Decision Making Clusters in Retirement Savings: Preliminary Findings

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Abstract

The aim of the present study was to explore whether identifiable member clusters exist in retirement savings decisions by considering the investment choice history of the members of four large Australian retirement savings funds. We used a two-step cluster analysis to examine whether well-defined subgroups exist as identified by their investment choices and member demographics. Funds were tested individually and collectively using a range of variables. Distinct groups were found, varying along gender and age lines. There were also clear distinctions between the groups in terms of the risk of the investments they chose. Future work is discussed, including the refinement of variables selected.

1. Introduction

An ageing population and the resultant increasing demand on government to fund retirement incomes (Guest and McDonald, 2000) has made the accumulation of retirement savings by individuals a significant policy issue in the developed world. Australia’s response has included the introduction of a regime of compulsory employer-funded retirement savings which began in 1986 and became entrenched in its current form in 1992 with the introduction of the Superannuation Guarantee. This places Australia at the forefront of other similar countries in tackling the problem (Bateman, Kingston and Piggott, 2001).

The assets controlled by retirement savings funds in Australia have grown rapidly, from $228.3 billion (38 per cent of GDP) in June 1995 to $1.0 trillion (100 per cent of GDP) in December 2006 (Australian Prudential Regulation Authority, 2007a). At the same time individual fund members are assuming greater responsibility in selecting the investment strategy applied to their funds with a shift from defined benefit to defined contribution plans (Clare and Connor, 1999) and an increase in the investment options available (Gerrans, Clark-Murphy and Speelman, 2006).

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Twenty-one years after the introduction of compulsory retirement savings, the way in which Australian employees make retirement savings decisions is beginning to be thoroughly investigated. The adequacy of these decisions is a primary determinant of the employee’s lifestyle in retirement and hence is important not only to the individual but also to government. If sub-optimal decisions are made, retirement incomes may be significantly reduced increasing the extent to which people will rely on government support during retirement (King, 2001).

The aim of the present study was to investigate whether demographic clusters exist in the investment choices made in four large superannuation funds with members covering a wide range of industries and income levels. Cluster analysis was used to examine the generality of previous findings in the literature, particularly with regard to gender, to see whether similar results existed in this sample. For example, the sub-group of young investors, identified by Clark-Murphy and Gerrans (2001b), who opted for safe and low-return investments, were members of a fund for the tertiary education sector. The present study allows testing the robustness of this result in a range of industries.

The remainder of this paper is organised as follows: the next section briefly outlines the Australian retirement income system. The third section examines the literature related to factors influencing investment choice in retirement savings. The fourth section presents details of data and methodology including the datasets and variables used in the present study. Section five sets out the results obtained. The final section discusses and summarises the work and identifies areas of future research.

2. Australian Retirement Incomes Framework
For much of the 20th century, Australia relied on two of the traditional three retirement income pillars: a non-contributory federal government age pension, and voluntary contributory savings schemes which were largely linked to white-collar occupations. With the introduction of the Superannuation Guarantee (SG) Act in 1992 Australia entrenched a third contributory, employment linked, forced savings pillar. The SG has its roots in agreements between the federal government and labour trade unions in 1986 which for the first time entrenched retirement savings as part of the employment conditions for workers.¹ The initial rate of contributions was 3 per cent of wages and by 2002 employees 18 and over who earned at least $450 per month were entitled to have contributions from their employer of 9 per cent of their ordinary earnings paid to a complying superannuation fund. Recent data indicates that 96 (78) per cent of full-time (part-time) employees receive these contributions (Australian Bureau of Statistics, 2006).

Employees covered by the SG contributions generally have two decisions they can make with regard to their superannuation. The first is to which retirement savings fund their employer contributions are directed. From July 2005 this choice became mandatory for an additional 5.2 million of a potential 9.5 million employees (Clare, 2006). Secondly, once in a fund the member generally is offered a range of investment strategy options. The level of choice varies by the type of fund though the absolute level depends on whether we measure this by the number of funds or the assets under

¹ For a wider discussion of the motivations of the scheme see Coates and Vidler (2004) for an interview with the then Treasurer Paul Keating.
management of these funds. For example 49 per cent of funds offer investment choice whereas 90 per cent of assets under management are in funds that offer choice. Company established funds (Corporate funds) are least likely to offer investment choice (37 per cent of funds or 88 per cent of assets) whereas not-for-profit industry funds have the greatest level of investment choice (84 per cent of funds or 99 per cent of assets). Similarly the number of options offered varies considerably with retail funds averaging 88 options and corporate funds only 6 options. The overall average is 35 (Australian Prudential Regulation Authority, 2007b). Funds can offer this investment choice to the member’s accumulated balance of savings and/or to their future contributions. Some funds allow different investment strategies to apply to each. This paper focuses solely on the investment choice decision relating to how future contributions are invested.

Despite all the options available, the reality is that most members remain in default options, both in terms of the fund nominated to receive their contributions and the investment strategy for those contributions. Where investment choice is available 54 per cent of assets are in the default investment strategy with the lowest proportion being for retail funds (33 per cent) and the highest for industry funds (74 per cent) (Australian Prudential Regulation Authority, 2007a). In the first six months after the introduction of mandatory fund choice only four percent of employees changed funds, and in most cases this was due to change of employment (Clare, 2006). An Australian study (Fry, Heaney and McKeown, 2006) has suggested that this reluctance to change funds indicates that fund members are loss averse. In a different context it has been suggested (McKenzie, Liersch and Finkelstein, 2006) that, where a default exists it will be seen as an implicit recommendation and hence is most likely to be adopted by individuals, though this has yet to be tested in the retirement savings context.

3. Previous Literature

Previous research in the area of retirement savings and retirement incomes has covered a wide range of issues. The focus of the present study was on decision making and in particular on issues of demographic difference. Research to date suggests that an individual’s ability to make optimal, wealth-maximising choices may fail in a number of areas and that demographic differences are apparent. These issues are significant since the primary determinant of dispersion in wealth at retirement has been shown to be the propensity to save during working life rather than the availability of disposable income from which to save (Venti and Wise, 1998).

The literature examining individual choice in a retirement savings framework is now large. A number of studies have examined the trend away from defined benefit funds (DBF) towards defined contribution funds (DCF) (Gustman and Steinmeier, 1992; Clare and Connor, 1999; Clark and Pitts, 1999; Dulebohn, Murray and Sun, 2000). It has also been argued (Bajtelsmit and VanDerhei, 1997; Goodfellow and Schieber, 1997) that, due to individual risk-aversion, funds in which employees can exercise investment choice may have lower long-term returns than employer controlled defined contribution funds. Clark-Murphy and Gerrans (2001a) and Gallery, Gallery and Brown (2000) provide an analysis of the DBF/DCF choice in the Australian higher education industry. Clark-Murphy and Gerrans (2001a) document demographic
differences in a sample from one fund where members were given the choice of remaining in a defined benefit account or moving to a defined contribution account. Gallery, Gallery and Brown (2000), looking at a subset of the same population, suggest choice differences linked to financial proficiency largely account for differences in the decision made.

There has been consistent Australian evidence that employees report feeling ill-informed and ill-equipped for the decisions presented to them relating to their superannuation decisions (Clare, 2002; Clark-Murphy and Gerrans, 2001a; Plum Financial Services, 2001) although this situation may be improving (Tuck, 2006). It does appear that Australians now understand they must accept responsibility for funding their own retirement with a recent international study indicating Australia ranks equal first in this regard with Hong Kong (AXA, 2007).

Gender differences have been a significant focus of previous research with several studies finding differences in risk aversion in general and in retirement investments in particular. The majority have found women show greater risk aversion in the allocation of funds to pension assets (Bajtelsmit, Bernasek and Jianakoplos, 1999; Bernasek and Shwiff, 2001; Hinz, McCarthy, and Turner, 1997; VanDerhei and Olsen, 2000) and this is supported by Australian evidence (Gerrans and Clark-Murphy, 2004; Speelman, Clark-Murphy and Gerrans, 2006; Quinlivan, 1997). However, contrary evidence can be found. Dwyer, Gilkeson and List (2002) suggest risk aversion falls with increased financial education while Clark, d’Ambrosio, McDermed and Sawant (2004) found that women are more likely than men to change their retirement saving behaviour in response to education seminars. A Swedish study of retirement savings has found that women were more likely than men to move away from a default plan and make investment choice (Engstrom and Westerberg, 2003). More recently Brown, da Silva Rosa and McNaughton (2006), examining managed fund investment decisions, suggested men were more risk averse than women. In comparing the apparent contradiction in Australian evidence (Gerrans and Clark-Murphy, 2004 versus Brown et al., 2006) it should be noted that the latter study considered those who had voluntarily chosen to invest in managed funds and who might therefore be expected to be relatively well-informed investors. Gerrans and Clark-Murphy (2004) looked at members of an industry superannuation fund who received superannuation as part of their employment benefits and had not made any conscious decision to acquire a financial asset, hence they were likely to be less well-informed, overall, about financial risk.

Researchers have identified sub-groups who appear to make inappropriate choices which will reduce their retirement incomes. For example workers under 40 years of age who choose to place their funds in a very low-risk, low-return capital guaranteed investment (Clark-Murphy and Gerrans, 2004; Goodfellow and Schieber, 1997). Recent work by the authors looking at primarily female members of an industry fund (Speelman, Clark-Murphy and Gerrans, 2006) found apparently excessive risk aversion among young females but a more moderate attitude to risk among older women, nearer to retirement. This may support the findings of Clark et al. (2004) that women are likely to change their allocations as knowledge increases.

Agnew, Balduzzi and Sunden (2003), in a study of 7,000 401(k) plans, found that men are more likely to make equity investments, that asset allocations tend to be
extreme, with very high or very low allocations to equities, and very limited movement in allocations. Chernev (2004) discussed evidence of extremeness aversion in choice and a tendency to go for the compromise option. This suggestion may in part explain the experience of most Australian retirement savings funds that the majority of fund members remain in the default investment option.

By contrast Benartzi and Thaler (2001) suggest employees, whether male or female, are likely to adopt a ‘naïve diversification’ strategy in employer-sponsored retirement savings, dividing their funds equally between each of the investment strategies offered, although they also identify a tendency to choose a ‘middle’ option (Benartzi and Thaler, 2002). Evidence of naïve diversification has also been found in Sweden (Hedesström, Svedsater and Garling, 2004) in a study which also supports extremeness aversion. Thus it has been suggested that plan design, the alternatives offered and the way funds can be divided, may significantly influence the choices made (Chernev, 2004). However the relationship between naïve diversification and plan design has been questioned by Huberman and Jiang (2006) as in part an artifact of data aggregation.

Literature from other fields of consumption suggests that a relatively high number of options may not facilitate good or satisfying choices and this is now being applied to retirement savings decisions (Sethi-Iyengar, Huberman and Jiang, 2004). This is of particular importance when, as noted above, Australian retail funds now offer their members an average of 88 different investment options (Australian Prudential Regulation Authority, 2007b). It has also been suggested (Papke, 2004) that the presence of investment options increases the proportion of funds members hold in equity and the likelihood that members will make voluntary contributions.

Taken as a whole the existing literature suggests that a wide range of factors may influence individuals’ investment decision making. Many of these factors appear to be behavioural in nature and go beyond the inputs employed in modern portfolio theory as part of the rational decision making framework. There is reasonably clear evidence of differences in retirement savings decision making although the nature of and reason for these remains a matter of debate.

4. Data and Methodology

Overview of Funds and Data

Four Australian superannuation funds have provided the investment strategy choice history of their members. Collectively the four funds have $44 billion in assets and 1.6 million members. The funds cover a wide range of industries and occupations ranging from unskilled to senior management. The funds introduced investment choice for their members between 1995 and 2001 and the level of investment choice varies. During the period covered by the present study three funds allowed members the choice of a selection of readymade options, which have a specified investment strategy, or a do-it-yourself (DIY) option where members choose their own investment strategy while the other offered a selection of readymade options only.2 The funds’ choice offerings have evolved over time and are summarised in figure 1.

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2 This fund has since introduced a DIY choice.
Figure 1 - Fund Investment Options

<table>
<thead>
<tr>
<th>Fund 1</th>
<th>Fund 2</th>
<th>Fund 3</th>
<th>Fund 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity Default Cash</td>
<td>Equity Default Conservative</td>
<td>Growth Default Conservative Cash</td>
<td>Equity Default Conservative Low Risk</td>
</tr>
<tr>
<td>Australian Equity Blend</td>
<td>Overseas Equity Blend</td>
<td>Australian Shares International Shares</td>
<td>Australian Shares International Shares</td>
</tr>
<tr>
<td>Australian Shares</td>
<td>International Shares</td>
<td>Australian Fixed Interest International Fixed Interest</td>
<td>Fixed interest Property</td>
</tr>
<tr>
<td>Property Cash</td>
<td>Infrastructure Private Equity</td>
<td>Cash</td>
<td>Ethical Australian Shares</td>
</tr>
<tr>
<td>December 2004</td>
<td>December 2004</td>
<td>September 2004</td>
<td>June 2004</td>
</tr>
</tbody>
</table>

- **Readymade Options**
- **Asset Classes**
Fund Investment Choice Data
For each fund the data included in the present study covers the period from the introduction of investment choice to the last data made available. In Fund 1 between July 1995 and December 2004, 44,393 members made 48,874 investment changes. This includes only changes applied to future contributions as members were able to choose a different strategy for their existing balance; the changes made to existing balances will be considered in future work. In Fund 2 between July 1997 and December 2004 22,969 members made 27,488 changes. Between July 1997 and December 2002 these changes applied to a member’s existing balance and future contributions. Since January 2002 the changes applied only to future contributions. In Fund 3 between July 2001 and June 2004 17,609 members made 19,688 changes. Between July 1997 and December 2002 these changes applied to both the existing balance and future contributions. In Fund 4 between July 1998 and June 2004 members made a total of 43,545 changes which applied to both the existing balance and future contributions. The structure of this fund meant that most members had more than one account hence the absolute number of individual members cannot be determined.

Variables
As well as investment choice information the databases include limited member demographics. Variables considered in this study were Gender, Age at the last birthday, Years of membership up until the point of sampling, Employer Contributions (used as a proxy for income) in the previous 12 months, Account Balance, Number of options chosen, Choice Number (indicating the number of choices made to date) and Asset Mix Type. The latter variable indicates whether the member chose the ready-made investment options, constructed their own (DIY) asset mix or took a combination of the two. Two additional variables were constructed. The first, Performance Change, represented a percentage comparison between the performance in the previous 6 months of the option the member had chosen (New) relative to their existing (Old) choice. This variable can indicate whether a member may be chasing an option with better historical performance than the one(s) they have previously chosen.

The second constructed variable, Risk, measured the risk of the new option chosen. This variable was derived from information provided to investors by the funds relating to the investment options. This took the form of information booklets which included graphs and other data indicating the estimated relative risk of the various investment options, in relation to their estimated likely return. While this variable may not be a completely accurate depiction of the actual risk associated with each investment option, it nonetheless represents information members had available to use when making their decision about which option(s) to choose. The rationale for analysing this variable, then, was to determine whether the information provided to members regarding the relative risk of investment options appeared to impact upon members’ choices.

5. Results
A two-step cluster analysis was performed using SPSS (v.14) to determine whether there were well-defined sub-groups within the sample on the basis of the variables examined and if so, to generate a profile of these groups in terms of their investment choices.

A total of 136,465 transactions were available for analysis, however only 50,516 (37 per cent) transaction records contained information on all of the variables mentioned above.
### Table 1 - Cluster profiles All Funds

<table>
<thead>
<tr>
<th>Cluster</th>
<th>n</th>
<th>Gender</th>
<th>Age last birthday</th>
<th>Years of membership</th>
<th>Employer contributions</th>
<th>Number of options</th>
<th>New–Old Performance (%)</th>
<th>Risk</th>
<th>Account Balance</th>
<th>Asset Mix Type</th>
<th>Choice Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18456</td>
<td>Female (100%)</td>
<td>38.72 (0.08)</td>
<td>2.52 (0.05)</td>
<td>2892 (27)</td>
<td>1.10 (0.003)</td>
<td>0.30 (0.02)</td>
<td>3.23 (0.01)</td>
<td>28444 (270)</td>
<td>Pooled (100%)</td>
<td>1.14 (0.003)</td>
</tr>
<tr>
<td>2</td>
<td>5869</td>
<td>Male (40%) Female (60%)</td>
<td>52.38 (0.09)</td>
<td>9.61 (0.07)</td>
<td>13975 (223)</td>
<td>1.08 (0.004)</td>
<td>2.86 (0.06)</td>
<td>2.88 (0.02)</td>
<td>218151 (2708)</td>
<td>Pooled (100%)</td>
<td>2.14 (0.016)</td>
</tr>
<tr>
<td>3</td>
<td>5392</td>
<td>Male (55%) Female (45%)</td>
<td>43.45 (0.15)</td>
<td>5.45 (0.07)</td>
<td>5567 (91)</td>
<td>3.23 (0.025)</td>
<td>1.68 (0.06)</td>
<td>3.63 (0.01)</td>
<td>43035 (810)</td>
<td>DIY (80%) Mixture (15%) Pooled (5%)</td>
<td>1.98 (0.023)</td>
</tr>
<tr>
<td>4</td>
<td>20799</td>
<td>Male (100%)</td>
<td>40.97 (0.08)</td>
<td>3.85 (0.05)</td>
<td>4933 (39)</td>
<td>1.12 (0.003)</td>
<td>0.93 (0.02)</td>
<td>3.52 (0.01)</td>
<td>52599 (456)</td>
<td>Pooled (100%)</td>
<td>1.24 (0.004)</td>
</tr>
</tbody>
</table>

Note: Except for n and Gender, values are means. Unless otherwise indicated, values in parentheses are standard errors.
Four clusters were produced and their profiles are presented in table 1. A MANOVA was conducted to test whether the clusters were significantly different to each other with respect to the range of dependent variables. An overall difference was detected (Pillai’s Trace: approx. $F(27, 151518) = 4669.191, p<.05$). Univariate ANOVAs were performed on each dependent variable. These tests indicated that the clusters differed significantly on each dependent variable (Age: $F(3, 50512) = 2660.89, p<.05$; Years: $F(3, 50512) = 4278.66, p<.05$; Employer Contributions: $F(3, 50512) = 3233.97, p<.05$; Number: $F(3, 50512) = 15027.84, p<.05$; Performance Change: $F(3, 50512) = 960.89, p<.05$; Risk: $F(3, 50512) = 385.41, p<.05$; Account Balance: $F(3, 50512) = 7304.34, p<.05$; Asset Mix Type: $F(3, 50152) = 124789.50, p<.05$; Choice Number: $F(3, 50512) = 3488.95, p<.05$). Tukey’s post hoc comparisons between each cluster on each dependent variable indicated that every cluster was significantly different to every other cluster on all variables, except for Clusters 1 and 2 (see below) on Number, and Clusters 1 and 4 on Asset Mix Type.

There are two large, single gender clusters (1 and 4) and two small, mixed gender clusters (2 and 3). Members of Clusters 2 and 3 are older and have made more changes to their investment options. They also have the greatest performance difference between their new and old investment options with the new option performing better than the old option; this indicates return chasing. The two clusters differ, however, on account balance and risk with members of Cluster 3 having a much lower account balance and a much greater willingness to take risk. This is also the only group that chooses options outside the fund’s ready-made (Pooled) options. Members of Cluster 2 have the highest account balance and employer contributions by a considerable margin but chose the lowest risk options. It may be that this group feels they have adequate superannuation accumulating and therefore do not feel it is necessary or desirable to take more risk.

Cluster 1 members are all female, they are the youngest group with the lowest account balances and employer contributions. They chose the next lowest risk options after Cluster 2. By contrast the other small group, Cluster 4, is all male, slightly older, slightly wealthier (in terms of account balance and employer contributions) and slightly more willing to take risk.

6. Discussion and Conclusion

A number of findings previously reported in the literature were observed in this sample indicating the generality of these findings across different industries. However, some results not previously reported were also noted. In general, females were more risk-averse than males, although there were exceptions. In addition, there was a group of females that were the youngest of all of the groups, and who opted for investments with a relatively low level of risk. This supports previous findings for a single industry (Speelman, Clark-Murphy and Gerrans, 2006) and suggests the problem is a general one. A clear challenge for retirement savings funds, then, is to find ways to educate this group in the wisdom of focusing on the longer term and choosing higher risk investment options in order to maximise the chance of higher returns. The long-term importance of this is exaggerated by the fact that women generally earn less than men over their working life and have a more disrupted work history, reducing their opportunity to

The behaviour of Cluster 2 is also noteworthy, and such a group has not been identified previously. This group, including both males and females, has selected a relatively low risk level but chosen options which have outperformed their existing option by the largest margin. It is interesting that these apparent return chasers are the oldest cluster. This is in line with previous research (Clark-Murphy, Gerrans and Speelman, 2007) which found that return chasing behaviour, while common in all age groups, tends to increase with age. It is possible that these members are preparing for retirement by attempting to reduce risk but still want to chase high performance options in the shorter remaining period of their working life.

The present study is based on secondary data and concerns individuals rather than households. This limits the extent to which conclusions can be drawn about the reasons for observed behaviour. Survey data is needed to explore these influences and strengthen the behavioural conclusions. For example gender effects have previously been identified in the current dataset (Gerrans and Clark-Murphy, 2004) and these may be related to marital status or household structure. Survey data would also facilitate an exploration of younger women’s attitude to and understanding of the risk/return trade-off and the intervention strategies that might be appropriate to address any misconceptions.

Future research on the current data will focus on the individual funds in more detail to explore differences that may exist between industries. Variables will also be refined, or possibly excluded, to increase the number of records available for analysis.

References


