Investigating the relationship between personal rates of return within MySuper and the account characteristics that influence these

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Abstract

The MySuper Dashboard 'representative member' investment return is intended to inform MySuper superannuation members about their fund's performance and, by inference, the returns received on their superannuation investment. However, this brings forward the question: Who exactly is the 'representative member'? This study argues that a reliance on the MySuper Dashboard 'representative member' return leads to a lack of transparency on investment outcomes experienced by its members. To show this, Excel's XIRR formula is used to derive individual MySuper member money-weighted personal rates of return, making explicit the dispersion of personal rates of return relative to the superannuation fund's 'representative member'. Additionally, the study utilises a multiple regression framework to identify cohort account characteristics and specific transactions (cash-flows) that impact on investment returns achieved. The study finds use of a single figure for communicating a MySuper fund's investment return is inaccurate, as evidenced by 84.2 per cent of members in the study received a personal rate of return below that of the MySuper Dashboard 'representative member'. Higher opening account balances, not paying insurance premiums, and more frequent contributions, have a positive effect on personal rates of return. Being female, paying insurance premiums, having a higher salary, receiving less frequent SGC, and Hardship payments, have a negative effect on personal rates of return. Transparency and member best interest reporting support the inclusion of the individual member money-weighted personal rate of return in member statements and fund communications (by cohort).

Keywords:

Superannuation, MySuper fund, MySuper Dashboard, XIRR, personal rate of return, time-weighted return, money-weighted return,

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1. Introduction

With over 16 million members (Treasury 2020) collectively owning superannuation assets approaching $2.9 trillion and total annual contributions exceeding $120 billion (ASFA 2020), superannuation plays a central role in funding Australians' retirement.

Although regulated by key laws (i.e., Superannuation Industry (Supervision) Act 1993 (SIS Act), Superannuation Guarantee (Administration) Act 1992, and Income Tax Assessment Act 1997), the purpose of Australia's superannuation system is not enshrined in legislation. This is despite superannuation often being identified as a vehicle "to provide income in retirement to substitute or supplement the Age Pension" (Australian Government 2016, p. 3).

Australia's retirement income system architecture emulates the globally recognised three-pillar approach (World Bank 1994) (Holzmann & Hinz 2005) (Borowski 2013). The first pillar is government funded welfare – often referred to as a 'safety-net'. The second pillar is comprised of compulsory savings, while the third pillar is voluntary savings.

With an almost universal change to defined contribution style plans, members are accountable for the success or failure of the second and third pillars via the requirement to select an investment option to invest their superannuation benefits. Defined contribution superannuation funds generally have many investment choices from which members can choose, offering a wide variety of asset allocations.

As part of the Australian Government's Stronger Super reforms, from 1 January 2014 individuals who do not make an active choice for their superannuation fund are defaulted into a product called MySuper, which has low-fees, is commission-free, has easy to understand disclosures and comparable with other MySuper products via a Dashboard (ASIC 2014).

The Australian Government claimed that the MySuper reforms:

> Will improve outcomes for members who do not wish to be actively involved in choosing their superannuation arrangements….. by focusing the trustee's obligations on net returns, MySuper is expected to put downward pressure on fees and deliver higher retirement incomes for members. (Australian Government 2010, p. 7).

As a financial planning practitioner for over 20 years, I interact directly with individuals who are attempting to navigate the compulsory yet complex, and seemingly everchanging superannuation environment. I consider the role of a financial planner as the interpreter between Government legislation and the end users of the system, individual superannuation

fund members. Observations of what policy makers believe they are delivering and what individual members experience motivated me to undertake this research.

The focus of the paper is to question if the legislated time-weighted methodology for how the MySuper Dashboard calculates and presents investment returns – via a 'representative member', is illustrative of what individual members earn.

Despite the growth of Australia's superannuation system and its key component of the government's retirement income policy, the body of literature relating to the performance of superannuation funds is notably absent. Gan, Heaney and Gerrans (2015) state that there is no available evidence documenting how the members of Australian superannuation funds perform individually. Studies investigating this important aspect of the operation of the superannuation system cite limitations in accessing data as a prohibiting factor in undertaking research (Liu 2013; Polidano et al. 2020).

The scarcity of available information was also a conclusion in the Productivity Commission's – Superannuation: Assessing Efficiency and Competitiveness inquiry's final report:

> Super has been a large and compulsory public policy endeavour, yet there is remarkably little publicly available data on the outcomes that individual members are actually experiencing — in terms of the returns they earn, the fees they pay, the insurance they hold and the outcomes they receive over time. (Productivity Commission 2018a, p. 27)

To achieve its goal, the study obtained primary, granular, de-identified member (age, salary and postcode), account balance and transaction history data that is not currently included in publicly available Australian Prudential Regulatory Authority (APRA) or confidential Australian Tax Office (ATO) reportable data sets, from a single Superannuation fund that is licensed to offer a MySuper product. The inclusion of confidential member level data distinguishes the research from other Government, academic and industry studies on superannuation fund investment performance.

Money-weighted personal rates of returns were calculated using Microsoft Excel's 'eXtended Internal Rate of Return' (XIRR) function as this formula measures the daily change in the portfolio balance based on recorded cash-flows to calculate the annualised rate of return.

The research emulated the Productivity Commission's methodology of calculated investment performance as net returns – net of all taxes, investment fees, and administration fees 'on the basis that this is what the system delivers to members' (Productivity Commission 2016b, p. 115).

Descriptive research via non-parametric statistics on the cross-sectional data analysed the characteristics of individual members and cohorts' (age, gender, account balance, location) personal rates of return against the annual MySuper Dashboard 'representative member' return.

Of the study sample size of 53,770 members, 45,256 or 84.2% received a personal rate of return, less than the MySuper Dashboard 'representative member' investment return. Through cohort analysis, account balance was identified as a determining factor of personal rate of return.

Overall, the study has provided evidence that the time-weighted investment performance methodology, as legislated for the MySuper Dashboard, does not represent the actual personal rate of return achieved by individual members. The study finds that the members most impacted by the current methodology, as measured by percentage of the MySuper Dashboard 'representative member' investment return achieved, are the vulnerable groups, that is members with low account balances, females, and paying insurance premiums.

This knowledge could assist policy makers and industry in determining an appropriate way to present investment specific member outcomes that focuses attention on the real story, investment return net of fees, taxes and insurance arrangements.

2. Background: investment return perspective – fund or member

In addressing the question, 'why performance measurement is undertaken given the amount of time, data and resources required?' (Feibel 2003, p. 3), Feibel responds from two perspectives, that of the Investor and the Investment Manager. Feibel categorises anyone who has money to invest is an investor, while someone who makes the day-to-day asset allocation, security selection, and other portfolio construction decisions in the management of a portfolio is an investment manager.

Feibel states this distinction is important to comprehend as different intentions are sought. The investor primarily uses the information derived from performance measurement to monitor the progress their savings are making towards their goals – such as accumulating sufficient superannuation capital to provide a comfortable retirement. While Investment managers measure performance to help evaluate if the product is delivering its objectives, that is returns generated relative to the risk undertaken, as well as to assist in the control their investment processes. Investment managers also use performance returns in marketing collateral to current

and perspective clients, ‘many strategies are sold based on demonstration of a superior historical performance record’ (Feibel 2003, p. 5).

Since inception of the MySuper regime in 2013 (Australian Government 2012), the Government stated the intention of the MySuper Dashboards is to provide key information which is useful for both new and existing superannuation fund members and for this information to be presented in a standardised manner to allow consumers to easily compare products and make informed choices. It is therefore aimed from the perspective of the superannuation fund, as the investment manager.

A central element of the MySuper Dashboard is the use of a ‘representative member’ as the basis for calculating fees, investment return and displaying product information. In this context, the legislation defines a representative member as a member who is fully invested in a MySuper product, does not incur any activity fees during a year (such as investment switching fees), and has a constant account balance of $50,000 throughout the period (i.e. excluding any investment gains or losses on the $50,000 balance) (ASIC 2014).

However, in the disclosure statements accompanying the MySuper Dashboards, APRA states that that the details presented in the dashboard will not necessarily represent the actual experience of induvial members:

> The return target, level of investment risk, and statement of fees and other costs are forward-looking, estimated measures, intended to facilitate comparison of MySuper products. The return target, level of investment risk, and statement of fees and other costs may not reflect actual member experience. (APRA 2020)

The reason why members will experience different outcomes is due to individuals account characteristics, in particular their account balance, presence and timing of transactions (contributions and withdrawals) and the impact different fee structures used by super funds (flat dollar and percentage based).

There are two investment performance return calculation methods that can be applied, these are time-weighted and money-weighted rates of return:

> **Time-weighted rates (TWR)** of return do not take into account the impact of cash-flows into and out of the fund. Time-weighted returns therefore reflect the compound rate of growth in a portfolio over a specified period with each period’s return having the same weight, regardless of how much money was invested.

> **Money-weighted rates (MWR)** of return does take into account the impact of cash-flows into and out of the fund. Money-weighted return finds the interest rate (or rate of return) that would have to have been paid for the investor to obtain the actual ending value, given the beginning value and the deposits and withdrawals that occurred during the period.

The methodology used to calculate investment performance has been the subject of numerous academic and industry studies (Bianchi et al. 2014; Illmer & Marty 2003). As Davies & Spaulding point out:

> Time-weighted returns are useful to compare investment managers and to understand how a manager performed. Money-weighted returns are useful to show investors how their money performed. (Davies & Spaulding 2011, p. 6)

In his analysis Spaulding (2003) states that the calculated differences between time-weighted and money-weighted calculations can sometimes be minor, particularly in the situation when the investment time-period is relatively short and a low number of cash-flows, especially when market volatility is low. But, as the time periods lengthen and increase the cash-flows, especially with increased market volatility, the differences diverge and demonstrate the true differences between the two methodologies (Le Sourd 2007, pp. 8 - 9).

In analysing the superiority of one method over the other, researchers reach consensus that there are advantages and disadvantages to using both methods for calculating net returns, and preferences should not be restricted to one method.

Illmer and Marty (2003) state that neither the time-weighted nor the money-weighted calculation should be neglected, but rather incorporated into the performance reporting and evaluation process. The Productivity Commission recommended that where the data is available, the Commission recommends calculating both the time-weighted and money-weighted methods (Productivity Commission 2016a, p. 114).

Le Sourd (2007, p. 9) takes a firmer stance by stating that ‘not considering the money-weighted concept and ignoring the timing effects of cash-flows bears the risk of misinterpretation and incorrect feedback in the investment process’.

As shown in this literature review, a money-weighted performance calculation methodology is the only method that provides individual superannuation fund members the true performance of their investments and how individual characteristics – such as account balance and transactions, influence the return achieved.

3. Data source and sample characteristics

3.1 Data source

As at 30 June 2018 there were 106 MySuper products available through 91 superannuation funds offered by 79 Registrable Superannuation Entity's (RSEs), with total assets of $677.5 billion (APRA 2019, p. 9).

During May and June 2019, all 79 RSE Trustee Companies who held MySuper Product provider authorisation were contacted via a letter inviting them to participate in the study. A follow up letter was sent to non-respondents during September 2019. By December 2019, only 1 RSE had agreed to participate (table 3.1).

Number of RSE's	Response
1	Agreed to participate
1	Withdraw after initially agreeing to participate (the reason for no longer being able to participate was difficulty in extracting the requested data from their administration system)
2	Requested further information and subsequently declined
4	Provided notification of the invitation letter being provided to management, but no subsequent response received
17	Declined to participate
54	No response received

Table 3.1 Summary of RSE's responses to the invitation to participate in the study

While the name of the participating superannuation fund has been censored from the research to protect the confidentiality of the superannuation fund and the individual members, to ensure robustness in the results, it can be stated that as of 30 June 2018 the superannuation fund managed between $10 to $20 billion in retirement savings for between 60,000 to 80,000 members.

As the data is sourced directly from a superannuation fund, the content is validated, and the analysis outputs can provide reliable representations of the actual investment returns earned by individual superannuation fund members.

Since all members within the sample are invested in an identical investment option for the entire study period, the personal rates of return are not impacted by other factors, such as investment selection and asset allocation, which has hindered previous studies, such as (Bell 2019, p. 5); De Zwaan, Brimble and Stewart (2015).

The superannuation fund was provided with the exclusion criteria in table 3.2 to ensure the characteristics of the participating members were consistent.

Area	**Justification**
Investment option	Members not invested 100% in the MySuper option for the entire 2018/19 financial year
Pension phase members	This research study is only concerned with understanding the investment returns of members in the Accumulation phase
Defined Benefit members	Defined Benefit members with an Accumulation component invested in the MySuper option These members have a combination of employer and employee compulsory and voluntary contributions to both the Defined Benefit and Accumulation accounts The superannuation fund was not able to segment the account balances of the Defined Benefit and Accumulation components, preventing isolation of the MySuper investment
Closing Balances below $5,999.99.	Following legislation of the 'Protecting your super' measures in 2019 – where super funds fees are restricted to 3% of the account balance for members whose account balance is below $6,000 at the end of the financial year, the investment performance returns for this cohort will change for future years and future conclusions for this cohort cannot be drawn from the study period
$0 opening balance on 1 July 2018 with a subsequent roll in during the financial year resulting in a closing balance above $6,000.	As the XIRR formula calculates an annualised return, the calculated rate of return is distorted for members not invested for the full time period and therefore not comparable with members invested for the entire study period (the de-annualised formula was not utilised in this research)
Insurance policy claim payment	Members who received an insurance policy claim (increasing their account balance as the super fund is the policy owner and beneficiary), were excluded as the insurance policy cover value and transaction date of the insurance proceeds being deposited into the members account was not disclosed in the raw data provided by the participating superannuation fund
Members over age 74	Due to the participating superannuation fund operating a 'Lifecycle' investment strategy approach to their MySuper product – where the allocation to defensive assets (i.e. cash and fixed interest investments) increases for members over age 75, participation of this age cohort was excluded as the MySuper Dashboard return is different to the under age 75 cohort

Table 3.2 Summary of member characteristics excluded from sample

Upon receipt and analysis of the primary data set, members were also excluded if there were observable inconsistencies. Examples of the inconsistencies encountered included the recording of multiple identical valued transactions on the same date (duplication error) and opening and closing balances not consistent with intra-period transactions (the superannuation

fund data analyst confirmed that the account balance data was sourced from a separate data base and integrated into the transaction report. This had led to some data integrity issues as the membership numbers were replaced with a de-identifier code prior to the merge).

Post exclusion, 53,770 members met the criteria to be included in the research study sample.

The primary data was extracted from the superannuation fund's ATO Member Contributions Statement and their fund administration system.

Member Contributions Statements (MCS)

All superannuation funds are required to lodge annual Member Contributions Statement (MCS) reports with the Australian Taxation Office (ATO) providing information about their members such as details of:

- contributions received for them during the financial year,
- the balance and other attributes of the account the member held in the fund.

The specific fields were requested from the Member Contributions Statement:

Character position	Field name	Field code	Reference number
231-231	Sex (= M or F or U)	MD12	6.69
232-233	^ Day of birth (= DD)	MD13	6.70
234-235	^ Month of birth (= MM)	MD14	6.71
236-239	^ Year of birth (= CCYY)	MD15	6.72
346-349	Residential postcode	MD20	6.76
931-931	Account phase (= P, B or A)	MD49	6.92
941-941	Insurance indicator (= N or Y)	MD54	6.95

Table 3.3 ATO Member Contributions Statement extract (Australian Government 2018)

^ To facilitate de-identification of individual members, the date of birth data fields was converted into an age (in years) as at 1 July 2018.

Fund administration system

The following member level data was sourced from the participating superannuation fund's internal administration system, as it is not required to be reported to the regulator:

- Opening and closing account balance
- Date and category description of every separate transaction
- Annual salary (if held, generally for insurance policy provision)

As the data is sourced directly from superannuation funds, the content is validated, and the analysis outputs can provide reliable representations of the actual investment returns earned by individual superannuation fund members.

3.2 Sample Characteristics

MySuper product investment performance

MySuper Dashboards are required to show the annual return – defined as the net investment return of a 'representative member' for a financial year minus administration and investment fees and taxes.

Super funds may also provide the daily earning rates (Figure 3.1) to show how the MySuper product as performed during the financial year. The study utilises this data to assess sequencing risk associated with transactions made during the study period.

Figure 3.1: MySuper product cumulative daily earning rates for the 2018/19 financial year. Note: the return is set to 0% on the first day of the financial year (1 July 2018).

Demographics:

The total number of members in the study sample is 53,770, reflecting the working age population (Figure 4.2). The declining number of members over age 65 can be explained by this cohort having reached the age 65 condition of release – rules governing access to preserved super benefits, who typically commence retirement income streams with their accumulation benefits.

Due to the participating superannuation fund operating a 'Lifecycle' investment strategy approach to their MySuper product – where the allocation to defensive assets (i.e. cash and fixed interest investments) increases for members over age 75, participation of this age cohort was excluded as the MySuper Dashboard return is not comparable with that of the under age 75 cohort.

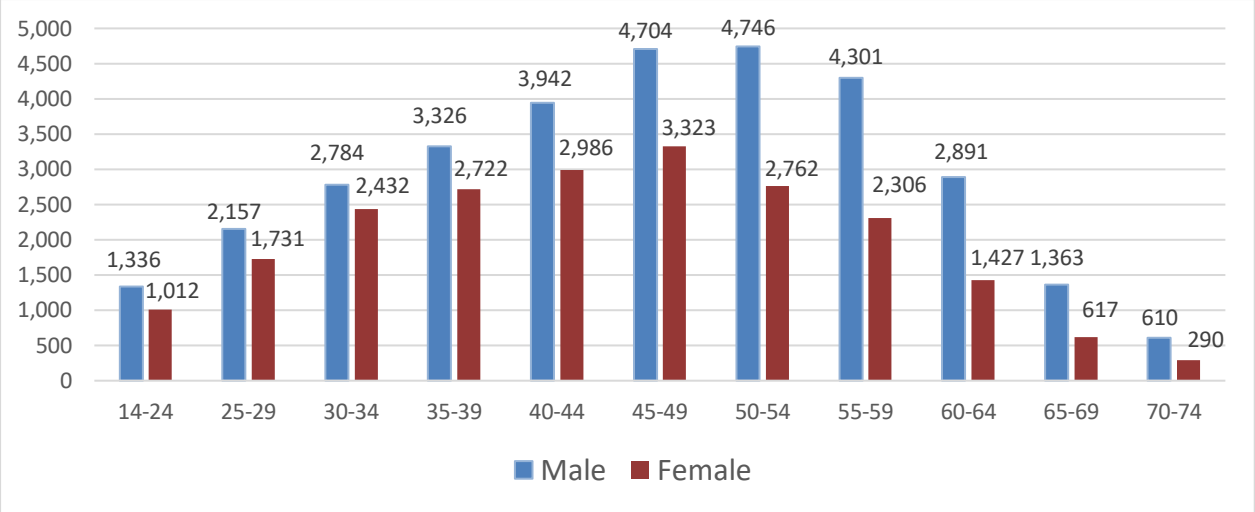

Figure 3.2: Distribution of members by age and gender.

The Association of Superannuation Funds of Australia (ASFA) October 2017 report 'Superannuation account balances by age and gender' stated that men held 61.2% of total account balances in 2015-16 compared to around 38.7% for women (ASFA 2017). That gender breakup is similar in the study sample (Table 3.4).

Gender	Frequency	Percent
Male	32,160	59.8%
Female	21,608	40.2%
Total	**53,768^**	**100%**

^ No gender recorded for two members
Table 3.4: Number of members by gender.

Closing balance distribution

Members with account balances below $6,000 were excluded from the study due to the Protecting your Super legislation – where super fund fees are restricted to 3% of the account balance (Parliament of Australia 2019). Following the introduction of this legislation, the MySuper investment returns for this account balance cohort will be significantly different in the future.

The median closing account balance of the study sample in June 2019 was $102,163, while the mean was $155,508 (Figure 3.3).

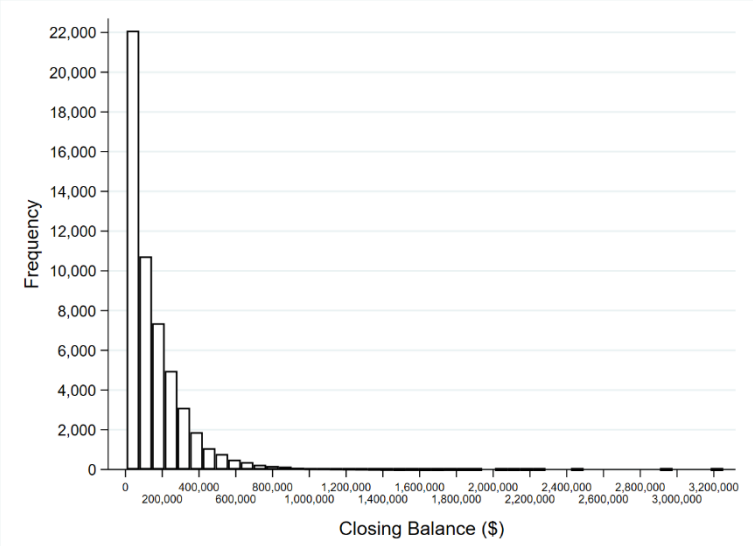

Figure 3.3: Frequency distribution of members closing account balance.

To demonstrate if the closing balances of the sample is representative of the Australian population, by both gender and age groups, Appendix B.1 compares the mean and Appendix B.2 median, closing account balances of the research sample compared with data reported in the ABS Household Income and Wealth, Australia 2017/18 report (Australian Bureau of Statistics 2019):

Salary distribution

Salary details were recorded for 28,833 members in the study sample. Super funds typically only record salary details when a member holds an income protection policy as part of their membership. This explains why the recorded observations are less than the study's sample.

The median salary for the study's sample was $66,473, while the mean was $72,224 (Figure 3.4). The 2017 Australian median salary (excluding Government pensions and allowance) was $49,083, while the mean was $59,998 (Australian Bureau of Statistics 2017).

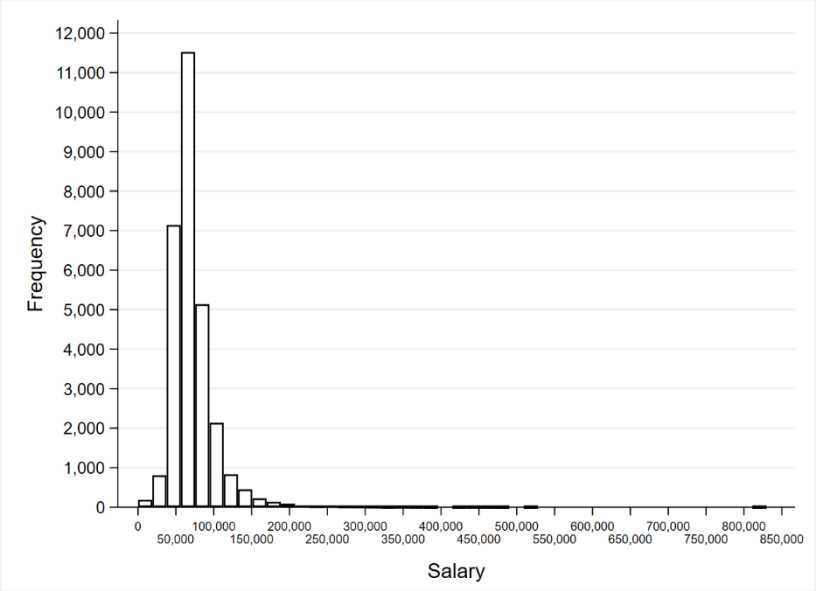

Figure 3.4: Frequency distribution of members salary.

To demonstrate if the annual salary of the sample is representative of the Australian (full-time) population, by both gender and age groups, Appendix B.3 compares the average annual salaries of the research sample compared with data reported in the Employee Earnings and Hours, Australia, May 2018 report (Australian Bureau of Statistics 2018):

4. Personal rate of return calculation methodology

4.1 Formula overview

A personal rate of return can be calculated via the Internal Rate of Return (IRR) formula as it is a money-weighted return. However, the simple IRR formula can be misleading, as it assumes all the time periods in a series of cash-flows are equal, which is rarely the case for superannuation members accounts (as shown in the results section of this paper). Tracking the net amount and timing of transactions (contributions or withdrawals) is essential to accurately calculate personal rates of return (Dichev 2007).

The Microsoft Office Excel XIRR function was used in this research to calculate individual members time-weighted personal rates of return. Short for “eXtended Internal Rate of Return”, it measures the daily change in a portfolio value based on the series of dated cash-flows (contributions and deductions) that occur at irregular intervals to calculate the annualised rate of return (Microsoft 2021).

The study emulated the Productivity Commission's methodology for calculating investment performance as net returns – net of all taxes, investment and administration fees 'on the basis that this is what the system delivers to members' (Productivity Commission 2016b, p. 115).

4.2 Treatment of specific transactions

Specific details of the study's treatment of cash-flow direction (positive or negative) and inclusion, exclusion or censoring of transaction types provided by the superannuation fund is included in the appendix (Appendix A).

Investment fees

The issue of accurate reporting of investment fees was identified in the Productivity Commission's enquiry:

> Among the most egregious is serial under-reporting and non-reporting of indirect investment costs. (Productivity Commission 2018a, p. 616)

As the study incorporates the actual amount credited to member accounts, it is expected that all investment fees (both disclosed and non-disclosed) have been deducted, thereby reflecting their genuine cost.

Fund Taxes

Contributions tax is charged at a flat rate of 15% on concessional (pre-tax) contributions. As this figure is known and included in the transaction list provided by the superannuation fund, the XIRR formula will use an effective 'net of tax' contribution rate.

Superannuation fund investment earnings are taxed at a rate of 15 per cent. However, the actual (effective) rate of tax paid is quite different as super funds can utilise tax deductions from operational expenses and the impact of franking credits and capital gains discounts.

How superannuation funds manage their tax obligations is important because it can make considerable differences to the net returns credited to a member's account. The MySuper dashboard requires investment performance to be reported after-tax. As investment returns are credited to members accounts net of tax, it is expected that all fund taxes have been incorporated into the investment returns.

Insurance premiums

Members of the participating superannuation fund are provided with default and optional Death, Total and Permanent Disability (TPD) and Income Protection insurance policies. The data set included insurance premiums as an outflow with a negative cash-flow sign. The XIRR formula treats this transaction as a return of capital to the member – like a dividend or interest payment.

While insurance premiums provide a conditional supplementary benefit, a quantifiable amount to be payable in the event of death, disability, or loss of income to the member or their Estate, the payments diminish the amount of investable funds available to generate investment returns. Therefore, the study has excluded insurance premium deduction transactions as they are not a monetary benefit received by the member.

4.3 XIRR formula precedence

International precedence for calculating personal rates of return using Microsoft Excel's XIRR formula exists with the Canadian Securities Administrators (CSA) 'Client Relationship Model Phase 2' (or CRM2) client investment performance reports issued by stock dealers (The Investment Funds Institute of Canada 2017).

5. Results

The study had two main aims. The first aim was to investigate the relevance of the MySuper Dashboard's 'representative member' time-weighted investment performance calculation methodology in representing the actual investment outcomes achieved by individual members. The second aim was to uncover which account characteristic variables have statistically significant relations with personal rate of return.

To achieve the second aim, Ordinary Least Squares (OLS) regression was used. To construct our OLS model, we first constructed a base model (1 Demographic) containing wealth measurement and demographic variables that are present in publicly available, individual-level data sets, such as The Household, Income and Labour Dynamics in Australia (HILDA) Survey (Melbourne Institute), and are frequently used in superannuation studies (Best & Saba 2021; Hodgson & Tapper 2018; Sneddon, Zhu & O'Hare 2016; Warren, D & Oguzoglu 2010).

While the determinants of superannuation fund balances have been studied from many perspectives, we find commonality in concluding four elements: (1) opening balance, (2) contributions, (3) withdrawals; and (4) investment income. A persistent limitation and future research consideration of previous studies into superannuation balances is the absence of transactional data to effectively measure the timing and magnitude of each transaction to calculate actual personal rates of return (Best & Saba 2021). For instance, modelling by Sneddon, Zhu and O'Hare (2016) assumes that transactions occur as a single payment at the end of each financial year. Without granular data, these studies are required to make investment return assumptions in their projections.

Since the data provided by the participating superannuation fund included member-level, quantified and dated transaction as well as demographic details, we were able to construct a second model (2 Demographic and Transactions) that includes explanatory variables containing the full history of the amount and timing of all transactions, such as contributions, insurance premiums, hardship payments, and rollovers between funds (roll in or roll out).

Of the study sample size of 53,770 members, 45,256 or 84.2% received a personal rate of return – as calculated by the XIRR formula, less than the MySuper Dashboard 'representative member' investment return. The distribution of personal rates of return calculated in the study uncovers the wide range in the actual outcome's received by members (Table 5.1 & Figure 5.1).

XIRR (%)					
Mean	**Median**	**Minimum**	**p25**	**p75**	**Maximum**
5.927	6.593	-63.896	5.819	6.879	34.164

Table 5.1: Mean, median, minimum, 25th and 75th percentile and maximum XIRR for the study sample

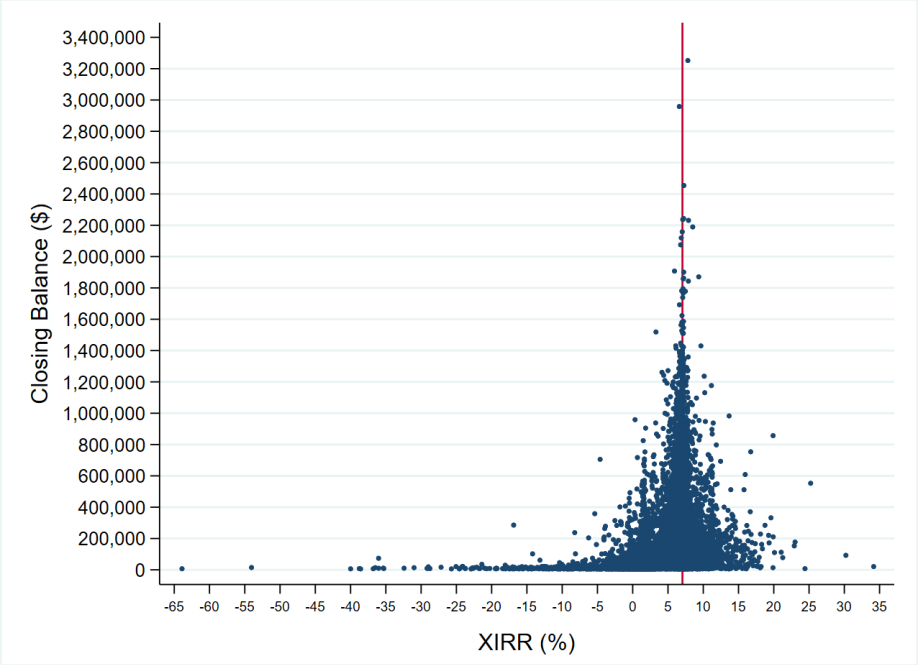

Figure 5.1: Scatterplot distribution of members XIRR, by closing account balance. The red line plots the MySuper Dashboard 'representative member' investment return

To enable validation of the outlining XIRR results, the key member characteristics and influencing transactions are detailed in Vignettes 1 & 2.

Vignette 1: Negative XIRR	**Vignette 2: Positive XIRR**
XIRR result: -63.896% Age Group: 55-59 Opening Balance Group: $6,000 - $10,000 Closing Balance Group: $6,000 - $10,000 Insurance policies held: Death, TPD & Income Protection Insurance policies premium payment frequency: Monthly Salary Range: Not provided SG Contribution Frequency Group: Quarterly **Influencing transactions:** Total insurance premiums paid: ~$9,000 Total net SG contributions received: ~$8,360	**XIRR result: 30.224%** Age Group: 35-39 Opening Balance Group: Less than $6,000 Closing Balance Group: $50,001 - $100,000 Salary Range: $40,001 to $60,000 SG Contribution Frequency Group: Fortnightly Insurance Held: Yes **Influencing transaction:** External Roll in: ~$70,000 in December 2018

Appendix C lists definitions of all dependent and explanatory variables. Estimation results from the OLS models, including the coefficient, T Statistic and P value are presented in Table 5.2

.	**Model 1 (Demographic)**	**Model 2 (Demographic & Transactions)**
Variables	**XIRR (y)**	**XIRR (y)**
Gender	-0.093***	-0.040
	(-3.44)	(-1.63)
Salary (log)	-0.947***	-1.416***
	(-24.51)	(-36.01)
Opening balance (log)	1.195***	1.290***
	(107.90)	(75.27)
Opening balance under $50,000		0.156***
		(3.32)
Age	-0.045***	0.014
	(-37.97)	(1.49)
Age (Squared)		-0.000***
		(-4.15)
Aged over 60 years		-0.135**
		(-2.17)
Location (postcode)	0.026	0.034
	(0.94)	(1.34)
No Transactions		0.647
		(0.79)
SG Contribution Frequency		-0.001**
		(-2.19)
No Insurance policy held		0.661***
		(9.66)
Insurance premiums (% annual salary)		-0.867***
		(-42.02)
Additional Contributions		0.544***
		(9.93)
Additional Contributions Frequency		-0.003***
		(-6.06)
Government Co-Contribution received		-0.069
		(-0.56)
Hardship payment		-1.061***
		(-2.83)
Roll-in received		1.447***
		(35.72)
Roll-out paid		-1.826***
		(-25.15)
Both Roll-in & Roll-out		-2.309***
		(-15.20)
Constant	4.844***	7.754***
	(11.74)	(16.77)
Observations	28,728	28,725
Adjusted R-squared	0.2898	0. 4067

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5.2: OLS models estimation results

5.1 Account Balance

The use of account balance as an indicator for member outcomes has precedence when the federal government determined that members with account balances below $6,000 require shielding from super fund fees via the Protecting Your Super Package legislated in the 2019 Treasury Laws Amendment (Putting Members' Interests First) Bill (Parliament of Australia 2019). These measures restrict super fund fees to 3% of the account balance for members whose account balance is below $6,000 at the end of the financial year.

Both models identify statistically significant, positive effect of increasing opening account balances on personal rate of return. However, model (2) identifies that the positive effect is smaller for balances under $50,000, which is the MySuper Dashboard ‘representative member’ assumed balance.

In assessing personal rates of return, fees and costs matter, particularly in long-term savings schemes where the effect of fees and costs compound and can have a substantial impact on member outcomes over time (Barry 2018). Australian superannuation funds typically charge a combination of fixed (or flat-dollar) administration fee and percentage-based investment management cost. It is this fee structure architecture that erodes the personal rate of return for lower opening account balances, as the fixed cost represents a higher percentage amount the smaller the opening account balance becomes.

As the study is focused on personal rates of return, the analysis has grouped the lower account balances into more frequent samples (measured in dollars), as these cohorts are most impacted by fixed fees and insurance premiums. Once account balances reach $50,000 the XIRR returns received are relatively close to the MySuper Dashboard ‘representative member’ and more granular groups will not identify significant differences in outcomes.

The median XIRR for the $6,000 to $10,000 closing account balance group was approximately 46% of the stated MySuper Dashboard ‘representative member’ investment return. This increases to approximately 96% for members with a closing account balance above $100,000 (Table 5.1).

Closing Balance Groups	Number	Mean XIRR (%)	Minimum XIRR (%)	Maximum XIRR (%)	Median XIRR (%)	Median % of MySuper Dashboard
$6,000 - $10,000	2,837	2.431	-63.896	24.428	3.219	45.660%
$10,001 - $15,000	2,728	3.542	-54.040	19.890	4.358	61.816%
$15,001 - $20,000	2,278	4.309	-28.971	14.884	5.010	71.064%
$20,001 - $30,000	3,591	5.038	-25.044	34.164	5.477	77.688%
$30,001 - $40,000	2,865	5.589	-21.387	16.354	5.844	82.894%
$40,001 - $50,000	2,507	5.911	-10.371	16.705	6.065	86.028%
$50,001 - $100,000	9,718	6.271	-36.031	30.224	6.406	90.865%
$100,001 - $500,000	24,834	6.679	-16.875	23.021	6.754	95.801%
$500,001 -$1,000,000	2,186	6.866	-4.620	25.227	6.898	97.844%
Above $1,000,001	226	6.968	3.296	11.160	7.003	99.333%

Table 5.1: Number of members by closing balance groups, mean, minimum, maximum & median XIRR and median XIRR as a proportion of the MySuper Dashboard 'representative member' investment return, by closing account balance groups.

5.2 Gender

Model (1) shows that being female has a statistically significant, negative impact on personal rate of return. However, in model (2) when the transaction variables are added, the Gender is no longer statistically significant. The study findings provide evidence to support previous research into gender-based superannuation outcomes inequality (Table 5.2).

	XIRR (%)					
Gender	**Mean**	**Median**	**Minimum**	**p25**	**p75**	**Maximum**
Male	5.937	6.618	-63.896	5.839	6.889	30.224
Female	5.912	6.555	-39.993	5.787	6.861	34.164

Table 5.2.1: Mean, median, minimum, 25th & 75th percentile and maximum XIRR, by gender.

The link between gender-biased labour market inequalities, such as income disparity Tracy and Ward (1986), opportunity for participation Wellen and Peck (1990), and historical performers of domestic roles, such as wife and mother Ginn and MacIntyre (2013) have been well researched. Wellen & Peck stated:

> Full-time, continuous employment has a positive effect on both income and net asset amounts, while interrupted work history patterns have a negative effect on income and net asset amounts. (Wellen & Peck 1990, p. 108)

It is important to note that the results in this study may not be generalisable as the superannuation fund predominantly represents employees of a single employment category (non-disclosed for deidentification purposes) that is at the forefront of gender equality initiatives. These comprise super contributions on employer provided paid parental leave, salary equality and right of return to substantive position. Data released by Women in Super –

a not-for-profit organisation that works to improve women's retirement outcomes, state that 'women working full-time employment earn 18% less than men' (Women in Super 2020). Across the study sample, the median difference in annual salary is approximately 3% (Table 5.2.2 and 5.2.3).

	Annual Salary ($)			
Gender	**Mean**	**Median**	**p25**	**p75**
Male	73,284	65,327	55,087	81,483
Female	70,547	67,599	57,879	80,197

Table 5.2.2: Mean, median, 25th and 75th percentile annual salary, by gender.

	Mean Annual Salary ($) by age group										
Gender	**14-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**50-54**	**55-59**	**60-64**	**66-69**	**70-74**
Male	53,365	63,198	69,868	73,135	76,401	77,953	77,046	74,790	73,261	71,992	72,576
Female	56,759	65,927	68,546	70,658	74,704	75,823	71,700	70,943	69,792	60,071	60,777
Difference	106%	104%	98%	97%	98%	97%	93%	95%	95%	83%	84%

Table 5.2.3: Mean annual salary and difference, by age groups and gender.

The data also supports previous research into childbearing age as the point when gender inequality manifests. As shown in Table 5.2.4, females in the study sample have a higher mean closing balance than males until the 30–34 age group.

	Mean Closing balance ($) by Age Group & Gender					
Age Group	**14-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**
Gender						
Male	26,920	55,728	88,628	122,212	151,589	180,743
Female	25,404	59,511	91,470	112,887	142,683	167,290
Difference	***94.37%***	***106.79%***	***103.21%***	***92.37%***	***94.13%***	***92.56%***

Age Group	**50-54**	**55-59**	**60-64**	**66-69**	**70-74**
Gender					
Male	224,335	250,892	216,153	173,057	169,391
Female	182,651	190,145	188,477	164,028	148,355
Difference	***81.42%***	***75.79%***	***87.20%***	***94.78%***	***87.58%***

Table 5.2.4: Mean closing balance, by age groups and gender.

5.3 Contributions

Superannuation Guarantee (SG) Contributions

When assessing investment performance from the members perspective, transactions are critical to the outcome as the addition or deduction of funds change the amount of capital available to generate a return. A justification for using a money-weighted performance calculation methodology is the ability to calculate the effects of compound interest. In the study

sample, fortnightly SG contributions were the most frequent in terms of periodicity, representing over 40% of members' accounts which received at least one contribution (Table 5.3).

SG Payment Period	Number	Percent
No SG Contributions	16,643	30.95%
Weekly	5,184	9.64%
Ad Hoc ≤ 25 Payments	7,751	14.42%
Fortnightly (26 payments)	15,495	28.82%
Ad Hoc ≥ 28 Payments	3,652	6.79%
Monthly	3,834	7.13%
Quarterly	1,211	2.25%
Total	**53,770**	**100.00%**

Table 5.3: Number and percentage of members by cohort, by Super Guarantee contribution payment frequency period groups.

The statistically significant, negative impact for less frequent SG contribution frequency is as expected. The longer the time between employer contributions, the less capital that is available to earn interest, resulting in a lower personal rate of return. While the legislation sets the requirement to pay SG contributions quarterly, this result, while even only minor, can support reforms to increase SG contribution frequency (i.e. to match employees pay cycles).

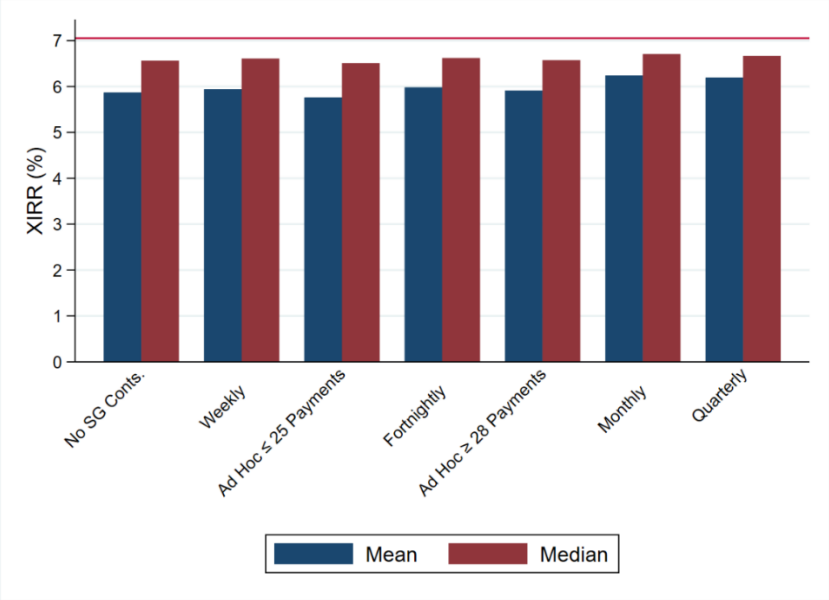

Figure 5.3: Mean and median XIRR, by Super Guarantee contribution payment frequency period groups. The red line plots the MySuper Dashboard 'representative member' investment return

Additional Contributions

Additional contributions also had a statistically significant, positive effect on personal rates of return, with more frequent contributions magnifying the effect.

Government Co-Contribution

Understanding if the Government Co-Contribution – an initiative introduced in 2003 to help eligible low or middle-income earners to boost their retirement savings by the government contributing up to a maximum of $500 if a member makes a personal (after-tax) contribution up to $1,000 to their super fund, was not possible as the result was not statistically significant. This result is due to only 821 co-contributions recorded in the data set. The same findings were also reached by Ruthbah and Pham (2021). Further research on the benefit of the Co-Contribution scheme is justified, as critics such as Cox (2007), state the architecture is an ineffective way to assist low income earners, or those out of the workforce, who do not have the discretionary funds to make their personal contribution.

5.4 Transactions

No Transactions

If there are no transactions, then both the time-weighted – proxied by the MySuper Dashboard 'representative member' and money-weighted rate of return calculation methods delivered similar results (Figure 5.4.1).

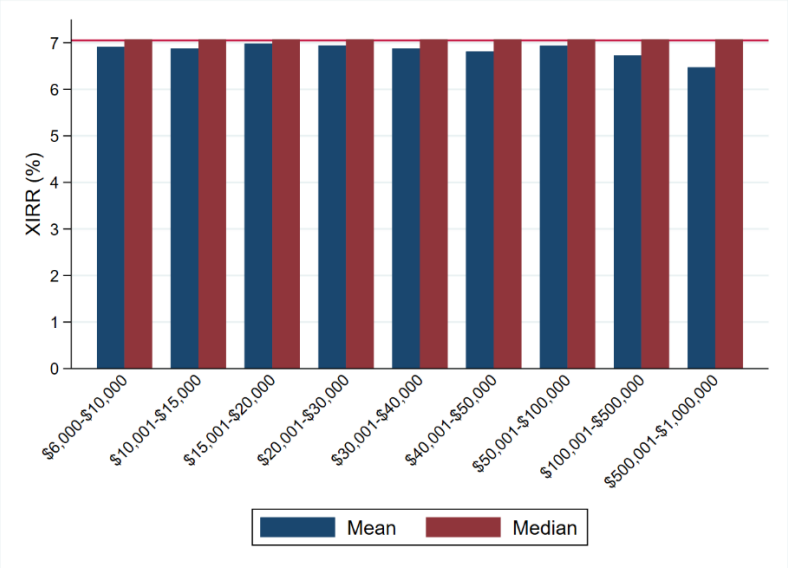

Figure 5.4.1: Mean and median XIRR for members with no transactions, by closing balance groups. The red line plots the MySuper Dashboard 'representative member' investment return

Transactions

Since 94% of members recorded at least one transaction, the 'no transaction' cohort is not representative of the study's sample. It would also be expected that it is not representative of the entire super system where significant efforts have been deployed by the government and industry to reduce the number of 'inactive' accounts – particularly duplicate accounts (ATO 2020).

When considering the $6,000 to $10,000 closing account balance group, the median XIRR was approximately 35% of the MySuper Dashboard 'representative member' investment return (Figure 5.4.2).

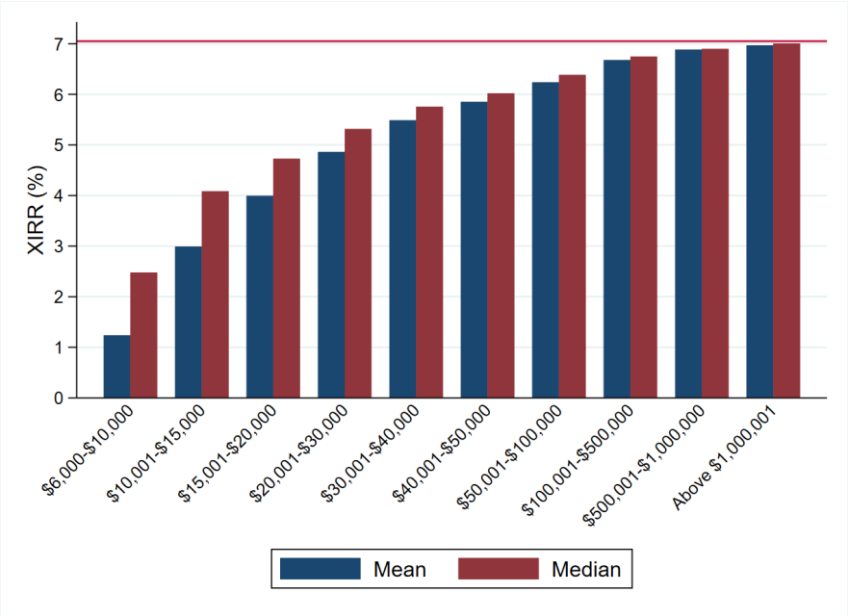

Figure 5.4.2: Mean and median XIRR for members with at least one transaction, by closing account balance groups. The red line plots the MySuper Dashboard 'representative member' investment return.

While this analysis provides evidence that the time-weighted investment performance calculation methodology is justified for providing super fund performance disclosures when no transactions take place, it is not reflective of most members.

5.5 Age

Model (1) shows that being older has a statistically significant, negative impact on personal rates of return. However, in model (2) when the transaction variables are included, Age is no longer statistically significant. This is reasonable. Just because a member is older should not result in a higher rate of personal return. While younger members would naturally have lower account balances due to their limited time in the workforce, older workers can also have lower account balances due to non-contributory periods or unemployment.

The statistically significant, negative impact on personal rate of return for members over age 60 is supported by declining average account balances (for both males and females) and can be connected with the studies into older members leaving the work force by either voluntary retirement, negative health (self or family member) or economic shocks (Cobb-Clark & Stillman 2009) or commencing Transition to Retirement Pension (Warren, DA 2015). Findings by Warren, D and Oguzoglu (2010) suggest that the Australian retirement system actually provides an incentive to retire early, through the receipt of higher means tested Age Pension.

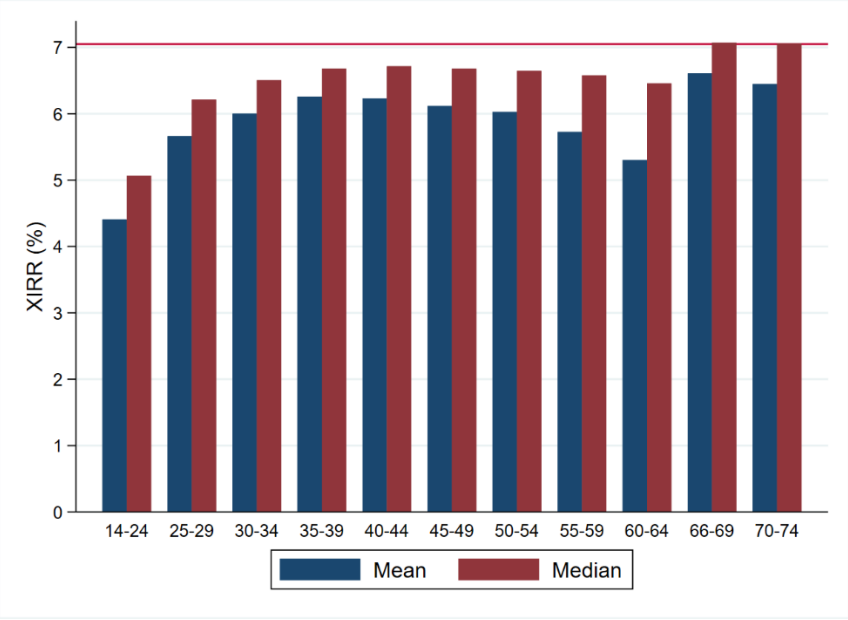

Figure 5.5: Mean and median XIRR, by age groups. The red line plots the MySuper Dashboard 'representative member' investment return.

5.6 Salary

The statistically significant, negative effect on personal rate of return for increasing salary may seem counterintuitive.

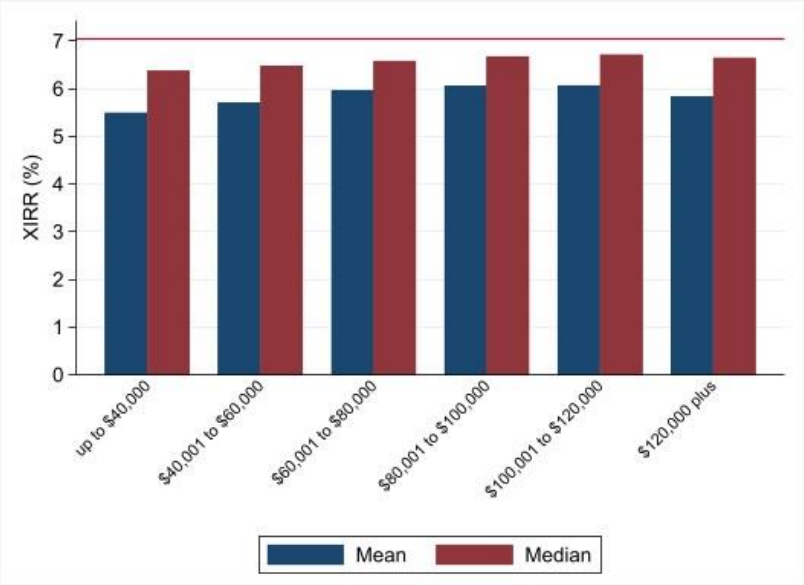

Figure 5.6: Mean and median XIRR, by annual salary groups. The red line plots the MySuper Dashboard 'representative member' investment return.

It could be expected that high incomes translate into both higher level of SG contributions and greater ability to engage in voluntary retirement savings (e.g. via additional personal voluntary contributions). However, to ensure tax concessions for superannuation savings do not favour higher-income earners, as identified in Best and Saba (2021), the Australian superannuation system has a contribution ceiling, known as the concessional (pre-tax) contributions cap. In the study period, the concessional contributions cap was $25,000 (ATO 2021).

Further rational for the negative effect is observed with the 'Insurance premiums as a percent of annual salary' variable. Income Protection (where a benefit of up to 75% of members monthly salary is paid for up to two years to replace part of their income if they become totally or partially disabled due to sickness or injury) premiums are calculated at a rate of per $100 per month of cover. Therefore, the higher a member's salary, the higher the premium. As expected, the model identifies statistically significant, negative effect on personal rate of return where insurance premiums as a percentage of salary increases.

The study's findings on salary impacting personal rates of return may not be generalisable or able to address previous research into the impact of cumulative lifetime earnings in combination with work patterns (Lis & Bonthuis 2019), since the sample's salary data is point in time for one financial year.

5.7 Location

Residents of metropolitan and regional locations experienced similar median XIRR's, receiving a return equalling approximately 94% and 93% respectively of the MySuper Dashboard 'representative member' investment return. Remote members achieved a lower mean XIRR, equalling only approximately 89% of the MySuper Dashboard 'representative member' investment return (Table 5.7).

	XIRR (%)					
Location	**Mean**	**Median**	**Minimum**	**p75**	**p75**	**Maximum**
Metropolitan	5.990	6.634	-54.040	5.922	6.900	30.224
Regional	5.942	6.583	-63.896	5.852	6.864	34.164
Remote	5.476	6.285	-38.761	5.029	6.730	21.274

Table 5.7: Mean, median, minimum, 25th & 75th percentile and maximum XIRR, by location.

While Preston and Austen (2001) state that salary gaps between metropolitan and non-metropolitan (combined regional and remote) can restrict potential lifetime earnings – insofar as this being a determinant of superannuation savings, we find that the geographical location of the member does not have a statistically significant effect on personal rates of return. Once again, the results in this study may not be generalisable as the superannuation fund predominantly represents employees of a single employment category (non-disclosed for deidentification purposes) that have standardised Enterprise Agreements and Awards that minimises the discrepancy of employment arrangements between locations.

5.8 Insurance

Most super funds automatically provide Life and Total & Permanent Disability (TPD) insurance as part of membership in their fund. Some funds also provide Income Protection insurance. For the participating superannuation fund, employed members are provided with all three types of insurance policies, resulting in 44,906 members (or 83.5%) in the sample holding insurance policies.

Insurance premiums are an expense deduction from the members account, reducing the amount of capital available to earn an investment return. While the member has the benefit of the insurance cover – a potential lump sum payout or replacement regular income in the case of death, disablement or temporary incapacity, the study found that they have a statistically significant, negative effect personal rate of return. Specifically, the mean and median XIRR is approximately 1% and 0.6% respectively lower for members holding an insurance policy compared to members without an insurance policy (Table 5.8). For the members with insurance

cohort, the median XIRR for the $6,000 to $10,000 closing account balance group was approximately 30% of the MySuper Dashboard 'representative member' investment return (Figure 5.8).

	XIRR (%)					
Insurance Held	**Mean**	**Median**	**Minimum**	**p25**	**p75**	**Maximum**
No	6.750	7.071	-19.467	6.786	7.170	24.428
Yes	5.765	6.501	-63.896	5.664	6.796	34.164

Table 5.8: Mean, median, minimum, maximum, 25th and 75th percentile XIRR, by insurance policy status.

The model (2) result for members who do not hold an insurance policy – identified by no premium deduction transactions, is as expected. This cohort recorded a statistically significant positive effect on personal rates of returns due to the absence of periodic capital deductions from their account balance. Also, where the insurance premium as a percentage of salary increases, there is a statistically significant negative effect on personal rates of returns.

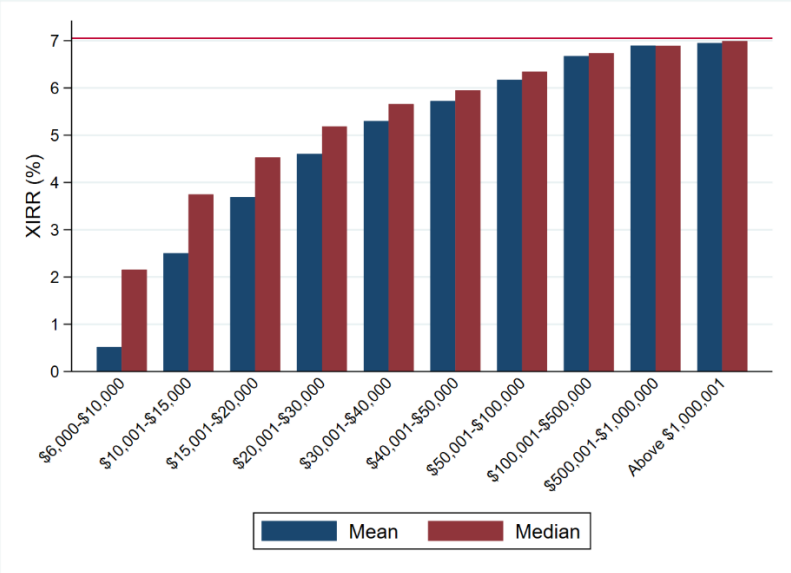

Figure 5.8: Mean and median XIRR for members with insurance, by closing account balance groups. The red line plots the MySuper Dashboard 'representative member' investment return.

The impact of insurance premiums eroding superannuation fund account balances has been identified in a number of Government inquiries in recent years, including the Productivity Commission's – Superannuation: Assessing Efficiency and Competitiveness inquiry (Productivity Commission 2018b) and he Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry (Hayne 2018). According to the 'Insurance in Superannuation Working Group' (ISWG) – comprised of Australia's

superannuation bodies to collaboratively enhance future iterations of insurance inside superannuation policy development, stated that the objective of insurance within superannuation is:

> To provide a measure of financial support to members and their families if the member is prevented from working to retirement age by death or ill-health. (ISWG 2017, p. 1).

The ISWG note that this objective must be balanced with the broader purpose of superannuation being the provision of retirement benefits for those that do have a full working life, recognising that insurance premiums will erode those sums to some extent.

5.9 Hardship payment

Due to the effects of Coronavirus on the economy, on 22 March 2020 the federal government announced a temporary measure allowing individuals to access up to $10,000 of their superannuation in 2019/20 and a further $10,000 in 2020/21 (Australian Government 2020). However, accessing super prior to an individual's preservation age has always been possible under superannuation law, provided that strict eligibility conditions around severe financial hardship or compassionate grounds are met.

During the study year, 447 members received a Hardship payment while 4 payments were made based on compassionate (Table 5.9.1). From a geographical perspective, regional and remote members were 1.2 times and 2.2 times respectively overrepresented in receiving Hardship payments:

Location	Frequency	Cohort %	Study sample (%)	Representation
Metropolitan	208	46.12%	63.26%	0.7 x
Regional	144	31.93%	26.60%	1. 2 x
Remote	99	21.95%	10.15%	2.2 x
Total	**451**	**100.00%**	**100.00%**	

Table 5.9.1: Frequency, cohort percentage, study sample percentage and representation, by location.

The characteristics of the Hardship payment recipient cohort (excluding compassionate payment) are shown in Table 5.9.2.

	Frequency	Proportion of cohort	Mean Payment	Received Hardship Median XIRR (%)
Cohort	**447**	**0.83%**	**$9,878**	**6.100**
Closing Balance Group				
$6,000-$10,000	28	0.99%	$9,604	3.240
$10,001-$15,000	27	0.99%	$9,741	4.494
$15,001-$20,000	42	1.84%	$9,675	5.229
$20,001-$30,000	45	1.25%	$10,000	5.689
$30,001-$40,000	40	1.40%	$10,000	5.886
$40,001-$50,000	29	1.16%	$9,862	5.817
$50,001-$100,000	122	1.26%	$9,902	6.236
$100,001-$500,000	112	0.45%	$9,938	6.680
$500,001-$1,000,000	2	0.09%	$10,000	^
Above $1,000,001	0	0.0%	-	-

^ Median XIRR not representative as only two observations occurred in this closing balance group.

Table 5.9.2: Number of members and proportion of cohort, mean Hardship payment, and Median XIRR for hardship payment recipient cohort, by closing balance groups.

The timing of Hardship payments introduces sequencing risk to the member – the danger that the timing of withdrawals from their super fund will have a negative impact on their overall rate of return. The 'V Shaped' return characteristics - a sharp rise back to a previous peak after a sharp decline experienced by the MySuper product in the sample year provides ideal conditions to analyse sequencing risk.

The analysis shows that sequencing risk only has a minimal impact on the median XIRR for Hardship payments received by members with a closing balance over $100,001. For this cohort, the median XIRR peaked at 6.89% in September 2018, dropping to 6.34% in January 2019 and recovering to 6.78% in May 2019 – a range of only 0.46%.

However, sequencing risk had a larger impact on the median XIRR for members with a closing balance under $50,000, with a range of 3.34%. For this cohort, returns peaked at 6.07% in September 2018, dropping to 2.73% in December 2018 and recovering to 5.86% in April 2019.

Figure 5.9: Median XIRR (bars) displayed in the month the Hardship payment received, grouped by closing balance groups, overlaid (line) with the MySuper product cumulative daily earning rates for the 2018/19 financial year.

5.10 Rollovers

A rollover is when a member transfers existing super benefits between funds and has the impact of increasing (roll in) or decreasing (roll out) the members account balance – or funds available for investment. As expected, increasing investable capital via a roll in had a statistically significant, positive effect on personal rate of return, while a roll out or both roll in and roll out had a statistically significant, negative effect.

During the study period, only 5,162 members (or 9.6%) recorded a rollover transaction.

Of the rollover cohort, 90% recorded a roll in, 6% recorded a roll out, while 4% recorded both a roll in and roll out transaction. The median XIRR for members who rolled in funds equalled approximately 94% of the MySuper Dashboard ‘representative member’ investment return. While members who rolled out funds received a median XIRR equalling approximately 82% of the MySuper Dashboard ‘representative member’ investment return (Table 5.10).

	XIRR (%)					
	Mean	**Median**	**Minimum**	**p25**	**p75**	**Maximum**
Has a Rollover						
No	5.893	6.591	-63.896	5.827	6.872	34.164
Yes	6.248	6.605	-36.503	5.729	7.040	30.224
Rollover Type						
Roll In	6.493	6.639	-36.503	5.897	7.057	30.224
Roll Out	4.851	5.799	-9.453	3.337	6.822	18.204
Roll In & Roll Out	3.389	5.853	-36.019	0.546	6.990	17.606

Table 5.10: Mean, median, minimum, 25th & 75th percentile and maximum XIRR for members who recorded a rollover transaction, by rollover status and type of rollover.

6. Discussion and Conclusions

Superannuation is a compulsory saving system in Australia, yet as identified in the review of the literature, there is little publicly available data on the investment return outcomes that individual members are actually experiencing. Motivated by this lack of transparency, the study was an initial attempt to test a money-weighted formula to calculate individual personal rates of return for members of a single superannuation fund's MySuper product. Firstly, analysis was able to make explicit the dispersion of personal rates of return for members compared to the superannuation funds MySuper Dashboard 'representative member' investment return. Secondly, once the individual personal rates of return were calculated, the study was able to construct regression analysis models to identify which account characteristics and specific transactions (cash-flows) impacted the personal rates of returns achieved.

The study confirms that if there are no transactions, both the time-weighted and money-weighted performance methodologies calculate similar results. However, the 'no transactions' cohort is not representative of this superannuation funds membership – only 6% of the participating superannuation funds membership had no transactions. It would also be expected that it is not representative of the entire super system where significant efforts have been deployed by the government and industry to reduce the number of 'inactive' or duplicate accounts. On this basis, it is justified to incorporate a money-weighted performance calculation in member statements and communications.

With comparison to the MySuper Dashboard 'representative member' investment return, 84.2% of the 53,770 members in the study received a personal rate of return below the 'representative member'. This begs the question, 'who exactly is a representative member'? This may result in its lack of personal relevance, which is a known to be a deterrent in relation

to superannuation fund member engagement.

As identified in previous academic studies, increasing opening account balances have a statistically significant, positive effect of on personal rate of return. However, the positive effect is smaller for balances under $50,000, which is the MySuper Dashboard 'representative member' assumed balance. This result demonstrates that further policy consideration is required of the investment outcomes experienced by lower account balance members.

Research into the prevalence of gender inequality in superannuation outcomes has intensified as the superannuation system matures and more individuals move into the retirement phase. The study found that during the 2018/19 financial year, being female had a negative effect on personal rate of return. The results are statistically significant when only demographic variables were considered. However, gender was not statistically significant when transaction variables were introduced into the model. This makes sense as the known effects of gender inequality on super outcomes are not captured in the single financial year calculation. A longitudinal study is required to examine how genders move through the superannuation system over their working lives.

Insurance premiums are an expense deduction, thereby reducing the amount of investable capital within the member's account. Members holding an insurance policy has a statistically significant, negative impact on their personal rate of return, while the opposite is true for members not holding an insurance policy. Advocates for holding insurance through super claim that insurance cover is more accessible as the insurance premiums are funded from your super balance – instead of personal income. While general warnings are provided that the payment of premiums will reduce savings for retirement, the actual impact is not directly communicated to members via the MySuper Dashboard or annual statements. Of particular concern from the results is the impact of insurance premiums for members with a low account balance.

The advantage of using a money-weighted methodology for investment performance measurement is the ability to calculate the benefit of compounding interest when the frequency of contributions varies. While only minor, the study found that receiving less frequent SG contributions – monthly or quarterly compared to fortnightly, had a statistically significant, negative impact on personal rate of return. Currently, the legislation stipulates that SG contributions must be paid at least quarterly. The findings of this study advocate for policy changes to increase the SG contribution payment frequency – matching employee pay cycles would be logical.

As expected, increasing investable capital via a roll in had a statistically significant, positive effect on personal rate of return, while a roll out or both roll in and roll out had a statistically significant, negative effect on personal rate of return. However, while the effect was large, less than 10% of members recorded a rollover transaction, thereby limiting the impact of this cohort's outcome on the sample population median results.

Interestingly geographical location – metropolitan versus regional and remote, did not have a statistically significant impact on personal rate of return. Previous studies have concluded that fewer employment opportunities and lower incomes in regional and remote Australia have a detrimental impact on superannuation outcomes. The results in this study may not be generalisable as the participating superannuation fund predominantly represents employees of a single employment category that have standardised Enterprise Agreements and Awards that minimises the discrepancy of employee benefits. Aside from personal rates of return, the data reveals that regional and remote members were overrepresented in requesting Hardship payments, identifying an area for further study.

The limitations of the study are acknowledged, important amongst which was the participation of a single RSE. In this regard, it would be useful to expand the sample with data sourced from more RSE's to determine if the variance in investment return outcomes can be generalised. Additionally, a single financial year study period does not identify how individual members progress through the account characteristics, such as growth in account balance, age or participation (entering or leaving) in the workforce. In this regard consultations have begun with the participating superannuation fund to commence a longitudinal study to track individual member outcomes over an extended period of time.

Also, the superannuation fund achieved a positive investment return during the study period,. Understanding the impact on personal rate of return when a negative return (loss) is experienced would require data from a different financial year and is therefore outside the scope of this thesis.

Despite the limitations in the study, it is proposed that the personal rate of return approach presented does cast light on the range of returns individual members receive whilst they are invested in the same MySuper product. This information could assist in determining a more appropriate way to present investment specific member outcomes that reports a more accurate reality, that is investment return, net of fees, taxes, and insurance arrangements.

As part of wider policy debate, the findings from the study raise further issues for investigation and discussion.

The first of these is the necessity to revisit the 'Protecting Your Super Package', in particular the $6,000 threshold for protection against fee erosion. The findings from this study detail the range of investment earnings received relative to the MySuper Dashboard 'representative member' investment return for different account balance thresholds. They point to the fact that those in the $6,000 to $10,000 bracket actually receive approximately 50% of the returns achieved by those members holding in excess of $100,000. How was the $6,000 amount arrived at, and given the results in the study, is it an appropriate threshold?

Secondly, the use of 'net investment' returns rather than 'net after investment and administration fees' returns to members distorts the 'Your Future, Your Super' performance test results. Failing to accurately include all inputs to the performance measure of true investment returns will undermine the legitimacy of the intention to remove underperforming RSE's, as cohorts within a well performing RSE may be achieving investment returns below the benchmark compared to other cohorts. The findings in the study highlight how different cohorts within a single MySuper product earn different rates of return. Therefore, applying a single performance benchmark to all members is not reflective of their reality and not appropriate.

Finally, when it comes to assessing the outcome of changes to the superannuation system, this inevitably involves long-term projections. The results depend on the comprehensiveness of the data and, most importantly, the assumptions used. Small changes in the assumptions can have a significant impact on the results from modelling exercises. The identification of cohort rates of return, based on matching member characteristics, could be compiled and utilised in such projections, rather than the current use of a single Government actuary specified rate. This will improve the accuracy of the projections by delivering a more reflective result.

The variance in personal rate of return outcomes experienced by cohorts in this study highlights the need for policy makers and superannuation funds to ensure that default account settings are not detrimental to vulnerable members at risk of not benefiting from this compulsory saving endeavour and member communication documents are well designed to ensure that they are reflective of actual member outcomes. This may result in its lack of personal relevance, which is a known to be a deterrent in relation to member engagement.

7. References

APRA 2019, 'Statistics: Annual Superannuation Bulletin'.
APRA 2020, *Quarterly MySuper statistics*, viewed 28/10/2020, Retrieved from <https://www.apra.gov.au/publications/quarterly-mysuper-statistics>
ASFA 2017, *Superannuation account balances by age and gender*,
ASFA 2020, *Superannuation Statistics: August 2020*, <https://www.superannuation.asn.au/resources/superannuation-statistics>.
ASIC 2014, *MySuper product dashboard requirements for superannuation trustees*,
ATO 2020, *Super data: multiple accounts, lost and unclaimed super*, viewed 01/08/2020, <https://www.ato.gov.au/About-ATO/Research-and-statistics/In-detail/Super-statistics/Super-accounts-data/Multiple-super-accounts-data/>.
ATO 2021, *Key superannuation rates and thresholds*,
Australian Bureau of Statistics 2017, *Australia: Estimates of Personal Income - Year ended 30 June*,
Australian Bureau of Statistics 2018, *6306.0 - Employee Earnings and Hours, Australia, May 2018*, Co Australia, viewed 29/04/2020, Retrieved from <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6306.0May%202018?OpenDocument>
Australian Bureau of Statistics 2019, *6523.0 - Household Income and Wealth, Australia, 2017-18. Data Cubes 12. Superannuation of Persons*, Commonwealth of Australia, viewed 25/04/2020, Retrieved from <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6523.02017-18?OpenDocument>
Australian Government 2010, *Stronger Super - Government Response to the Super System Review*,
Superannuation Legislation Amendment (Further MySuper and Transparency Measures) Act 2012
Australian Government 2016, *Superannuation (Objective) Bill 2016 - A Bill for an Act relating to the primary objective of the superannuation system*
Australian Government 2018, *Electronic Reporting Specification - Member Contributions Statement (MCS) version 10.1.2*,
Australian Government 2020, *Economic Response to the Coronavirus: Accessing superannuation*, viewed 01/08/2020, <https://treasury.gov.au/coronavirus/households/accessing-superannuation>.
Barry, MP 2018, 'Retirement Savings Policy: Past, Present, and Future', *Chapter 21: Why Fees?:*, De Gruyter, pp. 139-42.
Bell, D 2019, *Discussion Paper - Prudential Standard SPS 515: Strategic Planning and Member Outcomes*, viewed 03/07/2019,
Best, R & Saba, N 2021, 'Quantifying Australia's Gender Superannuation Gap', *Economic Record*.
Bianchi, R, Drew, M, Evans, M & Walk, A 2014, 'The two faces of investment performance and risk', *JASSA*, no. 1, p. 6.
Borowski, A 2013, 'Risky by Design: The Mandatory Private Pillar of A ustralia's Retirement Income System', *Social Policy & Administration*, vol. 47, no. 6, pp. 749-64.
Cobb-Clark, DA & Stillman, S 2009, 'The retirement expectations of middle-aged Australians', *Economic Record*, vol. 85, no. 269, pp. 146-63.
Cox, E 2007, 'Financing our futures: how privatising retirement discriminates against women', *Dialogue (Academy of the Social Sciences in Australia)*, vol. 26, no. 3, pp. 42-50.

Davies, T & Spaulding, D 2011, *The Myths of GIPS®: Money-Weighted Returns for Client Performance Reporting*,
De Zwaan, L, Brimble, M & Stewart, J 2015, 'Engatement with Superannuation: Is there really a gender gap?', *JASSA*, no. 4, pp. 12 - 18.
Dichev, ID 2007, 'What are stock investors' actual historical returns? Evidence from dollar-weighted returns', *American Economic Review*, vol. 97, no. 1, pp. 386-401.
Feibel, BJ 2003, *Investment performance measurement*, John Wiley & Sons,
Gan, S, Heaney, R & Gerrans, P 2015, 'Individual investor portfolio performance in retirement savings accounts', *Australian Journal of Management*, vol. 40, no. 4, pp. 652-71.
Ginn, J & MacIntyre, K 2013, 'UK pension reforms: is gender still an issue?', *Social Policy and Society*, vol. 12, no. 1, pp. 91-103.
Hayne, KM 2018, *Intrium Report - Royal Commission into Misconduct in the Banking, Superannuation and Financial Services Industry*, viewed 28/09/2018, <https://financialservices.royalcommission.gov.au/Documents/interim-report/interim-report-volume-1.pdf>.
Hodgson, H & Tapper, A 2018, 'Superannuation and economic inequality among older Australians: evidence from HILDA', *eJTR*, vol. 16, p. 236.
Holzmann, R & Hinz, R 2005, *Old-age income support in the 21st century: An international perspective on pension systems and reform*, The World Bank,
Illmer, S & Marty, W 2003, 'Decomposing the money-weighted rate of return', *Journal of Performance Measurement*, vol. 7, no. 4, pp. 42-50.
ISWG 2017, *Discussion Paper: Account balance erosion due to insurance premiums*, viewed March 2017,
Le Sourd, V 2007, 'Performance measurement for traditional investment', *Financial Analysts Journal*, vol. 58, no. 4, January 2007, pp. 36-52.
Lis, M & Bonthuis, B 2019, *Drivers of the gender gap in pensions: Evidence from EU-SILC and the OECD pension model*, World Bank,
Liu, K 2013, 'Australian superannuation: operational structure, investment performance and trustee governance', Discipline of Finance: Business School, The University of Sydney. viewed June 2013,
Melbourne Institute *The Household, Income and Labour Dynamics in Australia (HILDA) Survey*, viewed 07/08/2021, Retrieved from <https://melbourneinstitute.unimelb.edu.au/hilda>
Microsoft 2021, *XIRR function*, <https://support.microsoft.com/en-us/office/xirr-function-de1242ec-6477-445b-b11b-a303ad9adc9d#>.
Parliament of Australia 2019, *Treasury Laws Amendment (Protecting Your Superannuation Package) Act 2019*,
Polidano, C, Carter, A, Chan, M, Chigavazira, A, To, H, Holland, J, Nguyen, S, Vu, H & Wilkins, R 2020, 'The ATO Longitudinal Information Files (Alife): A New Resource for Retirement Policy Research', *Melbourne Institue: Applied Economic & Social Research*.
Preston, A & Austen, SE 2001, 'Women, superannuation and the SGC', *Australian Bulletin of Labour*, vol. 27, no. 4, 4/12/2001, pp. 272-95.
Productivity Commission 2016a, *How to Assess the Competitiveness and Efficiency of the Superannuation System: Productivity Commission Research Report - Stage 1*,
Productivity Commission 2016b, 'Productivity Commission Research Report - Executive Summary: How to Assess the Competitiveness and Efficiency of the Superannuation System'.
Productivity Commission 2018a, *Productivity Commission Final Inquiry Report - Superannuation: Assessing Efficiency and Competitiveness*
Productivity Commission 2018b, *Superannuation: Assessing Efficiency and Competitiveness: Supplementary Paper – Fiscal impacts of insurance in superannuation*,

Ruthbah, U & Pham, N 2021, *Despite overhaul attempts, Super still fails lower income earners*, Monash Centre for Financial Studies, viewed 19/01/2021, <https://www2.monash.edu/impact/articles/superannuation/despite-overhaul-attempts-super-still-fails-lower-income-earners/>.
Sneddon, T, Zhu, Z & O'Hare, C 2016, 'Modelling defined contribution retirement outcomes: A stochastic approach using Australia as a case study', *Australian Journal of Actuarial Practice*, vol. 4, pp. 5-19.
Spaulding, D 2003, 'Is the Modified Dietz Formula Money-Weighted or Time-Weighted?', *Journal of Performance Measurement*, vol. 7, no. 3, pp. 37-41.
The Investment Funds Institute of Canada 2017, *Backgrounder: CRM2 Myths and Facts - 2017 Edition*, Toronto, 31/01/2017.
Tracy, MB & Ward, RL 1986, 'Trends in old-age pensions for women: Benefit levels in ten nations, 1960–1980', *The Gerontologist*, vol. 26, no. 3, pp. 286-91.
Treasury 2020, *Your Future, Your Super*,
Warren, D & Oguzoglu, U 2010, 'Retirement in Australia: A closer look at the financial incentives', *Australian Economic Review*, vol. 43, no. 4, pp. 357-75.
Warren, DA 2015, 'Pathways to retirement in Australia: Evidence from the HILDA survey', *Work, Aging and Retirement*, vol. 1, no. 2, pp. 144-65.
Wellen, PD & Peck, CJ 1990, 'Effects of human capital factors on income and net asset amounts of older women', *Home Economics Research Journal*, vol. 19, no. 2, pp. 107-19.
Women in Super 2020, *The facts about women and super*, <https://www.womeninsuper.com.au/content/our-initiatives/gjhy7c>.
World Bank 1994, *Averting the Old Age Crisis: Policies to Protect the Old and Promote Growth*, Washington, DC: World Bank,

Appendix A. XIRR formula design

Treatment of the transaction type descriptions provided by the participating superannuation fund in the XIRR (money-weighted return) formula. Specifically, the cash-flow direction (positive or negative) and inclusion, exclusion or censoring from the formula:

Transaction Categories	**Transaction Type**	**Description**	**XIRR Formula Treatment**
Opening Balance	-	Closing Balances below $5,999.99. Following legislation of the 'Protecting your super' measures in 2019 – where super funds fees are restricted to 3% of the account balance for members whose account balance is below $6,000 at the end of the financial year, the investment performance returns for this cohort will change for future years and comparisons cannot be drawn from the study period.	**Excluded**
		Closing Balances above $6,000	**Included** Positive Transaction – due to Excel XIRR formula convention
Closing Balance	-		**Included** Negative Transaction – due to Excel XIRR formula convention

Transaction Categories	Transaction Type	Description	XIRR Formula Treatment
Regular Contributions	Superannuation Guarantee (SG) Amounts	Employer (Super Guarantee)	**Included** Positive Transaction
	Employee contributions	Pre-tax (salary sacrifice) or after-tax (non-concessional) contributions	
Irregular Contributions	Spouse Super Contribution	Individuals may be entitled to a tax offset if they make a contribution to a complying superannuation fund on behalf of their spouse.	**Included** Positive Transaction
	Capital Gains Tax (CGT) Concession – $500,000 or 15-years ownership	A personal super contribution using the capital proceeds of the sale of certain small business assets	**Included** Positive Transaction
	Co-Contribution	If you are a low or middle-income earner and make personal (after-tax) contribution to your super fund, the government also makes a contribution (called a co-contribution) up to a maximum amount of $500.	**Included** Positive Transaction
	Downsizing Contribution	From 1 July 2018, if you are 65 years old or older and meet the eligibility requirements, you may be able to choose to make a downsizer contribution into your superannuation of up to $300,000 from the proceeds of selling your home.	**Included** Positive Transaction
	Low-Income Super Tax Offset (LISTO)	Eligible individuals with an adjusted taxable income up to $37,000 will receive a low-income super tax offset (LISTO) payment to their super fund. The LISTO is calculated on 15% of the concessional (before tax) super contributions you or your employer pays into your super fund. The maximum payment you can receive for a financial year is $500, and the minimum is $10.	**Included** Positive Transaction
	Personal Deductible Contribution (Section 290-170)	Eligible members provide their super fund with a form notifying their intention to claim an income tax deduction in their personal tax return for some or all of the personal contributions they made on their own behalf during a financial year. Represents self-employed members equivalent of employees SG contributions.	**Included** Positive Transaction

Transaction Categories	**Transaction Type**	**Description**	**XIRR Formula Treatment**
Deduction	Contribution Tax	Contributions made to super before tax (concessional) are taxed at 15%. The deduction occurs on the same day as the contribution, producing a net amount.	**Included** Negative Transaction
	Contribution Tax Adjustment (Credit)	Adjustment to contributions tax previously deducted if the contribution amount changes.	**Included** Positive Transaction
	No-TFN Contribution Tax (5 observations)	Additional tax (additional 32% to 15% contributions tax) on concessional contributions (employer or salary sacrifice) when TFN has not been provided.	**Excluded** Negative Transaction Tax reflected in account balance
	Once off Adviser Fee	Payment of financial Advice fees relating to the members benefit within the fund.	**Included** Negative transaction
	Administration fee rebate	If a member is charged total Administration fees above the capped amount during the financial year, the excess is rebated to the members account on 30th June.	**Excluded** Fees are reflected in account balance
	Insurance Premium: Death, Income Protection & TPD	While insurance premiums provide a ***conditional*** supplementary benefit – a quantifiable amount to be payable in the event of death, disability, or loss of income to the member or their Estate, the payments diminish the amount of investable funds available to generate investment returns.	**Excluded** Negative transaction Not a monetary benefit to the member
	Insurance Premium Refund: Death, Income Protection & TPD	Super funds may refund premiums already deducted if the members insurance benefits change	**Excluded** Positive transaction
	Investment Fee	Investment fees deducted from investment earnings to cover the costs of managing MySuper investment portfolio.	**Excluded** Reflected in account balance
	Lump Sum Exit Tax	Under some limited circumstances, individuals can withdraw a lump sum from their super before preservation age. Withdrawals are taxed at 22% (including the Medicare levy) or the individuals Marginal Tax Rate, whichever is lower.	**Excluded** Reflected in account balance

Transaction Categories	**Transaction Type**	**Description**	**XIRR Formula Treatment**
Payments	Terminal Illness Total Permanent Disablement	Members who received an insurance policy claim – increasing their account balance as the super fund is the policy owner and beneficiary, were excluded as the policy value and transaction date of the insurance proceeds being deposited into the members account was not disclosed in the raw data provided by the participating superannuation fund.	**Excluded**
	Hardship	NOTE: Not related to COVID19 early release of super Accessing super prior to preservation age is possible under superannuation law, provided that strict eligibility conditions around severe financial hardship or compassionate grounds are met.	**Included** Negative Transaction A monetary benefit has been received by the member
	Withdrawal	Payments made when a 'Condition of Release' has been met – permanently retired, resignation after age 60 or attaining age 65.	**Included** Negative Transaction
Rollin (Internal) Rollin (External) Rollout (Internal) Rollout (External)	Rollover: 1 July 2018 balance greater than $0	A rollover is when a member transfers existing super benefits between funds.	**Included** Positive (Rollin) & Negative (Rollout)
	Rollover: 1 July 2018 balance $0 – i.e. rollover and account establishment made part-way through the financial year		**Excluded** As the XIRR formula annualising returns, the rate of return is distorted and not comparable with members invested for the entire study period
Rollout (Internal) Rollout (External)	Contribution Split 30 observations	Members can split certain contributions with their spouse, enabling them to boost their spouse's super savings with some of their own.	**Included** Negative transaction

Appendix B. Sample Characteristics

Figure B.1 Sample and ABS mean closing account balance by gender and age groups

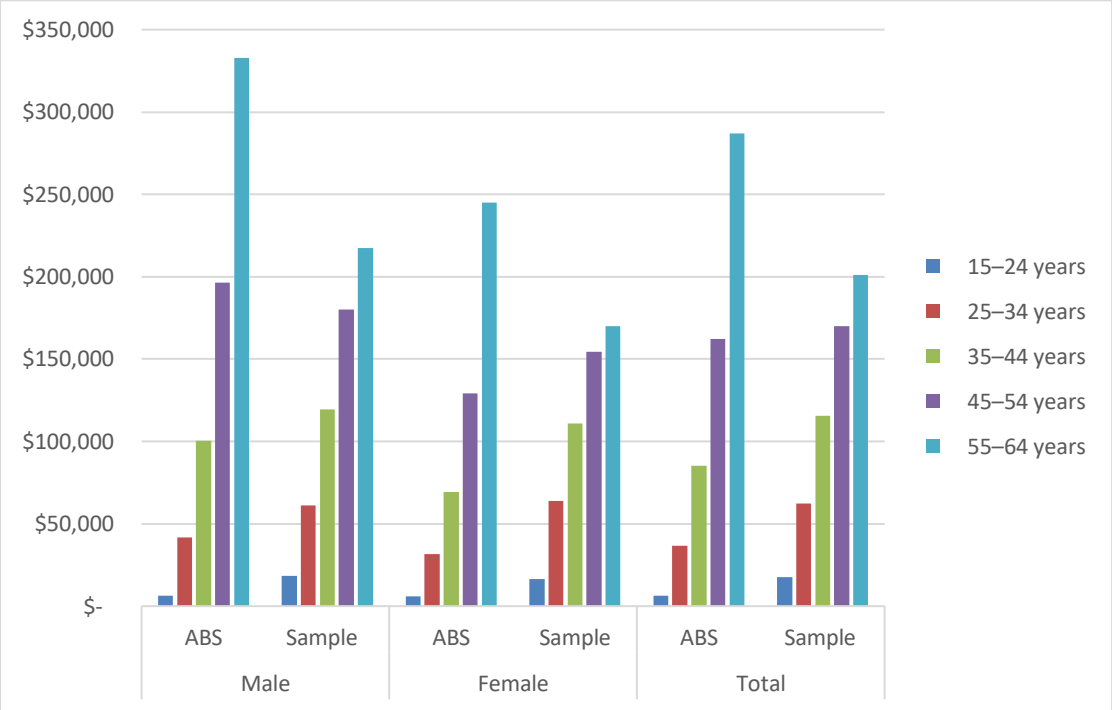

Figure B.2 Sample and ABS median closing account balance by gender and age groups

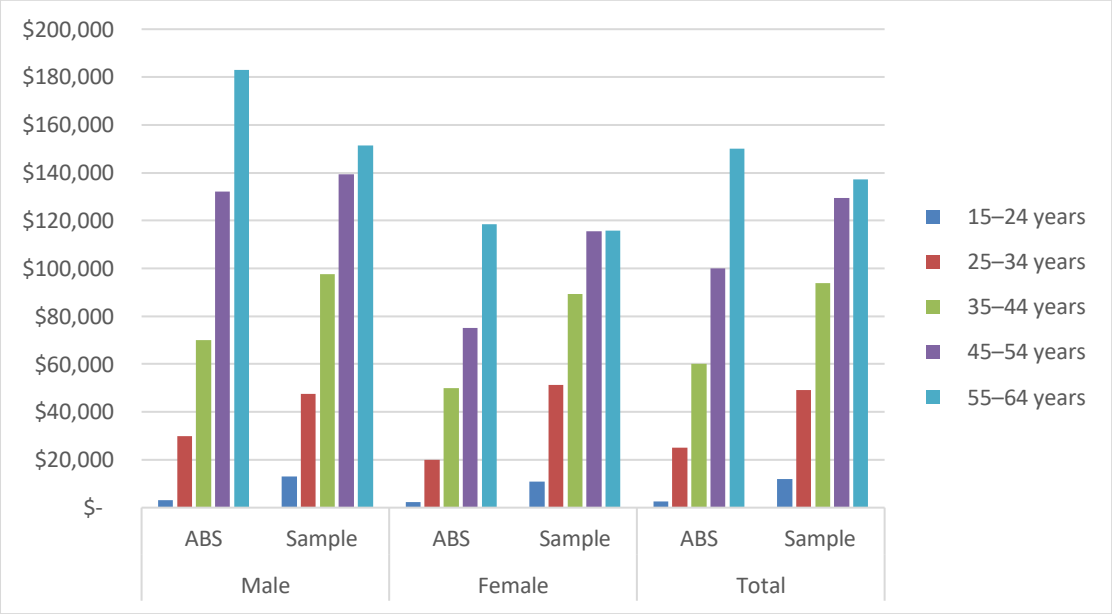

Figure B.3: Sample and ABS mean annual salary by gender and age groups

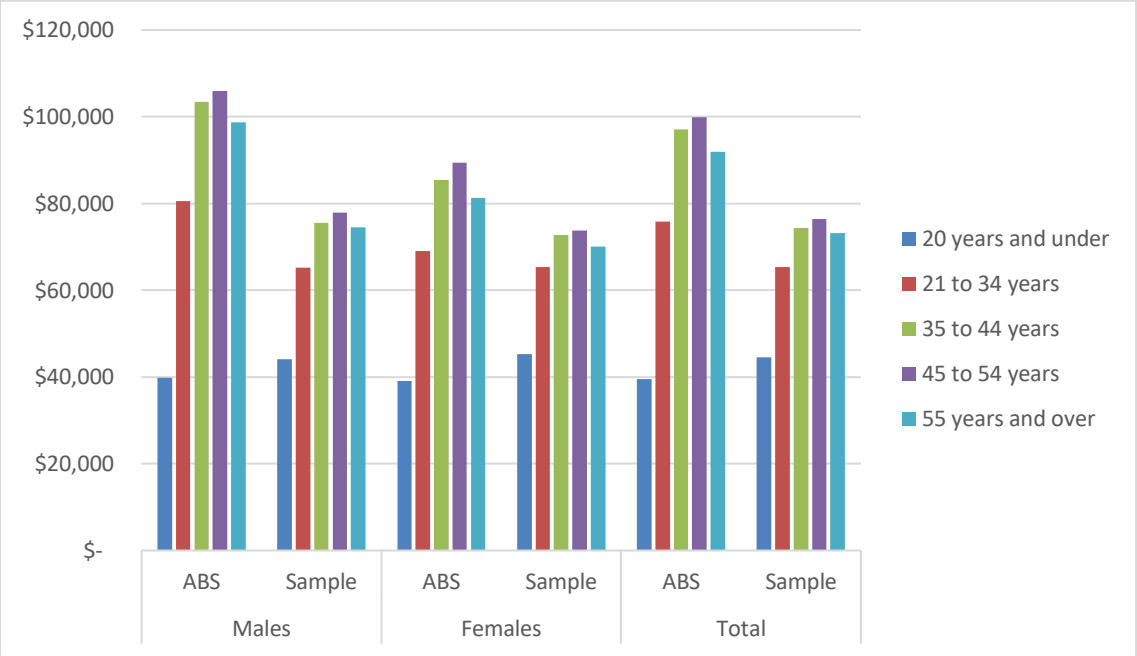

Figure B.4: Number of members, by closing balance groups and gender.

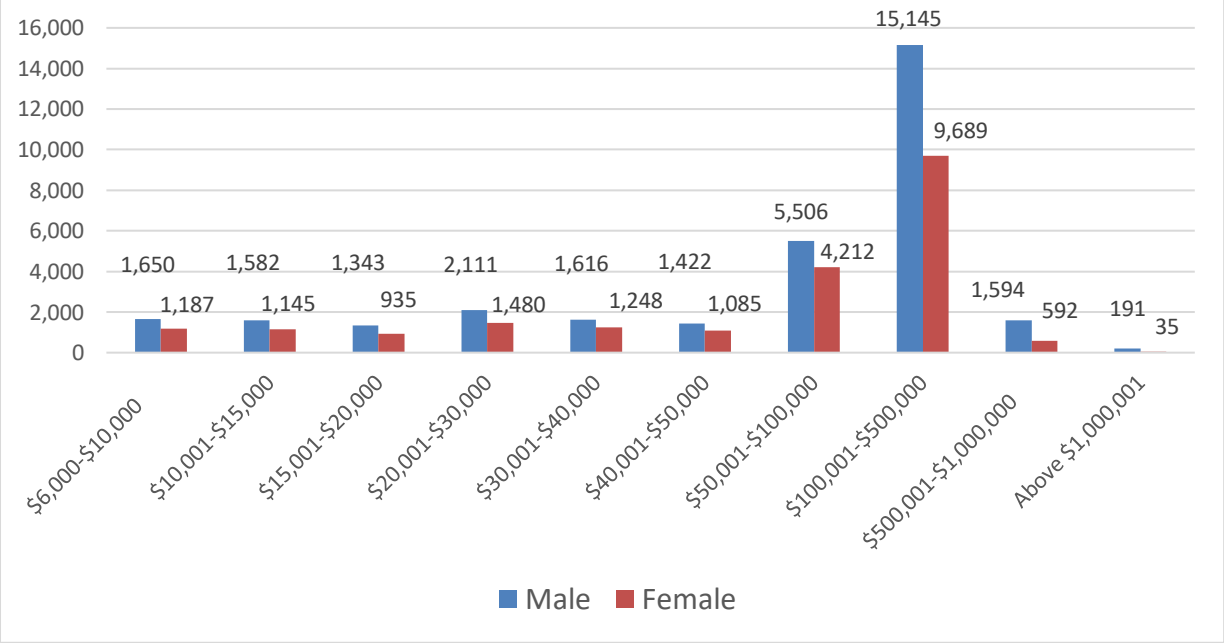

Table B1: Number of members by location.

Location	**Frequency**	**Percent**
Metropolitan	33,799	63.26%
Regional	14,210	26.60%
Remote	5,421	10.15%
Total^	**53,430**	**100.00%**

^ No postcode recorded for 340 members

Appendix C. Definition of regression variables

<table>
<tr><th>Variables</th><th>Definition</th></tr>
<tr><td>Gender</td><td>Indicator variable equal to 0 if observation is male,
1 for females</td></tr>
<tr><td>Salary (log)</td><td>Continuous variable of log salary (annual).
Null '.' observed when no salary recorded.</td></tr>
<tr><td>Opening balance (log)</td><td>Continuous variable of log opening balance, as at 1 July 2018. We model the logarithm of opening balance to normalise the distribution.</td></tr>
<tr><td>Opening Balance Under $50,000</td><td>Indicator variable equal to 0 if Opening Balance >=$50,000,
1 if Opening Balance < $50,000
(MySuper Dashboard representative member)</td></tr>
<tr><td>Age</td><td>Continuous variable of age in years as of 1 July 2018</td></tr>
<tr><td>Age squared</td><td>As nonlinearity was present, we entered squared terms</td></tr>
<tr><td>Age over 60</td><td>Indicator variable equal to 0 if observation age is <=59,
1 if observation age is >=60</td></tr>
<tr><td>Location</td><td>Indicator variable equal to 0 if observation lives in Metropolitan location (identified by recorded postcode),
1 if lives in a Rural or Remote location</td></tr>
<tr><td>No Transactions</td><td>Indicator variable equal to 0 if observation has >2 transactions recorded,
1 if only opening and closing balance recorded</td></tr>
<tr><td>Super Guarantee Contribution (SGC) Frequency</td><td>Continuous variable of 365 (days in year) divided by count of SGC contributions received, expressed as a percentage:
<table><tr><th>SGC Frequency</th><th>Number of contributions</th><th>Variable (% of 365 Days)</th></tr><tr><td>No SGC</td><td>0</td><td>0.00</td></tr><tr><td>Weekly</td><td>52</td><td>7.02</td></tr><tr><td>Fortnightly</td><td>26</td><td>14.04</td></tr><tr><td>Monthly</td><td>12</td><td>30.42</td></tr><tr><td>Quarterly</td><td>4</td><td>91.25</td></tr></table></td></tr>
<tr><td>Additional Contributions (Salary Sacrifice, Spouse)</td><td>Indicator variable equal to 0 if No Additional contributions made,
1 if >= 1 Additional Contributions made</td></tr>
<tr><td>Additional Contributions Frequency</td><td>Continuous variable of 365 (days in year) divided by count of additional contributions received, expressed as a percentage</td></tr>
</table>

No Insurance policy held	Indicator variable equal to 0 if observation holds an insurance policy (identified by cash-flow transaction deducting insurance premium), 1 if observation does not hold an insurance policy (identified by no insurance premium deduction transactions)
Insurance premiums as percentage of annual salary	Continuous variable of sum insurance premiums divided salary
Government Co-Contribution	Indicator variable equal to 0 if No Government Co-Contribution received, 1 0 if a Government Co-Contribution was received
Hardship payment made	Indicator variable equal to 0 if No Hardship payment made, 1 if a Hardship payment was made
Funds Rolled-in	Indicator variable equal to 0 if No Roll-in received, 1 if a Roll-in was received
Funds Rolled-out	Indicator variable equal to 0 if No Roll-out paid, 1 if a Roll-out was paid
Both Roll-in & Roll-out	Indicator variable equal to 0 if No Roll-overs (in and out), 1 if Roll-overs (in and out) occurred