ARC Centre of Excellence in Population Ageing Research

Working Paper 2021/31

Motivated saving: The impact of projections on retirement contributions

George Smyrnis, Hazel Bateman, Loretti Dobrescu, Ben R. Newell and Susan Thorp

---

This paper can be downloaded without charge from the ARC Centre of Excellence in Population Ageing Research Working Paper Series available at www.cepar.edu.au

Motivated saving: The impact of projections on retirement contributions

George Smyrnis[a]

[a] *The University of Sydney Business School, The University of Sydney NSW 2006 Australia; george.smyrnis@sydney.edu.au*

Hazel Bateman[b]

[b] *UNSW Business School and CEPAR, UNSW Sydney NSW 2052 Australia; h.bateman@unsw.edu.au*

Loretti Dobrescu[c]

[c] *UNSW Business School and CEPAR, UNSW Sydney NSW 2052 Australia; dobrescu@unsw.edu.au*

Ben R. Newell[d]

[c] *School of Psychology, UNSW Sydney NSW 2052 Australia; ben.newell@unsw.edu.au*

Susan Thorp[e 1]

[e] *The University of Sydney Business School, The University of Sydney NSW 2006, Australia; susan.thorp@sydney.edu.au*

Abstract

Can projections of retirement wealth and income motivate pension plan participants to save more? Results of field and online experiments show that participants who see both retirement balance and income projections increase voluntary savings. In the field study, conducted by a large Australian pension plan in 2013-14, participants of the treatment group received current balance, projected retirement balance and projected retirement income information, while participants of the control received only current balance information. Within one year of the treatment, the frequency, and average amount, of voluntary savings by treated plan participants rose significantly, as did the rate of participants'

[1]Corresponding author: Rm 5173 Abercrombie Building H70, The University of Sydney NSW 2006 Australia; **T** +61 2 90366354; **E** susan.thorp@sydney.edu.au

interactions with the plan. In the related online experiment conducted in 2017, we tested the relative effect of information on (i) current balance; (ii) current balance and projected retirement balance; (iii) current balance and projected retirement income; and (iv) current balance, projected retirement balance and projected retirement income. Consistent with the field trial, the combination of retirement balance and income projections motivates a significantly higher retirement savings accumulation, after a sequence of ten savings decisions, than current balance information alone. Together our results strongly endorse recent changes to retirement plan benefit statement guidelines initiated by pension regulators globally.

Keywords: pensions, field experiment, benefit projections

---

1. Introduction

Participants in defined contribution (DC) pension plans have to figure out for themselves if they are saving enough for retirement. Until recently, most DC plans have reported current account balances each year, leaving it to participants to assess what their present savings mean for future consumption, and to decide whether to change contributions and investments. The massive global shift towards DC plans has meant that millions of retirement savers have made this decision with limited guidance from plans.[2] Estimating retirement outcomes is made more challenging by people's overwhelming tendency to focus more on the present than the future – the 'present-bias' (Loewenstein & Elster, 1992; Laibson, 1997; Ainslie, 2001; Gabaix & Laibson, 2006) – and the difficulty of making forecasts that require compounding (e.g., Eisenstein & Hoch, 2007; Hilgert et al., 2003; McKenzie & Liersch, 2011; Stango & Zinman, 2009). Predictably, many people reach middle-age never having planned for retirement (Lusardi & Mitchell, 2011a) and consequently having saved too little by the

[2]DC plan assets have grown to 52% of total retirement assets in the seven largest retirement markets and dominate in Australia and the United States, with 87% and 60% market share respectively (Willis Towers Watson, 2017).

time they stop working (e.g., Mitchell & Moore, 1998; Skinner, 2007; Knoef et al., 2016; Poterba, 2014). This raises the question of how to help DC plan participants know if their retirement savings are on track.

One option is for plans to give participants personal projections of retirement income or wealth. A recent survey by the International Organisation of Pension Supervisors reported that most of the 26 responding jurisdictions supported retirement projections, either as calculators or in benefit statements. These projections were usually deterministic, individualized, single-scenarios of both pension assets and benefits (Stanko, 2019). In 2016, the EU directed that pension plan participants receive retirement benefit projections, and the UK has drafted legislation stipulating projections of retirement outcomes. Similarly, the 2019 US SECURE Act, while not specifically requiring projections, it does require that current balances be "illustrated" as annuity stream equivalents.[3] Along with the challenge of choosing the most appropriate estimation method and working assumptions for the projections, plans and regulators must decide how best to communicate the projections to unsophisticated participants (Stanko, 2019).

International field studies that have tested participants' responses to projections show modest average increases in retirement savings in the short term, but do not observe longer-term effects (e.g., Fajnzylber et al. (2009) for Chile; Dolls et al. (2018) for Germany; Goda et al. (2014) for a US pension plan, but c.f. Mastrobuoni (2011) for Social Security Benefits in the US). Here we study a field experiment conducted in Australia in 2013 and 2014 where DC plan participants received personal projections of their retirement income and lump sum (i.e., total balance at retirement), as well as their current balance, for two consecutive years. The plan provider calculated the projections for each partic-

[3]For the EU, see Directive (EU) 2016/2341 of the European Parliament and of the Council; US: https://www.dol.gov/agencies/ebsa/about-ebsa/our-activities/resource-center/fact-sheets/pension-benefit-statements-lifetime-income-illustrations; UK: https://www.gov.uk/government/consultations/simpler-annual-benefit-statements-draft-regulations-and-statutory-guidance/draft-statutory-guidance-simpler-annual-benefit-statements

ipant using a formula set by regulation (Australian Securities and Investments Commission, 2014) that fixed a certain real rate of return, held the participant's past year's contributions, fees and charges constant into the future, and assumed participants would retire the year they became eligible for the public pension. We report a two-year cross-sectional and longitudinal analysis of the impact of these new projections on participants' contributions and interactions with the plan. We then take components of the projection information and test their separate and joint effectiveness in online experiments with plan participants as subjects. Our two-part study measures the real-world effect of projections on pension contributions and also tests alternative formats for communication.

Treated field participants made significant changes to their contributions and interactions with the plan after receiving the projections. For example, in the first year of the trial, 36% [95% CI 34.9-36.8] of treated participants contacted the plan at least once, compared with 23% of the control group. Moreover, the average number of interactions made by treated participants was almost double the average of the control. In the second year of the trial, the rate and number of interactions tapered off but were still significantly higher for treated participants. Projections also motivated participants to increase retirement account contributions. In the first year of the projection trial, 12.7% [95% CI 12.2-13.5] of treated participants made additional voluntary contributions (above the 9.5% compulsory contribution level) compared with 11.5% of the control group, and the average additional savings of all treated participants was 0.5% of salary [95% CI 0.37-0.63] compared with 0.33% for the control. While the average treatment effect amounts to $8,000 extra at retirement (using a 5% rate of return over a 30 year working life), the treatment effect on those who made positive additional contributions is much larger. Conditional on making a voluntary contribution, treated participants saved an extra 1.4% of salary. If continued in the future, this boost to contributions would raise a retirement balance by close to $63,250 over 30 years, or the equivalent of one year's earnings at the median wage.[4] No-

[4]Median weekly earnings for full-time male employees in the construction sector (the ma-

tably, we see higher contributions persist into the second trial year at slightly lower rates. These results raise further questions about what features of the projection information motivated participants to change their retirement savings patterns.

Results from our trials add to insights from other field experiments in several ways. First, the projections we study are personalized and current. They are based on individual participants' current balances and assume that their past year's contribution patterns and fee expenses will continue until retirement.[5] Second, the projections we test are already approved by a pension regulator and are calculated from a stipulated formula using personalized inputs.[6] Third, we can measure the effect of two years of projection information. Because the plan sent one group of participants projections in two consecutive years, and another group projections only in the second year, we can observe repeated treatment effects for the two-year group and compare with the one-year treated group.[7] Fourth, we can observe and analyze the effects of projections on participants' subsequent interaction with the plan (calls, emails and standard mail relating to administration, contributions, investment or advice), as well as measuring treatment effects on voluntary tax-favored and fully taxed retirement plan contributions.

The plan sent participants personal projections of their retirement balance and the equivalent 25 year income stream, as the regulator required. An open

jority of our field trial sample - see Section 2) was approximately AU$68,000 p.a. in 2012 (6105.0 - Australian Labour Market Statistics, July 2014).

[5]The treatment in our study is somewhat similar to Fajnzylber et al. (2009) where administrators sent participants income projections based on participants' current accumulations, contributions and age, but different from Goda et al. (2014) where the plans sent participants projections personalized by age (years to retirement) but that showed generic additions to retirement income for different contribution scenarios.

[6]This is different from Fajnzylber et al. (2009) where administrators sent different projection scenarios to younger and older pension fund participants and different from Goda et al. (2014) where the researchers randomized assignment of rates of return, retirement ages and additional contribution rates for projections.

[7]Dolls et al. (2018) study longer-term savings effects using German administrative data and a Difference-in-Differences method and consider voluntary "third pillar" savings in response to projections of "first pillar" pension entitlements, whereas we study projections information and savings response in the "second pillar".

question from earlier studies is whether retirement balance and income projections could have different effects on intended and actual savings. For example, the field study by Goda et al. (2014) showed that when a plan provider gave one group of participants planning information and projections of the effects of additional savings on future balance and monthly retirement incomes, the group who received the plan information and forecasts of additional balances and incomes saved more, on average, in the next period than similar participants who did not. In related work, an on-line study by Goldstein et al. (2016) showed that presenting subjects with projections as either lump sums or income streams led to what they termed an "illusion of wealth, and its reversal". Specifically, they demonstrated that subjects who were asked to imagine relatively small lump sums ($100,000) indicated lower savings intentions than those shown the equivalent annuity ($500 per month). However, when the task involved relatively large lump sums ($2 million) the pattern reversed, with subjects indicating higher savings intentions than for the equivalent annuity ($10,000 per month). In essence, these results highlight a greater sensitivity to changes in wealth expressed in monthly amounts than in lump sums. This manifests as an 'illusion' where relatively small retirement income streams are perceived as less adequate for retirement than equivalent (small) balances, with the reverse perception of high amounts.

One potential psychological account of why this pattern emerges builds on long-established ideas of loss-aversion and reference-dependent utility (e.g., Kahneman & Tversky, 1979). Goldstein et al. (2016) speculate that monthly amounts are more readily compared to current consumption rates and thus act as natural reference points. A monthly 'salary' of $500 is likely to be lower than a saver's current monthly spend and thus perceived as loss, in turn inducing greater savings intentions. In contrast, an income of $10,000 per month is likely to exceed current monthly budgets and be perceived as a relative gain, thus leading to lower savings intentions. Lump sums, in contrast, generally do not have such readily available reference points and thus savers are less sensitive or susceptible to changes in their overall size.

We build on our own field work and these two studies using online experiments, aiming to tease out the separate and joint influences of income and balance projections. First, we introduce a comprehensive experimental design that includes a baseline treatment mirroring common DC plan practice, by providing only information about current balance (i.e., no projection). We then compare this treatment to ones in which the current balance is combined with (i) a retirement lump sum (balance) projection, (ii) an annual projected income stream (for the first 25 years of retirement), and (iii) both the lump sum and the income stream projections. This comprehensive design thus has the potential to shed light on practical questions providers and regulators have about how to present retirement wealth to plan participants.

Our second innovation is to extend on the two-year field trial by incorporating an important feature of retirement savings decisions that is not addressed in previous work: a saver's ability to revise and change her contribution rate, periodically, over her working life. From time to time, plan participants can change how much they contribute, in response to new information about their account balance. Because past decisions affect current and expected wealth, it is possible that information framing will affect a single-period saving decision differently from the way it influences the whole pattern of saving decisions over a working lifetime. It follows that we need to understand the potential interactions between information formats in successive saving choices as well as in a single choice. Our field study goes one step in this direction by covering two years of responses to projections, and our online experiments extend this (hypothetically) from current age to retirement.

We investigate these questions using an on-line panel of pension plan participants. The respondents in our experiment make hypothetical choices, but the saving scenarios we present are not hypothetical. Rather, they are calibrated to the age-related median incomes and retirement account balances accumulated by savers in our target population while the balances and projections evolve dynamically by following realistic trajectories. This feature of our experiment places it between our own field study (and that of Goda et al. (2014)), and the

one-shot, uncalibrated, hypothetical study of Goldstein et al. (2016). [8]

An open question thus remains over the comparative effectiveness of showing participants only one, versus both, types of projections. One possibility is that participants who receive both projections will see that the two formats are equivalent, thereby cancelling out any difference with participants who receive either of the projections alone. Alternatively, one of the projection formats may exert a stronger influence on saving behavior than the other; either weakening or strengthening total effects when participants get both. There may be a complementary effect, where encouraging savers to think about both their retirement lump sum and income leads to a general increase in savings, compared with responses to either of the projections alone, or the reverse could occur. We can evaluate these alternatives using the savings choices that respondents make in the first choice round, mimicking the one-shot choice of Goldstein et al. (2016) and Goda et al. (2014).

By observing participants' savings intentions at later choices, we measure the effect of different projections on the time path of savings. Since projections update for each participant at each choice set, participants receive feedback about the effects of their decisions at earlier choice sets. This feedback could have a range of effects on final retirement wealth. On the one hand, people who choose to save extra might be encouraged to save even more because of the growth they observe in their current or projected balance. We hypothesize that this positive feedback could be particularly effective for respondents in the balance projection treatments who might find lump sums to be more satisfying than income streams, or who do not anticipate the effects of compounded growth and are pleasantly surprised by the increases their saving generates. Of course, income streams also rise when participants decide to raise their contributions,

[8] Notably, our use of calibrated scenarios means that most of our respondents face choices that are similar to the lower end of the values examined by Goldstein et al. (2016) (because most Australians do not have balances of $2 million to look forward to). This means that if we were to observe a wealth illusion, it would manifest as higher savings for participants shown income projections (which may be perceived as inadequate for retirement due to their 'low' dollar-value) compared to those shown balance projections.

but income stream changes could be less noticeable than total balance changes. Alternatively, and for similar reasons, participants who see balance projections could become satisfied with their retirement prospects and stop saving.

To foreshadow our basic results, we demonstrate that simply inviting respondents to consider their retirement wealth increases voluntary saving – irrespective of the information presented (i.e., we see respondents in all treatments top up their accounts), and that the provision of balance and income stream projections together has the largest impact on savings both at the first choice and after the ten rounds of choices. The online and field experiments together confirm that projection information that includes both future balances and income streams motivates a significant and persistent increase in voluntary retirement contributions. As we hypothesized, for the average participant, both projection frames complement each other in boosting savings, and projections shown in succeeding years continue to be effective.

The next section reports the implementation and results of the field experiment. Section 3 describes the online experiment and results and the final section gives discussion and conclusions.

2. Field experiment

In Australia, where we conducted the field and on-line experiments, over 90 per cent of employees belong to retirement savings plans, labelled "superannuation funds".[9] At the time of this trial, on beginning a new job, employees signed up to a plan they chose themselves, or, if they did not choose for themselves, to a plan selected by their employer. Employers then made mandatory contributions of 9.5% of earnings into the plans on behalf of their employee-participants. Plan participants could also add to their accounts via tax-favored or fully taxed voluntary contributions.[10] For most participants, tax-favored

[9] Australian Bureau of Statistics Release 6310.0 Employee Earnings, Benefits and Trade Union Membership, Australia, August 2012

[10] In Australia pension plan contributions and fund earnings are taxed, but not retirement benefits. Tax-favored contributions are taxed at 15% and fully taxed contributions are taxed

contributions have financial advantages over fully taxed contributions, but are also subject to tighter annual limits and are administratively harder to implement. Except in cases of severe hardship, participants cannot withdraw from their plan accounts prior to reaching a stipulated age (60 years for most people) and retiring from work or reducing their hours.[11] Thus participants deciding to contribute extra to their retirement plans must weigh the benefits of (usually) tax-favored returns, and a boost to consumption in retirement, against higher current consumption or access to liquid savings before retirement.

2.1. Benefit statement regulations

Plan participants can keep track of their retirement savings by reviewing annual benefit statements. Australian retirement savings plan statements must show a participant's current balance and key information on contributions, investment returns, and fees and taxes (Commonwealth of Australia 2001). In addition, since 2014, retirement plans have been allowed to provide both a projected account balance at the prescribed retirement age, and a projected annual income stream for the first 25 years of retirement along with participants' current account balance (Australian Securities and Investments Commission - ASIC 2014). The prescribed projection formula assumes an investment return of 3% p.a. both before and after retirement, shows benefits in today's dollars, sets retirement at age 67,[12] treats retirement plan contributions and fee levels over the preceding 12 months as maintained into the future until retirement, and fixes current tax and legal conditions into the future.[13]

Elsewhere in the world, how plans present account balance information on benefit statements differs by plan structure and regulation (Stanko, 2019). De-

---

at marginal personal income tax rates.

[11] The Australian Government allowed participants experiencing unemployment or loss of income during the COVID-19 pandemic to make early withdrawals of up to AU$20,000 from their retirement accounts, between March and December 2020.

[12] There is no fixed retirement age for Australian employees with one or two exceptions. This is the age when most participants would be eligible for the public Age Pension. The plan can include a public pension payment in the income projections under fixed assumptions about participants' entitlements.

[13] Appendix A sets out the regulations and calculation of the projections.

fined benefit (DB) plans, by their design, show projected incomes (often presented as a retirement replacement rate) while DC plans, that pay benefits as a function of contributions and net earnings, have traditionally shown the current account balance only. However, with the increasing coverage and importance of DC plans in retirement provision, and concerns about engagement and under-saving of plan participants, plan providers, regulators and policymakers have been implementing other types of reporting. The form of communication, method of calculation and degree of prescription by regulators varies from system to system. While projections typically show future assets and benefits in today's dollars, there is no one approach (Stanko, 2019). For example, in the US, the SECURE Act, passed in December 2019, requires plan administrators to include lifetime income "illustrations" of participants' account balance (a single life annuity and a qualified joint and survivor annuity) in benefit statements.[14] Notably, the SECURE Act illustrations are annuitizations of current balances, not of projected balances. In the UK, amendments to the Occupation and Personal Pension Schemes Regulations proposed for 2022 include a section "How much money you could have when you retire" to give members an "illustration" of what their pension plan "could be worth at the member's anticipated or agreed date for retirement and what this may mean for their estimated retirement income." [15] Our investigation of the impact of alternative information formats for retirement account balances is therefore timely and relevant to plan providers, regulators and DC plan participants.

2.2. Plan and sample characteristics

Cbus, the retirement plan that provided the administrative data for this study, is one of Australia's largest public offer, profit-to-participants retirement

[14]The Department of Labor prescribes actuarial assumptions for the annuities: `https://www.dol.gov/agencies/ebsa/about-ebsa/our-activities/resource-center/fact-sheets/pension-benefit-statements-lifetime-income-illustrations`.

[15]See `https://www.gov.uk/government/consultations/simpler-annual-benefit-statements-draft-regulations-and-statutory-guidance/draft-statutory-guidance-simpler-annual-benefit-statements` Projection calculations, labelled "statutory money purchase illustrations" are prescribed by the UK Financial Conduct Authority.

plans, mainly serving the building, construction and allied industries. At the time of the projection field experiments, Cbus had around 700,000 participants and AU$22.8 billion in funds under management.

Cbus began their trials in 2013[16] by sending projections to 18,989 participants randomly selected from 355,083 eligible participants, out of a total plan enrolment of 674,557. [17] In 2014, after internal review of the 2013 projections trial, Cbus expanded the treatment group to include almost all of their eligible participants. They sent the 2014 projections to 337,305 participants, from a total enrolment of 704,286 while randomly selecting a holdout sample (control group) of 19,973 participants to *not* receive the projections. In short, Cbus randomly selected the treatment group from their eligible participants in 2013, but did not randomly select a control group, and then in 2014 Cbus randomly selected a control group but not a treatment group.

Since Cbus did not fully randomize treatment and control assignment in each of the two years of the trial, we used propensity score matching to draw two treatment groups and one control group that are as identical as possible across all observed characteristics in the June of the financial year prior to treatment (Stuart, 2010). We matched on plan participant age, account balance, gender and tenure or time since joining the plan. We first matched 9,649 Cbus participants who did not receive a projection in either 2013 or 2014 (T00) with Cbus participants who received both the 2013 and 2014 projections (T11) using characteristics at June 2013. We then matched 9,648 participants in the matched control group (T00) with the same number of Cbus participants who only received the 2014 projections (T01) using characteristics at June 2014. Consequently we can measure two cross-sectional treatment effects (T11 in 2013 and T01 in 2014) and one two-year treatment effect (T11 in 2014).[18]

[16] ASIC gave formal approval to plan projection information the next year.

[17] Cbus set eligibility criteria to comply with proposed ASIC rules and to ensure that projection information was meaningful and relevant. The plan excluded 49.27% (319,494 out of 674,494) and 47.36% (347,008 out of 704,286) of their total enrolment from the 2013 and 2014 projections field experiments. Appendix B describes the sample in more detail.

[18] To achieve balance in the T11 and T00 treatment and control group, due to the significant

Table 1 reports summary statistics and tests of sample balance. Compared with the population of Australian plan participants in the age group 21-55 years, the experimental sample has the same median and average age, includes a high proportion of males (91% c.f. 50% for the population of plan participants), has a higher median account balance ($35,081 c.f. $30,730), and a lower average account balance ($44,740 c.f. $52,449).[19] The lower sample average account balance and the large proportion of males is typical of participants from the construction sector, and the higher median balance of the experimental sample is due to Cbus' exclusion of inactive and very low balance participants from the treatment group.

Table 1: **Summary Statistics: Combined Treatment and Control Samples**

Columns 1-5 show summary statistics for the combined matched sample (i.e., the T01 and T11 treatment groups and the T00 control group) as at 30 June 2013, prior to the intervention. Column 6 shows p-values from F-tests for equality of means conducted across the two treatment groups and the control group. Total observations 28946.

	Median	Mean	Std. Dev.	T11 v. T00 p-val	T01 v. T00 p-val
Age (years)	37.00	37.20	9.89	0.302	0.738
Account Balance ($)	35,081	44,740	36,252	0.823	0.863
1 Male	1	0.914	0.281	0.200	0.563
Tenure (years since joining)	8.17	9.64	6.57	0.230	0.337

right-tail variation in the account balance of participants, we truncated the sample by removing all participants with a balance at or above the 95th percentile ($134,000 at June 2013). This was the highest percentile threshold (fewest participants) that we could remove to obtain sample balance across all four participant characteristics. We achieved balance between the T01 and T00 groups by truncating at $200,000 at June 2014. We used the propensity score distance measure and the 1:1 nearest neighbour method to construct a matched sample of 9,649 Cbus participants in T11 and T00, and of 9,648 for T01, using STATA function psmatch2. To ensure a close match from the very large number of treated participants in 2014 (over 211,000) and the very small number of the control (9,649) we restricted the propensity score difference to 0.00001. The matching algorithm found one fewer participants for the T01 group at this difference.

[19] See `https://www.superannuation.asn.au/policy/reports` December 2015. We cannot observe plan tenure for the population of plan participants.

2.3. Treatment

Cbus sent the first round of projections to treatment group participants in mid-November 2013, and the second round from late September to mid-October 2014.[20] The projection brochures included:

1. Personal financial information: participant's current account balance, age and contributions over the past 12 months; these values were inputs to the projection formula.
2. Retirement projections: lump sum balance at age 67 years and associated 25 year retirement income stream estimates (which included half of a couple's Age Pension, an estimate of participants' public pension entitlements).
3. Educational information: the assumptions used to calculate the projections, factors that influence adequacy (such as longevity risk, retirement age and the public Age Pension), and projected replacement rates relative to a widely used Australian retirement consumption benchmark.[21]
4. Calls to action: (i) ask for further information; (ii) consolidate multiple retirement accounts into a single Cbus account; (iii) review their contributions; and (iv) review their investment allocations.

Apart from some aesthetic differences, the 2013 and 2014 versions are very alike in content and structure. Cbus also sent all of their participants their standard account statements by mail in from mid-September to mid-October in each year.

2.4. Treatment effects

Cbus recorded participants' response to the calls to action in the projections related to (i) communication with Cbus; (ii) multiple account consolidations; (iii) contributions; and (iv) investment allocation, for 2013/14 and

[20] Appendix C shows the 2013 and 2014 projection brochures.

[21] See the Association of Superannuation Funds of Australia (ASFA) Retirement Standards (`https://www.superannuation.asn.au/resources/retirement-standard`). For example, the standard estimates that a single retiree who owns their home and is relatively healthy would need AU$22,654 p.a. to maintain a modest lifestyle, and AU$41,197 p.a. to live comfortably.

2014/15 financial years. (Financial years in Australia run from 1 July to 30 June, which means that Cbus began the 2013 projection trial in the second quarter of 2013/14 and began the 2014 trial in the first quarter of 2014/15.) We observe participant responses for the year up to the 30 June following the trial, that is, for two (2013) or three (2014) quarters after the treatment date. In this section we document treatment effects on communication with the plan and contributions only. The number of changes in investment strategy and account consolidations are very small in both the treatment and control groups.[22]

2.4.1. Contributions

Participants who get projections and decide that they are not saving enough can add voluntary contributions to the mandatory contributions made by their employers. Most plan participants who want to increase their savings arrange to pay tax-favored or 'concessional' contributions from their pre-tax earnings via workplace payroll systems.[23] However regulation limits total concessional contributions, including the 9.5% contributed by employers, to less than $25,000 p.a. Fully taxed contributions, or 'non-concessional' contributions are easier to make - simply requiring a participant to send a check or make a transfer to the plan - are paid out of post-tax income, and are also limited by regulation, but to AU$100,000 p.a. Cbus identified both types of contributions made by participants.

Table 2 shows the percentage of participants in the treatment and control groups who make voluntary contributions, and reports the difference in dollar amounts contributed. Turning first to the proportion of participants who made either or both types of voluntary contributions, we find significantly more T11 treated participants add to their savings this way in the first and second treat-

[22] Around 1% of participants changed investment allocations and around 3.5% of participants consolidated accounts in each year. Account consolidations are often caused by movement of participants into and out of the plan.

[23] This practice is called 'salary sacrifice'. It has the advantage of lowering participants' taxable incomes by the amount of the voluntary contribution while also applying a concessional flat tax rate of 15% to contributions rather than the relevant marginal income tax rate, that ranges from 21% to 47% for any employee earning more than AU$18,200 p.a.

ment period. In 2014, the treatment raised the rate of voluntary contributions by 12.2% (12.9% of the T11 treatment group compared with 11.5% of the T00 control) and in the second period (2015) by 6.1% (T11 12.0% compared with T00 11.3%). This increase was predominantly via a higher rate of tax-favored contributions: 24.2% and 14.1% in 2014 and 2015, respectively. The rate of voluntary fully taxed contributions among participants who were sent projections was higher but not significantly above the control, except in 2015 for the T01 group.

The average amounts of voluntary tax-favored contributions were also significantly higher for the T11 and T01 treatment groups. The T11 group saved an additional $132 or 46% more than the control group average of $287 in the first projection period and $133 or 34% more than the control group average of $391 in the second projection period. The T01 group who first received the projections in 2014 similarly saved more in the subsequent period: $170 or 43.8% above control. Average amounts of both tax-favored and fully taxed voluntary contributions were similarly significantly higher in 2014 and 2015.

Results of multi-variate models of rates and amounts of voluntary contributions regressed on participant characteristics and treatment indicators (see Appendix D for full results) show that tax-favored and fully taxed contributions are more common and are larger among older-age participants, and that the amounts of contributions are higher for participants with higher balances (See D.1 - D.4). The treatment effect for fully taxed contributions was stronger at older ages and the treatment effect for tax-favored contributions was stronger for higher-balance, higher-tenured participants in the T11 group. Older participants are likely to feel more urgency about saving enough for retirement and are also likely to have more discretionary income.

Another way to understand the impact of the projections is to measure the treatment effect in terms of participant salary and retirement accumulation. Cbus cannot observe the wages and salaries of the participants directly but the plan can estimate participants' annual salaries from the annual mandatory contributions made by employers into individual accounts. We use Cbus' salary es-

timates to calculate the average percentage of salary that treated and untreated participants voluntarily contribute as tax-favored and fully taxed contributions during the projection trial. Using this benchmark, T11 participants had voluntarily contributed on average 0.18% and 0.16% of their salaries more than the control group by the end of the first and second trial periods respectively. Using the mandatory 9.5% contribution rate as a comparison point, these extra contributions represent a 1.7-1.9% increase over the mandatory rate, and a similarly larger retirement accumulation depending on the fraction of working life the participant has left. For participants in the T01 group, the additional contributions amount to 0.24% of salary, or a 2.3% increase over the 9.5% mandatory contribution rate. These are the unconditional average treatment effects. If we calculate the average percentage of salary that treated and untreated participants voluntarily contribute, conditioning on the participant making a voluntary contribution, the comparable increases in contribution rates are 1.38% (T11, 2014) and 0.88% (T11, 2015) and 2.33% (T01, 2015) amounting to between 9% and 25% higher retirement accumulation than the mandatory rate would generate over a working life. In other words, for the group of participants who have the interest and financial capacity to contribute some extra, the projection information motivates them to save substantially more.

Around two thirds of treated participants (T11) who made additional voluntary contributions in the first year after getting retirement projections continued to make those contributions in the subsequent year. Figure 1 shows the percentages of 2013 treated participants (T11) who made additional contributions in either of 2014 or 2015, divided into those who made them in both years, in the first year only and in the second year only. Attrition after 2014 of 17% of voluntary contributors was partly offset by 13% new contributors in 2015. Although not shown separately in the chart, the proportion of participants who contributed two years in a row was very similar for tax-favored (69%) and fully taxed (66%) contribution classes. Attrition after one contribution year was somewhat lower for the tax-favored class at 14% of this group compared with 21% of the participants making fully taxed contributions. Participants who want

to start or stop voluntary tax-favored contributions usually have to go to the trouble of making arrangements through their employer/payroll office, making changes more costly, and this cost could explain the slightly higher persistence.

The average amount contributed was also higher for the T11 group who contributed in both years compared with the group who contributed in only one year. For example, in 2015, the average voluntary contribution of treated participants who contributed in both years was $4,552, and it was $3,362 for those who contributed in 2015 only and $2,085 for those who contributed in 2014 only.

2.4.2. Interactions with the plan

Plan participants communicate with Cbus via telephone, email, or mail and these interactions are recorded and classified by the plan into five categories:

1. Account: Communication made by Cbus participants directly relating to their retirement account, including general plan information; changing account details; balance inquiries; insurance; investment options; account consolidation; benefits/beneficiaries; inquiries about benefit statements. Around 60% of all inquiries are classified as "Account" inquiries.
2. Advice: Communications directly between Cbus participants and a Cbus adviser or queries about the provision of advice often relating to contributions, investments, insurance, public pensions, retirement ages, and withdrawals. Around 10% of inquiries are classified as "Advice".[24]
3. Employer: Communications made by Cbus participants about their employer(s) often relating to unpaid contributions. (Around 4% of inquiries.)
4. Authorized third party: Communications made by an authorised third party (financial, legal or medical representatives) on behalf of a Cbus participant.(Around 4% of inquiries.)
5. Administrative / Procedural: Communications made by Cbus participants about an existing action or process conducted by Cbus, typically follow

[24]Between 5-10% of participants use a Cbus adviser and their direct discussions accounted for the majority of communications in this category.

up to inquiries initiated in the "Account" category. (Around 22% of inquiries.)

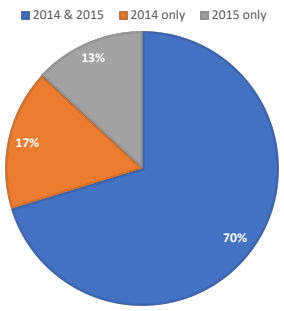
We group these communications together as a single "interaction" measure because each type of participant-plan communication could be prompted by the projections treatment. Table 2 reports the effects of the projection treatment relative to control on the proportion of participants who interact with the fund at least once in each of the trial years and the average number of interactions that participants make. We find a very large treatment effect in the first year of the trial where the proportion of T11 participants who communicated with Cbus was 13 percentage points higher than the control group (22.9% of T00 participants communicated with Cbus compared with 35.9% of T11). The treatment effect declined sharply in the next year of the trial to 1.1 percentage points above the control. Similarly, the average number of interactions that participants made was 1.66 for T11 in the first year, compared with 0.93 for T00 but tapered off in the second year. This pattern is consistent with the new projection information prompting participants to go to the plan for information and advice in the first instance and not needing to do that in the second year. The T01 group also interact with the plan at a higher rate (1.6 percentage points above T00) and significantly more often (1.29 times compared with 1.15 for the control) in the first year after getting projections.

Unlike voluntary contributions, the effects of the projections on interaction with the plan of the twice treated group were concentrated in the first year of the field trial and tapered off in the second. Figure 1 shows that 37% of the T11 treatment group who interacted with the plan over 2014-15 did that only in 2014 and sightly fewer called, emailed or wrote to the plan again in 2015. Around one quarter did not interact with the plan until 2015. These results indicate that the new information prompted participants to make inquiries and in some cases to make changes to contributions but once people had contacted the plan, many did not come back with another inquiry in the next year.

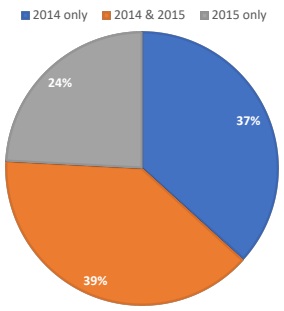
Table 2: **Projection Field Trial: Average Treatment Effects on Contributions and Plan Interactions**

Top panel shows average rates of voluntary contributions and interactions with the plan for T11 group that received projections in 2013 and 2014 and for T01 group that received projections in 2014. Bottom panel shows per member average annual dollar voluntary contributions and number of interactions for T11 and T01. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ where $H0 : T - C = 0$; $H1 : T - C > 0$.

	(T11 v. T00)			(T01 v. T00)		
% of participants	T-C/(se)	C	T	T-C/(se)	C	T
Voluntary Contributions						
Total 2014	1.40***	11.46	12.86			
	(0.470)					
Total 2015	0.69*	11.29	11.98	0.55	11.28	11.83
	(0.462)			(0.460)		
Tax-favored 2014	1.09***	4.51	5.60			
	(0.315)					
Tax-favored 2015	0.75**	5.30	6.05	0.32	5.29	5.61
	(0.339)			(0.333)		
Fully taxed 2014	0.40	7.66	8.06			
	(0.387)					
Fully taxed 2015	0.14	6.99	7.12	0.50*	6.98	7.47
	(0.375)			(0.379)		
Interactions with plan						
2014	12.98***	22.88	35.86			
	(0.649)					
2015	1.07**	26.83	27.90	1.60**	26.82	28.42
	(0.642)			(0.644)		
$ p.a. / no. p.a.						
Voluntary Contributions						
Total 2014	132.07***	287.39	419.45			
	(26.185)					
Total 2015	133.45***	391.01	524.47	170.25**	388.37	558.62
	(33.865)			(44.482)		
Tax-favored 2014	83.25***	144.08	227.33			
	(17.746)					
Tax-favored 2015	75.57***	237.61	313.17	54.12**	235.16	289.28
	(25.423)			(25.596)		
Fully taxed 2014	48.82***	143.31	192.13			
	(19.355)					
Fully taxed 2015	57.89***	153.41	211.29	116.13***	153.21	269.34
	(22.504)			(36.130)		
Interactions with plan						
2014	0.73***	0.93	1.65			
	(0.043)					
2015	0.06*	1.15	1.21	0.14***	1.15	1.29
	(0.041)			(0.044)		
Observations	19298			19296		



(a) 2-Year Voluntary Contributions



(b) 2-Year Interactions with Plan

Figure 1: Treatment Group 2013 (T11) - Persistence of Treatment Effects

The projection treatment was also associated with a higher proportion of participants who both interacted and voluntarily contributed in the same period. Table 3 reports comparisons between the treatment and control groups for participants who both added to savings and contacted the plan. The first panel shows the percentage of the total treatment and control groups who took both actions. The second panel, that conditions on the participants who made voluntary contributions, shows that while a majority did not also interact with the plan (55% of treatment), 13 percentage points more of the treated group than the control group did in the first year of the trial and 4-5 percentage points more did in the second year. Of the group who interacted with the plan, the treatment was associated with a 2 percentage point higher number who also added to contributions, compared with the control in the second year. Overall, the majority of contributing and interacting participants took one of those actions instead of both, but participants who received the projections were significantly more likely to both add to saving and contact the plan.

To summarize, plan participants to whom Cbus sent a projection of their account balance and 25 year income at retirement based on current account balance and saving patterns, were more likely to add extra contributions to the standard 9.5% contributions made by their employers. The average voluntary contribution made by treated participants was also higher than the control group for both 2013 and 2014 groups and persisted in the second year of treatment

Table 3: **Projection Field Trial: Average Treatment Effects on Joint Contributions and Interactions**

Top panel shows percentage of participants who made voluntary contributions and interacted with the plan for T11 group that received projections in 2013 and 2014 and for T01 group that received projections in 2014. Middle panel shows percentage of contributing participants who also interacted with the plan for T11 and T01. Bottom panel shows percentage of interacting participants who also contributed to the plan for T11 and T01. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ where $H0 : T - C = 0$; $H1 : T - C > 0$.

	(T11 v. T00)			(T01 v. T00)		
	T-C/(se)	C	T	T-C/(se)	C	T
% of participants						
Cont. & Inter. 2014	2.17***	3.68	5.85			
	(0.306)					
Cont. & Inter. 2015	0.77**	3.96	4.73	0.81**	3.95	4.76
	(0.293)			(0.294)		
Observations	19298			19296		
% of contributing participants						
Interacting 2014	13.35***	32.10	45.45			
	(2.000)					
Interacting 2015	4.37**	35.08	39.45	5.21***	35.02	40.23
	(2.041)			(2.051)		
Observations	2347/2245			2229		
% of interacting participants						
Contributing 2014	0.22	16.08	16.30			
	(1.004)					
Contributing 2015	2.18**	14.75	16.94	2.02**	14.72	16.74
	(1.006)			(0.998)		
Observations	5668/5281			5330		

for those treated twice. For participants who made any voluntary contribution, the increase in contribution rate as a proportion of salary was substantial for the treated, in the range of a 1-2% on top of the mandatory 9.5%. Treated participants were also more likely to contact the plan by phone, email or mail and to interact with the fund more often, contrary to the typically low engagement of participants with pension plans (Bateman et al., 2014). In other words, the trial results are consistent with the effects of a "boost" to retirement planning ability of plan participants by translating their current savings situation into a future outcome. By helping participants see where they are headed, the projections and related calls to action enable people to behave consistently with their preferences without compulsory or automatic one-size-fits-all changes to contribution rates.

These initial trial results raised two further issues for plans and regulators that we investigated using two rounds of online experiments. These are (1) the impact of lump-sum versus income-stream framing of projections as already raised by Goldstein et al. (2016) and Goda et al. (2014); and (2) the degree to which repeated choices about additional contributions change the one-off effects of new projection information.

3. Online experiment

We use an online experimental survey involving 1,615 plan participants where savers see their account balances presented in different formats. We fielded the online experimental survey in two rounds: Version 1 in August 2017 and Version 2 in December 2017, both via the web-panel provider Pureprofile. Both versions were implemented between-subjects and were identical with the exception that Version 1 involved a two-stage saving decision and Version 2 a single-stage decision, as discussed below.

The experimental survey consists of three stages: screening; experimental task; and covariate collection. Screening ensured that respondents were all pension plan participants in the accumulation phase at the time of the survey, that the sample was split 50:50 between genders and that four age groups: 25-30;

31-39; 40-48; and 49-57 were approximately equally represented.

The experimental task was designed to test four between-subjects account balance treatments in which respondents saw: (1) their current plan balance; (2) their current balance and a projected lump sum balance at retirement, based on a formula set by regulation; (3) their current balance and a projected 25 year income stream beginning at retirement, again computed by the regulated formula; and (4) their current balance, projected lump sum balance and projected 25 year income stream. In summary, the experimental design consists of 2 versions x 4 age groups x 4 account balance information treatments.

As background information, we informed respondents that we were interested in how much people plan to save for retirement in addition to compulsory retirement plan (superannuation) contributions. We explained that we would present a sequence of ten choice sets and ask respondents if they would like to save extra into their retirement account out of their discretionary income (which we call 'leftover income' in the choice sets) for that choice set only. We further explained that for each choice set we show typical income, expenses, and retirement account balance information for a person around their age. Respondents were then told that they would progress towards retirement through the ten choice sets, each time being offered the option to save extra into their retirement account out of their discretionary income. We stated that all amounts were after tax and expressed in today's dollars (and explained that this means they are adjusted for inflation). As such all additional contributions were fully taxed so we were not asking participants to choose between tax-favored and fully taxed contributions. We also highlighted that, in addition to their personal retirement account balance, many people are entitled to a government "Age Pension" of around AU$20,000 a year from age 67.

Respondents then completed choice sets one to ten, where they hypothetically progressed from their allocated starting age (the upper bound of the age group to which they had been allocated) in ten even steps to retirement. By choice set 10, all respondents had hypothetically progressed to age 66 where they made their final extra saving decision before "retirement" at age 67. In

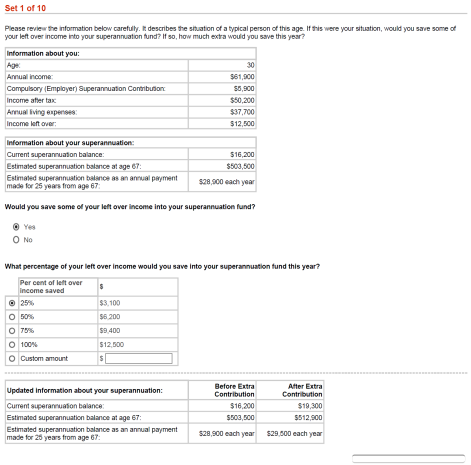
Version 1 of the survey we elicited voluntary saving intentions in two-stages by first asking the binary question 'Would you save some of your leftover income into your superannuation fund? (Yes/No)'. For those who answered 'Yes', we then asked, 'What percentage of your leftover income would you save into your superannuation fund this year?', followed by five options: 25%, (of leftover income) 50%, 75%, 100%, and an open box for custom amounts. Version 2 involved a single decision where we asked 'What percentage of your left-over income would you save into your superannuation fund this year?', followed by six options: 0%, 25%, 50%, 75%, 100%, custom amount. In all other respects Version 1 and Version 2 of the survey were identical. We ran Version 2 in an effort to replicate the findings in Version 1, to guard against the possibility that some respondents clicked 'No' in the initial question of Version 1 due to a lack of engagement with the survey rather than the expression of a true preference, and to test a variation in the choice architecture. In other words, an inadvertent feature of the two-step choice architecture used in Version 1 may have, by itself, impacted savings rates independent of any treatment effects. In both versions we tested the four between-subjects account balance treatments for participants in the four allocated age groups (which are associated with four hypothetical starting ages - 30, 39, 48 and 57).[25]

Figure 2(a) (for Version 1 of the survey) and Figure 2(b) (for Version 2 of the survey) show screenshots of the first choice set for the treatment showing current balance, projected balance and projected income stream (treatment 4) and age group 25-30 (hypothetical starting age 30). Respondents in the other three information treatments saw (both before and after the choice of extra contributions – if any) the current plan balance only (treatment 1), the current plan balance and projected lump sum retirement balance at age 67 (treatment 2), and the current plan balance and projected retirement balance at age 67 translated into an annual payment made for 25 years from age 67 (treatment

[25]The link to Version 1 of the survey is `http://survey.us.confirmit.com/wix/p3083650853.aspx` and to Version 2 is `https://survey.us.confirmit.com/wix/1/p3085280331.aspx`.

3). The income, expenses and leftover (discretionary) income information we showed participants in each choice set for each age group is consistent with population medians (Australian Bureau of Statistics, 2015; Australian Bureau of Statistics, 2016) adjusted by the personal income tax rates applying in 2017. Similarly, the starting account balances by age are also consistent with population medians (Australian Prudential Regulatory Authority, 2017) and are adjusted for mandatory contributions and for respondents' voluntary savings over the sequence of ten choices. We followed Australian regulations to compute the projected lump sum retirement account balance and projected 25-year annual payment (Australian Securities and Investments Commission, 2014).

Once respondents completed the ten choice sets, they progressed to the third stage of the survey in which they answered questions on risk attitude (Dohmen et al., 2011), patience; retirement adequacy; subjective financial literacy, objective financial literacy (Lusardi & Mitchell, 2011b) and numeracy (Lipkus et al., 2001); superannuation knowledge (derived from Agnew et al., 2013) and trust in pension plans (Agnew et al., 2012); bequests; subjective longevity; personality traits; and demographics. Respondents who completed the survey received a small compensation from the panel provider amounting to around US$4 redeemable as cash or rewards.



Set 1 of 10

Please review the information below carefully. It describes the situation of a typical person of this age. If this were your situation, would you save some of your left over income into your superannuation fund? If so, how much extra would you save this year?

Information about you:	
Age:	30
Annual income:	$61,900
Compulsory (Employer) Superannuation Contribution:	$5,900
Income after tax:	$50,200
Annual living expenses:	$37,700
Income left over:	$12,500

Information about your superannuation:	
Current superannuation balance:	$16,200
Estimated superannuation balance at age 67:	$503,500
Estimated superannuation balance as an annual payment made for 25 years from age 67:	$28,900 each year

Would you save some of your left over income into your superannuation fund?

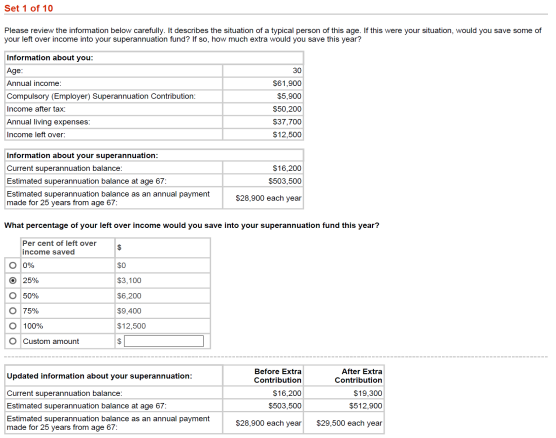
- (•) Yes
- ( ) No

What percentage of your left over income would you save into your superannuation fund this year?

	Per cent of left over income saved	$
(•)	25%	$3,100
( )	50%	$6,200
( )	75%	$9,400
( )	100%	$12,500
( )	Custom amount	$

Updated information about your superannuation:	Before Extra Contribution	After Extra Contribution
Current superannuation balance:	$16,200	$19,300
Estimated superannuation balance at age 67:	$503,500	$512,900
Estimated superannuation balance as an annual payment made for 25 years from age 67:	$28,900 each year	$29,500 each year

(a) **Version 1**



Set 1 of 10

Please review the information below carefully. It describes the situation of a typical person of this age. If this were your situation, would you save some of your left over income into your superannuation fund? If so, how much extra would you save this year?

Information about you:	
Age:	30
Annual income:	$61,900
Compulsory (Employer) Superannuation Contribution:	$5,900
Income after tax:	$50,200
Annual living expenses:	$37,700
Income left over:	$12,500

Information about your superannuation:	
Current superannuation balance:	$16,200
Estimated superannuation balance at age 67:	$503,500
Estimated superannuation balance as an annual payment made for 25 years from age 67:	$28,900 each year

What percentage of your left over income would you save into your superannuation fund this year?

	Per cent of left over income saved	$
( )	0%	$0
(•)	25%	$3,100
( )	50%	$6,200
( )	75%	$9,400
( )	100%	$12,500
( )	Custom amount	$

Updated information about your superannuation:	Before Extra Contribution	After Extra Contribution
Current superannuation balance:	$16,200	$19,300
Estimated superannuation balance at age 67:	$503,500	$512,900
Estimated superannuation balance as an annual payment made for 25 years from age 67:	$28,900 each year	$29,500 each year

(b) **Version 2**

Figure 2: Online Experiment

Notes: Respondents saw their current account balance at age 30 (AU$16,300), estimated retirement account balance at age 67 (retirement age) (AU$503,500), and estimated retirement account balance as an annual payment made for 25 years from age 67 (AU$28,900 each year). They then chose whether (Yes/No) and how much to voluntarily contribute for one year (Version 1). Once they had chosen their contributions, respondents saw the impact of the extra contributions (if any) on their account balance. For example, suppose a respondent chose to voluntarily save 25% of their leftover income in that year (equal to AU$3,100). Respondents in treatment 4 saw updated account balance information as follows: current balance of AU$19,300, estimated future balance of AU$512,500 and estimated future balance as an income payment of AU$29,500 each year. They could then decide whether to confirm the chosen voluntary saving of 25% of leftover income, or further investigate the impact of the alternative voluntary contribution options before settling on their choice. The full experiment can be found at `https://survey.us.confirmit.com/wix/3/p3083650853.aspx` (Version 1) and `https://survey.us.confirmit.com/wix/1/p3085280331.aspx` (Version 2).

3.1. Online experiment results

The experiment includes several mechanisms that could encourage respondents to choose to save incrementally more. First, respondents are compelled to notice the level of a typical retirement account balance for a person around their age and to decide whether or not to increase that balance by sacrificing part of their discretionary income. This step probably forces many of our respondents to engage with their retirement plan more than they ever have in the past, so we begin by reviewing aggregate saving responses. We then examine the conditional effects of the projection formats on saving intentions, by comparing between current balance, projected lump sum and projected income stream presentations of wealth. Finally, we review the variations in savings patterns that emerge as respondents make successive choices in response to updated account balances and wealth and income projections.

3.2. Data and summary statistics

We begin with descriptive statistics of the sample characteristics and aggregate results. Our study is based on two rounds of responses to the online experimental survey described in Section 3. To obtain them, we employed a panel provider (Pureprofile) to field the survey with representative samples of the Australian population filtered on age, gender and whether participants were enrolled in a retirement plan. The first round included 795 respondents and the second one included 820 respondents (for a total of 1,615 participants), with current ages between 25 and 57 years, consisting of 50% males and 50% females. The panel provider randomly allocated respondents from each age group (25-30, 31-39, 40-48, and 49-57) between the four treatment groups, placing 25% of the total sample of respondents in each treatment.[26]

Simply showing respondents a typical retirement account balance and asking them if they would save more stimulates the majority of respondents to make

[26]This random-assignment procedure was largely successful, with one exception: the 25-30 year-olds made up only 19% of the sample and are somewhat under-represented compared with 29%, 27% and 24% for the three older age groups respectively. Even so, we have at least 70 respondents per treatment group in the youngest age range.

extra contributions. For instance, at each choice set, an average of 62.5% of respondents chose to save some discretionary income, and 78.5% of respondents chose to make additional savings at least once during the task. By contrast, official statistics (Australian Bureau of Statistics, 2017) report that around 76% of Australian plan participants made no additional personal contributions to their retirement accounts – with "cost/can't afford to" or "have not bothered/never thought about it/not interested" as the most commonly cited reasons why not. Among Cbus participants in the field trial samples, the rates were even lower: around 12-13% made voluntary contributions with the lower rates likely due to the limited discretionary income of construction industry workers.

In terms of the value of savings, when we average over respondents and choice sets, supplementary voluntary savings were 29.2% of discretionary income. This represents a 32.7% increase on the mandatory minimum contribution rate of 9.5% of earnings, which effectively raises the total contribution rate to 12.6%. We note that the average extra savings in our experiment are somewhat higher than, but within the range of, patterns observed in aggregate administrative data. Industry studies report that voluntary contributions were about 25% of mandatory (employer) contributions (Financial Services Council, 2017). This amounts to raising the contribution rate from the mandatory 9.5% to around 11.9% of earnings compared with 12.6% in the survey data. (The average additional contribution made by Cbus members who made contributions (i.e., excluding those who made no voluntary contributions) was of a similar scale.) We take this as confirmation that the median income and discretionary income information we provide in the experiment is a realistic guide to respondent saving decisions for the national population of plan participants rather than the Cbus sample.

Our findings also show that offering a two-stage decision lowers both the aggregate saving probability and the aggregate percentage of discretionary funds saved but does not dramatically change the dynamic pattern of saving. On average, respondents in Version 1, who made a preliminary decision about whether to save at all, saved less than respondents who choose from a list of savings rates

that included zero per cent (Version 2). In Version 1 the average proportion of respondents in each choice set who chose zero savings was 47.8%; in Version 2 this proportion dropped to 27.6%. As a consequence, the choice architecture used in Version 2 raised the level of saving by an average of about 9% of discretionary income at each choice. This pattern confirmed our conjecture (following initial analysis of Version 1) that some respondents were taking the 'easy' (less time and effort consuming) option of simply saying "no" in the preliminary decision.

Figure 3 graphs the average percentage of discretionary income saved at each choice by information treatment group aggregating both versions. The projection treatments (2-4) all track steadily upwards as the respondents progress towards retirement, while the current balance treatment rises early and flattens off at later choices. There is also an obvious gap between the savings associated with treatment 1 (current balance) and the effects of the other information treatments that begins at choice 1 and widens over the remaining choices of the task. Overall, however, respondents who received information only about their current retirement balance saved an additional 27.2% of disposable income averaged over the 10 choices. This translates into an average increase in projected retirement savings of 9.3% (compared to a base of zero additional saving). In treatment 2, where respondents received information about their current balance and their projected retirement balance at age 67, the average extra savings for each respondent was 30.0% of disposable income. This figure was just above the 29.3% savings increase for treatment 3 respondents who got information on annual projected income stream instead of a projected retirement balance at age 67. Respondents in treatment 4, who saw their current balance, as well as projected wealth at age 67 and an annual projected income stream, on average saved an additional 30.3% of discretionary income over the 10 choices. On a first pass, these preliminary results indicate important effects on saving from changing the information architecture and similarly important effects from giving respondents successive savings choices.

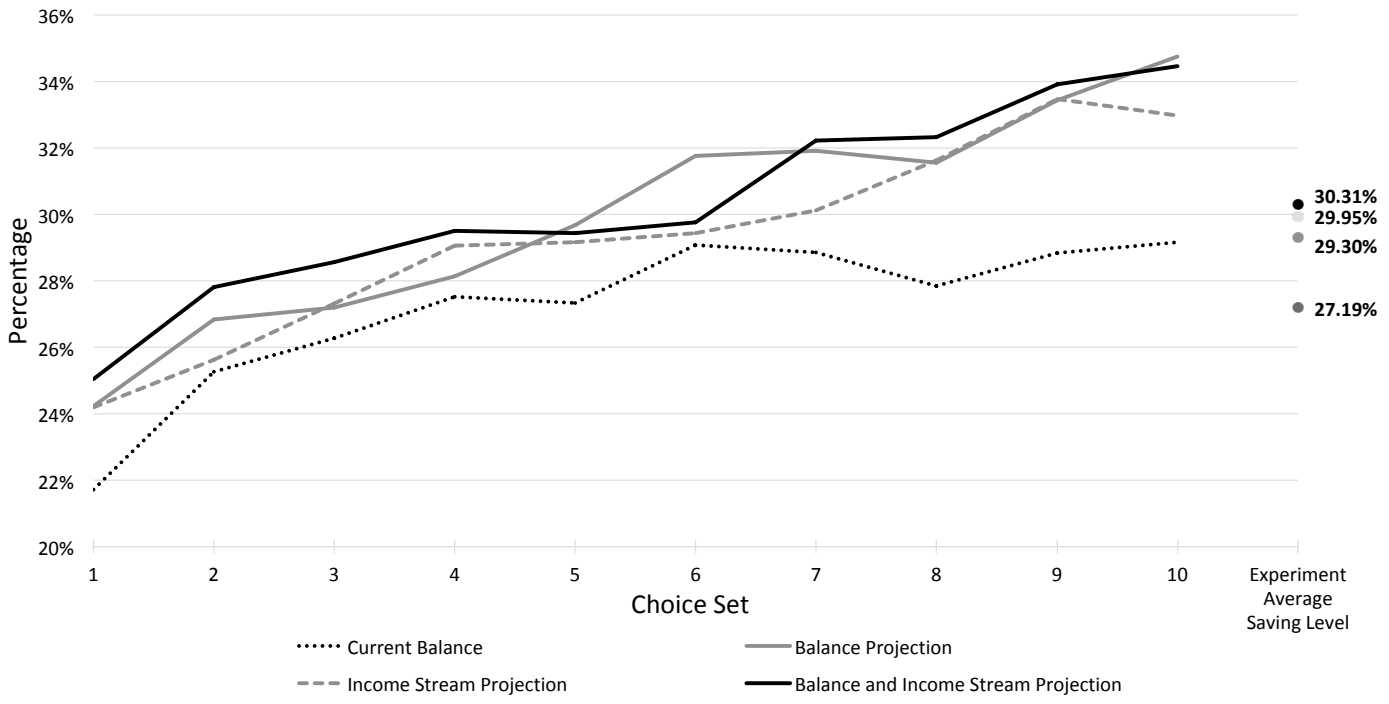


Figure 3: Average Percentage of Discretionary Income Saved

3.2.1. Impact of information format on first savings choice

In this section we answer the question of how information formats affected saving decisions for respondents' first choices. We concentrate on the first choice because it is the most comparable with the one-shot decisions studied by Goda et al. (2014) and Goldstein et al. (2016) and since our design nests the information formats in both these studies, we can complete the comparisons made in these studies.

In our experiment, respondents who saw projections of their retirement balance, income or both, chose to save significantly more in the first choice than respondents who saw only their current balance. (Table 4 sets out definitions of all variables used in the regression models.) Table 5 reports marginal effects from an OLS regression that tests the information treatment effect. The first column reports marginal effects from a model that regresses the log of projected retirement wealth at choice set one (that includes any increase due to additional savings made at the first choice set) on indicators for survey version, information treatment, age group and a complete set of interactions between age group and information treatment.

Table 4: Variable Definitions

Name	**Description**
Projected balance	The projected retirement balance at age 67, based on all savings choices.
Log projected balance	The natural logarithm of the projected retirement balance.
Version	A binary variable = 1 for survey Version 1 respondents and = 0 for survey Version 2 respondents.
Framing Treatment	A categorical variable indicating framing treatment. T1 - current retirement account balance; T2 - current retirement account balance plus lump sum retirement balance; T3 - current retirement account balance plus projection of 25 year retirement income; T4 - current retirement account balance plus lump sum retirement balance plus projection of 25 year retirement income.
Initial Age	The hypothetical starting (choice 1) age.
Age difference	The absolute difference between the respondent's actual age and their hypothetical age at each choice in years.
Income difference	Percent difference between the respondent's hypothetical gross income and their actual gross income at each choice.
Male	A binary variable = 1 for male respondents and = 0 otherwise.
Risk Aversion	A binary variable = 1 for risk aversion above median.
Patience	A binary variable = 1 for respondents with patience above survey median.
Financial Literacy and Numeracy	Per cent correct of three (3) financial literacy questions and the three (3) numeracy questions.
Pension Plan Knowledge	Percent correct of nine (9) pension plan knowledge questions.
Financial Support	A binary variable = 1 for respondents who are either solely or jointly responsible for major financial decisions within their household and = 0 otherwise.
Tertiary Education	A binary variable = 1 for respondents for college degree or higher and = 0 otherwise.
Employment	A binary variable = 1 for respondents who are employed (including full-time, part-time, self-employed) and = 0 otherwise.
Income (Personal)	Weekly gross personal income in AU$.
Bequest	Self-reported probability of leaving a AU$100,000+ inheritance.
Longevity	The absolute difference between the respondent's subjective life expectancy and their actuarial life expectancy in years.

Table 5: Marginal Effects of Information Treatment on Log Projected Retirement Balance

	Choice Set	
	First choice	Last choice
Dependent Variable: Log projected retirement balance		
Version	-0.0037***	-0.0286***
	(0.0007)	(0.0038)
Treatment 2 - Projected Lump Sum	0.0017*	0.0077
	(0.001)	(0.0053)
Treatment 3 - Projected 25 Year Income	0.0019*	0.0061
	(0.001)	(0.0053)
Treatment 4 - Projected Lump Sum and Income	0.0026**	0.0104*
	(0.001)	(0.0054)
Initial Age - 39	-0.2644***	-0.2576***
	(0.0012)	(0.0055)
Initial Age - 48	-0.5637***	-0.5518***
	(0.0012)	(0.0057)
Initial Age - 57	-0.7668***	-0.7717***
	(0.001)	(0.0055)
Observations	1615	1615

Notes: Marginal effects from OLS estimation of log projected balances at first choice (column 1) and last choice (column 2) on version indicator, treatment indicator, age indicators and interactions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

First, we note that the marginal effects of the projection treatments are all positive and significant at the 10% level or less in the first model. Treatment 4, that shows lump sum balance and income stream projections, is associated with a 0.26% ($p < 0.05$) increase in projected retirement wealth after the first saving choice. The next largest effect, of 0.19% ($p < 0.10$), is estimated for the income stream projection (treatment 3) and then 0.17% ($p < 0.10$) for the lump sum projection in treatment 2. While statistically significant relative to the control, these effects are small in economic terms partly because they relate to saving from only one year's discretionary income, made in addition to the mandatory minimum contribution rate of 9.5% of earnings. Although the treatment effects for treatments 2-4 are not statistically significantly different from each other, the estimated size order of the treatment effects is consistent with the results of Goda et al. (2014) – we also find the strongest inducement to save when

wealth is projected to retirement and shown as both a lump sum balance and an income stream; and also consistent with Goldstein et al. (2016) – we find the effect of the income stream representation on additional savings is (slightly) stronger than the effect of the lump sum projection.

Life cycle saving theory predicts that respondents with different preferences, financial literacy, life expectancy and bequest motives are likely to save differently for retirement. Table 6 reports marginal effects from a regression of the log of projected wealth on a constant, information treatment indicators, age group indicators, a version indicator, covariates that measure various preferences, psychological traits, financial literacy, bequest, longevity expectations and demographics, and a complete set of interactions between the treatment indicators and the age indicators and covariates. When we add covariates and their interactions with the treatment indicators into the initial regression (cf. Table 5, column 1), we see that the marginal treatment effects at the first choice set do not disappear (Table 6, column 1). In fact, they become slightly larger and stronger. We also show that higher savings are associated with higher patience, higher willingness to take financial risks, higher retirement saving system knowledge, tertiary education and a higher probability of wishing to leave a bequest. These are characteristics that are often associated with more financially sophisticated people. However, we also find that respondents who score higher in the test of objective financial literacy and numeracy, as compared with those who score higher on knowledge of the retirement saving system itself, tended to save less of their discretionary income. We infer that otherwise financially literate people who are relatively unfamiliar with the retirement saving system prefer to place their savings into investments other than their pension plans.

Our analysis of the first saving choices of respondents confirms that projection information can encourage additional retirement saving and that respondents are (slightly) more sensitive to income stream formats than lump sum formats. This sensitivity to projections and income streams is stronger for younger respondents and remains significant when we allow for the effects of demographics, financial skills or preferences.

Table 6: Marginal Effects of Information Treatment on Log Projected Retirement Balance

	Choice Set	
	First choice	Last choice
Dependent Variable: Log projected retirement balance		
Version	-0.0039***	-0.0296***
	(0.0008)	(0.0039)
Treatment 2 - Projected Lump Sum	0.0019*	0.0078
	(0.001)	(0.0051)
Treatment 3 - Projected 25 Year Income	0.0020*	0.0059
	(0.001)	(0.0052)
Treatment 4 - Projected Lump Sum and Income	0.0027**	0.0094*
	(0.001)	(0.0053)
Initial Age - 39	-0.2656***	-0.2525***
	(0.0012)	(0.0078)
Initial Age - 48	-0.5646***	-0.5552***
	(0.0013)	(0.0135)
Initial Age - 57	-0.7673***	-0.7705***
	(0.0011)	(0.0206)
Age Difference	0.0002	0.0002
	(0.0002)	(0.0008)
Income Difference	0.0005	-0.0052
	(0.0008)	(0.0040)
Male	0.0006	0.0015
	(0.0008)	(0.0040)
Risk Aversion	-0.0030***	-0.0186***
	(0.0008)	(0.0042)
Patience	0.0020***	0.0065***
	(0.0007)	(0.0039)
Financial literacy and numeracy	-0.0082***	-0.0323***
	(0.0016)	(0.0077)
Pension plan knowledge	0.0070***	0.0477***
	(0.0020)	(0.0100)
Financial support	0.0010	0.0021
	(0.0008)	(0.0045)
Tertiary Education	0.0017**	0.0088**
	(0.0008)	(0.0040)
Employment	0.0008	-0.0030
	(0.0013)	(0.0069)
Bequest	0.0017	0.0150**
	(0.0010)	(0.0058)
Longevity	0.0000	0.0002
	(0.0000)	(0.0002)
Observations	1615	1615

Notes: Marginal effects from OLS estimation of log projected balances at first choice (column 1) and last choice (column 2) on version indicator, treatment indicator, age indicators and interactions. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

3.2.2. Impact of information format on savings choice over time

After having explored the savings effects of our information intervention at the first experimental round, we now report the equivalent outcome after respondents have made 10 successive choices. We note that respondents move hypothetically in ten steps from their initial (close to current) age to retirement age at 67. As they do so, the information presented in each successive choice adjusts to their earlier saving decisions. Respondents who choose not to save more than the mandatory retirement contributions see their current or projected wealth increase as it would if their income path followed the median income for their age cohort, their contributions continued at 9.5% of earnings and they received the prescribed investment rate of return of 3% p.a. Naturally, respondents who choose to save from their discretionary income see their current or projected wealth increase even more. To evaluate the effects of feedback, we estimate the regression models again after the 10th choice and compare the results with the models estimated on the 1st choice (Table 5, column 2, and Table 6, column 2).

By the 10th choice, the increase in projected retirement wealth due to information format is 1.00% (or around $5K) in treatment 4 where respondents see both the balance and income stream projections. The marginal effect of the balance projection alone is 0.77% of retirement wealth (or around $3.4K) and of the income projection alone is 0.61% of retirement wealth (or around $2.5K); neither of these latter two marginal effects is, however, statistically significantly different from the control (treatment 1). When we include preference measures, financial literacy and demographic covariates, the size and significance of the treatments remain the same. The marginal effects of the covariates themselves are virtually the same as estimated at the 1st choice (see Table 6, column 2), with higher final saving related to higher risk tolerance, patience, retirement system knowledge, tertiary education and bequest motives.

4. Discussion and conclusion

Understanding how choice and information architectures influence behavior is becoming increasingly important across a wide range of areas. None more so than retirement planning where the complexity of products on offer, the difficulties in getting people engaged, and the consequences of inadequate saving all contribute to the urgent need to help consumers (Campbell et al., 2011). We present field and online experimental evidence on how projected retirement wealth and income influence patterns of voluntary saving. Here we highlight key results and briefly discuss their theoretical and policy implications.

First, making people think about retirement outcomes increases engagement and saving: Field trials of projections of retirement outcomes raise saving rates and sizes but also substantially increases the frequency of interactions between participants and plans. In the online experiment, almost 80% of our sample chose to save some of their discretionary income at some point during the experiment, a response that contrasts sharply with official reports that over three-quarters of plan-participants never make voluntary contributions (Australian Bureau of Statistics, 2017). While some of this effect can no-doubt be attributed to the demand of being in the experiment or the hypothetical setting, the difference between the experimental results and the official survey data is not so surprising in other ways. The task addresses the two most commonly mentioned barriers to making additional contributions: "cost/can't afford to" or "have not bothered/never thought about it/not interested" (Australian Bureau of Statistics, 2017). The task requires respondents who have "never thought about it" to review their retirement account balance and to decide whether to save more. It also shows respondents the discretionary income that they could save from, thus directly informing them about affordability. These results indicate that plan providers can promote engagement by inviting or reminding participants to think about how their retirement savings are tracking. Our results support the ample evidence from field studies that simple, informative reminders can significantly increase saving and loan repayment (Karlan et al., 2016; Cadena

& Schoar, 2011; Soman & Cheema, 2011).

Second, both income and lump sum projections lead to more savings than either projection alone: Following the work of Goldstein et al. (2016) and Goda et al. (2014) we predicted that projected income stream information would have a more positive effect on savings than lump sum projections. This effect is consistent with a reference-dependence account whereby respondents perceive the projected income as lower than their current salary and thus inadequate (c.f. Goldstein et al., 2016). The respondents in treatments 3 and 4 in our experiment saw income stream projections at the first choice set that correspond to replacement rates of 46% (for ages 25-30), 29% (for ages 31-39), 21% (for ages 40-48) and 20% (for ages 49-57). These levels of income would be patently inadequate for almost all respondents, even if augmented by the public pension. However, the fact that providing both lump sum and income projections encourages the most saving indicates that some respondents may also compare lump sum projections to a reference level – possibly the "round numbers" proposed by popular financial planning advice such as $1 million dollars. Respondents who compared a projected lump sum with a $1 million reference level would expect a shortfall of between $500K (25-30) and $760K (49-57). Either way, the combination of income and lump sum projection provides more information in total for respondents in treatment 4 than in treatments 2 or 3, and offers two possible channels for reference-dependence. Thus the experiment verifies the choice of the Australian regulator to include both formats.

Third, field experiment results show that projection information raises average saving by treated participants in consecutive years. The online experiment verifies that over successive choices the combination of lump sum balance and income-stream projections is best: We found that combining both forms of projection led to the highest level of additional saving – and that this effect persisted across all ten choices. This additive effect may have arisen because the combination gives respondents initial realistic – and motivating – information about future consumption in the income stream projection, along with the continued satisfaction of seeing their balance projection grow in value across choices. Such

an account presentation format again suggests a dual-reference-dependence: one in which projected income is compared with current consumption/salary (and perceived as either a loss or gain), and another in which the lump sum amount is compared with a notional impression of how much is 'enough' for retirement. Because the changes in the lump sum projection are more noticeable across choices, the positive feedback loop created by seeing 'the pot grow' sustains additional voluntary savings. For example, a respondent aged 31-39 who saves 100% of their discretionary income sees a pot that grows from $386,200 at choice 1 to $497,700 at choice 5 to $538,500 at choice 10 whereas the analogous changes in projected income are $22,200 to $28,600 to $30,900.

Our field experiment verifies that inclusion of lump sum balance and income stream projections increases participants' interaction with their plan, and prompts increases in voluntary savings. Our online experiment complements these observations and suggests that it is the combination of formats that provides the strongest impetus to save. Taken together, results from both the field and the online environment strongly support recent changes to retirement plan statement guidelines to include benefit projections, initiated by Australian plans and regulators, as well as numerous other pension regulators globally.

References

Agnew, J. R., Bateman, H., & Thorp, S. (2013). Financial literacy and retirement planning in australia. *Numeracy*, *6*, Article 7.

Agnew, J. R., Szykman, L. R., Utkus, S. P., & Young, J. A. (2012). Trust, plan knowledge and 401(k) savings behavior. *Journal of Pension Economics & Finance*, *11*, 1–20.

Ainslie, G. (2001). *Breakdown of will*. Cambridge, United Kingdom: Cambridge University Press.

Australian Bureau of Statistics (2015). *Australian National Accounts: Distri-*

bution of Household Income, Consumption and Wealth, 2003-04 to 2014-15 (Catalogue No. 5204.0.55.011). Canberra, Australia: ABS.

Australian Bureau of Statistics (2016). *Employee Earnings and Hours, Australia, May 2016 (Catalogue No. 6306.0)*. Canberra, Australia: ABS.

Australian Bureau of Statistics (2017). *Employment Arrangements, Retirement and Superannuation Australia (Catalogue No. 6361.0)*. Canberra, Australia: ABS.

Australian Prudential Regulatory Authority (2017). *Annual Superannuation Bulletin, June 2016*. Canberra, Australia: APRA.

Australian Securities and Investments Commission (2014). *Regulatory Guide 229 - Superannuation Forecasts*. Canberra, Australia: ASIC.

Bateman, H., Deetlefs, J., Dobrescu, L. I., Newell, B. R., Ortmann, A., & Thorp, S. (2014). Just interested or getting involved? an analysis of superannuation attitudes and actions. *Economic Record*, *90*, 160–178.

Cadena, X., & Schoar, A. (2011). *Remembering to Pay? Reminders vs. Financial Incentives for Loan Payments*. NBER Working Paper 17020 National Bureau of Economic Research.

Campbell, J. Y., Jackson, H. E., Madrian, B. C., & Tufano, P. (2011). Consumer financial protection. *The Journal of Economic Perspectives*, *25*, 91–114.

Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J., & Wagner, G. G. (2011). Individual risk attitudes: Measurement, determinants, and behavioral consequences. *Journal of the European Economic Association*, *9*, 522–550.

Dolls, M., Doerrenberg, P., Peichl, A., & Stichnoth, H. (2018). Do retirement savings increase in response to information about retirement and expected pensions? *Journal of Public Economics*, *158*, 168–179.

Eisenstein, E. M., & Hoch, S. J. (2007). *Intuitive Compounding: Framing, Temporal Perspective, and Expertise*. Johnson Graduate School of Management, Cornell University, Working Paper Cornell University.

Fajnzylber, E., Plaza, G., & Reyes, G. (2009). *Better-informed Workers and Retirement Savings Decisions: Impact Evaluation of a Personalized Pension Projection in Chile*. Superintendencia de Pensiones Working Paper 31 Superintendencia de Pensiones.

Financial Services Council (2017). *The State of the Industry*. "Sydney, Australia: FSC and UBS Asset Management" Financial Services Council.

Gabaix, X., & Laibson, D. I. (2006). Shrouded attributes, consumer myopia, and information suppression in competitive markets. *The Quarterly Journal of Economics*, *121*, 505–540.

Goda, G. S., Manchester, C. F., & Sojourner, A. J. (2014). What will my account really be worth? experimental evidence on how retirement income projections affect saving. *Journal of Public Economics*, *119*, 80–92.

Goldstein, D. G., Hershfield, H. E., & Benartzi, S. (2016). The illusion of wealth and its reversal. *Journal of Marketing Research*, *53*, 804–813.

Hilgert, M. A., Hogarth, J. M., & Beverly, S. G. (2003). Household financial management: The connection between knowledge and behavior. *Federal Reserve Bulletin*, *89*, 309–322.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, *47*, 263–291.

Karlan, D., McConnell, M., Mullainathan, S., & Zinman, J. (2016). Getting to the top of mind: How reminders increase saving. *Management Science*, *62*, 3393–3411.

Knoef, M., Been, J., Alessie, R., Caminada, K., Goudswaard, K., & Kalwij, A. (2016). Measuring retirement savings adequacy; developing a multi-pillar

approach in the netherlands. *Journal of Pension Economics & Finance*, *15*, 55–89.

Laibson, D. (1997). Hyperbolic discounting and golden eggs. *Quarterly Journal of Economics*, *112*, 443–477.

Lipkus, I. M., Samsa, G., & Rimer, B. K. (2001). General performance on a numeracy scale among highly educated samples. *Medical Decision Making*, *21*, 37–44.

Loewenstein, G., & Elster, J. (1992). *Choice Over Time*. New York, NY: Russell Sage Foundation.

Lusardi, A., & Mitchell, O. S. (2011a). Financial literacy and planning: Implications for retirement wellbeing. In A. Lusardi, & O. S. Mitchell (Eds.), *Financial Literacy: Implications for Retirement Security and the Financial Marketplace* (pp. 17–39). Oxford, United Kingdom: Oxford University Press.

Lusardi, A., & Mitchell, O. S. (2011b). Financial literacy around the world: An overview. *Journal of Pension Economics & Finance*, *10*, 497–508.

Mastrobuoni, G. (2011). The role of information for retirement behavior: Evidence based on the stepwise introduction of the social security statement. *Journal of Public Economics*, *95*, 913–925.

McKenzie, C. R. M., & Liersch, M. J. (2011). Misunderstanding savings growth: Implications for retirement savings behavior. *Journal of Marketing Research*, *48*, S1–S13.

Mitchell, O. S., & Moore, J. F. (1998). Can americans afford to retire? new evidence on retirement saving adequacy. *Journal of Risk and Insurance*, *65*, 371–400.

Poterba, J. M. (2014). Retirement security in an aging population. *The American Economic Review*, *104*, 1–30.

Skinner, J. (2007). Are you sure you're saving enough for retirement? *The Journal of Economic Perspectives*, *21*, 59–80.

Soman, D., & Cheema, A. (2011). Earmarking and partitioning: Increasing saving by low-income households. *Journal of Marketing Research*, *48*, S14–S22.

Stango, V., & Zinman, J. (2009). Exponential growth bias and household finance. *The Journal of Finance*, *64*, 2807–2849.

Stanko, D. (2019). *Design and supervision of pension projections in 26 jurisdictions*. IOPS Working Papers on Effective Pensions Supervision 34 International Organisation of Pension Supervisors.

Stuart, E. A. (2010). Matching methods for causal inference: A review and a look forward. *Statistical Science*, *25*, 1–21.

Willis Towers Watson (2017). *Global Pension Assets Study 2017*. London, United Kingdom: Willis Towers Watson.

Appendix A. Projection calculation regulations

The Australian legislation relating to retirement benefit statements is set out in the *Corporations Act* (Section 1017D of the Corporations Act and Div. 5 of Part 7.9 of the Corporations Regulations) and for retirement projections in Australian Securities and Investments Commission (2014) Class Order 11/1227, as amended by Class Order 14/870.

Under the Corporations Act a benefit statement must include the following information: (i) opening and closing balances; (ii) the termination value of the investment; (iii) account transactions; (iv) account contributions; (v) investment performance; (vi) changes in circumstances affecting the investment; and (vii) fees and costs.

Although the Corporations Act requires that plans ("superannuation funds") disclose a range of information in their benefit statements, it is not mandatory for them to include any retirement projections or estimates. Plans that decide to disclose retirement projections must follow the ASIC regulations (Australian Securities and Investments Commission (2014)) summarized as follows:

1. Including an estimate of an individual's annual Age Pension benefit (A) is optional.[27] Should the Age Pension benefit be included, the estimate must be expressed in today's dollars rounded to the nearest three significant figures. The projection can aggregate the Age Pension benefit with the projected retirement income stream to calculate a total retirement income estimate. If included, the Age Pension must be calculated assuming that the individual: (i) qualifies for his / her Age Pension; (ii) has a partner / spouse; (iii) jointly owns a home; (iv) has accumulated an average superannuation account balance; and (v) has no other assets or income (i.e., funds retirement expenses exclusively from the Age Pension

[27] The Age Pension is a targeted (means-tested) public safety-net pension provided by the Australian government to people who meet age and residence requirements. The Age Pension pays single pensioners a maximum rate approximately equal to 28% of male average weekly earnings and tapers off beyond means-testing thresholds for income and assets. Approximately 70% of Australians over 65 years of age receive a full or part Age Pension.

and personal superannuation savings). For such persons the annual Age Pension is approximately $20,000.

2. The annual real investment return before administration fees, but net of investment and other fees and tax (r) is 3%. Separate consideration of inflation on retirement estimates is not required and information must convey all retirement projections / estimates in "today's dollars."
3. Retirement projections / estimates are to be rounded to the nearest three significant figures for simplicity and ease of comparison.
4. Contributions (excluding account consolidations) and fee levels over the preceding 12 months are to be maintained into the future. Specifically, the current (2017) Superannuation Guarantee (mandatory employer contribution) SG rate is to be maintained at 9.5% of gross income (I). Furthermore, other retirement plan contributions (S) (i.e. non-concessional contributions, spouse contributions, government matching etc.) are to recur annually. In addition, administration fees / costs (F) quoted as a fixed dollar value, and administration fees / costs (f) quoted as a percentage of an individual's current account balance are assumed to be charged periodically throughout each year.
5. All retirement projections assume a retirement age of 67.
6. The projected retirement income stream is an annual amortization over 25 years (i.e., have an assumed drawdown period of 25 years) from the age of retirement. To maintain internal consistency, the projected retirement income stream calculations must assume the annual real investment return before administration fees, but net of investment and other fees and tax (r) is 3%. The projected retirement income stream is to be specified as an annual amount in today's dollars rounded to the nearest three significant figures. The legislation stipulates quarterly withdrawals (i.e. $r = \frac{0.03}{4}$ and $n = 100$) in the amortization calculation.
7. Current taxation conditions will remain unchanged.

According to these assumptions, the projected lump sum balance at retirement

age (RB_t), and associated total projected retirement income stream beginning at retirement (IS_t), where $t = 67$ can be calculated as:

$$\begin{aligned} RB_t &= RB_{t-1} \times (1 + (r - f)) + (I_{t-1} \times SG) + S_t - F_t \\ RB_{67} &= RB_{66} \times (1 + (0.03 - f)) + (I_{66} \times 0.095) + S_t - F_t \end{aligned} \tag{A.1}$$

$$\begin{aligned} IS_t &= RB_t \times \frac{1 - \frac{1}{(1+r)}}{1 - \frac{1}{(1+r)^n}} \times 4 + A_t \\ IS_{67} &= RB_{67} \times 0.0566 + A_t \end{aligned} \tag{A.2}$$

Appendix B. Cbus Field Experiment Eligibility Criteria

Cbus excluded groups of participants in the following categories from the 2013 and 2014 projections:

1. New participants (less than one year) who were excluded by ASIC regulation from projection communication.
2. Participants with potentially unreliable data. This included participants with: (i) duplicate or merged accounts; (ii) invalid residential addresses; and (iii) incorrect annual administrative fees.
3. Participants with abnormally high or low contributions or other unusual flows that would render the projections unreasonable.
4. Participants outside the target demographic: participants younger than 21 and older than the retirement age; who were not Australian residents; in transition to retirement, semi-retired or retired; and/or totally and permanently disabled.

Cbus excluded 49.27% (319,494 out of 674,494) and 47.36% (347,008 out of 704,286) of their total participants from the 2013 and 2014 projection field experiments, respectively. Table B.1 reports the exclusion criteria used for the 2013 and 2014 projection field experiments.

Table B.1: **Cbus Projections Field Trial Participant Exclusion Criteria**

This table reports the exclusion criteria used by Cbus to determine treatment and controls groups in the 2013 and 2014 RIE field experiments.

Exclusion Criteria	Description	Used	
		2013	2014
Address	Exclude participants with an invalid residential address.	-	✓
Administration Fee	Exclude participants who have an annual administration fees not equal to $78. An incorrect annual administrative fee may indicate either: (i) an unreliable data point; (ii) a participant with small benefits where deducting the full fee would result in a nil balance; and / or (iii) a participant who has been in the fund for less than 12 months.	✓	✓
Age	Australian Securities and Investments Commission (2014) Class Order 11/1227 assumes that retirement age for all participants is 67, therefore exclude participants older than age 55 for whom Age Pension eligibility is before age 67. Exclude participants younger than age 21 for whom contributions are likely to be low due to apprenticeships and default insurance cover is only two units (rather than the default of four units for participants older than 21).	✓	✓
Concessional Contributions	Exclude participants with concessional contributions (i.e., SG and other concessional contributions) greater than the concessional contributions limit. Prior to and including FY 2013/14, the concessional contribution limit for individuals aged 59 or over and less than 59 as at 30 June 2013 was $35,000 and $25,000, respectively. For FY 2014/15, the concessional contribution limit for individuals aged 49 or over and less than 49 as at 30 June 2014 was $35,000 and $30,000, respectively.	-	✓

Continued

Table B.1 – *Continued*

Exclusion Criteria	Description	Used	
		2013	2014
Current Balance	Exclude all active participants with a zero current retirement account balance. An active participant with a zero current balance is an expected data error (i.e., late notification of contributions) because, by definition, an active participant must have made contributions throughout the FY.	-	✓
Death and Total Permanent Disability (TPD)	Exclude participants who have died or received a TPD benefit in the last 12 months.	-	✓
Income Stream	Exclude participants who are retired or semi-retired and already receiving retirement income streams. These participants are likely to be either in their transition to retirement or formally retired, and therefore, these participants are likely to find the RIE confusing.	-	✓
International Residency	Exclude participants with an overseas address. Cbus assumed that participants living abroad are not Australian residents and not likely to engage with their Australian retirement account.	✓	✓
Merged Accounts	Exclude duplicate participants which have been merged into an existing account.	-	✓
New Participant	The Australian Securities and Investments Commission (2014) Class Order 11/1227 stipulates that superannuation funds are not to provide retirement projections to participants who have been with them for less than one year.	✓	✓

Continued

Table B.1 – *Continued*

Exclusion Criteria	Description	Used	
		2013	2014
Large Non-Concessional Contributions	The Australian Securities and Investments Commission (2014) Class Order 11/1227 requires non-consolidation cash flows into and out of a superannuation accounts (i.e., contributions, taxation, administrative fees and insurance premiums) remain constant throughout the projection period (i.e., until retirement age at 67 years old). Therefore, retirement projections would assume any large one-off non-concessional (i.e., after tax) contributions in the current FY would recur annually, which could significantly overstate participants projected superannuation account balance. Therefore, exclude participants with non-concessional voluntary contributions greater than $25,000 in the FY.	✓	✓
Projected Balance	Exclude participants for whom their projected lump sum at retirement age (67 years old) is less than $1,000 greater than their current superannuation account balance. This is primarily due to insurance premiums, fees and tax being greater than contributions over the last FY. Since the Australian Securities and Investments Commission (2014) Class Order 11/1227 requires non-consolidation cash flows into and out of a superannuation account (i.e., contributions, taxation, administrative fees and insurance premiums) remain constant throughout the projection period, eventually the current superannuation account balance will erode.	-	✓
Tax File Number (TFN) Status	Exclude participants without a valid TFN. Participants without a valid TFN will have their contributions taxed at their marginal tax rate (and not the concessional tax rate of 15%). Since the Australian Securities and Investments Commission (2014) Class Order 11/1227 requires non-consolidation cash flows into and out of a superannuation account (i.e., contributions, taxation, administrative fees and insurance premiums) remain constant throughout the projection period, this may understate retirement projections.	✓	✓

Appendix C. 2013 and 2014 Projection brochure

Cbus administered their first projection treatment in mid-November, 2013, and their second from late-September to mid-October 2014, containing:

1. *Personalized financial information*: the member's current retirement account balance, current age and retirement contributions over the past 12 months. These figures were used to calculate their retirement age and all associated retirement projections.
2. *Retirement projections*: both projected lump sum balance estimates at retirement age (67 years) and associated total projected 25 year income stream estimates (which included half of a couple's Age Pension) during retirement.
3. *Educational information*: information to educate Cbus members about the adequacy of their projected retirement wealth.
4. *Four (4) calls to action*: encouragement for participants to consider: (i) communicating directly with Cbus fund employees / advisers for further information; (ii) consolidating their retirement wealth into a single (Cbus) account; (iii) their current and future retirement contribution decisions; and (iv) their current and future retirement account investment asset allocation.
5. *A case study.*

Your Personal Retirement Income Estimate

Prepared 30 June 2013

We've taken some of the hard work out of planning for the future

Your Annual Benefit Statement looks at the history of your Cbus account. So to help you plan for when you stop working, Your Personal Retirement Income Estimate looks at the future.

And we've estimated how much your Cbus account balance may be when you retire

Based on your Cbus account details at 30 June 2013, your transactions during the financial year and various important assumptions, we've estimated how much your account could grow between now and when you retire. Plus it shows the income you could expect to receive each year for 25 years.

Your account balance:
$25,000
at age 39 in 2013

Your estimated account balance:
?????
if you retire at age 67 in 2041

Member name
«Member Name»

Your membership number
«123456789»

Turn over to see your account balance estimate at age 67 and what annual income this could provide.

(a) **2013 p.1**

Your Personal Retirement Income Estimate

Prepared 30 June 2013

Step 1. What will my Cbus account balance be at retirement?

Your account balance:
$25,000
at age 39 in 2013

Your estimated account balance:
$198,000
if you retire at age 67 in 2041

If you don't like the estimate, call the Cbus Advice Team to work out a plan for you.

What this estimate means

The projection is just an estimate, not a guarantee. The actual money you get in your retirement may be very different from this estimate.

How this is worked out

This is the super you may have when you retire, based on your account activity over the past 12 months. Your estimate is based on the contributions and deductions that occurred last financial year that we project (according to assumptions and rules defined by the Government) what you will have at age 67. The result is in today's dollars, which means it includes increases in the cost of living.

Step 2. How much income will this pay me when I finish work?

Yearly income (when retired)

See page 4 for other assumptions used to calculate this estimate.

$11,200 pa
Cbus account

+

$13,600 pa
Your half of the Government age pension

+

Other potential sources

$24,800 pa
Your yearly income in retirement

This is calculated to last 25 years. This is in today's dollars.

Adding up your income

To work this out, we've brought together two 'incomes' you could get in retirement. These incomes are from your Cbus account and the Government age pension.

About the Government age pension

The Government age pension shown is half of the maximum amount a couple can currently receive. You may not be eligible for some or all of this age pension amount if you (or your partner) have income or assets in addition to this super fund. Pension rates and eligibility rules may change between now and when you retire.

Your other sources income

This estimate doesn't include any other super you may have or income you may get. This could be from shares, interest from savings or investment properties. These investments can support you in retirement.

We can help you get a clearer picture

The Cbus Advice Team can answer your questions about super and planning for retirement. Their tools can produce simple but accurate personal estimates that consider your whole financial situation, not just your Cbus account. And while they're phone based, they're fully qualified to work out a plan for you.

(b) **2013 p.2**

Step 3. What can I do to improve my estimate?

Contact the Cbus Advice Team

If you have questions, the Cbus Advice Team can give you answers you need to improve your estimate.

Call 1300 361 784
Mon to Fri, 8am to 8pm

Email
advice@cbussuper.com.au

Visit
www.cbussuper.com.au/future

How much income will I need?

Decisions you make now can change outcomes. The Government age pension provides a basic safety net in retirement. It's your super (and any other savings and investments) that helps you achieve a higher standard of living.

There are two simple ways we can help you decide if your estimated income is enough:

- **Replacement rate:** This compares a person's spending power before and after retirement (eg 60 to 70% of your working income), and
- **Budget standard:** This is based on working out income needed, on average, to live at a certain standard in retirement.

Get your own answers

Whatever your situation, the Cbus Advice Team can help you get a view of what's enough for you and your family. They can talk you through your options over the phone and provide you with all the detail you need.

Four facts that will change the way you plan for retirement

Longevity
Around one in six men and one in four women who retire at 67 years old will live longer than 25 years after retirement

Average age of retirement
Men 'retire' at 57.9 years old and women at 49.6 years old

Pension
77% of Australians over 65 years old received income support

Pension rate
Current full fortnight rate (including supplements) is $808.40 a for a single and $1,218.80 for a couple

Sources: ABS (2011) 'Retirement and retirement intentions, Australia, Commonwealth of Australia (2008) Pension Review, www.centrelink.gov.au

Some of the strategies Justin discussed

- Combining his super into one account
- Choosing a different investment option
- Adjusting his super contribution levels

Case study:

What Justin thought about

Justin, 38, works as an Account Manager in a construction company. He is married with two kids.

He received his Cbus Personal Retirement Income Estimate and thought he'd have more for his retirement.

Looking through it, it was clear to Justin that the estimate didn't cover his full financial position. For instance, he had another super account.

So Justin called the Cbus Advice Team to get answers to his questions. They were able to help him see his financial options clearly, and take appropriate action.

(c) **2013 p.3**

More details on how this estimate is calculated

How the estimate is calculated

This estimate has been calculated using these assumptions and figures:

- **$25,000** in your super fund now
- investment earnings of 3% per year after inflation
- annual fees and costs of **$78** representing the administration fees during the year ending on 30 June 2013 (note that this amount may change over time)
- your super contributions during the previous year will continue until retirement
- you retire at age 67
- you want your super to last for 25 years after your retirement – that is, until age 92
- annual insurance premiums of **$600** (note that this amount may change over time), and
- current tax and laws remain unchanged.

These are standard assumptions and have been set with input from the Australian Government Actuary. They may not match your actual circumstances either now or in the future. Also, the figures used may differ from those shown in your member statement. The annual income shown does not include any deductions for income tax you may have to pay.

What you will actually get when you retire

The actual amount of money you get in retirement may vary considerably from the estimate.

Factors that influence what you will get include:

- the investment options you choose (for example Cash Savings, Conservative, Growth (Cbus Choice), High Growth)
- the performance of your investment
- the total fees deducted from your account
- when you retire and get access to your super
- the super contributions you and your employer make
- whether you choose to buy an account-based pension or non-account-based income stream when you retire
- any allowance you make for a pension for your spouse or partner, and
- whether you receive any age pension or other government benefit.

This estimate has been calculated assuming all current rules concerning super and taxing super remain in place.

This estimate only applies to your Cbus super account.

If you want to know more about the way this estimate has been calculated, or the assumptions, call Cbus on **1300 361 784** or visit **www.cbussuper.com.au/future**

Cbus is a leading super fund

Cbus continues to produce strong long-term returns for members with a 16.1% return* this year. This builds on the average 9.1% pa return the Growth (Cbus Choice) default investment option has delivered for its members, since 1994. Cbus now looks after over $22 billion in members' super, for more than 700,000 members across Australia.

Investing in building Australia

Cbus invests members' money in a diversified range of assets to produce strong long-term returns. What makes Cbus special is that we also develop projects that employ our members through Cbus Property. These projects have created more than 74,000 of jobs across Australia and have helped define our cities and economy. Visit **www.cbussuper.com.au/AnnualReport** to learn more.

Getting help

Don't make changes to your retirement savings arrangements based on this estimate. Before you make changes, you should get further information or advice.

Online calculators let you explore your potential retirement income in more detail. They let you personalise the estimate and show you how you can improve your retirement income. These calculators include the Cbus Super Income calculator at **www.cbussuper.com.au** and ASIC's Money Smart retirement planner at **www.moneysmart.gov.au**.

Cbus phone advisers are licensed to provide financial advice by our fund administrator, Superpartners Pty Ltd ABN 57 078 907 883. Superpartners is responsible for the advice provided to you under its Australian Financial Services Licence 238761.

Call 1300 361 784
Mon to Fri, 8am to 8pm

Email
advice@cbussuper.com.au

Visit
www.cbussuper.com.au/future

Cbus' Trustee: United Super Pty Ltd ABN 46 006 261 623 AFSL 233792 Cbus ABN 75 493 363 262
* Past performance is not a reliable indicator of future performance.

4516 0913 (ACT)

(d) **2013 p.4**

Your Personal Retirement Income Estimate

Prepared 30 June 2014

CELEBRATING 30 YEARS

What's retirement income about?

We spend most of life working, to provide an income for us and our families, but we don't tend to think about what kind of income we will have when we retire. Who is going to pay you in retirement?

And this may be hard to think about when retirement is many many years away, and your super balance is quite small at the moment. There are also questions about how much you will need and how long it should last. All not so simple questions.

That's why Cbus has produced this estimate of your retirement income – based on what we know now. It's not perfect, but it will help you make some good decisions about your super.

Member name

«Member Name»

Your membership number

«123456789»

Use this number when you speak with us.

Turn over to see your account balance estimate at retirement and what annual income this could provide.

What will make up your retirement income?

There are three elements that make up your retirement income. We know a lot about the super and the age pension elements, and for most people that will form the main part of their retirement incomes.

Your other income

This is the 'everything else' in your life. It represents any income that may come from your investments or savings outside of super. So if you have an investment property, bank savings or shares, these may pay regular rent, interest or dividends. They can also be sold off from time to time, to provide extra money when you need it.

Your super

This is the sum of your Cbus account, and any other accounts you may have. Generally, when you retire, you can access your super. Taking out a super income stream, you benefit from tax-free earnings while drawing a regular income. This estimate is based on only your Cbus account.

The Government Aged Pension

This is what you'll get from the Government if you meet the eligibility requirements. The full fortnight rate (including supplements) is $842.80 for a single and $1,270.60 for a couple (at 30 June 2014). Most retirees will receive at least some pension when they retire. In the estimate over the page, we divide the couple amount in half, as this represents your share of a couples pension.

(e) **2014 p.1**

Your Personal Retirement Income Estimate

Prepared 30 June 2014

Now 2014

Age <29>

Cbus account balance

<$50,000>

We start with what we know – your Cbus account balance in your statement at 30 June 2014. If you have other super accounts, you can talk to the Cbus Advice Team to include them in a personal estimate.

Super strategies to have more in retirement

There are a number of ways you can have more in your retirement. What works for you will depend on your situation. You can talk to the Cbus Advice Team, for some personal advice, but common strategies include:

- Putting a little extra into your super each week, could be either before or after tax
- Put all your super into one account so you pay less fees
- Consider a different investment choice
- Work for longer (either part time or full time)

6 facts about super and retirement

Super balances overall
Average super account balances were around $83,000 for men and $45,000 for women (2011/12)

Age Pension
77% of Australians over 65 years received income support from the Government Aged Pension

Intended retirement age
The average age people intend to retire is 63.8 years for men and 63.0 years for women

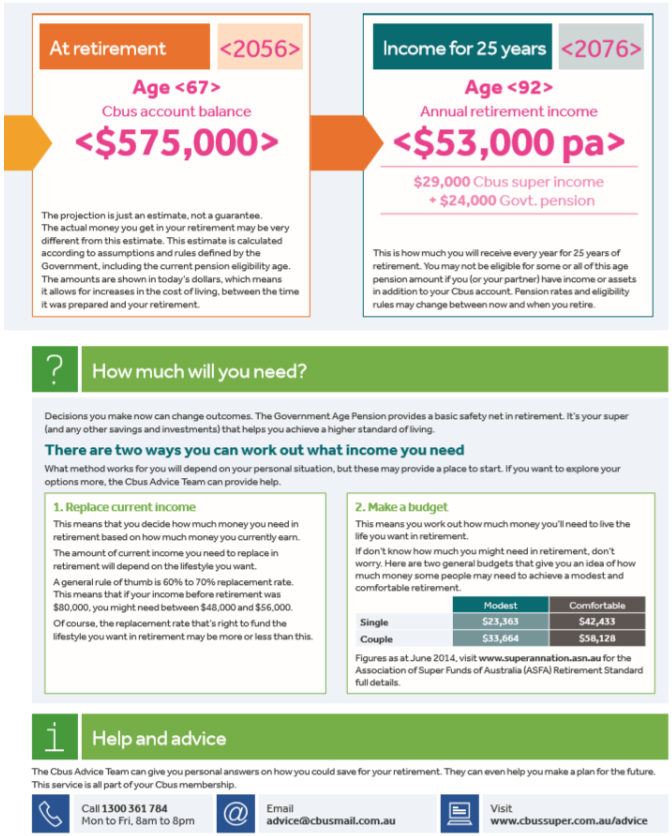
Living longer
Around one in six men and one in four women who retire at 67 years old will live longer than 25 years after retirement

Super for young people
Average balances for 30–40 year olds, are around $20,000 for men and $14,000 for women (2011/12)

Super balances at retirement
Average balance at retirement were around $197,000 for men and $105,000 for women (2011/12)

Sources: Australian Bureau of Statistics (2013) 'Retirement and Retirement Intentions, Australia', www.centrelink.gov.au, Association of Super Funds of Australia (2014) 'An update on the level and distribution of retirement savings'.

(f) **2014 p.2**



At retirement <2056>

Age <67>

Cbus account balance

<$575,000>

The projection is just an estimate, not a guarantee. The actual money you get in your retirement may be very different from this estimate. This estimate is calculated according to assumptions and rules defined by the Government, including the current pension eligibility age. The amounts are shown in today's dollars, which means it allows for increases in the cost of living, between the time it was prepared and your retirement.

Income for 25 years <2076>

Age <92>

Annual retirement income

<$53,000 pa>

$29,000 Cbus super income
+ $24,000 Govt. pension

This is how much you will receive every year for 25 years of retirement. You may not be eligible for some or all of this age pension amount if you (or your partner) have income or assets in addition to your Cbus account. Pension rates and eligibility rules may change between now and when you retire.

How much will you need?

Decisions you make now can change outcomes. The Government Age Pension provides a basic safety net in retirement. It's your super (and any other savings and investments) that helps you achieve a higher standard of living.

There are two ways you can work out what income you need

What method works for you will depend on your personal situation, but these may provide a place to start. If you want to explore your options more, the Cbus Advice Team can provide help.

1. Replace current income

This means that you decide how much money you need in retirement based on how much money you currently earn.

The amount of current income you need to replace in retirement will depend on the lifestyle you want.

A general rule of thumb is 60% to 70% replacement rate. This means that if your income before retirement was $80,000, you might need between $48,000 and $56,000.

Of course, the replacement rate that's right to fund the lifestyle you want in retirement may be more or less than this.

2. Make a budget

This means you work out how much money you'll need to live the life you want in retirement.

If don't know how much you might need in retirement, don't worry. Here are two general budgets that give you an idea of how much money some people may need to achieve a modest and comfortable retirement.

	Modest	Comfortable
Single	$23,363	$42,433
Couple	$33,664	$58,128

Figures as at June 2014, visit **www.superannation.asn.au** for the Association of Super Funds of Australia (ASFA) Retirement Standard full details.

Help and advice

The Cbus Advice Team can give you personal answers on how you could save for your retirement. They can even help you make a plan for the future. This service is all part of your Cbus membership.

Call **1300 361 784**
Mon to Fri, 8am to 8pm

Email
advice@cbusmail.com.au

Visit
www.cbussuper.com.au/advice

(g) **2014 p.3**

More details on how this estimate is calculated

Getting help

Don't make changes to your retirement savings arrangements based on this estimate. Before you make changes, you should get further information or advice.

Online calculators let you explore your potential retirement income in more detail.

They let you personalise the estimate and show you how you can improve your retirement income.

These calculators include the Cbus Super Income calculator at **www.cbussuper.com.au** and ASIC's MoneySmart retirement planner at **www.moneysmart.gov.au**.

How the estimate is calculated

This estimate has been calculated using these assumptions and figures:

- **$25,000** in your super fund now
- investment earnings of **3%** per year after inflation
- annual fees and costs of **$78** representing the administration fees during the year ending on 30 June 2014 (note that this amount may change over time)
- your super contributions during the previous year will continue until retirement
- you retire at age **67**
- you want your super to last for 25 years after your retirement – that is, until age **92**
- annual insurance premiums of **$600** (note that this amount may change over time), and
- current tax and laws remain unchanged.

These are standard assumptions and have been set with input from the Australian Government Actuary. They may not match your actual circumstances either now or in the future. Also, the figures used may differ from those shown in your member statement. The annual income shown does not include any deductions for income tax you may have to pay.

If you want to know more about the way this estimate has been calculated, or the assumptions, contact Cbus **1300 361 794** or visit **www.cbussuper.com.au**

What you will actually get when you retire

The actual amount of money you get in retirement may vary considerably from the estimate.

Factors that influence what you will get include:

- the investment options you choose (for example Cash Savings, Conservative, Growth (Cbus MySuper), High Growth)
- the performance of your investment
- the total fees deducted from your account
- when you retire and get access to your super
- the super contributions you and your employer make
- whether you choose to buy an account-based pension or non-account-based income stream when you retire
- any allowance you make for a pension for your spouse or partner, and
- whether you receive any age pension or other government benefit.

This estimate has been calculated assuming all current rules concerning super and taxing super remain in place.

This estimate only applies to your Cbus super account.

Call **1300 361 784**
Mon to Fri, 8am to 8pm

Email
cbusenq@cbussuper.com.au

Visit
www.cbussuper.com.au

The Cbus Advice Team are licensed to provide financial advice by our fund administrator, Superpartners Pty Ltd ABN 57 078 907 883. Superpartners is responsible for the advice provided to you under its Australian Financial Services Licence 238761. This information is about Cbus. It doesn't take into account your specific needs, so you should look at your own financial position, objectives and requirements before making any financial decisions. Read the relevant Product Disclosure Statement to decide whether Cbus is right for you. Contact **1300 361 784** or visit **www.cbussuper.com.au** for a copy.

Cbus' Trustee: United Super Pty Ltd ABN 46 006 261 623 AFSL 233792 Cbus ABN 75 493 363 262

3258.08/14

(h) **2014 p.4**

Appendix D. Voluntary Contributions: Rates and Amounts

Table D.1: Voluntary Contributions T11: Tax-Favored

Table shows estimation results (top panel) and marginal effects (bottom panel) from logit estimation of the probability of making a tax-favored contribution in 2014 (col 1) and 2015 (col 2) and OlS regression of the dollar amount of tax-favored contributions in 2014 (col 3) and 2015 (col 4), on treatment indicators, participant characteristics and interactions.

	(1) Tax-Fav. cont. 2014	(2) Tax-Fav. cont. 2015	(3) Tax-Fav. cont. ($) 2014	(4) Tax-Fav. cont. ($) 2015
Variable				
T11=1	0.216	0.129	-32.411	24.562
	(0.408)	(0.398)	(106.270)	(151.702)
Age (2013, yrs)	0.015**	0.029***	6.187***	14.302***
	(0.007)	(0.006)	(1.724)	(2.664)
T11=1 × Age	-0.007	-0.012	0.244	-3.701
	(0.009)	(0.009)	(2.336)	(3.406)
Male=1	-0.108	0.004	-54.303	-28.075
	(0.180)	(0.170)	(53.966)	(79.563)
T11=1 × Male=1	-0.117	-0.085	-19.669	-13.482
	(0.241)	(0.237)	(84.915)	(113.127)
Balance (end FY2013, $,000)	0.018***	0.017***	3.639***	5.639***
	(0.002)	(0.002)	(0.612)	(0.910)
T11=1 × Balance	0.004**	0.005**	4.170***	3.537***
	(0.002)	(0.002)	(0.977)	(1.353)
Tenure (2013, yrs since joining)	-0.044***	-0.054***	-11.906***	-21.392***
	(0.009)	(0.009)	(3.007)	(4.726)
T11=1 × Tenure	0.006	0.025**	-6.494	4.216
	(0.013)	(0.012)	(4.881)	(7.082)
Marginal effects				
T11=1	0.009***	0.006*	82.763***	74.008***
	(0.003)	(0.003)	(17.480)	(25.093)
Age	0.001**	0.001***	6.309***	12.453***
	(0.000)	(0.000)	(1.168)	(1.703)
Male=1	-0.009	-0.002	-64.137	-34.812
	(0.006)	(0.006)	(42.457)	(56.563)
Balance	0.001***	0.001***	5.724***	7.407***
	(0.000)	(0.000)	(0.488)	(0.677)
Tenure	-0.002***	-0.002***	-15.153***	-19.286***
	(0.000)	(0.000)	(2.440)	(3.541)
(Pseudo) R-squared	0.063	0.069	0.0293	0.0268
Observations	19,298	18,656	19,298	18,656

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.2: Voluntary Contributions T01: Tax-Favored

Table shows estimation results (top panel) and marginal effects (bottom panel) from logit estimation of the probability of making a tax-favored contribution in 2015 (col 1) and OlS regression of the dollar amount of tax-favored contributions in 2015 (col 2), on treatment indicators, participant characteristics and interactions.

	(1)	(2)
	Tax-Fav. cont. 2015	Tax-Fav. cont. ($) 2015
main		
T01=1	-0.060	-419.716***
	(0.399)	(157.870)
Age (2014, yrs)	0.025***	12.128***
	(0.006)	(2.476)
T01=1 × Age	0.004	8.998**
	(0.009)	(4.199)
Male=1	-0.031	-46.929
	(0.171)	(79.173)
T01=1 × Male=1	-0.129	161.764
	(0.240)	(100.743)
Balance (end FY2014, $,000)	0.017***	6.093***
	(0.001)	(0.914)
T01=1 × Balance	-0.004**	-2.017
	(0.002)	(1.304)
Tenure (2014, yrs since joining)	-0.057***	-23.610***
	(0.009)	(4.963)
T01=1 × Tenure	0.028**	9.399
	(0.012)	(7.126)
Marginal effects		
T01=1	0.000	59.470**
	(0.003)	(25.278)
Age	0.001***	16.620***
	(0.000)	(2.098)
Male=1	-0.005	33.823
	(0.006)	(50.390)
Balance	0.001***	5.086***
	(0.000)	(0.652)
Tenure	-0.002***	-18.917***
	(0.000)	(3.563)
(Pseudo) R-squared	0.066	0.0269
Observations	18,636	18,636

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.3: Voluntary Contributions: Fully Taxed

Table shows estimation results (top panel) and marginal effects (bottom panel) from logit estimation of the probability of making a fully taxed contribution in 2014 (col 1) and 2015 (col 2) and OlS regression of the dollar amount of tax-favored contributions in 2014 (col 3) and 2015 (col 4), on treatment indicators, participant characteristics and interactions.

	(1)	(2)	(3)	(4)
	Fully Taxed. cont. 2014	Non-Tax-Pref. cont. 2015	Fully Taxed. cont. amount 2014	Fully Taxed. cont. amount 2015
Variables				
T11=1	0.000	-0.027	-217.379*	-149.507
	(0.287)	(0.308)	(111.220)	(126.182)
Age (2013, yrs)	0.026***	0.029***	5.357***	6.423***
	(0.005)	(0.005)	(1.581)	(1.681)
T11=1 × Age	0.001	0.004	4.926*	4.463
	(0.007)	(0.007)	(2.591)	(2.838)
Male=1	-0.579***	-0.448***	-43.987	-82.168
	(0.119)	(0.131)	(46.820)	(59.235)
T11=1 × Male=1	0.097	-0.030	59.575	49.864
	(0.167)	(0.179)	(70.293)	(92.062)
Balance (end FY2013, $,000)	-0.002	-0.003*	1.157*	1.328*
	(0.001)	(0.001)	(0.686)	(0.691)
T11=1 × Balance	-0.000	-0.001	1.693*	1.227
	(0.002)	(0.002)	(1.028)	(1.121)
Tenure (2013, yrs since joining)	0.033***	0.031***	0.914	2.361
	(0.007)	(0.007)	(3.324)	(3.826)
T11=1 × Tenure	-0.005	-0.003	-4.799	-6.149
	(0.010)	(0.010)	(5.792)	(6.760)
Marginal effects				
T11=1	0.004	0.001	49.886***	58.048***
	(0.004)	(0.004)	(19.338)	(22.434)
Age	0.002***	0.002***	7.820***	8.653***
	(0.000)	(0.000)	(1.295)	(1.419)
Male=1	-0.045***	-0.035***	-14.199	-57.252
	(0.008)	(0.008)	(35.147)	(46.026)
Balance	-0.000***	-0.000***	2.004***	1.941***
	(0.000)	(0.000)	(0.514)	(0.560)
Tenure	0.002***	0.002***	-1.485	-0.711
	(0.000)	(0.000)	(2.896)	(3.379)
(Pseudo) R-squared	0.019	0.021	0.0083	0.0070
Observations	19,298	18,656	19,298	18,656

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table D.4: Voluntary Contributions: Fully Taxed

Table shows estimation results (top panel) and marginal effects (bottom panel) from logit estimation of the probability of making a fully taxed contribution in 2015 (col 1) and OlS regression of the dollar amount of tax-favored contributions in 2015 (col 2), on treatment indicators, participant characteristics and interactions.

	(1)	(2)
	Fully Taxed. cont. 2015	Fully Taxed. cont. amount 2015
Variables		
T01=1	-0.189	-567.545**
	(0.295)	(220.991)
Age (2014, yrs)	0.029***	5.957***
	(0.005)	(1.617)
T01=1 × Age	0.007	20.501***
	(0.007)	(5.559)
Male=1	-0.450***	-85.881
	(0.131)	(59.072)
T01=1 × Male=1	-0.045	-64.889
	(0.182)	(190.880)
Balance (end FY2014, $,000)	-0.002	1.511***
	(0.001)	(0.581)
T01=1 × Balance	0.000	-1.908
	(0.002)	(1.652)
Tenure (2014, yrs since joining)	0.030***	1.504
	(0.007)	(3.724)
T01=1 × Tenure	-0.001	6.511
	(0.010)	(10.036)
Marginal effects		
T01=1	0.004	118.685***
	(0.004)	(36.246)
Age	0.002***	16.191***
	(0.000)	(2.776)
Male=1	-0.037***	-118.273
	(0.008)	(95.316)
Balance	-0.000**	0.559
	(0.000)	(0.825)
Tenure	0.002***	4.754
	(0.000)	(5.012)
(Pseudo) R-squared	0.027	0.0097
Observations	18,636	18,636

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$