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HOUSEHOLD SAVINGS AND THE SUPERANNUATION GUARANTEE

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Contents

EXECUTIVE SUMMARY

The purpose of this study is to examine how the compulsory employer superannuation system interacts with voluntary savings. The study focuses in particular on the extent to which the existence of compulsory superannuation – and increases in the compulsory superannuation rate – might affect voluntary savings.

Our study, like others before it, finds evidence of substitution between compulsory and private household saving in Australia; in other words, increases in compulsory saving are associated with decreases in private household saving. However, the substitution effect is significantly less than one – hence, for every dollar increase in compulsory superannuation, the associated decrease in private saving is less than one dollar. This suggests that the compulsory superannuation system in Australia generates a net overall savings increase. By contrast, international evidence on whether savings in pension accounts create positive net savings is mixed.

In this report, we examine the impacts of superannuation guarantee on private household saving(s) using three different measures of SG for comparative analysis:

- An SG dummy variable, taking the value of one if any member of the household received a compulsory super contribution from employers;
- The superannuation guarantee policy rate in percentage terms
- The compulsory employer contribution in dollar terms.

We use two measures of saving(s). The first is a flow concept, where *saving* is defined as the difference between household disposable income and final household consumption (including rental payments and mortgage repayments). The second measure uses the household's wealth as a proxy for accumulated savings, or the stock of savings. Both are measured in terms of dollars.

Data for the study was sourced from the Household, Income and Labour Dynamics in Australia Survey Restricted Release 18, which collects information about households' disposable income and expenditure annually, and household wealth-related data at four-year intervals. Due to data availability of expenditure, our analysis period is from 2005 to 2018.

Our models control for households' various socio-demographic-economic characteristics, and consider the possible non-linearity between household saving and household income, size and age, as reflected in prior studies. The Government's 2007 'Simpler Super' reform is included in our model as a dummy variable.

We find that the voluntary private saving of households receiving superannuation guarantee are not significantly lower than the voluntary private saving of households without superannuation guarantee. However, increasing the superannuation guarantee rate reduces voluntary private household saving. The findings are consistent with behavioural models, which suggest that when the superannuation guarantee rate increases, people have less incentive to save by themselves because they know employers are saving more on their behalf. We also find that changing the rate of superannuation guarantee has no significant effect on the saving behaviour of households that receive additional employer superannuation contributions over the prescribed superannuation guarantee rate as non-cash benefits. The signs of all other control variables are in line with the conventional saving models.

We find that increasing the superannuation guarantee rate from 9% to 9.25% increases household wealth by 17.5%, and from 9% to 9.5% increases net household wealth by 53.7% during 2006-18. These effects are larger for households where at least one member is receiving superannuation guarantee.

We find that each dollar of compulsory employer contributions reduces private household saving by 43 cents, compared to the findings of Connolly (2007) of a 38-cents reduction. The difference may be explained by our different methodologies and timeframes. Depending on the period under consideration, our estimated *'crowding-out'* effect gets smaller when measured within shorter

and later time windows. The substitution rate is less than one, which means superannuation guarantee overall increases wealth for households.

A large part of the decline in net household saving is accounted for by increased mortgage repayments – which for most people means increased savings in housing assets. Mortgage repayments increase by 24 cents in response to each additional dollar of compulsory employer contribution.

We find that a one-dollar rise in compulsory employer contributions increases net household wealth by $2.21, over a four-year period. Household wealth includes superannuation balance, property (net of debt), and non-super and non-property wealth.

Most of the increase in wealth associated with an increase in compulsory employer contribution occurs in superannuation and property (housing). We find that a $1 increase in compulsory employer contribution boosts the superannuation account balance by $1.51, and housing wealth by $1.21 (due to higher mortgage repayments). In contrast, there was a decline of approximately $0.51 in non-super and non-housing wealth.

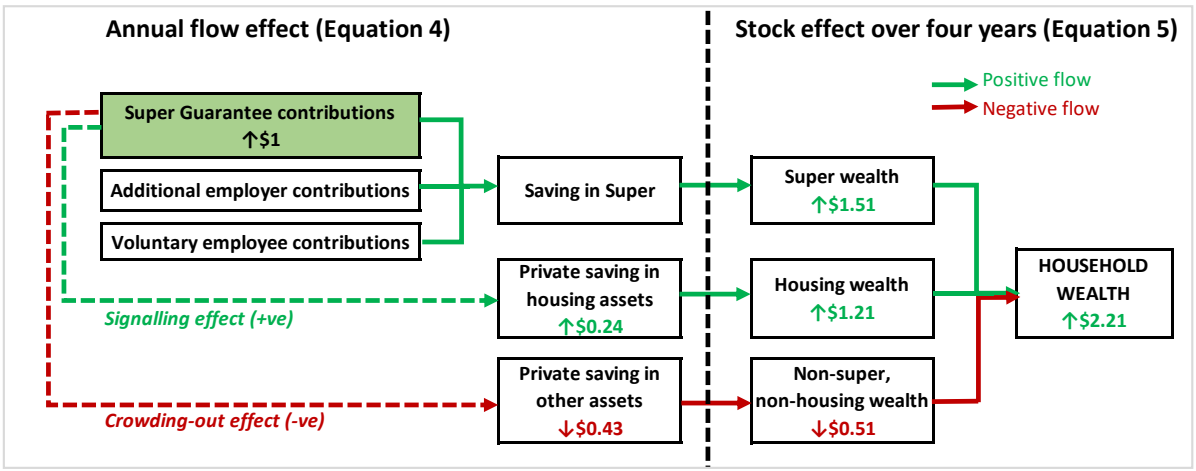
Our analysis of the impact of compulsory employer contribution on households' investment in property assets supports the existence of a 'signalling effect' – which suggests compulsory superannuation provides a degree of confidence for households to increase debt to invest in property, resulting in lower net household saving. This occurs with the knowledge that they can access superannuation savings to extinguish debt in the future and that the residential home is not counted in the age pension assets test under current rules.

Our report also shows how the saving behaviour of households varies across different demographic and economic groups. We find that home owners save 26 cents less for each dollar increase in compulsory employer contribution compared to non-home owners.

We employed the Heckman sample selection model to test our findings. The results were consistent, although with slightly different magnitudes. Overall, the results suggest that households with saving(s) behave differently to those without saving(s) in response to changes in eligibility for compulsory employer contributions or changes in superannuation guarantee rates.

In conclusion, the study has two main findings. First, we demonstrate that compulsory superannuation, while associated with a significant reduction in private household saving, leads to net additional household wealth. Second, we find that compulsory superannuation encourages and leads to the reallocation of household wealth into property from other forms of investment.

Figure 1: The relationships between compulsory employer contributions, household saving and wealth



INTRODUCTION

The Australian retirement system is regarded as one of the world's best, ranked third following the Netherlands and Denmark by the Melbourne Mercer Global Pension Index in 2019 (Mercer, 2019).

Compulsory superannuation is one of the three pillars of Australia's retirement income system. The other two pillars are a means-tested age pension, and voluntary private savings (which includes home ownership, bank accounts and other private investments). Compulsory superannuation contributions in Australia are made by employers under the Superannuation Guarantee (SG), currently set at 9.5 per cent of wages and salaries. Additional superannuation contributions can be made by employers (in the form of non-cash benefits), and by employees through voluntary salary-sacrifice contributions and additional personal contributions. The Government also makes co-contributions to superannuation for some lower-income earners.

The purpose of this report is to analyse the interaction between compulsory superannuation and voluntary private savings, with a primary focus on the effect of the compulsory super system on the level of private household savings.

One of the issues with policies designed to encourage savings for retirement is the possibility that they have unintended effects. It is possible that compulsory superannuation provides a positive signal to some individuals about the importance of saving for retirement – and, in theory, even encourages some of them to save more. On the other hand, SG might have a 'crowding out' effect on the private savings – with households feeling less pressured and less inclined to save privately for retirement in the knowledge of their SG entitlements. The crucial issue for policymakers is the overall extent of substitution between the two forms of savings, and the net effects. Do Australian Government policies to encourage retirement savings actually result in a net increase in household savings?

This study finds, overall, that access to SG leads to a considerable net increase in household savings and wealth. However, we find that there is a significant substitution effect, with households reducing private voluntary savings after an increase in the SG rate. Nevertheless, the net result – when both increased SG and reduced private savings are taken into account – is an increase in household wealth.

We also find evidence of significant heterogeneity, with the effect of SG on household private saving varying by the age of the household's head, income distribution, location, home ownership and financial situation.

The rest of this report is organised as follows. The next section describes the compulsory superannuation system in Australia and its evolution over time. Section 3 outlines previous literature related to saving(s) and co-contribution into pension plans in Australia and the rest of the world. Section 4 explains the methodology used in this paper. Section 5 illustrates the data we use and presents the results. And Section 6 analyses the results and their policy implications.

THE AUSTRALIAN SUPERANNUATION SYSTEM

System overview

Australia has the fastest-growing private pension savings system in the world[1]. The value of total assets managed by Australian superannuation funds has grown from A$73 billion in 1989 to A$2.89 trillion, as reported by the ABS in June 2019, representing a compound annual growth rate of 13%. The rapid growth resulted in Australia's superannuation sector becoming the 4th largest private pension system (A$2.89 trillion), and the sixth when measured by total managed assets (A$3.6 trillion) globally in 2019[2].

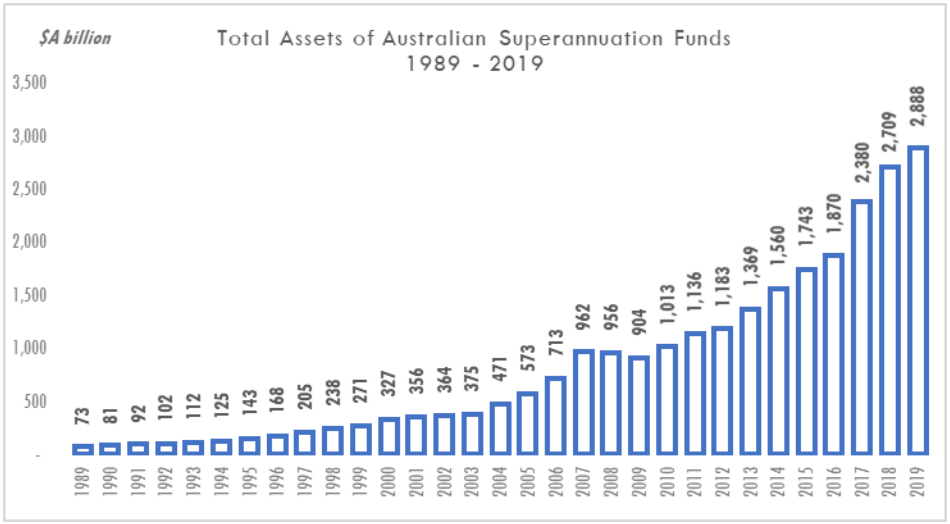


Figure 2: Total Assets of Australian Superannuation Funds – Source: ABS

Relative to GDP, based on OECD's figures, Australia's pension assets increased from 79% in 2010 to 137% in 2019[3] while the average ratio of pension assets to GDP of the world's 22 largest pension markets in 2019, reported by Willis Towers Watson, was 60%[4].

As shown in Figure 3, the growth of pension assets as a share of GDP of Australia is keeping pace with that of the others in the top seven pension markets of the world, P7, as identified by Willis Towers Watson[5]. From 2009 to 2019, while the growth of pension assets of non-P7 systems has been relatively modest, from 23% to 36% of GDP, the relative size of pension assets to GDP of the P7 markets has almost doubled.

[1] Willis Towers Watson: Global Pension Assets Study 2019
[2] Australian Bureau of Statistics (2019) and Financial Services Council (2019) State of the Industry
[3] MMGPI dataset from 2010 - 2018
[4] Willis Towers Watson: Global Pension Assets Study - 2019
[5] According to Willis Towers Watson (2019), in the Global Pension Assets Study, the seven largest pension markets in the world, in terms of pension assets, are Australia, Canada, Japan, the Netherlands, Switzerland, the UK and the US, with the total assets of USD36.6 trillion. Non-P7 markets included in the chart are Argentina, Austria, Brazil, Chile, China, Colombia, Finland, France, Germany, Hongkong, India, Indonesia, Ireland, Italy, Korea, Malaysia, Mexico, New Zealand, Norway, Peru, The Philippines, Poland, Spain, Saudi Arabia, Singapore, South Africa, Sweden, Turkey, and Thailand.

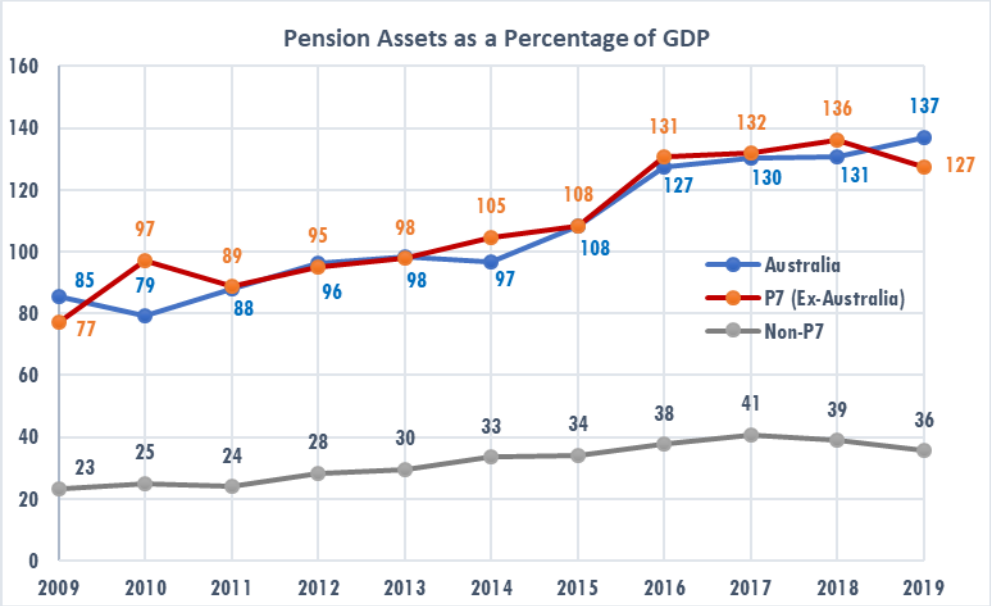


Figure 3: Pension assets as a percentage of GDP, Australia and other countries – Source: MMGPI data[6]

Superannuation encompasses Pillar Two and part of Pillar Three of the retirement income system. It is designed with various sources and mechanisms of contributions, reflecting the responsibility of individuals, employers and the Government for contributing to future retirement income.

Apart from the variety of contribution sources, the superannuation system has different tax mechanisms embedded in it. Superannuation contributions can be made with and without tax concessions. As estimated by Vanguard in 2019, approximately 12% of over two million members in their study, who are working members, made salary sacrificed superannuation contributions or non-concessional contributions or both[7]. For those that have both contributed via salary sacrificed superannuation contributions and personal post-tax contributions, the median total contribution rate was 30.1% for the fiscal year ended in June 2018.

The following figure illustrates the various components based on types of contributions in the current superannuation system in Australia.

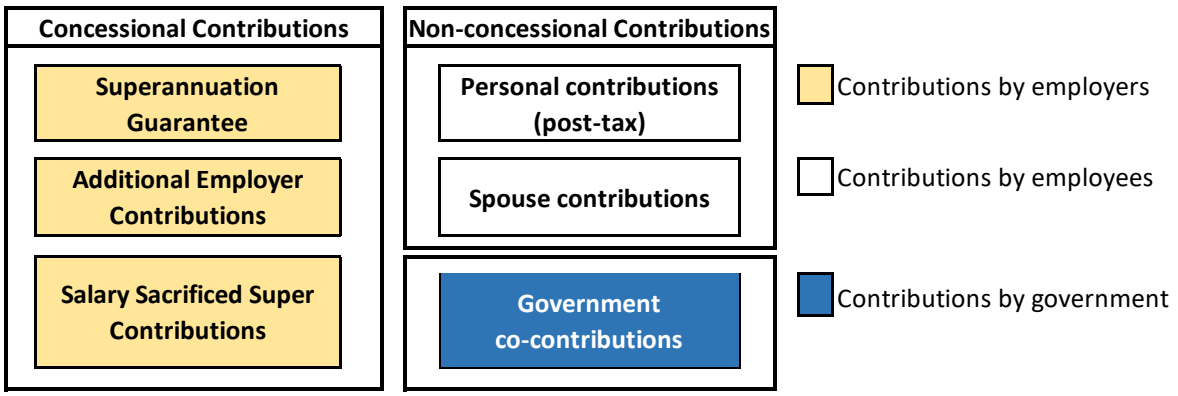


Figure 4: Superannuation by type of contributions

[6] Mercer (2019) Melbourne Mercer Global Pension Index 2019, Monash Centre for Financial Studies.
[7] Vanguard (2019), *How Australia Saves 2019 – A Report on Superannuation Data,* Vanguard Investments Australia. The report is on over two million members of First State Super, Sunsuper, and VicSuper.

Together with the means-tested Age Pension, the superannuation aims to provide retirement income adequacy for Australian residents, as well as fiscal sustainability for the Australian government.

History of the legislated Superannuation Guarantee

The superannuation regulatory framework has been evolving continuously. A significant part of the evolution is the change in the prescribed SG rate. SG is mandatory employer contributions for all employees receiving at least $450 per month.

The SG was introduced in 1992 at 3%. In its first decade, the SG had a few big jumps to 9% in 2002 where it stayed for another ten years. In 2013 and 2014, SG increased by 0.25% in each year and is scheduled to increase to 12% by 2025. The primary purpose of increasing SG is to grow compulsory retirement savings.

SG is mandatory on the individual employee's earnings under the quarterly maximum super contribution base. Employers do not have to provide SG on the amount of earning beyond the maximum super contribution limit. For simplicity, in this report, we ignore the maximum superannuation contribution base as there have been no significant changes in the ceiling over the years except for the fact that the amount is indexed annually.

Compared to other forms of saving, superannuation contributions and earnings are taxed at a concessional rate. Retirement benefits, however, are tax-exempt, providing an incentive for people to save toward retirement within the super system.

Contributions	Earnings in Super Account	Benefits Payout
Concessional contributions are taxed at a concessional rate of 15%. Non-concessional contributions are made from after-taxed income. Concessional cap and non-concessional contributions caps apply.	Earnings within Super are taxed at a concessional rate of 15%.	Super benefits are tax exempt, subject to eligibility. Transfer Balance Cap: $1.6m

Figure 5: Tax features of superannuation contributions, earnings and payouts (as of February 2020)

HOUSEHOLD SAVING(S)

Definitions

According to the Australian Bureau of Statistics (ABS), household net saving, as a flow concept, is defined as household net disposable income less household final consumption expenditure. In this report, the annual net household saving is one of the dependent variables which we also refer to as private household saving.

Household saving(s) in Australia

Figure 6 presents the net household saving rate in Australia. The saving rates have been meagre during the beginning of this century. It started to increase since the later part of the last decade and then again began to plummet since 2016. In 2019 it was at its lowest in a decade (2.7%).

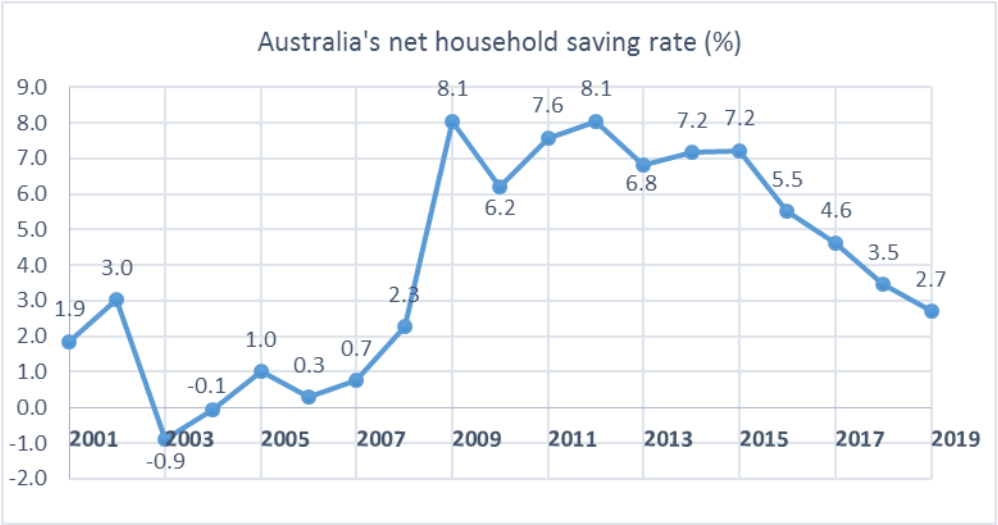


Figure 6: Net household saving rate in Australia - Source: ABS

The link between household saving and wealth

Household saving is the flow of saving, which is added to the accumulated household wealth, measured by the household net worth. In other words, household wealth is the stock of savings. In this report, *saving* refers to the annual flow of saving, whereas *wealth* refers to the stock of savings.

A household's wealth is its net worth, calculated as the total value of super and non-super assets less the household liabilities. In the ten years from 2005-06 to 2015-16 net worth of households increased by 28.70% and grew by another 6.06% in the following two years. In 2017 – 2018, according to the ABS, the mean net worth of the Australian households was over $1 million. The share of financial assets in net household assets increased from 37% to 42% during the same period.

ABS statistics	2005–06	2015–16	2017–18
Mean household net worth	$748,900	$963,800	$1,022,200
Mean total financial assets	$275,900	$392,700	$427,700
Mean total non-financial assets	$596,000	$749,100	$778,800
Mean total liabilities	$123,000	$174,900	$183,900

Figure 7 below illustrates the link between household saving and household wealth. According to the HILDA Restricted Release 18 manual, the total income in a financial year of a household includes all regular income such as wages and salaries, business income, investment income, transfers and irregular income.

Household saving is the residual of disposable income after all household consumption expenses, including rent and mortgage repayments.

The annual household saving, via both superannuation and private saving channels, amass into household wealth, the so-called 'net worth', over time. Household wealth is the sum of superannuation balance, housing wealth and other wealth. Housing wealth is the total value of all properties, including home and investment properties, net of all property debt. The other wealth component consists of non-super, non-housing assets such as bank accounts, cash investments, securities investments, trusts, life insurance and collectables, net of other financial and personal debt.

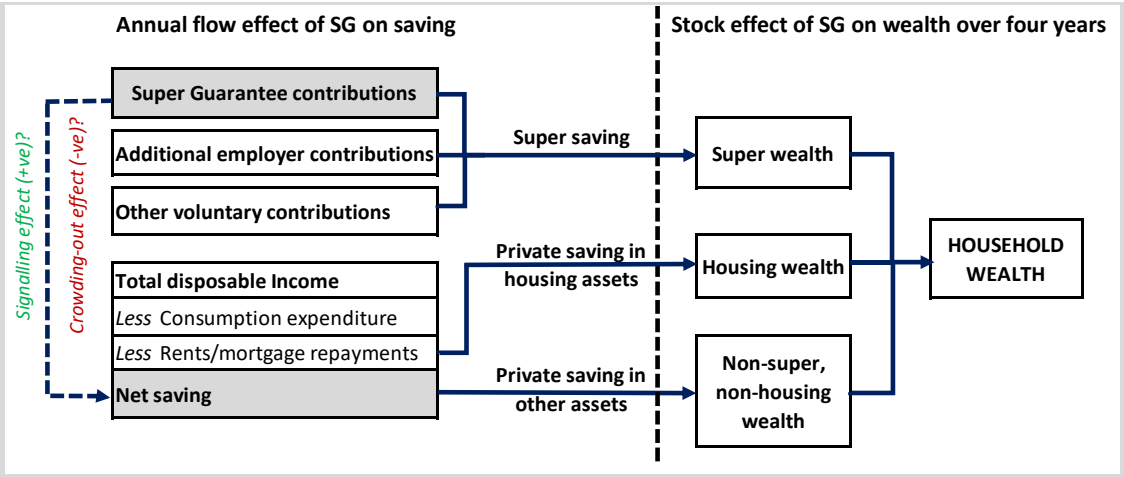


Figure 7: The relationship between household saving (the flow concept) and household wealth (the stock concept)

In this report, we examine the relationship between SG and net household saving (saving as the flow), as well as total household wealth and its various components (as the stock of savings).

While HILDA collects households' disposable income and expenditure annually, its wealth-related data is only measured at four-year intervals. Therefore, our analysis of household saving will be on an annual basis, whereas the wealth analysis will be based on data observed once every four years.

LITERATURE REVIEW

The theoretical foundation of saving(s)

The literature on superannuation and saving(s) spans across the fields of social and behavioural science and public policy. Seminal economic theories underpinning the literature on saving and the effects of pension and tax policies are the intertemporal optimisation theory, the lifecycle hypothesis and behavioural economics.

Fisher (1930) developed the theory of intertemporal consumption in his seminal book *Theory of Interest*, which provides a framework for understanding how individuals choose between consumption today and consumption tomorrow. Based on this theory of intertemporal consumption, later, Modigliani and Brumberg (1954) introduced the lifecycle income hypothesis, and Friedman (1957) developed the permanent income hypothesis.

According to the permanent income model (Friedman 1957), intertemporal consumption and saving decisions are based on the principle of optimisation given the level of permanent income, rather than temporary income, as temporary variations in disposable income average out in the long run. Similarly, the lifecycle hypothesis (Modigliani and Brumberg 1954) explains consumption and saving behaviour assuming that individuals maximise an inter-temporally utility function given their intertemporal budget constraint. This theory predicts that contributions to tax-favoured accounts, such as pension accounts, substitute other forms of saving. Thus, according to the lifecycle hypothesis, the contributions in tax-favoured accounts do not create new private saving. Variations and extensions of the original lifecycle hypothesis include those with bequest motives, liquidity

constraints, and uncertainty (See Bernheim (2002) for a comprehensive review)[8]. The introduction of uncertainty and liquidity constraints in the model reduces the degree of substitutability between illiquid tax-deferred savings and liquid financial assets, as uncertainty increases the value of liquidity. As a result, liquidity-constrained individuals are expected to be less responsive to tax-incentivised voluntary pension saving policies under uncertain economic environment.

Another stream of literature, grounded on behavioural theories, assumes that people do not always respond rationally to the economic incentives embedded in pension and tax policies. The evidence of behavioural decision-making effects in saving outcomes has grown in the past two decades.

This new strand of literature on household saving originated in the US (Shefrin and Thaler 1988), followed by Thaler (1990); Thaler and Benartzi (2004); Duflo, Gale et al. (2006); and Carroll, Choi et al. (2009)). It has evolved around behavioural economics and developed into the behavioural lifecycle theory. While people want to optimally smooth consumption and, hence, plan to save throughout a lifetime, there are cognitive and emotional biases leading to sub-optimal decision making. The concept of bounded rationality (Simon 1957) challenges the prediction of the traditional lifecycle hypothesis in individuals' decision making. It argues that due to bounded rationality, such as mental accounting (Thaler 1990), individuals' self-control ability and their perception of control (Cobb-Clark, Kassenboehmer et al. 2016) compromise their ability to implement the saving decision due to the complexity of intertemporal planning. Clark, Strauss et al. (2012) explain how intuition, habits and imitations influence the saving decision of an individual.

From a policy perspective, the design of incentive mechanisms (such as tax concessions or co-contributions) that encourage saving needs to be guided by these behavioural biases. The consideration of behavioural biases in decision making has given rise to policies that 'nudge' people to save more toward their retirement, and that has been advocated by libertarian paternalists (Friedman 2015, Statman 2017). These nudges are default options – with automatic enrolment into employer contribution accounts and pre-set contribution rates – which can be libertarian in the sense that individuals who wish to can opt-out.

The behavioural literature has expanded in scope beyond individual decision making. Several studies in the behavioural stream have focused on the role of other agents as third parties, such as tax advisors and employers (Choi, Laibson et al. 2002, Duflo, Gale et al. 2006) in providing behavioural nudges to promote private saving behaviour.

Empirical evidence

There is a large volume of literature on how people save in response to the introduction of tax-incentivised pension programs such as the Superannuation Guarantee in Australia, the Individual Retirement Accounts (IRAs) and 401(k)s in the US and the Individual Savings Accounts (ISAs) in the UK. It should be noted that the key difference among them are about who can make the contributions into these accounts, and if contributions are mandatory. In Australia, superannuation guarantee contributions are compulsory and made by employers, whereas for IRAs and ISAs, it is the individuals that contribute to these accounts.

Links between saving(s) in superannuation and other saving(s) have been widely analysed, with the key questions regarding whether measures promoting pension savings work, and whether pension

[8] Please see Bernheim (2002) for the detailed review of studies using lifecycle hypothesis. Most reviewed studies are from the United States.

savings – in the Australian case, superannuation contributions – crowd out other savings. Empirical evidence relating to superannuation and savings in Australia, as well as the US, UK and other countries, is presented next.

The Australian experience

After the introduction of the SG in 1992, several studies examined if it had achieved the objective of promoting private savings toward retirement. Evidence from the SG experience suggests an increase in superannuation savings is offset by changes in other savings, though only partially (Morling and Subbaraman, 1995, Connolly and Kohler, 2004, and Connolly, 2007). While these studies report various levels of substitution between superannuation and other savings, they all agree that the substitution is less than perfect, and that the degree of substitution varies among different household groups. However, as reported findings vary greatly, the extent to which compulsory superannuation savings adds to aggregate savings is unclear.

Different sources of data have been used in this stream of literature in Australia, including ABS aggregate data, the HILDA survey data and more recently, member data provided by the super funds. The discussion that follows will highlight the most relevant studies in more details.
Prior studies in Australia focus on various types of superannuation contributions and savings, as illustrated in Figure 8. While Morling & Subbaraman (1995) study the link between the total super savings and non-super savings, Connolly & Kohler (2004) and Connolly (2007) examine the interaction between compulsory superannuation and other savings.

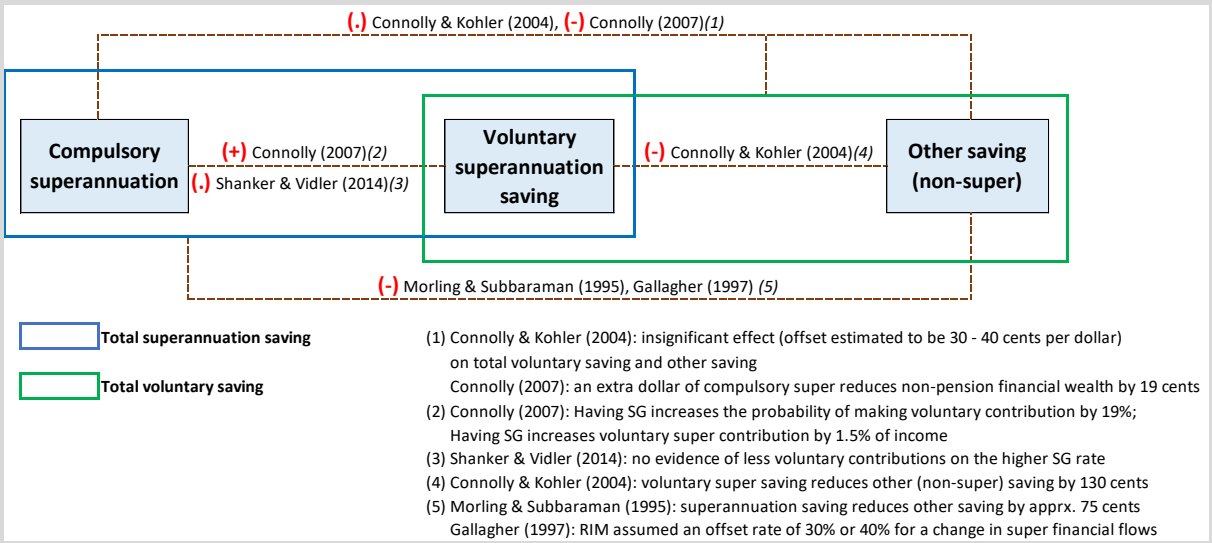


Figure 8: Major studies on superannuation and non-super savings in Australia

The study by Morling and Subbaraman (1995) is among the early ones[9] that examine the impact of superannuation on private savings. They use an Error Correction Model for aggregate household savings data from 1959 to 1994. The study finds a substantial substitution effect of approximately 75 percentage points between super saving and non-super saving, both in the short-run and long-run. The paper also reports the impact of other factors on savings, including human capital (i.e. labour income) and non-human factors such as housing value and demographic characteristics. However,

[9] For a review of research prior to 1995 on the offset impact between superannuation and other forms of saving, please see Gallagher (1996).

Morling and Subbaraman (1995) argue that the offset rate between superannuation and other forms of savings would be lower after the introduction of the compulsory SG. The post-1992 SG relies on compulsory rather than voluntary saving and aims at broad coverage for all wage and salary earners. Such coverage could cover more liquidity-constrained households that may not be able to offset superannuation savings with equal (or close to one) reductions in non-super savings.

Connolly and Kohler (2004) adopt a similar approach to Morling and Subbaraman (1995) and estimate the extent to which households substitute compulsory superannuation with other forms of saving. They use aggregate data from 1966/67 to 2001/02. The other forms of saving include voluntary superannuation contributions and non-superannuation saving. They also estimate the degree of substitution between voluntary superannuation contributions and other (non-super) saving.

Connolly and Kohler (2004) find negative but statistically insignificant coefficients between compulsory superannuation and total voluntary saving (including super) and other (non-super) saving. The coefficient of compulsory superannuation on the total voluntary savings was -0.38. This means only 38 cents from each 100 cents increase in compulsory contributions is offset by the decrease in voluntary savings, meaning that 62 per cent of compulsory contributions are added into new savings. Indeed, as this coefficient is not significantly different from zero, there could even be no offset at all. They also find evidence of a significant negative relationship (-1.30) between voluntary superannuation contributions and other (non-super) saving. This suggests that each dollar contributed to voluntary superannuation would decrease other (non-super) saving by $1.30. The authors, however, noted that the data quality, due to the potential double-counting of voluntary superannuation contributions through rollovers, may distort this seemingly large coefficient.

Connolly and Kohler (2004) then use these results to construct a counterfactual saving rate. They suggest that compulsory superannuation may have raised the household savings rate by up to 2 per cent in recent years. Overall, Connolly and Kohler (2004) argue that compulsory superannuation effectively encourages households to raise their retirement savings and increase their wealth as a result.

In 2007, Connolly again came back to the topic of superannuation and household saving, however, with a different approach, using the data collected from the HILDA survey Wave 2. Using household-level data allows the examination of household savings behaviour, taking into account the heterogeneity of the households, which is not possible with aggregated data. Connolly (2007) evaluates three aspects of the effect of the SG on household saving, including its impact on household wealth, voluntary retirement saving and expected timing of retirement. He uses a dummy variable of whether the household receives mandatory contributions for the policy instrument. Using the median regression model with bootstrapped standard errors, Connolly (2007) finds that the SG has a positive impact on household wealth. Specifically, the probability of making voluntary contributions is 19% higher, and the extra savings is 1.5% of income if the household receives compulsory contributions. Connolly (2007) also runs a regression of household wealth on the dollar values of the compulsory pension accounts. The finding suggests that each additional dollar of mandatory superannuation increases household wealth by approximate 70 to 90 cents on average while reducing household net financial wealth (excluding pension assets). This implies a small offset rate between mandatory superannuation and other non-super savings. He also finds that the substitution rate is insignificant among the financially constrained households, consistent with the

argument put forward by Morling and Subbaraman (1995). As financially constrained households have less opportunity to reduce other savings, compulsory superannuation increases their net financial wealth (including superannuation) without reducing non-super wealth.

More recently, using the dataset from UniSuper from 2002 to 2006, Shanker and Vidler (2014) confirm that an increase in the compulsory rate seems to be carried over into an increase in total contributions. Feng (2014) also affirms that compulsory employer contributions mostly represent new saving and are not funded by the reduction in household consumption and other assets or debts. Feng's work used various survey datasets including the Survey of Employment Arrangements, Retirement and Superannuation (SEARS) 2007, Surveys of Income and Housing (SIH) in 2005/06, 2007/08 and 2009/10, the Household Expenditure Survey (HES) and the HILDA surveys from 2002 - 2010. The availability of large longitudinal surveys and data from super funds have enabled researchers to explore more aspects of saving behaviour and the heterogeneity of savers. Feng (2014) and Feng and Gerrans (2014) provide evidence that personal characteristics, gender, income level, and home ownership are important determinants of participation rates and contribution levels of both concessional and non-concessional personal superannuation. Most empirical studies use some personal characteristics, educational background, income level, and home ownership to control for saver heterogeneity (Chenozhukov & Hansen, 2004). Saver heterogeneity could be an impediment to determining the saving effect if not specified correctly in a model.

Lessons from the rest of the world

Although there are critical differences between the pension systems in the US and Australia, some studies provide helpful insights into the links between various components of the systems, such as the relationship between employer and employee pension contributions, and that between pension and non-pension savings.

In the early days, Katona (1966) asserts that having private pension accounts motivate households to save more. Since then, the pension system in the US has evolved substantially with more tax-linked saving products and services. Before delving into the empirical evidence of how they impact savings, it is useful to understand the essential features of the leading pension saving accounts available in the US now.

The literature from the US centres on the two major retirement savings products - IRAs and 401(k) accounts. The US introduced IRAs in 1974 as a tax-deferred retirement saving vehicle set up by individuals. In the traditional IRAs, contributions, subject to an annual cap, are made by the individuals and are tax-deductible. Withdrawals in retirement are taxed at the ordinary personal income tax rate. Since eligibility was expanded in 1981, IRAs have become popular for people at various income levels, not just the wealthy. As of 2020, there are Simple IRAs and IRAs for the self-employed and small business owners and Roth IRAs[10] for individual taxpayers with different tax incentives.

Another saving vehicle, the 401(k) account, was introduced in 1978 with tax-deductible contributions from employees, typically matched by employer contributions, tax-free returns on investment, and tax paid upon withdrawal. As both IRAs and 401(k)s are earmarked for retirement saving, there is a penalty for early withdrawals, similar to superannuation accounts in Australia.

[10] Roth IRAs: contributions are from after-tax income; however, its investment gains and withdrawals during retirement are tax-free.

There was a heated debate in the literature in the 1990s and early 2000s on the extent to which tax-incentivised pension savings in IRA and 401(k) represented new savings rather than a reshuffling of assets from other non-tax-advantaged vehicles. The debate heightened in the mid-1990s. While Poterba, Venti et al. (1996) assert that IRA and 401(k) contributions are not substitutes for other financial assets, Engen, Gale et al. (1996) argue that tax incentives have little impact on household savings. According to Engen et al. (1996), other papers have overstated the effectiveness of these saving tools.

While studies in the 1990s were inconclusive on whether IRAs and 401(k)s generate new savings, later research seems to agree on the evidence of new savings, at least as a partial effect (Chernozhukov and Hansen 2004, Card and Ransom 2011, Gelber 2011). The table below summarises their findings.

Evidence that proves new saving

Studies	Findings
Venti and Wise (1991)	There is insignificant substitution effect of IRAs as increased saving is financed by reduced consumption (2/3) and reduced taxes (1/3) rather than other savings or debt.
Poterba and Venti (1994)	401(k) savings represent new savings as 401(k) contributors save more than non-contributors There is little evidence of substitution between 401(k) contributions and other financial assets and IRAs.
Venti & Wise (1995)	There is little change in other financial assets when a household starts or stop contributing to IRAs.
Chernozhukov and Hansen (2004)	401(k) participation has a significant effect on both net financial assets and total wealth. Impact of 401(k) participation on net non-401(k) financial assets is insignificant. For cases in the lower tail of wealth distribution, most savings in 401(k) accounts represent new saving.
Gelber (2011)	401(k) eligibility increases 401(k) balance and reduces the consumption of durable assets. There is no evidence that 401(k) eligibility crowds out other financial assets and net worth.

Evidence that rejects new saving

Studies	Findings
Gale and Scholz (1994)	No significant impact of changes in IRA limits on national savings. Only 2% of the increase in IRA contributions would represent new net national savings.
Chernozhukov and Hansen (2004)	Evidence of substantial substitution effect is documented at the upper tail of wealth distribution
Card and Ransom (2011)	Each dollar of employee contribution reduces supplementary savings by 60-80 cents. Each dollar of employer contribution reduces supplementary savings by half.

The debate in this stream of literature centres on how the models used to measure these relationships deal with saver heterogeneity and endogeneity. The availability and quality of large-scale longitudinal datasets on individuals or households over time has made it possible to study savings at the household and individual level. However, even with the best survey data, it is challenging to measure and model household financial decisions because each household or individual is unique in their characteristics and behaviour biases (Campbell 2006).

The randomised control trial (RCT) method (Duflo, Gale et al. 2006, Chetty and Saez 2013) could offer an approach to address saver heterogeneity and identification. However, unless perfectly run, even an RCT will not be capable of controlling for every possible type of heterogeneity (Poterba et al. 1996). In the absence of a perfect RCT, researchers have used several approaches to improve the

identification strategy. The first approach is within-group change analysis by following the same household over time to examine the change in assets or savings before and after an event of interest happens, such as the change in employer contribution eligibility (Venti and Wise (1995). The second approach is the between-group comparison, in which one can compare the savings rates of two groups at the same point in time with the condition that the compared groups are different only in terms of the examined factor. This approach is used by studies that compare savings of households with and without a 401(k) account (Poterba, Venti and Wise 1995). The question is whether 401(k) eligibility is exogenous. When unobservable factors associated with saving influence participation in 401(k), there is endogeneity in the model, and the estimates could be biased. While one can argue that participation is exogeneous as eligibility is determined by the employer (Poterba, Venti and Wise 1995), it may be plausible that employers consider their employees' preferences in offering the account (Engen, Gale et al. 1996). It is also possible that individuals who want to save more would prefer to work for companies that offer generous 401(k) and therefore, the estimated coefficients represent correlation, not causality. 401(k) eligibility may not be as exogenous as it seems to be. Therefore, the challenge for this method lies in the matching exercise to ensure that the compared groups are similar in terms of their savings preferences. Alternatively, researchers can analyze by cohort to examine if the savings patterns of the subject group over different stages in the lifecycle is different from the pattern observed for other groups. This approach is possible with longitudinal datasets.

While researchers from the US dominate the various streams of literature related to pension savings, empirical evidence from other markets is relatively scarce. The following discussion touches on several studies that could provide an insight into how people around the world are managing savings within and outside pension systems in response to pension policies.

In the UK, adopting the Lifecycle Hypothesis of Modigliani and Brumberg (1954), Green (1981) examines the changes in other savings in response to the increase of pension assets. He uses two databases providing survey data on personal savings, including the 1953 Oxford Savings Survey (OSS) and the annual Family Expenditure Surveys (FES) 1969. Green (1981) argues that if individuals have a savings target, they will reduce other savings when their savings in more tax-favoured pension accounts increase. He rejects the hypothesis that people have a savings target as they do not find a significant substitution effect between pension savings and other types of savings.

Using the same FES data but for a later period, from 1974 to 1987, Attanasio and Rohwedder (2003) also employ the lifecycle model to examine the association between pension wealth and other household savings in the UK. The paper proposes an innovative approach to measuring pension wealth. Perceived pension wealth is calculated as the sum of the present value of all expected future pension benefits less the present value of all future contributions. The paper considers three key reforms in UK pension system - two changes in the indexation of the Basic State Pension (BSP) in 1975 and 1981, and the implementation of the State Earnings-Related Pension Scheme (SERPS) in 1978[11]. For SERPS, Attanasio and Rohwedder (2003) document a substantial substitution effect between pension wealth and other savings for people over 31, but this impact is insignificant for younger people. For BSP, they find little evidence of substitution between BSP savings and other financial assets for all age groups. Attanasio and Rohwedder (2003) argue that liquidity constraints may explain the insignificant substitution effect among young and poor groups of individuals who are typically not eligible for SERPS. In contrast, in other research using data from the Family Resources Survey during the period from 1998/99 to 2002/03, Attanasio, Banks et al. (2004)

[11] The BSP is the compulsory contributions plan which is applied for all employees while SERPS is an additional mandatory pension plan for employees whose earnings are within certain limits.

document a significant substitution effect between contributions in pension plans and other household assets in the UK.

Adopting another approach, Blundell, Emmerson et al. (2006) examine changes in private spending patterns as an indicator for saving. They find that spending by working-age individuals increased upon the introduction of SEPRS, signalling no added saving. In summary, the literature from the UK seems mostly inconclusive.

In New Zealand, based on a national survey conducted in 2010[12] on KiwiSavers, a voluntary saving account similar to the IRAs in the US, the New Zealand Treasury reported that a third of the contributions made to KiwiSaver accounts represented additional savings (Law, Meehan et al. 2011). In the long run, however, the estimated effect of the program on net national savings is only marginal or even negative considering public contributions through tax concessions and direct grants.

The evidence from Spain is mixed among studies that use change in consumption to indicate savings and those that examine changes in saving contributions directly. Anton, Bustillo et al. (2014) use the Spanish Survey of Household Finances in 2002 and 2005 of the Bank of Spain and the National Statistics Institute, and find that tax-favoured contributions to pension funds are not associated with a lower consumption level (with and without consumption of durable goods), which implies that this policy does not increase national saving. Their study, however, finds inconsistent results when attempting to measure the impact of pension contributions on non-pension wealth and total wealth. In their models, being a contributor, the indicator variable has a significantly negative coefficient on wealth while the contribution amount, as a continuous variable, does not.

In contrast, an earlier study in Spain by Ayuso, Jimeno et al. (2007) provided evidence that for one dollar contributed to tax-favoured saving accounts, the new saving generated is approximately 25 cents. New saving is measured by changes in consumption rather than household wealth. Moreover, the saving response differs substantially across different age groups. This study utilised a panel dataset from 1985 to 1991 of tax returns from the tax authority and household expenditure. They used the introduction of tax incentives to retirement savings in 1988 as a natural experiment.

There has also been evidence that people adjust their pension savings before an anticipated change in pension tax policy occurs. In Denmark, Kreiner, Leth-Petersen et al. (2017) find that the contribution to employer organised accounts increased by one unit while contributions to privately organised accounts increased by 0.156 units in response to an anticipated tax change. The data was collected from the income Register of the country from 2008 to 2011. The positive coefficient suggests a "crowding in" effect between employer contributions and private contributions, which is understandable because the change in tax incentives would apply to both employer contributions and private contributions. The same crowding-in effect may not hold in another context. Again, the evidence from Denmark is not conclusive in terms of the existence and direction of the substitution effect among pension savings and other savings.

Another study from Denmark by Chetty, Friedman et al. (2014) was conducted with 41 million observations from the income tax register, the population register and the Danish Integrated Database for Labour Market Research. This study finds that the majority of people (85%) are passive savers, sticking to the automatic contributions made and having no response to the tax subsidies. Only 15% are active savers who switch assets from taxable accounts to tax-subsidised saving accounts. For these active savers, tax subsidised saving crowds out other saving substantially. As such, Chetty, Friedman et al. (2014) concluded that automatic contributions are more efficient in promoting saving than increasing tax subsidies for passive savers.

[12] The survey was conducted in 2010 with 825 respondents.

Again, the evidence from Denmark is, therefore, not conclusive in terms of the existence and direction of the substitution effect among pension savings and other savings.

In summary, in evaluating the empirical evidence from other countries, it is essential to bear in mind the fundamental design differences between systems in terms of types of pension contributions and tax incentives. In Australia, employer contributions, being compulsory by law, serve as the backbone of the system. In contrast, in other countries, namely New Zealand, the US and the UK, employer contributions are not obligatory, and voluntary contributions represent a vital component of the system. Furthermore, the age pension in Australia is means-tested using both an assets test and income test, whereas in the US and the UK, a universal age pension is provided and the means-tested mechanism is only applicable for supplemental income. As pension systems are designed differently around the world, people's saving behaviour will also likely differ. Therefore, empirical evidence from other countries is not directly comparable to the experience in Australia. Besides, as the international evidence is mostly mixed, it does not inform us precisely on the impact of compulsory pension savings on other savings. The rest of this report presents an empirical model that aims to address the question of how the legislated SG has impacted private household savings in Australia.

METHODOLOGY

Econometric models

We use a unitary household model to estimate the impact of SG on voluntary household saving and wealth. We use three different measures of SG.

1. SG dummy (SGD): This is a dummy variable taking the value of one if any member of the household received a compulsory super contribution from an employer. It is zeroed otherwise.

2. SG policy (SGP): The rate of superannuation guarantee prescribed for the year, as described in Section 2. Since there are only three SG rates relevant for the period of our analysis (9%, 9.25% and 9.5%) we treat it as a categorical variable with 9% as the base category.

3. Compulsory employer contribution in dollar terms (CEC): This is the amount of compulsory contribution made by the employer per annum. It is estimated as the product of the employee's gross wage/salary and the SG rate (SGP) in any particular year.

We measure the saving of a household i in period t (s_{it}) as the difference between its total disposable income and expenditure, including rental payment and mortgage repayments, for that particular household in that specific year. It should be noted that the questions on household consumption expenditure in the HILDA survey were not consistent across all the years[13]. Specifically, while information on non-durables spending is available across the waves from 2006 to 2018, information on durables spending[14] was only collected from 2006 to 2010. To ensure consistency of measurement, based on data availability, we only consider non-durables spending in household expenditure. The trade-off, however, is that with this approach, the total household consumption expenditure would be underestimated, which implies overestimation of household saving[15]. For

[13] We use households' annual expenditure data from the Self-completed Questionnaire of the HILDA survey.
[14] Such as computers, motor vehicles, TV and home entertainment systems, furniture, etc.
[15] The HILDA expenditure module does not collect data on all types of household consumption items either. As result, the final consumption expenditure from the HILDA represents only a fraction of the total household final consumption expenditure published by ABS. however, as savings is the dependent variable in our model, any measurement error in savings will not cause any problem in estimating the regression models (Wooldridge, 2005).

robustness, we have conducted the same analysis with durables spending information for the shorter time window and obtained results similar to what is presented here.

A household's saving will depend on its socio-demographic characteristics (for example, age, household size, marital status, occupation, location, income level, home ownership and financial constrained status etc.), and any policy instrument targeted to influence their saving behaviour – in this case, SG.

$$lns_{it} = \alpha_1 + \beta_1 SG_{it} + \Gamma_1 X_{it} + \theta_i + \gamma_t + \varepsilon_{1it} \qquad (1)$$

Where, lns_{it} is log of household private[16] saving; SG_{it} is the superannuation policy (SGD or SGP as described above) affecting saving, X_{it} is a vector of household economic and demographic characteristics, θ_i is the unobserved household-specific fixed effect and γ_t is the time fixed effect. We control for the following household economic and demographic characteristics - age, gender, education and marital status of the household head, employment status of the head, log of total disposable income of the household, household size, number of children aged less than or equal to 14 years, a dummy to indicate if the household is financially constrained, a dummy if the household has an indigenous background with at least one Aboriginal member or Torres State Islander, a dummy for household location (state), industry dummies, a dummy for the remoteness of the household, a dummy for home ownership status and a dummy for the Simpler Super reform. The relationship between saving and income, age of the head and household size might be non-linear. To incorporate the possible non-linearity, we control for the squares of these variables.

In Equation (1), a one-unit change in SG would result in a 100x $(e^{\beta_1}$-1)% change in saving. For very small β_1, $(e^{\beta_1} - 1) \approx \beta_1$. For example, for $\beta_1 = 0.06$, $(e^{0.06} - 1) \approx 0.06$. Therefore, a one-unit change in SG would lead to approximately 6% change in saving.

Using the 2007 ABS Survey of superannuation and HILDA survey 2006, the Association of Superannuation Funds of Australia finds that, on average, employers were paying contributions equivalent to 10.5% of wages, while the prescribed SG then was 9%. It was estimated that about 23% of employees, or 1.8 million people, received employer contributions above 9% of wages (non-cash benefits). Higher employer contribution rates were more evident in some sectors such as finance, universities (commonly 17%), building (up to 18% of the trade base rate), brewing (11-12%), and government (12-15%). Using HILDA survey data in 2018, we find that, among those who reported superannuation as non-cash benefits received from their employers, the total employer contributions rate was 17.9% for financial and insurance services, 18.3% for education and universities, 17% for public administration and safety, manufacturing, construction, wholesale trade and 16% for health care and social assistance[17].

Based on this observation, we would hypothesise that those receiving the minimum SG have a higher propensity to save (voluntarily) than those receiving an employer contribution rate over the minimum SG.

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[16] We use the terms household private saving and voluntary household saving interchangeably in this report.

[17] Please note that there were only 457 cases reporting non-cash benefits in superannuation in HILDA dataset for 2018 across all industries.

We would also hypothesise that the impact (if any) of the change in minimum SG from 9% to 9.25% and 9.5% respectively in 2013 and 2014 on household saving would be more evident among those receiving the minimum SG.

Therefore, we would use an interaction between SG rates and non-cash benefits and estimate the following regression:

$$lns_{it} = \alpha_2 + \beta_2 SG_{it} + \delta NC_{it} + \tau NC_{it} * SG_{it} + \Gamma_2 X_{it} + \theta_i + \gamma_t + \varepsilon_{2it} \quad (2)$$

Where NC_{it} is a dummy variable to indicate if the employer contribution a person receives equals the minimum required SG or is over the prescribed rates.

We also estimate the effect of the SG on household savings measured by household wealth, following Connolly (2007)[18]. We use household wealth as the dependent variable and estimate the following relationships.

$$lnW_{it} = \alpha_3 + \beta_{31} SG_{it} + \beta_{32} SG_{it-1} + \beta_{33} SG_{it-2} + \beta_{34} SG_{it-3} + \Gamma_3 X_{it} + \theta_i + \gamma_t + \varepsilon_{3it} \quad (3)$$

As measures of wealth are available every four years, any change in wealth would be an accumulated response to policies in the previous three years. Accordingly, we use SG in the current period as well as the lagged values of the previous three periods in Equation (3). We also control for total disposable income in the current year and the last three years instead of disposable income only in the current period. For SGP, since SGP only changed twice during our analysis period, from 9% to 9.25% in 2013, and then to 9.5% in 2014, the number of observations with lagged SGP values is limited, so it would not be possible to estimate β_{33} and β_{34}.. Therefore, we could only use the SGP categories of the current period.

Principal residences and other properties are a significant part of household wealth across Australia. As property values depend on market prices, we control for housing prices by including the Residential Property Price Indexes of Eight Capital Cities in Australia provided by the ABS[19] in our regression models. All other control variables in X_{it} are the same as in Equation (1).

The main parameters of interest are β_1, τ, β_{31}, β_{32}, β_{33} and β_{34}. We estimate these parameters using the fixed effect (FE) estimators. Under the assumption that the unobserved household fixed effect is uncorrelated with the regressors, both the FE and generalised least squares (GLS) estimators provide consistent estimates of model parameters. Even though at first sight, it may appear that SG_{it} is a policy instrument and hence is exogeneous; in our model, whether a household has access to SG (SGD) may depend on the household fixed effects; and hence, the FE estimator would be the more suitable one.

Next, we estimate the effect of compulsory employer contributions (CEC) on household saving(s). Even though employer superannuation contribution is included as a question in the HILDA survey, not all the waves of HILDA data have information on the dollar amount of compulsory SG that a household received. Given the sparsity of this information, we do not use the dollar amount of compulsory SG contributions from the HILDA survey. We use an extrapolated measure of compulsory SG contribution using the product of the household's annual wage/salary and the

[18] Conolly (2007) used only level of wealth and wealth as a per cent of income not log of wealth as the dependent va riable. We use both the level of wealth and log of wealth as dependent variables.
[19] ABS, 6416.0 Residential Property Price Indexes: Eight Capital Cities

prescribed rate of SG (SGP) for any year, for those receiving a wage/salary of at least $450 per month. The data on household's wage/salary is from the HILDA survey.

$$s_{it} = \alpha_4 + \beta_4 CEC_{it} + \Gamma_4 X_{it} + \theta_i + \gamma_t + \varepsilon_{4it} \quad (4)$$

Equation (4), β_4 measures by how much households change their private saving in response to each additional dollar of the compulsory contribution made by the employer in their superannuation account. This analysis uses annual data.

We also measure the same relationship for household wealth.

$$W_{it} = \alpha_5 + \beta_5 CEC_{it} + \Gamma_5 X_{it} + \theta_i + \gamma_t + \varepsilon_{5it} \quad (5)$$

Since wealth data is available in every fourth wave, the compulsory employer contribution (CEC_{it}) in Equation (5) is an accumulated employer SG amount over the period t and the previous three periods. All the other control variables are the same as in Equation (2).

It could be argued that the relationship between household saving(s) and its determinants may not be linear, as households with positive savings and those without have different preferences, and the above specification suffers from selection bias, as it excludes non-positive savings. To overcome such selection bias (if there is any), we also analyse if SG (as in SGD and SGP) has any impact on household saving by using a bivariate sample selection model. It includes a probit regression for the decision to save and a generalised linear model (GLM) for the decision about how much to save.

In Equation (6), V is a dummy variable with a value of one, if the household has any saving and zero otherwise. Let s_{it}^* be households' desired saving and s_{it} be the actual amount of saving.

We specify the sample selection model as follows, where Equation (6) is the participation Equation and Equation (7) is for the outcome variable:

$$V_{it} = \begin{cases} 1 \; if \; V_{it}^* > 0 \\ 0 \; if \; V_{it}^* \leq 0 \end{cases} \quad (6)$$

$$s_{it} = \begin{cases} s_{it}^* \; if \; V_{it} = 1 \\ 0 \; if \; V_{it} = 0 \end{cases} \quad (7)$$

V_{it}^* and s_{it}^* follow the following processes:

$$V_{it}^* = \alpha_6 + \Gamma_6 X_{it} + \theta_i + \gamma_t + \varepsilon_{6it} \quad (8)$$

$$lns_{it}^* = \alpha_7 + \beta_6 SG_{it} + \Gamma_7 X_{it} + \theta_i + \gamma_t + \varepsilon_{7it} \quad (9)$$

Under the assumption that the errors in the Equations (8) and (9) are correlated, estimating them independently will result in a biased and inconsistent estimator of β_6. We use the full information maximum likelihood (FIML) estimation method or the two-step estimation method to estimate our bivariate sample selection model. The FIML method produces the most efficient estimates of the Heckman model. However, it assumes that the errors are jointly normally distributed, which is a strong assumption to make and might not always be the case. The two-step method also produces a

consistent estimate of the Heckman model but under the less strict assumption. Using a bivariate sample selection model instead of a Tobit model, as in Conolly (2007), is a significant improvement in modelling saving behaviour in the context of Australia, as it treats the desire to save and the actual amount of savings as two separate but correlated processes. Earlier models treated the two as identical. We estimate the same models for household wealth as well.

Heterogeneous policy effects

For each of the models, analysis across the population as a whole and different income groups, different age cohorts, and across different demographic characteristics (gender of the head of the household, location, indigenous status, etc.) will be conducted to see if households in different groups have different responses to changes in SG. Further analysis includes studying the saving behaviour of financially constrained households and those that are not. We define financial constraint in the same way as Connolly (2007)[20]. We also examine whether the saving behaviour and wealth of households differ by home ownership status.

DATA

We use the Household, Income and Labour Dynamics in Australia Survey (HILDA) for this analysis. It is a household-based longitudinal survey carried out annually. It follows a multistage clustered sampling method covering 19,914 individuals residing in 7,682 households in wave 1, in 2001, and 23,237 individuals residing in 9,693 households in wave 18, in 2018. The data set includes a wide array of topics ranging from family background, education, employment status, income, expenditure to wealth, health and retirement. We use wave 5 to wave 18 HILDA data, collected from HILDA Release 18 – the restricted release version, as it started collecting details of household consumption expenditure only from wave 5.

Our full sample excludes households with multiple families if they are unrelated. Details of our sample are provided in Table 1. Unlike Connolly (2007), we do not exclude households based on any criteria related to age or employment status of household members, as these characteristics of a household change over time. These changes provide meaningful variations and transitions of households in a panel dataset, which was not absent in the cross-sectional setting of Connolly (2007).

We present a brief description of the variables from the HILDA survey that are relevant for our analysis in Table 2, Table 3 and Table 4.

Table 2 presents the economic and demographic characteristics of households. On average, from 2005 to 2018, the household heads were aged from 47 to 50 years. Around 60% of the households had a male head, and approximately 62% to 64% of these household heads classified themselves as married. Households that reported a working head represented from 65% to 71% of the total sample in these years. The share of heads with a tertiary degree increased over time from 52% in 2005 to 67% in 2018. The average household size was relatively stable at around 2.5 members, with the average number of children per household slightly decreased from 0.55 to 0.49 during the same period. Households with an indigenous background represented less than 4% of the total. 11 to 12% of the households were based in remote areas. Household disposable income grew by about 71% from $57,237 to $97,612 during the same period.

[20] A household will be classified as a financially constrained household for the year in which the response is "yes" to any of the following questions: having difficulty raising $2000, or $3000 in later HILDA waves, in an emergency; difficulty paying utility bills on time, difficulty paying mortgage/rent on time; having to pawned or sold something; went without meals, was unable to heat home; and asked for financial help from friends and family.

Approximately 64% of households owned their home, including those with mortgages. 48% of households were classified as financially constrained.

Table 3 describes the policy variables relevant to this analysis. These variables are defined at the respondent person level, not at the household level. On average, more than half of all responding individuals had access to superannuation guarantee in all waves. The HILDA survey collected information on superannuation only from wave 10 regularly. Before wave 10, limited information on superannuation was available in waves 2 and 6 from the wealth module. The share of individuals who had non-cash benefits in the form of superannuation was low and varied between 2-3%.

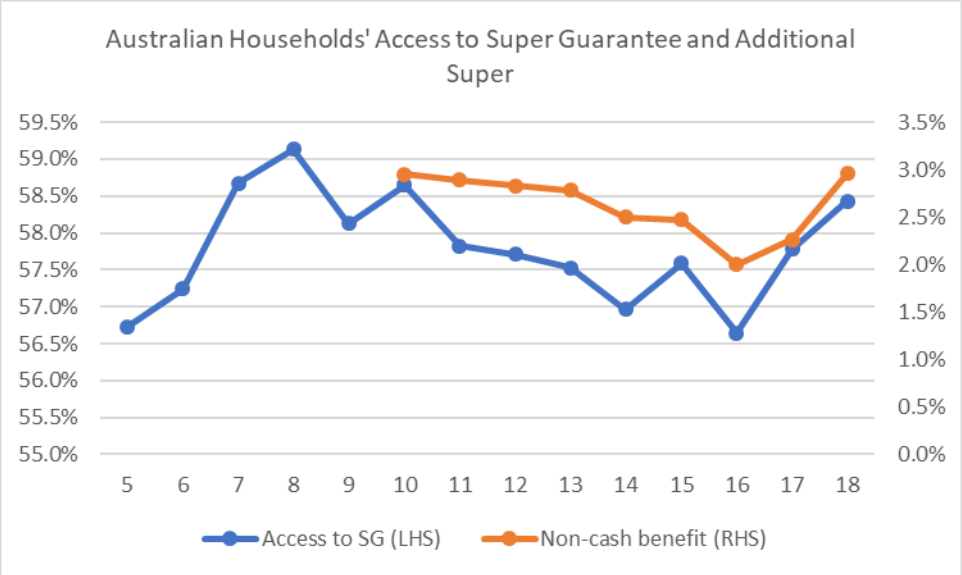

Figure 9: Access to SG and additional employer contributions - Source: HILDA, 2005 to 2018

HILDA added a question about the receipt of additional superannuation as a non-cash benefit from Wave 10 (2010). In the post-GFC period, from 2008, we observe a downward trend in the proportion of individuals having access to the SG. Since 2005, both access to SG and access to non-cash benefits had their lowest levels in 2016 and 2017. Only 56.6% received compulsory superannuation in 2016, and only 2% received additional employer super contribution as a non-cash benefit. From 2016 to 2018, both SG coverage and superannuation as non-cash benefits increased to 58.4% and 3% respectively. SG coverage, however, has not come back to its pre-GFC height of 59.1%.

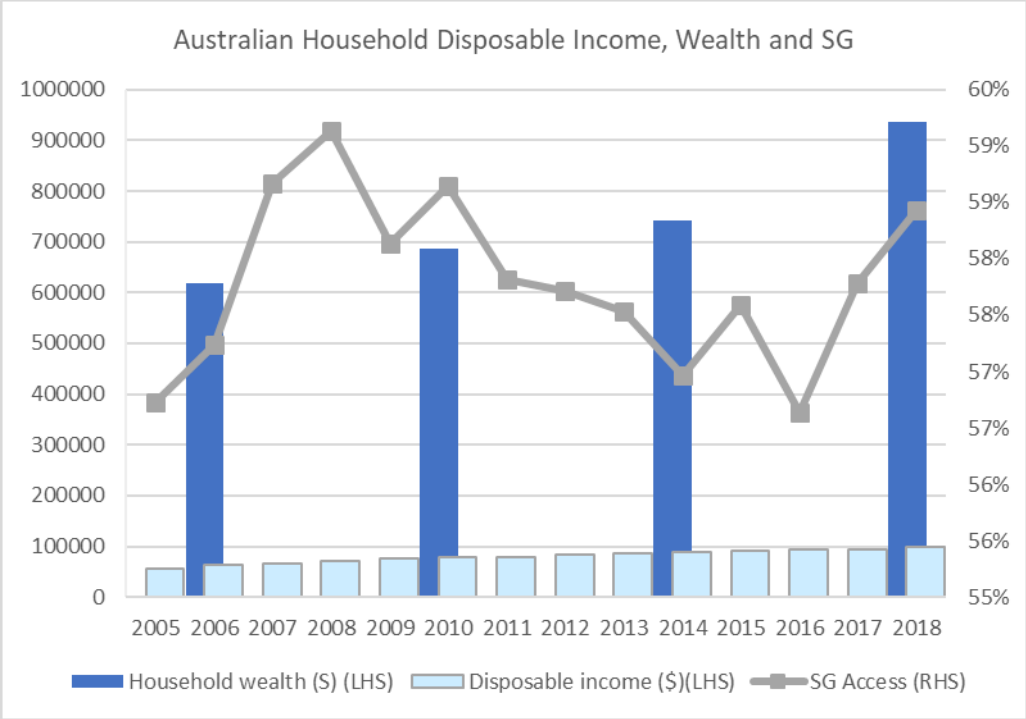

Figure 10: Australian Household Disposable Income, Wealth and SG Access - Source: HILDA

The Wealth module was introduced into the HILDA survey in Wave 2 in 2002 and has been repeated every four years since. The module covers a detailed measure of households' assets and liabilities, allowing us to examine the change in households' wealth as an indicator of household savings. As Table 4 shows, on average annual household net worth increased at rates of 11.13%, 2.63%, 1.91% and 6.02% between 2002-2006, 2006-2010, 2010-2014 and 2014-2018 respectively. Non-financial assets accounted for 65-70% of total household assets, and the rest were financial assets held in the form of bank deposits, savings in superannuation, bonds and insurance, etc. We include all the households in the respective wave in our analysis.

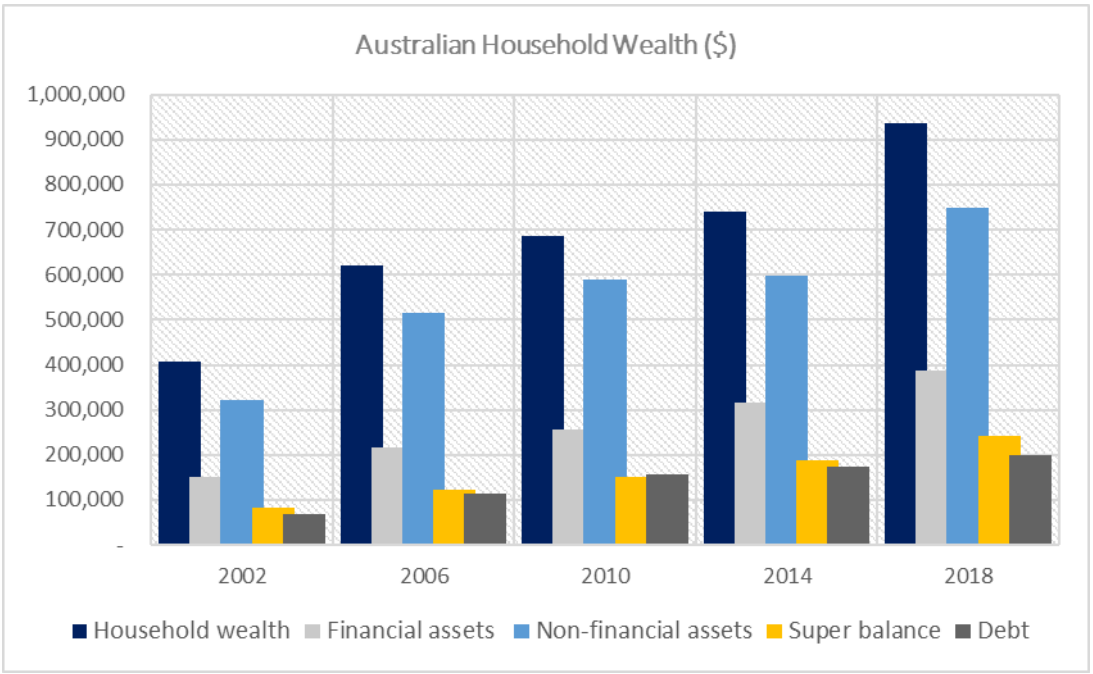

Figure 11: Australian Household Net Worth - Source: HILDA data

FINDINGS

The extensive margin

Effect of SG dummy and SG policy on household saving

Table 5 presents the fixed effect estimates of regression Equation (1) in columns 1-3 and those of Equation (2) in column 4.

Column 1 shows there is no significant difference in private voluntary saving between households that receive SG and those that do not. On average, households with SG save 1.1% more, but this is not statistically significant. However, we find that increasing the SG rate reduces private household saving. As column 2 shows, increasing the rate from 9% to 9.25% reduces private household saving by 3.2% and raising it from 9.25% to 9.5% reduces household saving by 2.3%. We also find that those who are eligible for SG save more than those who are not when the rate changes (column 3). These findings are consistent with behavioural models. When the SG rate increases, knowing that employers will be contributing more toward their retirement savings, people would have a lower incentive to save by themselves. We also find that changing the rate of SG has no significant effect on the saving behaviour of households who receive additional employer super contributions over the prescribed SG rate as non-cash benefits compared to those who don't (column 4). The signs of all other control variables are in line with the conventional saving models. Households save more as they have higher disposable income, but the relationship is non-linear. The rate at which saving increases with income declines at higher income levels. Saving also declines with the age of the head and size of the household, and there is evidence of non-linearity in these relationships. Households with married heads and those who are still working also save less. We do not find any significant relationship between household saving and the gender of the head. However, households with heads who have at least a tertiary degree save less than households with less-educated heads. The Simpler Super reform, which was designed to make superannuation savings accounts more attractive through tax incentives, had a negative and statistically significant impact on alternative private household saving, with which fell 4% to 6% less in response.

Effect of SGD and SGP on wealth

Table 6 presents the impact of the SG rate on household wealth, as specified by Equation (3). We find that overall access to SG (SGD) has a positive effect on wealth (column 1). Increasing the SG rate from 9% to 9.25% increases household net wealth by 17.5% ($(e^{0.162} - 1)X100\%$) and an increase from 9% to 9.5% increases net household wealth by 53.7% ($(e^{0.43} - 1)X100\%$) (column 2). These effects were more substantial for households where at least one member was eligible for SG (column 3). Since households' assets include savings in superannuation, one would expect an increase in the rate of SG to increase their total assets. The NC dummy (non-cash benefit) has no significant impact on household wealth, nor the interaction with the SG rates.

The intensive margin

The effect of compulsory employer contributions (CEC) on household saving

Table 7 presents the results of the regression Equation (4). It helps explain the marginal effect of each additional dollar of compulsory employer contribution (CEC) on households' private saving. We find that there is some substitution between CEC and household saving. As shown in column 1, each dollar of employer contribution reduces private household saving by 43 cents. However, we find that this substitution effect depends on the period under consideration. After the Simpler Super reform,

this substitution effect declines to 41 cents for each dollar of CEC (column 2). It further declines to 35 cents per dollar for the period 2014-2018 (column 3).

A large part of this decline in net household saving comes from increased mortgage repayment. As shown in columns 4-6, mortgage repayments by these households increased by about 24 cents in response to each additional dollar of CEC. This coefficient stays significant in other estimations with shorter time frames. It remained almost the same after the GFC, as shown in columns 5 and 6 even though the substitution rate between CEC and net household saving declined during that period.

This finding suggests that compulsory employer contributions provide an incentive for households to increase debt-financed property investment, resulting in higher mortgage payments and lower net household saving. It is inferred that households will be more comfortable and inclined to take on property debt given the knowledge that they can access their accumulated retirement savings to pay-off mortgages in the future, as documented by Kelly (2012). Further, as the means-tested age pension system leaves the residential home outside the assets test calculation, households have an incentive to invest more in their primary residence, and in doing so add to their home mortgage. The degree of substitution between private household saving and super saving revealed in our data is comparable to findings in other studies. Connolly and Kohler (2004) find that private household saving declines by 38 cents for each additional dollar employer contribution. However, the data and methodology used by Connolly and Kohler (2004) differ from ours. First, Connolly and Kohler (2004) use macro data and an Error Correction Model to estimate the substitution effect, whereas we use microdata (household data) and employ panel data models. In addition, the time periods for which we estimate these substitution effects are entirely different. Even though our estimates of the substitution effect are broadly similar in magnitude to those reported by Connolly and Kohler (2004), it is important to note that ours are statistically significant, whereas, the latter are not.

Effect of compulsory employer contributions (CEC) on household wealth

Table 8 presents the effects of compulsory SG on household wealth using the extrapolated estimate of employer contribution. All values in this part of analysis are measured at four-year intervals. A $1 rise in employer contribution increases net household wealth by $2.21. Much of this increase in household net wealth comes from superannuation. A $1 increase in employer contribution boosts the superannuation account balance by $1.51. The rest comes from other assets. We find that households' equity ownership in property (net of debt), i.e., property wealth – increased by $1.21 for a $1 increase in CEC over four years. There was also a decline in households' non-super non-housing wealth by $0.51; however, this estimated coefficient was statistically insignificant.

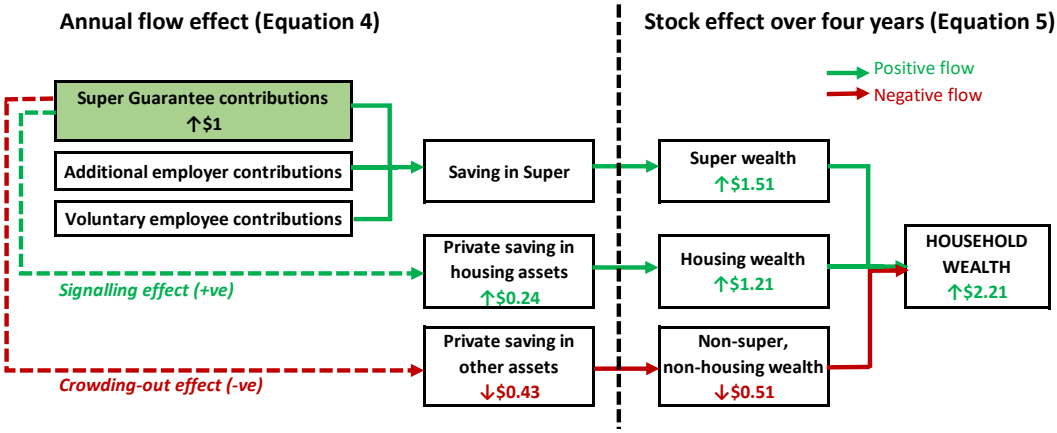

Figure 12: Links between household private saving and wealth

These findings are in line with those of *Table 7*. While private household saving declined in response to higher CEC, household wealth increased over the same period. The added household wealth results partly from the increase in assets owned in property, which should be expected given the observed higher mortgage repayments

Our analysis of the impact of CEC on households' housing wealth supports the *'signalling-effect'* theory, which holds that compulsory superannuation savings provide some confidence for households to increase property investment, resulting in higher mortgage payments and lower net household saving, which in turn, leads to lower value of other wealth assets.

The second source of increased household wealth is the larger superannuation balance. The boost of $1.51 in superannuation assets resulting from one dollar of CEC could be explained by the accumulated returns earned over time on superannuation investment. The HILDA survey provides information on wealth at four-year intervals only. Hence, the boost in superannuation resulting from a $1 increase in CEC includes the compound returns earned on the invested superannuation over those four years. Annual returns of super funds in Australia in the past two decades have been strong, with an average annual return of 7.39% since 2002 [21]. A dollar invested in super funds in 2002 would on average have earned a return of 47 cents by 2006. As we change the period of our analysis, these magnitudes change due to the variations in investment returns. The average annual returns reported by super funds was 4.54% for 2007-2010 and 9.37% for 2011-2014. Therefore, if we shorten the analysis period to 2010–2014, the effect of a one-dollar increase in employer contribution on super balance is only $1.14. For the later period of 2014 - 2018, that effect increases to $1.34[22].

Figure 12 presents the possible links between household private saving and wealth, via superannuation, property and other vehicles, as estimated by Equations (4) and (5). Overall, an increase in compulsory superannuation contribution leads to a strong boost to superannuation balance, more housing wealth accompanied by higher mortgage repayments, and a reduction in other wealth due to lower private saving. As a whole, household wealth increases when compulsory superannuation contributions increase.

We find a higher effect of a $1 increase in employer contribution to household wealth than in the existing literature. Connolly (2007) finds that each dollar of employer contribution increases household financial wealth by less than a dollar ($ 0.91). However, it should be noted that Connolly (2007) uses a different extrapolation method to calculate the amount of employer contribution, which is based on average industry wage. Both Connolly's and our estimated employer contribution amounts are prone to measurement error and are not comparable. Another reason why our estimates differ to Connolly's could be the different periods and nature of the two studies. Connolly (2007) uses a cross-sectional analysis, whereas we employ a panel approach, which captures the dynamics in household saving behaviour and deals with unobserved household-specific heterogeneity. However, the effect of the employer contribution on pension asset that Connolly (2007) finds ($1.74) is larger than what we find ($1.51).

We acknowledge that our estimate of CEC is prone to measurement error. However, as we measure CEC from the individual wage/salary reported in the HILDA survey, the probability that this estimate is measured with error is no higher than that of any other variables in this survey.

[21] https://www.superguide.com.au/comparing-super-funds/super-funds-returns-financial-year
[22] We don't present these results in this report; however, they can be provided upon request.

Heterogeneity in saving behaviour

Table 9 shows how the saving behaviour of households varies by different groups. Columns 1 and 2 present the heterogeneous saving behaviour by demographic characteristics, and columns 3-4 show them by financial hardship and home ownership. We find that as income increases, those with access to SG (SGD) save more than those without (column 1). Financially constrained households save 6.1% less than those who are not financially constrained, and home owners save 19.1% (=$(e^{0.181}-1)X100\%$) less than non-home owners when they are eligible for SG (column 3). As the SG rate increases from 9% to 9.25% and 9.5%, households with married heads save more than those with single heads, as do households with older heads. However, households with male heads save less when these rates increase. We find similar patterns for households in income quantiles 2, 3 and 4 compared to those in quantile 1. The higher income quantile households save about 5% more than those in income quantile 1 in response to a change in SG from 9%-9.25%, and 5-9% more as the SG rate increases from 9%-9.5%. There is evidence of heterogeneous saving response to SG rate changes among households based on home ownership as well. The home owners save 7.3% and 8.5% more than the non-home owners as the SG rate increases from 9% to 9.25% and 9.5%.

We also find evidence that the magnitudes of substitution between the compulsory employer contribution and private household saving differ between households that own their house and those that do not. We run regression Equation (4) for using separate interaction terms for financial constraint and home ownership. The results are presented in *Table 10*. We find that home owners save 26 cents less for each dollar increase in employer contribution compared to non-home owners. However, this effect declines in later years (after 2007, as shown in columns 2 and 3). We also find that financially constrained households save more than those who do not face such constraints. These results are also in line with those found in the literature. Financially constrained households find it difficult to borrow, and therefore are less inclined to substitute the extra saving with higher consumption compared to those who are not restricted by such constraints. However, the effect of financial constraint on private household saving, or the difference in rates of substitution between private saving across these two groups of households, is not statistically significant at 5%.

Heterogeneity in wealth accumulation

Table 11 presents the heterogeneous effects of CEC on household wealth by financial hardship. For households that are not financially constrained, a $1 additional CEC increases wealth, superannuation assets, property and other assets (as also shown in Table 8). However, compared to financially constrained households, their level of wealth in superannuation property and other assets is much higher. Financially constrained households have 97 cents less savings in superannuation, $2.54 less in property and 63 cents less in other assets compared to those that are not financially constrained in response to a $1 increase in their CEC.

Heckman sample selection model

We present the results for the Heckman sample selection model for saving in *Table 12*. Column 1 reports the estimated coefficients for the participation Equation (Equation (8)). Columns 2-5 present the estimated coefficients for Equation (9), where the policy variables are SG dummy (SGD) and SG policy (SGP) and the interaction of SG policy with SG dummy and non-cash benefit (NC).

On average, households with access to SG have 6.2% higher saving (column 1), but saving declines by 2.8% and 2.7% as the SG rate increases from 9% to 9.25% and from 9% to 9.5% respectively (columns 2). However, for households that are eligible for employer contribution (SGD =1), the

saving rate increases by 5.9% and 9.5% respectively in response to these changes in the SG rate. These results are qualitatively the same but different in magnitudes from those we find in the FE estimated presented in Table 5. In line with the FE estimates, we find that non-cash benefits do not affect household saving.

Our estimates of the Heckman sample selection model for household private saving show that the correlation between the errors in Equations (8) and (9) is statistically significant, as indicated by the level of significance of the parameter lambda. This implies that the model defined in Equation (1) has selection bias – those who have positive net saving behave differently to those who have non-positive net saving – and therefore we see results in different parameter estimates. The difference in the magnitudes of the results presented in *Table 5* and *Table 12* may also stem from the fact that Heckman uses GLS method to estimate Equation (9) and we use a fixed-effect model for Equation (1).

Table 13 presents the Heckman estimates for wealth. Column 1 reports the coefficients of the participation equation, while columns 2-5 report the coefficients of Equation (9), where the dependent variable is the log of net household wealth. As column 2 shows, eligibility for SG does not have any significant effect on household wealth. Increasing the SG rate from 9% to 9.5% results in a 12.9% rise in wealth (column 3). However, the change is not statistically significant for the change from 9% to 9.25%. Besides, for households that were eligible for employer contribution (SGD=1), the increase in the SG rate from 9% to 9.25% resulted in an 8.9% decline in wealth compared to those that were not eligible.

Our FIML estimates of the Heckman model show that the errors in Equations (8) and (9) are correlated, implying that the wealth model in Equation (2) suffers from selection bias - that those who have non-positive wealth behave differently to those who have positive wealth in response to changes in the eligibility for compulsory employer contribution or changes in the SG rates. However, as the Heckman model employs the GLS estimation method for Equation (9), it ignores any unobserved household-specific heterogeneity that might be present.

A summary of the main findings of this report and interpretations is provided in *Table 14.*

CONCLUSION

The Superannuation Guarantee is designed principally to build up the retirement savings of Australian households. While the SG system unquestionably succeeds in increasing collective superannuation savings, our study finds it also has the (possibly unintended) effect of helping to boost other forms of household savings.

Using a panel data model and a sample selection model, we find that households that are eligible for the employer contribution do not save less than other households. However, increasing the rate of SG is also associated with a reduction in voluntary private saving. This finding is consistent with theories of nudging, or signalling human behaviour. When employers contribute financially towards retirement, households, responding to the positive signal about saving, may also be inclined to save more. However, as the contribution by the employer increases, households tend to substitute the employer contribution for their own private saving. We find that households reduce saving by 0.43 cents for each additional dollar of compulsory employer contribution. Part of this decline is due to higher mortgage payments, as households invest more in their homes.

We find that net household wealth increases as the SG rate increases. A one-dollar increase in compulsory employer contribution leads to more than a one-dollar increase in net household

wealth. Most of the boost in wealth results from the growth in the superannuation asset and the rest comes from increased housing wealth. We find that households tend to invest more in property as employer superannuation contributions increase. However, there is also a lower level of annual private saving, resulting in a decline in non-super and non-housing wealth. We also find that these effects are smaller for households that are financially constrained.

The directions of all our findings are in line with established theories of household saving. However, the magnitudes are different from those found in the literature. Our estimates show that a $1 increase in compulsory employer contribution results in more than a one-dollar increase in super assets, with much of the boost resulting from high returns that super funds have produced during the past two decades. This conclusion may not hold for future returns in the event of changed market conditions.

Overall, our results suggest that the SG has had a positive impact on overall wealth. There is some substitution between super saving and private household saving. The substitution rate, however, is less than one, which means these policies help to generate new savings. We also find that compulsory superannuation leads to a partial reallocation of household wealth into property that might not otherwise occur.

Table 1: Sample description

Wave	Year	HIDLA	Our sample	Per cent	Cum.
5	2005	7,125	6,947	5.95	5.95
6	2006	7,139	6,953	5.95	11.9
7	2007	7,063	6,877	5.89	17.79
8	2008	7,066	6,889	5.9	23.69
9	2009	7,234	7,028	6.02	29.71
10	2010	7,317	7,126	6.1	35.82
11	2011	9,543	9,258	7.93	43.75
12	2012	9,537	9,267	7.94	51.68
13	2013	9,555	9,286	7.95	59.63
14	2014	9,538	9,288	7.95	67.59
15	2015	9,631	9,379	8.03	75.62
16	2016	9,750	9,513	8.15	83.77
17	2017	9,742	9,535	8.17	91.94
18	2018	9,639	9,416	8.06	100
Total		*119,879*	*116,762*	*100%*	

Table 2: Household Economic and Demographic Characteristics

Variable	Wave 5	Wave 6	Wave 7	Wave 8	Wave 9	Wave 10	Wave 11	Wave 12	Wave 13	Wave 14	Wave 15	Wave 16	Wave 17	Wave 18
Age of head (years)	47.7	47.73	47.87	47.67	47.95	48.16	49.17	49.26	49.39	49.36	49.51	49.61	49.99	49.91
	0.31	*0.3*	*0.3*	*0.28*	*0.28*	*0.28*	*0.29*	*0.29*	*0.31*	*0.3*	*0.3*	*0.29*	*0.3*	*0.28*
Gender of head (male)	62%	61%	61%	62%	61%	61%	61%	61%	60%	60%	61%	60%	59%	59%
	1%	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*
Married	63%	63%	63%	63%	63%	63%	64%	64%	64%	64%	63%	63%	63%	62%
	1%	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*
Working	69%	70%	71%	70%	71%	71%	70%	70%	70%	70%	70%	69%	69%	69%
	1%	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*
Tertiary education	55%	57%	57%	58%	59%	59%	62%	63%	64%	65%	66%	66%	67%	67%
	1%	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*
Household size	2.51	2.51	2.52	2.51	2.52	2.52	2.5	2.49	2.48	2.49	2.48	2.47	2.48	2.48
	0.02	*0.02*	*0.02*	*0.02*	*0.02*	*0.02*	*0.02*	*0.02*	*0.02*	*0.02*	*0.02*	*0.02*	*0.02*	*0.02*
No. of children	0.53	0.52	0.52	0.52	0.51	0.51	0.5	0.51	0.5	0.5	0.5	0.49	0.5	0.49
	0.02	*0.01*	*0.01*	*0.02*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*
Indigenous	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	4%
	0%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Home ownership	67%	67%	67%	67%	67%	67%	65%	65%	64%	64%	64%	64%	64%	64%
	1%	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*
Financially constrained	51%	49%	47%	46%	49%	47%	51%	50%	49%	50%	48%	50%	48%	48%
	1%	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*
Remote	11%	12%	11%	11%	11%	11%	12%	12%	12%	12%	11%	11%	11%	11%
	1%	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*	*1%*
Disposable income ($)	57,237	62,997	66,252	71,019	75,967	78,028	79,914	84,795	87,044	88,760	90,688	92,944	93,656	97,612
	899	*1225*	*1113*	*1234*	*1126*	*1202*	*1127*	*1303*	*1237*	*1276*	*1244*	*1555*	*1483*	*1478*
N	6627	6665	6572	6602	6766	6831	8889	8898	8898	8931	8998	9130	9144	9055

Notes: We define the head of the household as the person with the highest disposable income in that household. If two or more members of the households have the same disposable income, then the oldest among them is considered as the head. If more than one members have the same disposable income and the same age, then the one higher educational qualification among them is treated as the head. Mean and standards errors are in the first and second row respectively for each variable. We use the HILDA survey structures and prescribed weight for each round in calculating the mean and standard errors.

Table 3: Policy variables

Wave	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Access to SG	56.73%	57.24%	58.67%	59.13%	58.13%	58.65%	57.82%	57.71%	57.53%	56.96%	57.59%	56.64%	57.78%	58.43%
	0.74%	0.75%	0.71%	0.70%	0.70%	0.69%	0.63%	0.73%	0.71%	0.70%	0.75%	0.71%	0.76%	0.73%
Non-cash benefit						2.95%	2.89%	2.83%	2.78%	2.50%	2.47%	2.00%	2.26%	2.96%
						0.23%	0.24%	0.23%	0.19%	0.18%	0.21%	0.13%	0.19%	0.20%
N	12759	12905	12789	12785	13301	13526	17612	17475	17500	17511	17605	17693	17570	17434

Notes: Mean and standards errors are in the first and second row respectively for each variable.
We use the HILDA survey structures and prescribed weight for each round in calculating the mean and standard errors.

Table 4: Household wealth

$	Wave 2	Wave 6	Wave 10	Wave 14	Wave 18
Bank accounts	23,774.89	29,932.88	40,571.60	51,705.60	70,241.63
	1,246.30	*1,530.77*	*2,151.82*	*2,363.44*	*3,509.95*
Equity investments	32,425.34	47,290.62	38,644.01	44,071.00	43,643.51
	2,239.72	*3,751.44*	*2,983.18*	*3,570.70*	*2,816.61*
Super balance	83,444.28	121,973.18	151,943.15	189,068.73	241,190.42
	3,151.88	*4,854.43*	*6,627.34*	*6,144.02*	*7,284.24*
Cash investments	2,081.58	2,481.25	1,973.62	1,927.03	1,254.29
	301.14	*523.47*	*390.35*	*404.41*	*267.80*
Trust investments	5,029.84	8,797.97	11,489.48	13,003.76	19,393.17
	1,093.98	*2,339.07*	*2,022.59*	*1,692.44*	*3,283.15*
Life insurance	5,012.78	7,264.47	11,394.88	15,158.24	12,146.68
	524.44	*1,076.24*	*1.543.01*	*1.862.22*	*1.486.14*
Property	258,507.10	440,510.99	507,724.74	530,818.70	668,693.56
	8,876.31	*19,664.48*	*13,789.84*	*12,942.14*	*16,641.68*
Business assets	41,239.75	49,508.30	50,739.33	37,653.20	44,644.00
	4,746.93	*4,646.76*	*5,111.72*	*4,077.47*	*4,931.64*
Other assets	22,098.09	26,477.91	29,411.40	30,363.87	35,014.14
	785.88	*875.93*	*837.21*	*784.22*	*1,017.07*
Financial assets	151,768.72	217,740.36	256,016.73	314,934.36	387,869.70
	5,819.97	*8,648.92*	*10,651.05*	*10,582.55*	*12,173.17*
as % of total assets	*32.0%*	*29.7%*	*30.3%*	*34.5%*	*34.1%*
Non-financial assets	321,844.93	516,497.20	587,875.46	598,835.77	748,351.70
	11,868.82	*22,425.14*	*16,949.18*	*15,235.25*	*19,157.19*
as % of total assets	*68.0%*	*70.3%*	*69.7%*	*65.5%*	*65.9%*
Total assets	473,613.65	734,237.56	843,892.19	913,770.12	1,136,221.41
	16,075.77	*28,046.91*	*24,967.97*	*22,992.16*	*28,426.17*
Total debt	67,728.63	115,081.09	156,913.63	172,802.32	199,970.16
	2,272.42	*4,057.68*	*5,133.04*	*5,508.83*	*6,831.99*
Household wealth	405,885.02	619,156.47	686,978.57	740,967.81	936,251.25
	14,766.50	*25,773.65*	*22,699.13*	*20,697.09*	*25,587.09*
Annual growth from previous wave		*11.13%*	*2.63%*	*1.91%*	*6.02%*
N	7,051	6,953	7,126	9,288	9,416

Notes: Mean and standards errors are in the first and second row respectively for each variable. We use the HILDA survey structures and prescribed weight for each round in calculating the mean and standard errors.

Table 5: The effect of SGD and SGP on household saving rates) (Fixed effect estimates)

VARIABLES	(1) SGD	(2) SGP	(3) SGP*SGD	(4) SGP*NC
SGD	0.011		-0.009	
	(0.011)		(0.012)	
SG1		-0.032***	-0.063***	-0.035***
		(0.010)	(0.015)	(0.009)
SG2		-0.023**	-0.061***	-0.029***
		(0.010)	(0.013)	(0.010)
SGD*SG1			0.044***	
			(0.016)	
SGD*SG2			0.053***	
			(0.011)	
Simpler Super Reform	-0.061***	-0.038***	-0.040***	
	(0.012)	(0.011)	(0.011)	
Financial constraint	-0.003	-0.003	-0.003	-0.006
	(0.006)	(0.006)	(0.006)	(0.007)
Log of income	4.987***	4.990***	5.033***	5.583***
	(0.094)	(0.094)	(0.094)	(0.117)
Log of income squared	-0.138***	-0.138***	-0.140***	-0.163***
	(0.004)	(0.004)	(0.004)	(0.005)
Age of head	-0.011***	-0.011***	-0.014***	-0.011***
	(0.001)	(0.001)	(0.002)	(0.002)
Age of head squared	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Head is male	-0.003	-0.003	-0.004	-0.007
	(0.007)	(0.007)	(0.007)	(0.008)
Head is married	-0.066***	-0.067***	-0.067***	-0.060***
	(0.010)	(0.010)	(0.010)	(0.012)
Head is working	-0.045***	-0.044***	-0.045***	-0.046***
	(0.013)	(0.013)	(0.013)	(0.015)
Education (tertiary)	-0.019**	-0.019**	-0.019**	-0.012
	(0.009)	(0.009)	(0.009)	(0.011)
No of children	-0.042***	-0.042***	-0.041***	-0.042***
	(0.006)	(0.006)	(0.006)	(0.007)
Household size	-0.072***	-0.071***	-0.073***	-0.082***
	(0.011)	(0.011)	(0.011)	(0.014)
Household size squared	0.005***	0.005***	0.006***	0.008***
	(0.001)	(0.001)	(0.001)	(0.002)
Indigenous	0.071**	0.071**	0.071**	0.036
	(0.032)	(0.032)	(0.032)	(0.039)
Home ownership	-0.128***	-0.128***	-0.129***	-0.122***
	(0.008)	(0.008)	(0.008)	(0.010)
Non-cash benefit (NC)				-0.020
				(0.017)
NC*SG1				0.025
				(0.034)
NC*SG2				0.014
				(0.022)
Observations	93,242	93,242	93,242	66,356
R-squared	0.569	0.569	0.569	0.564
Number of id	12,985	12,985	12,985	11,776
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Notes:
The dependent variable is log of saving in all regression results presented in this table. All models include time fixed effects, state, industry and location dummies. But we do not report their coefficients for brevity. SG1 refers to SG rate=9.25% and SG2 refers to SG rate=9.5%. The base category is SG rate=9.00%.

Standard errors in parentheses.
**** p<0.01,*
*** p<0.05,*
** p<0.1.*

Table 6: The effect of SGD and SDP on household wealth (Fixed effect estimate)

VARIABLES	(1) SGD	(2) SGP	(3) SGP*SGD	(4) SGP*NC
SGD	0.048		-0.013	
	(0.033)		(0.035)	
L.SGD	0.010			
	(0.025)			
L2.SGD	-0.017			
	(0.024)			
L3.SGD	0.083***			
	(0.022)			
SG1		0.162***	0.107***	0.159***
		(0.015)	(0.025)	(0.016)
SG2		0.430***	0.249***	0.425***
		(0.019)	(0.029)	(0.019)
SGD*SG1			0.077***	
			(0.029)	
SGD*SG2			0.264***	
			(0.033)	
Simpler Super Reform	-0.021	0.153***	0.150***	0.153***
	(0.027)	(0.016)	(0.016)	(0.016)
Financial constraint	-0.150***	-0.164***	-0.161***	-0.163***
	(0.016)	(0.015)	(0.015)	(0.015)
Income	0.010***	-0.119	0.093	-0.095
	(0.000)	(0.151)	(0.154)	(0.152)
Income squared	-0.359	0.018***	0.008	0.016**
	(0.271)	(0.006)	(0.007)	(0.006)
Age of head	0.028**	0.075***	0.063***	0.075***
	(0.011)	(0.004)	(0.004)	(0.004)
Age of head squared	0.059***	-0.001***	-0.001***	-0.001***
	(0.004)	(0.000)	(0.000)	(0.000)
Head is male	-0.001***	0.076***	0.076***	0.076***
	(0.000)	(0.018)	(0.018)	(0.018)
Head is married	0.076***	0.145***	0.144***	0.145***
	(0.018)	(0.025)	(0.025)	(0.025)
Head is working	0.122***	0.024	0.014	0.025
	(0.027)	(0.036)	(0.036)	(0.036)
Education	0.021	0.065***	0.066***	0.065***
	(0.036)	(0.024)	(0.024)	(0.024)
No of children	0.028	-0.125***	-0.120***	-0.125***
	(0.025)	(0.014)	(0.014)	(0.014)
Household size	-0.091***	0.335***	0.330***	0.334***
	(0.014)	(0.026)	(0.026)	(0.026)
Household size squared	0.278***	-0.017***	-0.016***	-0.017***
	(0.027)	(0.004)	(0.004)	(0.004)
Indigenous	-0.014***	-0.089	-0.087	-0.088
	(0.004)	(0.081)	(0.081)	(0.081)
Home ownership	0.025	0.947***	0.942***	0.946***
	(0.091)	(0.022)	(0.022)	(0.022)
Non cash benefit (NC)				0.012
				(0.051)
NC*SG1				0.046
				(0.069)
NC*SG2				0.093
				(0.069)
Observations		29,732	29,732	29,732
R-squared		0.363	0.366	0.364

VARIABLES	(1) SGD	(2) SGP	(3) SGP*SGD	(4) SGP*NC
Number of id		11,841	11,841	11,841
State FE		Yes	Yes	Yes
Year FE		Yes	Yes	Yes
Industry FE		Yes	Yes	Yes

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is log of wealth in all four columns. All models include time fixed effects and location dummies. But we do not report their coefficients for brevity. SG1 refers to SG rate=9.25% and SG2 refers to SG rate=9.5%. The base category is SG rate=9.00%

Table 7: The effect of compulsory employer contribution (CEC) on household private saving ($) and mortgage repayments (Fixed-effect estimates)

	(1)	(2)	(3)	(4)	(5)	(6)
	Net saving			Mortgage repayments		
Waves	5-18	8-18	14-18	5-18	8-18	14-18
CEC	-0.430***	-0.414***	-0.347***	0.243***	0.265***	0.259***
	(0.028)	(0.032)	(0.049)	(0.023)	(0.026)	(0.037)
Super Reform	-5,266.81***			3,183.31***		
	(574.30)			(550.695)		
Financial constraint	15.376	111.30	532.20	-607.01***	-488.34*	-866.94**
	(255.02)	(296.51)	(461.41)	(222.76)	(251.79)	(363.96)
Income	0.975***	0.981***	0.999***	0.011***	0.004	-0.022***
	(0.003)	(0.004)	(0.005)	(0.003)	(0.003)	(0.005)
Income squared	0.000***	0.000***	0.000	-0.000	0.000	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age of head	-1,248.88***	-1,200.14***	-955.89***	399.797***	286.677**	45.381
	(89.480)	(112.737)	(212.880)	(104.622)	(125.599)	(219.999)
Age of head squared	14.103***	13.431***	10.679***	-4.943***	-3.703**	-0.489
	(1.011)	(1.273)	(2.390)	(1.240)	(1.481)	(2.562)
Head is male	-387.696	-601.492	-53.560	147.311	400.781	-460.283
	(324.647)	(382.862)	(610.886)	(296.521)	(338.600)	(503.782)
Head is married	-2,204.92***	-2,249.0***	-1,860.24**	2,092.13***	2,390.68***	836.371
	(431.280)	(518.5448)	(895.520)	(479.160)	(563.806)	(929.709)
Head is working	280.232	171.581	-442.351	587.273	85.756	-653.290
	(619.453)	(719.271)	(1,105.222)	(649.508)	(728.819)	(1,019.94)
Education	88.229	-26.883	-172.738	-395.937	-184.899	56.395
	(423.016)	(504.980)	(860.378)	(430.420)	(499.539)	(796.686)
No of children	990.467***	884.802***	1,101.279*	52.036	105.561	-440.075
	(242.268)	(301.482)	(607.806)	(199.939)	(238.781)	(443.959)
Household size	-4,238.35***	-4,497.41***	-7,140.56***	-286.976	-213.264	1,193.894
	(464.234)	(571.232)	(1,090.638)	(441.227)	(512.823)	(1,014.64)
Household size squared	-4.019	64.663	532.711***	-0.981	-54.299	-188.307
	(65.418)	(81.180)	(160.222)	(59.113)	(68.734)	(144.617)
Indigenous	855.147	608.642	894.991	255.458	-184.483	352.243
	(1,482.704)	(1,757.094)	(3,221.204)	(1,663.697)	(1,945.755)	(2,973.37)
Home ownership	-8,989.8***	-9,601.6***	-6,838.44***	-7,895.894	-14,394.069	
	(375.680)	(449.943)	(786.984)	(7,263.457)	(15,020.184)	
Observations	72,536	59,626	29,238	32,104	26,468	12,868
R-squared	0.838	0.835	0.866	0.036	0.019	0.013
Number of id	10,571	9,899	8,056	5,654	5,159	3,896
State FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The dependent variable is $ amount saving in columns 1 – 3 and mortgage payments in column 4 – 6. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All models include time fixed effects, state, industry and location dummies. For brevity, we do not report their coefficients.

Table 8: The effect of the compulsory employer contribution on wealth (measured at four-year intervals) (FE estimates)

VARIABLES	(1) Wealth	(2) Superannuation balance	(3) Property	(4) Non-super, non-property wealth
CEC	2.205***	1.507***	1.206***	-0.508
	(0.580)	(0.188)	(0.322)	(0.374)
Super Reform	-132,232.09***	-8,334.83	-76,989.1***	-46,908.16**
	(28,896.001)	(9,377.030)	(16,051.352)	(18,664.786)
Financial constraint	-43,642.282***	-4,831.083	-10,621.322	-28,189.88***
	(15,638.952)	(5,074.990)	(8,687.234)	(10,101.664)
Housing price	7,319.745***	2,355.571***	3,662.449***	1,301.726***
	(511.198)	(165.889)	(283.964)	(330.198)
Income	0.533***	0.073***	0.184***	0.275***
	(0.080)	(0.026)	(0.045)	(0.052)
Income squared	0.000***	0.000***	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Age of head	-44,724.77***	-20,731.54***	-23,314.9***	-678.34
	(4,993.688)	(1,620.500)	(2,773.929)	(3,225.571)
Age of head squared	575.356***	265.250***	301.963***	8.143
	(55.567)	(18.032)	(30.866)	(35.892)
Head is male	-16,355.627	15,458.661**	-12,268.107	-19,546.181
	(19,234.395)	(6,241.746)	(10,684.456)	(12,424.067)
Head is married	17,025.981	15,868.583*	-20,446.395	21,603.793
	(25,118.615)	(8,151.232)	(13,953.063)	(16,224.860)
Head is working	-3,091.040	-11,626.237	12,159.014	-3,623.817
	(39,010.512)	(12,659.286)	(21,669.831)	(25,198.049)
Education	-83,900.30***	-13,055.418	-43,975.25***	-26,869.64*
	(24,801.847)	(8,048.438)	(13,777.103)	(16,020.250)
No of children	-25,525.32**	-17,557.04***	-9,221.315	1,253.029
	(12,954.152)	(4,203.747)	(7,195.862)	(8,367.471)
Household size	107,480.339***	22,433.677***	53,261.721***	31,784.942*
	(25,286.057)	(8,205.569)	(14,046.075)	(16,333.016)
Household size squared	-6,224.538*	-1,078.350	-3,139.807	-2,006.381
	(3,481.134)	(1,129.661)	(1,933.724)	(2,248.568)
Indigenous	-32,725.432	-942.406	-8,150.101	-23,632.925
	(82,969.837)	(26,924.510)	(46,088.663)	(53,592.683)
Home ownership	163,480.428***	-9,088.845	160,176.544***	12,392.729
	(21,681.070)	(7,035.715)	(12,043.552)	(14,004.447)
Observations	20,793	20,793	20,793	20,793
R-squared	0.194	0.213	0.009	0.016
Number of id	9,153	9,153	9,153	9,153
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. We do not report the coefficients of the interaction terms here. They are all positive and statistically insignificant. We run all the models with a set of time fixed effect, industry, state and location dummies, but we do not report their coefficients for brevity.

Table 9: Heterogeneous policy effects on household saving rate

VARIABLES	(1) SGD	(2) SGP	(3) SGD	(4) SGP
SGD	-0.137***	0.008	0.154***	-0.007
	(0.033)	(0.013)	(0.016)	(0.012)
SG1		-0.140***		-0.107***
		(0.032)		(0.020)
SG2		-0.177***		-0.122***
		(0.023)		(0.015)
SG1*SGD		-0.011		0.045***
		(0.033)		(0.017)
SG2*SGD		0.015		0.048***
		(0.019)		(0.011)
SG1*tertiary		-0.002		
		(0.016)		
SG2*tertiary		0.002		
		(0.010)		
SG1^agegroup2		0.052***		
		(0.017)		
SG1*agegroup3		0.038		
		(0.028)		
SG1*2.agegroup2		0.065***		
		(0.012)		
SG2*.agegroup3		0.057***		
		(0.019)		
SG1*(head is male)		-0.038**		
		(0.016)		
SG2*(head is male)		-0.026***		
		(0.010)		
SG1*(head is married)		0.063***		
		(0.018)		
SG2*(head is married)		0.056***		
		(0.012)		
SG1*(head is working)		0.035		
		(0.034)		
SG2*(head is working)		0.009		
		(0.019)		
SG1*income quantile 2		0.046*		
		(0.026)		
SG1*income quantile 3		0.050*		
		(0.029)		
SG1*income quantile 4		0.044		
		(0.030)		
SG2*income quantile 2		0.080***		
		(0.016)		
SG2*income quantile 3		0.086***		
		(0.018)		
SG2*income quantile 4		0.051***		
		(0.019)		
SG1*Indigenous		-0.027		
		(0.040)		
SG2*Indigenous		0.036		
		(0.025)		
SGD*Education	-0.027*			
	(0.015)			

VARIABLES	(1) SGD	(2) SGP	(3) SGD	(4) SGP
SGD*age group 2	0.009			
	(0.017)			
SGD*age group 3	0.033			
	(0.023)			
SGD*(head is male)	-0.003			
	(0.013)			
SGD*(head is married)	0.019			
	(0.015)			
SGD*(head is working)	0.046*			
	(0.026)			
SGD*income quantile 2	0.040**			
	(0.018)			
SGD*income quantile 3	0.080***			
	(0.021)			
SGD*income quantile 4	0.171***			
	(0.024)			
SGD*indigenous	0.039			
	(0.036)			
SGD*FC			-0.061***	
			(0.011)	
SGD*HO			-0.181***	
			(0.014)	
SG1*FC				-0.007
				(0.015)
SG2*FC				0.013
				(0.009)
SG1*HO				0.071***
				(0.016)
SG2*HO				0.085***
				(0.011)
Observations	93,242	93,242	93,242	93,242
R-squared	0.570	0.570	0.570	0.570
Number of id	12,985	12,985	12,985	12,985
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Notes: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. All models include time fixed effects and location dummies. But we do not report their coefficients for brevity. The dependent variable is the log of saving in all the columns. We only report the coefficients of the interaction terms for the demographic and economic characteristics of the households, not the coefficients on those variables for brevity. SG1 refers to SG rate=9.25%, and SG2 refers to SG rate=9.5%. The base category is SG rate=9.00%

Table 10: Heterogeneous effect of the compulsory employer contribution on saving ($ amount) (FE estimates)

VARIABLES	(1) Waves 5-18	(2) Waves 8-18	(3) Waves 14-18
CEC	-0.194***	-0.232***	-0.246***
	(0.050)	(0.058)	(0.081)
Financial constraint (FC)	491.319	218.720	1,237.981*
	(385.711)	(456.564)	(733.911)
Home ownership (HO)	-6,821.153***	-7,653.497***	-5,900.856***
	(545.024)	(660.899)	(1,132.493)
CEC*FC	-0.056	-0.011	-0.074
	(0.036)	(0.040)	(0.060)
CEC*HO	-0.260***	-0.219***	-0.094
	(0.047)	(0.054)	(0.081)
SR	-5,357.902***		
	(574.561)		
Log of income	0.974***	0.980***	0.998***
	(0.003)	(0.004)	(0.005)
Log of income squared	0.000***	0.000***	0.000*
	(0.000)	(0.000)	(0.000)
Age of head	-1,284.175***	-1,229.549***	-971.318***
	(89.697)	(112.958)	(213.138)
Age of head squared	14.500***	13.759***	10.838***
	(1.013)	(1.276)	(2.393)
Head is male	-432.503	-644.705*	-62.234
	(324.767)	(383.014)	(611.037)
Head is married	-2,402.627***	-2,414.510***	-1,919.684**
	(432.618)	(520.120)	(896.275)
Head is working	265.966	132.615	-392.457
	(619.832)	(719.676)	(1,105.821)
Education (tertiary)	5.547	-96.871	-177.461
	(423.311)	(505.319)	(860.425)
No of children	967.291***	894.969***	1,048.326*
	(244.412)	(303.486)	(609.823)
Household size	-4,369.190***	-4,634.479***	-7,186.587***
	(465.153)	(572.485)	(1,093.689)
Household size squared	15.768	81.344	545.687***
	(65.498)	(81.284)	(160.472)
Indigenous	784.333	537.946	844.161
	(1,482.412)	(1,756.973)	(3,221.303)
Observations	72,536	59,626	29,238
R-squared	0.838	0.835	0.866
Number of id	10,571	9,899	8,056
State FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes

Notes: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. All models include time fixed effects and location dummies. But we do not report their coefficients for brevity.

Table 11: Heterogeneous effect of Compulsory Employer Contribution on wealth (FE estimates)

VARIABLES	(1) Wealth	(2) Super assets	(3) Property	(4) Other wealth
CEC	3.528***	1.816***	2.016***	-0.305
	(0.611)	(0.199)	(0.340)	(0.396)
Financial constraint (FC)	80,227.934***	24,129.410***	65,268.662***	-9,170.138
	(24,247.784)	(7,875.911)	(13,463.722)	(15,690.747)
FC*CEC	-4.152***	-0.971***	-2.544***	-0.637
	(0.622)	(0.202)	(0.345)	(0.402)
Home ownership	163,169.406***	-9,161.561	159,985.994***	12,344.973
	(21,640.492)	(7,029.038)	(12,016.009)	(14,003.568)
Super Reform	-127,787.012***	-7,295.589	-74,265.789***	-46,225.634**
	(28,849.539)	(9,370.604)	(16,018.873)	(18,668.544)
Housing Price	7,439.267***	2,383.514***	3,735.675***	1,320.078***
	(510.554)	(165.833)	(283.488)	(330.379)
Income	0.550***	0.077***	0.195***	0.278***
	(0.080)	(0.026)	(0.045)	(0.052)
Income squared	0.000***	0.000***	0.000***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Age of head	-43,446.156***	-20,432.593***	-22,531.544***	-482.018
	(4,988.009)	(1,620.153)	(2,769.621)	(3,227.742)
Age of head squared	559.161***	261.463***	292.041***	5.657
	(55.515)	(18.032)	(30.825)	(35.924)
Head is male	-14,719.099	15,841.277**	-11,265.477	-19,294.899
	(19,199.917)	(6,236.316)	(10,660.865)	(12,424.271)
Head is married	14,622.699	15,306.702*	-21,918.783	21,234.780
	(25,074.130)	(8,144.316)	(13,922.556)	(16,225.476)
Head is working	1,571.400	-10,536.172	15,015.492	-2,907.919
	(38,943.675)	(12,649.276)	(21,623.701)	(25,200.462)
Education	-80,659.925***	-12,297.827	-41,990.005***	-26,372.092*
	(24,760.130)	(8,042.326)	(13,748.206)	(16,022.286)
No of children	-38,922.044***	-20,689.150***	-17,428.914**	-803.980
	(13,084.679)	(4,250.028)	(7,265.344)	(8,467.099)
Household size	111,710.533***	23,422.684***	55,853.379***	32,434.470**
	(25,246.628)	(8,200.345)	(14,018.336)	(16,337.099)
Household size squared	-5,775.753*	-973.425	-2,864.856	-1,937.472
	(3,475.261)	(1,128.798)	(1,929.659)	(2,248.842)
Indigenous	-44,914.834	-3,792.252	-15,618.026	-25,504.556
	(82,834.489)	(26,905.429)	(45,994.330)	(53,602.219)
Observations	20,793	20,793	20,793	20,793
R-squared	0.197	0.214	0.158	0.029
Number of id	9,153	9,153	9,153	9,153
State FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. We do not report the coefficients of the interaction terms here. They are all positive and statistically insignificant. We run all the models with a set of time fixed effect, industry, state and location dummies, but we do not report their coefficients for brevity.

Table 12: Heckman Sample Selection Model (effect on log of Household Saving)

VARIABLES	(1) Participation Equation	(2) SGD	(3) SGP	(4) SGD*SDP	(5) SGP*NC
SGD		0.062***		0.028**	0.028***
		(0.010)		(0.011)	(0.011)
SG1			-0.028***	-0.070***	-0.071***
			(0.011)	(0.017)	(0.017)
SG2			-0.027**	-0.093***	-0.093***
			(0.011)	(0.013)	(0.013)
SGD*SG1				0.058***	0.057***
				(0.018)	(0.018)
SGD*SG2				0.091***	0.092***
				(0.010)	(0.010)
Super Reform	-0.716***	-0.196***	-0.166***	-0.170***	-0.169***
	(0.031)	(0.013)	(0.013)	(0.013)	(0.013)
Financial constraint	0.070***	-0.044***	-0.044***	-0.043***	-0.044***
	(0.012)	(0.005)	(0.005)	(0.005)	(0.005)
Log of income	5.935***	2.997***	2.990***	3.115***	3.112***
	(0.214)	(0.140)	(0.141)	(0.141)	(0.141)
Log of income squared	-0.204***	-0.063***	-0.063***	-0.068***	-0.068***
	(0.010)	(0.006)	(0.006)	(0.006)	(0.006)
Age of head	-0.020***	-0.015***	-0.015***	-0.015***	-0.015***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Age of head squared	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Head is male	0.048***	0.005	0.005	0.005	0.005
	(0.012)	(0.005)	(0.005)	(0.005)	(0.005)
Head is married	-0.161***	-0.095***	-0.095***	-0.097***	-0.096***
	(0.015)	(0.006)	(0.006)	(0.006)	(0.006)
Head is working	-0.083**	-0.069***	-0.057***	-0.070***	-0.070***
	(0.035)	(0.013)	(0.013)	(0.013)	(0.013)
Education	-0.164***	-0.051***	-0.051***	-0.051***	-0.051***
	(0.012)	(0.005)	(0.005)	(0.005)	(0.005)
No of children	-0.024**	-0.094***	-0.095***	-0.094***	-0.094***
	(0.012)	(0.004)	(0.004)	(0.004)	(0.004)
Household size	-0.178***	-0.021***	-0.019***	-0.022***	-0.022***
	(0.019)	(0.007)	(0.007)	(0.007)	(0.007)
Household size squared	0.009***	0.005***	0.005***	0.005***	0.005***
	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)
Indigenous	0.159***	0.075***	0.075***	0.075***	0.075***
	(0.030)	(0.012)	(0.012)	(0.012)	(0.012)
Home ownership	-0.102***	-0.018***	-0.018***	-0.018***	-0.018***
	(0.013)	(0.005)	(0.005)	(0.005)	(0.005)
NC					-0.012
					(0.018)
NC*SG1					0.02
					(0.040)
NC*SG2					-0.000
					(0.025)
Lambda		-0.100***	-0.109***	-0.090***	-0.091***
		(0.033)	(0.033)	(0.033)	(0.033)
Observations	111,427	111,427	111,427	111,427	111,427
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All models include time fixed effects, industry, state and location dummies. But we do not report their coefficients for brevity. We use both the FIML and the two-step estimation method and present only the later estimates here. Our estimates show that there is selection bias (indicated by the statistical significance of Lambda). We find similar results employing the FIML method. SG1 refers to SG rate = 9.25% and SG2 refers to SG rate = 9.5%. The base category is the SG rate of 9%.

Table 13: Heckman sample selection model (for log of wealth (measured at four-year interval)

VARIABLES	(1) Wealth Dummy	(2) SGD	(3) SGP	(4) SGP*SGD	(5) SGP*NC
SGD		-0.059		0.009	
		(0.037)		(0.037)	
L.SGD		-0.053*			
		(0.030)			
L2.SGD		-0.021			
		(0.030)			
L3.SGD		0.000			
		(0.027)			
SG1			0.001	0.058*	0.022
			(0.020)	(0.031)	(0.027)
SG2			0.129***	0.122***	0.204***
			(0.020)	(0.031)	(0.047)
SGD*SG1				-0.085**	
				(0.036)	
SGD*SG2				0.010	
				(0.036)	
Super Reform	-0.170***	-0.283***	-0.046**	-0.046**	
	(0.043)	(0.040)	(0.021)	(0.021)	
Financial constraint	-0.270***	-0.496***	-0.522***	-0.522***	-0.522***
	(0.031)	(0.016)	(0.015)	(0.015)	(0.015)
Housing price		0.004***			-0.002**
		(0.001)			(0.001)
Income	-1.506***	2.019***	-1.019***	-1.029***	-1.017***
	(0.233)	(0.249)	(0.139)	(0.140)	(0.139)
Income squared	0.078***	-0.044***	0.070***	0.071***	0.070***
	(0.010)	(0.010)	(0.006)	(0.006)	(0.006)
Age of head	0.017***	0.041***	0.043***	0.043***	0.043***
	(0.005)	(0.003)	(0.002)	(0.002)	(0.002)
Age of head squared	0.000	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Head is male	0.089***	0.046***	0.052***	0.052***	0.052***
	(0.031)	(0.016)	(0.015)	(0.015)	(0.015)
Head is married	0.113***	0.088***	0.165***	0.165***	0.165***
	(0.037)	(0.021)	(0.020)	(0.020)	(0.020)
Head is working	0.246***	0.233***	0.271***	0.275***	0.271***
	(0.081)	(0.043)	(0.041)	(0.042)	(0.041)
Education	-0.033	0.188***	0.228***	0.228***	0.228***
	(0.031)	(0.016)	(0.016)	(0.016)	(0.016)
No of children	0.025	-0.125***	-0.157***	-0.157***	-0.157***
	(0.029)	(0.014)	(0.014)	(0.014)	(0.014)
Household size	-0.015	0.016	0.067***	0.067***	0.067***
	(0.045)	(0.024)	(0.023)	(0.023)	(0.023)
Household size squared	-0.002	0.004	0.001	0.001	0.001
	(0.006)	(0.003)	(0.003)	(0.003)	(0.003)
Indigenous	-0.117**	-0.463***	-0.484***	-0.484***	-0.484***
	(0.056)	(0.042)	(0.039)	(0.039)	(0.039)
Home ownership	0.912***	1.959***	1.919***	1.919***	1.919***
	(0.040)	(0.018)	(0.017)	(0.017)	(0.017)
Non-cash benefit (NC)					0.034
					(0.067)
NC*SG1					0.012
					(0.091)

VARIABLES	(1) Wealth Dummy	(2) SGD	(3) SGP	(4) SGP*SGD	(5) SGP*NC
NC*SG2					-0.051
					(0.088)
athrho		-0.084***	-0.078***	-0.078***	-0.078***
		(0.020)	(0.020)	(0.020)	(0.020)
lnsigma		0.132***	0.183***	0.183***	0.183***
		(0.004)	(0.004)	(0.004)	(0.004)
Observations	31,418	27,096	31,418	31,418	31,418
State FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All models include time fixed effects, industry, state and location dummies. But we do not report their coefficients for brevity. We use both the FIML and two-step estimation methods. Please note that for the wealth module, the two-step method and the FIML method produce similar estimates, and we only present FIML estimates here. SG1 refers to SG rate = 9.25% and SG2 refers to SG rate = 9.5%. The base category is SG rate of 9%.

Table 14: Summary of key findings

Eq.	Table	Independent variable	Dependent variable	Estimated coefficients	Interpretation
Eq.1	Table 5	Receiving SG	saving - ln(saving)	0.011	Having received SG does not significantly affect household saving.
Eq.1	Table 5	SG rate (%)(SG1/SG2)	saving - ln(saving)	-0.032***/ -0.023**	Compared to 9% SG, when SG rate is 9.25%, household saving decreases by 3.2% Compared to 9% SG, when SG rate is 9.5%, household saving decreases by 2.3%
Eq.2	Table 5	Receiving NCB (NCB*SG1/NCB*SG2)	saving - ln(saving)	0.025/0.014	Receiving non-cash benefits does not affect the impact of changes in SG rate on saving.
Eq.3	Table 6	Receiving SG (SGD/L1/L2/L3)	wealth - logW	0.048/0.010/-0.017/0.083***	A household receiving SG has more wealth than other households.
Eq.3	Table 6	SG rate (%) (SGP)	wealth - logW	0.162*** 0.430***	When SG rate increases, household wealth increases.
Eq.3	Table 6	Receiving NCB (NCB*SG1/NCB*SG2)	wealth - logW	0.046/0.093	Receiving non-cash benefits does not affect the impact of changes in SG rate on wealth.
Eq.4	Table 7	Compulsory employer contribution	net household saving $ (S)	-0.43***	For each dollar increase in CEC, net household saving decreases by 43 cents.
Eq.4	Table 7	Compulsory employer contribution	mortgage expenses ($)	0.243***	For each dollar increase in CEC, mortgage payment increases by 24 cents.
Eq.5	Table 8	Compulsory employer contribution	wealth ($)	2.205***	For each dollar increase in CEC, total household wealth increases by $2.21.
Eq.5	Table 8	Compulsory employer contribution	super balance	1.507***	For each dollar increase in CEC, total super balance increase by $1.51.
Eq.5	Table 8	Compulsory employer contribution	housing wealth	1.206***	For each dollar increase in CEC, housing wealth increases by $1.21.
Eq.5	Table 8	Compulsory employer contribution	non-super, non-housing wealth	-0.508	For each dollar increase in CEC, non-super, non-housing wealth does not reduce significantly.
Eq. 6-9	Table 12	***Heckman sample selection model***			
		Receiving SG	saving - ln(saving)	0.062***	Households that receive SG save 6.2% more than non-SG households.
		SG rate (%)(SG1/SG2)	saving - ln(saving)	-0.028***/-0.027**	Compared to 9% SG, when SG rate is 9.25%, household saving decreases by 2.8% Compared to 9% SG, when SG rate is 9.5%, household saving decreases by 2.7%
		Receiving NCB (NCB*SG1/NCB*SG2)	saving - ln(saving)	0.02/-0.000	Receiving non-cash benefits does not affect the impact of changes in SG rate on saving.
Eq. 6-9	Table 13	Receiving SG	wealth - log(W)	-0.059/-0.053*/-0.021/0.000	Households that receive SG do not have higher wealth than those that do not.
		SG rate (%)(SG1/SG2)	wealth - log(W)	0.001/0.129***	Compared to 9% SG, when SG rate is 9.25%, household wealth does not change significantly. Compared to 9% SG, when SG rate is 9.5%, household wealth increases by 12.9%
		Receiving NCB (NCB*SG1/NCB*SG2)	wealth - log(W)	0.012/-0.051	Receiving non-cash benefits does not affect the impact of changes in SG rate on wealth.

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Appendix 1: Superannuation Guarantee Percentage

Income year	Superannuation Guarantee Percentage (%)[23]	
	Employer's base year payroll <= $1m	Employer's base year payroll > $1m
1992/1993 (first six months)	3.00	4.00
1992/1993, 1993/1994	3.00	5.00
1994/1995	4.00	5.00
1995/1996	5.00	6.00
1996/1997, 1997/1998	6.00	
1998/1999, 1999/2000	7.00	
2000/2001, 2001/2002	8.00	
2002/2003 – 2012/2013	9.00	
2013/2014	9.25	
2014/2015 – 2019/2020	9.50	
2020/2021	9.50	
2021/2022	10.00	
2022/2023	10.50	
2023/2024	11.00	
2024/2025	11.50	
2025/2026 and onwards	12.00	

Source: The ATO[24]

[23] For simplicity, in our analysis, we ignore the maximum superannuation contribution base as there have been no significant changes of the cap over the years except for the amount being indexed annually.

[24] https://www.ato.gov.au/rates/key-superannuation-rates-and-thresholds/?anchor=Superguaranteepercentage#Superguaranteepercentage