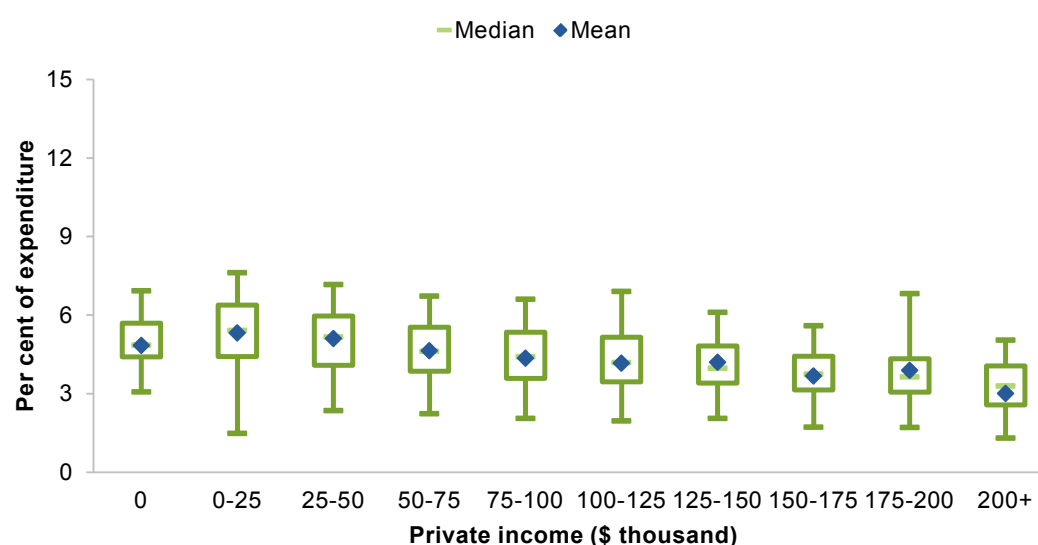
a The edges of the boxes represent values for the 25th and 75th percentiles. The 'whiskers' extending out from the boxes show the values for the 5th and 95th percentiles. **b** The matching process used to estimate GST (appendix B) means that the degree of dispersion may be underestimated in these figures.

Source: Commission estimates.

In terms of wealth, transfers are largest as a proportion of private income for families with between $0 and $15 000 in net assets. They are also relatively large for families with net assets worth $200 000 to $500 000. This is mainly due to aged payments (figure 4.16) — as described earlier, this group contains many elderly families with low private incomes and moderate wealth.

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[39] As the SIH does not contain data on expenditure, the expenditure data used in this analysis are indirectly estimated via a matching procedure (appendix B). Hence the level of the ratio in figure 4.15 is unlikely to be an accurate point estimate, and should not be compared to the level of the ratios in figure 4.14. The information is more meaningful in terms of the slope across income groups.

Figure 4.16   **Composition of transfers as a proportion of private income, by wealth**^a

Composition of transfers as a proportion of private income, by wealthᵃ

Per cent of private income, 2014-15

Aged

Disability

Net asset value ($ thousand)

Net asset value ($ thousand)

Family

Working-age

Net asset value ($ thousand)

Net asset value ($ thousand)
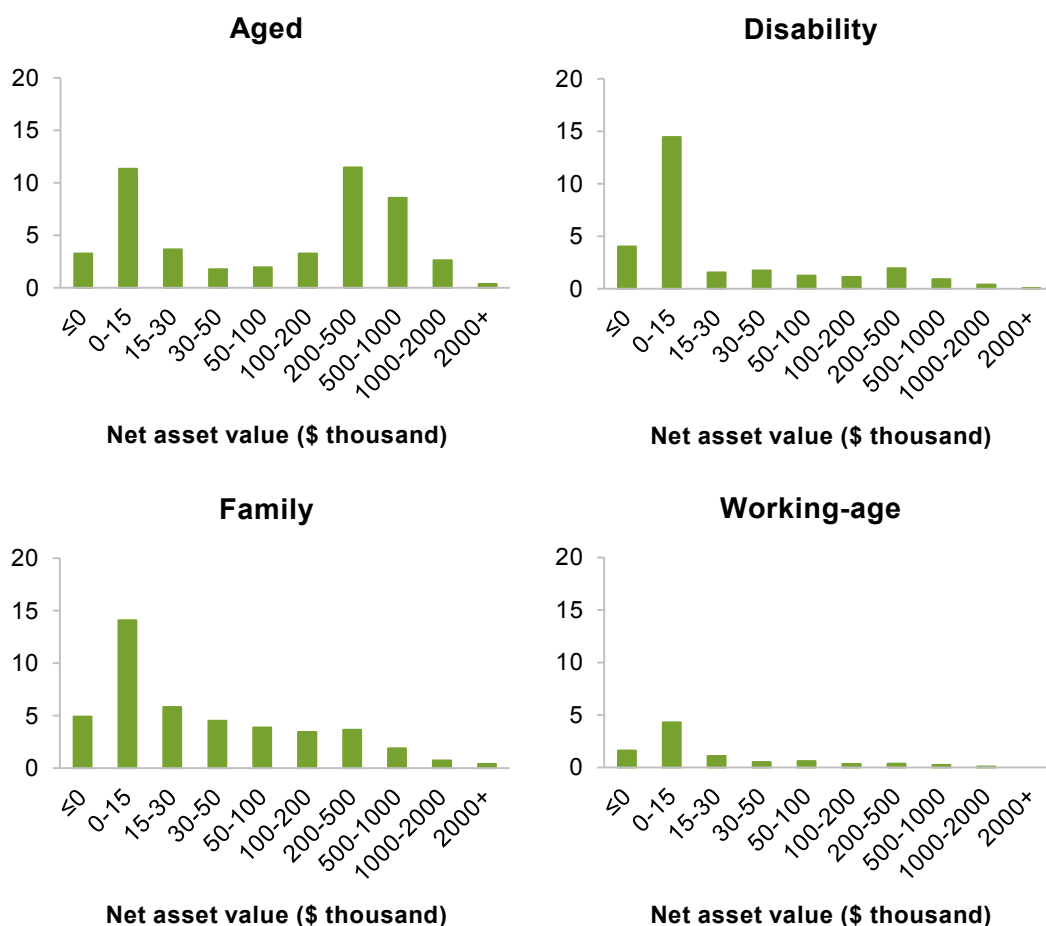
a The chart excludes carer, student and uncategorised supplementary payments. These account for 9 per cent of total transfers.

Source: Commission estimates.

How do effective average tax rates vary with income and wealth?

An effective average tax rate (EATR) provides an overall measure of tax and transfer incidence. In this chapter, it is calculated as the total amount of tax paid (personal income tax and GST) less the total amount of transfers received, divided by total private income (chapter 2, box 2.4). A higher EATR indicates higher net taxes paid relative to private income.

EATRs can be used to measure progressivity — under a progressive tax and transfer system, EATRs increase as private income rises, whereas under a regressive system, EATRs decrease as income rises. The results show that EATRs increase with private

income (figure 4.17). Families with private incomes of $0 to $25 000 have a negative EATR of minus 190 per cent on average, indicating that this group receives much more in transfers than they pay in taxes. EATRs steadily increase as private income rises, from an average of 3 per cent for families with private incomes of $25 000 to $50 000 to 33 per cent for families with over $200 000 in private income.

Figure 4.17   **Effective average tax rates by private income**
2014-15
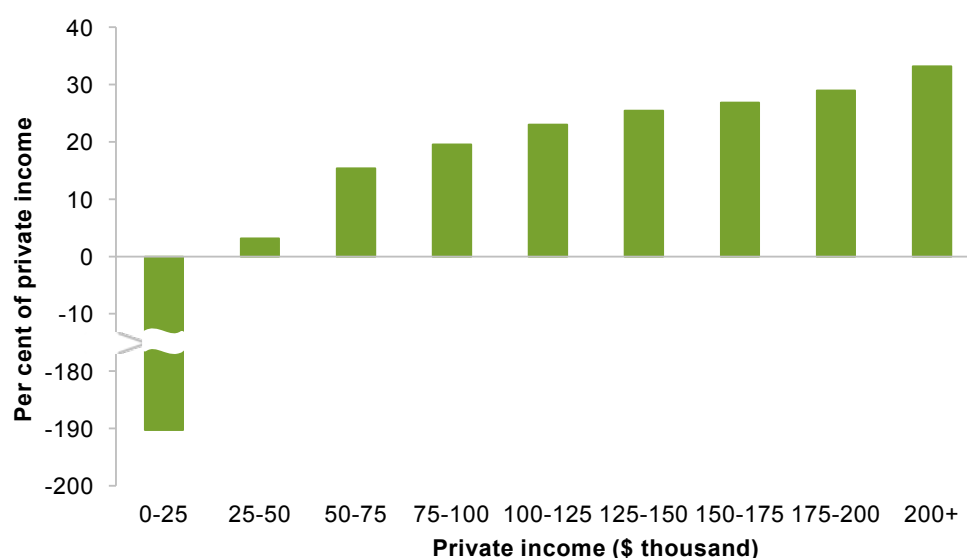
Source: Commission estimates.

In terms of wealth, families with $0 to $15 000 in net assets (17 per cent of the population) have the lowest EATR, at about minus 27 per cent of private income (figure 4.18). Families with wealth of $200 000 to $500 000 (about 20 per cent of the population) have the next lowest EATR, at 8 per cent of private income. This is mainly due to aged payments and low income taxes paid by the elderly in this group. As discussed above, the family home is not included in the pension assets test, so older families with low incomes and moderate levels of wealth can claim the Age Pension.

Families with zero or less wealth pay more tax than they receive in transfers on average, resulting in a positive EATR. This arises because some families in this group are earning private incomes but own few assets and have outstanding liabilities, such as personal loans and credit card debts.

Figure 4.18   **Effective average tax rates by wealth**
2014-15
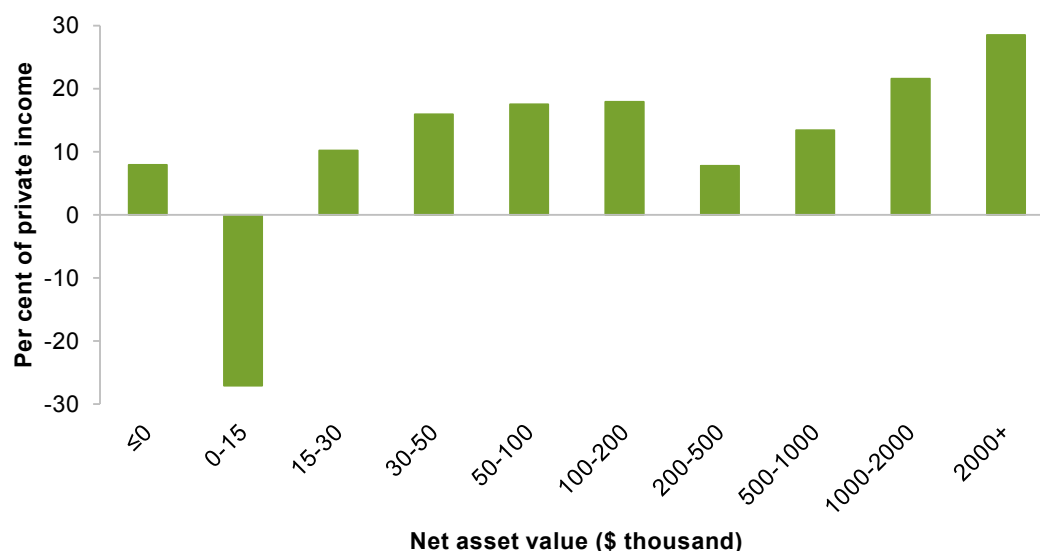
Source: Commission estimates.

4.4   Tax and transfer incidence by age and family type

The clearest age-related effect of the tax and transfer system is to redistribute income from families of working age to families of retirement age. Average net tax flows — taxes paid less transfers received — are positive across all age groups except for those aged 60+ (figure 4.19). On average, families in the under-60 age groups pay $15 300 more per year in taxes than they receive in transfers. By contrast, families in the 60+ age group receive an average of $10 900 more in transfers than they pay in taxes. Families in the 60+ age group also pay the least in gross taxes and receive the most in gross transfers, largely because this age group is least likely to be working. In total, families in the 60+ age group account for 51 per cent of all transfer expenditure.

Figure 4.19   **Average tax and transfer flows by family age group**
2014-15

Gross tax and transfer flows

Net tax and transfer flows

■ Taxes ■ Transfers
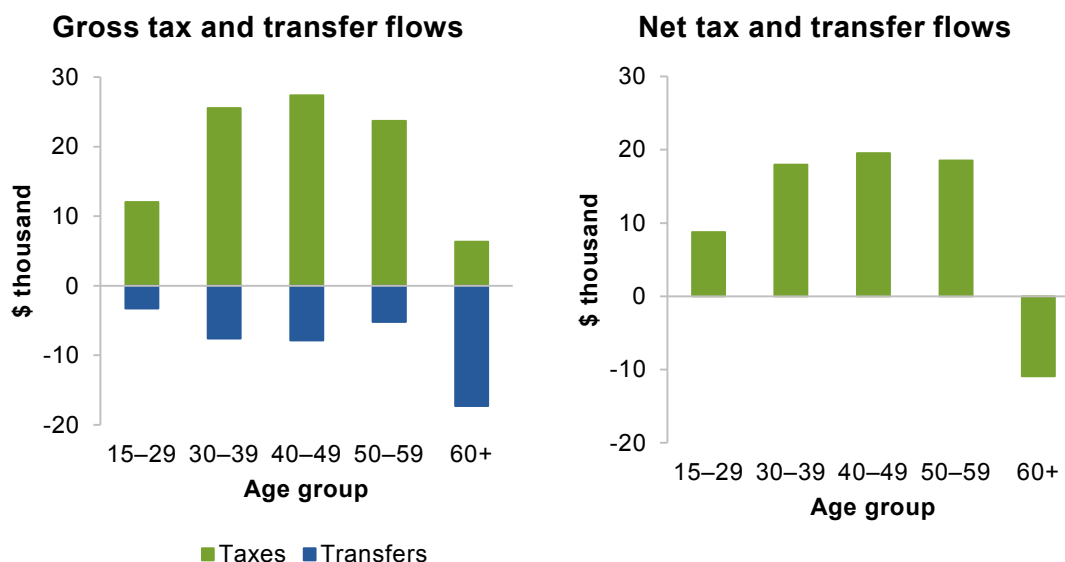
Source: Commission estimates.

Average net taxes increase with age, peaking in middle age before declining as retirement approaches. This is mainly due to differences in the average amount of gross tax paid. Taxes paid tend to follow the same age profile as private income. In the 40 to 49 age group, the total of income tax and GST paid averages $27 400 per family.

Aside from the 60+ age group, gross transfer flows follow a similar pattern to tax flows, rising with age before peaking in the 40 to 49 age group. In other words, the age group that pays the most tax is also the age group that receives the second most in transfers (after the 60+ age group).

This result can be explained by looking at the dispersion in net taxes paid by age group (figure 4.20). Although families in the 40 to 49 age group pay the most in net taxes on average, a significant proportion receive more in transfers than they pay in taxes. Among families in the 40 to 49 age group, 29 per cent receive more in transfers than they pay in taxes.

Figure 4.20   **Distribution of net taxes paid by family age group**[a]
2014-15
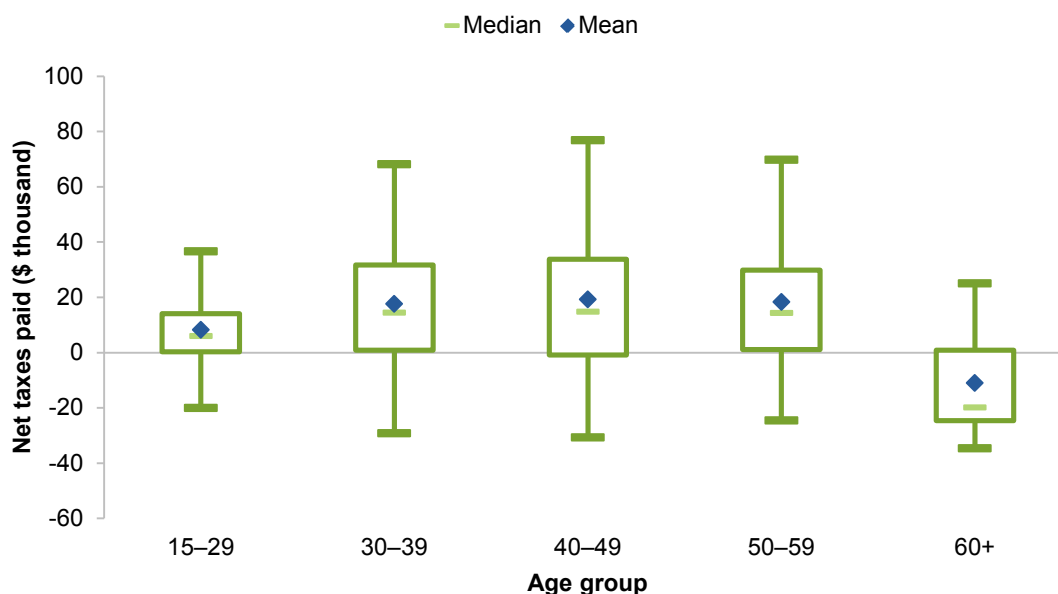
a The edges of the boxes represent net taxes paid between the 25th and 75th percentiles. The 'whiskers' extending out from the boxes show the 5th and 95th percentiles. When net taxes paid are below zero, a family is receiving more in transfers than it pays in taxes.

Source: Commission estimates.

Which age groups pay which taxes?

The two most important taxes for families — income tax and GST — have somewhat similar age structures (figure 4.21). Both average income tax paid and average GST paid rise in younger age groups, peak in the 40 to 49 age group and then decline as retirement age approaches. Across working-age groups, the ratio between GST paid and income tax paid is relatively constant. However, in the 60+ age group, this ratio is much higher. That is, families in the 60+ age group pay more of their tax in GST and less of their tax in income tax. This is perhaps because people in the 60+ age group are less likely to be working and paying income tax. Furthermore, their investment income may be taxed concessionally. That said, the absolute level of GST paid falls notably in retirement. Whether the ratio or the absolute level is more important depends on the policy proposal in question.

When GST is compared to expenditure,[40] there is a reasonably flat trend (though there is a large degree of dispersion within each age group) (figure 4.22).

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[40] As the SIH does not contain data on expenditure, the expenditure data used in this analysis are indirectly estimated via a matching procedure (appendix B). Hence the level of the ratio in figure 4.22 is unlikely to be an accurate point estimate, and should not be compared to the level of the ratios in figure 4.14. The information is more meaningful in terms of the slope across age groups.

Figure 4.21   Average income tax and GST paid by family age group

2014-15

Average tax paid

Proportional share of income tax and GST

■ Income tax   ■ GST
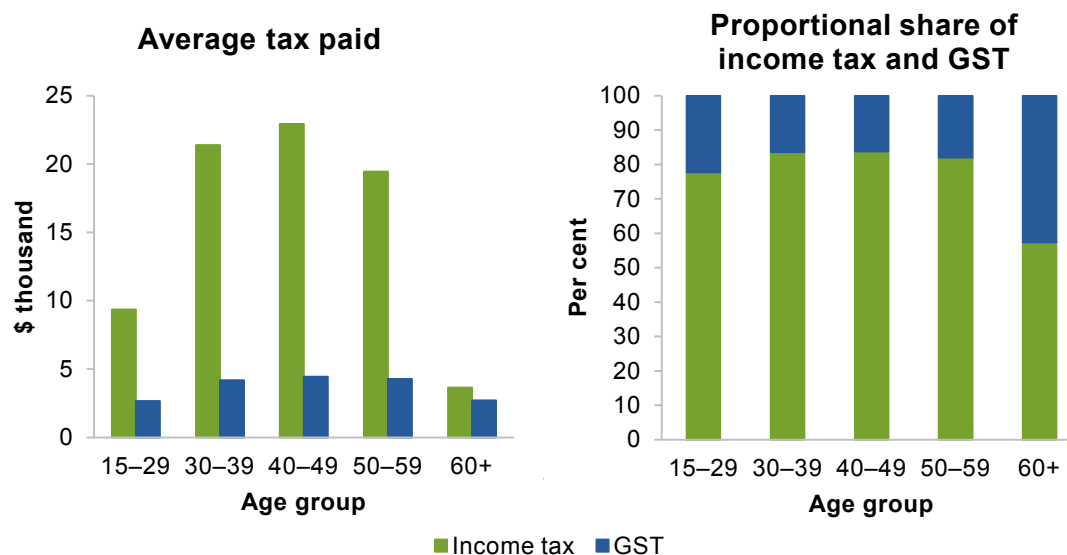
Source: Commission estimates.

Figure 4.22   Distribution of GST as a proportion of expenditure by family age group[a,b]

2014-15
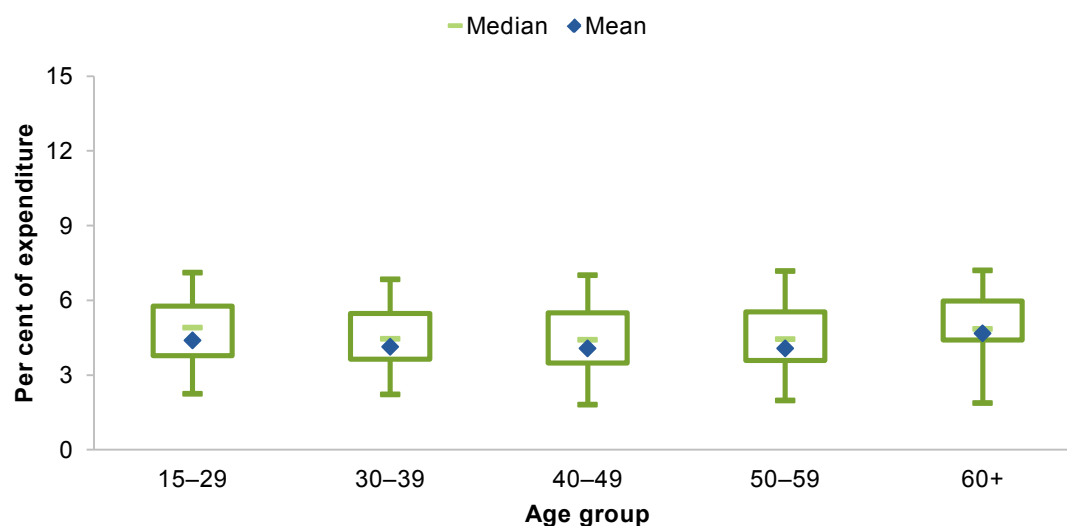
─ Median   ◆ Mean

a The edges of the boxes represent values for the 25th and 75th percentiles. The 'whiskers' extending out from the boxes show the values for the 5th and 95th percentiles. **b** The matching process used to estimate GST (appendix B) means that the degree of dispersion may be underestimated in these figures.

Source: Commission estimates.

Which age groups receive which transfers?

Different payment categories are concentrated in different age groups (figure 4.23). Aged payments are paid almost exclusively to families in the 60+ age group. Families in this age group received an average of $14 600 in aged payments per year. Aged payments are the main category of transfers for families aged 60+ and thus the main reason why total transfer payments to this group are so high.

Figure 4.23   **Composition of transfers by family age group^a**
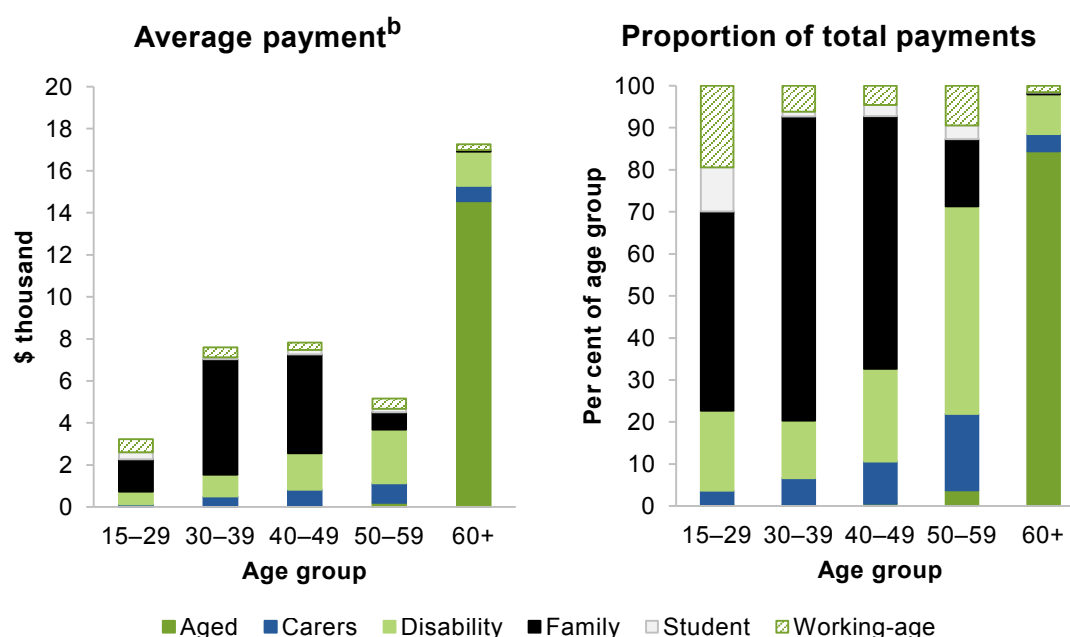
Figure 4.23   **Composition of transfers by family age group[a]**
2014-15

a Totals exclude uncategorised supplementary payments to income support recipients such as the Utilities Allowance. These account for 0.3 per cent of total transfers across all age groups. **b** This describes total transfers divided by the total number of families in the age group, not the average payment received by recipient families.

Source: Commission estimates.

For those under 60, on average, the largest category of transfers is family payments. Across all working-age families, including those that do not receive any transfer payments, the average total of family payments received is $3000. Family payments are highest for families in the 30 to 39 age group and 40 to 49 age group, accounting for 72 per cent and 60 per cent of all payments received by these cohorts, respectively. Family payments are the main reason that transfers peak in the middle age group (40 to 49) for families aged under 60.

Disability payments are the next largest category of payment to families under 60. The average payment across all families in this category peaks in the 50 to 59 age group at

$2600, accounting for half of all transfers to this age group. Payments fall dramatically for families in the 60+ age group mainly because eligibility for the Disability Support Pension ceases at 65. People receiving this payment then transfer to the Age Pension.

How do taxes and transfers differ by family type?

Couple families pay about three times the amount of tax paid by single families (including childless individuals as well as single parents). On average, single families pay $8500 in tax whereas couples pay $26 000. This reflects the higher incomes earned by couple families. Similarly, families with children pay a much higher amount of tax on average than families without children, as the former are more likely to be couple families.

Despite the large difference in tax paid, both couple and single family types receive similar amounts in transfers on average, at about $9500 and $8000 respectively. However, the composition of transfers differs. Both single and couple families receive a large proportion in aged payments, but single families account for a greater share of disability payments, whereas couple families (which are more likely to have children) receive a greater share in family payments.

In absolute terms, families with children receive more transfers on average than families without children. This is mainly due to the variety of family payments that families with children can receive, such as Family Tax Benefits, which can be paid to families on a broad range of incomes. For example, the maximum income limit for Family Tax Benefit Part A is about $102 000 for families with one child, and the limits increase with the number of children.

When analysed as a proportion of income however, the results reveal another story. Couple families pay a larger proportion of private income in income tax and receive proportionally less in transfers compared with single families with and without children (figure 4.24). This is because single families have lower private incomes, even though both family types receive about the same dollar amount in transfers.

Similarly, families with children pay a larger proportion of their private income in income tax and receive proportionally less in transfers than families without children. Even though families with children receive a greater dollar amount in transfers on average, they also have higher average private incomes, so transfers are lower as a proportion of income than they are for families without children.

Figure 4.24   **Income tax and transfers as a proportion of private income by family type**

2014-15
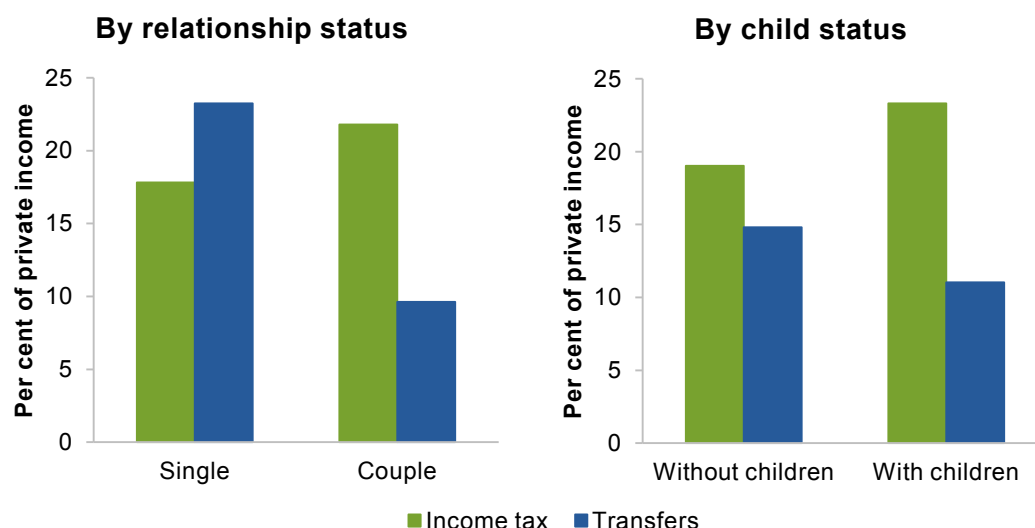
Source: Commission estimates.

4.5   Tax and transfer payers and recipients

Families can be grouped into four categories according to the relative amounts of income tax they pay and transfers they receive in a year.[41]

- Recipients only, who receive transfers but pay no income tax (32 per cent of all families).

- Net recipients, who pay at least one dollar in income tax but receive more in transfers (8 per cent of all families).

- Net taxpayers, who receive at least one dollar in transfers but pay more in income tax (11 per cent of all families).

- Taxpayers only, who pay income tax but receive no transfers (50 per cent of all families).

The majority of families with low incomes are recipients only. As incomes rise, families are more likely to be taxpayers only (figure 4.25). Net recipients and net taxpayers experience 'churn' — they simultaneously pay income tax and receive transfers. While common preconceptions suggest that there is a high level of churn in the tax and transfer system, overall, these groups represent just under 20 per cent of all families. Consistent with past studies, churn is more common among middle-income families.

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[41] Families that receive no transfers and pay no income tax (or receive no transfers and have negative income tax) are excluded from these results. They account for about 8 per cent of all families and are predominantly in the 15 to 29 age group.

Figure 4.25   **Taxpayers and transfer recipients by private income**
2014-15
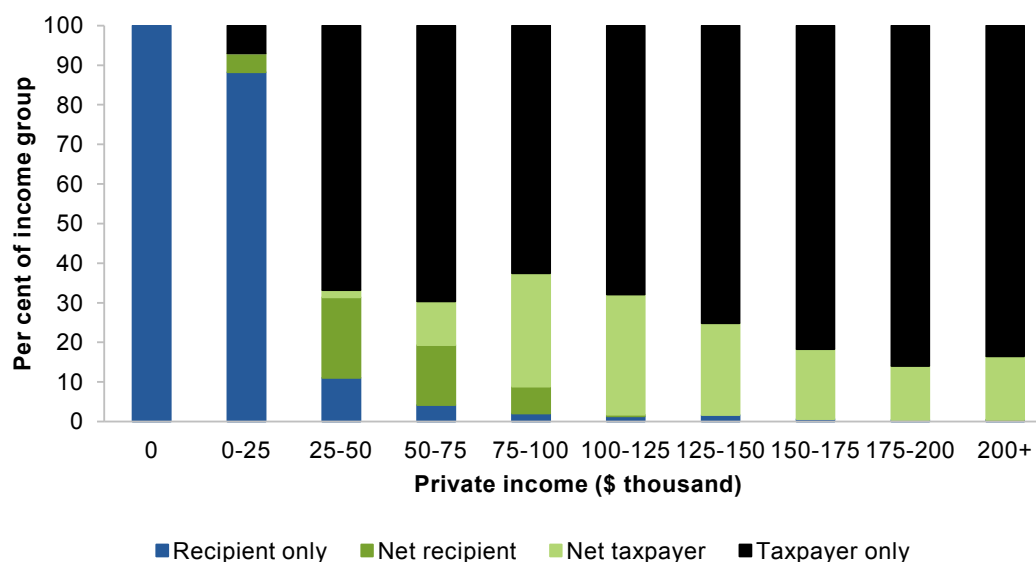
Source: Commission estimates.

Families could be experiencing churn due to three main factors.

- First, the analysis is based at the family level rather than at the individual level. This means that if one member of a family receives a transfer and another member pays taxes, the family experiences churn, even if no individual family member simultaneously pays income tax and receives transfers.

- Second, some family payments, such as Family Tax Benefits, are available to families with higher private incomes (that are more likely to be paying income tax) compared with other transfers, such as pensions.

- Third, although recipients of taxable transfers are generally eligible for tax offsets[42] that reduce their tax payable, some transfer recipients could still be paying a positive amount of income tax if they received other taxable income during the year, such that their tax payable exceeds the offset amount.

The proportion of families simultaneously paying income tax and receiving transfers is highest for the $75 000 to $100 000 group (35 per cent) (figure 4.25). Among families that have low private incomes and pay tax and receive transfers, the majority are net recipients. As incomes rise, the proportion of net taxpayers increases. The majority of these higher-income families receive family payments, which at high income levels result in small payment levels, making it more likely that recipients will be net taxpayers.

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[42] Examples of tax offsets include the Low Income Tax Offset, Seniors and Pensioners Tax Offset and the Beneficiary Tax Offset.

The effect of family payments is also evident when analysed by family type or by age group. Churn is most prevalent among families with children (figure 4.26) and among families in middle age (families aged 30 to 49, when family payments are most commonly paid). Overall, 80 per cent of all families that experience churn are families with children. However, that is not to say that a vast majority of families with children experience churn — about 57 per cent of families with children pay income tax and receive transfers at the same time, but a moderate 43 per cent of families with children are either recipients only or taxpayers only.

Figure 4.26   Taxpayers and transfer recipients by family type
2014-15
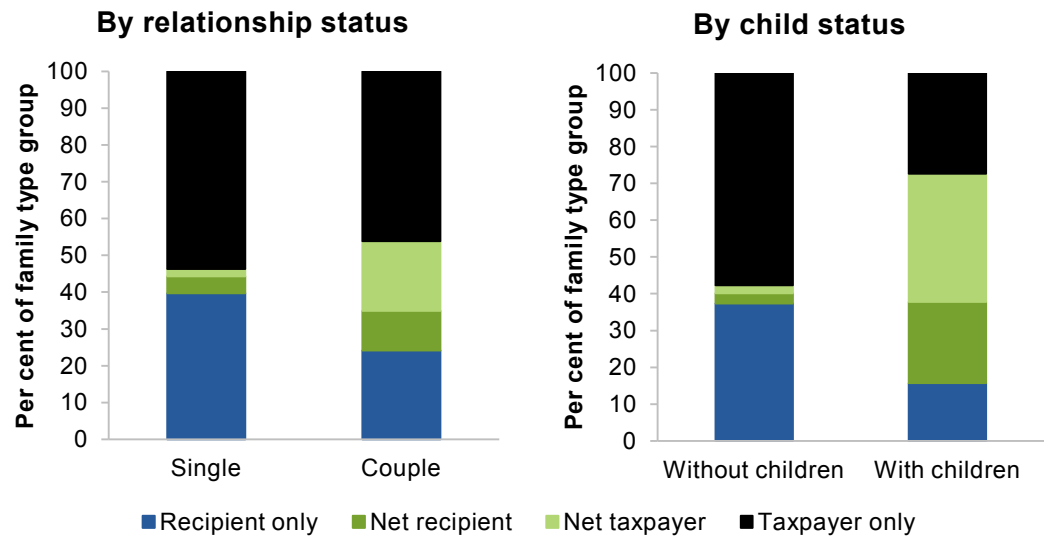
Source: Commission estimates.

5   Tax and transfer incentives

Key points

- To provide an indication of the effects of the tax and transfer system on incentives to engage in paid work, the Commission estimated effective marginal tax rates (EMTRs) and participation tax rates (PTRs).

- EMTRs measure the net result of the additional amount of personal income tax paid and transfers foregone when a family earns an additional unit of private income.

   – EMTRs were estimated based on a $5000 increase to the annual private income of one income earner in a family (equivalent to an additional half a day of work per week at the median individual income).

   – EMTRs were generated for both primary income earners and secondary income earners.

- By definition, the private income of the primary income earner is always the same or higher than the secondary income earner, so the EMTR faced by a primary income earner is also the same or higher in almost all cases.

- Among families that earn a private income, but make less than $25 000 a year, two-thirds have primary income earners that face an EMTR of 20 per cent or less, while about a quarter have primary income earners that face EMTRs of more than 40 per cent.

   – The EMTRs of more than 40 per cent largely reflect the withdrawal rates of 50 to 60 per cent for the Age Pension and Newstart Allowance, and the imposition of income tax and the Medicare Levy.

- About a quarter of primary income earners in families with earnings between $25 000 and $100 000 also face EMTRs in excess of 40 per cent.

   – These EMTRs are mainly due to the withdrawal of family payments coupled with higher marginal income tax rates for middle-income families.

- While punitive EMTRs exist, they affect relatively few (but potentially lower-income) families. Less than 2 per cent of families have an EMTR over 70 per cent, and EMTRs over 100 per cent are very rare.

- PTRs measure the additional amount of income tax paid and transfers foregone when moving from non-employment to employment.

   – PTRs were estimated for a number of hypothetical scenarios to illustrate disincentives to enter the workforce for specific family situations.

- The results show that there are a number of scenarios in which families can face PTRs of over 50 per cent, particularly when a large loss in transfers — relative to the increase in private income — is accompanied by increases in income tax paid. These scenarios cannot be generalised and are not representative of the broader population.

- Although high EMTRs and high PTRs can indicate large disincentives to work, work decisions may also be influenced by other factors. This analysis does not examine how responsive families are to EMTRs and PTRs.

Taxes and transfers can affect many decisions, especially decisions to work, save and invest (chapter 2). This chapter presents results from the Commission's modelling of the effects of personal income tax and transfer payments on the financial incentives to earn additional income (section 5.1) and to enter the workforce (section 5.2).[43] Respectively, these financial incentives are measured by estimating effective marginal tax rates (EMTRs) and participation tax rates (PTRs). Due to model limitations and the project timeframe, effects on actual labour market decisions and on savings were not investigated.

Although the focus of this chapter is on the immediate effects of the tax and transfer system on incentives to engage in paid work, it is important to note that many other factors — financial and non-financial — influence these decisions. For example, there could be costs associated with transport and clothing. People may also have different preferences for work versus unpaid activities (including leisure, education and caring responsibilities). Furthermore, while the immediate EMTR or PTR might be high, people may take a longer term view that it is worth working despite this because of expectations of moving beyond the income range where these high rates apply over time. Such people may also see benefits in remaining attached to the workforce, even though the returns may not be very high in the near term. EMTRs or PTRs are thus only one of a number of different influences affecting the incentives that people face (section 5.3).

Furthermore, EMTRs and PTRs abstract from the demand side of labour — although some people may be willing to work (or work more) despite high EMTRs or PTRs, they may not be able to find suitable employment. To assess the likelihood of a person actually earning additional income or entering the workforce would require a broader approach. It would require taking into account all the other factors that affect workforce decisions to determine the responsiveness of employment outcomes to the EMTR or PTR.

5.1   Incentives to earn additional income

EMTRs measure the net effect of the additional amount of income tax[44] paid and transfers foregone when a family earns an additional unit of income. High EMTRs can act as a disincentive to paid work because they reduce the effective returns from working. In general, an EMTR exceeding 50 per cent is considered to be relatively high because it means that the net effect of the tax and transfer system is to reduce each dollar earned to less than 50 cents. In comparison, the top marginal income tax rate in 2014-15 reduces each dollar earned above $180 000 to 51 cents (including the Medicare Levy and Temporary Budget Repair Levy).

Although EMTRs can act as a work disincentive, the solutions for reducing EMTRs for transfer recipients are not always clear. This is because policies that could reduce EMTRs for one group may lead to an increase in EMTRs (and work disincentives) for others (box 5.1).

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[43] Child Care Benefit, Child Care Rebate and GST are not included in this chapter's calculations.

[44] The term 'income tax' in this chapter refers specifically to personal income tax.

Box 5.1   Reducing effective marginal tax rates: a balancing act

Although means testing and associated withdrawal rates on transfers are important in achieving a targeted transfer system, withdrawal rates add to effective marginal tax rates (EMTRs), which can reduce the incentive for transfer recipients to work.

A solution to reducing EMTRs for people who currently receive part transfers could be to reduce the withdrawal rate. This decreases the effective cost of working, thus inducing people to work more (the 'substitution effect'). However, reducing withdrawal rates has potential negative effects on work incentives (Henry 2004).

- Because a reduction in the withdrawal rate makes the transfer reduce more slowly as income rises, it would result in an increase in the income level at which the transfer gets reduced to zero. Therefore, people on higher incomes who did not previously qualify become eligible for the transfer and subject to the transfer withdrawal rate. This raises their EMTRs.

- The increase in the level of transfers received for some existing and new recipients could reduce their incentive to increase their work hours and earn more (the 'income effect').

Therefore, reducing high EMTRs is a delicate balancing act. The overall impact on work incentives for people currently receiving the transfer depends on the relative sizes of the income and substitution effects, but the effect on work incentives for people who become eligible for the transfer is unambiguously negative. As a result, it may be preferable to have higher withdrawal rates affecting a few rather than low withdrawal rates affecting many.

The reduction of withdrawal rates is not the only way to reduce disincentives to work, however. Other solutions exist. For example, policies such as Working Credit, Income Bank and Work Bonus enable various transfer recipients to increase the amount they can earn from employment before their transfer payment is reduced. Similar arrangements exist for public housing tenants in some states, where increases in income from employment do not have an immediate effect on income-based rent (PC 2015).

While EMTRs can be calculated for increases of only one dollar, changes in labour supply decisions are usually based on adjusting the number of working hours or on changing jobs, which tend to involve much larger dollar amounts. Therefore, the Commission calculated EMTRs for a $5000 per year increase in income to the primary income earner. This is roughly equivalent to increasing labour supply by an extra half day of work per week, based on the median income of an individual. EMTRs were also estimated for the secondary income earner. Further details on the EMTR calculations and caveats are described in appendix B.

These EMTRs differ from those in some other studies (for example, PC 2015), which look at illustrative EMTRs over a range of private income levels, given a particular set of circumstances (for example, residing in social housing). In contrast, the EMTRs in this paper consider the distribution of characteristics of people and families (based on survey data), including the incomes they actually earn. These EMTRs provide a greater sense of the actual distribution of families across EMTR ranges.

The distribution of EMTRs depends on whether the EMTR is measured for the primary income earner or the secondary income earner (figure 5.1). By definition, the private income of the primary income earner is always the same or higher than the secondary income earner so the EMTR faced by a primary income earner is also usually the same or higher (appendix B provides an illustrative example).[45] Consequently, at all income levels, there are generally more primary income earners facing high EMTRs than secondary income earners. Therefore, the remainder of the analysis focuses on EMTRs for primary income earners.[46]

Figure 5.1   **Distribution of EMTRs by private income[a]**

For primary and secondary income earners, couple families only
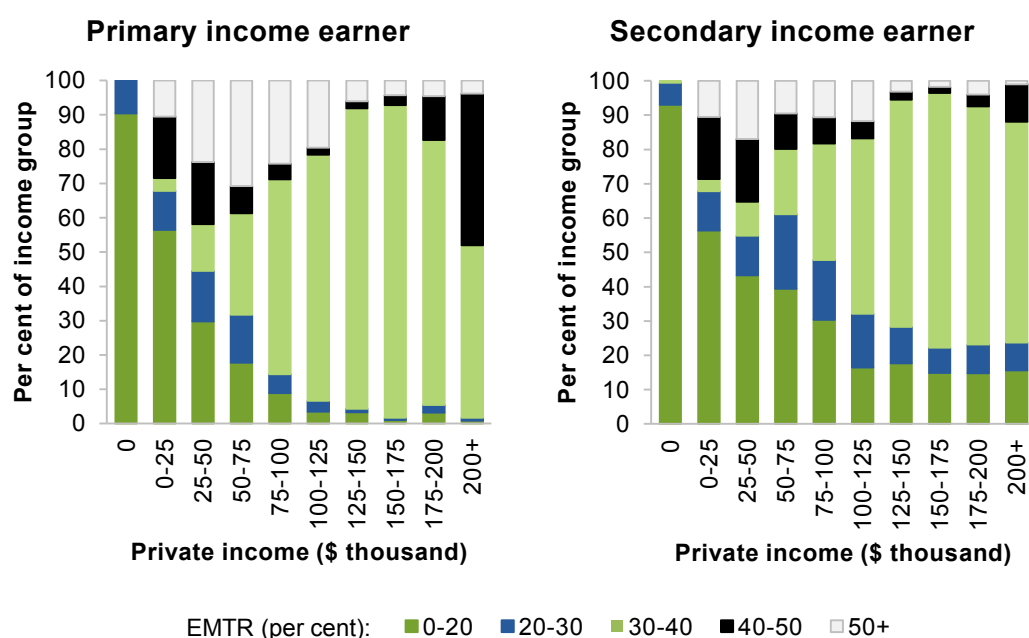
a Excludes Child Care Benefit and Child Care Rebate.

Source: Commission estimates.

The distribution of EMTRs differs across private income levels (figure 5.2). Recall that more than half of all families have private incomes of less than $50 000 (chapter 4). In general, families with low private incomes have low EMTRs — for families with private

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[45] EMTRs for the secondary income earner could be higher if the family receives Family Tax Benefit B — if the primary earner's income is below $100 000, Family Tax Benefit B depends only on the secondary earner's income.

[46] Nevertheless, EMTRs may act as a work disincentive for secondary income earners. This is because secondary income earners may have more flexibility in the nature and hours of their work than a primary income earner who may already be working full-time. This view is supported by evidence that suggests that lower-income earners are generally more responsive to changes in take-home pay than higher-income earners (Gruen 2006).

incomes of \$25 000 or less, two-thirds of primary income earners have an EMTR of 20 per cent or less. This is because, for many low-income families, a \$5000 increase in income is still within the effective tax-free threshold (\$20 542) and below the thresholds from which transfers begin to be withdrawn.

Figure 5.2   Distribution of EMTRs by private income[a]

For the primary income earner
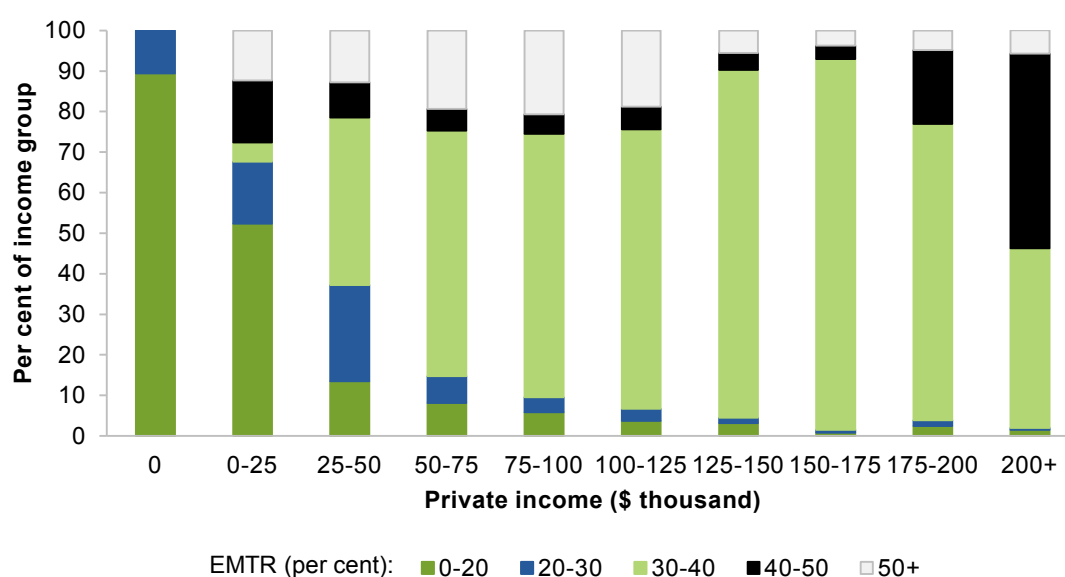
a Excludes Child Care Benefit and Child Care Rebate.

Source: Commission estimates.

As private incomes increase, families face higher marginal income tax rates and the withdrawal of transfers, both of which contribute to EMTRs. As income rises, the contribution of the marginal tax rate to the EMTR rises and the contribution of transfer withdrawal rates declines. Primary income earners from families with incomes greater than \$50 000 typically have EMTRs of 30 to 40 per cent, and an increasing proportion of primary income earners face the top marginal tax rate of 49 per cent at family incomes higher than \$180 000.

Few primary income earners from families in the highest income groups face EMTRs greater than 50 per cent. Some of these primary income earners have EMTRs slightly over 50 per cent because they pay the top marginal tax rate (45 per cent), the Temporary Budget Repair Levy (2 per cent), the Medicare Levy (2 per cent) and the Medicare Levy Surcharge (1 to 1.5 per cent). Other primary income earners have higher EMTRs because of the combination of marginal tax rates and withdrawal of Family Tax Benefits.

Low-income families receiving aged payments can face high EMTRs. About a quarter of primary income earners from families in the \$0 to \$25 000 private income group have

EMTRs of over 40 per cent. Aged payments represent the largest transfer category in this group (chapter 4). These EMTRs are consistent with the withdrawal rate of the Age Pension, which is 50 cents in the dollar.[47]

With an ageing population, the labour supply decisions of older Australians are becoming increasingly important. These high EMTRs indicate a disincentive for them to engage in part-time work or remain employed. Even though their labour supply decisions may also be driven by other factors, a recent report suggests that EMTRs play an important part in these decisions. Prior to reforms in 2009, which saw the Age Pension rate rise and the withdrawal rate increase from 40 to 50 per cent (box 5.2), the Pension Review Report found that many pensioners would like to undertake some part-time work but were discouraged by income testing (Harmer 2009).

Box 5.2   The Pension Review and work incentives

The Pension Review was tasked in 2008 to investigate the structure and adequacy of pension payments, including the consideration of issues surrounding workforce participation (Harmer 2009).

The review recommended increasing the base rate of payment to people who were wholly reliant on the Age Pension, while limiting the flow-on effects of such an increase to those with low to moderate reliance on the pension. Only a small proportion of Age Pensioners were found to be within the income range where high effective tax rates occur and most were within the income range where they were eligible for the full pension (however, this part of the analysis did not consider payment rates under the assets test). Because of this finding, the review concluded that there was capacity to tighten the income test (for example, by increasing the withdrawal rate) to reduce flow-on effects without adversely affecting incentives to work and save. Therefore, the high effective marginal tax rates for Age Pensioners observed in the modelling results of this paper are partly a result of these reforms.

This review provides a useful example of how the analysis of effective marginal tax rates can play an important role in informing policy.

Working-age and student payments also drive high EMTRs. Roughly half of primary income earners from families in the $0 to $25 000 income group that receive working-age or student payments have EMTRs greater than 50 per cent. These payment types have withdrawal rates of 50 to 60 cents in the dollar. The main working-age payment, Newstart Allowance, begins withdrawing at lower incomes than pensions and is also affected by partner income. These high EMTRs could create a disincentive for people, or their partners, to engage in work or increase work hours.

Family payments can contribute to high EMTRs as well. About 10 to 20 per cent of primary income earners from families in the private income groupings between $25 000

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[47] The model does not take into account transitional-rate pensioners, who continue to receive a payment rate according to the policy settings before the September 2009 pension reforms for as long as that rate remains greater than the rate under the current pension system. Transitional-rate pensioners have withdrawal rates of 40 per cent rather than 50 per cent.

and $125 000 face EMTRs of more than 50 per cent. This is due to family payments, which represent the largest share of transfers for families in these income ranges (chapter 4). These payments are reduced by between 20 to 60 cents for each dollar of income earned over the maximum payment threshold, depending on the specific payment received and family circumstances. In conjunction with marginal income tax rates of 32.5 to 37 cents for each dollar earned between $37 000 and $180 000, this can lead to EMTRs of over 50 per cent.

Overall, EMTRs over 70 per cent are rare. Among all primary income earners from families with private incomes in the $25 000 to $100 000 ranges, only about 2 per cent experience EMTRs greater than 70 per cent (and even fewer in other income ranges). These families generally receive aged or family payments and pay income tax. An example scenario of an EMTR that exceeds 70 per cent could involve a single person family who receives the Disability Support Pension and earns $30 000 a year. They face a pension withdrawal rate of 50 per cent, a marginal tax rate of 19 per cent and a Medicare levy of 2 per cent, bringing their EMTR to 71 per cent. Although some income earners experience EMTRs that are as high as 100 per cent or more, these cases are very rare.

EMTRs also differ by family type. In general, the distributions of EMTRs for primary income earners from single families and couple families are similar, but there are some significant differences (figure 5.3). First, the impact of family payments is more noticeable among couple families because these are the types of families in which children are most prevalent (chapter 4). About a quarter of primary income earners from couple families with private incomes of $25 000 to $100 000 face EMTRs of more than 50 per cent, compared with less than 10 per cent of primary income earners from single families.

Second, primary income earners from single families with private incomes in excess of $175 000 are more likely to have EMTRs in the 40 to 50 per cent range than primary income earners from couple families. This is because single families in this income range consist of a sole income earner in the top income tax bracket who is facing the highest marginal income tax rate of 45 cents in the dollar, the Temporary Budget Repair Levy, the Medicare Levy and potentially the Medicare Levy Surcharge as well. Couple families are more likely to consist of two income earners in lower income tax brackets whose joint private income is over $175 000 — a $5000 increase in income to the primary income earner may not necessarily push them up into the top income tax bracket.

Figure 5.3   **Distribution of EMTRs by private income**[a]

For the primary income earner by relationship status

Single

Couple

EMTR (per cent): ■0-20 ■20-30 ■30-40 ■40-50 □50+
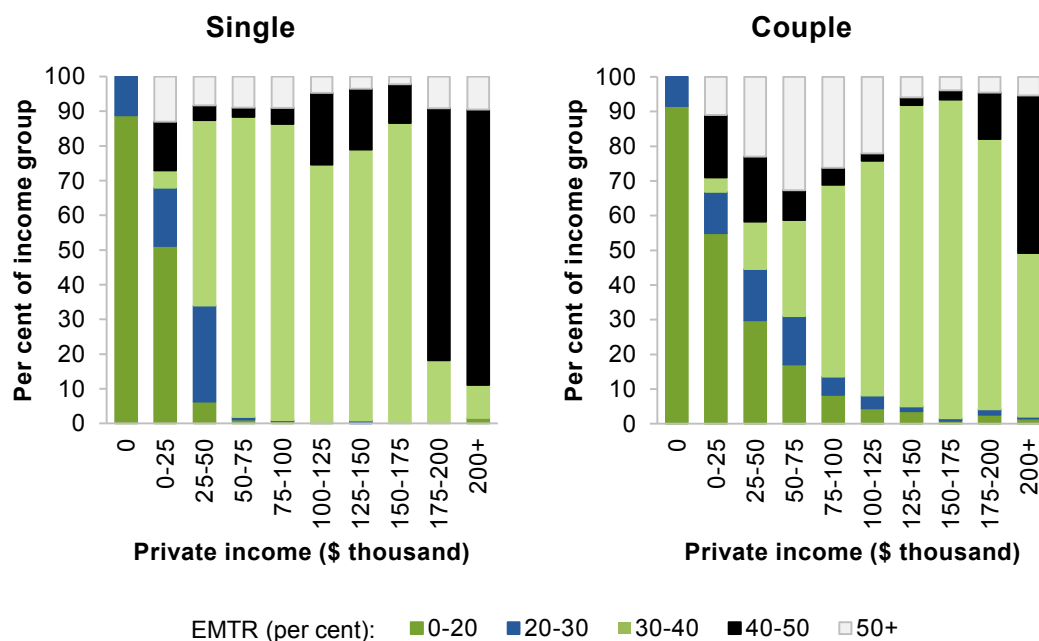
a Excludes Child Care Benefit and Child Care Rebate.

Source: Commission estimates.

The effect of family payments on EMTRs is even more obvious in the breakdown of EMTRs by child status. Over half of primary income earners from families with children in the $50 000 to $100 000 private income range have EMTRs higher than 50 per cent (figure 5.4). As mentioned, the combined effect of the withdrawal of family payments (particularly Family Tax Benefit Part A) and increasing marginal income tax rates results in these high EMTRs for middle-income families with children.

Figure 5.4   **Distribution of EMTRs by private income**[a]

For the primary income earner by child status

Without children

With children

EMTR (per cent): ■0-20 ■20-30 ■30-40 ■40-50 □50+
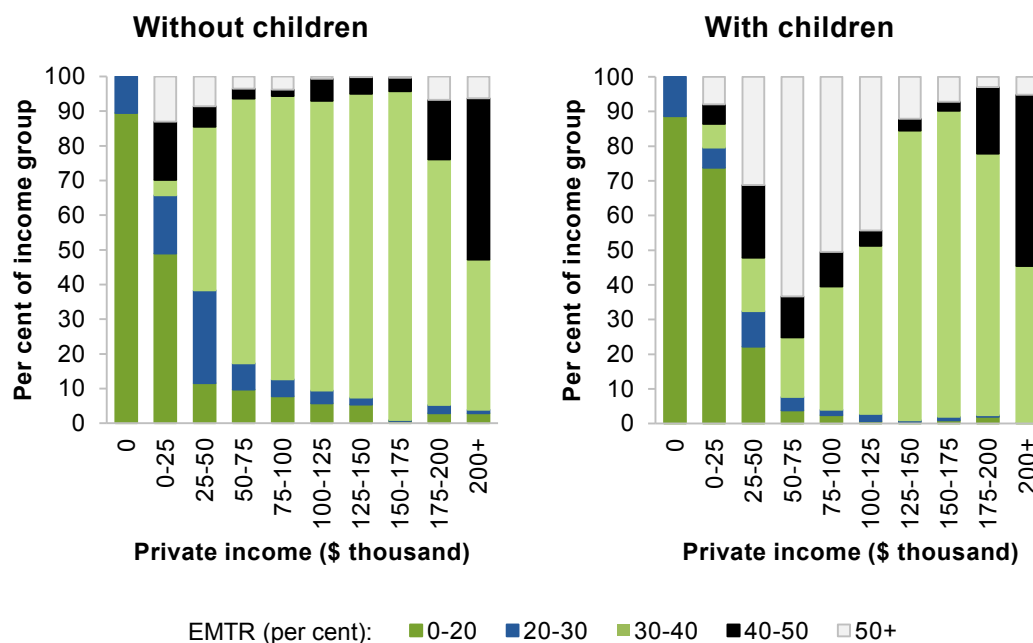
a Excludes Child Care Benefit and Child Care Rebate.

Source: Commission estimates.

5.2   Incentives to enter the workforce

EMTRs are a useful measure of work disincentives when considering the decision to increase work hours, move to a higher paying job or otherwise earn additional income for people who are already employed. However, they may be of limited value when considering incentives to enter the workforce (Dockery, Ong and Wood 2011).[48] Other measures such as replacement rates and PTRs, which have been examined in previous studies (chapter 3), are more appropriate for analysing the work incentives faced by people who are not employed. These methods require estimating what an unemployed person would earn if they were employed. Representative analysis using these alternative measures could not be examined within the timeframe of this project.

Instead, the Commission analysed PTRs for a number of hypothetical scenarios — 'cameos'. The cameos are provided to illustrate work disincentives for specific family situations and cannot be generalised to other families. PTRs are calculated in the same way

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[48] Dockery, Ong and Wood (2011) only considered people aged 25 to 64 in their study. The extent to which their results can be applied to people in younger or older age groups is uncertain, especially for older people looking to re-enter the workforce.

as EMTRs (by considering the additional amount of income tax paid and transfers foregone), except rather than being calculated for a small marginal increase in income, they are calculated for the increase in income that occurs as the person enters employment. These PTRs differ from the effective average tax rates calculated in chapter 4 (box 5.3).

Box 5.3   Calculation of participation tax rates and effective average tax rates

Participation tax rates (PTRs) consider the increase in income tax and the loss in transfers after a transition into employment. This involves a comparison before and after the transition into work. Denoting subscript 0 as before the transition and 1 as after the transition, the PTR is calculated as:

$$PTR = \frac{(income\ tax_1 - income\ tax_0) - (transfers_1 - transfers_0)}{(private\ income_1 - private\ income_0)}$$

If private income and income tax are zero before the transition into work, this is simplified to:

$$PTR = \frac{income\ tax_1 - (transfers_1 - transfers_0)}{private\ income_1}$$

In contrast, the effective average tax rates (EATRs) in chapter 4 are calculated by dividing net taxes paid (income tax and GST less transfers) by private income, given the current situations of each family. For people who are already employed, this calculation does not take into account the transfers that they would have received if they had not been in work.

$$EATR = \frac{income\ tax + GST - transfers}{private\ income}$$

Abstracting from GST, the EATR for a working family and the PTR after a transition into work (for a family that originally had no private income) would be the same if a household receives no transfers when they are not in employment (that is, if $transfers_0$ is equal to zero).

Four cameos are considered (box 5.4). These are chosen as illustrations of high PTRs (for example, people who transition into a low to moderate wage job). These cameos are not representative of the broader population. The results show that some families can experience PTRs of over 50 per cent, which could reduce their incentives to find paid work. In the cameos considered, this is particularly true when a large loss in transfers, relative to the increase in private income, is accompanied by an increase in income tax paid.

Even though PTRs in the selected cameos are high, a transition into work still results in a substantial increase in disposable income. For example, in cameo 1, a single person on Newstart Allowance would experience an overall increase in disposable income from $13 800 to $30 200 by moving into a full-time minimum wage job (appendix C). Some families may deem that working would be worthwhile for such an increase in disposable income, in spite of the losses through the tax and transfer system.

Box 5.4   **Participation tax rates for cameo families**

Cameo 1

A single person is initially not working and receives Newstart Allowance. They transition into a full-time minimum wage job ($33 327 per year). In doing so, they lose their transfer payments and start paying income tax. Their participation tax rate (PTR) is 51 per cent.

Cameo 2

One member of a couple with two school-age children is working full-time in an average wage job ($56 211 per year), whereas the other member of the couple is not working. The family receives Family Tax Benefits. The non-worker then transitions into a full-time average wage job. As a result, the family loses most of their Family Tax Benefits and pays more in income tax. The family's PTR is 44 per cent.

Cameo 3

Two members of a couple with two school-age children are not working and both receive Newstart Allowance. The family also receives Family Tax Benefits. One member of the couple transitions into a full-time minimum wage job ($33 327 per year). In doing so, the family loses some of their transfers and starts paying some income tax. The family's PTR is 59 per cent.

Cameo 4

A single person is initially not working and receives the Disability Support Pension. They transition into a part-time job paying $16 000 per year. The person loses some of their Disability Support Pension but remains within the tax-free threshold so pays no income tax. Their PTR is 37 per cent.

Change in private income, income tax and transfers after transition into work
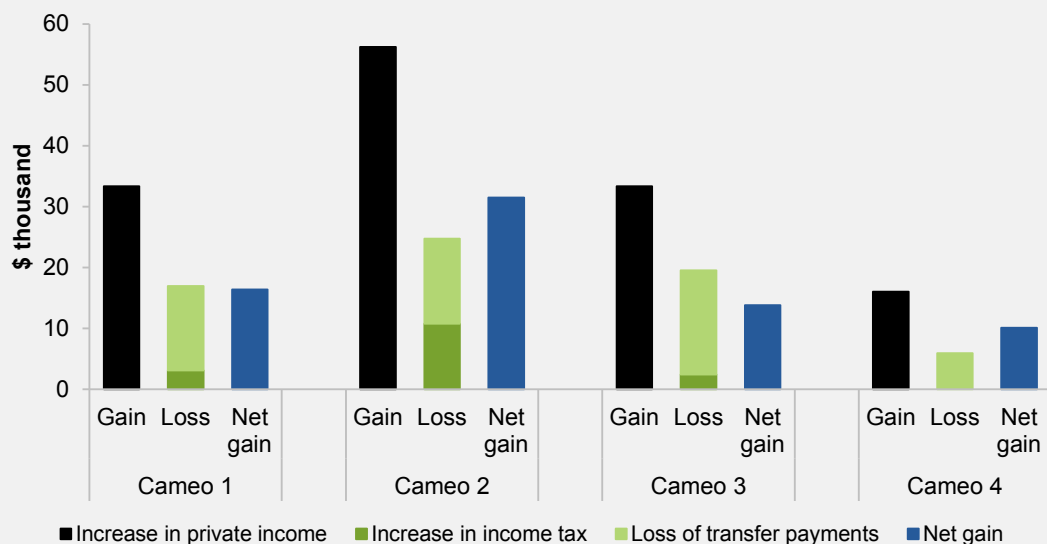
Source: Commission estimates.

5.3   Responsiveness to incentives

The analysis in this chapter highlights that some families can experience high EMTRs or high PTRs. However, as noted at the beginning of this chapter, these alone do not necessarily reflect a family's inclination to undertake paid work because of other considerations that can influence labour supply decisions. The fact that some families remain in private income ranges where they experience high EMTRs could indicate that the EMTRs do not have a large effect on labour supply decisions, and that other factors prevail. Similarly, families with low EMTRs might actually be so largely affected by EMTRs that they intentionally avoid income ranges where they would experience high EMTRs. This project does not examine the extent to which this is the case because the modelling approach has not been designed to analyse behavioural impacts.[49] The EMTR results in this chapter should be interpreted as simply presenting how EMTRs are distributed given the population's income and characteristics.

The importance of EMTRs and PTRs on labour supply decisions could be largely influenced by age and life stages. Younger families that receive student payments may be less responsive to EMTRs and PTRs, resolving not to work full-time because of their studying commitments, while those receiving working-age payments may wish to work despite high EMTRs or PTRs. As families move towards middle age and have children, other factors (such as caring responsibilities or the desire to provide for one's family financially) may be more important determinants of a person's labour activity. When families approach retirement age, their work hours could be affected for other reasons, such as health, involuntary redundancy or age discrimination. While this paper does not examine tax and transfer work incentives over the life cycle, chapter 6 presents results analysing tax and transfer incidence over time.

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[49] Past Australian studies have used behavioural microsimulation models to simulate labour supply responses to changes in tax rates or transfer withdrawal rates (for example, Duncan and Harris 2001). Some international studies have made use of 'natural experiments' by comparing the behaviour of relevant groups before and after an actual policy change to estimate the effect of the change on labour supply (Kalb 2003).

6 Tax and transfer incidence over time

Key points

- Tax and transfer flows vary over time even in the absence of changes to policies. At an individual level, this reflects changing personal and financial circumstances. At an aggregate, system level, it reflects changes to demographics and economic conditions.

- The lifetime incidence of a tax and transfer system can look very different from the annual incidence of a tax and transfer system because, for example, a person may pay tax during their prime earning years but receive transfers earlier or later in life when their personal and financial circumstances are different.

  - To demonstrate how the tax and transfer system operates on a lifetime basis, illustrative scenarios of lifetime tax and transfer flows were estimated using current data and policies.

  - **The results suggest that the tax and transfer system is less progressive on a lifetime basis than it is on an annual basis, but that it is still strongly progressive.**

- The incidence of the tax and transfer system is likely to change over time as a result of income growth and the ageing of the population.

  - A simple illustrative 20-year projection of population, income and inflation suggests that substantial changes to tax and transfer flows are likely if the tax and transfer system is left unchanged.

  - **Total income tax paid is projected to increase substantially in real terms as average income tax rates rise, though the size of the increase depends on assumptions about future wage growth and adjustments to income tax thresholds.**
    - ⋯ **Bracket creep is specifically addressed, albeit using a simplified approach.**

  - **Total expenditure on pension payments is projected to increase significantly in real terms due to population ageing and relatively generous rules for the indexation of payment rates, though the absence of assets testing from the model may mean that future Age Pension expenditure is overstated.**

  - Total expenditure on other types of transfer payments that are typically indexed to changes in consumer prices **(such as family payments and payments to students) is projected to decline in real terms** as the number of families eligible for these payments declines. This reflects growth in real incomes and changes to the population structure.

  - These deliberately simple projections suggest that an increasing share of the tax burden will fall on the working-age population. However, the size of the shift depends on economic conditions, how tax and transfer policies change over time, and the effect of the maturation of the Superannuation Guarantee on Age Pension reliance.

As people age and progress through different stages of life, their income, wealth and personal circumstances vary. In turn, this affects the amount of tax they pay and the amount of transfers they receive. In aggregate, these changes affect total taxation revenue and transfer expenditure via income growth and demographic change. Two illustrative approaches were adopted to examine these effects.

The first approach (section 6.1) involved estimating hypothetical lifetime income tax[50] flows and transfer flows assuming a large number of (representative) families were to fully live out their lives under the current tax and transfer system with no changes in prices or any other economic or demographic parameters. This approach provides an indication of the redistributive nature of the current tax and transfer system on a lifetime basis. The results suggest that the system is less progressive on a lifetime basis than on an annual basis, but is still strongly progressive.

The second approach (section 6.2) involved projecting income tax flows and transfer flows into the future. This approach provides an indication of the effect that population ageing, income growth and selected policy changes would have on aggregate tax and transfer flows over the next twenty years. The results suggest that income tax revenue would increase substantially in real terms between 2014-15 and 2034-35, but the magnitude of the increase would depend on the rate of real wage growth and how income tax thresholds (and marginal tax rates) are adjusted over time. Growth in transfer expenditure would be slower than growth in revenue, but still significant. Transfer expenditure related to ageing and disability would increase substantially in real terms between 2014-15 and 2034-35 due to population ageing and increasing real payment rates, while transfer expenditure in other categories, such as family payments, would decline as changes to the population structure and rising real incomes reduce payment eligibility.

Both approaches take account of personal income tax and 38 major personal transfer payments (appendix A). GST, the Child Care Rebate and the Child Care Benefit were not included in this analysis.

6.1   Lifetime tax and transfer flows

Changes in financial and family circumstances can significantly affect the taxes paid and transfers received by a person or family. For example, a person may pay taxes during prime earning years but receive transfers earlier or later in life. This can mean that, to a certain extent, the tax and transfer system helps to smooth income flows over a person's life cycle at the expense of reducing disparities in lifetime income flows between different people. The distinction is only apparent when tax and transfers flows are examined from a lifetime perspective. As a result, the incidence of the tax and transfer system over a lifetime may look very different from the incidence of the tax and transfer system over a single year.

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[50] The term 'income tax' in this chapter refers specifically to personal income tax.

The theoretically ideal approach to estimating tax and transfer incidence over a lifetime would be to estimate lifetime tax and transfer flows for each family in the population (or a representative sample). However, this approach confronts major difficulties. First, for families that are already approaching retirement, this would require looking backwards over their life course. Without an historical longitudinal data source that can be used to estimate historical tax and transfer flows this is difficult to do. Further, even if such data were available, because the tax and transfer system has changed significantly in recent decades, such an approach would not explain how the *current* tax and transfer system affects lifetime incomes.

Second, for younger families this approach would require projecting forward what their life course might look like. Such an exercise is highly uncertain, and would require projecting patterns of family formation and income growth while holding policy settings constant. To get a view of the redistributive nature of the system over time would then require adding up the lifetime tax and transfer flows of different scenarios weighted by the probability of each potential future 'life path'. This complex exercise is impractical, subject to strong assumptions and beyond the scope of this paper.

As an alternative, a relatively simple illustrative approach has been adopted for calculating lifetime tax and transfer flows (appendix B).[51] This approach does not involve projecting actual lifetime tax and transfer flows into the future or using data from the past. Rather, it is a hypothetical illustration of what lifetime tax and transfer flows would look like if a large number of families — representative of today's population — were to fully live out their lives under the current tax and transfer system with no changes to prices or any other economic or demographic parameters. Consequently, the results provide an indication of the lifetime redistributive effects of the tax and transfer system as it exists today, but cannot be used to examine the effect of the tax and transfer system on intergenerational equity.

The results suggest that the tax and transfer system is less progressive over lifetimes than it is over a single year. When annualised lifetime private incomes[52] are compared to 2014-15 annual private incomes, on average, families in low-income groups tend to pay more in income tax on a lifetime basis than on an annual basis and families in high-income groups tend to pay less in income tax on a lifetime basis than on an annual basis (figure 6.1).

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[51] The CAPITA model is not designed for life cycle analysis. Rather, results generated with CAPITA were used to separately estimate lifetime tax and transfer flows.

[52] Estimates of annualised lifetime private incomes are calculated by dividing total lifetime income by the number of years in an adult life in the model. Because estimates are made on the basis of people fully living out their lives under the current tax and transfer system with no changes to economic or demographic parameters, annualised lifetime estimates are presented without discounting.

Figure 6.1   **Average income tax paid by private income**

Annualised lifetime results compared to annual 2014-15 results
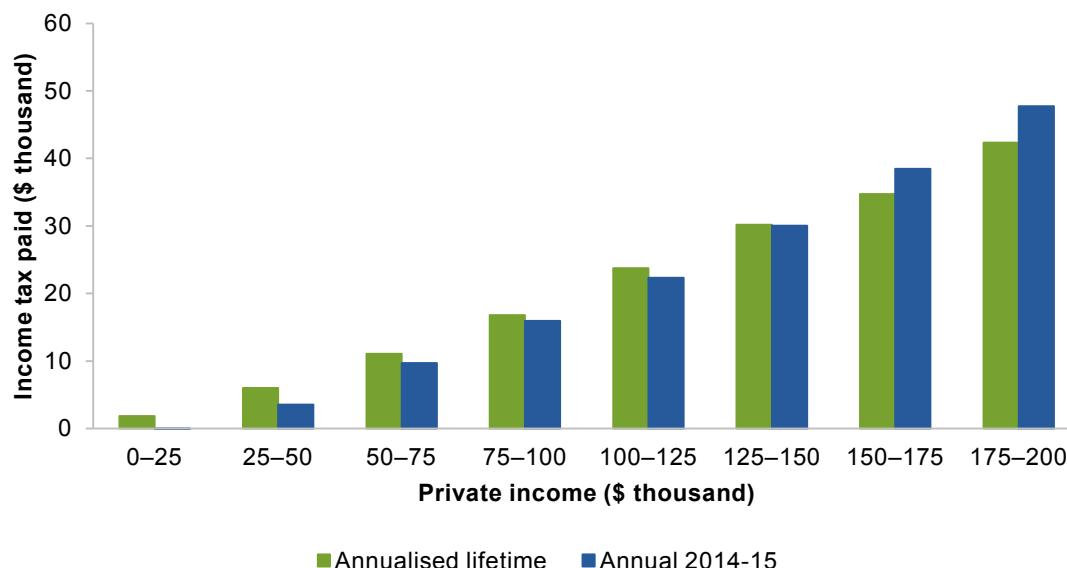
Source: Commission estimates.

This means that the average income tax rate does not increase as sharply on a lifetime basis as on an annual basis (although it is still progressive across income groups) (figure 6.2). This is because a family's position in the income distribution can move around over a lifetime. For example, consider a family with two parents on high incomes throughout their lives. If one of the parents takes time out of the workforce to raise their children then, for that period, the family's annual income could be substantially lower than when both parents are working. Due to the progressive structure of income tax rates, during that period of time, the decline in the family's tax paid would be more than proportional to the reduction in private income. If other taxes such as GST, superannuation taxes and excises on alcohol, tobacco and fuel were included in modelling, the results would be different. However, given personal income tax accounts for a large majority of the tax levied on individuals (and the goods and services that they consume) the overall story would not likely change.

Figure 6.2   **Average income tax rate by private income**

Annualised lifetime results compared to annual 2014-15 results
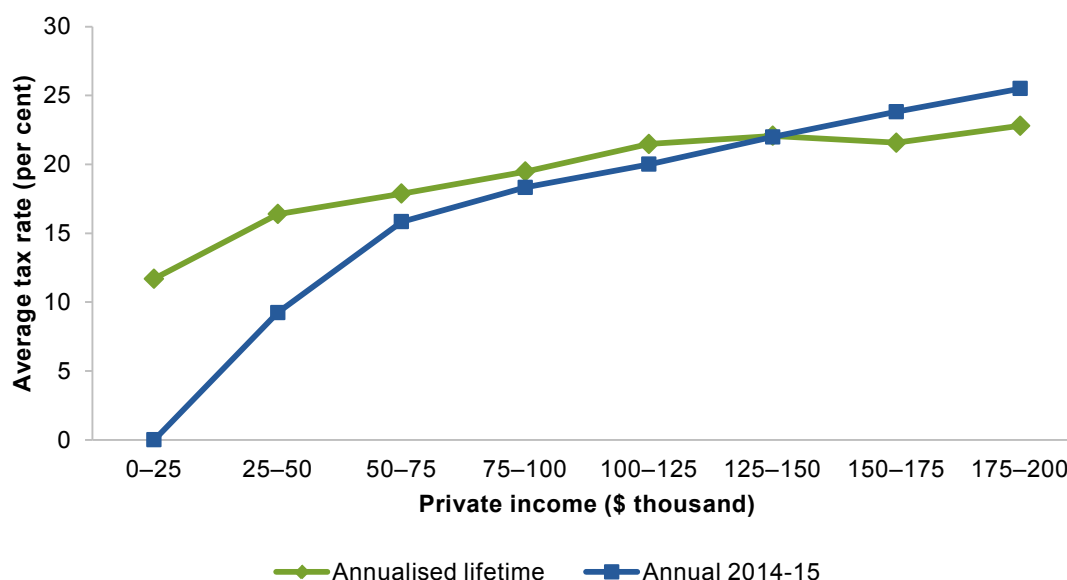
Source: Commission estimates.

The results also show that for a given annualised lifetime income, the average rate of income tax paid can vary substantially (figure 6.3). This is especially true for families with low lifetime incomes. For example, among families with annualised lifetime incomes between $25 000 and $50 000, the top 25 per cent paid 19 per cent or more of their lifetime private income in income tax while the bottom 25 per cent paid 13 per cent or less. Again, this reflects the potential for families to move around between income groups. A family that spent half of their working lives earning $75 000 per year and half of their working lives earning $25 000 per year would have a higher average rate of income tax across a lifetime than a comparable family that consistently earned $50 000 per year even though their annualised lifetime income would be the same.

Figure 6.3   **Distribution of average income tax paid by private income**[a]
Annualised lifetime results
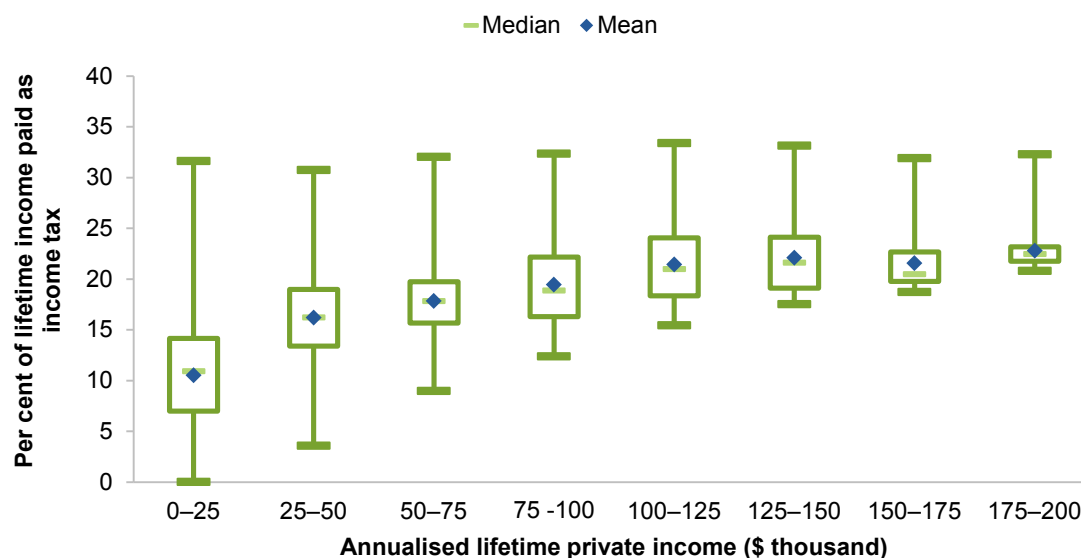
a The edges of the boxes represent income values between the 25th and 75th percentiles. The 'whiskers' extending out from the boxes show the values for the minimum and maximum.

Source: Commission estimates.

High-income families also receive more transfers on a lifetime basis than on an annual basis (figure 6.4). For example, on average, families with a relatively high annualised lifetime income of between $100 000 and $125 000 received $5100 in annualised lifetime transfer payments, while families with annual incomes between $100 000 and $125 000 in 2014-15 received only $1400 in transfer payments in that year.[53] One reason why the difference is so substantial is that most families, even ones with high annualised lifetime incomes, are likely to be eligible for at least a partial Age Pension once they reach retirement age (if their income falls sufficiently), but families that earn high incomes in a single year are likely to be in their prime earning years.[54]

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[53] It is worth noting that childcare payments — the Child Care Benefit and the Child Care Rebate — are not included in these results. However, these payments represent less than 4 per cent of total transfer expenditure and would not materially alter the results.

[54] The model does not account for differences in longevity across income groups. To the extent that higher income families tend to live longer, this effect will be stronger.

Figure 6.4 **Average transfers received by private income**

Annualised lifetime results compared to annual 2014-15 results
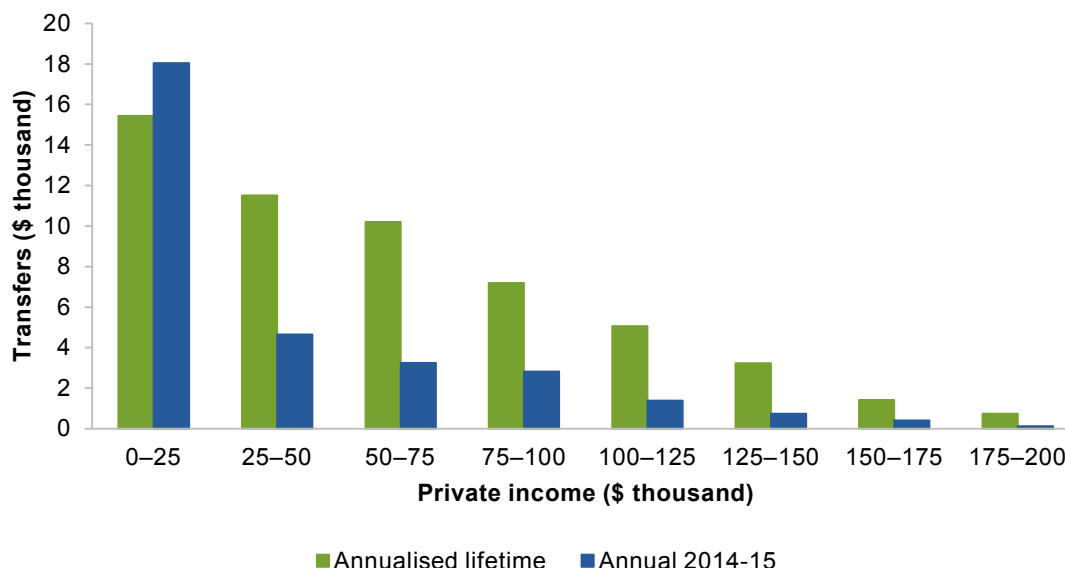
Source: Commission estimates.

While it is important to emphasise the illustrative nature of these results and the key assumptions noted above, overall, the results do suggest that the current tax and transfer system has two redistributive effects. First, it redistributes income from families with high lifetime incomes to families with low lifetime incomes — even on a lifetime basis, on average, high-income families pay substantially more in net tax than low-income families. Second, it redistributes income across time periods to smooth incomes for families — on average, high-income families receive more in transfers on a lifetime basis than on an annual basis because many are on lower incomes for some period during their lifetimes (figure 6.5).

These results reflect the fact that, regardless of lifetime income, the tax and transfer system provides a form of insurance against unexpected outcomes like unemployment and living longer than expected. The effect of this is to reduce the incentive to save earned income for precautionary purposes, even for those with high lifetime incomes (box 2.3).

Varying income path dependence

An important assumption in the analysis above relates to how family incomes change as people age. To estimate representative lifetime income paths it is necessary to answer the question: if a family has a high income for their age when they are young, how likely are they to still have a high income for their age when they get older?

Figure 6.5　Average net tax paid by private income[a]

Annualised lifetime results compared to annual 2014-15 results
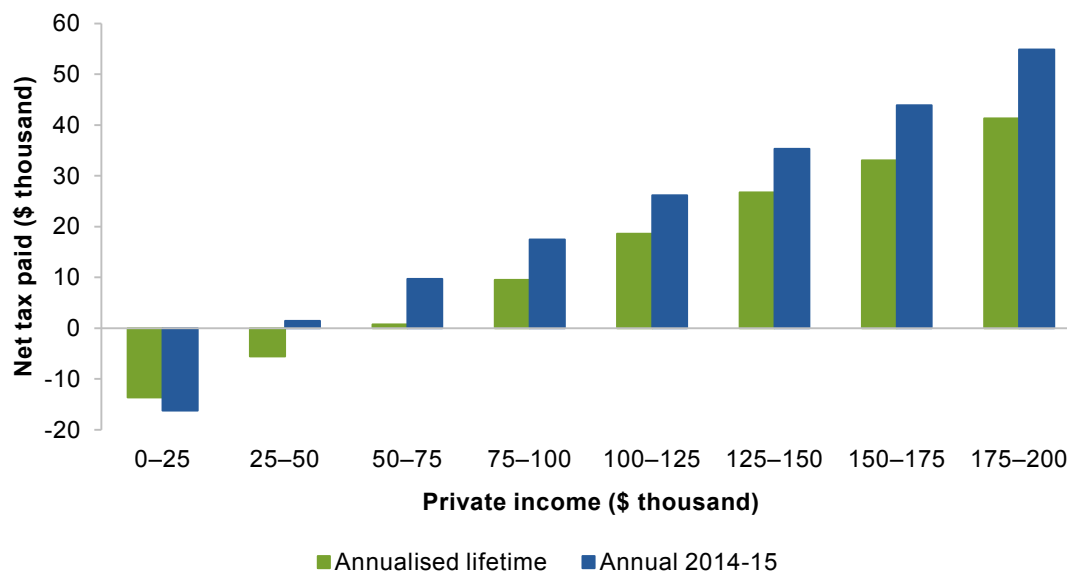
a 'Net tax paid' refers to income tax paid less transfers received.

Source: Commission estimates.

The results above assume a degree of 'income path dependence'. That is, families that have high incomes for their age when they are young, were assumed to be more likely than other families to have high incomes for their age when they are older. (The precise probability distribution assumed is discussed in appendix B.)

To test the extent to which assumptions about income path dependence affect the results, lifetime income tax flows and transfer flows were also estimated assuming no dependence. That is, families that have high incomes for their age when they are young were treated as just as likely to have low incomes as high incomes for their age when they are older.

Without path dependence, families are more likely to jump around between income groups as they age and are therefore more likely to pay high taxes in one period and receive high transfer payments in another. However, the results suggest that, even with this extreme assumption, the tax and transfer system remains progressive on a lifetime basis and net tax paid is little different from when a degree of path dependence is assumed (figure 6.6). Whether or not path dependence is assumed makes little difference to aggregate results because for every family that jumps from a low income to a high income, another family jumps from a high income to a low income. Hence, the central tendency remains the same with or without path dependence.

Figure 6.6   **Average net tax paid with and without path dependence**[a]
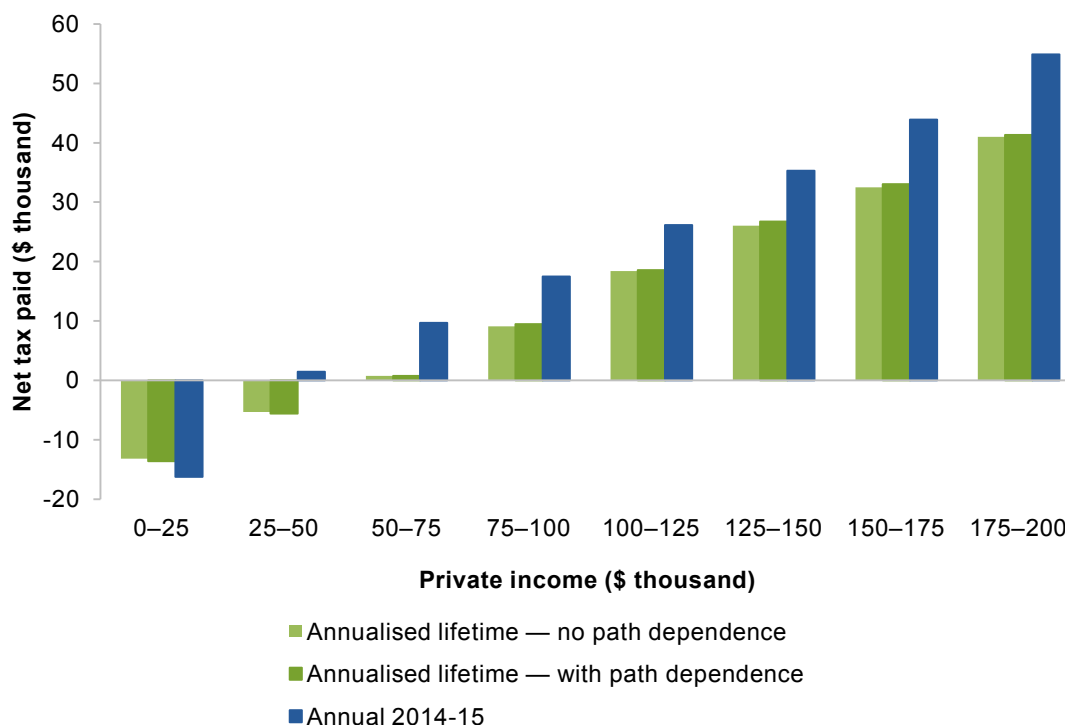
Legend:
- Annualised lifetime — no path dependence
- Annualised lifetime — with path dependence
- Annual 2014-15

a 'Net tax paid' refers to income tax paid less transfers received.

Source: Commission estimates.

6.2   Projecting tax and transfer flows

Tax and transfer flows between different groups can vary substantially over time, particularly when the age structure of the population is changing. To illustrate the effect of population ageing and income growth on tax and transfer flows over the next 20 years, the Commission projected forward population growth, nominal wage growth and inflation to 2034-35. Projections of population are drawn from the Commission's modelling for the Ageing Australia research project (PC 2013) (appendix B).

Projecting tax and transfer flows into the future is an inherently uncertain exercise. In addition to population ageing, future tax and transfer flows depend on factors such as economic conditions and policy changes. Three scenarios were modelled to examine how key parameters influence tax and transfer flows (table 6.1).

These scenarios were deliberately kept simple, are not intended as a forecast of future tax and transfer flows and are unlikely to match actual future tax and transfer flows. They do not, for example, take account of changes in behaviour in response to changes in tax rates or transfer payment rates. Furthermore, estimates of Age Pension payments are likely to be

overstated because they assume that future retirees have the same level of assets as retirees today. In reality, the maturation of the Superannuation Guarantee could see more families reach retirement age with a level of assets that renders them ineligible for the Age Pension or eligible for a reduced rate pension.

Table 6.1   **Scenarios for tax and transfer projections**

Scenario name	Income tax thresholds	Annual real wage growth (per cent)[a]
Base case	Indexed to CPI from 2024-25	1.2
Unchanged tax thresholds	Unindexed	1.2
Low wage growth	Indexed to CPI from 2024-25	0.5

a All scenarios assume CPI growth of 2.5 per cent per year.

Across the scenarios, all elements of the tax and transfer system are assumed to be unchanged, with the exception of income tax (the largest component of Australian Government tax revenue). Due to its effect on both income tax revenue and transfer expenditure, nominal wage growth is also varied.

Indexing income tax thresholds

Income tax thresholds are not automatically adjusted for inflation or income growth. Rather, governments tend to make periodic adjustments. Unless adjustments take place regularly, the rate of tax that families pay on their real income can increase significantly due to inflation — a phenomenon known as 'bracket creep'. In two of the three scenarios considered below, income tax thresholds are indexed to CPI from 2024-25.[55] This is intended to account for likely future periodic adjustments to income tax thresholds that take place beyond the forward Budget estimate period. In the 'unchanged tax thresholds' scenario, income tax thresholds are left unadjusted to illustrate the effect of unrestrained bracket creep on tax revenue.

Wage growth

The rate of wage growth is an important parameter affecting both tax revenue and transfer expenditure. It affects income tax revenue in two ways. First, higher wage growth means there is more income to tax. Second, higher wage growth pushes families into higher

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[55] As in the 2015 Intergenerational Report, this approach allows tax revenue to grow strongly for an initial period. However, in the 2015 Intergenerational Report, a different approach is used to slow tax revenue growth over the longer term. Rather than indexing income tax thresholds, in the Intergenerational Report, a constant tax-to-GDP ratio of 23.9 per cent is assumed from 2020-21 — this figure being the average tax-to-GDP ratio for the period between the introduction of the GST and the onset of the Global Financial Crisis (Australian Government 2015).

income tax brackets more quickly and therefore increases the average rate of tax paid more quickly (unless income tax thresholds are adjusted accordingly).

The rate of wage growth also affects transfer expenditure in two ways. First, some transfers have payment rates linked to average weekly earnings, so higher wage growth means higher payment rates. Second, most transfer payments are subject to income testing so higher wage growth means fewer families are eligible for payments (or families are eligible for payments at reduced rates). Two of the three scenarios assume a medium rate of real wage growth (1.2 per cent) based on projections derived from CAPITA parameters. In the 'low wage growth' scenario, a lower rate of real wage growth (0.5 per cent) is assumed.[56]

Results

Population growth

Between 2014-15 and 2034-35, the total number of families (singles and couples, with or without dependent children) is projected to increase by one third, equivalent to an annual growth rate of 1.4 per cent per year. Population growth is strongest in the 60+ age group (figure 6.7). By 2034-35, there are projected to be 5.3 million families in the 60+ age group, an increase of 70 per cent on 2014-15. The proportion of all families in the 60+ age group is projected to increase from 26 per cent to 33 per cent. In other age groups, growth is slower and the composition of families across the under-60 age groups does not change substantially. Consequently, the average age of the population is projected to increase from 46 to 49 over the 20 years.

Income tax revenue

Both total income tax paid and average income tax paid are projected to grow in real terms across all scenarios (figure 6.8). In the base case, total income tax revenue is projected to increase by 105 per cent in real terms between 2014-15 and 2034-35. Under the scenario with unindexed income tax thresholds, the increase is larger (128 per cent) and under the scenario with low wage growth, the increase is smaller (58 per cent).

Due to population growth, the average amount of income tax paid by each family grows more slowly than total income tax paid in all scenarios. In the base case, the average amount of real income tax paid increases from $13 600 in 2014-15 to $21 000 in 2034-35 — an increase of 55 per cent. Due to wage growth, the proportion of private income paid as income tax also increases from 21 per cent to 27 per cent.

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[56] In all scenarios, wage increases are assumed to be distributed evenly across all workers.

Figure 6.7   Projected number of families by age group

2014-15 and 2034-35
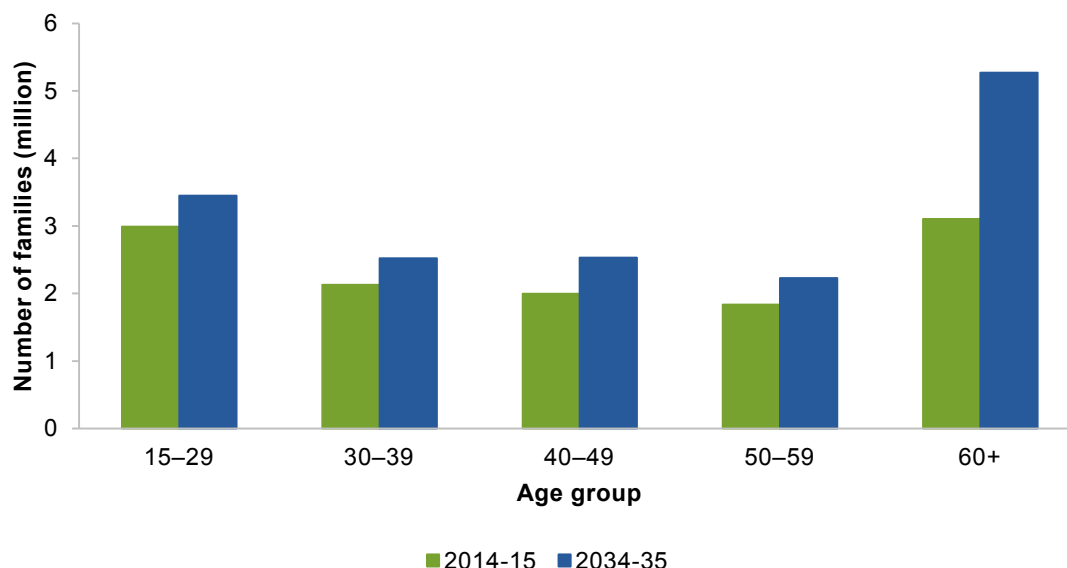
Source: Commission estimates.

Figure 6.8   Change in income tax paid by scenario

Percentage change from 2014-15 to 2034-35 in real terms
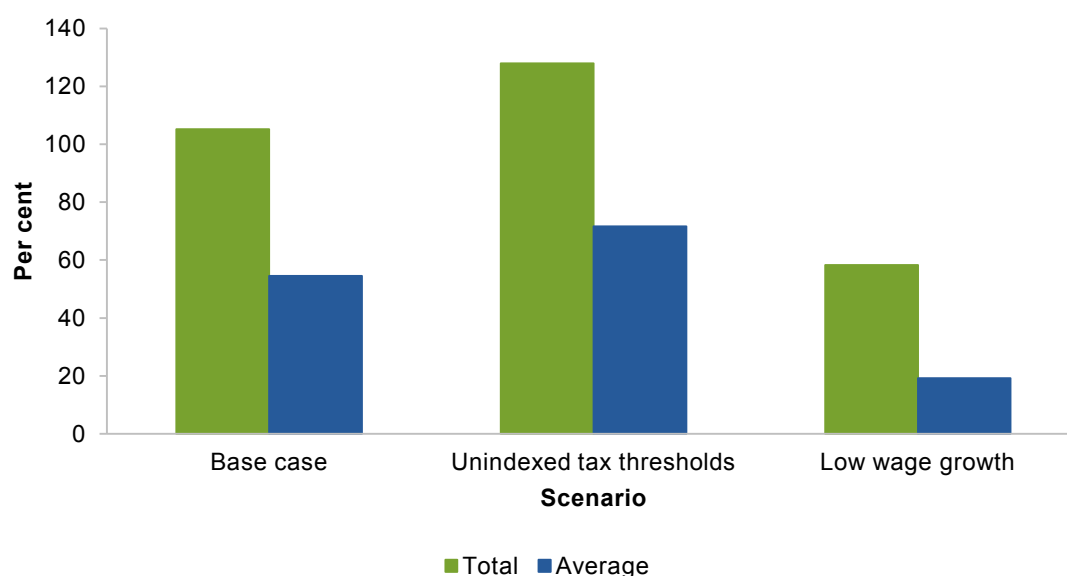
Source: Commission estimates.

As with total tax paid, the increase in average tax paid (both in absolute terms and as a proportion of private income) is larger with unindexed tax thresholds and smaller with low wage growth. In the unindexed tax threshold scenario, the average proportion of private income paid as tax increases to 30 per cent by 2034-35. In the low wage growth scenario, it increases to 24 per cent by 2034-35.

Transfer expenditure

Total transfer expenditure increases across all scenarios (figure 6.9), but the magnitude of the change is much smaller than it is for total tax revenue. In the base case, total transfer expenditure is projected to increase by 57 per cent in real terms between 2014-15 and 2034-35. Under the scenario with low wage growth, the increase is somewhat smaller (45 per cent between 2014-15 and 2034-35 in real terms) as pension payment rates increase more slowly (as discussed below).

In real terms, the average amount of transfers received by each family increases moderately between 2014-15 and 2034-35 across all scenarios. For example, in the base case, the average amount of real transfers received increases from $8400 in 2014-15 to $10 000 in 2034-35 — an increase of 19 per cent in real terms over twenty years. This is because some categories of transfer payments increase substantially, while others decline substantially.

Figure 6.9   Change in transfers received by scenario[a]

Percentage change from 2014-15 to 2034-35 in real terms
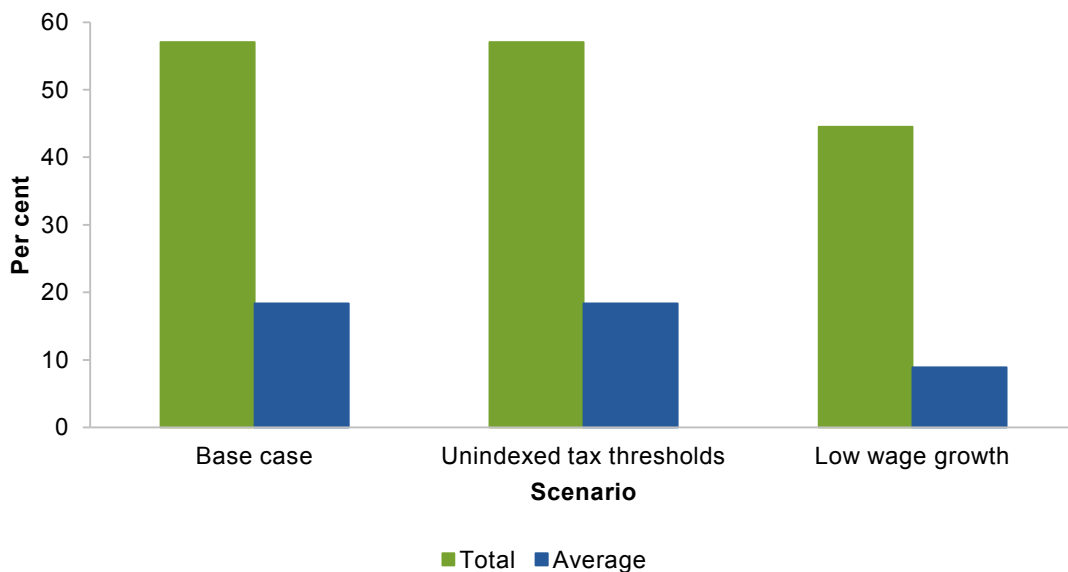
[a] The indexation of tax thresholds has no effect on transfers received so the change is the same under the base case and the unindexed tax thresholds scenario.

Source: Commission estimates.

The composition of transfer payments changes between 2014-15 and 2034-35 due to two factors. The first factor is population ageing. Some transfer payments are more commonly paid to younger families (such as family payments), while others are more commonly paid to older families (such as the Age Pension). As the population ages, proportionally more families become eligible for the latter and fewer for the former.

The second factor is the indexation of payments. Family payments, payments to students, and payments to working-age people have payment rates and income thresholds indexed to CPI. Because incomes are projected to outpace CPI across all scenarios, fewer families are projected to be eligible to receive these payments than would otherwise be the case. Payments received by retirees, people with disabilities and carers also have income thresholds indexed to CPI, but most payments in these categories have payment rates that are indexed more generously by a method which more closely tracks growth in nominal wages. Although increases in wages still reduce the number of families eligible for these payments, payment rates increase in real terms when, as projected, nominal wages grow faster than CPI.

Overall, the result is that, across all scenarios, the average amounts of family payments, student payments and working-age payments received per family decline (figure 6.10), whereas the average amounts of payments received by retirees, people with disabilities and carers either increase or are little changed. However, as noted above, these results may overstate the level of Age Pension payments.

Figure 6.10   **Change in average transfers received by category**
Percentage change from 2014-15 to 2034-35 in real terms
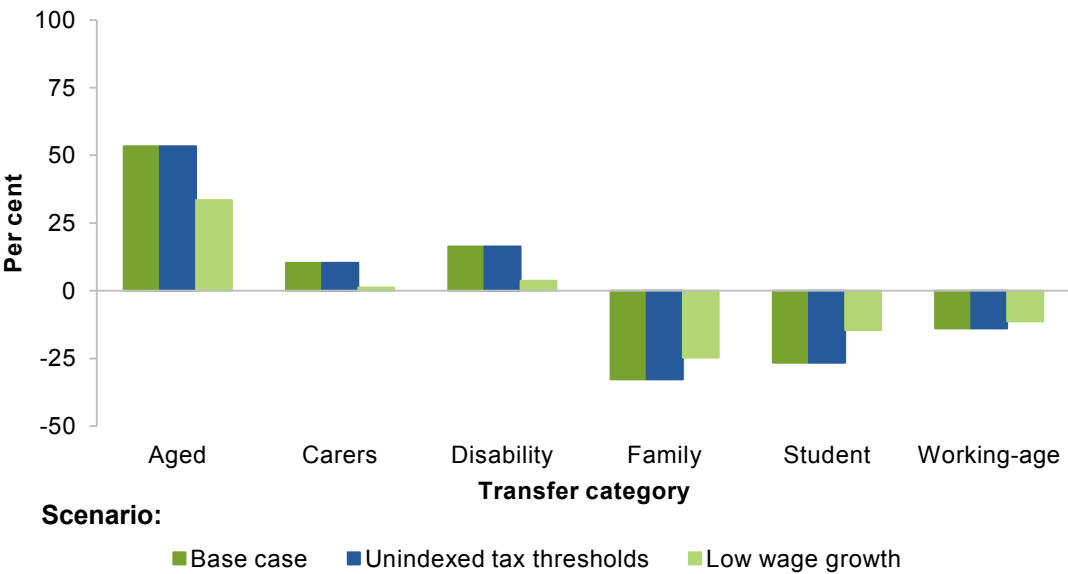
Source: Commission estimates.

Net tax paid

Average net tax paid (income tax paid less transfers) increases substantially across all scenarios. In the base case, the average amount of net tax paid rises in real terms from $5200 in 2014-15 to $11 000 in 2034-35. Reflecting underlying changes in average tax paid and average transfers received, the increase is smaller for the low wage growth scenario, but larger for the scenario with unindexed income tax thresholds.

Across all scenarios, increases in average net tax paid are substantial for families under 60 (figure 6.11). However, reflecting growth in the rate of payment of the Age Pension, the average net tax paid is little changed for families in the 60+ age group. Families in this group remain net recipients from the tax and transfer system (on average) across all scenarios.

Figure 6.11   **Change in real average net tax paid by age group**
Percentage change from 2014-15 to 2034-35 in real terms
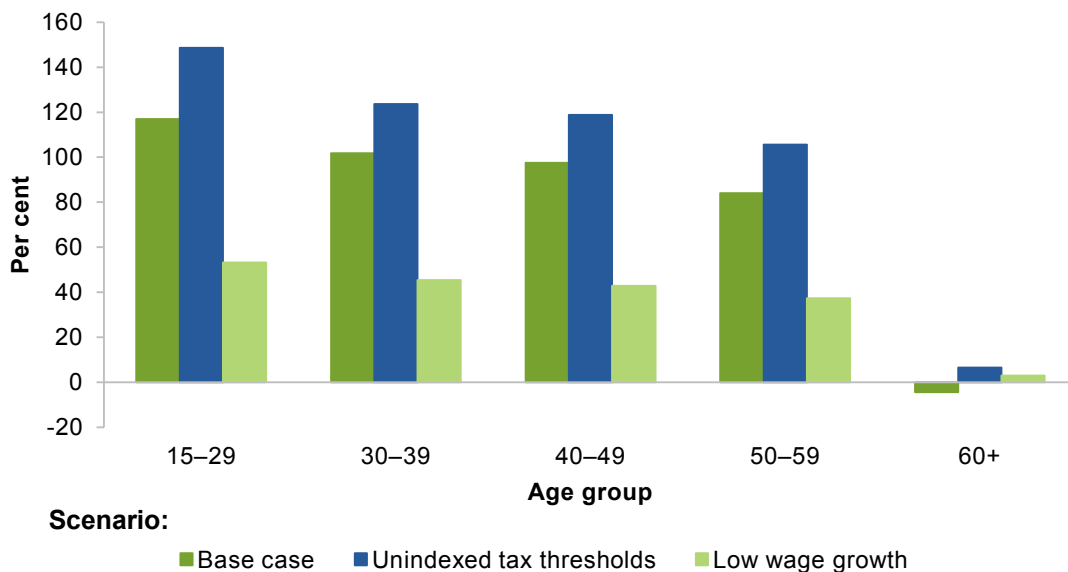
Source: Commission estimates.

As a consequence of the large increase in net tax paid, average disposable real income only slightly increases in real terms between 2014-15 and 2034-35 in the base case, from $60 000 to $67 200. This is an increase of just 12 per cent over 20 years, despite an increase in real private income of 20 per cent over the same period. Under the scenario with unindexed income tax thresholds, the increase is even smaller (8 per cent). And under the scenario with low wage growth, the average disposable real income actually declines by 2 per cent (because income tax thresholds are unindexed between 2014-15 and 2024-25).

Overall, this exercise illustrates that when changes to population, income and inflation are projected forward over long periods, and the tax and transfer system is held constant, income tax revenue can increase substantially. This occurs even if income tax thresholds are indexed to CPI beyond the forward Budget estimate period. However, this increased revenue comes at the expense of higher average income tax rates and, consequently, slower growth in disposable incomes.

The exercise also highlights the fiscal impact of population ageing on a pay-as-you-go system — in particular, the strong growth in transfer payments related to age and the change in the composition of transfer payments as the proportion of the population aged under 60 declines. The projections indicate an increasing share of the tax burden will fall on the under-60 age group, though the size of the shift depends on assumptions about economic conditions, how tax and transfer policies change over time, and the extent to which the maturation of the Superannuation Guarantee reduces reliance on the Age Pension.

7   Opportunities for further work

This paper has provided a broad overview of the incidence of the current tax and transfer system at a point in time and over time. It has also briefly examined how the redistribution of income through the tax and transfer system affects the immediate financial incentives to engage in paid work. Given the broad nature of this topic, the results raise many new research questions.

The paper confirms the view that the tax and transfer system is highly progressive and that it is more progressive than the tax and transfer systems of comparable OECD member countries. Illustrative modelling results also suggest that the tax and transfer system remains progressive when taxes and transfers are assessed from a lifetime perspective. However, this paper has not assessed the extent to which the progressivity of this system affects inequality.

Q. To what extent does the Australian tax and transfer system affect inequality?

The incidence of GST is only briefly analysed. The results from chapter 4 suggest that, on average, GST represents a slightly larger share of disposable income for low-income earners than for high-income earners. However, behind these averages lies substantial variation within income groups. There would be merit in further exploring GST incidence, the effect of exemptions on GST incidence, and how GST incidence varies over the life cycle.

Q. How do the incidence of GST and GST exemptions vary with age, income and expenditure?

The discussion of incidence in chapter 4 highlighted that if there is any form of 'middle-class welfare' and unnecessary churn in the tax and transfer system it is likely to arise from family payments. In chapter 5, it was also highlighted that family payments are a major contributor to high effective marginal tax rates for middle-income families.

Q. Are there opportunities to restructure the taxation of families to generate the same level of disposable income while minimising both churn and distortions to work incentives?

Many families at low, medium and high incomes face high effective marginal tax rates (chapter 5). High participation tax rates for family members who are considering whether to enter the workforce are also possible. These estimates illustrate that the tax and transfer system can have significant effects on the returns to earning additional income or entering employment. However, it is less clear how important effective marginal tax rates and participation tax rates are in influencing actual decisions to work, or work more, for family members of different ages and at different stages of life.

Q. How do effective marginal tax rates and participation tax rates influence actual labour force decisions at different ages and at different life stages?

While the focus of chapter 5 was on the effects of the tax and transfer system on work incentives, chapter 2 noted that effective marginal tax rates also matter for decisions to save and invest. As population ageing places pressure on the Age Pension, and more people use superannuation and private savings to fund retirement, the tax treatment of savings will become increasingly important.

Q. How does the tax and transfer system affect incentives to save and invest?

In addition to investing in financial capital, people often save to invest in 'human capital' — income-earning skills and abilities acquired through education and training. The tax and transfer system affects both the costs and benefits of education by taxing the returns to human capital (through personal income tax) and subsidising participation (through, for example, Youth Allowance, Austudy and ABSTUDY). Understanding how the tax and transfer system affects decisions to stay in school, attend TAFE or complete a university degree is very important as, for most people, human capital investment is the main determinant of lifetime income.

Q. How does the tax and transfer system affect incentives to invest in human capital?

Yet another decision that taxes and transfers can affect is the choice of where to live. Historically, tax and transfer systems in most OECD countries were developed on the assumption of an immobile labour supply, given the high costs of migration (OECD 2011). As these costs have declined, it is conceivable that taxes and transfers play a greater role in decisions to immigrate to Australia and emigrate from Australia. Of particular importance is the appropriate taxation of retirement savings given Australia's internationally unusual retirement income system and the varying extent to which countries rely on taxation of the working-age population to fund retirement benefits. The portability of superannuation and eligibility for transfer payments across national boundaries will also become increasingly important as the degree of cross-border mobility increases.

Q. How does the tax and transfer system affect incentives to migrate?

The analysis above indicates that, over a lifetime, the tax and transfer system serves both to redistribute income between families and to smooth consumption by distributing income across time periods for a family. In the lifetime tax and transfer flows calculated above, superannuation was not included, but it plays a similar smoothing role by compulsorily transferring income across time periods. This raises questions about how superannuation should be treated in life cycle analysis and how tax concessions associated with superannuation should be viewed.

Q. How should the superannuation system be viewed and treated in life cycle analyses of tax and transfer systems?

A   Major Australian taxes and transfers

The following tables provide a summary of the major sources of taxation revenue, taxation offsets and transfer payment expenditure. Revenue and expenditure data are mapped against the taxes and transfers included in the development version of CAPITA augmented by the Commission. Recent changes to taxes, levies, offsets and transfers are noted. All changes to taxes, levies, offsets and transfers that have been legislated as at 1 July 2014 are accounted for in the model, including legislated changes that do not affect tax and transfer flows until after that date.

A.1   Taxation revenue

In 2013-14, the Australian Government collected $352 billion in taxation revenue (table A.1). The two taxes included in the model, personal income tax and the GST, accounted for 63 per cent of this total in 2013-14.

In addition to basic income tax levied according to the personal tax rate scale, personal income is also subject to levies raised to fund specific public purposes. In 2013-14, there were two levies on personal income: the Medicare levy and the Medicare levy surcharge. These levies are included in the value for personal income tax revenue in table A.1. Together, they account for roughly 6 per cent of the total (ATO 2015).

Two important changes to personal income levies took effect from 1 July 2014, and are included in the model.

1. The Medicare Levy increased from 1.5 per cent to 2 per cent of taxable income to fund DisabilityCare Australia (*Medicare Levy Amendment (DisabilityCare Australia) Act 2013* (Cwlth)). This is expected to increase revenue from the Medicare Levy by $3.3 billion in 2014-15 (Treasury 2014).

2. A Temporary Budget Repair Levy of 2 per cent on individuals' taxable income above $180 000 will be introduced for three years (*Tax Laws Amendment (Temporary Budget Repair Levy) Act 2014* (Cwlth)). It is expected to raise $0.6 billion in revenue in 2014-15 (Treasury 2015a).

Table A.1 Major Australian Government taxes
2013-14

Name of tax	Levied on	Revenue	Proportion of total tax revenue	Annual growth rate from 2004-05	Included in model
		$m	%	%	
Personal income tax[a]	Individuals	166 027	47	5	✓
Company income tax	Enterprises	68 773	20	5	
GST	Goods and services	55 517	16	5	✓[b]
Fuel excise	Goods and services	17 767	5	2	
Customs duties	Goods and services	9 290	3	6	
Other excises	Goods and services	7 882	2	0	
Superannuation fund taxes	Enterprises	6 133	2	2	
Fringe benefits tax	Enterprises (on behalf of individuals)	4 285	1	2	
All others[c]		15 848	4	14	
Total[d]		**351 522**	**100**	**5**	

[a] Includes income tax on capital gains. [b] Only modelled for single-year incidence. [c] Other taxes of significance include resource rent taxes, wine equalisation tax, luxury car tax and revenue from carbon pricing. The relatively high growth rate for this item is attributable to revenue from carbon pricing introduced in 2012-13. [d] Excludes taxes received from other levels of government and taxes received from public corporations.

Sources: ABS (*Taxation Revenue, Australia, 2013-14*, Cat. no. 5506.0); Treasury (2015a).

A.2 Taxation offsets

Individual tax offsets reduce the amount of tax payable on individual income. In 2012-13 (the most recent year for which data are available), the total value of non-refundable tax offsets claimed was $6.8 billion (ATO, pers. comm., 19 June 2015). The model includes five major individual tax offsets: the Low Income Tax Offset, the Seniors and Pensioners Tax Offset, the Australian Superannuation Income Stream Tax Offset, the Beneficiary Tax Offset and the Dependent Invalid and Carer Tax Offset (table A.2). Together, these offsets accounted for 52 per cent of the total value of non-refundable tax offsets claimed in 2012-13. However, as some offsets have been phased out or abolished from 2012-13, the model likely accounts for a greater share of non-refundable tax offsets in 2014-15.

Following recommendations from the *Australia's Future Tax System Review* in 2009, a number of tax offsets have been consolidated, progressively phased out and/or abolished from 2012-13 (Treasury 2009).

- The Mature Age Worker Offset was progressively phased out from 2011-12 and the last year this offset could be claimed was 2013-14 (*Tax and Superannuation Laws Amendment (2014 Measures No. 5) Act 2015* (Cwlth)).

Table A.2   Personal income tax offsets[a]
2012-13

Name of tax offset	Value[b]	Proportion of total offset value	Annual growth rate from 2003-04	Abolished or being phased out	Included in model
	$m	%	%		
Low Income Tax Offset	2 066	30	na		✓
Employment Termination Payment Tax Offset	1 195	18	-3		
Senior Australians and Pensioners Tax Offset	735	11	na		✓
Foreign Income Tax Offset	667	10	18		
Australian Superannuation Income Stream Tax Offset	564	8	-2		✓
Mature Age Worker Tax Offset	385	6	-3[c]	✓	
Net Medical Expenses over the Threshold Amount Tax Offset	376	6	3	✓	
Zone or Overseas Forces Tax Offset	287	4	3		
Dependent Spouse Tax Offset	172	3	-9	✓	
Beneficiary Tax Offset	169	2	0		✓
Averaging Tax Offset	161	2	1		
Dependent (Invalid and Carer) Tax Offset	29	<1	na		✓
Superannuation Contributions on Behalf of Your Spouse Tax Offset	5	<1	-11		
Life Assurance Bonus Tax Offset	1	<1	-12		
Other non-refundable tax offsets	4	<1	na		

a Includes all non-refundable income tax offsets in 2012-13. **b** The value is the amount of the offset that an individual claimed or the maximum offset amount an individual was entitled to. This will differ from the total amount of the offset used by taxpayers to reduce their tax liabilities because a taxpayer's total offset amount may exceed their gross tax liability. **c** This is the growth rate from 2004-05 when the Mature Age Worker Tax Offset was introduced. **na** Not available.

Source: ATO (2015).

- The Net Medical Expenses Tax Offset is being progressively phased out over a six year period commencing in 2013-14. The last year this offset can be claimed is 2018-19, but tightened eligibility criteria mean the total value of this offset is expected to begin declining from 2013-14 (*Tax and Superannuation Laws Amendment (2014 Measures No. 1) Act 2014* (Cwlth)).

- The Dependent Spouse Tax Offset is being progressively phased out. The phase out began in 2011-12 when eligibility was restricted to taxpayers with a dependent spouse born before 1 July 1971 meaning that the offset would be gradually phased out as the population ages (*Tax Laws Amendment (2011 Measures No. 5) Act 2011* (Cwlth)). From 2012-13, the phase out was sped up with eligibility further restricted to taxpayers with a dependent spouse born before 1 July 1952 (*Tax Laws Amendment (2012 Measures No. 1) Act 2012* (Cwlth)). This explains the negative growth in the total value of this offset since 2003-04. The offset was abolished entirely in June 2015 (*Tax and Superannuation Laws Amendment (2015 Measures No. 1) Act 2015* (Cwlth)).

- The Senior Australians and Pensioners Tax Offset replaced the Senior Australians Tax Offset and the Pensioners Tax Offset in 2012-13 (*Clean Energy (Tax Laws Amendments) Act 2011* (Cwlth)).

The model also imputes tax deductions by mapping tax records from 2011-12 to the person records in the 2011-12 ABS Survey of Income and Housing (appendix B).

A.3   Transfer expenditure

In 2013-14, the Australian Government provided $125 billion in transfer payments[57] to individuals, equivalent to about 35 per cent of federal tax revenue (ABS 2015a). Two thirds of all transfer expenditure goes to the five largest transfer payments: the Age Pension, the Disability Support Pension, Family Tax Benefit part A and B, and Newstart Allowance (table A.3).

The model includes 40 different payments (if allowances and supplements are counted as separate payments). These 40 payments accounted for more than 89 per cent of total transfer expenditure[58] in 2013-14 and included all of the ten largest payments by expenditure.

The following important changes to transfer payments have occurred since the beginning of 2013-14.

- The Baby Bonus has been phased out. From 1 July 2013, the amount of the Baby Bonus was reduced for second and subsequent children. From 1 March 2014, the Baby Bonus was abolished and replaced with a Newborn Upfront Payment and a Newborn Supplement payable to parents of a newborn who are eligible for the Family Tax Benefit Part A (*Family Assistance and Other Legislation Amendment Act 2013* (Cwlth)).

- Eligibility for the Schoolkids Bonus was subject to an income test from 1 January 2015 and will be abolished at the end of 2016 (*Minerals Resource Rent Tax Repeal and Other Measures Act 2014* (Cwlth)).

- The Income Support Bonus will be abolished at the end of 2016 (*Minerals Resource Rent Tax Repeal and Other Measures Act 2014* (Cwlth)).

The model includes 14 payments not included in table A.3. These payments are not included in this table because their total expenditure was under $100 million in 2013-14 or because these payments are supplements and paid and reported as part of other transfer payments. For example, Rent Assistance is a supplement included in the calculation of 19 transfer payments (many of which are listed in table A.3). The total amount of Rent Assistance paid in 2013-14 was $4.0 billion (DSS 2014a).

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[57] This total includes overheads associated with the delivery of social security and welfare programs as well as some non-cash transfers (ABS, pers. comm., 29 May 2015).

[58] See footnote above.

Table A.3   Major transfer payments[a]

Payment	Estimated actual expenditure 2013-14	Payment recipients		Included in model
		At June 2013	Annual growth rate 2003–2013	
	$m	no.	%	
Age Pension	39 373	2 356 226	2.4	✓
Disability Support Pension	16 110	821 738	2.0	✓
Family Tax Benefit Part A	14 761	1 578 201	-1.2	✓
Newstart Allowance	7 379	660 673	2.6	✓
Family Tax Benefit Part B	4 653	1 357 341	1.2	✓
Carer Payment	4 193	221 954	11.3	✓
Parenting Payment Single	3 581	255 411	-5.2	✓
Service Pensions	2 785	211 427	-5.4	✓
Child Care Benefit	2 360	930 570	2.9	✓[b]
Child Care Rebate	2 225	na	na	✓[b]
Youth Allowance (student)	1 942	247 656	-2.1	✓
War Widow/ers Pension and Orphans Pension	1 846	87 036	-2.7	✓[c]
Parental Leave Pay	1 686	131 307	0.5[d]	✗
Veterans' Disability Pension	1 574	105 705	-3.9	✓[c]
Carer Allowance (Adult)	1 449	422 034	9.0	✓
Parenting Payment Partnered	828	103 497	-5.5	✓
Youth Allowance (Other)	824	113 840	2.7	✓
Schoolkids Bonus	684	1 250 479	na[e]	✓
Carer Supplement	532	na	na	✓
Carer Allowance (Child)	520	132 341	1.1	✓
Austudy	462	46 039	1.7	✓
Baby Bonus	388	155 743	-4.1[f]	✓[g]
Widow Allowance	299	25 681	-5.1	✓
Seniors Supplement	290	283 591	0.0	✓
ABSTUDY	197	34 185	-3.1	✓[c]
Child Disability Assistance Payment	169	na	na	✗
Wife Pension (Age)	124	7 932	-8.9	✓
Mobility Allowance	123	63 207	4.0	✗
Wife Pension (DSP)	119	8 789	-13.6	✓

a Transfer payments with total expenditure of $100 million or more in 2013-14. **b** Only modelled for single-year incidence. **c** Not modelled but included in results by adjusting values in the Survey of Income and Housing by inflation. **d** Refers to the growth rate from the first full year of payment (2012). **e** First introduced in 2013. **f** Refers to the growth rate from the first year of payment (2005). **g** The model includes the Newborn Upfront Payment which replaced the Baby Bonus. **na** Not available.

Sources: DOE (2014); DSS (2014a); DVA (2014).

The payments included in the model but not separately noted in table A.3 are:

- Energy Supplement
- Income Support Bonus
- Large Family Supplement
- Partner Allowance
- Pension Supplement
- Pensioner Education Supplement
- Pharmaceutical Allowance
- Rent Assistance
- Sickness Allowance
- Single Income Family Supplement
- Single Parent Supplement
- Special Benefit
- Telephone Allowance
- Utilities Allowance.

Separate expenditure totals are unavailable for these payments.

B   Modelling approach

This appendix outlines the modelling approach taken by the Commission to analyse Australia's tax and transfer system. The Commission's approach was to model:

- annual tax and transfer incidence (for 2014-15)

- tax and transfer incidence in the future (projections for 2034-35 were modelled)

- the lifetime incidence of taxes and transfers.

Section B.1 explains why a microsimulation model can be used for these tasks, and some features of these models.

The Commission used the CAPITA microsimulation model developed by the Australian Treasury. Section B.2 provides specific details of the data used and the CAPITA model of the tax and transfer system, including modules added by the Commission to estimate GST paid and childcare transfers. CAPITA was primarily used to model annual tax and transfer incidence. The Commission also used CAPITA as a basis from which to estimate tax and transfer incidence in the future and over the life cycle — both of these approaches are also described. Finally, section B.2 concludes with caveats that need to be considered when examining model results.

B.1   Aim of the modelling and the approach used

The objectives of the modelling in this paper are to estimate the incidence and distribution of various taxes and transfers across the population and how they might change over the life cycle.

This analysis requires population-level data to estimate incidence of taxes and transfers in 2014-15. Administrative data records from the Australian Taxation Office and Centrelink, if available, would have much of the tax and transfer information required (they would not include GST). However, such data are not publicly available. Therefore the Commission has used survey data that are broadly representative of the Australian population.

The survey data contain information on earnings, demographic variables and expenditure. All of this information can be used to impute income taxes, transfer payments received and GST paid. However a model must be used to do the imputation. Essentially, the model should act as a 'calculator' — not only to calculate taxes and transfers, but also to estimate effective marginal tax rates (EMTRs). The model will necessarily be complex, given how many transfers there are and the eligibility rules for each. The CAPITA model, which the

Commission used, contained most of these policy parameters.[59] CAPITA is a 'microsimulation model', and is well suited for the task required — to use survey data as an input to calculate EMTRs and tax and transfer incidence at different points in time.

Some features of microsimulation models

Microsimulation models use large cross-sectional datasets with comprehensive information on households and individuals, including demographic and labour market characteristics. They can include a large amount of specific policy detail, making them ideal for examining the interaction between many policies — such as tax and transfer policies — as they relate to a large number of different individuals, households or families.

The microsimulation model used in this paper overlays the survey data with tax and transfer policy rules. Because the data are from a representative survey, estimated weights are used to replicate population-level information on families. It is also relatively straightforward to re-weight the sample, so that it replicates the demographic profile expected in the future (discussed below).

The model can accommodate many changes in circumstances. For example, it can be used to calculate how tax and transfer incidence changes in response to a change in income (which is required for EMTR calculations).

A 'static' non-behavioural microsimulation model is used in this paper. As Li et al. (2014, p. 47) explain:

> Static models take individual characteristics and behaviours as exogenous. These models are commonly used to evaluate the immediate distributional impact upon individuals/households of [policy] … Static models are thus commonly referred to as models that estimate the day after impact of a policy reform ignoring the behavioural response impact due to policy.

A 'behavioural' microsimulation model could have been used instead. Behavioural models are most useful where a policy change is being simulated, because they account for behavioural responses. This was not the focus of this paper. As this project is largely descriptive — mainly examining the incidence and distribution of tax and transfer policies as they applied to the population in 2014-15 — a static microsimulation model is appropriate for the analysis. The estimated EMTRs abstract from any behavioural changes, to isolate the financial incentive to paid work. This is measured as the change in disposable income that occurs as a result of the rules embedded in the tax and transfer calculator, assuming a hypothetical small change in private income (the 'marginal' change).

Other microsimulation models that have been used to analyse Australia's tax and transfer system are discussed in box B.1.

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[59] Other, publicly available, resources exist that contain Australian tax and transfer policy parameters required to model the tax and transfer system (for example, MIAESR (2012b)).

Two microsimulation models that have previously been used to analyse the Australian tax and transfer system are STINMOD and MITTS.

STINMOD

STINMOD (Static Incomes Model) is a static microsimulation model. It was developed by the National Centre for Social and Economic Modelling and first released in 1994. Each year the model is updated to reflect the latest changes to the Australian tax and transfer system. The base population is also regularly updated.

STINMOD has mostly been used to analyse the distributional and individual impacts of income tax and income support policies and to estimate the fiscal impact for government and distributional impacts of policy reform.

MITTS

The Melbourne Institute began developing the Melbourne Institute Tax and Transfer Simulator (MITTS) in 1997. MITTS contains detailed information on the tax and transfer system between early 1995 and 2013.

MITTS comprises an arithmetic, non-behavioural model (MITTS-A) and a behavioural model (MITTS-B). The behavioural model projects changes in labour supply variations in response to changes in the tax and transfer system. Predicted labour supply changes are based on the estimated parameters of an Australian labour supply model.

Both MITTS models can be used to explore the effects of proposed policy changes affecting the Australian tax and transfer system.

Sources: NATSEM (2015); MIAESR (2012a); Creedy et al. (2004).

B.2 The tax and transfer model in more detail

The model of the tax and transfer system the Commission used consists of three components.

3. Input data: The survey data used were representative of the Australian population in 2011-12 (except expenditure data, which were for 2009-10).

4. A framework to model tax and transfers in 2014-15: This has two parts. First, the input data are processed to be compatible with CAPITA, including using inflators for some variables to 'uprate' the data to 2014-15 levels. Second, the model compares the characteristics of income units with tax and transfer rules (as modelled in CAPITA) to determine tax and transfer eligibility and applicable rates. This two-step process produces output for further analysis.

5. Output: The model produces output which was used to calculate and present different measures of tax and transfer incidence and distribution (for example, output was used

to identify income units that pay income tax and receive transfers in the same financial year).

These components are shown in figure B.1. The income tax and transfer model is based on CAPITA (discussed below). The Commission augmented CAPITA with expenditure data (for 2009-10) to estimate GST paid and also estimated EMTRs by re-running the model with different income levels (extensions to CAPITA are noted by the asterisks in figure B.1).

Figure B.1   **Conceptual illustration of the tax and transfer model[a]**
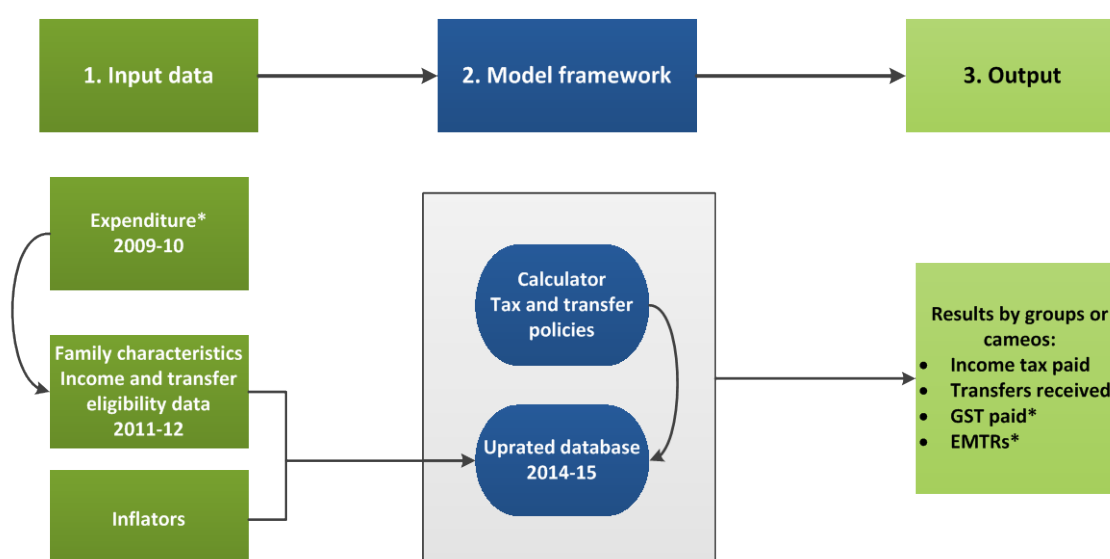
a Transfers include childcare related payments, which were incorporated by the Commission.

The above components are discussed in more detail below.

Input data

The Commission has used publicly available data where possible. The model uses data from two ABS sources.

- 2011-12 data from the Survey of Income and Housing (SIH) basic Confidentialised Unit Record File (CURF) are used to model the income tax and transfer system.

- 2009-10 data from the Household Expenditure Survey and SIH basic CURFs (which were jointly conducted for that year) contain information on consumption expenditure required to estimate GST paid.

The 2011-12 SIH collected information from usual residents aged 15 years and over of private dwellings (excluding very remote areas), covering about 97 per cent of people living in Australia. The sample consisted of 14 569 households, comprising 28 258 people

(ABS 2013b). This converts into 17 834 income units. In this paper the income unit is used as the basis from which taxes and transfers are calculated (rather than, for example, the household or the individual) (box B.2).

Box B.2   Households, income units and families

The ABS Survey of Income and Housing distinguishes between households and income units.

- **Household:** One person or a group of people who live in the same dwelling.

- **Income unit:** One person or a group of related people within a household who share their income. Income sharing is assumed to take place within couples and between parents and dependent children. Dependent children are any children aged under 15 years, or people aged between 15 and 24 years who are full-time students, have a parent in the household and have no partner or child of their own in the household.

As the transfer system works on the basis of an income unit, rather than a person or household (chapter 2), the analysis in this paper is performed for income units. For simplicity the term 'family' is used to describe an income unit when presenting results in chapters, and this definition can include families of one person.

Source: ABS (2013b).

Model

The model of the income tax and transfer system for 2014-15, described in this section, is based on CAPITA. CAPITA has been developed by the Australian Treasury, and was used by the Commission in its analysis. The CAPITA model is documented in Treasury (forthcoming) and much of the explanation of CAPITA in this appendix is sourced from a draft of that document.

Data preparation and imputation

The 2011-12 SIH contains most of the data necessary to evaluate income taxes (private income components described in figure 2.5) and transfer payment eligibility and amounts (for example, age and children). However, steps need to be taken to impute a small number of variables not adequately reported in the basic CURF version of the SIH and to uprate data so that they are relevant for 2014-15.

CAPITA imputes values for variables that are either not reported in the SIH basic CURF or are reported at an inappropriate level of aggregation. For instance, the basic CURF reports ages in ranges for some people (for example, people aged between 40 and 44 are reported as having age '40 to 44'). In this instance, CAPITA selects one of the possible ages at random.[60]

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[60] Other imputed variables include the value of tax deductions and franking credits received, as well as workforce dependence, year of arrival of migrant families and the number of dependents for Carer Allowance purposes.

CAPITA uprates data from the 2011-12 SIH to equivalent 2014-15 values. Income components for 2011-12 were inflated by wage or price indices, as appropriate,[61] to obtain imputed values for 2014-15. Parameters that determine transfer payment amounts were indexed as legislated (for example the Age Pension and Disability Support Pension were indexed using average weekly earnings[62]).

Data for the 17 834 income units in CAPITA were population-weighted to represent the demographic profile of the Australian population in 2014-15. The Commission did this by adjusting population weights reported in the 2011-12 SIH to reflect population projections from its Ageing Australia paper (PC 2013).[63]

The dataset with population-weighted data for 2014-15 forms the basis from which to calculate tax and transfer amounts for the Australian population in 2014-15.

Framework to model income tax and transfer amounts

CAPITA combines the uprated data with tax and transfer eligibility rules to determine income tax and transfer amounts in 2014-15. The model includes most of the tax and transfer policies administered by the Australian Government. For 2014-15, the model includes 40 transfers[64] (payments, allowances and supplements) in the form of the various parameters that describe them (for example, eligibility, payment amounts, thresholds and withdrawal rates) and five major individual tax offsets. Appendix A contains the list of tax offsets and transfers included. CAPITA also has imputed data for tax deductions. Deductions were estimated within CAPITA by combining tax record information from the Australian Taxation Office for 2011-12 with person records in the 2011-12 SIH. Tax deduction amounts were imputed by mapping data from a sample of personal income tax files to the person-level dataset, for individuals with similar characteristics. These characteristics included age, assessable income, whether people had salary income, earned interest, dividend or trust income and had taxable government payments.

Childcare transfer payment rates are based on many factors, including childcare expenditure and the type of childcare used. Disaggregated data to accurately impute childcare subsidies at the population level were not available in the 2011-12 SIH basic CURF. Thus the CAPITA model includes childcare policies only for cameo[65] scenarios (to

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[61] For instance, employee income was uprated using average weekly earnings and a person's income from trusts was uprated using the consumer price index (CPI).

[62] Average weekly earnings was greater than the CPI and the Pensioner and Beneficiary Living Cost Index over the period.

[63] Population weights are also available within CAPITA, but weights consistent with long-term population projections in the Ageing Australia paper (PC 2013) were preferred. Projections from that paper were also used to project tax and transfer incidence in the future (discussed below).

[64] Including childcare payments, which the Commission added to the CAPITA model (discussed below).

[65] A cameo refers to a hypothetical income unit. Cameos are typically used as case studies to evaluate the possible effects on a certain, narrowly defined type of family.

illustrate what the transfer payments would be for a 'representative' income unit with specific realisations of unobserved child-related variables). The Commission added a module to calculate the largest currently legislated childcare transfers (by value) — the Child Care Benefit and Child Care Rebate — for each income unit in the database. Because the survey data did not contain the required level of detail to accurately model these transfers across the population, some simplifying assumptions were made, including for the type of childcare used, the number of children in an income unit (in some cases) and hours of childcare used.[66]

All of the income components which comprise private income (as defined in figure 2.5) are in the database. Some transfer amounts are also reported in the SIH, but many of these were not used. Instead, for most of the transfers modelled, CAPITA uses two criteria to determine whether an income unit receives a transfer payment. First, a person within an income unit must be observed to be receiving the relevant payment in the SIH. Second, that person must be determined to be eligible for the payment, as determined by their demographic characteristics (these are reported in CAPITA, but based on the SIH). Any person who is reported as receiving a payment in the SIH data but is ineligible for it (as determined by the eligibility rules in CAPITA) is assumed not to receive the payment. (An exception to this is for Family Tax Benefit payments. CAPITA determined eligibility for these payments using its own rules, rather than considering whether a person reported receiving the payment in the SIH). Those people who CAPITA deems to be eligible are assumed to receive their full entitled amount. This is determined by the model parameters,[67] and may differ from the amount reported in the SIH data — at the very least because the 2014-15 rates were applied whereas the data would be consistent with the 2011-12 payment rates.

Thus the calculation of tax and transfers occurs by combining two elements. First is the dataset for 2014-15, which contains characteristics required to estimate taxes and transfers of each income unit. Second is the tax and transfer policies that apply to each income unit. The calculation occurs by overlaying the data with tax and transfer policy parameters.

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[66] For example, the SIH reports total childcare hours and expenditure (not disaggregated by child). Where there is more than one child, the hours of childcare used were apportioned between pre-school aged children (under four years) and children aged five to 14 years. A higher share was given to pre-school children because they are likely to have more intensive childcare demands (for example, school age children do not require full day care). It was important to differentiate children by age groups because the subsidy rate calculation differs for pre-school and school-aged children. Furthermore, the SIH does not report the exact number of children in income units with two or more children aged: under two years; between two and four years; between five and nine years; or between nine and 13 years. This was accounted for by comparing the number of children in each age category with the total reported number of children, and assuming that more children fall in younger age groups if necessary. For simplicity it was also assumed that all childcare hours were 'standard' hours and all childcare was approved care (not registered care, which carries a smaller subsidy rate).

[67] There were some minor exceptions to this, in terms of their value. The following transfer payments were taken from the SIH (and uprated to obtain estimates for 2014-15): Special Benefit, Sickness Allowance, Partner Allowance, Austudy and some disability and war widow/ers pensions and allowances under the *Veterans' Entitlements Act 1986* (Cwlth).

Framework to model GST paid

As mentioned above, GST paid was estimated by the Commission outside of the CAPITA model of the income tax and transfer system. Box B.3 describes the method used to calculate GST paid.

Box B.3   How the GST was calculated

The amount of GST imputed to an income unit depends on its consumption pattern.

The ABS Survey of Income and Housing (SIH), which was used as a basis for CAPITA, does not have information on consumption expenditure to calculate GST paid. However, the Household Expenditure Survey (HES) does contain such information. The HES is conducted jointly with the SIH, on a periodic basis. The most recent HES is available for the year 2009-10.

The GST amount paid was calculated by combining information on consumption patterns on goods and services from the joint 2009-10 SIH and HES with the 2011-12 SIH. Conceptually, this involved 'matching' an income unit from the 2011-12 SIH with a similar income unit in the 2009-10 SIH and HES.

- The 2009-10 SIH and HES and 2011-12 SIH collected personal information on a range of characteristics. Some of these characteristics, such as private and total transfer income, were also reported in the 2011-12 SIH and could be used to perform the 'match' (the variables and process are explained below).

- An income unit in 2011-12 was assumed to exhibit the same consumption patterns as its matched counterpart in 2009-10.

For each income unit, aggregate expenditure was adjusted to be consistent with growth in incomes. That is, if income for a matched income unit was 5 per cent higher in 2011-12 than in 2009-10, then expenditure was also increased by 5 per cent.

Similarly, the proportion of expenditure subject to GST (which was based on information provided by Treasury) was assumed to remain unchanged, meaning that growth in GST was also adjusted in line with changes in income.

The process used to match income units between 2009-10 and 2011-12

The 2009-10 SIH and HES and 2011-12 SIH collected personal information on a range of variables which were used to match observations in a process called 'nearest neighbour distance hot deck' (see D'Orazio, Di Zio and Scanu (2006) for a description of this method).

This process allocates a match by determining which income unit in the 2009-10 data (the 'donor') has the most similar characteristics to an income unit in 2011-12 (the 'recipient'). The characteristics used were average age, couple status, private income, total transfer income and whether anyone in the income unit studies or is renting. The donor and recipient with the smallest combined difference in these characteristics is deemed to be the most suitable match. The pattern of the donor's GST paid and expenditure are allocated to the recipient to calculate GST (as described above).

When several potential donors are equidistant to a recipient, the donors are 'tied' and the process selects a donor at random from among the tied donors. When a significant number of recipients have tied donors, these randomised tie-breaking match procedures may affect patterns in GST paid and expenditure. Tied matching is most likely to occur when many observations share similar observed characteristics. To avoid this, the number of tied donors was minimised by the careful selection of individual characteristics (mentioned above) to capture otherwise unobserved differences between a recipient and multiple tied donors. Any remaining recipients with tied donors were not assigned GST (this impacted only 161 observations).

Output from the model

Output from CAPITA (including modules the Commission added for GST and childcare) was used to produce the results for annual tax and transfer incidence in 2014-15 (chapter 4). Results can be reported at the aggregate level and for many subgroups of the population because population-weighted data were used.[68]

The main results of interest were:

- income taxes paid
- transfer payments received
- GST paid.

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[68] The model can also be run for cameos. Cameos were only used in a few instances in this paper (to estimate participation tax rates for a few hypothetical families with an income earner entering into paid work). Cameos were generally not the preferred way to present results because stylised examples of a few different family types cannot shed insight into what is actually happening, in aggregate, for the population or sub-groups of the population. Furthermore, in order to account for the many different examples of family types, in practice many different cameos have to be used.

CAPITA produces this output after the model is run. The Commission processed this output to present findings of interest in various ways (for example, tax and transfer incidence by wealth levels and estimates of churn in chapter 4).

In addition to these outputs, EMTRs were calculated by the Commission to analyse the impact on incentives to paid work (chapter 5).

Estimating effective marginal tax rates

EMTRs are a measure of the total amount of additional tax paid and transfers forgone when an income unit earns an additional amount of income. They can be used as a measure of the financial disincentive associated with the tax and transfer system that an income unit faces when considering whether to increase its labour supply (chapter 2). High EMTRs are thought of as a significant barrier to paid work; that said, there are many other reasons for which people might choose not to enter the paid workforce.

To calculate EMTRs the model was run twice. After running the model the first time gross wages in the database were increased for each income unit and taxes and transfers that applied at the new level of income were estimated. Results from the two models were compared to determine EMTRs. This calculation is complicated by various factors.

- What is an appropriate 'margin' to increment income by in calculations?

- When there are two income earners in the income unit, which person's income should be adjusted?

- How should childcare transfer payments be reflected in EMTR calculations?

These issues, and how the Commission has dealt with them, are discussed next.

Determining the margin for EMTRs

EMTRs can be calculated for increases of just one dollar. However, decisions to adjust labour supply are typically based on working more hours and involve much larger financial amounts. Similarly, an increase in income through a pay rise, promotion or change in jobs would typically involve a much larger amount. The marginal amount to increase income could be based on a fixed amount, or vary according to an income unit's labour supply decision (for example, by assuming a one day increase in labour and calculating the corresponding increase in income, for each income unit).

As the choice of which margin to use is not guided by theory, the Commission has for simplicity decided to use a fixed amount of $5000 per year. This amount is roughly equivalent to increasing weekly labour supply by half a day for many, based on the median income of a worker in the database ($46 876 in 2011-12). Results were robust to small variations to this amount. For example, with a $5000 increase in income to the primary earner, the model estimated that the share of income units with an EMTR of 20 per cent or

less was 27 per cent. This share increased to only 29 per cent if a $4000 margin was used instead.

The Commission also estimated participation tax rates for cameo scenarios, using income margins that were deemed appropriate for the hypothetical situation being modelled (box 5.3).

Estimating EMTRs for income units with two income earners

When both members of a couple earn the same level of income, EMTRs can be interpreted as a financial barrier the income unit faces in its joint labour supply decision.

However, when each member of a couple earns a different level of income or when transfer payments are income tested, EMTRs are likely to differ depending on the person for whom they are calculated. The EMTR will be higher for the primary earner in most cases. There are two reasons for this.

- Income taxes are collected on an individual basis, and income tax rates increase with the level of income. To the extent that the primary earner has a higher individual income than other members of an income unit, they are likely to face a higher marginal income tax rate.

- Most transfers are income tested based on either total income from the income unit or the income of the primary earner. To the extent that the primary earner increases their income, transfer payments will therefore decline by at least as much as they would have, had the secondary earner's income increased by the same amount.[69]

As both of the components that affect EMTR calculations (per dollar tax paid and per dollar benefits foregone) are usually equal or larger for the primary earner, the EMTR faced by the primary earner will usually be larger than that faced by the secondary earner.

This can be illustrated through a simple example. Consider a couple comprising a full-time worker who earns $50 000 (with a marginal tax rate of 32 per cent) and a part-time worker who earns $20 000 (with a marginal tax rate of 19 per cent), giving a total pre-tax income of $70 000 for the couple. The couple also receives a means tested income support payment of $5000, which, if the couple earned an additional dollar, would decrease by $0.20 (20 per cent). The EMTR for the primary earner is 52 per cent (32 + 20 per cent), while the EMTR for the secondary earner is 39 per cent (19 + 20 per cent).

There is uncertainty about the opportunities for primary and secondary earners to change their income. For instance, it is likely that secondary earners work fewer hours, so they have more potential to increase their hours. In addition, they typically face lower EMTRs so have a greater financial incentive to work more hours. However, even though primary

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[69] An exception is for some income units receiving Family Tax Benefit B — it depends only on the secondary earner's income if the primary earner's income is below $100 000 per annum (chapter 5).

earners might not be able to increase hours, they may change jobs or earn a promotion, both of which could lead to higher income.

The decision as to whether to increase the income of the primary or the secondary earner is an important determinant of the level of EMTRs faced by an income unit. For double-income families, the Commission has focused on presenting results mainly for the primary income earner in chapter 5 (only some results for secondary earners are reported). In addition to the EMTRs presented in chapter 5 for primary earners, appendix C also reports EMTRs estimated for secondary income earners, to allow a comparison of results.

How do the childcare transfer payments influence the EMTR calculation?

Those income units who use childcare are entitled to receive a subsidised proportion of their total childcare payments. This proportion decreases as income rises.

Estimating an EMTR to account for childcare transfers is more complicated than for other transfers. This is because the total level of childcare assistance received is tied to the quantity of childcare demanded and the total expenditure on childcare. While the per unit subsidy rate is a function of income, the total expenditure and total dollar subsidy are linked to the amount and type of childcare used. The static microsimulation model used in this paper does not project whether a change in income, perhaps resulting from an increase in labour supply, might affect the demand for childcare. This can have a large influence on the estimated EMTR.

Consider, for example, a person who increases labour supply such that income increases by $500 and the income unit has to also use additional childcare, because the person who increases their hours cannot care for the child in that time. Suppose the cost of additional childcare is $200 (subsidised at a rate of 20 per cent). For simplicity assume that no other taxes and transfers apply. The net (out–of–pocket) increase in childcare expenditure is $160 ($200 – 0.2x$200). If it is assumed that out-of-pocket childcare expenses are part of a family's financial barriers to paid work then these should be reflected in EMTRs. Thus, in this example the EMTR is 32 per cent ($160/$500). If instead childcare expenditure increased by $100 then the EMTR would be 16 per cent. Note that, in both cases, the EMTR is different from the childcare subsidy rate (20 per cent), which remains unchanged. Finally, if the additional income was different, the EMTR would again be different, in both cases above.

The model does not account for behavioural responses to childcare demands that might occur in response to changes in labour supply, and estimating them would be difficult.

Another consideration is whether childcare is demanded for reasons other than to enable paid work (such as socialisation or educational benefits). To the extent that childcare is used for these reasons then lower childcare subsidies are not a barrier to paid work, per se. In this case, an EMTR that includes childcare would not be a reflection of the financial disincentives to paid work.

Due to the uncertainty around modelling the likely level of childcare expenditure and subsidies and because childcare can be demanded for reasons other than enabling paid work, the Commission has not included childcare subsidy payments as part of EMTRs as measures of financial disincentives to paid work.

Life cycle analysis

Chapter 6 incorporates an analysis of tax and transfer incidence over the life cycle, by examining tax and transfer incidence in the future and over the lifetime of representative families. Evaluating tax and transfer incidence over the life cycle could be done by various means, including by projecting growth in variables such as income, and incorporating assumptions for demographic variables such as family structure over the lifetime. As noted in chapter 6, such an approach requires a lot of assumptions. For example, there are many different family structures which can occur over a life cycle, and income can change at different stages of the life cycle (chapters 3 and 4).

The Commission used the CAPITA model as a basis for its life cycle analysis. Two simple approaches were used to analyse taxes and transfers over the life cycle:

- static ageing
- stylised age-income paths.

Static ageing

Under this approach, the incidence of taxes and transfers was evaluated for 2034-35 under the current policy framework. Key variables, including incomes, were projected from 2014-15 to 2034-35 levels. Data were population-weighted to reflect demographic projections in 2034-35. The approach is explained in box B.4.

The calibrated population-level data for 2034-35 are then combined with the tax and transfer policies applicable for 2034-35, by indexing the relevant policy parameters (for example, transfer payment amounts and withdrawal rates) in line with current legislation. This is done within CAPITA. The Commission's modules for GST and childcare transfer payments were not included in the forward projection period.

A static microsimulation model can be used to analyse taxes and transfers in the future by using 'static ageing' techniques. Static ageing was done outside of CAPITA, to generate a dataset consistent with population projections for 2034-35.

The static ageing process is similar to that used to uprate data from 2011-12 to 2014-15. The steps taken to adjust the characteristics in 2011-12 to generate a representative population for 2034-35 were as follows.

- Data from the ABS Survey of Income and Housing 2011-12 were used. These data contain population weights. (That is, to generate a representative sample of the Australian population, each of the 17 834 income units has a weight attached to it.)

- Demographic predictions regarding the future profile of the Australian population were used. Projections for the age profile of the population in 2034-35 were taken from the Commission's Ageing Australia paper (PC 2013).

- The existing population weights for each income unit in the database (for 2011-12) were adjusted, so that the population is consistent with the demographic profile in 2034-35. In practice, this means that if a certain cohort (for example single 55-60 year olds) is expected to be more prevalent in 2034-35 then the weighting attached to this type of income unit is higher in the 2034-35 database. (Thus, single 55 to 60 year olds are assumed to share the same characteristics in 2034-35 as single 55 to 60 year olds did in 2014-15).

- The database was also adjusted to account for growth in prices and incomes. This was done by using consumer price index and various wage earnings growth assumptions (chapter 6).

In addition, some scenarios with different parameters were also modelled. These scenarios were designed to explore key relationships in the model. For instance, the Commission specified scenarios with:

- small and large differences between average wage earnings and CPI

- tax thresholds indexed in line with predicted changes in the CPI (annually, but commencing from 2024-25).

More details on these assumptions are in chapter 6.

Stylised age-income paths

The second approach models different income paths over the lifetime of various representative families (box B.5). This method estimates lifetime tax and transfer flows assuming the tax and transfer system remains unchanged from 2014-15 and income distributions in each age group are held constant over a lifetime.

In contrast to static ageing, this approach does not invoke any assumptions regarding changes in the demographic profile. Instead, it is a type of cohort model with ageing — groups of people are aged and allocated the average incomes of corresponding groups in 2014-15. The model does not include the Commission's modules for childcare transfers or GST paid.

Box B.5   Representative families by age and income

A number of representative families were modelled, to show how their income, taxes paid and transfers received change over the lifetime. The Commission's modelling incorporates some variation in the following factors:

- age

- income

- family type (relationship status and whether a family has any dependent children during their lifetime).

The process by which this is done is described next.

Representative family types over the life cycle

The 2014-15 database was first split into five age groups (15–29, 30–39, 40–49, 50–59 and 60+). Within each age group, annual private income was sorted by decile.

Representative lifetime age-income paths were then generated for different family types. Couple and single families were modelled separately. Families were also defined as those that have dependent children for part of their lifetimes and those who do not. Thus, there were four different types of representative families: singles with dependent children; singles without dependent children; couples with dependent children; couples without dependent children.

For simplicity, representative families who have dependent children were assumed to only have them when they were in the 30–39 and 40–49 age groups. Relationship status was assumed to be constant across the lifetime of each family — a couple in early life will also be a couple in retirement. These simplifying assumptions dramatically reduce the number of representative families required, but should be borne in mind when interpreting the results. For example, the number of people in a family is likely to change over time (for instance, if a couple divorces) and, as indicated in this paper, income, expenditure and tax distributions are very different for couples and singles.

Life cycle paths for each family type were then constructed, to generate income paths for families as they move from 15–29 to 60+. Because there are five age range groups, each containing ten income deciles, there are a total of 100 000 age-income paths for each family type.

Assumptions regarding lifetime income paths

A key determinant of lifetime income is how a representative family transitions between different income deciles as it ages. That is, how likely is it that a family in the highest income decile when aged 30–39 will remain in the highest income decile when aged 40–49? An income path dependent life cycle was modelled. Conceptually this means that, even though families have ten different income deciles they can move to as they age, a higher probability is allocated to the income decile they were in at the previous age group. For example, a family that is in the highest income decile when aged 30–39 is modelled as most likely to be in the highest income decile when aged 40–49. And a relatively higher weighting is allocated to surrounding deciles than to lower income deciles. Similarly, a family in the middle income decile at age 30–39 will have relatively higher probabilities of being in the middle income deciles when 40–49.

A triangular probability distribution for income was used to transition between age groups. For example, a person in the lowest income decile is 10 times more likely to be in the lowest income decile when transitioning to the next age group than in the highest income decile.

The income path dependence assumption was also relaxed to examine the effect on results (chapter 6).

Calculating tax and transfer incidence over the life cycle

At each age cohort, the transfers received and taxes paid, when aggregated across all families sorted by income deciles, reflect those which the model estimated for 2014-15. (Note that, because families in the model can only have dependent children when aged 30–49, child-related transfer payments (such as Family Tax Benefits) are assigned to families with children only at those ages.) For each representative family, the taxes paid and transfers received at each age group are then aggregated to obtain lifetime incidence. However, most age groups span 10 years whereas the last age group is for all ages over 60. The 60+ age group was cycled through three times, to represent what happens between 60 and 90 years, holding private income (and taxes and transfers) constant over that period.

To generate results representative of the population, each of the four family types (and therefore the 100 000 corresponding age-income paths for each) was weighted in line with the demographic characteristics in the 2014-15 database. For example, the proportion of single families with dependent children (as a share of the entire population in 2014-15) was used as a population weight for the family type 'single with dependent children'.

Model limitations and caveats

Several caveats and model limitations should be kept in mind when interpreting the results presented in this paper.

Data

Similar to the issues discussed in chapter 3, there are many data limitations which can affect the analysis. Estimates from the SIH are subject to non-sampling and sampling error.

Sources of non-sampling error can include non-response and errors in reporting by respondents. The latter could affect some variables used in the analysis, because the answers to some questions required respondents to estimate certain values. A number of variables in the survey require the respondent to estimate values of which they are not entirely sure (for example, recent work patterns). While some households might be able to reliably provide these statistics, others might not.

Sampling error occurs because the data are based on a sample, and therefore might not replicate figures that would have been produced had information been collected from the entire population.

In addition, the sample did not cover some subsets of the population. Residents of non-private dwellings were excluded from the scope of the survey. Non-private dwellings include hotels, boarding schools, boarding houses and institutions (ABS 2013b).

Behavioural changes

CAPITA is a static microsimulation model and does not consider any behavioural responses that might occur (section B.1). In calculating EMTRs this is desirable, as they are designed to be an indication of disincentives or impediments to increase paid work.

The assumption regarding no change in behaviours has implications for the projections estimated for 2034-35. That is because it assumes that paid work, unpaid activities and consumption behaviours for people of a particular age in 2014-15 are the same as for people who are the same age in 2034-35. This abstracts from factors which could influence future behaviour, such as changes in superannuation balances or health status, or changes in indexation rules, which could all feed into labour market behaviour (chapter 3).

The stylised age-income path model has the same limitation. For example, suppose a representative family is determined to be in the highest income decile at each age range (from 15–29 to 60+). In that case, it implicitly assumes that the taxes and transfers paid at each age reflect what the highest income earners at various ages paid in taxes and transfers in 2014-15 — abstracting from any behavioural changes that might occur in the future (in response to changes in superannuation balances, for example).

Some taxes and transfers are not included

A number of transfer payments were not included (appendix A contains a list of transfers that were not modelled). However, given that the vast majority of transfers (by size) were included, this is not likely to materially affect the results. State taxes and a number of state concessions also exist, which were not modelled. These could affect results.

The Commission has estimated taxes and transfers for 2014-15. Several new policies have been announced, but not implemented. These were not included in the model.

GST paid

As noted above, imputing GST required matching records from the 2009-10 HES to the 2011-12 SIH. Implicit in this approach, it was assumed that the distribution of GST applicable expenditure in 2009-10 was similar to that in 2011-12 and that income units with similar relationship status, average age, private income, transfer income, rental status and study characteristics had similar consumption patterns. If these assumptions were violated, income units could be matched with GST expenditure shares that do not accurately reflect their consumption patterns.

Assets testing

Some transfers are subject to both income and assets tests. In its current form, CAPITA accounts only for income testing. This is likely to affect CAPITA's estimates of the amount of Age Pension — not the number of recipients, because the model only imputes a transfer to an income unit if that income unit is first recorded as having received the transfer in the SIH. The absence of assets testing is likely to overstate the number of full-rate Age Pension recipients and understate the number of part-rate recipients. The extent of this is unknown, but it unlikely to be large. The total amount of Age Pension expenditure generated by CAPITA is reasonably close to administrative data on Age Pension expenditure.

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