



# Asset portfolio retirement decisions: the role of the tax and transfer system

Inquiry into pathways to housing tax reform

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Lachlan Dynan's contributions were made during his time as an Honours student at the University of Sydney, and not during his subsequent employment at the Reserve Bank of Australia. As such, the views represented here are unrelated to the Reserve Bank of Australia.

This report uses unit record data from the Household, Income and Labour Dynamics in Australia (HILDA) Survey. The HILDA project was initiated and is funded by the Australian Government Department of Social Services (DSS) and is managed by the Melbourne Institute of Applied Economic and Social Research (Melbourne Institute). The findings and views reported in this report, however, are those of the authors and should not be attributed to either DSS or the Melbourne Institute.

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# Contents

<b>List of tables</b>	<b>vii</b>
<b>List of figures</b>	<b>viii</b>
<b>Acronyms and abbreviations used in this report</b>	<b>ix</b>
<b>Glossary</b>	<b>ix</b>
<b>Executive summary</b>	<b>1</b>
Key points	1
The report	2
Key findings	3
Policy development options	4
The study	5
<b>1 Introduction</b>	<b>7</b>
1.1 Why this research was conducted	9
1.2 Policy context	11
1.3 Existing research	16
1.4 Research methods	18
1.4.1 Methodological approach	18
1.4.2 The Household, Income and Labour Dynamics in Australia dataset	20
<b>2 Analysis of Age Pension reforms</b>	<b>22</b>
2.1 The life-cycle model: existing research	23
2.2 Portfolio choice over the life-cycle: empirical evidence	25
2.3 Asset allocation: empirical specification	29
2.4 Asset allocation: data and descriptive statistics	30
2.5 Asset allocation: empirical results	39
2.6 Changes to the Age Pension taper rate: empirical specification	44
2.7 Changes to the Age Pension taper rate: data and descriptive statistics	47
2.8 Changes to the Age Pension taper rate: results of the analysis	48
2.9 What are the policy development implications of this research?	51
<b>3 Analysis of removal of the superannuation surcharge</b>	<b>53</b>
3.1 Changes to superannuation: abolition of the superannuation surcharge	53
3.2 Changes to superannuation: data, descriptive statistics and results of the regression analysis	57
3.3 What are the policy development implications of this research?	58
<b>4 Policy development options</b>	<b>60</b>

4.1	What are the key questions the research answers?	61
4.2	Final remarks	65
<b>References</b>		<b>66</b>
<b>Appendix 1: Changes to the Age Pension taper rate in a life-cycle model</b>		<b>71</b>
<b>Appendix 2: Additional results</b>		<b>79</b>

## List of tables

Table 1: Age Pension assets test thresholds 2017	12
Table 2: Summary statistics: pooled sample 2002–16	31
Table 3: Wealth holdings and asset portfolio: pooled sample 2002–14	32
Table 4: Determinants of asset portfolios: couples pooled sample 2002–14	40
Table 5: Determinants of asset portfolios: singles pooled sample 2002–14	42
Table 6: Changes in portfolio allocation: 2002–14	48
Table 7: Difference-in-difference results: Age Pension policy change	49
Table 8: Percentage of before-tax salary contributed to superannuation: 2002–14	57
Table 9: Difference-in-difference results: superannuation surcharge change 2006–14	58
Table A 1: Characteristics of the estimation sample: 2006	79
Table A 2: Difference-in-difference: Superannuation Surcharge change full results	79



## List of figures

Figure 1: Age Pension assets test: single non-homeowners	14
Figure 2: Age Pension assets test: single home owners	15
Figure 3: Portfolio allocations of older households	33
Figure 4: Household wealth and liabilities 1995–2014	35
Figure 5: Household net worth 2002–14: all households	36
Figure 6: Household net worth 2002–14: home owners	36
Figure 7: Household net worth 2002–14: non-homeowners	37
Figure 8: Household net worth 2002–14: house investors	37
Figure 9: Removal of the superannuation surcharge	55
Figure A 1: The Age Pension means test in the life-cycle model	71
Figure A 2: The Age Pension means test in the life-cycle model: reduced taper rate	73
Figure A 3: Indifference curves in a life-cycle model	74
Figure A 4: The Age Pension means test in the life-cycle model	75
Figure A 5: The Age Pension means test in the life-cycle model: initial taper rate	76
Figure A 6: The Age Pension means test in the life-cycle model: reduced taper rate	77

## Acronyms and abbreviations used in this report

ACOSS	Australian Council of Social Services
AHURI	Australian Housing and Urban Research Institute Limited
AP	Age Pension
DiD	Difference-in-difference
DSS	Department of Social Services
EMTR	Effective marginal tax rate
GFC	Global Financial Crisis
OECD	Organisation for Economic Cooperation and Development
SS	Superannuation surcharge
UK	United Kingdom
US	United States

## Glossary

A list of definitions for terms commonly used by AHURI is available on the AHURI website [www.ahuri.edu.au/research/glossary](http://www.ahuri.edu.au/research/glossary).

# Executive summary

## Key points

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The tax and transfer system has important implications for the choices Australians make around retirement and retirement planning. Any meaningful reform of the tax system must recognise that the financial incentives embedded in the tax and transfer system shape decisions of Australians throughout their working life and following their withdrawal from the labour force. Those financial incentives have implications for the portfolio choices of Australians. Given that owner-occupied housing usually represents the largest single component of the household wealth portfolio, the tax and transfer system is likely to have important implications for housing-related decisions.

This report examines how the rules embedded in the tax and transfer system, especially in relation to the age pension (AP), may impact on household choices. The empirical analysis identified the following patterns of behaviour.

- Notwithstanding that the exclusion of owner-occupied housing from the AP assets test creates an incentive to hold a larger share of household assets in this form, there is little evidence that households structure their wealth portfolio to maximise access to the AP.
- There is evidence that the 2007 reduction in the AP taper rate (from \$3.00 to \$1.50 for those households holding that held non-exempt assets exceeding the lower threshold) led to increases in saving. The estimated effects are in the order of \$300,000 of additional savings for affected households. Such effects are large and likely overstate the behavioural response, with valuation effects likely influencing the estimated impact of the reduction of the taper rate.
- The empirical analysis indicates high-income individuals responded to the removal of the superannuation surcharge (SS) in 2005 by increasing contributions to superannuation.

Reform of the tax and transfer system as it relates to retirement incomes poses challenges because of the long-term horizon that such decisions usually involve. A useful starting point for addressing some of the issues raised in this report is to reassess the parameters of the AP assets test. Such steps will provide opportunities to develop a sustainable tax and transfer system in a manner that recognises the concessional treatment of owner-occupied housing in the tax system over the life cycle.

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## The report

This report addresses the question of how individuals respond to the incentives embedded in the Australian tax and transfer system. Much of the analysis focuses on decisions around asset allocation and how those decisions are shaped by taxes and rules that determine eligibility for AP payments. That is, the focus is on decisions relating to savings and wealth accumulation associated with retirement. In considering those decisions, the institutional and policy context means that housing-related questions are front and centre of the analysis.

This report is part of a larger AHURI Inquiry around the development of pathways to tax reform. The starting point of this report is that such an endeavour requires a life-cycle perspective reflecting the fact that taxes shape decisions both while individuals work and throughout their retirement. As noted, the focus in this report is on financial decisions associated with retirement. Examining decisions at and around retirement is pertinent because it represents the point in the life cycle at which many individuals make the transition from being a net contributor, in a fiscal sense, to drawing government funded benefits and services in excess of any contributions that they may still be making. Moreover, it is at this point that many Australians interact with the transfer system in a robust and continued manner. Hence, the interface between the tax and transfer system at this point in the life cycle is critical, not just for the individual but for the welfare and efficient operation of the economy more generally.

When examining tax policy in the context of retirement, an understanding of how the tax and transfer system shapes housing outcomes is critical for a variety of reasons. Often referred to as the ‘fourth pillar’ of retirement incomes, housing plays a central and significant role in sustaining Australians in their working life and during retirement. The rules embedded in the tax and transfer system provide significant incentives for home ownership. Moreover, in the Australian context, home ownership and the accumulation of housing equity is critical for households given the relatively low rates at which government funded pensions are paid.

An understanding of how financial decisions associated with retirement are shaped by the tax and transfer system is critical from a policy perspective. Notwithstanding the means-tested, targeted and non-contributory nature of the Australian AP, fiscal challenges associated with the ageing of the population present some stark policy choices for the Australian Government (Department of the Treasury 2010; 2015). Understanding how decisions around retirement, in particular those associated with portfolio choices, are shaped by the tax and transfer system is essential to the development of a tax and transfer system that encourages the efficient allocation of resources across the economy, is consistent with principles of equity, and is sustainable. For historical and institutional reasons, any such tax system is likely to have important implications, both direct and indirect, for housing choices and housing markets more generally.

The aim of this report is to gain a deeper understanding of how tax and transfer policies shape the behaviour of individuals. Arguably, identifying the behavioural responses to the incentives embedded in the current tax and transfer system is fundamental to developing a pathway to tax reform that is robust and consistent with the long-term prosperity of Australia.

## Key findings

This report examines three distinct questions. These questions relate to savings behaviour or the choices that individuals make around portfolio allocation.

- Are patterns of asset accumulation consistent with the incentives associated with the AP means test?
- Do changes in the AP taper rate impact on savings behaviour?
- How did high-income individuals respond to the removal of the SS in 2005?

In each case, the tax and transfer system may have shaped behaviour by providing incentives for individuals to accumulate higher levels of particular types of assets or to alter the total amount of savings. Given that housing equity often represents the largest single asset in a household's wealth portfolio, there are clear policy implications for housing-related behaviours and outcomes. For example, in the presence of a more neutral policy regime that does not distinguish between different types of housing tenure, it is possible that portfolio allocation decisions—such as the amount of housing equity held—will be somewhat different.

The analysis is based on longitudinal data in the form of the Household, Income and Labour Dynamics in Australia (HILDA) dataset. For the second and third question, the analysis examines policy changes that provided natural experiments. These policy changes provide exogenous variation in the economic environment faced by individuals, which in turn allows the behavioural impact of changes in policy to be analysed.

The first research question focuses on the portfolio decisions of Australian households and the analysis attempts to identify if the patterns of wealth holdings are consistent with the incentives provided by the AP means test. For the AP a means test is applied to both assets and income. The AP assets test excludes owner-occupied housing from the set of assessable assets and thereby provides an incentive for households to accumulate a relatively high level of assets in the form of home equity rather than other forms of wealth. Observed patterns of asset holdings are as expected, with owner-occupied housing generally representing the largest single asset in a household's wealth portfolio. Such a result is not surprising, for a number of reasons. Housing plays a central role in supporting living standards during retirement in the face of a publicly means-tested AP that is relatively low in value and unrelated to contributions over an individual's working life. Moreover, there is clear evidence that individuals prefer to 'age in place' and remain in the family home rather than consuming the wealth associated with it. Given the increasing maturity of the mandatory superannuation scheme introduced in 1992, more recent cohorts of older Australians are holding relatively larger shares of their wealth in the form of superannuation assets.

We examine statistical analysis that considers how those individuals who are close to losing their AP eligibility in terms of income choose their asset portfolio and level of wealth holdings. The statistical analysis suggests that individuals and households are not structuring their asset portfolios to maintain eligibility for the AP.

The second question considers how changes to the AP taper (or withdrawal) rate in 2007 affected the savings decisions of households. The AP taper rate effectively acts as a wealth tax, reducing the level of consumption enjoyed by those with relatively high assessable assets by limiting the amount of AP they are eligible to receive. The changes to the AP taper rate in 2007 provide an opportunity to observe how those individuals who were affected by the change in the taper rate and became newly eligible for the AP responded. In addition to the total level of savings, their portfolio allocation decision may also have been impacted.

The empirical analysis suggests that following the reduction in the AP taper rate, those individuals who were affected increased their level of saving relative to those who were unaffected by the

change. While the analysis identifies a large and statistically significant impact on savings, a number of caveats should be highlighted. In particular, the positive change in saving identified in the analysis may reflect passive accumulation of wealth through asset appreciation. Further, there is evidence that the households impacted by the 2007 reduction in the AP taper rate allocated wealth in a way that is consistent with the exemption of owner-occupied housing from the AP assets test. As the taper rate was reduced, this created an opportunity to hold additional wealth in assets other than owner-occupied housing while still retaining access to the AP.

The final research question focused on changes to the taxation of superannuation for high-income earners. The analysis was possible because of the removal of the superannuation surcharge in 2005, which was announced with little forward notice. A priori, one might expect that such a change would lead to an increase in the savings directed to this tax-preferred form of saving. The analysis suggests that this was indeed the case, with relatively high-income earners increasing this form of savings.

The empirical analysis in this report was directed at understanding how the tax and transfers systems shape decisions around the asset portfolio. It is important to stress that the interface between the four pillars of the retirement income system (superannuation, AP, private savings and home ownership) mean changes that impact one pillar are likely to have important implications across a range of behaviours. Housing represents a central component of retirement planning in Australia and changes associated with the generosity of the AP have important implications for housing-related behaviours and policy. More generally, the analysis in this report is largely consistent with the framework provided by the life-cycle model and the findings add to the evidence base on which a sustainable pathway to tax reform can be developed.

## **Policy development options**

The analysis in this report focuses on two specific policy changes and seeks to identify the impact of those changes on behaviour. The outcomes identified are consistent with the predictions of the life-cycle model and the economic framework more generally. In the case of changes to the AP taper rates, the evidence suggests this led to increased savings for those impacted by the reduction in the withdrawal rate. Similarly, in the case of superannuation, there is evidence that those affected by the increased concessional treatment of this form of saving increased their superannuation contributions.

The policy lessons to be drawn from this report reflect a number of key considerations. First, retirement income policy and the place of housing in that framework is complex. The pillars of the retirement income system are interdependent, and care must be taken when adopting piecemeal changes, as such changes can have unintended consequences. While this report has not considered changes to the taxation of housing assets directly, the interface between the pillars of the retirement income system mean that changes to one pillar are likely to impact on decisions related to other pillars.

Second, it is important to note that the guiding principles of tax reform have been clearly articulated in the past. It is widely accepted that steps should be taken to develop a tax system that is fair, promotes efficiency and does not impose high administrative costs on those it taxes. Moreover, in terms of the tax and transfer system, any changes must be sustainable. Finally, in the context of retirement incomes policy change, it is critical that actual or proposed changes provide sufficient time and guidance for individuals to make appropriate decisions in the life-cycle context.

There is a reasonable degree of consensus across the political spectrum about what changes to the tax and transfer system might be desirable, in order to make it compatible with the aims it seeks to achieve while at the same time being sustainable in the face of increasing fiscal challenges. A number of these changes have direct implications for housing. For example, the

removal of the exemption of the family home from the AP assets test has been mooted in the past by commentators across the political spectrum. The most comprehensive set of tax reform proposals in the past decade, the Henry Tax Review, recommended the inclusion of owner-occupied housing in the means test, above a relatively generous threshold (Henry, Harmer et al. 2009).

This report identifies the relatively high levels of financial wealth held by households that are owner-occupiers. Moreover, there is evidence that notwithstanding the predictions of the life-cycle model, households do not tend to draw down wealth following retirement (DSS 2016). In light of this and the continuing fiscal challenges associated with an ageing population, a step toward the sort of comprehensive reform that has been identified in the past should focus on how housing is treated in the assets means test for the AP. While removal of the exemption for owner-occupied housing has been identified as a laudable goal, there is unlikely to be a political consensus to adopt such a change in the near to medium term. Rather, more modest changes may provide opportunities to rebalance the tax and transfer system in a way that achieves desirable outcomes. The treatment of housing assets and wealth is likely to be a key component of any such changes. In particular, changes to the AP taper rate and thresholds for home owners and non-home owners present opportunities to more accurately reflect the value associated with owner-occupation. The AP assets means test effectively taxes the wealth of those households whose AP is reduced by virtue of having assessable assets that exceed the lower threshold. Changes in the taper rate and thresholds have the potential to alter the financial advantage associated with home ownership, potentially mitigating the distortionary effects associated with the concessional treatment of housing more generally and addressing the need to develop a fiscally sustainable tax and transfer system.

It is important to emphasise that any such changes must, however, be gradual. Moreover, they need to take account of the lessons learned from the analysis in this report. In particular, the finding that households and individuals are likely to respond to the incentives provided by the tax and transfer system and shape their behaviour accordingly.

## The study

This study is part of a wider AHURI *Inquiry into pathways to housing tax reform*. This report focuses on how tax and transfer policies shape decisions at and around retirement. Specifically, the analysis considers behaviour around the accumulation of assets and allocation of wealth across alternative asset classes. The policies considered are those relating to the AP and superannuation. In both cases, we have found that the parameters or rules of the programs potentially create incentives that impact on housing and housing-related outcomes. For example, the exclusion of owner-occupied housing from the AP assets test creates an incentive to hold more wealth in this form than would be the case in a more 'tenure-neutral' regime in which housing was treated like other assets. Similarly, the generous tax treatment of superannuation savings creates an incentive to accumulate additional savings of this nature relative to a tax system that was more asset neutral.

Housing is a critical component of the wealth portfolio of Australian households and it plays a central role in retirement planning. Tax and transfer settings that impact on decisions at this critical life juncture are likely to have important implications for housing-related decisions and housing markets. In turn, such policies impact on the broader functioning and performance of the economy.

The analysis in this report uses the HILDA Survey: a longitudinal dataset containing detailed information on the behaviours and outcomes experienced by Australian households over a period spanning more than 15 years. Specifically, the wealth modules available in 2002, 2006, 2010 and 2014 provide detailed insights into decisions around portfolio allocation and wealth holdings.

Importantly, the data allows a comparison of the behaviour of households before and after the Global Financial Crisis (GFC). Moreover, in the period covered by the analysis, important changes were made to the rules associated with the AP taper rate and taxes applied to superannuation savings. In turn, the statistical analysis considers how decisions and outcomes were shaped by the AP assets test and generous tax treatment of superannuation savings.

The findings of this report add to the existing evidence base in a number of ways. First, we provide additional insight into the patterns of asset accumulation by Australian households and how they are shaped by the AP assets test, by utilising additional waves of the HILDA data. Further, we conduct some original analysis, using HILDA, of the impact of the changes to the AP assets taper rate. Finally, the removal of the SS in 2005 provided an opportunity to consider how the tax treatment of this form of saving impacted on high-income earners affected by the change. Together, the analyses of these policies provides new insight into how the behaviour of Australian households is shaped by the tax and transfer system.

This report is timely in light of recent changes to the AP assets test that effectively reversed the AP policy change considered in this report. As a result, the research provides insight into the likely behavioural implication of these changes. More generally, the study provides additional evidence upon which an efficient, equitable, enabling and sustainable tax system can be developed.



# 1 Introduction

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Like many other countries, Australia faces fiscal challenges associated with an ageing population. The tax and transfer system will play a critical role in responding to those challenges by shaping decisions around work, saving and retirement. At present there is widespread recognition that housing is taxed lightly both during an individual's working life and retirement. This reflects a number of considerations, including: the design of the publicly funded Age Pension (AP); the strong tradition of home ownership in the Australian psyche; and the recognition that owner-occupied housing is an important pillar in the retirement system for most Australians.

This paper is premised on the principle that decisions around saving for retirement are shaped by a life-cycle perspective.<sup>1</sup> Moreover, both the total value of saving and its components are affected by the financial incentives embedded in the tax and transfer system. In this context it is important to note that housing plays a critical role both as a consumption good and an investment. Policy settings in the Australian tax and transfer system have, however, led to a belief that there is over-accumulation of this form of saving relative to what would occur in a more neutral tax system. This report seeks to provide insight into how the savings decisions of Australians at or around retirement are shaped by the tax and transfer system. In particular, the analysis addresses the following questions:

- How do Australian households, especially those approaching retirement age, allocate wealth across assets?
- How have the asset allocation decisions of Australian households changed over the period 2002 to 2014?
- How might the tax treatment of housing assets have impacted on the asset allocation decisions of Australian households over the period 2002 to 2014?
- How might developments in retirement incomes policy, including the transfer system, have impacted on the asset allocation decisions of Australian households over the period 2002 to 2014?
- What challenges do these relationships present for the future of the Australian tax system and its reform?

In addressing these questions, the analysis will add to the evidence-base on which to develop proposals to reform tax in a way that acknowledges the key challenges of optimal tax design.

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<sup>1</sup> The life-cycle approach is described in section 1.4.1. This approach assumes that economic actors are forward looking and make decisions at any point in time taking into account their current and expected future. For tractability, such an approach often characterises the life-cycle as consisting of periods when individuals gain education, followed by a period during which they work and accumulate saving, and then retire.

This report forms part of a broader investigation that seeks to identify a viable pathway to housing tax reform. This project is economic in nature and the key questions addressed relate to the asset portfolio decisions of Australians around retirement. Existing evidence from Australia and internationally suggests that those choices, especially as they relate to housing, are shaped by a variety of considerations, including the incentives associated with the tax and transfer system that apply to individuals or households at this critical life juncture (Chiuri and Japelli 2010). Recent reviews into taxation in Australia have devoted substantial attention to taxation of savings and more generally the retirement incomes system (Henry, Harmer et al. 2009; Australian Government 2015). Earnings from accumulated saving, along with the savings themselves, are often used during retirement to support consumption activities in the absence of a stream of labour income. Understanding how such savings decisions are shaped by the tax and transfer system is likely to be critical for developing proposals for comprehensive tax reform that is sustainable and consistent with promoting the efficient allocation of resources over time.

The fundamental issue addressed in this report relates to the treatment of different asset classes that is embedded in the Australian tax and transfer system. In particular, the treatment of housing in the tax and transfer system potentially creates a range of distortions that impact on housing-related decisions and outcomes.

From an economic perspective, there are a number of reasons why households may allocate their portfolio across alternative asset classes.<sup>2</sup> Heterogeneity means that households are likely to make portfolio allocation choices that reflect preferences over risk and return. Such choices may be shaped by a variety of considerations, including the household's age and exposure to longevity risk, their bequest motives, and the financial implications of such decisions. Central to those financial implications are the parameters of the tax and transfer system.

Owner-occupied housing often forms the largest single asset class in the household portfolio, so decisions around housing are likely to be particularly important from a policy perspective. Existing evidence across countries suggests that households tend not to consume wealth held in the form of housing equity following withdrawal from the labour force (Chiuri and Jappelli 2010). There are various reasons why such behaviours may be observed. For example, there is a well-recognised preference of individuals to 'age in place' (Judd, Liu et al. 2014). Similarly, the maturity of financial markets may be an important determinant of the tendency and ability of older households to 'consume' wealth of this nature. Central to the discussion in this report, there may be strong financial incentives provided by the tax and transfer system for individuals or households to accumulate housing wealth during their working life—and a clear disincentive to de-accumulate such wealth following retirement from the labour force.

In an economic sense, rules embedded in the tax and transfer system may create distortions that shape the decisions and outcomes experienced by households. In particular, it is generally acknowledged that the favourable or concessional tax treatment of a particular asset class provides an incentive for agents to increase their holdings of certain assets, such as housing, over and above that which would be held under a more neutral tax regime. In the case of Australia, for example, there is a consensus that the current tax system encourages 'more savings [to be] held in superannuation and housing than would otherwise be the case' (Australian Government 2015: 57).

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<sup>2</sup> In much of the discussion throughout this report, the terms 'households', 'individuals' and 'agents' are used interchangeably. Decisions around savings and the allocation of assets are often made by individuals in the context of a household unit. For example, the choices of each individual in a couple likely reflects the preferences and financial circumstances of the 'household' or 'couple'. There is evidence, for example, that retirement decisions of individuals in a couple are closely linked (Atalay and Barrett, 2016). In the Australian context, some parameters associated with the transfer system such as the AP explicitly consider the circumstances of the 'couple' rather than the individual. Where a distinction is important this will be made clear in the text.

The approach adopted in this paper is retrospective in nature. That is, the study examines how changes to policy settings have shaped behaviours in the past through an analysis of historical data. While ‘backward-looking’, such an approach adds to the evidence base to inform the development of a sustainable tax system in the future. Importantly, this report seeks to identify the behavioural response to changes in the tax and transfer system that directly impact on the asset allocation decisions of households at (or near) and following retirement. Moreover, the historical developments considered in this report are similar to a series of policies currently being proposed or implemented. Hence, while examining past changes to policy, the analysis has the potential to further the development of tax policy going forward.

## 1.1 Why this research was conducted

Like many other countries, Australia is experiencing population ageing, which presents a series of fiscal challenges for policy-makers. These demographic patterns and the consequences for the fiscal balance have been recognised for some time and are well documented in academic research and a series of intergenerational reports developed by the Productivity Commission over the past decade (Creedy and Taylor 1993; Department of the Treasury 2010; 2015).<sup>3</sup> The research suggests that despite recent policy changes, the number of individuals in receipt of the AP, and the cost of the program, will continue to rise over time even in the presence of an increasingly mature pool of private savings in the form of superannuation (Productivity Commission 2015). Further, the Treasury has identified the relatively high cost associated with a range of tax settings that favour the accumulation of savings in the form of superannuation and housing assets (Department of the Treasury 2017). While it has been recognised that over time a fiscal gap may arise, it is also true that the severity of such a development will largely depend on the nature of policy measures put in place in response to these developments.

Some of the key approaches available to policy-makers to address the fiscal challenges as the population ages relate to the tax and transfer programs that shape the decisions that Australians make around engagement in the labour force and their provision for retirement. The Henry Tax Review (Henry, Harmer et al. 2009) and more recent *Tax Discussion Paper* (Australian Government 2015) both devoted substantial attention to the incentives embedded in the tax and transfer systems and how they shape decisions around saving and provision for retirement. Those incentives are likely to determine how much individuals save over the course of their working lives and the form that those savings take. A critical component of this is the accumulation of housing wealth over the life-cycle. Those decisions around the amount and type of savings that individuals choose to make in turn have important consequences for housing markets and the long-run performance of the economy more generally. It is for this reason that such arrangements are central to any discussion about tax reform.

This report focuses on parameters of the tax and transfer system, and some of the key decisions impacted by those systems at a critical point in the life-cycle. In particular, the research focuses on how the asset portfolio decisions of Australians are shaped by tax and transfers settings as they approach and enter retirement. This represents the part of the life-cycle when many individuals withdraw from the labour force, draw on publicly funded pensions and pay significantly less in the form of taxes. A comprehensive set of tax reform measures that addresses the fiscal challenge posed by an ageing population will provide appropriate incentives and shape behaviour over the life-cycle. Moreover, the parameters of the transfer system mean that any substantial tax reform must take into account the likelihood that individuals will increasingly rely on publicly funded transfers as they dissave (i.e. spend more than their income) and draw down wealth

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<sup>3</sup> It is interesting to note that the 2005, 2010 and 2015 reports did not specifically address challenges associated with housing.

accumulated over their working lives. Understanding the interface of the tax and transfer system in this regard is critical to the development of a set of comprehensive and appropriate policy settings.

It is important to emphasise that while the analysis in this report focuses on older Australians, rules around the tax and transfer system as they relate to retirement are likely to impact on decisions over the course of the life-cycle. The life-cycle approach adopted in this report recognises that younger cohorts will also make decisions regarding the level and type of savings that reflect the institutional framework and policy settings in place. Moreover, to the extent that such decisions impact on housing choices, they are likely to have important implications for housing markets more generally. Ideally, those decisions and their implications for housing markets would be modelled using a framework that captures those general equilibrium relationships. The focus of this research, however, is narrow in nature and a more comprehensive analysis of those relationships is beyond the scope of this report.

While the research is part of a broader research agenda attempting to map out a pathway to tax reform, examination of the transfer system is a central question in this analysis for two reasons. First, transfers such as the AP can be characterised as ‘negative taxes’. That is, while they represent payments *from* the government rather than payments to the government, they will shape behaviour in similar ways by changing the costs and rewards of making various decisions. Transfers such as the AP are likely to influence decisions around the participation and intensity of engagement in the labour market just as income taxes do.

Secondly, and perhaps more importantly, the transfer system interacts closely with the tax system in myriad ways. The Australian system of social support is widely recognised as exhibiting a high degree of targeting (Whiteford 2010). This is achieved in part through the extensive reliance on means-testing a range of payments that are made available to recipients. It is well established, for example, that individuals who receive a means-tested payment from the government often face relatively high effective marginal tax rates (EMTRs) when they engage in employment activity. EMTRs reflect the fact that gross income might be reduced because of the payment of tax and a reduction of means-tested transfers from the government. It is well documented that high EMTRs have the potential to disincentivise engagement in the labour force and they likely impact on a range of other decisions, such as those related to saving (Chomik and Piggott 2014). In the case of the Australian AP, a means test on assets and income can be characterised as a wealth tax or a tax on saving, potentially distorting the savings decision of individuals.

To address the question of how to develop a pathway to tax reform, this report focuses on decisions around asset portfolio. Such decisions are central to retirement and retirement planning and the analysis focuses on how Australians who are entering this stage of the life-cycle respond to the incentives provided by the tax and transfer system. Such incentives are likely to have important implications for owner-occupied housing and the decision to hold investment properties. For this reason, the research will add to the evidence base that facilitates the development of a tax and transfer system that is sustainable over the long term. Further, the analysis provides the basis for the development of a pathway to tax reform that maximises economic efficiency, embodies horizontal and vertical equity, is sustainable and supports the growth of the Australian economy over time.

## 1.2 Policy context

As in many other countries, retirement incomes policy in Australia has been characterised as consisting of three pillars:

- compulsory or mandated private savings in the form of superannuation
- publicly provided pensions
- voluntary private savings.

Ostensibly, the pillars are designed to complement each other to provide an appropriate level of support during retirement (Chomik and Piggott 2012). For Australia, the central role played by home ownership housing over the course of the life-cycle, and its complementary nature to the publicly provided pension, has led to it being identified as the fourth, albeit increasingly precarious, pillar of Australian retirement incomes policy (Yates and Bradbury 2010).

Each of the pillars in Australian retirement incomes policy is characterised by a set of unique characteristics. The superannuation system was effectively made compulsory in 1992 and the contribution rates progressively increased over following years (Nielson 2010). One of the implications of this is that while superannuation is becoming increasingly important over time, its relatively recent introduction means that many Australians who are currently retiring will continue to rely on the other pillars to sustain living standards during retirement years, until the superannuation system matures in the 2030s (Burnett, Fin et al. 2013; Productivity Commission 2015). Nonetheless, it is important to emphasise that notwithstanding recent changes, superannuation remains an attractive savings vehicle for retirement planning given the range of tax concessions that are applied to this form of saving.

Publicly funded pensions in Australia are defined by their means-tested and highly targeted nature (Whiteford 2010). Unlike many other countries, the receipt of the AP in Australia is not dependent on contributions throughout an individual's working life. Rather, eligibility for the AP in Australia simply requires the individual meet residency requirements and attains the appropriate age at which eligibility occurs.<sup>4</sup> Although a means test is applied on both income and assets of potential recipients, the relatively generous provisions result in a large proportion of retired individuals remaining in receipt of at least a part pension. The Productivity Commission (2015) reports that as of 2014, approximately 70 per cent of individuals aged over 65 received at least a part pension, with the majority in receipt of a full pension. Moreover, despite the relatively low value of the AP in Australia, current high rates of home ownership among those aged over 65 mean that, at least at present, the majority of older Australians maintain a satisfactory standard of living during retirement years.

The role of owner-occupied housing in the retirement incomes system reflects historical developments and policy settings that have shaped the choices and behaviours of successive cohorts of Australians over time. Traditionally, home ownership has been the dominant form of tenure, though there is evidence that younger cohorts of Australians are less likely to attain home ownership at the same rates as their parents did (Yates and Bradbury 2010). While it remains the case that around 80 per cent of households attain this form of tenure by age 60, there is also some evidence that increasing numbers of households are entering into retirement with mortgage debt or as renters rather than owners (Yates and Bradbury 2010; Burke, Stone and Ralston 2014). Historically, high ownership rates have been supported by explicit and implicit tax policy settings that favoured this form of tenure. For example, imputed rent is ignored in the calculation

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<sup>4</sup> Over the period 1995–2014 the AP eligibility age for females increased from 60 years to 65 years. From 2017, the AP eligibility age will increase progressively for males and females to 67 years of age.

of income, and owner-occupied housing remains exempt from capital gains tax provisions. Critically for the purpose of this report, owner-occupied housing is exempted from inclusion in the assets means test that determines eligibility for, and the amount of, the AP. In this sense, owner-occupied housing is treated more generously than other classes of assets (Henry, Harmer et al. 2009).

While it is true that owner-occupied housing is not considered in the AP assets test, it remains the case that such assets potentially impact, at least indirectly, on the receipt and value of AP received. To see this, it is necessary to consider the nature of the AP and how it is calculated. First, note that the maximum value of the transfer received depends on the partnered status of the individual (either single or married) and the availability of supplemental benefits.<sup>5</sup> For an individual, the AP provides a lower threshold of assets that may be held before the receipt or value of any pension paid is affected.<sup>6</sup> Once the lower threshold level of assets is attained, a taper rate is applied so that the AP is reduced or withdrawn by a fixed amount for every thousand dollars in assets held beyond the lower threshold. That lower threshold differs by tenure status, with home owners facing a lower threshold than individuals who are non-homeowners. When assets are sufficiently high, the AP is reduced to zero and the individual is no longer deemed eligible. Current asset thresholds associated with the AP for different types of households are reported in Table 1. As discussed later in the report, it is important to stress that assessable assets may include superannuation holdings.

**Table 1: Age Pension assets test thresholds 2017**

	Singles		Couples	
	Home owners	Non-homeowners	Home owners	Non-homeowners
Lower threshold	\$253,750	\$456,750	\$380,500	\$583,500
Upper threshold	\$550,000	\$753,000	\$827,000	\$1,030,000

*Note: The figures are correct as at 1 July 2017. The figures for the lower threshold represent the maximum amount of assessable assets the individual (or couple) may hold while still in receipt of the full AP. After the lower threshold has been reached, the AP is reduced at a rate of \$3 per \$1,000 of assessable assets. The upper threshold refers to the maximum value of assets an individual (or couple) may hold and still receive a part pension. For home owners, the asset holdings exclude the value of owner-occupied housing.*

Source: Department of Human Services (2017)

It should also be noted that assets tests such as that imposed for the AP in effect represent a tax on wealth holdings. Ingles and Stewart (2015) note that wealth can be taxed by applying an annual wealth tax, or through the effect of 'deeming provisions' that impute income for holders of the assets.<sup>7</sup> Under the current rules that determine AP eligibility, both an assets means test and

<sup>5</sup> There are various supplemental benefits available to recipients of the AP, including those associated with energy payments and medical-related costs. Significantly, recipients of a part of full pension may be entitled to a concession card that provides access to subsidised goods and services such as utility bills, healthcare costs and public transport. Although the exact value of the transfers afforded to holders of concession cards is difficult to estimate, as it depends on the individual circumstances of the holder, it is generally recognised to be significant (Productivity Commission 2015).

<sup>6</sup> Note that the AP is also subject to an income test. The AP is paid at the lower rate as determined by the income or assets means test. Details of the income test can be found at: <https://www.humanservices.gov.au/customer/enablers/income-test-pensions>.

<sup>7</sup> Deeming provisions assume that owners of assets earn a return on those assets and include that as income when assessing entitlements to transfers such as the AP. Deeming rules for the AP can be found here: <https://www.humanservices.gov.au/customer/enablers/deeming>. Note that the deeming rate applied depends on



an income test are applied, with the test that results in the lower value of AP entitlements being imposed. While in general it is the income test that is applied in the calculation of the allowable pension, it remains the case that for those individuals with relatively high levels of assessable wealth the assets test will act to reduce the amount of AP received. Ingles and Stewart (2015) argue that following recent changes to the assets test for the AP, the tax rate applied to wealth is equal to 7.8 per cent on assets that exceed the lower threshold. This tax rate reflects the fact that every \$1,000 of assets above the lower threshold reduces the AP entitlement by \$3 per fortnight or \$78 per annum. In effect, the means test taxes 7.8 per cent of wealth annually through a reduction in AP entitlements.<sup>8</sup>

The effect of the assets test can also be assessed by considering the AP deeming provisions. Under the income test for the AP, benefits are withdrawn at a rate of 50 per cent: so that every \$100 in earnings results in a reduction of AP entitlements of \$50. Recall that the assets test reduces AP entitlements by \$78 per annum for every \$1,000 of assets above the lower threshold. Hence, under the income test, earnings of \$156 would be required to achieve a similar reduction in AP entitlements. The implication of this is that, in effect, the AP assets test deems a rate of return of 15.6 per cent. Such rates of return are high and unlikely to be achieved in the current economic environment.

Ingles and Stewart (2015) consider the implications of a rate of return of 6 per cent. In this case, the \$1,000 in assets would generate an income of \$60. Given that the assets test leads to a reduction of AP entitlement of \$78 for every \$1,000 of assets, this represents an EMTR of 130 per cent.<sup>9</sup> Ingles and Stewart (2015) argue that a more realistic rate of return of 3 per cent implies an EMTR of approximately 260 per cent.

The discussion above highlights the potential financial and economic implications of the AP assets tests. By taxing wealth holdings directly through the assets test or indirectly through deeming provisions, the AP assets test creates potentially large disincentives to save and accumulate wealth. As Ingles and Stewart note, the assets test may 'encourage dissaving among some pensioners' (2015: 16). Moreover, it may create an incentive to hold un-taxed assets such as owner-occupied housing.

### Changes to the Age Pension assets test in 2007

From an analytical perspective, there are a number of changes to the AP assets test that are central to the discussion presented in this report. In 2006 the Australian Government announced a reduction in the taper rate associated with the assets test for age pensioners. From September 2007, the withdrawal rate of \$3 per \$1,000 of assessable assets in excess of the lower threshold was reduced to \$1.50 per \$1,000 of assessable assets. Though no changes were made to the lower asset threshold, the effect of the change in the taper rate was to increase the range of assessable assets over which a part AP could be received, thereby increasing the number of individuals who received an AP and increasing the amount received for existing recipients. The effect of the changes can be seen in Figure 1, which plots the AP entitlement received for a single non-homeowner with differing amounts of assets prior to and following the reduction of the taper rate in 2007.

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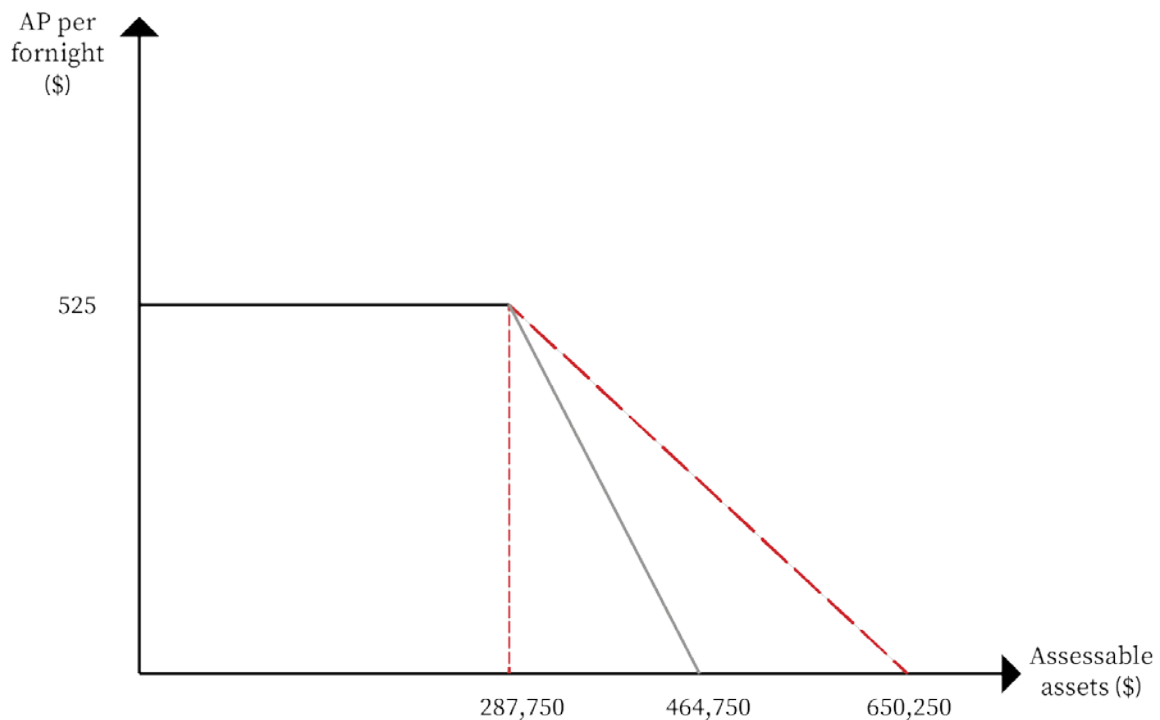
the level of assets. The first \$50,200 of financial assets has the deemed rate of 1.75 per cent applied, while asset holdings over \$50,200 are deemed to earn 3.25 per cent.

<sup>8</sup> It is important to note that the 7.8 per cent tax represents a marginal tax rate on assessable assets that exceed the lower threshold. The average tax rate across all wealth holdings will be lower because of the exemption of assets such as owner-occupied housing.

<sup>9</sup> In this case, the extra income of \$60 leads to a net reduction in income of \$78, implying an EMTR of 130 ( $78/60 \times 100$ ).

In 2007, the maximum fortnightly pension rate of \$525 was paid for (non-home owning) individuals with assessable assets less than or equal to \$287,750. The withdrawal or taper rate of \$3 per \$1,000 of assets meant that the amount of AP received was reduced to zero when assets exceeded \$464,750. Following the reduction in the taper rate, the new relationship between the AP received and assets held is given by the dotted line in Figure 1. Although the level of assets at which the AP received begins to reduce is the same (\$287,750), the lower taper rate meant that individuals with substantially higher assets were entitled to some AP payment. Indeed, for all individuals with assets between the previous and new upper thresholds, the amount of AP received increased.

**Figure 1: Age Pension assets test: single non-homeowners**

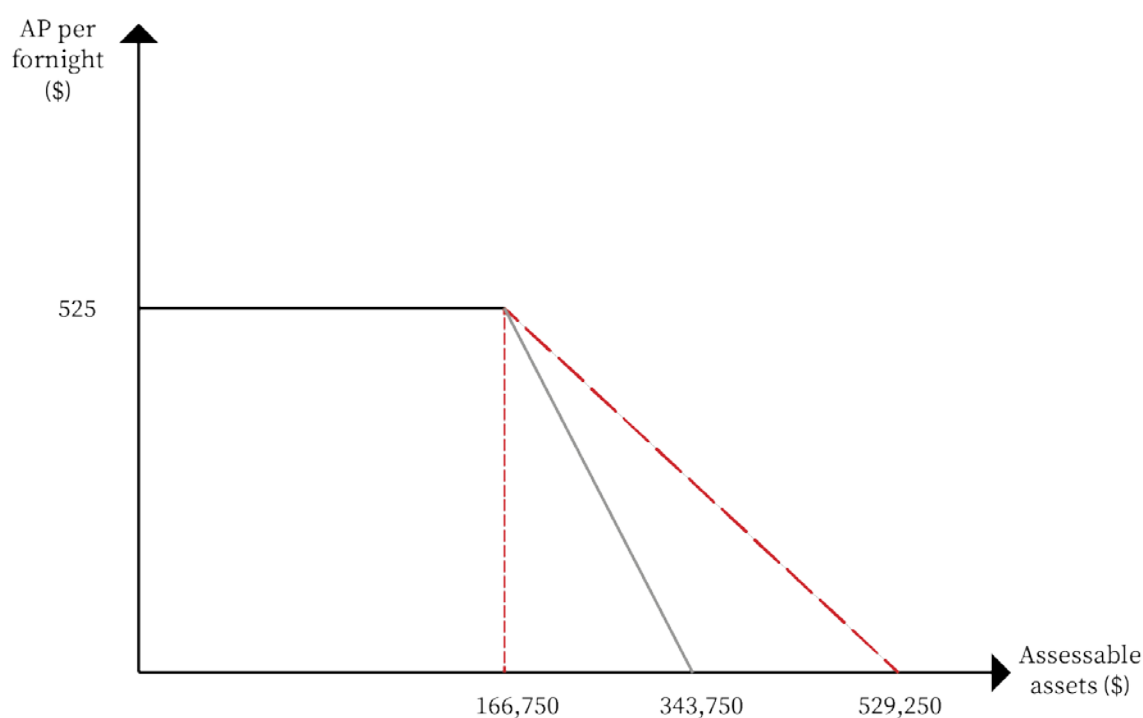


Source: authors' calculations based on Department of Human Services (2017)

The corresponding relationship for single home owners is presented in Figure 2. The key difference being the lower level of allowable assets allowed under the means test for home owners compared to non-homeowners.



**Figure 2: Age Pension assets test: single home owners**



Source: authors' calculations based on DSS (2017)

The broad parameters of the AP described above, along with the changes that have occurred over the past decade, provide the policy context for the analysis in this report. This study takes an economic approach to understanding the behavioural responses induced by the incentives associated with parameters of retirement incomes policies, including tax and transfer programs. Economic theory suggests that the nature of the income support system provided for older Australians provides some important incentives that are likely to shape behaviour around the choice of asset portfolio, especially with respect to housing. Though a more formal model is set out in Appendix 1, intuitively the parameters of the AP assets test and changes to those parameters provide an incentive for individuals at or near retirement to adjust their behaviour to maximise the potential benefits from the AP program. Recall that the value of owner-occupied housing is not included in the AP assets test. Hence, by allocating a greater proportion of assets to owner-occupied housing, an individual reduces their holdings of assets included in the AP means test. In turn, they may potentially become eligible for the AP or increase the rate at which the AP is received.

Importantly, the changes in the AP withdrawal rates put in place in 2007 provided variation in the range over which those individuals with assets could claim at least a part pension. This change provides an opportunity to observe how a shift in the parameters of an important transfer program potentially influences behaviour. It is important to note that recent changes to the AP have reversed or at least substantially mitigated the 2007 policy changes. From 1 January 2017, the assets means test taper rate has been restored to \$3.00 for every \$1,000 of assessable assets over the lower threshold (Department of Human Services 2017).<sup>10</sup> Hence, understanding how

<sup>10</sup> Note that one significant difference between the 2017 reforms and the earlier changes to the taper rate is an increase in the lower thresholds in 2017. For example, for single non-homeowners the lower threshold was increased from \$209,000 to \$250,000 in January 2017. This has the effect of extending the 'flat section' of the relationship in Figure 2, as no reduction in the AP received occurs until assets exceed the lower threshold.

individuals responded to the 2007 changes will provide important insight into the likely impact of recent changes to the AP assets test. More generally, the findings of the analysis will provide important information to add to the evidence base as the tax system evolves.

### **Changes to superannuation in 2005**

As noted above, the superannuation system in Australia remains relatively immature. There is evidence that many of the current cohorts of Australians entering retirement have inadequate superannuation savings to sustain an appropriate level of living standards over the remainder of their life (Productivity Commission 2015). Superannuation savings have traditionally been treated in a concessional manner in terms of tax, with a portion of contributions taxed at lower rates than other income and relatively low tax rates on funds that are withdrawn for consumption purposes. Tax expenditures on superannuation are large, estimated to be in excess of \$32 billion per annum (Department of the Treasury 2017). Like the AP assets test, past and existing arrangements create an incentive for individuals to accumulate this form of assets relative to their portfolio choices under a more neutral set of policy parameters.

As with the AP, a number of important changes were made to the superannuation regime in the mid-2000s that potentially provide insight into how individuals respond to the tax-favoured treatment of this form of saving. In particular, in May 2005 the abolition of the superannuation surcharge (SS), effective from July 2005, was announced. The SS was an additional impost or tax imposed on employer contributions to superannuation for high-income earners. The abolition of the surcharge meant that for those who were currently working and directing relatively large amounts of savings into superannuation, the effective tax rate on such savings was substantially reduced. Importantly, such a change was likely to provide additional incentives to direct funds towards superannuation as a tax-preferred method of saving. Additional details of the change in policy are described in section 3 of this report.

These changes to the AP and superannuation form the focus of this report. In both cases, policy changes were implemented in the tax and transfer system that potentially provided incentives for individuals to accumulate additional savings, or at least additional savings in specific assets. While the policy changes did not relate directly to the treatment of housing assets, the life-cycle model implies that such changes would have important implications for housing. In particular, the relative return from different asset classes is likely to have important effects for the accumulation of housing equity and other forms of saving. The analysis of the responses to such changes provides insight into how the tax system shapes behaviour. As noted, while 'backward looking' in nature, the analysis adds to the evidence base around how tax and transfer policies impact on behaviour and provides insight into how a sustainable and efficient tax system can be attained over time.

## **1.3 Existing research**

The first component of this study will focus on the role of the AP assets test on the portfolio decisions of Australian households. There is a relatively large international literature which examines how decisions around retirement are shaped by the tax and transfers system that individuals face (Duval 2003). A key issue is how wealth is distributed across different asset classes and how such decisions are shaped by rules associated with access to and the value of transfers received. Some analysis has been conducted for the United States (Ameriks and Zeldes 2004; Coile and Milligan 2009), Canada (Milligan 2005) and a series of European countries (Attanasio and Brugiavini 2003). It is important to note that while instructive, such analyses may provide limited insight for the Australian context. This reflects the unique historical, institutional and regulatory environment under which decisions over the course of the life-cycle are shaped. In the case of Australia there are, for example, relatively high rates of home ownership that have been supported by implicit and explicit policy settings; a means-tested non-contributory public

pension; and a relatively immature mandatory private savings regime. In this setting, the experience and findings from other countries may provide only limited insight into behaviours and policy in the Australian context.

There is some existing Australian research which has considered the level of wealth and how individuals allocate their wealth across different asset classes in their portfolio. Early studies were largely descriptive in nature, focusing on the differences in total wealth holdings and the nature of assets held across the wealth distribution (Headey, Marks and Wooden 2005; Marks, Headey and Wooden 2005; Finlay 2012). As expected, there are large disparities in wealth holdings across households, with average household wealth peaking at or near retirement. Given the long tradition of home ownership in Australia, a substantial part of the wealth is held in the form of equity in owner-occupied housing. Empirical analysis also identifies a more diversified asset portfolio among wealthier households. Subsequent studies sought to identify the correlates of wealth and asset holdings across households based on characteristics such as migrant status (Cobb-Clark and Hildebrand 2009; Doiron and Guttman 2009).

More pertinent to this report is the relationship between the incentives embodied in the tax and transfer system and how they impact on behaviours and decisions around retirement. Recall that owner-occupied housing is exempt from the AP assets means test. Potentially, this exemption provides a significant incentive to hold a larger proportion of total wealth in the form of 'exempt assets' in order to maintain access to the AP and related benefits. Cobb-Clark and Hildebrand (2011) consider this issue by analysing how households allocate their assets across their portfolio just prior to retirement or AP age. Of particular interest in that study was whether wealth was distributed across various asset classes, including owner-occupied housing, in such a way so as to maximise the value of public transfers. The empirical analysis in that report finds little evidence that households respond to the incentives embedded in the means-test for the AP. One notable exception is for single pensioners in poor health. Recall that supplementary benefits for individuals in receipt of the AP, such as those associated with medical costs, are potentially large. In turn, maintaining eligibility for even a small part-pension may provide significant benefits over and above the value of direct money transfers received. It is noteworthy that while the analysis in Cobb-Clark and Hildebrand (2011) uses the same rich longitudinal dataset examined in this study (i.e. HILDA), the empirical analysis largely relied on a single year of data.

Cho and Sane (2013) examine the asset allocation decision by developing a macro-economic model of the Australian economy that captures key relationships linking the means-tested AP and home ownership. The approach in that paper uses aggregate- rather than individual-level or household data to identify how outcomes, such as the level of savings and aggregate home ownership rates, may change if the rules regarding the AP were altered. The model suggests that inclusion of owner-occupied housing in the AP assets test would lead to important behavioural changes. In particular, a decrease in home ownership rates could be expected as wealth was reallocated across the household portfolio. Intuitively, by removing the incentive to hold assets in the form of owner-occupied housing through its exclusion from the means test, home ownership rates are predicted to fall.

Bradbury (2010) considers how the asset allocation and housing consumption experience of Australian households compares to those in a range of other advanced economies. A priori, one might expect that the strong tradition of owner-occupied housing and the incentives embedded in the tax and transfer system mean that Australian households hold a relatively large share of their assets in the form of owner-occupied housing equity compared to households in other countries. While there is some evidence that this is the case, it is also true that total housing consumption by Australian households is comparable to that of other countries, such as the United Kingdom (UK).

A final set of studies examines how the asset portfolios of Australian households evolve post-retirement. Spicer, Stavrunova and Thorp (2016) argue that at retirement, Australian households hold a portfolio of assets with different risk profiles. As households age, they tend to prefer

portfolios that are less risky, possibly reflecting precautionary motives on the part of households. Significantly, there is evidence that those households that exhaust their financial wealth do not draw on housing wealth at a faster rate than other households.

The second component of this report will focus on changes to superannuation that occurred in 2006, and in particular, the removal of the SS. As an immature but nonetheless increasingly important pillar of the retirement incomes system, there is growing recognition of the importance of superannuation policy settings to the fiscal challenges associated with an ageing population. Moreover, the role of superannuation in the broader incomes retirement system has been brought sharply into focus in light of the relatively generous tax treatment afforded to superannuation savings (Department of the Treasury 2017). As noted above, superannuation is taxed in a concessional manner relative to other forms of saving and this potentially provides an incentive for some individuals to increase the share of superannuation in their wealth portfolio.

To date, there has been only limited research on how superannuation affects decisions such as the timing of retirement; wealth accumulation and saving over the life-cycle; and asset portfolio allocation decisions (Connolly 2007; Chomik and Piggott 2016). This report provides some of the first insights into how a specific change in superannuation rules affected the asset portfolio choices of Australians. It is important to stress that the analysis in this paper is not meant to represent a comprehensive assessment of how superannuation affects behaviour and outcomes, as such an analysis is beyond the scope of this report. The superannuation system is complex and there have been myriad changes to the superannuation regime over time, making analysis of behavioural responses challenging (Nielson 2010). Rather, our analysis focuses on the impacts of one change to the superannuation system in 2006, relating to the removal of the SS, and how it has impacted saving in the form of superannuation.

## **1.4 Research methods**

### **1.4.1 Methodological approach**

#### ***Conceptual framework***

The analysis in this report is economic in nature and the conceptual framework is grounded in the life-cycle model of consumption. In this model, economic agents or decision makers are assumed to maximise their lifetime welfare subject to a range of constraints.<sup>11</sup> Life-cycle models originated in the work of Modigliani and Brumberg (1954) and such models explicitly recognise that decisions such as those related to engagement in the labour market, consumption and saving are made by forward-looking agents in a dynamic setting.

In general, life-cycle models posit that the individuals face different decisions at various points throughout their lifetime. In the early part of their life, individuals engage in education or related activities so as to develop a stock of human capital. Following this they will work for a period of time, before entering retirement. Agents are assumed to make decisions around consumption and saving which have implications for holdings of assets at various stages of the life-cycle. Working individuals will tend to forgo consumption and save, thereby accumulating assets. During retirement, those assets are generally drawn down, as individuals maintain consumption through dissaving in the absence of employment-related income.

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<sup>11</sup> An economic agent represents a decision-making unit such as an individual or household. While life-cycle models are usually set out in terms of individual decision-making, as noted previously choices over assets and engagement in the labour market are often considered to be made at the household level, at least for those individuals who are part of a couple. While decision-making at the household level presents particular challenges in terms of modelling, the fundamental predictions of the life-cycle model continue to hold.

Consumption patterns in life-cycle models are influenced by two considerations. First, it is generally assumed that individuals prefer consumption to be allocated smoothly over their lifetime. That is, in the absence of uncertainty, individuals would allocate consumption so as to avoid large changes in consumption between periods. In addition, individuals generally prefer to consume sooner rather than later. While the optimal pattern of consumption may reflect these considerations, individuals face a range of constraints or obstacles to achieving the desired pattern. For example, credit market constraints that prevent borrowing against future income mean that consumption in the early part of the life-cycle may be less than desired. Similarly, unexpected shocks to income, such as those associated with poor health or the loss of employment, may impact on the ability to achieve the desired pattern over time.

Importantly, choices over saving, the allocation of consumption over time and asset accumulation are undertaken in a broader institutional setting in which rules around retirement and retirement income are defined. For example, those who are working face taxes on earned income and, in the case of Australia, compulsory contributions to superannuation. Individuals who have retired from the work force can potentially collect a publicly funded AP, subject to asset and income means tests. The parameters of the tax and transfer system have important implications for those who are working and accumulating savings, along with those individuals who are retired. For both types of individuals, tax and transfer policies affect the benefits and costs associated with adopting different actions around work and saving. For example, the imposition of taxes may reduce the incentive to engage in paid employment by reducing the net benefit from engaging in labour market activity. Similarly, the presence of a means-tested publicly funded pension may reduce the incentive to accumulate private savings while working (Sefton, van de Ven and Weale 2008), or provide incentives to spend accumulated assets quickly in retirement so as to access the publicly provided pension (Atkinson, Creedy and Knox 1995). In effect, the means test may reduce the net benefits that individuals obtain from saving or deferring consumption while working. Put another way, the means test essentially taxes away some of the publicly funded AP that would otherwise be collected, thereby reducing the incentive to engage in saving while working and providing an incentive to draw down private savings while retired. It is these incentives and the behavioural responses they induce that are the central concern of the economic approach and the life-cycle model of behaviour. With this framework as the starting point, this report examines how changes around retirement incomes policies, especially as they relate to the tax and transfer system, impact on asset portfolio decisions. In general, owner-occupied housing represents the largest single asset in a household's portfolio and policy settings that impact on wealth allocation decisions are likely to have important implications for housing-related behaviours and outcomes.

To the extent that changes in tax and transfer policies do have an effect on behaviours, they have the potential to impact the efficient allocation of resources across the economy—and ultimately the long-term sustainability of the tax and transfer system. Hence, the effects of policy changes on behaviour should be considered when developing a pathway to a sustainable and enabling tax system.

### ***Empirical approach***

The empirical approach adopted in this report is quantitative in nature. To identify how policy has impacted on behaviour in the past, and to inform future policy settings, a series of statistical or econometric models are estimated. Detailed descriptions of such models are presented in Chapters 2 and 3. Those models are intended to isolate the effect of changes to policy parameters of interest, such as taper rates, on decisions around asset portfolio choice. In doing so, they provide a quantitative measure of the behavioural responses that facilitate inferences of how alternate policy settings might influence behaviours and outcomes.

### **The economic approach: a non-technical description**

The economic approach begins by setting out a model that attempts to describe the behaviour of economic agents such as individuals or households. In general, these models posit that economic agents make decisions after comparing the costs and benefits associated with different actions. For example, the cost of saving is that consumption is lower today, but it provides a benefit in the form of higher consumption in the future. The costs and benefits of different choices will be determined by a range of considerations, including the institutional framework that an individual faces. An important part of the institutional framework are rules around tax and transfer policies that are likely to be particularly important for decisions such as those associated with saving.

Central to the economic approach is the notion that economic agents respond to incentives. In general, if the cost associated with a given action falls (or the benefit rises) then agents will have an incentive to undertake that action. In the case of the assets test for the AP, for example, the exemption of owner-occupied housing provides an incentive to accumulate more wealth in this form. By saving and increasing the amount of owner-occupied housing equity held, access to the AP is not curtailed. In comparison, accumulating other forms of wealth that are included in the AP assets test reduces the amount of AP that can be received. Hence, individuals have an incentive to structure their wealth portfolio in a way that maximises access to benefits such as the AP. Similarly, by lowering the level of tax on some forms of saving, an incentive is created to save in that form. Effectively, the benefit of saving in the form of a tax-preferred asset is higher and an incentive to do so is created.

Economists generally test their models of behaviour using statistical or regression models. Such models use data to determine if the behaviour that is observed is consistent with the predictions of the economic models. For example, it may be of interest whether or not the level or nature of savings is affected by the parameters of the AP means test. One challenge in undertaking such an analysis is that often it is necessary to control for confounding factors. For example, the level of savings is likely to be determined by a range of factors, such as the age of an individual and his or her income. By including controls for such factors in the statistical models it is possible to identify how, if at all, the parameter of interest is actually related to behaviour.

#### **1.4.2 The Household, Income and Labour Dynamics in Australia dataset**

The empirical analysis uses the Household, Income and Labour Dynamics in Australia (HILDA) data. The HILDA survey is funded by the Department of Social Services (DSS) and is a general population survey that follows individuals and households over time. It is this panel feature of HILDA that makes it unique among the general population surveys in Australia. The analysis in this report uses data from the first 14 waves of the HILDA dataset, collected between 2001 and 2014. Each year includes detailed questions on household income, economic wellbeing, measures of labour market activity, and a broad array of socio-demographic characteristics. Housing-related information, such as tenure, value of residential properties and mortgage debt held, is also available in every wave.

Each annual wave of HILDA includes a rich set of topics that are repeated every year, along with a set of special topics or 'modules' that are one-off or repeated over longer intervals. Every four years, HILDA includes a wealth module that asks respondents a comprehensive series of questions about their holdings of assets and liabilities. The wealth module was included in the survey in 2002 (Wave 2), 2006 (Wave 6), 2010 (Wave 10) and 2014 (Wave 14). Significantly, the repeat nature of wealth modules will enable us to examine dynamics around the behaviours of the households. It is this information, in combination with the policy changes described above, that provide an opportunity to undertake a quantitative analysis of how changes in the tax and transfer system impact on behaviour. Moreover, the detailed information in HILDA on characteristics such as the value of owner-occupied housing provides an opportunity to identify how such changes are associated with housing-related choices. Importantly, unlike some earlier



analyses, the availability of the data up to 2014 provides an opportunity to identify how outcomes were impacted by the Global Financial Crisis (GFC).

The remainder of this report is structured as follows. In Chapter 2, the changes to the AP in 2007 are analysed. The first section of the chapter contains a more detailed discussion of life-cycle models and presents detailed empirical evidence around how the asset portfolio choices of individuals are shaped by means-tested pension programs. This discussion also provides the theoretical context for the analysis of changes to superannuation, which is set out in Chapter 3. In Chapter 4, the policy implications of the analysis are presented.

## 2 Analysis of Age Pension reforms

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The life-cycle model provides a flexible framework with which to analyse decisions around the allocation of assets. The empirical analysis in this chapter focuses on the impact of financial incentives embedded in the AP means test and consists of two components. The first is descriptive and seeks to identify if stylised patterns of asset holdings are consistent with the incentives in the AP means test associated with the exclusion of owner-occupied housing from the assets test. The second seeks to identify the behavioural response afforded by a natural experiment associated with the 2007 changes to the AP taper rates. This policy change reduced the taper (or withdrawal) rate from \$3.00 per \$1,000 of assessable assets to \$1.50 for assets that exceeded the lower threshold. The empirical analysis identifies the following patterns:

- There is no evidence that individuals alter their asset portfolio in a way to maximise eligibility for the AP, given the rules associated with the assets means test.
  - Following the reduction in the AP taper rate, there is some evidence that individuals affected by the change increased the total amount of saving they engaged in. The magnitude of the estimated effect, however, is large and likely captures in part a valuation effect rather than active savings decisions.
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In this chapter, we describe how the structure of and changes to the AP assets means test is related to choices around asset portfolio and savings behaviour. As discussed in Chapter 1, changes in the means test influence the tax rates faced by individuals or households, with the likely implication that behavioural changes follow. The analysis presented in this chapter has two components. The first is descriptive in nature and identifies stylised patterns in the data to determine if the observed allocation of assets across the households' portfolio is consistent with the incentives associated with the AP assets test. This component of the analysis builds on the existing evidence base by providing insights into household behaviour up to 2014. The second part of the analysis seeks to identify the behavioural response to the 2007 change in the AP assets test. Importantly, the analysis relies on a policy change that is arguably exogenous and provides a natural experiment through which the behavioural implications of policy can be assessed.

We begin by setting out a literature survey in two sections. The first part consists of a non-technical description of the life-cycle model which underpins the empirical analysis. The second focuses on existing evidence around portfolio choice and its relationship to retirement incomes policy. Of central concern in this discussion is how housing choices and outcomes are shaped by the institutional setting, including tax and transfer policy, within a life-cycle framework.



## 2.1 The life-cycle model: existing research

This report takes as its starting point the canonical life-cycle model of consumption and saving. Life-cycle models were initially developed by Friedman (1957) and Modigliani and Brumberg (1954). In these models, economic agents are forward looking, and make choices around consumption and saving that take into account inter-temporal trade-offs.<sup>12</sup> The key feature of such models is that it is assumed that agents make choices that are 'best' or optimal for them, subject to a series of constraints. More formally, they are assumed to maximise their lifetime utility subject to some inter-temporal budget constraints, meaning that lifetime consumption cannot exceed lifetime income.<sup>13 14</sup>

In life-cycle models, it is generally assumed that agents exhibit decreasing marginal utility, so that at any point in time the marginal benefit associated with increasing consumption is declining. This is an important assumption as it implies that, in general, decision makers will prefer to smooth consumption over the course of the life-cycle. The implication of this is that agents tend to save during their working life and dissave, or draw down accumulated assets, during their retirement (Browning and Crossley 2001). Such an outcome avoids agents experiencing very high consumption in some periods and very low consumption in other periods.

While agents may desire to smooth their consumption across the life-cycle, there are a variety of reasons why such an outcome might not be attained. For example, agents may face unpredictability in their income stream, and shocks to income levels may mean that desired consumption is not attained. This may reflect the unanticipated nature of the income shock, coupled with credit market constraints that limit the ability of the agent to borrow and thereby smooth consumption.<sup>15</sup>

While predicated on an assumption of utility-maximising choices by rational forward-looking agents, life-cycle models are relatively flexible and can incorporate a variety of factors faced by individuals and households in making decisions over the course of the life-cycle. For example, models have been developed in the literature that identify optimal choices in the presence of pension programs, and tax and transfer systems that impact on the saving decision. The presence of such rules is likely to have important implications for the amount of saving that agents engage in over the course of their working life and the nature of those savings. For example, Attanasio and Brugiavini (2003) find evidence that a reduction in pension entitlements during retirement for Italian households was offset, at least in part, by increases in voluntary saving. Moreover, how savings are allocated among the choice of available asset classes is likely to be determined by the agents own preference in regards to risk-taking, the risk profile of

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<sup>12</sup> Life-cycle models are generally couched in terms of the decisions of an individual. For those individuals who are part of a couple household, choices around consumption and saving might be made at the household level. The term 'economic agent' applies to both the choices of the individual or household.

<sup>13</sup> Note that lifetime income might include inherited wealth and/or transfers that are received over the course of the life-cycle. Further, income is assumed to include both labour and non-labour income. Life-cycle models can easily be extended to incorporate additional considerations such as bequest motives—in this case, lifetime income will be less than lifetime consumption.

<sup>14</sup> A graphical representation of the life-cycle model using a simple two-period framework is presented in Appendix 1.

<sup>15</sup> There are alternative models in which consumption smoothing does not occur. For example, Hall (1978) argues that rational forward-looking economic agents should incorporate all available information into decisions about current consumption, including expectations about future income. Given decreasing marginal utility, this suggests that consumption should follow a random walk (or change randomly from one period to the next) as income shocks are experienced by economic agents.

different types of assets, and rules such as those relating to the taxation of income streams derived from different asset classes (Hubbard, Skinner et al. 1995).

In the context of the life-cycle, housing has a particularly important role given its dual function as both a consumption and investment good. The purchase of owner-occupied housing generally represents the largest single transaction that households engage in over the life-cycle. Moreover, as a durable asset, housing delivers a stream of consumption services over time and historically, in Australia at least, it has appreciated in value in real terms. Hence, at or around retirement, housing generally represents the single largest asset in the household portfolio and has traditionally represented an important part of retirement planning. Interestingly, there is evidence from a variety of countries that post-retirement households do not consume their housing and thus it becomes an increasingly important component of the wealth portfolio (Milligan 2005; Coile and Milligan 2009; Spicer, Stavrunova et al. 2016).<sup>16</sup> In a life-cycle context, it is not obvious that such behaviour represents an optimal strategy for a rational forward-looking utility-maximising agent. For this reason, one question of interest is whether such behaviours are driven by underlying risk or precautionary preferences, and the role played by the tax and transfer system.

A number of studies focus on the role played by housing in the life-cycle asset allocation model. These papers identify a range of theoretical factors that affect investment in and consumption of housing over the life-cycle. In particular, they focus on considerations such as: house price risk; the price of housing versus renting; interest rates; down payment requirements; and the relative returns on alternative assets such as equities and riskless bonds (Cocco 2005; Yao and Zang 2005; Chambers, Carlos et al. 2009). While all three studies stress the critical role housing assets play in life-cycle asset allocation, none identify optimal asset allocation rules relating to housing in the agent's wealth portfolio decisions.

In related literature, a series of studies have developed general equilibrium models to explain the rapid acceleration in home ownership across developed countries over recent decades. In general, such studies suggest that incentives to allocate wealth to housing increased substantially over the 1994–2005 period, due to a range of factors including innovations in the mortgage market. For example, relaxation in loan-to-valuation ratios via the 'combo loan' lowered barriers to the purchase of housing assets by reducing down-payment requirements. Significantly, recent research also examines the extent to which the provision of public pensions may discourage private savings, and the implications of this for the accumulation of housing assets over the life-cycle (Attanasio and Brugiavini 2003). The life-cycle model can be generalised to recognise that consumption and saving choices are also likely to be influenced by the presence of pension programs and mandated saving policies. Transfer programs such as the Australian AP have the potential to decrease private saving, as higher levels of post-retirement incomes from publicly funded programs mitigate the need to undertake private saving. Similarly, there is some evidence that mandated savings in the form of superannuation displaces private saving (Kudrna and Woodland 2011).

It is important to note that while much of the theoretical literature focusing on means testing of transfer programs gives mention to the asset allocation problem, modelling generally abstracts from housing decisions. One recent paper that does in fact address the housing issue, and from an Australian perspective, is a study by Cho and Sane (2013). In that paper, a general equilibrium life-cycle model is developed that considers the economy-wide impact of changing the owner-occupier exemption in the AP assets test. That is, the model is distinctively Australian oriented, as agents are assumed to be subject to income and assets tests indicative of current Australian

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<sup>16</sup> Note that consumption of housing wealth may take a number of different forms. Households may consume equity by taking out a reverse mortgage or similar product, or alternatively they may simply downsize and choose to reside in a smaller home. See Ong, Jefferson et al. (2013).

policy. The analysis looks to evaluate the effects of three alternative reforms on the current means-testing scheme, two of which are particularly pertinent. First, a complete removal of the current exemption, so that owner-occupied housing *is* included in the assets means test. Simulation of this policy alternative predicts a 15 per cent reduction in the population entitled to some AP benefit, in addition to decreases in the size of benefits for many of those receiving transfers. Over the long term, this policy would result in a lower fraction of wealth being held in the form of housing. This reduction would be strongest in cohorts well into retirement, and individuals that are nearing retirement. Such a result is unsurprising, considering the policy essentially removes a large tax concession afforded to owner-occupied housing, effectively reducing its post-tax return. The second policy simulation considered in Cho and Sane (2013) examines the effect of a partial removal of the exemption afforded to owner-occupied housing in the AP assets test: namely a cap on the value of owner-occupied housing which is exempt from the assets test. While such a policy was identified in the Henry Tax Review (Henry, Harmer et al. 2009) as one component of a series of recommended reforms to the tax and transfer system, the cap of \$120,000 considered in Cho and Sane's paper is significantly less than the cap of \$1.2 million mooted in the Henry Tax Review. Their results suggest that the imposition of such a cap would lead to declines in the level of housing assets across households in all cohorts, as a result of the significantly lower incentive to accumulate housing assets into retirement.

## **2.2 Portfolio choice over the life-cycle: empirical evidence**

Empirical analysis of household portfolio decisions is challenging for a range of reasons. First, in many cases there is a paucity of data that relates to the asset holdings of households. Further, even when comprehensive household-level data is available, there is the challenge of distinguishing time, cohort and age effects (Ameriks and Zeldes 2004). This in turn makes it potentially challenging to understand how behaviour changes and portfolio choices vary in response to policy settings. Notwithstanding these challenges, there is increasing international research around the portfolio choices of households, albeit much of it descriptive in nature. One particular question of interest has been how the risk profile of the household's portfolio changes as it ages. In general, the life-cycle model suggests that households should hold a constant fraction of total wealth in the risk-free assets. Furthermore, as the value of human wealth declines with age, it follows that the share of risky assets should tend to increase with age up until retirement. However, the evidence of such behaviour in the data is mixed (Ameriks and Zeldes 2004).

Ameriks and Zeldes (2004) examine the behaviour of households in the United States (US) and note three important patterns: the lack of stock or share ownership; heterogeneity in asset allocation; and what appears to be a general unwillingness on the part of households to actively alter their portfolio choices as they age. To the extent that there *are* changes in portfolio allocations, the pattern seems to be one in which households become increasingly risk averse, possibly reflecting a more precautionary approach among older households. There is little evidence that households reduce the level of relatively risky assets, such as shares, as they age. Owner-occupied housing often represents the largest single asset held by households, and Poterba, Venti and Wise (2011) argue that many households in the US appear to treat housing equity as 'precautionary savings'. That is, they tend to draw those assets down or consume them only when they experience a shock, such as the death of a spouse or a period of substantial medical outlays. Thus, the evidence suggests that housing equity is often conserved until end of the life—providing an insurance against the risk of living longer than expected.

In a similar fashion, Milligan (2005) examines the asset portfolio choices of Canadian households over the life-cycle. As expected, wealth is maximised at or around the time of retirement. Although housing or property is the dominant asset at ages 40 to 45, it remains an important asset beyond retirement—notwithstanding the increasing importance of financial assets. Milligan

finds little evidence that the value of housing assets or ownership decreases at or around retirement. Rather, such a decrease appears more likely to occur following health or life shocks, such as the death of a partner. Similar patterns are observed in the US, with home ownership rates remaining relatively high until around age 80 (Coile and Milligan 2009). Evidence suggests that households in the UK do not in general adjust their housing situation following retirement, but rather do so later in life in response to life events such as the death of a spouse (Ermisch and Jenkins 1999).

International research also provides some insight into how retirement income programs impact on housing-related decisions. In a study of the US Social Security program, Engelhardt (2008) finds that increases in the value of benefits are associated with significantly higher rates of home ownership among the elderly. Engelhardt argues that higher public transfers allow older individuals to 'age in place' for longer and leads to increased rates of home ownership among successive cohorts of Americans. Moreover, Social Security transfers in the US are decoupled from other factors such as interest rates and tax policy which has impacted on the home ownership rates of younger cohorts.

In terms of housing consumption post retirement, Chiuri and Jappelli (2010) use a series of micro-economic surveys to undertake a cross-country comparison of asset decumulation among the elderly, focusing on how housing assets are consumed post retirement. The study examines 15 Organisation for Economic Cooperation and Development (OECD) countries, including Australia, and discusses how institutional considerations shape home ownership rates among post-retirement individuals. There is some evidence that institutional arrangements, including pension programs, are important determinants of home ownership patterns. In some countries where mortgage equity withdrawal (in the form of reverse mortgages or similar financial instruments) is less accessible due to institutional and regulatory constraints, there appears to be higher rates of asset decumulation among the elderly. In general, home ownership rates are observed to decline after age 60; however, the patterns observed in the data are driven largely by cohort effects. After controlling for the cohort effects, in particular the lower rates of home ownership experienced by older cohorts, the evidence suggests that home ownership rates actually start declining around age 70. For Australia, the evidence suggests that as households age they tend to adopt asset portfolios that exhibit lower levels of risk and contain more liquid assets. A more recent study suggests that even those households that deplete their wealth do not tend to consume housing equity at a faster rate than other households (Spicer, Stavrunova et al. 2016).

As noted above, housing plays a critical role in household decisions around asset portfolios and retirement, because of its dual role as a consumption good and an investment, along with its lumpiness. Flavin and Yamashita (2002) explicitly consider the optimal portfolio choice for households. While households can, through participation in the rental market, potentially decouple the link between housing consumption and the level of housing assets held, it is generally accepted that housing services purchased in this way represent a poor substitute for owner-occupied housing. In effect, households are constrained to include the amount of housing services actually consumed in their asset portfolio. Analysing the behaviour of households in the US, Flavin and Yamashita argue that this constraint has important implications over the life-cycle, with young households being highly leveraged and therefore faced with a relatively high-risk and high-return portfolio. In turn, such households tend to reduce their exposure to risk associated with housing by reducing mortgage debt or buying low-risk assets such as bonds.

Of key interest in the present study is how asset portfolio choices are shaped by the tax and transfer system faced by households. Existing analysis has tended to focus on programs that mandate savings in a similar fashion to superannuation, or tax incentives that provide explicit and implicit incentives to accumulate assets over the course of an individual's working life. In this context, the rules and institutional arrangements within which decisions are made are likely to be

particularly important.<sup>17</sup> While analysis that examines the peculiar nature of pension arrangements and tax incentives in other jurisdictions is unlikely to provide specific insight into the Australian situation, it nonetheless remains the case that such research is instructive in terms of providing evidence about the predictions of the life-cycle model and the implications of financial incentives associated with tax and transfer programs.

One issue that has been extensively dealt with in the literature is how pension wealth impacts on the level of voluntary savings. Pension wealth generally reflects the rules associated mandatory savings in the form of social insurance contributions, or in the case of Australia, superannuation contributions. In a simple life-cycle model, public and private savings are perfect substitutes, so that increased pension wealth should be offset by a comparable decrease in private saving. Considering Italy, Attanasio and Brugiavini (2003) find that voluntary savings increased as a result of changes to the Italian pension system that altered eligibility by restricting early retirement options and increasing retirement age. Using a cross-country dataset, Hurd, Michaud et al. (2012) find that public pensions and private savings are substitutes, though imperfectly so. In particular, they estimate that a \$1 increase in pension wealth is associated with a reduction in private saving and a \$0.22 decrease in financial assets at the time of retirement.

Of particular relevance for this report, given the nature of the Australian AP, is the role of means testing on savings behaviour and portfolio allocation. International evidence suggests that means testing can have important behavioural implications on a range of decisions around labour force activity, retirement and saving. More generally, it highlights that any analysis of the pension system must be considered in the wider context of redistributive policies and within the parameters of the tax and transfer system (Sefton and van de Ven 2009). Sefton, van de Ven et al. (2008) use a dynamic programming approach to simulate the implications of changes in means testing policy in the UK. The policy changes reduced the EMTRs from 100 per cent to 40 per cent on earned income, including investment income. While it is generally acknowledged that means testing potentially provides a more equitable outcome than a universal pension payment, the cost associated with such an approach is that, in general, recipients face high EMTRs. Those high EMTRs can in turn provide a large disincentive to undertake employment, as pension benefits are withdrawn and taxes paid when a recipient engages in employment. The analysis of the UK experience suggests that the reduction in EMTRs provided incentives for poorer households to save more and delay retirement, with the opposite effect for wealthier households.

An early piece of analysis for the US suggests that assets means testing in social insurance programs such as those associated with retirement tend to discourage saving, especially for households with low levels of wealth (Hubbard, Skinner et al. 1995). Neumark and Powers (1998) also examine behavioural responses of households to the Social Security program in the US and found that means-tested benefits induced dissaving prior to retirement. In the presence of uncertainty, means testing effectively provides insurance in the bad state of the world and thereby tends to decrease private savings associated with precautionary motives. Moreover, the large implicit tax rate on assets accumulated through saving acts as a disincentive for households to accumulate private savings. While existing studies show that means tests can discourage saving by low-wealth households, the impact on wealthier households is unclear (Hubbard, Skinner et al.

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<sup>17</sup> The Australian system of a non-contributory AP is in stark contrast to pension or social security programs in many other countries such as the United States and Canada. In other countries, employers and/or employees are commonly required to contribute to pension programs, with the benefits available at retirement dependent upon the individual's age when they retire and the cumulative sum of the contributions made over their working life. A useful discussion of the retirement incomes programs can be found in OECD (2016).

It is also important to note that contributions like superannuation represent mandatory savings for retirement and are in effect a tax on labour income. The tax treatment of those contributions and the funds they provide at retirement are likely to be important for a range of decisions, including: labour force participation, the magnitude of non-compulsory private saving, and the asset portfolio choices of households.



1995; Neumark and Powers 1998, 2000; Ziliak 2003; Hurst and Ziliak 2006; Sefton, van de Ven and Weale 2008).

Australian analysis of how the pension means test impacts on behaviour is relatively limited, in part due to the paucity of data on the wealth holdings of households. Early analysis of the AP means test suggested that it created strong incentives for households to restructure their portfolio around retirement, to maximise the likelihood and value of public transfers received. An obvious strategy to facilitate higher consumption post retirement was to deplete private savings relatively rapidly following withdrawal from the labour force, thereby establishing eligibility for the means tested AP (Atkinson, Creedy and Knox 1995). Such a strategy depended, at least in part, on the portfolio choice, so that a higher proportion of wealth being held in owner-occupied housing generally increased an individual's entitlement to publicly funded pensions.

As noted in Chapter 1, Bradbury (2010) finds little evidence that the value of assets held in the form of owner-occupied housing by Australian households is significantly different to that held by households in other countries. This is the case notwithstanding the incentives embedded in the AP eligibility rules. Cobb-Clark and Hildebrand (2011) examined the asset portfolio choices of a set of Australian households where the head of the household was aged between 55 and 74 years. The analysis focused on asset portfolio choices around the critical retirement years, and the potential for provisions in the AP means test to impact on the household's choice of assets. Recall that the exemption for owner-occupied housing may encourage individuals to accumulate relatively high levels of equity in housing, compared to a situation where all the assets (including owner-occupied housing) were included in the means test. In a similar fashion, deeming provisions may impact on the choice of assets held by encouraging the purchase of higher-return (albeit relatively more risky) assets.

The stylised patterns in the data described in Cobb-Clark and Hildebrand are generally consistent with a priori expectations. For example, households aged 55–64 usually have higher levels of wealth, and the largest single asset is generally owner-occupied housing. That analysis used the 2006 HILDA wealth modules and found little evidence that the rules around the AP means test impact on the choice of assets held by households. To the extent that there is any evidence consistent with such behaviour, it appears to be limited to singles who have reached pension age and who are in poor health. For this group, the receipt of an AP may be particularly valuable because of various health-related concessions that are attached to the receipt of the AP.

The analysis presented in this chapter is similar to that reported in Cobb-Clark and Hildebrand (2011), though it builds on that research in a number of important ways. First, the analysis in that paper is largely cross-sectional in nature and does not take advantage of the panel nature of the data. While the 2002 and 2006 data are used in Cobb-Clark and Hildebrand (2011) to estimate a series of difference-in-difference (DiD) models that examine the changes in assets across these years, again there is little evidence that changes in asset holdings among households that become eligible for the AP differ from those households that do not. Further, this report examines wealth portfolio choices across an extended time period, namely 2002–14, including the period straddled by the GFC. Importantly, changes to the AP assets test in 2006 provide important variation and a natural experiment by which to assess how the rules around the AP affect asset portfolio choices.

## 2.3 Asset allocation: empirical specification

The analysis of how the rules associated with the AP are related to the asset portfolio decisions of Australian households consists of two separate and distinct steps. The first step is descriptive in nature and characterises the portfolio allocation decisions of Australian households while controlling for a range of observable characteristics. The second step is arguably more ambitious and attempts to identify the behavioural responses of households using a change in policy relating to the taper rates applied to non-exempt wealth holdings in the assets means test. This latter analysis relies on the variation in the policy environment associated with changes made to AP taper rates in 2007 and the ‘natural experiment’ it affords.

Recall that eligibility for the AP is determined, in part, by means tests related to the income earned and asset holdings of the individual. The first step in understanding the behavioural implications of these rules is to identify if there are any patterns in the data that are consistent with the incentives associated with the assets means test. For example, we might expect that individuals arrange their asset holdings in such a way as to ensure that holdings of non-exempt assets lie below the relevant threshold, thereby ensuring eligibility for a part or full AP. In the first piece of empirical analysis, we consider if individuals structure their portfolios to take advantage of the relevant thresholds of the AP assets test.

This analysis is descriptive in nature and the results are useful in highlighting the broad differences in asset portfolios across households. The analysis proceeds by estimating a series of statistical or regression relationships that seek to identify the pattern of asset holdings, conditional on a range of characteristics. In particular, the statistical analysis controls for a range of observable characteristics such as age, health status and time. Ideally, any comparison would examine whether changes in portfolios as households age can be attributed to the incentives inherent in the AP eligibility rules, rather than simply being associated with age and wealth accumulation effects. The regression models are ‘reduced form’ or essentially descriptive in nature and help identify if individuals choose to hold assets at or around the thresholds associated with the AP means test, conditional on their observable characteristics.

In undertaking such an analysis it is important to control for observable characteristics that might impact on asset portfolio choices. Consider, for example, the effect of age. It is well established in the literature that individuals often draw down their assets following retirement and restructure their wealth portfolio. In its very base form, the life-cycle theory suggests that individuals should run down their assets as they approach the end of their life. Hence, it is important to control for age when comparing the asset holdings of individuals or households. Similarly, by controlling for the level of wealth, the statistical analysis allows a comparison of households with the same level of net worth. Essentially, these included controls net out the effect of confounding factors on the issue of interest.

In addition, the empirical strategy recognises that the propensity to invest in and hold a specific asset will depend on the range of assets held. The statistical models involve estimating a set of reduced form equations that capture asset composition, using specification (1), as follows:

$$\sinh^{-1}(A_{itk}) = a_{0k} + IncomeThresh_i b_{1k} + X_i b_{2k} + Age_i b_{3k} + W_i b_{4k} + \mu_{ik} \quad (1)$$

Where  $A_{itk}$  represents the dollar value of the asset  $k$  that household  $i$  holds at year  $t$ . The asset classes considered are shaped by the data available in HILDA. In particular, the classes of assets considered in the empirical specification are: financial wealth, business equity, equity in own home, lifestyle assets (e.g. cars, recreational vehicles, holiday homes), and pension funds. In equation (1) the term  $IncomeThresh_i$  is a measure that captures if the individual’s reported income is within 10 per cent of the income threshold that determines eligibility for the AP. Intuitively, it might be expected that those individuals are more likely to rebalance their choice of assets in a way that maximises their eligibility for and entitlement to the AP.

The vector  $X_i$  in equation (1) represents a set of observable characteristics that includes education, marital status and health. Such measures proxy for a range of life-cycle considerations that are likely to be important for the portfolio choice decision. The variable  $Age_i$  is a vector that includes a quadratic in age and an indicator variable that captures if the individual has attained the eligibility age for the AP. These measures account for the effects of ageing generally and any specific effects associated with reaching AP eligibility age. Finally, the specification allows for households' asset portfolios to depend on household net worth ( $W_i$ ). This is likely to vary across households and be related to the decision to hold a particular asset. Finally, we incorporate a series of year and state indicators into the specification.

The specific functional form used in equation (1) is an inverse hyperbolic sine transformation of asset and income variable variables. Introduced by Burbidge, Magee and Robb (1988) and commonly used by portfolio allocation models, this functional form is used to account for the highly skewed nature of the distribution of these variables (e.g. Pence 2002; Cobb-Clark and Hildebrand 2011). Similar to Cobb-Clark and Hildebrand (2011), equation (1) is estimated as a system of equations, and a set of cross-equation restrictions are imposed to satisfy the adding-up requirement that the sum of assets across asset types equals to net worth. We also bootstrapped standard errors by 999 times. An alternative model was also estimated without transforming the variables and using robust standard errors. The results of those models are qualitatively similar to the results reported in Table 4.

It is important to stress that specification (1) effectively provides a detailed descriptive analysis of how asset allocation is related to the observable characteristics of the individual, households and the program parameters that define eligibility for the AP. That is, the empirical estimates should not be interpreted as representing a causal relationship. While the analysis is similar to that reported in Cobb-Clark and Hildebrand, it considers a significantly longer time frame. Importantly, our analysis also transposes the GFC and thereby provides insights into the path of asset accumulation over this period.

## 2.4 Asset allocation: data and descriptive statistics

The statistical analysis uses the wealth modules from the HILDA dataset collected in 2002, 2006, 2010 and 2014. In those modules, detailed information is collected on the wealth and asset holdings of households. Two subsamples are used in the estimation of equation (1). The first consists of all households in which the reference person (or household head) is between 55 and 64 years of age. In couple households the reference person is defined as the oldest partner in a couple and this subsample is termed the 'pre-retirement cohort'. During the period covered by the data, very few household members in this age group are entitled to claim the AP. Recall that between 2001 and 2014, the eligibility age for the AP was 65 years for males and was progressively increased from 61 to 65 years of age for females. Hence, only a limited set of couples in which the female was the oldest partner in the couple and also satisfied the age criteria for the AP is included in the sample.

The second subsample includes all households in which the reference person is between 65 and 74 years old and is termed the 'post-retirement cohort'. Among this subsample, at least one household member has reached the age necessary to receive AP benefits. Because marital status is likely to have a significant impact on both the amount and nature of assets held, the analysis is undertaken separately for partnered individuals and for individuals who are single or unpartnered. In Table 2 we present a set of means of the variables used in the analysis, from the pooled sample for the period 2002 to 2014.



**Table 2: Summary statistics: pooled sample 2002–16**

	Partnered				Single			
	55–64		65–74		55–64		65–74	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Age (years)	60.001	2.878	69.669	2.642	59.954	2.923	69.540	2.589
Partner age	55.800	5.986	67.458	6.795				
University degree	0.245	0.430	0.171	0.377	0.195	0.397	0.163	0.369
Partner uni. degree	0.246	0.431	0.163	0.369				
Female	0.235	0.424	0.340	0.474	0.632	0.483	0.668	0.471
Home owner	0.893	0.310	0.902	0.297	0.634	0.482	0.725	0.447
Retired	0.244	0.430	0.760	0.427	0.354	0.478	0.802	0.399
Partner retired	0.239	0.427	0.717	0.451				
Both retired	0.135	0.342	0.624	0.484				
In poor health	0.212	0.409	0.268	0.443	0.330	0.470	0.320	0.467
Partner is in poor health	0.186	0.390	0.258	0.437				
Was married					0.806	0.395	0.878	0.328
Single					0.192	0.394	0.122	0.328
NSW	0.311	0.463	0.308	0.462	0.345	0.476	0.327	0.469
Vic.	0.243	0.429	0.240	0.427	0.223	0.416	0.242	0.429
Qld	0.192	0.394	0.185	0.388	0.205	0.404	0.207	0.405
SA	0.097	0.296	0.108	0.310	0.097	0.295	0.091	0.287
WA	0.098	0.297	0.117	0.321	0.086	0.281	0.095	0.293
Tas.	0.030	0.170	0.025	0.156	0.031	0.173	0.028	0.166
NT	0.008	0.088	0.001	0.032	0.004	0.066	0.001	0.029
ACT	0.022	0.145	0.016	0.127	0.010	0.097	0.009	0.097
No. observations	2038		1957		1357		1169	

Source: author's own calculations from HILDA waves 2, 6, 10 and 14.

The summary statistics presented in Table 2 reveal a number of patterns that are generally consistent with a priori expectations. Recall that most household members in subsample 1 (the pre-retirement sample or the set of younger households in which the head is aged 55–64 years) are not eligible to claim AP benefits. In this sample, in only around 14 per cent of couples do both partners report being retired. In contrast, approximately 35 per cent of single-headed households in this younger age group have already left the labour force and retired over the same time period. Note also that rates of home ownership are relatively high in both samples: approximately 90 per cent in the case of couple households.

In Table 3 and Figure 3 we present descriptive statistics showing the level of assets reported by the younger and older cohorts, for each of the wealth modules in HILDA. Net wealth is defined as

the total value of assets held, less all outstanding debt (including mortgages, personal loans and credit card debt). It is important to note that in HILDA wealth information is collected at the household level. Hence, each of the columns refers to the age of the reference person or head of the household. All values reported in Table 3 are in real values expressed in \$2015.

**Table 3: Wealth holdings and asset portfolio: pooled sample 2002–14**

	Couples				Singles			
	55–64		65–74		55–64		65–74	
	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
Net wealth (\$000s)	1,219.7	1,560.3	1,223.9	1,819.9	544.0	775.5	563.9	922.6
Net fin. assets (\$000s)	154.2	475.0	240.3	754.3	71.9	207.9	108.9	343.6
Home equity (\$000s)	422.0	406.3	465.6	443.0	241.0	330.7	269.7	291.8
Business equity (\$000s)	90.1	652.9	44.1	323.3	23.6	213.5	24.8	275.6
Life-style assets (\$000s)	218.9	526.5	192.4	695.1	75.1	217.6	67.3	276.2
Pension assets (\$000s)	334.4	489.3	281.5	574.5	132.4	262.1	93.1	283.1
<i>Holding any:</i>								
Fin. asset	1.00	0.05	1.00	0.06	0.99	0.12	0.99	0.11
Home equity	0.89	0.31	0.90	0.30	0.63	0.48	0.72	0.45
Household income (\$000s)	114.5	107.0	68.7	127.8	53.3	69.4	38.8	46.4

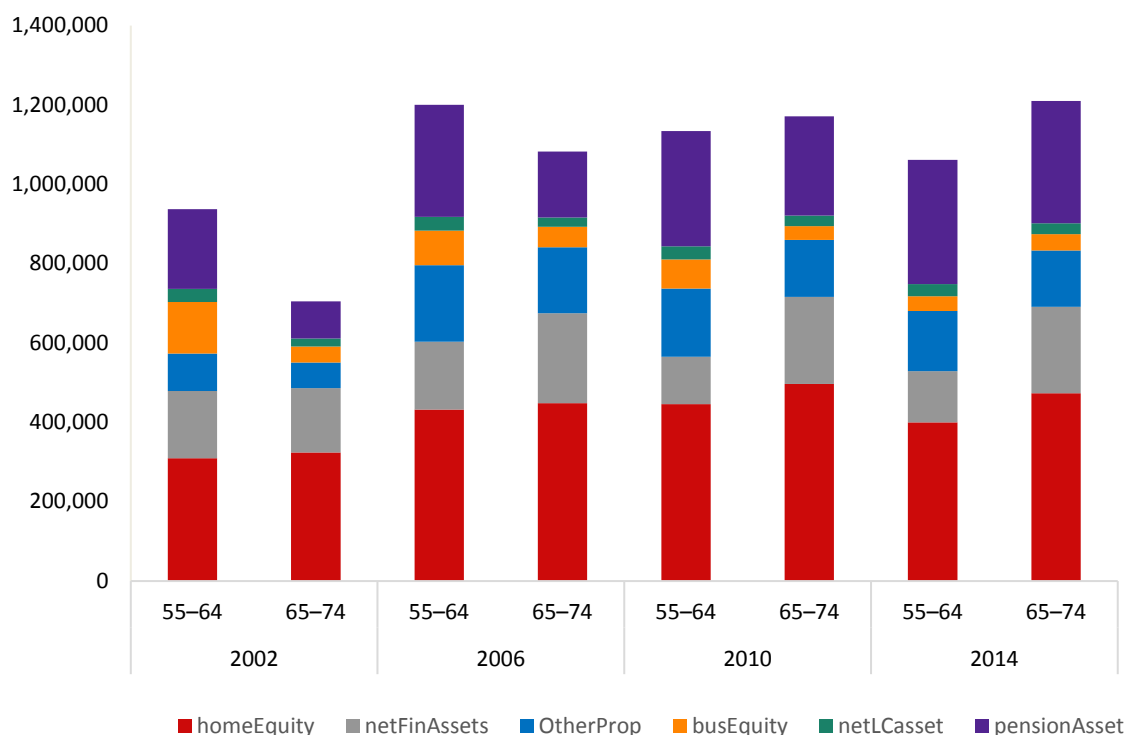
Source: author's own calculations from HILDA waves 2, 6, 10 and 14.

An examination of Table 3 indicates that, as expected, partnered Australians are on average wealthier than single Australians, with the net wealth of partnered Australian households approximately double that of individuals in 'single' Australian households. Figure 3 uses the successive waves of HILDA to highlight the evolution of wealth across households over time. It is clear that Australians witnessed rapid growth in their total net worth between 2002 and 2006. For pre- and post-retirement cohorts, average net worth grew by 28 per cent and 53 per cent respectively over this period. That growth slowed significantly between 2010 and 2014, and net wealth actually contracted in 2010 and 2014 for the pre-retirement cohort. For the post-retirement age cohort, growth in net wealth fell to 8 per cent between 2006 and 2010, and to 3 per cent in the final four years of data.

A pattern whereby wealth increases following retirement may appear somewhat counter-intuitive in the life-cycle context, where it is generally assumed that households or individuals dissave following withdrawal from the labour force. Nonetheless, such a pattern has been identified previously in analysis undertaken by the DSS and most likely reflects, at least in part, a valuation effect (DSS 2016). That is, assets held following retirement increase in value and thereby increase net wealth, notwithstanding limited or zero earned income (Finlay 2012). For the pre-

retirement age cohort, average net worth is observed to contract by approximately 6 per cent between 2006 and 2010, and by a similar amount between 2010 and 2014. While the life-cycle model would suggest that wealth should be increasing among this cohort as they approach retirement and withdrawal from the workforce, the contraction in wealth likely reflects macro-economic considerations such as the GFC.

**Figure 3: Portfolio allocations of older households**



Source: author's own calculations from HILDA waves 2, 6, 10 and 14.

In Table 3, the components of net worth for the pre- and post-retirement cohorts across the wealth modules are also presented. The data indicate that Australians have gradually been decreasing the proportion of their asset portfolios dedicated to financial assets over the period 2002 to 2014. Whilst significant decreases are seen from 2006 to 2010 (the two waves which straddle the GFC), this decrease appears to be part of a general decline in the average holdings of financial assets. A noticeable decline is observed in the holdings of stocks or equities across 2006 to 2010 for both pre- and post-retirement cohorts, suggesting households responded strongly to an increase in the perceived riskiness associated with equities markets, and to a lesser extent bond markets, in the wake of the GFC. The increase in the value of assets held in bank accounts and the proportion of net worth it represents in 2010 and 2014 may be consistent with a pattern whereby households have sought the safety of bank deposits rather than relatively riskier financial assets.

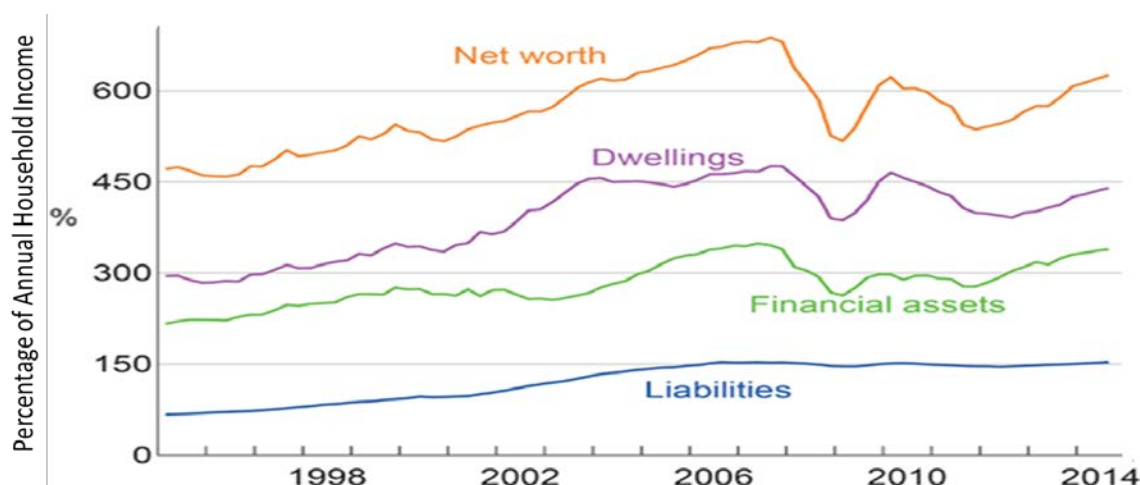
The destination for much of this wealth withdrawn from financial assets appears to be pension/superannuation funds—and in the case of the pre-retirement cohort, owner-occupied housing. Both pre- and post-retirement cohorts substantially increased the proportion of their portfolios dedicated to pension/superannuation funds over the period 2002 to 2006. Such a pattern is consistent with government policies that encouraged the accumulation of private savings via compulsory and non-compulsory superannuation contributions during this period, and the increase in the value of those assets during the run up to the GFC.

For the reasons discussed previously, housing represents a critical component of retirement planning and the wealth accumulation process for Australian households. In terms of housing, the value of assets held in the owner-occupied home, as well as its contribution to net worth, has grown steadily over time for the pre-retirement cohort. Figure 3 highlights how owner-occupied housing has increased in importance over time, representing approximately one-third of net worth in 2002 and increasing to more than 40 per cent of net worth by 2010. Notwithstanding a slight decline in the following four years, it remains the case that owner-occupied housing represents a significant component of net wealth for Australian households entering retirement. For those in the post-retirement age cohort, however, the contribution to net worth from the owner-occupied home has declined from 46 per cent in 2002 to 39 per cent in 2014. Nevertheless, home equity remains by far the largest asset in the portfolios of older Australians, with the period 2002 to 2006 characterised by strong growth in investments in property excluding the principal residence. The proportion of wealth dedicated to these assets grew from 10 (9) per cent to 16 (15) per cent for pre-retirement (post-retirement) cohorts respectively during that period. While the proportion has remained relatively stable up to 2014, it remains the case that for those approaching retirement age property holdings other than the family home have gradually become relatively more important in the context of the wealth portfolio. In 2002 around one quarter of responding households approaching retirement held property other than the family home and this has grown to 30 per cent in 2014. Similarly, in 2002 'other property' represented the fifth most valuable asset in the portfolios of those approaching retirement. By 2014 it had grown in relative importance to become the third largest component of wealth for the pre-retirement cohort.

In terms of the allocation of savings between various investments, equity in the owner-occupied home and superannuation assets represent the largest stores of wealth within the retirement portfolio of both pre- and post-retirement households. The importance of superannuation is expected, given the increasing maturity of the superannuation system over this period. As noted above, owner-occupied home equity represents the largest single component of the asset portfolios of older Australians, contributing approximately 35–45 per cent of net worth over the observation period. Consistent with this pattern, among older Australians, approximately 60 (90) per cent of individuals who are single (part of a couple) are home owners (see Table 3).

One concern with these findings may relate to the accuracy of the self-reported wealth data in HILDA and used for the empirical analysis. Figure 4 presents the changes in financial and non-financial wealth in household portfolios over the period 1995 to 2014, using aggregate data. The comparison with the HILDA data used in the empirical analysis suggests that although there are major changes occurring at the macro level, the HILDA sample replicates trends observed in the macro-economic data reasonably closely. Figure 4 also highlights that while clear increases in dwelling and financial wealth are observed over this period, there were also sharp increases in the level of household liabilities.

**Figure 4: Household wealth and liabilities 1995–2014**

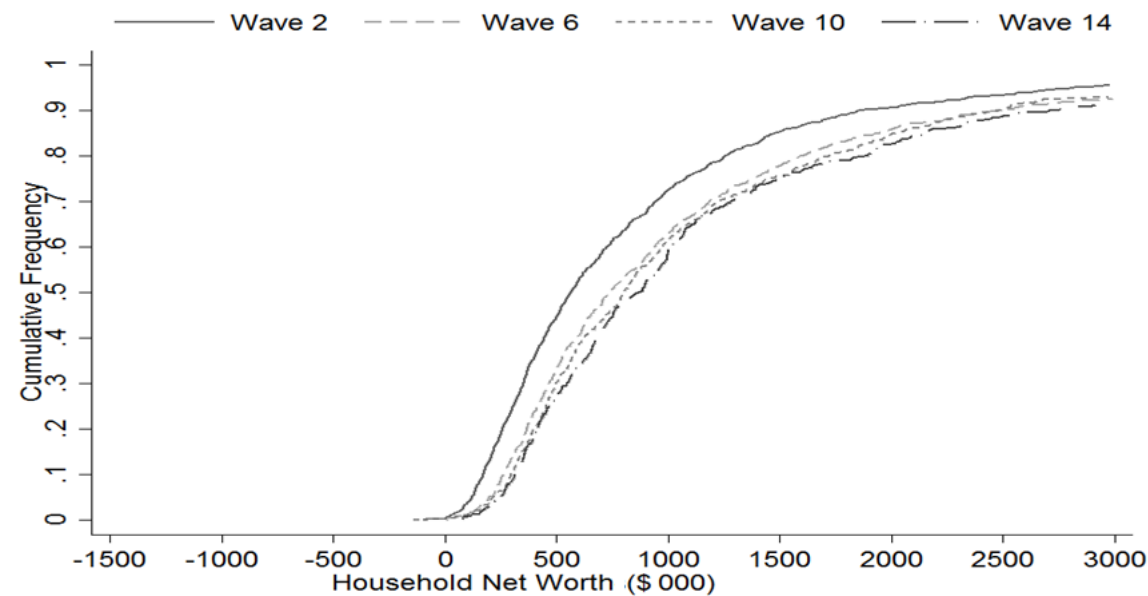


Source: RBA 2014 and ABS 2017.

One of the advantages of the HILDA dataset is the opportunity it provides to observe how household wealth holdings evolve over time. Figures 5 to 8 present the cumulative distribution functions of household net worth for each of the wealth modules that are available in the HILDA data. Such graphs allow the identification of the proportion of households that have a given level of wealth holdings in a given year. For example, consider Figure 5, which shows the net wealth holdings for all Australian households in waves 2, 6, 10 and 14 of HILDA. In 2002 approximately 55 per cent of households had net worth of \$500,000 or less. By 2014 the share of households with net wealth exceeding this figure had fallen to approximately 40 per cent. Alternatively, by 2014 approximately 60 per cent of Australian households reported net wealth in excess of \$500,000. Figure 5 shows those patterns for all households, while Figure 6 focuses on home owning households and Figure 7 on non-homeowning households. Given the importance of investment housing in the asset portfolio of Australian households, Figure 8 presents the cumulative distribution function for households that hold an investment property. Figure 5 and 6 together indicate that the distribution function shifts to the right over time, reflecting general increases over time in net worth.

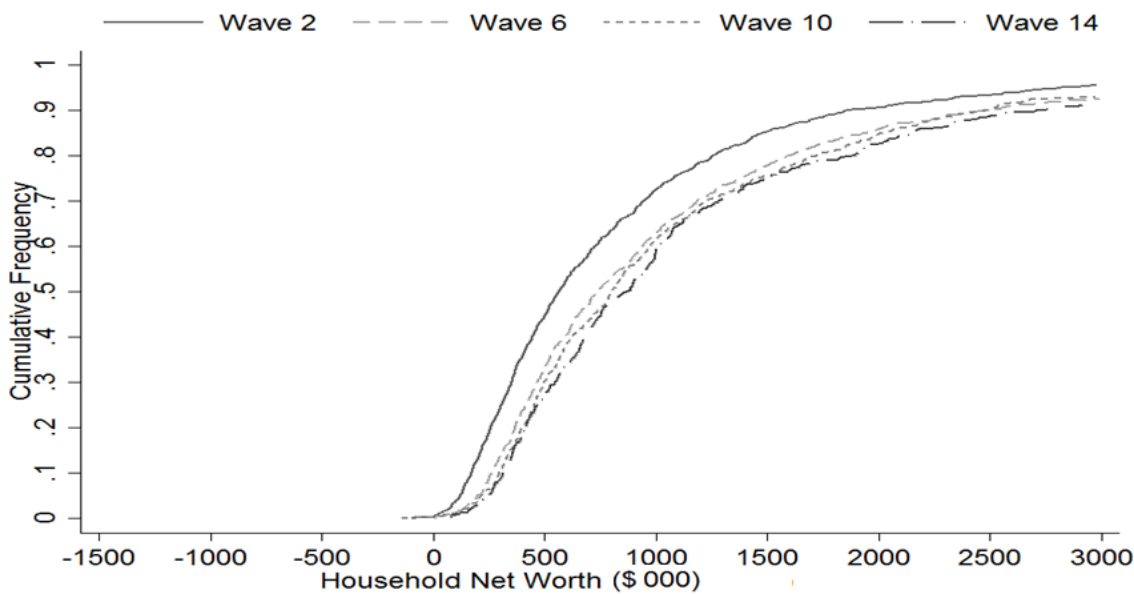
A comparison of Figures 6 and 7 indicates that, as expected, home owners are wealthier than non-homeowners. Moreover, for home owners a clear rightwards shift in the cumulative distribution function between 2002 and 2006 is observed. While this rightwards shifts continues in 2010 and 2014, in general the shift is somewhat smaller in the later years. In comparison, in Figure 6 we observe very little change for non-home owning households in terms of changes in net wealth over the period 2002 to 2014. Among households who own a property other than an owner-occupied dwelling, there is evidence of a substantial increase in wealth over the period 2002 to 2014 (Figure 8).

**Figure 5: Household net worth 2002–14: all households**



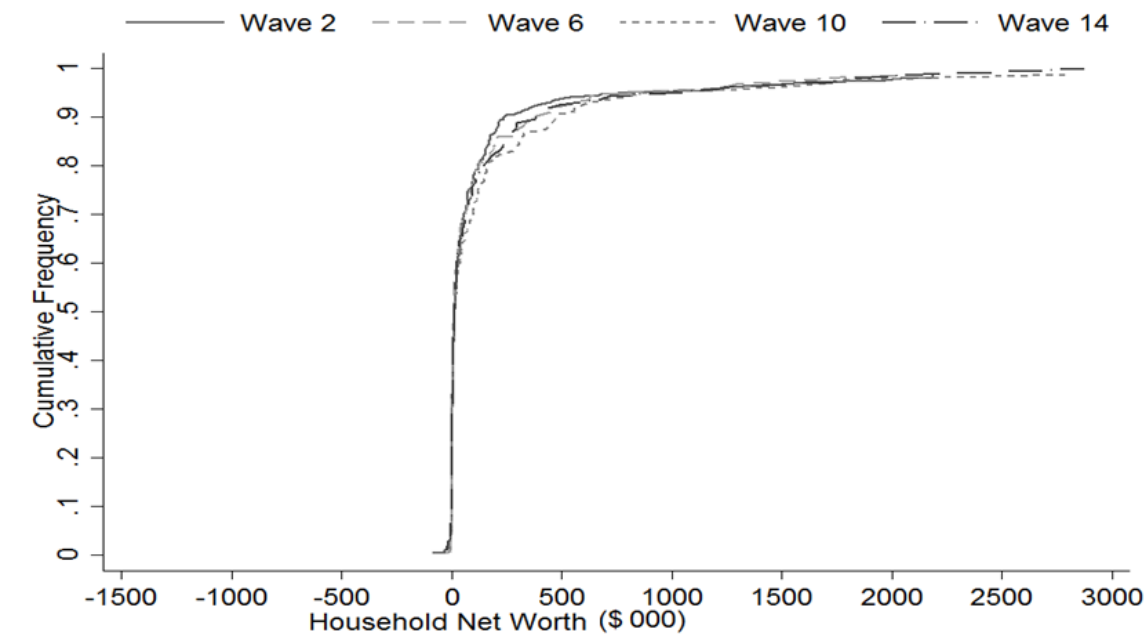
Source: Author's own calculations from HILDA waves 2, 6, 10 and 14.

**Figure 6: Household net worth 2002–14: home owners**



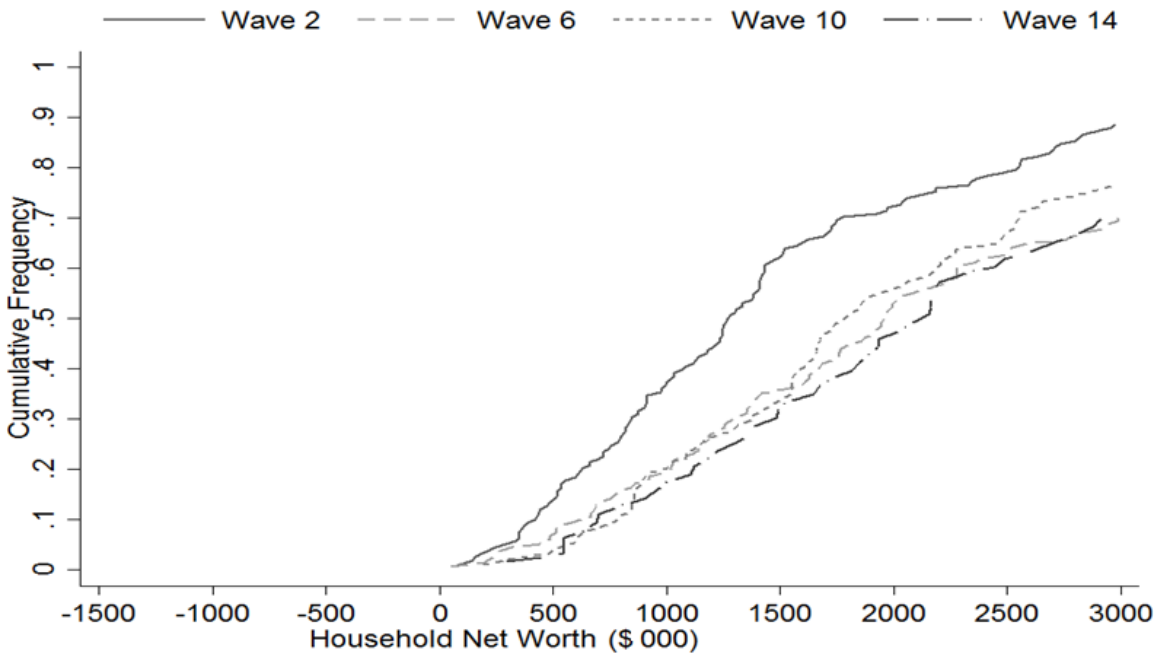
Source: Author's own calculations from HILDA waves 2, 6, 10 and 14.

**Figure 7: Household net worth 2002–14: non-homeowners**



Source: Author's own calculations from HILDA waves 2, 6, 10 and 14.

**Figure 8: Household net worth 2002–14: house investors**



Source: Author's own calculations from HILDA waves 2, 6, 10 and 14.



The information in Figures 5–8, along with the summary statistics presented in Table 2 and 3, highlight the following key patterns in terms of the wealth holdings and portfolio allocation of Australian households.

- The incidence of home ownership remains relatively high among older Australians, with around 60 to 90 per cent of responding households reporting that they own their own home. This is the case notwithstanding evidence that home ownership rates have fallen in Australia over recent years.
- Equity held in owner-occupied housing represents the largest portion of the asset portfolios of older Australians, contributing 35–45 per cent of net worth over the period 2002–14.
- The high proportion of wealth held in the owner-occupied home not only persists, but increases as individuals enter retirement. This is consistent with a pattern whereby individuals or households do not downsize but rather retain the family home. In turn, owner-occupied housing represents an increasing proportion of net wealth, as that net wealth declines further into retirement. One possibility is that rather than simply retaining the family home or trading down, some of the responding households may have traded up as they moved into retirement.
- On average, pension assets or superannuation are the second largest contributor to net worth for older Australians, representing 20–30 per cent of their net worth over the period 2002–14. The value of assets held in superannuation declines substantially between pre- and post-retirement age.
- The increase in the value of wealth held in financial assets between pre- and post-retirement age is consistent with a pattern whereby agents withdraw funds from their pension or superannuation funds upon retirement, and invest in other asset classes such as financial assets in order to provide a more liquid source of wealth to consume in retirement years. Similar patterns have been observed and noted in Cobb-Clark and Hildebrand (2011).
- Within the set of financial assets considered, on average agents tend to hold most of their wealth in equities or stocks, closely followed by cash holdings in the form of bank deposits. As agents reallocate wealth into financial assets, the destination for much of that wealth appears to be equities/stocks, with the value of assets held in this form increasing most substantially between pre- and post-retirement. Households also tend to increase their holdings of cash investments such as bonds as they enter retirement.
- Holdings of additional properties (including holiday homes and/or investment properties) also represent an important store of wealth for older Australians. Over the survey years, investments in property other than the family home represent 10–15 per cent of net worth. Prior to retirement, roughly 25–30 per cent of responding households own some form of property asset other than the principle residence. Between pre- and post-retirement age, the value of investment housing assets tends to decline slightly, while the proportion of households holding this asset class declines substantially, suggesting that many households begin to sell-off investment properties in retirement.

The examination of the asset holdings of Australian households and their evolution over time highlights a pattern that is similar to those identified for other countries, with owner-occupied housing playing a central role in the retirement planning of Australian households. The analysis that follows seeks to identify how the patterns observed in the data and described above are correlated with a set of observable household characteristics. In particular, we consider how portfolio decisions are related to eligibility for the AP.

## 2.5 Asset allocation: empirical results

The descriptive results discussed above are useful in highlighting the broad differences in asset portfolios over time and across household types and by age. Nonetheless, it is important to take care when interpreting these differences, because the level of household wealth also varies with these same characteristics. This is problematic because the nature of credit markets and financial institutions implies that there is a link between total wealth and asset portfolios. Of interest in the present study is whether changes in portfolios as household heads' age can be attributed to the incentives inherent in the AP eligibility rules.

The statistical models presented below build on the simple comparison set out above. In particular, they allow the relationship between means testing, the household's access to Australian AP and household portfolio decisions to be characterised in a more robust manner. Importantly, specification (1) is sufficiently flexible that it allows for the possibility that the propensity to invest in a specific asset will depend on the amounts of other assets held. Finally, by incorporating a series of observable characteristics in the specifications, the analysis allows a comparison of households with the same level of net worth and controls for other confounding factors such as health status. This means that, in effect, the results on asset composition are calculated for households with average levels of wealth. It is important to note this empirical specification is aiming to provide a robust descriptive picture, rather than to identify the causal impacts. Tables 4 and 5 present the results of the baseline model (equation (1)) for couples and singles respectively. Each column in Tables 4 and 5 presents the relationship between asset holdings and the observable characteristics of the household.

In the estimation framework described in section 2.3, the potential impact of the AP on asset portfolios is captured in two ways. The first is through a *measure of income eligibility* and the second via a *measure of age eligibility*. In the empirical analysis, total wealth levels are effectively held constant by including a measure of net worth in the specification. In both cases these measures should show how, if at all, decisions around asset allocation are related to key parameters that determine eligibility for the AP.

For couple households, the results in Table 4 indicate that poor health of the partner is associated with households allocating less wealth to superannuation assets and additional wealth to housing assets. The empirical results also indicate that educational attainment is not associated with the asset allocation for couples. Specifically, although we find positive effects on the education variables for superannuation and housing assets, they are statistically insignificant. In comparison, for singles the analysis indicates that individuals with an undergraduate qualification allocate additional wealth to superannuation in their portfolio relative to non-university graduates *ceteris paribus*.

Of key interest in this report is the way the rules around eligibility for the AP are related to patterns of asset allocation. Recall that the specification incorporates information about the household or individual's eligibility for the AP in two ways. Specification (1) incorporates a measure of total household income, as well as any additional effect of having an income level within plus or minus 10 per cent of the relevant AP income eligibility threshold ( $IncomeThresh_i$ ). In effect, the  $IncomeThresh_i$  variable seeks to identify whether households who have income levels that place them at or near the means-test threshold for the AP alter their asset portfolio decision. A priori, one might expect that such individuals allocate additional wealth to non-income generating assets so as to maintain access to the AP. In turn, this specification should highlight whether the stylised patterns of behaviour of individuals is such that assets are allocated in a way that is influenced by the AP.

As expected, the regression results suggest that asset allocation is related to households' current income levels. A comparison of households that are equally wealthy indicates that households with higher income hold significantly more income in superannuation and less income in the

principal dwelling or business assets. The results also highlight differences in the way that households allocate an additional dollar of wealth across their various asset holdings. We find that for couples, each additional dollar of wealth is associated with an increase in superannuation wealth holdings and lower housing wealth holdings. For singles, additional income is associated with increases in business and superannuation wealth holdings and decreases in holdings of financial and housing wealth.

**Table 4: Determinants of asset portfolios: couples pooled sample 2002–14**

	Financial wealth	Home	Super	Lifestyle asset	Business
Household income	-0.224 (0.121)	-0.106 (0.055)	0.461 (0.134)	0.0178 (0.031)	-0.149 (0.083)
(+/- 10% income cut-off)	-0.199 (0.301)	-0.026 (0.127)	0.958 (0.619)	0.165 (0.123)	-0.899 (0.516)
Net wealth	0.441 (0.083)	0.161 (0.096)	0.186 (0.042)	0.164 (0.045)	0.049 (0.033)
Household head age	-0.482 (0.457)	0.140 (0.286)	0.276 (0.378)	-0.007 (0.209)	0.0729 (0.351)
(Household head age) <sup>2</sup>	0.005 (0.003)	-0.001 (0.002)	-0.003 (0.003)	-0.000 (0.002)	-0.001 (0.003)
Head is eligible for AP	-0.518 (0.355)	-0.0287 (0.179)	0.206 (0.292)	0.139 (0.155)	0.201 (0.286)
Partner age	-0.232 (0.105)	-0.120 (0.06)	0.299 (0.086)	0.0849 (0.058)	-0.0305 (0.067)
(Partner age) <sup>2</sup>	0.003 (0.001)	0.001 (0.000)	-0.003 (0.001)	-0.001 (0.000)	0.000 (0.001)
Partner is eligible for AP	0.397 (0.280)	-0.189 (0.126)	-0.150 (0.271)	-0.060 (0.166)	0.002 (0.232)
<i>Household head</i>					
University graduate	-0.236 (0.304)	0.0265 (0.143)	0.517 (0.235)	0.135 (0.126)	-0.442 (0.233)
Has diploma	-0.083 (0.233)	0.0351 (0.117)	0.489 (0.190)	-0.250 (0.112)	-0.191 (0.179)
High school graduate	-0.004 (0.387)	-0.162 (0.232)	0.553 (0.251)	-0.161 (0.171)	-0.226 (0.256)
<i>Partner</i>					
University graduate	0.061 (0.274)	-0.227 (0.173)	0.387 (0.208)	0.263 (0.134)	-0.484 (0.213)
Has diploma	0.085 (0.220)	-0.072 (0.109)	0.0543 (0.177)	0.221 (0.107)	-0.288 (0.170)

	Financial wealth	Home	Super	Lifestyle asset	Business
High school graduate	0.562 (0.328)	-0.0462 (0.188)	-0.040 (0.245)	0.319 (0.153)	-0.795 (0.230)
Head is female	-0.476 (0.254)	0.154 (0.111)	0.243 (0.171)	-0.0707 (0.0940)	0.150 (0.187)
Outright home owner	-4.253 (0.467)	10.66 (0.363)	-1.785 (0.269)	-1.194 (0.209)	-3.429 (0.291)
Mortgage holder	-6.083 (0.516)	10.34 (0.389)	-1.469 (0.282)	-0.728 (0.208)	-2.058 (0.305)
Head is retired	0.724 (0.321)	0.340 (0.155)	0.309 (0.227)	0.0421 (0.148)	-1.415 (0.231)
Partner is retired	0.814 (0.320)	0.294 (0.126)	-0.210 (0.249)	-0.101 (0.159)	-0.797 (0.271)
Both head & partner retired	0.127 (0.405)	-0.032 (0.172)	-0.672 (0.345)	0.199 (0.199)	0.378 (0.285)
Household head has poor health	0.113 (0.244)	0.228 (0.088)	-0.574 (0.190)	0.115 (0.113)	0.119 (0.164)
Partner has poor health	0.262 (0.209)	0.255 (0.106)	-0.589 (0.186)	-0.001 (0.120)	0.073 (0.161)
LGA unemployment	-0.030 (0.046)	-0.007 (0.021)	-0.018 (0.038)	-0.005 (0.032)	0.060 (0.040)
LGA average income (\$000,000s)	-0.303 (1.823)	-1.781 (0.924)	6.165 (1.489)	-1.322 (1.043)	-2.760 (1.366)
LGA average house prices (\$000,000s)	-0.050 (0.078)	0.153 (0.035)	-0.055 (0.060)	0.005 (0.040)	-0.054 (0.060)
Number of observations	2944	2944	2944	2944	2944
R <sup>2</sup>	0.09	0.72	0.31	0.07	0.003

Notes: 1. Estimates are from equation (1). We require that estimated marginal effect of an additional dollar of log wealth sums to 1 across asset types, while the marginal effect of a change in any other dependent variable is restricted to sum to 0. Regression includes year and state fixed effects, as well as indicators for movers, and marital status changes. Bootstrapped standard errors are reported in parentheses. 2. LGA = local government areas.

Source: author's own calculations from HILDA waves 2, 6, 10 and 14.

**Table 5: Determinants of asset portfolios: singles pooled sample 2002–14**

	Financial wealth	Home	Super	Lifestyle asset	Business
Household Income	-0.279 (0.192)	-0.078 (0.070)	0.477 (0.191)	0.104 (0.068)	-0.225 (0.068)
(+/- 10% income cut-off)	-0.558 (0.423)	-0.185 (0.157)	1.309 (0.310)	-0.329 (0.245)	-0.238 (0.235)
Net wealth	0.610 (0.041)	0.0100 (0.033)	0.184 (0.023)	0.169 (0.028)	0.0270 (0.019)
Household head age	-1.119 (0.565)	0.103 (0.246)	1.487 (0.413)	-0.226 (0.341)	-0.246 (0.309)
(Household head age) <sup>2</sup>	0.010 (0.004)	-0.001 (0.00185)	-0.013 (0.00322)	0.002 (0.00264)	0.002 (0.00236)
Head is eligible for AP	-0.057 (0.486)	0.040 (0.148)	-0.262 (0.379)	0.036 (0.318)	0.242 (0.238)
<i>Household head</i>					
University graduate	-0.172 (0.350)	-0.258 (0.131)	1.020 (0.285)	0.113 (0.208)	-0.703 (0.190)
Has diploma	-0.105 (0.299)	-0.0450 (0.100)	0.638 (0.216)	-0.168 (0.180)	-0.320 (0.150)
High school graduate	-0.719 (0.443)	0.060 (0.155)	1.225 (0.314)	-0.471 (0.287)	-0.096 (0.283)
Head is female	-0.521 (0.251)	0.426 (0.104)	0.106 (0.210)	0.215 (0.157)	-0.227 (0.164)
Outright home owner	-4.241 (0.426)	10.94 (0.252)	-2.642 (0.280)	-1.400 (0.250)	-2.655 (0.184)
Mortgage holder	-5.206 (0.555)	10.65 (0.346)	-2.123 (0.363)	-0.955 (0.270)	-2.363 (0.252)
Head is retired	2.277 (0.309)	0.233 (0.105)	-1.510 (0.257)	-0.213 (0.194)	-0.787 (0.184)
Household head has poor health	-0.230 (0.305)	0.347 (0.111)	-0.601 (0.239)	0.0779 (0.174)	0.406 (0.128)
LGA unemployment	0.078 (0.0685)	0.0348 (0.0203)	-0.103 (0.0552)	0.0486 (0.0424)	-0.058 (0.0363)
LGA average income (\$000,000s)	3.981 (2.123)	-0.390 (0.854)	1.932 (1.642)	-5.613 (1.440)	0.0913 (1.118)
LGA house prices (\$000,000s)	0.014 (0.086)	0.057 (0.044)	-0.043 (0.067)	0.038 (0.058)	-0.065 (0.055)

	Financial wealth	Home	Super	Lifestyle asset	Business
Number of observations	1745	1745	1745	1745	1745
R <sup>2</sup>	0.15	0.91	0.25	0.05	0.00

Notes: 1. Estimates are from equation (1). We require that estimated marginal effect of an additional dollar of log wealth sums to 1 across asset types, while the marginal effect of a change in any other dependent variable is restricted to sum to 0. Regression includes year and state fixed effects, as well as indicators for individuals who report moving and marital status changes. Bootstrapped standard errors are reported in parentheses. 2. LGA = local government areas.

Source: author's own calculations from HILDA waves 2, 6, 10 and 14.

As noted, the key interest in the present paper is how the rules associated with AP eligibility may impact on portfolio choice or the allocation of wealth across various asset classes. The statistical analysis does not suggest that households with incomes close to the AP eligibility threshold allocate assets in a way that is shaped by the parameters of the AP. Among couples and singles, we find that having a household income in the range of income eligibility has a positive effect on housing wealth and financial wealth, but these effects are highly insignificant in a statistical sense. This suggests that households that are close to the AP income test thresholds are not allocating assets in a way that maximises eligibility for and entitlement to the AP.

It is important to note that income eligibility for the AP is likely to be highly endogenous to the asset allocation decision, so that a household's asset allocation choice and therefore their income may also have an effect on their AP eligibility. This endogeneity might be reflected in a positive association between housing wealth and the income threshold faced by the household. That is, households are strategically allocating their assets to receive government support.

The empirical specification also considers how being 'age eligible' for the AP is associated with the asset allocation decision. For couples and singles, we observe that when the head of the household is AP eligible based on his or her age, additional wealth is allocated to lifestyle assets, including the holiday home and vehicles, but the effect is not statistically significant. Further, the coefficient capturing whether the partner is AP age eligible is positively associated with the allocation of additional funds to financial assets and slightly less funds to superannuation. However, again these effects are not statistically significant. For singles, the statistical analysis reveals no significant relationship between AP age eligibility and the allocation of wealth across different asset classes. Together, these results suggest that attaining the age when eligibility for the AP is met does not have a relationship with portfolio allocation.

Taken together, these results are consistent with the findings of Cobb-Clark and Hildebrand (2011). The analysis in this report uses additional waves of data and, most importantly, covers a period when macro-economic conditions associated with the GFC impacted on the asset portfolios of Australians over a prolonged period. Overall, the analysis provides little support for the view that households are strategically reallocating their portfolios in order to maximise their eligibility for the Australian AP. In particular, we did not observe an increase in holdings of assets in owner-occupied housing in a way designed to maximise eligibility for the AP. Among singles who have incomes that would qualify them for the AP, the analysis suggests they allocate their wealth across assets in the same way as singles who are not eligible as a result of their income. Further, for singles there is no relationship between individuals having reached pension age and their asset portfolio choices. Similarly, there is no evidence that if the household head in a couple has reached AP age that this is related to the asset holdings of those households. Overall, the analysis suggests that there is little evidence that the means test underlying the Australian AP, at least in the income dimension, is leading healthy households or couples to reallocate assets in a way that maximises AP entitlements.

It is important to note two important limitations of the empirical analyses presented above. First, recall that effectively the analysis examines the impact of eligibility rules on *portfolio allocation*, while holding the wealth levels constant. The empirical methodology does not address changes in saving levels. In addition, the results rely on the assumption that thresholds are not endogenous to portfolio allocation—this is a reasonable assumption for the age thresholds but unlikely for income thresholds. Further, the empirical model does not capture long-term planning effects. The life-cycle model emphasises that decisions around saving, retirement and consumption during retirement are shaped over a long planning horizon. For example, households in the sample may have started planning portfolio allocations in their 30s or 40s. At the time of retirement, the means tests may not have a large impact on observed outcomes.

## 2.6 Changes to the Age Pension taper rate: empirical specification

The analysis presented in section 2.5 provides only limited insights into the behavioural responses associated with the incentives embedded in the rules around eligibility for the AP. Understanding the likely implications of changes to the AP system requires a somewhat more nuanced approach. In this section we consider exogenous changes in the Australian AP system, which allow us to examine the impact of changes in the means test taper rates across similar households. Announced in 2006, changes to the taper rates were implemented in 2007 and effectively relaxed the rules regarding AP eligibility, so that some individuals who previously did not receive a pension would do so in the future. Others, who already received a part pension under the previous assets means test, received a higher pension after the changes were introduced.<sup>18</sup>

The analysis in this section builds on the discussion set out in section 2.5. The empirical analysis identified only a weak association between the asset holdings of individuals/ households and the rules that define eligibility for the AP. While informative, these results must be interpreted cautiously as they reflect correlations rather than causal relationships. A more informative insight is provided by understanding how behaviour is affected in response to changes in the parameters of the AP. Identifying this causal relationship in the social sciences is challenging because in general it is not possible to undertake an experiment with appropriate treatment and control groups. Ideally, one group (the treated group) would be exposed to a different set of rules than the control group is exposed to. Assuming that the individuals are randomly assigned to the treatment and control groups, the difference in the behaviours and outcomes exhibited by the two groups could be attributed to the variation in rules experienced by the treatment group. In general, such experiments are not feasible and it is necessary to identify situations that give rise to natural experiments that generate similar types of situations. The 2007 changes to the AP taper rate provide such an opportunity through what is often referred to as a ‘natural experiment’.

Recall that the rule change in 2007 reduced the taper rate applied to the AP from \$3.00 per \$1,000 of assets above the lower threshold, to \$1.50 per \$1,000 of assets. This change had a number of effects, as described in section 1.3 and Appendix 1. In particular, individuals who previously received a reduced rate of the AP as a result of the assets test, in future received a higher pension payment. In effect, the implicit wealth tax on holdings of non-exempt assets was reduced, increasing their AP entitlements and lifetime wealth, *ceteris paribus*. Further, the reduction in the taper rate meant that a group of individuals who were previously ineligible for the AP, because their assets were too high, found themselves newly entitled to at least a part AP.

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<sup>18</sup> Note that the changes to the asset taper rate implemented in 2007 have recently been reversed. The analysis in this report is hence timely and provides insights into the appropriate design of the tax and transfer system in the future.



For analysis purposes, the change in the AP taper rate represents an ideal natural experiment for a number of reasons. First, there is no evidence to suggest that the change was anticipated and therefore altered behaviour prior to the announcement of the change. Given the substantial lead times associated with retirement planning, it is unlikely that individuals or households altered their savings behaviour in anticipation of the change. In addition, natural experiments ideally work off policy changes or some other change that is not induced by the behaviour of those affected. That is, it is exogenous to the behaviour that it is likely to influence. Again, there is no evidence that the change in the AP taper rate was in response to particular patterns of behaviour by the groups affected by the policy change.

A natural experiment will ideally provide treatment and control groups for whom behaviour and the outcomes exhibited can be readily compared. The treatment group in this case is effectively that set of individuals who can now accumulate additional savings and still access the AP. Among this group, some individuals will receive a higher rate of AP than they did in the absence of the reform, while others who previously did not receive the AP will now do so. Identifying the control group is somewhat more challenging. Ideally, it will consist of a set of individuals who are unaffected by the change in policy. In the case of the AP reform, the individuals who were ineligible to collect the AP prior to and also following the reform constitute such a group. For those individuals, there is no reason to believe that their behaviour would have been affected by the change in policy, and as such they represent a natural control group against which the behaviour of the treatment group can be assessed.

A challenge associated with the evaluation of AP reform is that, in essence, treatment and control groups are defined by income and asset levels. This is especially problematic when the outcome variables of interest—such as the level of saving or the allocation of wealth across the portfolio—are a function of those same variables. This is an important consideration in the interpretation of the results from the analysis and we discuss the consequences of this at the end of the chapter. Nonetheless, given data limitations imposed by HILDA and the nature of the policy changes, we believe that the approach is likely to be as informative as alternative methods. In particular, the evaluation method in the analysis we undertake is a difference-in-difference (DiD) approach. In essence, the statistical model seeks to measure the difference in behaviour of the treatment and control groups following the policy change, and compare that to pre-change behaviour. We believe that such an approach is likely to be as effective as alternative methods such as propensity score matching. However, if suitable data (such as comprehensive administrative records) were available, other program evaluation methods, such as regression discontinuity methods, may better identify the behavioural impact of the policy change.

The key empirical question is how variation in the taper rate of the AP assets means test affects savings behaviour. While a more formal model is presented in Appendix 1, below we set out in intuitive terms how behaviour among the treated group may have changed. A stylised approach assumes that individuals experience two distinct life-cycle periods. In the first period they are assumed to work and save, while in the second period they are assumed to be retired and to consume any savings accumulated during period 1 (alternatively termed the ‘current period’). During the latter period they also consume any transfers received from the government, such as the AP. The key question then is: how is period 1 saving or asset accumulation affected by a reduction in the AP taper rate?

To understand how behaviour may be affected, it is possible to consider potential responses among the treatment group. For those households who were entitled to a full AP prior to the relaxation of the assets test, we would expect no change in behaviour. For those who previously received a part pension and were therefore impacted by the change in the taper rate, the policy change will have two effects. First, the reduction in the taper rate reduces the implicit tax imposed on accumulated wealth and makes saving relatively more attractive from a life-cycle perspective. A simple way to characterise the reduction in the taper rate is that it increases the after-tax return

to saving. Intuitively, such a change is likely to encourage greater saving and accumulation of assets among this group. This effect is commonly referred to as the ‘substitution effect’, as the lower tax on accumulated wealth encourages the individual to substitute future consumption in lieu of current consumption. This effectively arises because the implicit penalty or tax imposed by the assets test on deferred consumption through saving is reduced.

At the same time, by increasing the value of the AP received, this group will have higher real lifetime wealth. This will tend to reduce saving during the individual’s working life, and therefore the accumulation of savings or assets, because with higher pension wealth post retirement greater consumption is possible both during the individual’s working life and in retirement. That is, there will be less need for an individual to defer consumption and save. This effect is commonly referred to as the ‘income effect’, as greater lifetime ‘wealth’ or ‘income’ provides an opportunity to increase consumption in the current period and future periods. Increased consumption in the current period is achieved by reducing saving. Hence, for this group the net effect of the reduction in the taper rate will be ambiguous in terms of total savings.

The final sub-group to consider is the set of individuals who previously did not receive any pension because their assets exceeded the upper threshold. Among this group, individuals will experience a positive income effect that encourages increased consumption in period 1, and therefore lower accumulation of assets through reduced saving. At the same time they will experience a substitution effect that encourages greater saving, as the implicit tax imposed on deferred consumption (saving) is now lower.

Among the groups that are newly eligible for pension or receiving a greater amount of AP benefits, the effect of the reduction on the taper rate will be ambiguous, with the positive substitution effect on savings offset by the negative income effect. Intuitively, it might be expected that the income effect becomes more important as wealth increases. Ultimately, however, the impact of the changes to the AP taper rate on savings is an empirical question.

In the empirical analysis we restrict the sample to households whose heads are currently working and aged between 50 and 75 years old. The treatment group consists of all households which before the policy change held assets below the upper threshold level. Our control group consists of the households which are ineligible for the AP both before and after the change in the taper rate—that is, households which held assets greater than the old and new upper thresholds, both before and after the change. For this group, the taper rate change does not provide any incentive to alter savings behaviour or change portfolio allocation.

The baseline DiD model assesses the impacts of the relaxation of the assets test taper rate using specification (2) set out below. It is important to emphasise that similar specifications have been used by Cho and Sane (2014) and Dynan (2016).

$$Saving_{i,t} = \alpha_1 + \alpha_2 X_{i,t} + \beta_{1,t} Period_t + \beta_2 Treatment_i + \beta_{3,t} Period_t * Treatment_i + u_{i,t} \quad (2)$$

In specification (2),  $Saving_{i,t}$  denotes the savings of household  $i$  across period  $t$  measured as the change in the stock of net wealth; and  $X_{i,t}$  denotes a vector of household characteristics such as demographic measures, income, home ownership status and other variables which may affect wealth accumulation.  $Treatment_i$  is an indicator variable which takes the value 1 if the household is in the treatment group and 0 otherwise. Recall that the treatment group is the set of households that became newly eligible for the AP or received a higher level of AP following the reduction of the taper rate.

The model is estimated using HILDA data from the wealth modules available for 2002, 2006, 2010 and 2014. Using these data, it is possible to measure saving in three inter-‘wealth module’ periods, namely 2002 to 2006; 2006 to 2010; and 2010 to 2014. As noted, saving is identified as the change in net reported wealth for each of the asset classes considered in section 2.5. In specification (2),  $Period_t$  is an indicator variable for each of these periods.

The policy impact of the change in the taper rate, or more precisely the DiD treatment effect, is captured by the interaction of these time dummies with the treatment group indicator. Given the policy change in 2007, the periods 2006 to 2010 and 2010 to 2014 are ‘after’ periods. Hence the coefficient on the interaction terms *‘Period<sub>2006-2010</sub> \* Treatment’* and *‘Period<sub>2010-2014</sub> \* Treatment’* capture the impact of taper rate change. The former policy impact reflects the short run or immediate impact of the policy change, whereas the latter captures longer-run impacts.

The validity of the DiD approach rests on the parallel trends assumption. This is that savings behaviour in any of the three savings periods would not differ between treatment and control groups had policy intervention not taken place. We also control for observable characteristics that may differ between control and treatment groups (the vector  $X_{i,t}$ ). Hence, any estimated differences in savings rates between treatment and control groups after the policy reform are attributed to the impacts of the reform. If the policy change leads to increased levels of savings, as suggested by economic theory, we expect the coefficients on the interaction terms to be positive and significant. Alternatively, if the income effect dominates, the interaction terms would be negative.

In addition to level of savings, households may also respond to the change in the policy environment by changing the manner in which savings are allocated across the portfolio. For example, the change in the asset taper rate implied that treated households could now direct more wealth to assets (other than the owner-occupied home) than was previously the case, and still maintain eligibility for the AP. Hence, treated households may adjust their asset allocation behaviour to direct more wealth into the asset classes they could now hold higher levels of, such as investment properties and superannuation assets. To assess this possibility, we replace the dependent variable of equation (2) with a measure of net housing wealth change and use it to examine the impact of the change in taper rate on the value of housing equity held.

## **2.7 Changes to the Age Pension taper rate: data and descriptive statistics**

The set of households included in the analysis are those with a household head aged between 55 and 74 years of age, and which appear in consecutive wealth modules in the HILDA dataset. In Table 6 we present the summary statistics describing the savings and asset allocation decisions of the treatment and control groups used in the empirical analysis. A full set of summary statistics of households included in the analysis are presented in Table 10 (Appendix 1). An examination of the demographic characteristics of the treatment and control groups suggests that there are some differences across the groups in terms of their observable characteristics (see Appendix 1 for details). For example, as expected the control group contains households in which individuals have higher levels of education and income. Recall that the control group in general have higher levels of wealth, so that the reduction in the taper rate does not impact on their eligibility for the AP and they remain ineligible prior to and following the reduction of the taper rate. Overall health among the control group is also slightly better than that reported by the treatment group. Similarly, when looking at financial characteristics, average income, home ownership and investment property ownership in the control group are markedly higher relative to the treatment group. These differences are to be expected, since households are necessarily classified as ‘treatment group’ based on their level of assessable assets; we expect wealthier households, which have higher levels of educational attainment and higher income, are more likely to be placed in the control group. It is important to note that controls for the set of demographic variables in Table 10 are included in the statistical models.

Table 6 reports the changes in mean and median savings and asset allocation across control and treatment groups for each of the inter-‘wealth module’ periods. The summary statistics suggest that distinct changes in the behaviour of the treatment group relative to the control group occur

following the AP taper rate change in 2007. Between 2002 and 2006, both the treatment and control groups exhibit growth in their retirement portfolios. On average, households in the treatment group reported savings (measured as a change in net wealth) above \$100,000. Interestingly, the groups display differences in the increase in savings in the form of owner-occupied housing during this period. For the treatment group, savings over 2002–06 are almost entirely represented in the growth of home equity. For the control group, however, growth in home equity only accounts for approximately one-third of savings over the period and was outpaced by growth in other property investments and increases in superannuation assets.

**Table 6: Changes in portfolio allocation: 2002–14**

	Mean changes in selected asset categories (\$000s)					
	2002–06		2006–10		2010–14	
	Treatment	Control	Treatment	Control	Treatment	Control
Home equity	122.4	91.5	23.5	127.7	-2.5	20.4
Other property	5.1	133.8	16.1	-17.5	12.5	-85.5
Superannuation	1.5	96.7	22.0	-0.6	7.5	71.7

*Notes: all amounts are in 2015 dollars.*

Source: authors own calculations from HILDA.

Somewhat different patterns emerge in the post-GFC period. We observe that, on average, the control group witnesses declines in net worth in both the 2006 to 2010 and 2010 to 2014 periods. In contrast, the treatment group reports increases in net worth over the same periods. Note that changes in the various components of household portfolios across this period are also observed for both groups. Given owner-occupier housing is exempt from consideration in the AP assets test, of particular interest is how holdings of such assets evolve over time. In this respect, there appears to be some evidence that, following the change in the taper rate—and especially in the 2010 to 2014 period—the treatment group households shift wealth from owner-occupied housing to other portfolio assets. In the 2006 to 2010 period, the increase in home equity is similar to increases in superannuation wealth, while in the 2010 to 2014 period, home equity declines slightly on average for this group.

## 2.8 Changes to the Age Pension taper rate: results of the analysis

Results from the estimation of equation (2) are reported in Table 7. Column (1) reports a baseline DiD specification, without controls, that considers total savings. In column (2), additional controls for observable socio-economic and demographic characteristics are included in the specification. The results indicate a difference in the behaviour of treatment and control groups during our observation period. In particular, after including the additional controls in column (2), the analysis indicates that the treatment group had savings approximately \$100,000 lower than the control group, *ceteris paribus* (see coefficient for treatment dummy). The estimated coefficient on the interaction between the treatment group and time period suggests that for 2006 to 2010, following the change in the taper rate, the treated group saved approximately \$300,000 more than the control group. The results are similar in the specifications that do not include additional controls (column 1, coefficient 342,264) and when a set of observable characteristics are controlled for (column 2, coefficient 330,138). The coefficient is highly statistically significant and suggests the change in the AP assets test taper rate had a large impact on the total level of savings. Nonetheless, it is important to emphasise that the magnitude of the estimated response most

likely reflects a range of considerations. The first point to note is that the results appear to be largely driven by the significant fall in savings of the control group in the 2006 to 2010 period relative to the 2002 to 2006 period. This decrease in savings was identified in Table 6 previously. Recall that ‘savings’ is defined as the change in net wealth over the relevant inter-‘wealth module’ period. A consequence of this definition is that the measure of savings used in the analysis captures not only active savings efforts of households, but also valuation effects. That is, an increase in the valuation of wealth such as housing may cause a change in the reported wealth that is identified as savings.

**Table 7: Difference-in-difference results: Age Pension policy change**

	Total savings		Asset class		
	Baseline	With controls	Home equity	Other property	Super.
	(1)	(2)	(3)	(4)	(5)
2006–10	-382,082 (41,755)	-378,109 (40,390)	32,847 (32,745)	-16,492 (35,896)	-98,300 (128,068)
2010–14	-336,097 (48,022)	-308,686 (47,210)	-73,396 (38,800)	-216,325 (42,653)	5,133 (33,000)
Treatment Group (TG)	-192,624 (35,496)	-109,897 (36,640)	58,541 (29,652)	-55,000 (32,528)	-78,559 (25,434)
(2006–10)*TG	342,264 (47,331)	330,138 (45,792)	-132,456 (38,096)	170,136 (40,000)	115,440 (31,804)
(2010–14)*TG	242,261 (54,627)	228,742 (53,065)	-46,834 (43,534)	211,211 (47,758)	3,610 (37,343)
Controls	No	Yes	Yes	Yes	Yes
No. observations	1173	1173	1173	1173	1173
R <sup>2</sup>	0.08	0.16	0.10	0.08	0.04

Source: author’s own calculations from HILDA waves 2, 6, 10 and 14.

Given that the 2006 to 2010 period was characterised by a dramatic downturn in the macro-economic environment, associated with the GFC, it is also informative to consider the period 2010 to 2014. The result for this period is statistically significant and points to a long-run impact of the change in the AP taper rates.

It is noteworthy that the results presented in Table 7 are consistent with those reported in Hubbard, Skinner et al. (1995). In that study, it is argued that the presence of means testing of benefits can lead to lower lifetime savings due to the implicit incentive to hold wealth below defined eligibility thresholds. In turn, relaxing those thresholds leads to higher levels of household saving. Further, the results are similar—though slightly greater in magnitude—to the estimates presented in Cho and Sane (2014). The results in Dynan (2016) indicate that these results are robust when controls for the impact of the GFC and heterogeneous income shocks are included in the analysis. Dynan studies the income process of households, and using this process he controls for the potential differential impacts across treatment and control groups. He shows that although results slightly alter, the main results are robust.

Given the increase in savings of treated households suggested by the empirical analysis, it is also important to examine how the portfolio allocation across alternative asset classes might have

been affected by the AP policy change. In particular, whether treated households adjusted their portfolios in a way that they can take the advantage of the policy change. For example, was the increase in savings concentrated in exempt assets such as owner-occupied housing? The descriptive results in section 2.7 indicate that the household asset portfolio is more dispersed across the range of assets in 2010 than 2006. It is particularly noticeable that in 2002 to 2006 there is a large growth in the value of wealth held in the form of the principal residence, which is not replicated in 2006 to 2010 (Table 6).

The DiD results where the dependent variable is changed from total savings to housing wealth, other property and superannuation are presented in columns 3 to 5 of Table 7. The results in column (3) suggest that, consistent with the descriptive statistics, there is a slight decline in housing wealth over the observation period. The results also point to an increase in holdings of 'other properties' by treated households. The coefficient on the interaction term '2006–10' \* 'Treatment Group' (TG) is approximately \$170,000 in column (4) (other property assets) and \$113,000 in column (5) (superannuation assets). Hence, relative to the control group for 2006 to 2010, the results indicate that the treated group increased wealth in these asset classes compared to 2002 to 2006, *ceteris paribus*. In both cases, the estimates are statistically significant at the 1 per cent level.

By looking at column (4), we observe similar differences between treatment and control groups regarding investments in other property for 2010 to 2014. Surprisingly, the effect on superannuation that was apparent for the 2006 to 2010 period largely disappears in the 2010 to 2014 period. This suggests that the taper rate change increased the savings of the treatment group in both periods; however, after the GFC these new savings are mostly located in 'other properties'.

A final point to highlight is that these results suggest that in 2006 to 2010, treated households actually reduced the value of equity in the owner-occupied home by approximately \$135,000 compared to the control group. This may be consistent with a pattern whereby households in the treated group reallocated wealth away from owner-occupied housing. Alternatively, it might be purely a valuation effect related to the GFC, as the coefficient for the period 2010 to 2014 indicates that this effect is no longer apparent.

In summary, the DiD estimates of the effects of the policy reform associated with the change in the asset taper rate in 2007 suggest that treated households saved substantially more than those unaffected by the policy change. Furthermore, the statistical analysis indicates that households directly impacted by the change allocated wealth in ways consistent with the exemption of the owner-occupied home from the current assets test. That is, contrary to our descriptive statistics, there is some suggestive evidence that some of the households are responding to AP rules to maximise their benefits.

While the empirical analysis has identified relatively large impacts from the policy change, it is important to emphasise a number of limitations associated with the statistical or econometric model. First, the magnitude of the impacts from the policy changes identified should be interpreted with some caution. It is important to remember that savings in our data is defined as the change in net wealth of the household, and hence will include any valuation effects. This passive saving reflects inflated values of the underlying assets that contribute to the net wealth, as well as active saving efforts of the household. In the period 2008 to 2009 and also 2013 to 2014, for example, there were some significant increases in house prices in some capital city markets such as Sydney. For home owners, such changes may increase their reported net wealth purely through valuation effects.

A second constraint relates to measurement error, especially in relation to the value of home equity and other property. These values are self-reported in HILDA and because of the illiquid nature of real-estate assets, as well as changing market conditions, accurate valuations by



surveyed respondents may be prone to error. In the case of owner-occupied housing, the property may have been held for a long period of time and thus its current market value may be difficult to estimate accurately. Such measurement error would tend to attenuate the estimated impact of the policy change considered. Existing research suggests that individuals may overstate the value of their home (Melser 2013).

Finally, as mentioned in the methods section, there is a potential threat that the treatment group systematically differs from the control group. Hence, the estimates from the DiD model may be biased. A number of alternative methods are available to assess policy reforms such as the change to the AP taper rate. Cho and Sane (2014) adopt a propensity score matching (PSM) model, while Dynan (2016) incorporates heterogeneous income shocks into the model. A series of robustness checks undertaken for the current analysis confirm the results presented in Table 6. Moreover, it is important to emphasise that the reliability of these alternative methods is restricted by data availability. In particular, the HILDA dataset contains relatively few observations that could be used to support the robust analysis that would be ideal.

On a final note, a recent study by the DSS, using administrative data, has pointed to somewhat different results to those reported in this paper.<sup>19</sup> The DSS report presents an analysis of the changes in asset holdings of individuals receiving the AP over two five-year periods. The analysis considers a five-year period prior to 2007, when the taper rate was applied at the higher rate of \$3.00 per \$1,000 of assessable assets, and the five years after 2007, when the taper rate was reduced to \$1.50. The results are not fully in line with the results presented in this report nor earlier studies (Cho and Sane 2014; Dynan 2016). In particular, the DSS analysis identifies that the change in the taper rate had a very minor impact on the asset holdings of those who collected the AP. Arguably, a robust evaluation of administrative data using state-of-the-art program evaluation methods would provide insight into the impact of the AP and associated means test on savings behaviour and asset allocation.

## **2.9 What are the policy development implications of this research?**

The analysis of the AP and its relationship to the asset portfolio choices of Australian households highlights an important component of policy that requires careful consideration in any reform of the tax system. As discussed in Chapter 1, the tax and transfer system are intricately linked, especially as they relate to decisions around retirement. The rules associated with the AP assets test determine eligibility for the AP, the amount received and implicitly impose taxes that shape decisions around saving and asset allocation. The analysis in this chapter has highlighted how those rules embedded in the transfer system have the potential to impact on savings decisions, which may have important implications for the allocation of resources in the Australian economy, the fiscal sustainability of the tax and transfer system, and the attainment of outcomes that are consistent with equity objectives. In shaping decisions around saving and the allocation of wealth across various asset classes, the analysis in this chapter highlights that those rules may have an important role to play in shaping decision-making.

The analysis suggests that there is little evidence that households intentionally arrange their asset portfolio in such a way as to maximise access to and availability of the AP. This is an important observation given the view among many commentators that a meaningful reform of the tax system should involve the removal of the exemption applied to owner-occupied housing from

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<sup>19</sup> Paper is available publically on the Australian Parliament House web site as it was provided in response to a Question on Notice from Senator Murray Watt (SQ16-000422), [http://www.aph.gov.au/Parliamentary\\_Business/Senate\\_Estimates/claccte/estimates/sup1617/DSS/index](http://www.aph.gov.au/Parliamentary_Business/Senate_Estimates/claccte/estimates/sup1617/DSS/index).



the AP assets test, on both equity and efficiency grounds. At the same time, there is some evidence that the parameters of the AP assets test have important implications for the savings decisions of Australian households.

From a policy perspective, the analysis highlights how the AP and the rules defining eligibility are integral to any meaningful tax reform, both over the short term and the long term. Moreover, given the central role played by housing in terms of wealth creation and as a pillar of the retirement incomes system, tax reform that impacts on the AP is likely to have important implications for housing and its role in the retirement planning of Australian households. Discussion of how the AP and the rules defining eligibility for this program may be shaped in the broader aim of developing a pathway to sustainable tax reform are discussed further in Chapter 4.

### 3 Analysis of removal of the superannuation surcharge

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Changes to the taxation of superannuation in 2005 provide an opportunity to observe how individuals respond to a reduction in the tax rate applied to a particular form of saving. In particular, the removal of the SS meant that high-income individuals experienced a decrease in the tax applied to savings devoted to superannuation. Existing evidence suggests that for high-wealth or high-income individuals, such a change tends to have little effect on total saving, but changes the nature of saving.

- The empirical analysis suggests that the removal of the SS led to an increase in the level of voluntary savings in this asset class by those affected.
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As noted in Chapter 1, superannuation represents an increasingly important pillar of the Australian retirement income system. Taxation of superannuation is complex and has been subject to a range of changes over time (Nielson 2010). The analysis in this chapter considers a relatively small, albeit important, change in the taxation of superannuation that occurred in 2005. In particular, we analyse changes that removed the tax surcharge imposed on contributions to superannuation for high-income earners. The focused nature of the analysis reflects the challenges, noted previously, with undertaking behavioural analysis of taxation reform. It can be difficult to identify ‘clean’ natural experiments that facilitate the analysis of behavioural response through the comparison of well-defined treatment and control groups. The changes to the SS levy in 2005 provide one such example for analysis purposes.

#### 3.1 Changes to superannuation: abolition of the superannuation surcharge

The SS was a tax impost on superannuation contributions that was selectively imposed. The surcharge itself was introduced in 1996, ostensibly as a revenue measure, and reduced the concessional treatment of superannuation contributions made by high-income earners. Recall that superannuation contributions in Australia are generally taxed at a lower or concessional rate relative to other forms of income—that is, at a rate that is lower than would be imposed if that contribution was taken as income or used in other forms of saving. Up to pre-defined limits, concessional superannuation contributions are taxed at 15 per cent.<sup>20</sup> After the pre-defined limit, the tax rate imposed is generally the individual’s marginal tax rate.

Prior to 2005, individuals with earnings above specific thresholds were charged an additional tax surcharge termed the ‘superannuation surcharge’. The SS was a tax that was imposed at a sliding rate up to a maximum of 15 per cent, meaning that the effective tax rate on superannuation contributions for high-income earners was as high as 30 per cent. In general, the lower and upper thresholds that defined the tax owing were adjusted annually.

In the May 2005 federal budget, it was announced that the SS was to be abolished effective from July 2005. This announcement followed a number changes in the preceding years, in which the surcharge was progressively reduced to 12.5 per cent from its previous maximum of 15 per cent. The effect of the 2005 change was to significantly alter the incentives for high-income individuals

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<sup>20</sup> Those limits have been subject to change over time and have generally been age dependent. In general, older individuals have been allowed to make higher levels of concessional contributions.

to save via superannuation, with the tax imposed on this form of saving relative to other forms of savings substantially reduced.

The abolition of the SS potentially provides a natural experiment through which the behavioural responses to the tax-preferred status of superannuation can be analysed. As noted previously, however, taxation of superannuation is complex, and the rules and regulations associated with superannuation have changed significantly over time. While the abolition of the SS occurred in 2005, at or around the same time other major changes to superannuation and retirement incomes policy more generally were implemented. For example, from July 2007 onwards, the end benefits from superannuation for those aged over 60 became tax free. Similarly, administrative changes made saving through superannuation simpler and arguably more attractive. For this reason, it is important that care be taken in identifying the treatment and control groups in order to isolate the behavioural impacts of the superannuation changes.

The effect of the change to the SS can be analysed in the same fashion as the changes to the AP taper rate, by drawing on the implications of a life-cycle model. A somewhat simplified and stylised model is presented in Figure 9, which captures the effect of the SS and its removal in 2005. Figure 9 depicts two budget constraints that capture the opportunities to consume over the life-cycle. Consumption can occur either in period 1 (C1) or period 2 (C2) and the budget constraints depicted show the trade-off faced by the individual if they undertake saving in period 1 to increase consumption in period 2. Importantly, in Figure 9 we abstract from other considerations, such as those around the value of the AP that may be received by the individual, and focus on savings in the form of contributions to superannuation.

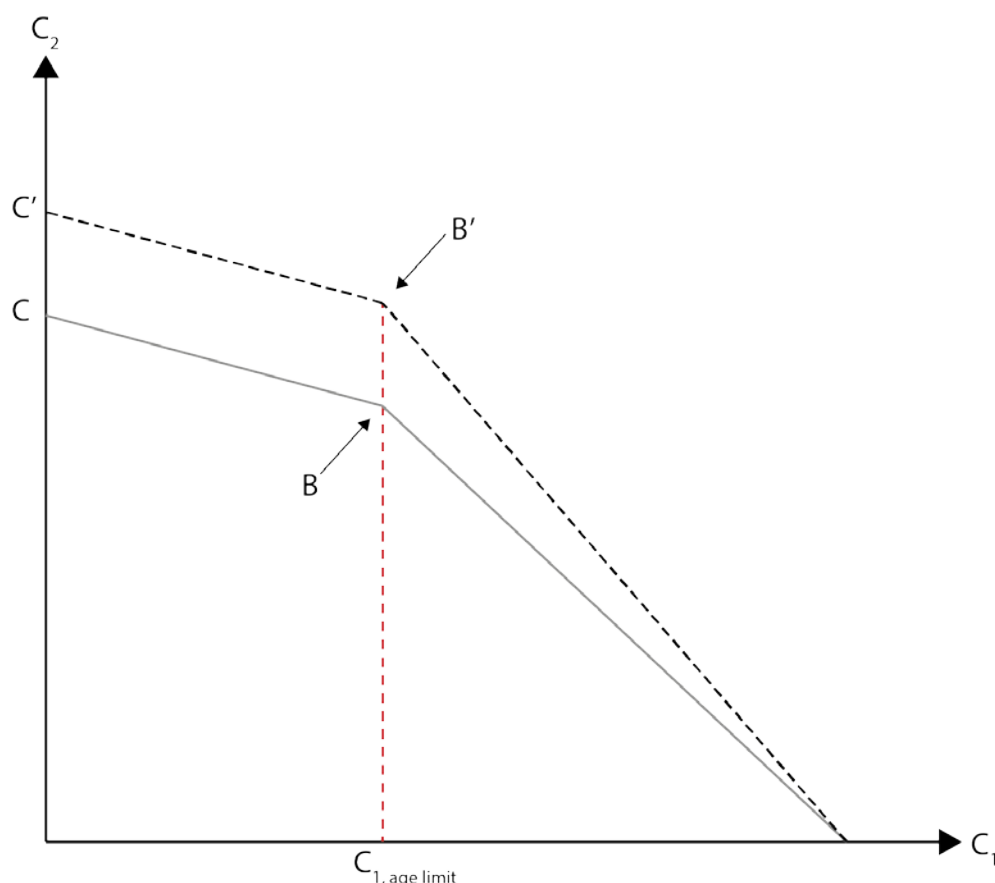
To understand the implications of the removal of the SS, it is useful to begin by considering two groups of individuals. Individuals in the first group had an income that was below the threshold at which the SS was imposed. For those individuals, the removal of the surcharge effectively had no impact, as both prior to and following the removal of the SS, the tax imposed on superannuation contributions remained unchanged. In comparison, the second group contains high-income earners, for whom the removal of the surcharge meant that superannuation became a more financially attractive savings option. To understand this, recall that maximum limits were placed on the amount of savings that could be directed to superannuation on an annual basis. After the limit had been reached, superannuation contributions were taxed at the same rate as the individual's marginal income tax rate.

The situation before and after the removal of the SS is depicted in Figure 9. The effect of the SS and the maximum contribution limit for high-income earners is depicted in the budget constraint denoted by ABC in Figure 9. This solid line represents the situation before the SS was removed. At high levels of period 1 consumption (low levels of superannuation saving), the individual faces a trade-off defined by the segment AB of the budget constraint. In effect, higher superannuation contributions reduced period 1 consumption and increased period 2 consumption. The slope of the budget constraint between A and B is determined by the contributions tax on superannuation and the SS. For high-income earners, this tax rate was 27.5 per cent. Hence, every \$1 reduction in period 1 consumption that was saved as superannuation led to an increase in period 2 consumption of \$0.725.<sup>21</sup>

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<sup>21</sup> Note that this assumes that the savings do not earn any return. In general, we would expect \$1 of savings in period 1 would lead to a more than \$1 increase in period 2 consumption.

**Figure 9: Removal of the superannuation surcharge**



Notes:  $C_1$  = period 1 consumption,  $C_2$  = period 2 consumption. Consumption represents contributions to superannuation only.

Source: authors' calculations.

At point B it is assumed that the individual reaches their maximum contribution limit. At this point, any additional savings contributed to superannuation incur a higher tax rate (equal to the individual's marginal income tax rate). In 2005, this higher tax rate was approximately 46 per cent: hence, a \$1 decrease in period 1 consumption (and a corresponding increase in superannuation savings) led to an increase in period 2 consumption of \$0.54. Thus, between B and C the budget constraint is flatter, reflecting the higher tax rate imposed on superannuation savings after the maximum contribution is reached.

Now consider the effect of the removal of the SS. The situation following the removal of the SS is depicted using the dotted line in Figure 9. For high-income earners such as those depicted in Figure 9, contributions to superannuation up to the age limit (i.e. 60 years) are now taxed at the concessional flat rate of 15 per cent. Hence, reductions in consumption (i.e. increased superannuation savings) in period 1 between zero and the maximum level allowed annually lead to higher period 2 consumption, compared to when the SS was in place. A \$1 decrease in period 1 consumption leads to an increase in period 2 consumption of \$0.85. This change is captured by the increase in the slope of the budget constraint between A and  $C_{1, \text{age limit}}$ . After the maximum super contribution has been made, the slope of the budget constraint reflects the impact of the individual's marginal rate of taxation, so the segment B'C' has the same slope as the segment BC on the original budget constraint.

For our purposes, the key question is: what is the effect of the removal of the SS? A comprehensive discussion is presented in the appendices, but it is clear that the effect on total

savings will be ambiguous for many individuals facing the budget constraint depicted in Figure 9. This reflects the impact of offsetting income and substitution effects following the abolition of the SS. In effect, period 2 consumption will have become cheaper because the SS has been abolished, encouraging greater period 2 consumption and therefore increased saving in period 1. However, the increase in saving will be offset by the income effect that encourages higher period 1 consumption. The net effect then will be ambiguous and will ultimately be identified vis-a-vis the empirical analysis. What is clear, however, is that the abolition of the SS for high-income individuals meant that superannuation became a relatively more attractive savings vehicle, and in general we would expect the level of superannuation savings to increase for this group.

The empirical specification aims to capture the causal impact of the removal of the SS on superannuation contributions. The empirical framework here is similar to the one used in section 2.5 and by Dynan (2016). We again utilise a DiD methodology and in particular we define the treatment and control groups based on the pre-tax annual income levels. Individuals whose earnings are above the prescribed *low-income threshold* (\$90,527 in 2002 dollars) are affected by the policy changes. Prior to the change, the rate of surcharge increased from 0 per cent at the lower income amount to 12.5 per cent at the higher income threshold (\$109,924 in 2002 dollars). Therefore, the abolishment of the surcharge has differential effects for individuals above the low-income threshold and under the *high-income threshold*. In order to ease the interpretation of the results, we focus on individuals who are fully impacted by the reform. That is, those individuals whose pre-tax incomes are above the high-income threshold. The treatment group consists of individuals whose gross income was always above the 'higher income amount' between 2002 and 2005. The control group is defined in a similar fashion. It contains individuals whose reported pre-tax earnings before the policy change are lower than the low-income threshold. This group of individuals are not affected by the reform and hence we do not expect a change in their savings or asset allocations to be induced by the removal of the SS.

To undertake the analysis, it is necessary to identify how superannuation contributions changed over time. In the HILDA wealth modules, respondents are asked to report their percentage of before-tax salary contribution to superannuation by their employer. This includes any compulsory employer component, in addition to any salary sacrifice component. Since the minimum employer contribution remained stable for almost the entire analysis period, with only a 0.25 per cent rise in 2014, any changes in an individual's percentage of before-tax salary contributed by the employer should capture, at least in part, changes in the voluntary salary sacrifice component. This question is asked only in wealth modules, producing four waves over which behaviour can be measured. Our empirical model addresses this question and utilises a DiD strategy similar to the approach used in the analysis of the AP means test change. In particular, a model of the following form is estimated:

$$Contribution_{i,t} = \alpha_1 + \alpha_2 X_{i,t} + \beta_{1,t} Period_t + \beta_2 Treatment_i + \beta_{3,t} Period_t * Treatment_i + u_{i,t} \quad (3)$$

In this specification, 2002 is the base period and  $Period_t$  is a series of indicator variables capturing whether the year is 2006, 2010 or 2014. The treatment indicator variable captures whether the individual is affected by the abolition of the SS. The policy treatment effect is measured by  $\beta_2$ , the interaction term between period and the treatment group. Following the abolition of the SS, the treatment and control groups effectively faced the same flat rate of 15 per cent tax on before-tax super contributions. Therefore, we might expect that, conditional on observable characteristics, we should observe no statistically significant difference between treatment and control groups after the policy reform. Prior to the reform though, since treated individuals faced a higher effective tax rate on contributions, we might expect that, conditional on individual characteristics, the treated group would contribute a smaller percentage of their before-tax salary compared to the control group. That is, we expect the policy change should increase the level of contributions to superannuation for the treated group.

### 3.2 Changes to superannuation: data, descriptive statistics and results of the regression analysis

Our analysis uses the HILDA dataset described earlier. In Table 8 we provide a brief descriptive analysis of changes in the percentage of before-tax salary contributed to superannuation across treatment and control groups. The results are consistent with a priori expectations and point to a large increase in 2006 among treated households following the abolition of the SS. In 2002, the average level of contribution stood at 9.7 per cent among treated individuals. In 2006, following the abolition of the SS in 2005, the average contribution increases to 11.7 per cent. During the same period, we also see a small increase in the before-tax or concessional contributions of the control group. In 2010 and 2014, we observe some changes in the contributions of the treated group: falling before rising again in the final year of data. For the control group, contributions also tend to increase but at a lower rate compared to the treatment group. This pattern is consistent with the predicted effect of the abolition of the SS—that is, creating an incentive for treated households to increase their superannuation contributions.

**Table 8: Percentage of before-tax salary contributed to superannuation: 2002–14**

Year	Treatment group		Control group	
	Mean (%)	Standard dev.	Mean (%)	Standard dev.
2002	9.7	2.1	8.9	1.9
2006	11.7	6.3	9.3	2.0
2010	10.8	3.1	9.3	1.8
2014	12.2	3.8	10.3	3.7

*Notes: the first year after which the SS was abolished was 2006.*

Source: author's own calculations from HILDA waves 2, 6, 10 and 14.

The results of the DiD model described in equation (3) are reported in Table 9. The model contains individual controls including, age, educational attainment, individual and household income, and health status.<sup>22</sup> The results indicate that, after controlling the time and individual characteristics, there is no statistically significant difference between the control and treatment group's average superannuation contribution, *ceteris paribus* (a coefficient of 0.34 and statistically insignificant). Nonetheless, we observe a positive time effect. In particular, the results indicate that, on average, superannuation contributions in 2010 and 2014 are significantly higher compared to 2002.

The DiD treatment effect coefficient on 2006 is positive and statistically significant at the 5 per cent level. The results suggest that by 2006, one year after the abolition of the SS, the treatment group increased before-tax salary contributions to superannuation by approximately 1.7 percentage points relative to the control group. These results indicate some effect from the abolition of the SS as higher income earners moved to take advantage of the lower tax rate on superannuation contributions. By 2010 and 2014, though, this effect appears to have dissipated, with DiD treatment coefficients close to zero and not statistically significant. It is important to stress that other significant changes to superannuation, the macro-economic environment and pension policy occurred over this time. Hence, accurate identification of the effect of the policy change is challenging.

<sup>22</sup> Full results from the empirical specification are reported in Appendix 2.

**Table 9: Difference-in-difference results: superannuation surcharge change 2006–14**

Variable	Coefficient
2006	0.37 <sup>a</sup> (0.19)
2010	0.49 <sup>b</sup> (0.21)
2014	0.96 <sup>c</sup> (0.27)
Treatment Group (TG)	0.34 (0.40)
2006*TG	1.70 <sup>c</sup> (0.59)
2010*TG	0.23 (0.66)
2014*TG	0.40 (0.80)
Controls	Yes
R <sup>2</sup>	0.08
Number of observations	1061

Notes: <sup>c</sup> represents significant at 1%, <sup>b</sup> represents significant at 5% and <sup>a</sup> represents significant at 10%.

Source: author's own calculations from HILDA waves 2, 6, 10 and 14.

In summary, this chapter has presented empirical evidence on the effects of the abolition of the SS in 2005. The empirical model estimations suggest that, relative to unaffected individuals (those in the control group), individuals impacted by the policy change contributed approximately 1.70 percentage points more of their before-tax salary to superannuation. While we observe this impact immediately after 2005, the effect is not apparent in the long run. Since HILDA measures savings at the household level, it is not possible to measure the impact of the removal of the SS on an individual's overall savings. Ideally, future work could use data sources to measure the impact of increased tax concessions on overall lifetime savings and portfolio allocations.

### **3.3 What are the policy development implications of this research?**

Over time, superannuation has and will become an increasingly important component of the Australian retirement system. Taxation of superannuation and similar forms of mandated savings poses some unique policy challenges. Decisions around retirement are generally made with a life-cycle perspective and care needs to be taken when policy settings change, given the potential for older individuals to have made decisions on the basis of a given institutional regime. Nonetheless, in the Australian case, while there is widespread acknowledgement that superannuation should be taxed in a concessional manner relative to other forms of income, there is less consensus on how taxes should be structured. Moreover, there is concern that current taxation arrangements provide relatively large benefits to those with higher lifetime



income and wealth. Moreover, it is not clear that such concessional arrangements make a significant difference to the amount of saving engaged in, especially for high-income individuals.

The analysis in this chapter is exploratory in nature and should be viewed as indicative of how taxation around superannuation and other retirement incomes policies may influence behaviour. The lesson for policy development is that the financial incentives associated with particular forms of savings have consequences and are likely to encourage saving across particular asset classes.

## 4 Policy development options

This report considers the implications of the tax and transfer system for individual and household decision-making around retirement. It is important to note that retirement income policy in Australia has explicitly and implicitly supported home ownership as a fourth pillar of the retirement savings system (Castles 1997; Yates and Bradbury 2010). The conceptual framework adopted in this report is economic in nature and relies on the life-cycle framework. The model posits that economic agents will tend to smooth consumption over the life-cycle so as to avoid large fluctuations from period to period. Central to consumption smoothing is the need to save, so as to reallocate consumption from periods when income is high to those periods when income is low. In the Australian context, the accumulation of housing equity over the individual's working life has been an important feature of saving for retirement, supported by explicit and implicit incentives in the tax and transfer system. In turn, the focus of this report is on the savings decision and, in particular, asset portfolio decisions. In the context of the challenge of developing a pathway to sustainable tax reform, understanding how individuals respond to the incentives embedded in the tax and transfer system is vital if the aims of tax reform are to be achieved. A useful starting point for understanding the place of the research set out in this report is to consider recent studies into tax reform, in terms of the Henry Tax Review (Henry, Harmer et al. 2009) and the *Re:think* discussion paper (Australian Government 2015).

In setting out the case for reform, the Henry Tax Review identified a multitude of challenges that are likely to be faced by the Australian economy over the coming decades. One that has been discussed in this report is the ageing of the population and the increasing fiscal demands this will place on government. In this context, the tax and transfers system will play a central role in ensuring that desired outcomes are achieved. The Henry Tax Review argued that the tax and transfer system should meet its aims 'efficiently, equitably, transparently and effectively' (Henry, Harmer et al. 2009: xvii). In doing so it would support a range of outcomes, including a more efficient pattern of saving, patterns of economic activity that are fiscally sustainable, and provide fairness both in a vertical and horizontal sense. In a similar fashion, the *Re:Think* discussion paper identified the principles of fairness, efficiency and simplicity as central to a good tax system.

Both the Henry Tax Review and the *Re:Think* discussion paper devoted substantial attention to the transfer system and its interface with the tax system. Specifically, attention was focused on the AP and how it, along with housing and superannuation, shapes a range of decisions—not just at retirement, but also over the course of the life-cycle. These decisions include the level and nature of savings that individuals undertake during their working lives. One issue that has been highlighted in the discussion in Chapters 1 and 2 is the potential for the interaction between the tax and transfer systems to encourage the accumulation of wealth in housing assets over and above that which would occur if owner-occupied housing was treated in a more neutral manner or similar fashion to other assets. The analysis in this report considered the reduction in the taper rate applied to non-exempt assets in the AP means test in 2007. The recent restoration of the taper rate to a value of \$3 per \$1,000 of assessable assets serves to highlight the importance of understanding the implication of changes such as these from a policy perspective.

Similarly, the generous taxation of superannuation has arguably encouraged the use of this tax-preferred form of savings over and above that which would have occurred in the presence of a more neutral tax system. Questions around the fairness and sustainability of the current arrangements for superannuation have been brought to the fore in light of recent reforms designed to limit the amount of this asset that can be accumulated over an individual's working life. Recent changes to the taxation of superannuation have sought to provide greater fairness and equity to the system and provide a more sustainable framework for superannuation into the future (Commonwealth of Australia 2016).

The Australian retirement incomes system consists of four interconnected pillars. The three traditional pillars—namely the AP, mandatory savings in the form of superannuation and private savings—are complemented by owner-occupied housing as the fourth pillar. It is important to emphasise that Australia's welfare system provides reasonable outcomes for those who retire as outright home owners. This form of 'asset-based welfare' is not unique to Australia and it has facilitated an outcome in which AP payments are relatively low while rates of poverty among older Australians are also low (Doling and Ronald 2010; Yates and Bradbury 2010). Given the interface between the tax, transfer and superannuation systems, piecemeal changes to one pillar are likely to have important implications for behaviour relating to the other pillars, and in turn other components of the tax and transfer system. The Henry Tax Review, for example, described a comprehensive approach to the reform of the tax and transfer systems that encompassed recommendations around retirement incomes. This included detailed proposals around superannuation and the transfer system, including changes to means testing arrangements that retained, up to a maximum level, the exemption of owner-occupied housing.

The analysis in this report is necessarily modest in scope and focused in its nature. The empirical analysis has focused on a number of specific, arguably important, components of the tax and transfer system as they relate to retirement and retirement incomes. The nature of the approach taken—namely an economic one that attempts to identify the behavioural implications of changes to the tax and transfer system—means that the questions which are addressed are more limited. By exploiting policy changes and examining behavioural responses to those reforms, the analysis has the potential to provide insights into the implications of changes such as those proposed in the Henry Tax Review and, more recently, those associated with the tightening of the AP means test.

## **4.1 What are the key questions the research answers?**

The analysis in this report sought to provide insight into five questions relating to the tax and transfer system and decisions associated with retirement. Those questions are:

- How do Australian households, especially those approaching retirement age, allocate wealth across assets? That is, what do we know about the portfolio choices of Australian households?
- How have the asset allocation decisions of Australian households changed over the period 2002–14?
- How might the tax treatment of housing assets have impacted on the asset allocation decisions of Australian households over the period 2002–14?
- How might developments in retirement incomes policy, including the transfer system, have impacted on the asset allocation decisions of Australian households over the period 2002–14?
- What challenges do these relationships present for the future of the Australian tax system and its reform?

The findings from the analysis are discussed below in the context of the broad implications of the research.

### **How does the Age Pension means test shape asset portfolios around retirement?**

The life-cycle model of behaviour suggests that the AP means test and the tax preferred nature of housing and superannuation provide incentives for individuals and households to arrange their portfolios in such a way as to maximise their incomes and consumption over retirement. From a theoretical perspective, the exemption of owner-occupied housing from the AP means test

provides an incentive to hold wealth in this form, as it does not impact on eligibility for or amount of AP benefit received. One interpretation of such a rule is that the means test is not 'tenure neutral'. That is, wealth held in the form of owner-occupied housing equity is treated differently to other assessable forms of wealth and this may have implications for efficiency and equity.

Efficiency is impeded in part because owner-occupied housing is treated differently to other asset classes, thereby providing an incentive to accumulate greater levels of such assets relative to what would occur under a more neutral set of arrangements (Australian Government 2015: 66). As noted in this report, incentives for individuals to accumulate owner-occupied housing wealth are embedded in the AP means test and the tax system more generally. While this may have important implications for the efficient allocation of savings across the portfolio, it also has important equity implications. Many Australians currently eligible for the pension have significant housing assets, and over 20 per cent of AP recipients have net wealth of more than \$1 million (Daley, McGannon et al. 2013). Existing studies suggest that the increase in total savings associated with the concessional treatment of certain types of assets is small and generally confined to low-income earners. In contrast, relatively high-income earners tend to divert savings into tax-preferred vehicles (Australian Government 2015: 59). Although the AP program treats owner-occupiers differently than non-home owners, the likelihood remains that it is relatively high-wealth individuals who can take greatest advantage of the exempt status of owner-occupied housing.

It is in this context that the analysis in this report addresses how the AP means test may impact on the portfolio decisions of Australian households at or around retirement. In particular, in section 2.5 we considered whether households are more likely to hold substantial assets in owner-occupied housing when they are close to the thresholds associated with the AP income means test. The empirical analysis found little evidence that this was the case. That is, households do not appear to structure their portfolio in such a way so as to maximise access to the AP. Moreover, there is no evidence that this behaviour has changed over time. While the analysis in this report traversed the period of the GFC, the results are largely consistent with earlier analysis, which suggested that households were not tailoring their choice of assets to the AP means test.

Such a finding is important for a number of reasons. The sustainability of the AP as one of the pillars of the retirement system going forward is a key fiscal challenge for the Australian Government (Department of the Treasury 2015). Notwithstanding efforts over the past few decades to limit the cost of the AP—through measures such as the means test and increased AP eligibility ages—successive reports have identified that an increase in the fiscal cost of the AP is likely to occur over time. Recent changes have altered the level of assets that individuals may hold while maintaining access to the AP, effectively reversing the AP policy change considered in this report.<sup>23</sup> The analysis in this report suggests that in some dimensions, changes in the AP means test may not have a large impact on behaviour. Such a conclusion must, however, be considered in light of the specific nature of the analysis in this report. For example, while the focus of the analysis has been on the implications of the assets test, AP eligibility is also influenced by an income test that has not been considered as part of the analysis in this report.

It is generally accepted that tax policy should treat asset classes neutrally so as not to distort the efficient allocation of resources. In the context of the AP means test, progressive and conservative commentators have advocated the partial or complete removal of the exemption for

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<sup>23</sup> It is important to note that such changes were introduced as part of the changes to the AP assets taper rate. The increase in the taper rate, to \$3 per \$1,000 of assessable assets, was partly mitigated by an increase in the lower threshold at which the AP assets test applied. For example, the lower threshold at which the AP assets test applied was increased from \$209,000 to \$253,750 for single homeowners.

owner-occupied housing from the AP means test (Daley, McGannon et al. 2013; Taylor and Cowan 2015). Such proposals have been motivated by both efficiency and equity concerns. In the current political climate, such a proposal is unlikely to have widespread political support and the Henry Tax Review alternatively recommended limiting the owner-occupied exemption to a reasonable, albeit high, level rather than removing the exemption completely.

As a useful step towards more neutral tax settings, this report does draw attention to one important feature of the AP means test. At present, owner-occupiers are allowed to hold exempt assets in excess of \$250,000 before the assets test reduces the AP. In comparison, non-homeowners can hold in excess of \$450,000 in assets. Hence, the valuation placed on housing by the means test is approximately \$200,000. A useful step towards a better tax and transfer system would investigate the appropriate valuation placed on home ownership in the AP assets test. Indeed, following the 2014 Federal Budget, the Australian Council of Social Services (ACOSS) proposed that the lower asset threshold in the assets means test be reduced for home owning households (ACOSS 2015). At the same time, it was proposed that the taper rate be increased from \$1.50 (as it was then) to \$2.00 per \$1,000 of assessable assets. Together, these proposals would have made the AP somewhat less generous for home owning households and, in the view of ACOSS, provided incentives for households with substantial levels of wealth to draw on that to sustain living standards.

As discussed in this report, changes in the implicit valuation of housing in the AP means test will potentially have important implications for decisions around housing by altering the relative financial attractiveness of holding wealth in this form. The potential for non-home owning households to hold relatively larger levels of wealth in the form of financial assets may make a change of tenure more financially attractive. At the same time, the economic framework highlights the unintended consequences of policy changes. Indeed, for existing home owners that wish to retain the security of home ownership, downsizing and a change to more suitable housing could be facilitated by policies such as those recently proposed by the Federal government. Under those proposals, part of the proceeds from the sale of owner-occupied housing could be directed into superannuation accounts, mitigating the impact of the AP means test on the tenure decision. Provision for such a policy has been signalled in the 2017 Federal Budget (Morrison 2017).

Moreover, as noted in Chapter 1, the AP assets test acts as a tax on wealth for assets held above the lower threshold. The investigation of the data in Chapter 2 highlights that, in general, home owners retain high levels of housing equity and other forms of wealth throughout retirement. A change in the lower thresholds for home owners relative to non-homeowners will, if carefully designed, provide opportunities to raise additional revenue and enhance the vertical equity of the tax system. Any such change would, however, require careful analysis of the fiscal implications of changes to the AP means test.

### **How do changes in the tax and transfer system impact on savings behaviour?**

The second issue addressed in this report focused on two natural experiments that provided an opportunity to identify behavioural responses around the tax and transfer system. The first concerned the 2007 change in the AP assets test taper rate. This change had potentially ambiguous impacts on savings behaviour from a theoretical perspective, given that the income and substitution effects worked in opposite directions. Moreover, the analysis is particularly useful in light of recent changes in policy that effectively reversed the 2007 change. In a similar vein, the second natural experiment analysed in this report considered the reduction in the SS in 2005 that applied to high-income earners.

The empirical analysis reported in section 2.5 identified that the reduction in the AP assets taper rate led to an increase in savings among those affected by the reduction in the taper rate. This is consistent with the substitution effect outweighing the income effect. This would, in turn, suggest that recent changes to the AP taper rate may adversely impact on the savings behaviour of

Australian households. The analysis of the changes to the taxation of superannuation highlights how individuals respond to incentives embedded in the tax system. The changes that were put in place impacted on relatively high-income individuals. Existing analysis points to the role of tax concessions in the allocation of savings for high-income individuals, and the results of the empirical analysis would appear to bear this out. Reductions in the effective tax rate on superannuation contributions for high-income earners appear to lead to a significant increase in the amount of funds that are devoted to superannuation.

As discussed in Chapter 2, the taper rates in the AP means test may impose relatively high tax rates on retirees. The recent doubling of the taper rate (as of July 2017) exacerbates the disincentive effect of such taxes and, over time, may impact on the level of savings accumulated to support consumption during retirement. The analysis in this report highlights that careful consideration needs to be given to the taper rate and its impact on behaviour over time.

### **What are the implications of the analysis for developing a pathway to sustainable tax reform?**

Reform of provisions associated with the tax and transfer programs as they relate to retirement is, by its very nature, a long-term undertaking. Governments have traditionally phased in major changes that impact on retirement planning, recognising that such changes can have large cumulative impacts over the course of an individual's working life.<sup>24</sup> For any set of changes, it is important that policy is grounded on sound evidence.

The most comprehensive proposals for reform around retirement incomes policies were presented in the 2009 Henry Tax Review. The changes set out in that document were a comprehensive response to the challenges identified at the time. The impact of the GFC has meant that on the fiscal dimension, the challenge has become more acute since those proposals were identified. Nonetheless, the principles that shaped the discussion in the Henry Review reflect a set of aims that is generally acknowledged to be key to successful tax reform. These aims include considerations around efficiency, fairness and sustainability in a fiscal sense. It is also true that reforms need to be pragmatic, reflecting the political economy challenges of implementing changes. In the Australian case, housing represents an important component of the retirement incomes system and the treatment of housing assets in the tax system is constrained by political considerations. For example, the *Re:Think* discussion paper acknowledged that 'Given the central importance of the home for Australian families, there is a strong consensus that it would not be appropriate to tax either the imputed rent on owner-occupied housing or capital gains derived from it.' (Australian Government 2015: 67). This, of course, places a significant constraint on the nature and magnitude of tax reform that can be achieved and it is within this context that the analysis in the present report must shape tax reform discussions. Moreover, notwithstanding the proposals in the Henry Tax Review, the government response ruled out including owner-occupied housing in the AP means tests.

One of the challenges faced by policy-makers is the central role played by housing, and in particular owner-occupation, in the Australian psyche. It is unlikely that a consensus could be achieved for the comprehensive treatment of capital gains from owner-occupied housing in the income tax system, or the inclusion of imputed rent. Rather, it is likely that more modest and targeted reforms are likely to be achievable and sustainable over time. If appropriately designed, these will represent important steps towards a better tax system. Over time, it is likely that AP could be structured in a way that makes it more tenure neutral, by adjusting the respective thresholds for individuals or households that do and do not own property. In addition, taper rates

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<sup>24</sup> For example, the increase in the AP age for females from 60 to 65 years was phased in over a period of 20 years. The current increase in the AP eligibility age to 67 years for males and females will be phased in over a period of 9 years (from 2014 to 2023).



applied to holdings of non-exempt assets should be balanced, taking into account the potential disincentives imposed by high EMTRs and the fiscal costs of lower taper rates. In the context of superannuation, although estimates vary, it is generally acknowledged that higher-income individuals receive a disproportionately large share of the benefits associated with the superannuation tax concessions. The analysis in this report serves to highlight the need to ensure that incentives associated with the superannuation system are balanced, providing incentives for individuals to accumulate savings for retirement while targeting those who would otherwise under-provide for retirement.

## **4.2 Final remarks**

This study has examined some specific aspects of the AP and taxation arrangements around superannuation. By its nature, this report has taken a narrow perspective, examining particular aspects of the tax and transfer system that impact on decisions associated with retirement. The analysis has not considered broader policy options, such as including the value of housing above a specific limit in the means test, or merging the income and assets means test, which have been proposed elsewhere (Henry, Harmer et al. 2009). Similarly, the analysis has not considered issues such as the role of negative gearing on investment choices in the context of retirement planning, or how stamp duty may discourage downsizing among older Australians. Both of these policies have been recognised as potentially contributing to the relatively high rates of housing equity that older Australians hold in their wealth portfolio. Rather, the analysis here is designed to be illustrative and takes advantage of the natural experiments afforded by the 2005 and 2007 changes to the AP and superannuation. Moreover, the study highlights the central role that housing plays in retirement planning and the importance of the tax and transfer system.

It is important to emphasise that tax and transfer arrangements considered in this report are complex. Hence, isolating the behavioural implications of any one specific feature of the tax and transfer system is challenging. While two ‘natural experiments’ were identified for analysis purposes, it must be noted that other developments may also have impacted on behaviour over the study period. For example, increased employee choice of superannuation fund was made available in 2005, at the same time as the SS was abolished (Nielson 2010). The difficulty with isolating ‘clean’ changes in policy means that it is important to treat the results identified in this report cautiously.

Though focused on the question of retirement, the discussion has important implications for housing policy, given the role of housing as one of the pillars of the retirement income system and the recognition that changes to any one pillar will have ramifications for the remainder of the tax and transfer system. Tax reform associated with decisions that impact on retirement should be long term in nature, to allow for appropriate planning by those affected. While there are sound grounds for making significant changes to the treatment of housing in the tax and transfer system, it is unlikely that widespread support exists for some of the fundamental changes that have been mooted—such as the removal of the exemption of housing from the assets means test. Rather, reform will need to be incremental, recognising the relative value that home ownership confers and the relative light taxation of it over the life-cycle. Changes to the AP assets test that address these issues in a fiscally sustainable manner are likely to offer opportunities to enhance both the efficiency and equity of the tax system over time.



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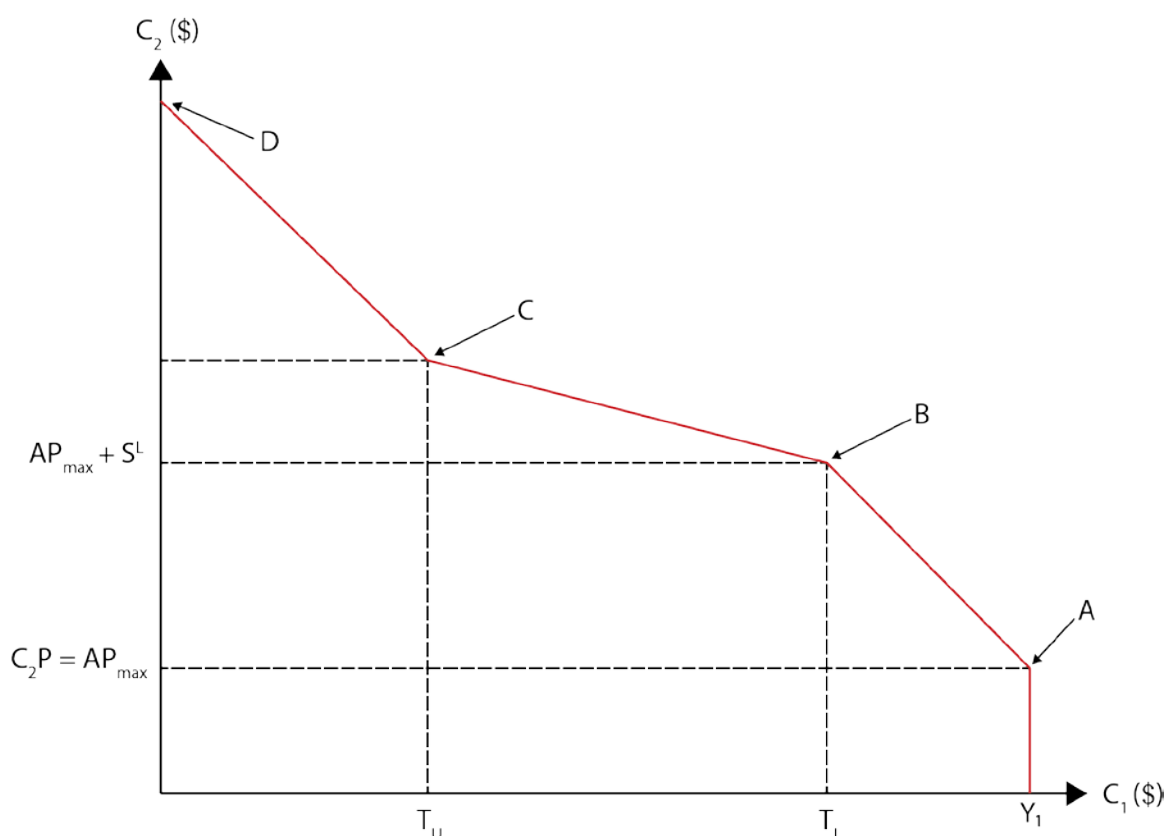
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## Appendix 1: Changes to the Age Pension taper rate in a life-cycle model

Analysis of the changes to the AP assets test and superannuation taxation can be more fully understood by drawing on a simple life-cycle model that captures the key decisions and behaviours of interest. Consider an agent who experiences two distinct life-cycle periods, termed  $t = 1$  and  $t = 2$ . Broadly speaking, the first period represents the part of the life-cycle when the individual works and accumulates savings; while retirement occurs in the second period. Consumption in period 1 is financed by labour-market earnings and in period 2 consumption is financed from accumulated savings and a means-tested pension (the AP). Any period 1 income that is not consumed adds to the individual's level of period 2 assets and this is used in conjunction with the AP to support period 2 consumption. For individuals who have sufficiently large assets (or savings) in period 2, the AP is reduced at a fixed rate. For example, a taper rate of 1 per cent implies that the AP is reduced by \$1 for every \$100 of savings. The choices available for the individual are presented in Figure A1.

**Figure A 1: The Age Pension means test in the life-cycle model**



Notes:  $C_1$  = period 1 consumption,  $C_2$  = period 2 consumption,  $Y_1$  = period 1 income,  $T_L$  = lower asset threshold,  $T_U$  = upper asset threshold.

Source: authors' calculations based on Department of Human Services (2017).

It is important to stress that Figure A1 depicts the budget set, or consumption opportunity set, faced by the individual in the presence of a means-tested pension. When period 1 consumption ( $C_1$ ) is equal to  $Y_1$  (period 1 income), the individual effectively consumes all his/her period 1 income, undertakes no saving and relies on the AP to finance period 2 consumption. Hence, period 2 consumption ( $C_2$ ) is equal to the maximum value of the Age Pension,  $AP^{\max}$ . In the



figure, this point is indicated by A. For individuals who consume of all of their period 1 income, the value of the AP and period 2 consumption is equal to  $C_2^P$ .<sup>25</sup>

For individuals who do not consume all of their period 1 income, savings will supplement the consumption that is financed by the AP. Hence, between point A and point B, lower consumption in period 1 is offset by higher period 2 consumption. It is important to note that in general the slope of the budget constraint between A and B reflects the return on savings or wealth. A decrease in period 1 consumption of \$1 generally entails a more than \$1 increase in period 2 consumption, due to the return to savings. If we ignore the return on saving then we can readily identify period 2 consumption at a point like B. At that point, period 2 consumption will be equal to the maximum value of the AP ( $AP^{\max}$ ) plus any savings from period 1. If we denote period 1 saving at a point like B as  $S^L (=Y_1 - T_L)$ , then second period consumption will be equal to  $AP^{\max} + S^L$ . Moreover, along the segment AB, a \$1 reduction in period 1 consumption leads to a \$1 increase in period 2 saving. Hence, the slope of the segment AB is -1.

An important feature of the AP in Australia is the assets means test. The impact of the AP means test is captured in the segment of the budget constraint between B and C. Recall that at some lower threshold of assets, the AP is effectively 'taxed' away as the amount of the AP that the individual is entitled to is reduced by virtue of the assets test taper rate. Assume that the lower asset threshold is indicated by  $T_L$  in Figure A1.

It is important to interpret  $T_L$  in the context of the inter-temporal life-cycle model. Assume that an individual chooses to consume an amount ( $T_L$ ) in the first period, out of a total income of  $Y_1$ . As noted above, the difference between  $Y_1$  and  $T_L$  represents period 1 saving, which in turn is equal to second period wealth or assets. At the lower threshold ( $T_L$ ), higher wealth reduces the value of the AP received in period 2. Hence, as period 1 consumption is reduced below the level  $T_L$ , period 2 wealth increases by an equal amount. However, this is offset at least in part by the amount by which the AP received in period 2 is reduced due to the means test.

Consider, for example, if every \$1 of period 2 wealth led to a \$0.20 reduction in the AP. In that case, \$1 of savings in period 1, over and above savings associated with  $T_L$ , would lead to an extra \$1 of wealth to be consumed in period 2 and a reduction of \$0.20 in the AP received. The net increase in period 2 consumption from the \$1 of increased savings is thus \$0.80 of period 2 consumption. Hence, although lower period 1 consumption leads to higher period 2 consumption, the budget constraint over the segment BC is flatter than the segment AB.

At some point, the means test reduces the AP entitlement to zero. After this point, decreases in period 1 consumption (that is, greater period 1 saving) leads to increases in period 2 consumption at the same rate as between A and B. The point at which the AP is reduced to zero in Figure A1 is indicated by C. We can characterise this as the 'upper threshold',  $T_U$ . At this point, period 2 consumption will be equal to period 1 savings, ( $Y_1 - T_U$ ), and each additional \$1 of saving will increase period 2 consumption by \$1. Hence, the slope of the budget constraint above C will be equal to 1.

The first step in understanding how changes to the taper rate affect behaviour is to identify how the reduction in the taper rate in 2007 changed the consumption opportunities for individuals. Recall that the taper rate was decreased from \$3.00 per \$1,000 of assessable assets to \$1.50 per \$1,000 of assessable assets. As a result of this change, for some individuals every dollar of saving (or lower period 1 consumption) resulted in higher period 2 consumption, as the tax rate on savings was effectively reduced. The effect of this was to increase the slope of the budget

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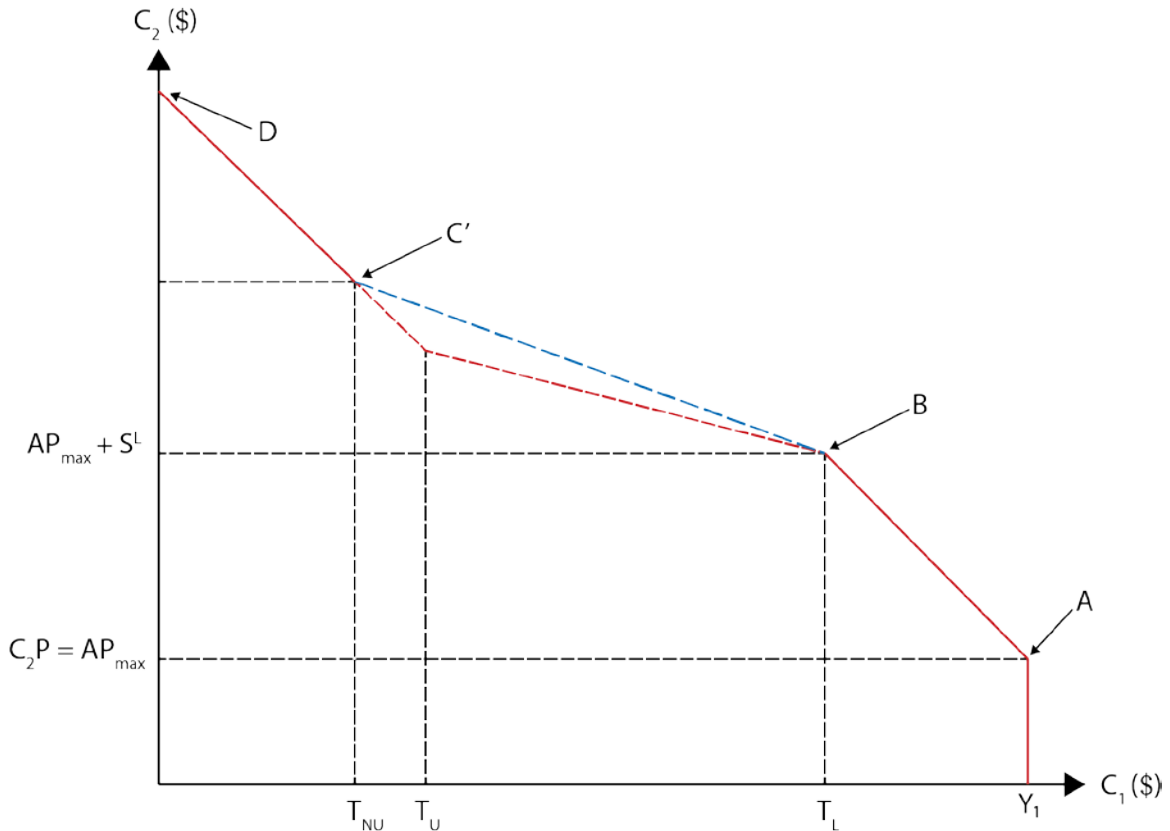
<sup>25</sup> The model assumes that the individual does not have a bequest intention and so consumes all his/her lifetime income.



constraint from point B. The new budget constraint, taking into account the reduction in the taper rate, is depicted in Figure A2.

In Figure A2, the original budget line from Figure A1 (in red and the red dotted line) is reproduced. The new budget constraint is given by the combination of the red solid line and the blue dotted line. The reduction in the taper rate had a number of implications. First, note that the diagram has been drawn under the assumption that the lower threshold is unchanged. However, with the reduced taper rate, the AP was reduced to zero at a significantly higher level of assets—which in the context of our two-period model, corresponds to greater savings (or lower levels of period 1 consumption). The new upper threshold of the assets test is indicated by  $T_{NU}$ . Moreover, at this new upper threshold, the level of period 2 consumption achieved is higher, as indicated by  $C'$ . The new budget constraint is given by  $Y_1ABC'D$  in Figure A2.

**Figure A 2: The Age Pension means test in the life-cycle model: reduced taper rate**



Notes:  $C_1$  = period 1 consumption,  $C_2$  = period 2 consumption,  $Y_1$  = period 1 income,  $T_L$  = lower asset threshold,  $T_U$  = previous upper asset threshold,  $T_{NU}$  = new upper asset threshold.

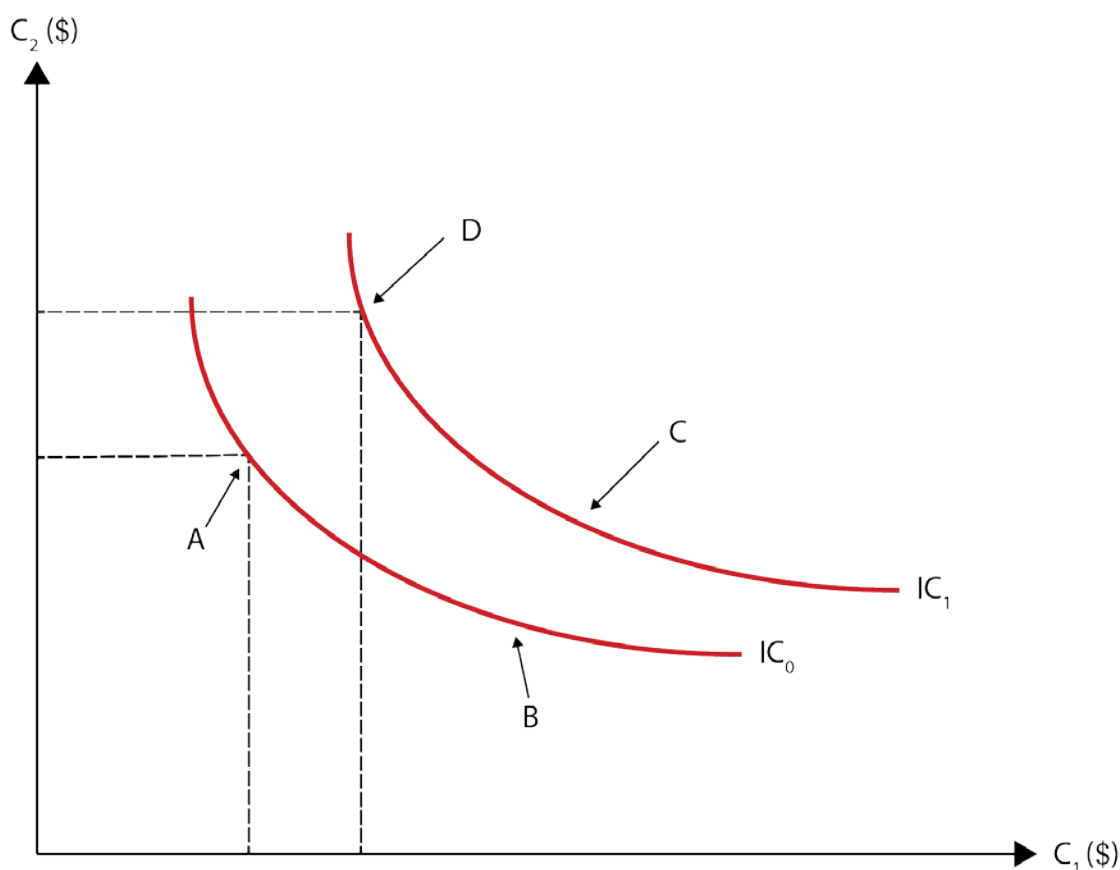
Source: authors' calculations based on Department of Human Services (2017).

There are two important implications that follow from the depiction of the change in Figure A2. First, some individuals will now receive a higher AP payment than they would have in the absence of the reduction in the taper rate. Individuals who had period 2 asset levels between the original lower and upper thresholds ( $T_U$  and  $T_L$ ) are now entitled to a higher AP payment in period 2 given their level of saving. Further, some individuals who previously did not receive a pension payment, due to having assets that exceeded the original upper threshold, are now eligible for a part pension. Those individuals have period 2 asset levels between the original and new upper threshold levels ( $T_U$  and  $T_{NU}$ ). In effect, both groups can now enjoy higher second period consumption, while maintaining the same level of first period consumption. This is reflected in the

fact that the new budget constraint  $Y_1ABC'D$  in Figure A2 lies above the original budget constraint ( $Y_1ABCD$  in Figure A1) between B and C'.

In an economic setting, the choices that individuals make are usually identified by determining the optimal choice among the feasible set. The feasible set is described above, as is its change following the reduction in the taper rate. The choices made by individuals are determined in part by their preferences, which are captured in the concept of an indifference curve. Two indifference curves for an individual ( $IC_0$  and  $IC_1$ ) are presented in Figure A3. There are two features of indifference curves that are important for the analysis in this report. First, an individual is equally satisfied or happy along all points on an indifference curve. Hence, the two points given by A and B on  $IC_0$  in Figure A3 provide equal levels of satisfaction to the individual. Second, indifference curves that are further from the origin are 'better' for the individual. Hence, a point such as C on  $IC_1$  is preferred to either A or B, as they both lie on a 'lower indifference curve'. Similarly, point D is preferred to A and B because it is also on a higher indifference curve ( $IC_1$ ). It is clear that D is a better or preferred outcome to A, because at D the individual enjoys higher consumption in both period 1 and period 2 relative to A.

**Figure A 3: Indifference curves in a life-cycle model**



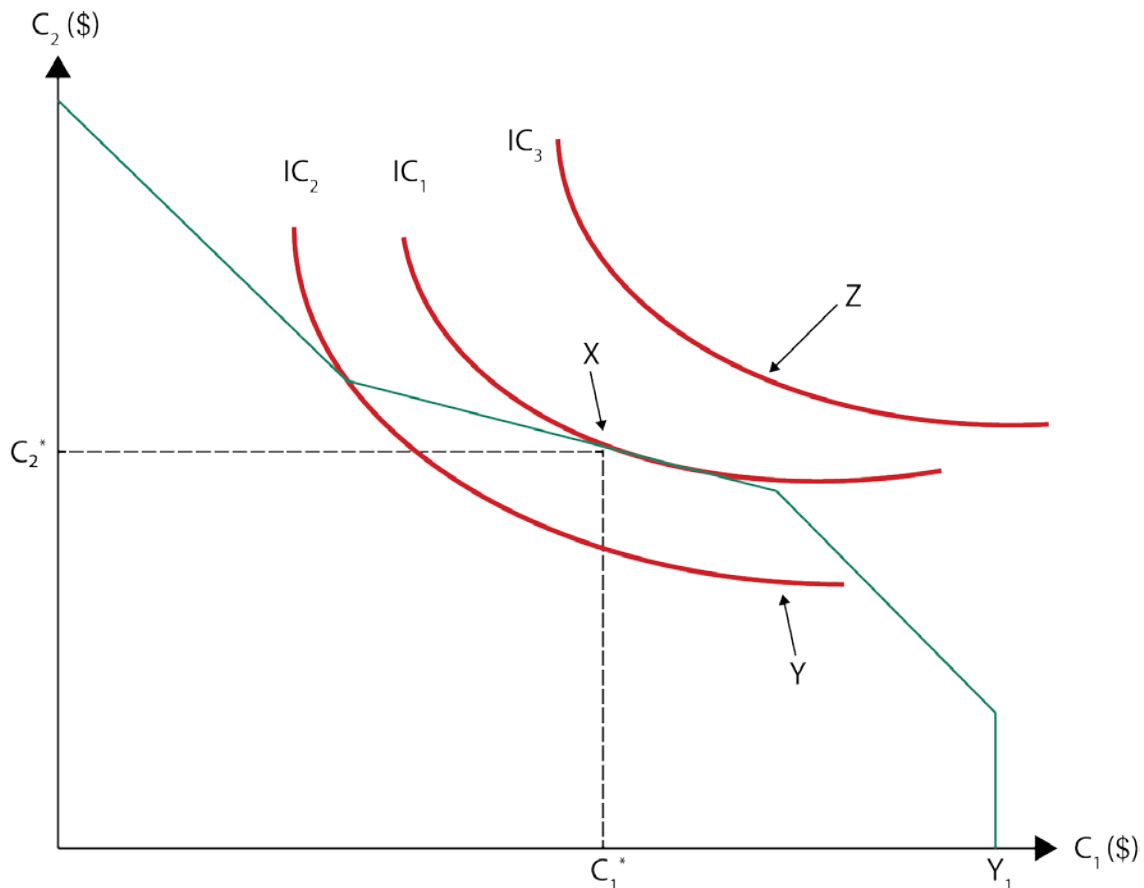
Notes:  $C_1$  = period 1 consumption,  $C_2$  = period 2 consumption, IC = indifference curve.

Source: authors' calculations.

While a robust mathematical formulation is possible, the key process by which individuals make optimal choices in this framework can be readily demonstrated using a diagram. In particular, the general principle is that individuals make a constrained optimal choice. In the context of the model described above, this means that individuals move to the highest possible indifference curve subject to the budget constraint. This is depicted in Figure A4, where the initial budget constraint presented in Figure A2 is reproduced. Given the individual's preferences (or

indifference curves), the best or optimal choices are represented by X on  $IC_1$ . Consider two alternative possibilities. The first is that the person chooses point Y on  $IC_2$ . Such a choice is clearly not optimal, as it lies on a 'lower' indifference curve to the one that X lies on. Hence, point X represents a better outcome or choice. Alternatively, consider point Z on  $IC_3$ . Such a point is 'better' than X, as it lies on a higher indifference curve. However, such a point is not feasible—or put another way, it is unattainable—as it lies outside the budget constraint. The clear implication of this graphical analysis is that the individual's choice can be characterised as the need to move to the highest possible indifference curve subject to the budget constraint.

**Figure A 4: The Age Pension means test in the life-cycle model**

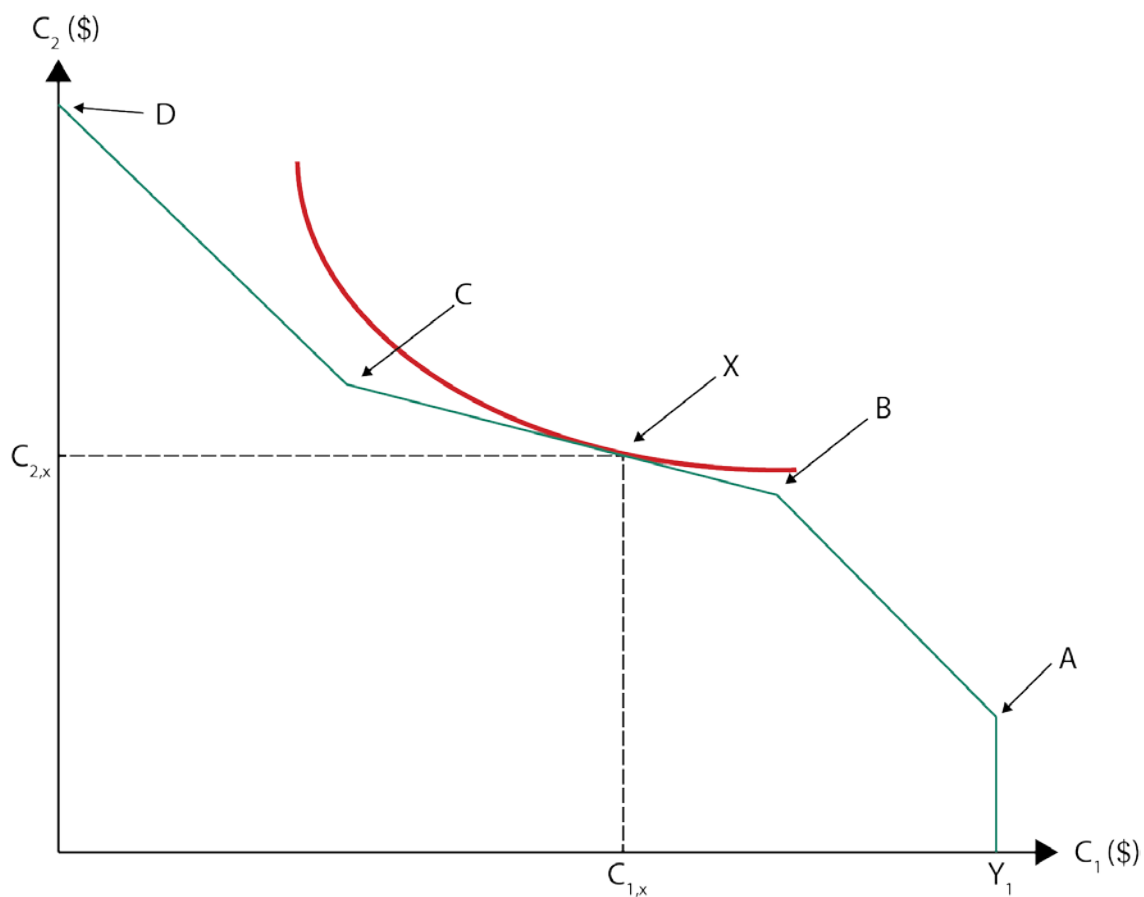


Notes:  $C_1$  = period 1 consumption,  $C_2$  = period 2 consumption, IC = indifference curve,  $C_1^*$  = optimal period 1 consumption,  $C_2^*$  = optimal period 2 consumption.

Source: authors' calculations.

With this framework in mind, it is possible to identify how the choice of an individual may change (i.e. the behavioural response) when the asset taper rate changes. In Figures A5 and A6, we present the original and new feasible consumption sets, described above, for the period before the assets taper rate was changed and after the taper rate change. The original budget set is given by the line  $Y_1ABCD$  (Figure A5), while the budget set after the taper rate changes is given by the line  $Y_1ABC'D$  (Figure A6). Initially, consider an individual who makes an optimal choice that places them at point X in Figures A5 and A6. Such a choice entails a certain level of consumption (and therefore saving) in period 1, and a level of consumption in period 2 that reflects their saving and entitlement to the AP. In Figure A5, period 1 consumption is denoted by  $C_{1,X}$  and period 2 consumption by  $C_{2,X}$ .

**Figure A 5: The Age Pension means test in the life-cycle model: initial taper rate**

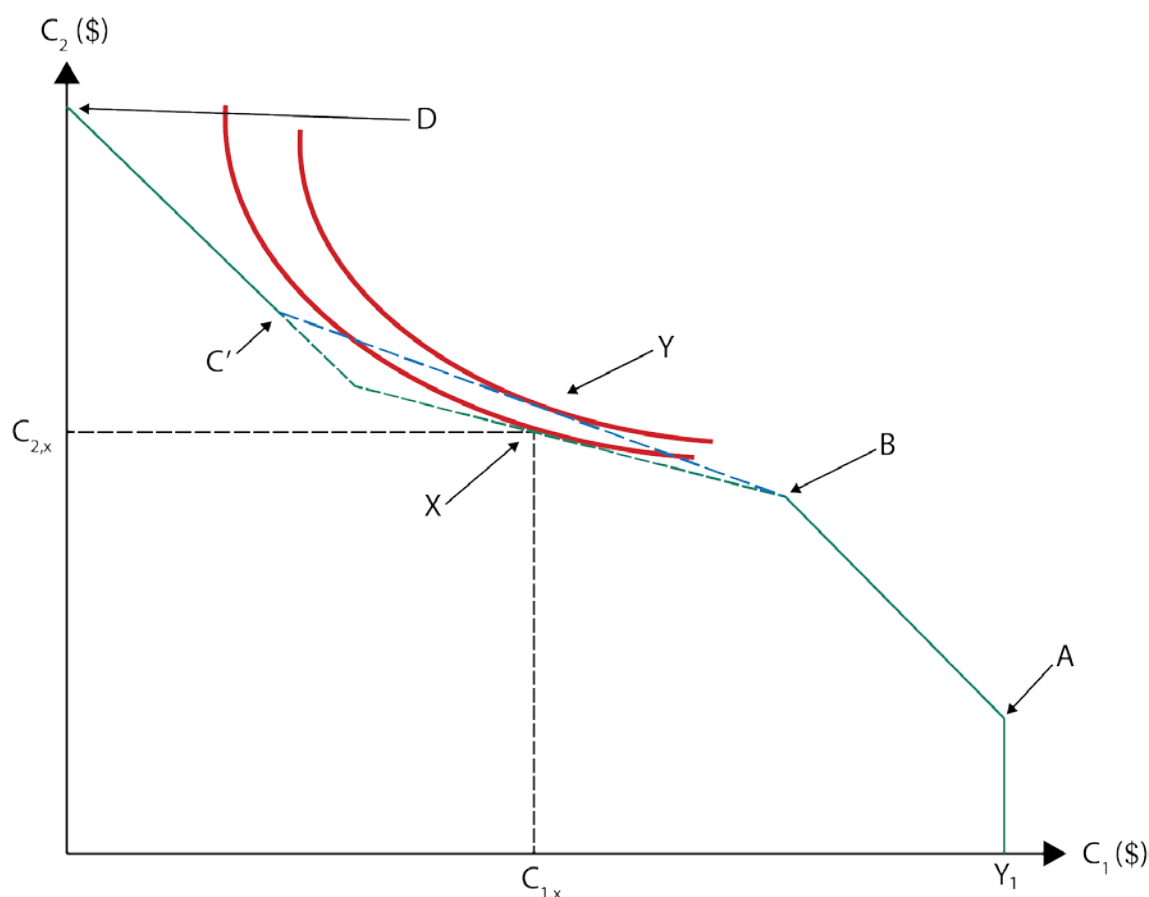


Notes:  $C_1$  = period 1 consumption,  $C_2$  = period 2 consumption,  $C_{1,x}$  = optimal period 1 consumption,  $C_{2,x}$  = optimal period 1 consumption.

Source: authors' calculations.

Following the reduction in the taper rate, the individual makes a new choice regarding first period consumption (and therefore saving), which is captured in Figure A6. At the new choice (denoted by Y), both period 1 consumption and period 2 consumption are higher than they were prior to the reduction in the taper rate.

**Figure A 6: The Age Pension means test in the life-cycle model: reduced taper rate**



Notes:  $C_1$  = period 1 consumption,  $C_2$  = period 2 consumption,  $C_{1,x}$  = optimal period 1 consumption,  $C_{2,x}$  = optimal period 2 consumption.

Source: authors' calculations.

In a graphical sense the change in the AP taper rate depicted in Figure A6 is the same as that shown in Figure A2. With the reduction in the taper rate, the optimising choice of individuals changes. The change between Figures A5 and A6 indicates that period 1 consumption increases and therefore savings decreases. This outcome is possible because, by reducing the taper rate, the amount of AP that is received in period 2 is higher, thereby facilitating higher consumption in both period 1 and period 2.

It is also possible that period 1 consumption may have fallen, reflecting the impact of two countervailing influences, termed the income and substitution effects. The 'substitution effect' captures the idea that following the reduction in the taper rate, period 2 consumption is now 'cheaper'. For example, assume that the assets taper rate had been reduced from \$0.20 to \$0.10. For individuals who receive the AP and have assets exceeding the lower asset threshold ( $T_L$ ), this means that a \$1 reduction in period 1 consumption initially led to a \$0.80 increase in period 2 consumption. In the future, however, a \$1 decrease in period 1 consumption would increase period 2 consumption by \$0.90. Hence, it is now 'cheaper' to increase period 2 consumption by decreasing period 1 consumption. The substitution effect implies that the individual substitutes or increases consumption in period 2 because it is relatively cheaper to do so. Recall that increases in period 2 consumption can be achieved by decreasing period 1 consumption or saving more. Hence, the substitution effect suggests a decrease in period 1 consumption (or increased saving) following the policy change.

At the same time, the reduction in the taper rate means that lifetime income will increase, because the individual now receives additional income by way of the AP in period 2. With higher lifetime income, the individual will tend to increase period 1 consumption and therefore reduce saving—this is the ‘income effect’. It is the relative importance of these two impacts, the negative substitution effect and the positive income effect, that determines if period 1 consumption increases or decreases following the reduction in the taper rate. If period 1 consumption decreases, this is consistent with savings increasing. Conversely, an increase in period 1 consumption is consistent with a decrease in savings.

The discussion above suggests that the effect of a change in the taper (or withdrawal) rate will have ambiguous effects on savings. For some individuals, it will tend to encourage greater saving, while in other cases savings will be reduced. This ambiguity reflects the fact that choices depend on the individual’s preferences and the constraints they face. Some individuals will have a stronger preference to consume more in the present rather than saving for retirement. Other individuals, such as those who may be described as more patient, may actually save more in anticipation of consuming greater amounts in the future. For these two types of individuals, the income and substitution effects will differ, and therefore so will the impact of a change in the taper rate. Ultimately, the impact of such a change can be identified through empirical analysis of how individuals respond to such a change. This behaviour is considered in the empirical analysis reported in Chapter 2 and Chapter 3.

## Appendix 2: Additional results

**Table A 1: Characteristics of the estimation sample: 2006**

	Treatment group		Control group	
	Mean	Standard dev.	Mean	Standard dev.
<i>Demographics</i>				
Age (years)	63.50	3.60	64.30	4.30
Head is female	0.37	0.49	0.35	0.48
Uni. graduate	0.16	0.37	0.35	0.48
Self-reported poor health	0.21	0.40	0.11	0.47
<i>Finance</i>				
Income(\$)	74,200	43,000	139,000	95,000
Home owner	0.85	0.36	0.96	0.18
Own investment property	0.11	0.31	0.42	0.50
Home equity (\$)	419,000	343,000	623,000	383,000
Assess. assets (\$)	256,000	195,000	1,720,000	970,000

Source: author's own calculations from HILDA waves 2, 6, 10 and 14.

**Table A 2: Difference-in-difference: Superannuation Surcharge change full results**

Variable	Coefficient
2006	0.37 (0.19)
2010	0.49 (0.21)
2014	0.96 (0.27)
Treatment Group (TG)	0.34 (0.40)
2006*TG	1.70 (0.59)
2010*TG	0.23 (0.66)
2014*TG	0.40 (0.80)
Age	-0.24 (0.44)



Variable	Coefficient
(Age) <sup>2</sup>	0.002 (0.003)
Income	0.0004 (0.003)
Female	-0.25 (0.13)
University	0.29 (0.16)
High school graduate	0.51 (0.26)
Health status	0.24 (0.16)
Controls	Yes
R <sup>2</sup>	0.08

Source: author's own calculations from HILDA waves 2, 6, 10 and 14.

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