

GENDER DIFFERENCES IN RETIREMENT SAVINGS DECISIONS

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Abstract

As members of the Australian workforce approach retirement, they are being presented with increased choice in their superannuation investments. With increased choice has come greater personal responsibility for ensuring adequate retirement savings. This paper explores gender differences in superannuation investment choices through a range of interactions with individual demographics and in doing so a gender effect can be further refined than previous research has identified. The data for this paper comes from a survey of members of the Superannuation Scheme for Australian Universities (SSAU).

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Keywords: superannuation, investor choice, retirement savings, gender differences

1.0 Introduction

One word that can be used to describe the net effect of recent changes to superannuation in Australia is *choice*. Choice is increasingly being presented to superannuation¹ members at a variety of levels. Choice can mean a once only decision between a Defined Benefit Fund (DBF) and an Investment Accumulation Account (IAA), a choice of where superannuation contributions are directed or choice as to the asset mix of fund members' portfolios. Legislation currently before the Australian parliament, if passed, will see the opportunity for individuals to choose the fund to which contributions should be directed become compulsory.

The move to offer choice has coincided with a conscious effort by government to move the responsibility for retirement income provision from the government to individual employees. The decisions made by individual employees therefore have a heightened level of significance. To date little research attention has been given to these decisions and even less to any systematic gender differences in the choices made. As summarised by Hersch (1996) there is considerable evidence that women exhibit greater risk aversion not only in their financial investments but also in other activities including such activities as smoking and seat belt usage. Bajtelsmit, Bernasek and Jianakoplos. (1999), note that in view of the longer life expectancy of women, even given the same investment strategy and retirement savings as men, consumption in retirement will be less for women. Thus if greater risk aversion is evident in retirement saving decisions women's consumption levels could be eroded.

¹ Superannuation is the term used in Australia for any savings made during an employee's working life with a view to providing an income during retirement. Superannuation funds to which monies are contributed by the employee and/or their employer would in the terminology of American funds include both 401(k)s and IRAs.

This paper explores possible gender effects in the decisions made by members of the Superannuation Scheme for Australian Universities (SSAU), who were given the once only choice of remaining with a Defined Benefit Fund (DBF) or changing to one of four Investment Accumulation Accounts (IAA). SSAU is a regulated scheme under the Superannuation Industry (Supervision) Act and membership is compulsory for permanent and contract staff, of greater than two years term, in Australian tertiary institutions. UniSuper Management Pty Ltd (UniSuper) is the Administrator of SSAU, which in turn is a fully owned subsidiary of UniSuper Ltd, the Trustee of SSAU. Members of SSAU are required to contribute 7% of salary and their employer contributes 14%.² Prior to July 1998, all members had benefits prescribed under a DBF.

Under the DBF all funds are pooled and each member receives a payout according to a schedule, determined by the member's salary and length of membership. The long-term performance of the funds managed by SSAU is an important component of the ultimate payout though this risk is shared by all members³. In contrast a member who chose one of the four investment options in the IAA, had an individual account created. This account increases or decreases given the performance of the investment option and contributions are directly credited to the account. The investment performance of their selected option directly impacts on the individual member's final payout

² Provisions are available for half contributions from both employee and employer for lower salary levels.

³ The Scheme must perform at some minimum level to provide the defined benefit prescribed at any point in time. Better performance by the fund enables an increase in the defined benefit multiple. Under performance, resulting in a shortfall in DBF funds, should be made up by the employer.

that the member receives upon retirement and as such they assume the risk of investment performance.

The first section of this paper reviews the level of choice offered by superannuation funds in Australia. The second section reviews the literature related to investor choice within a retirement context with a specific focus on gender issues. The third section describes the survey instrument and response rates. The fourth section presents the model of member choice and the test results of these models using the survey data. The final section provides concluding remarks.

2.0 Australian Superannuation Industry and Choice

By any measure, the superannuation industry is a significant component of the Australian financial system. The assets of over 217,000 funds now total approximately \$500 billion. By fund type, Retail funds have the majority of assets (\$169 billion) and member accounts and are open to all employees. Public Sector funds are open to government employees only and account for the second largest pool of assets (\$100 billion). Corporate and Industry funds are open to employees of a particular company or industry respectively and collectively account for \$112 billion of assets (Australian Prudential Regulation Authority, 2003, Table 1b). Choice is an issue for members of each of these funds.

Choice offerings are not uniform across the various fund classifications as 57% of retail funds and only 11% of non-retail funds offer. Consumer preference would however appear to favour choice as 74% of voluntary contributions have been made to those funds that do offer choice (Insurance and Superannuation Commission,

1998). The Australian experience in regards IAAs and DBFs has largely mirrored that in the US. While diminishing in their own right, DBFs do remain a significant option for employees. In public (private) sector funds, of the \$100 (\$281) billion of total assets, 85% (22%) of assets are in funds that offer both IAA and DBF options (Australian Prudential Regulation Authority, 2003, Table 5a).

3.0 Investor Decisions

3.1 Superannuation Choice Literature

The literature devoted to superannuation in Australia is primarily macro in orientation. Bateman and Piggott (2000) and King and Bækgaard (1999), for example, provide an excellent overview of retirement incomes policy in Australia and the role of superannuation within this.

At the micro level of individual choice, Clark-Murphy and Gerrans (2001a) provide an analysis of the level of difficulty and importance attached to superannuation choices, using the data in this paper. They confirm the findings of Gallery, Gallery and Brown (2000), who conducted a survey on the same population though with a smaller restricted sample, that those who considered the decision between DBF and IAA a difficult one to make and those who had limited knowledge of superannuation were more likely to stay with the DBF.

Australian superannuation funds can be considered under the wider umbrella of managed funds⁴, which again have focussed on micro level issues of risk-adjusted performance and related issues of performance persistence. For an extensive review of

⁴ In effect the Australian equivalent of a mutual fund.

these studies see Allen, Brailsford, Bird and Faff (2002). Drew and Stanford (2001) reviewed performance of superannuation funds, contrasting the performance of active and passive management styles and implications for fund trustees. Sawicki and Ong (2000) considered investor responses to performance but at the level of total flow of funds, as against individual responses. Specific superannuation choice literature however is sparse.

Literature focusing on individual choice within a retirement savings context is developing in the US. Gustman and Steinmeier (1992) examined broad issues of increased preference of Defined Contribution Plans (DCP), the equivalent of the IAA in Australia⁵, as against the DBF using pension plan records. They suggest that changes in employment mix can explain this trend with the shift towards companies who have had historically lower proportions of DBPs.

Clark and Pitts (1999) use administrative records to examine the pension plan choice of university employees in addition to a survey of staff which examines the decision process. Clark and Pitts (1999) found age, the certainty value of the DBP, mobility risk, the real benefit of the pension and the risk of the real growth in earnings to be influences for a preference for a DBP or DCP. The influence of previous investments, in particular share holdings, was found by Weisbenner (1999) to be significantly associated with the choice of a fund that allowed the member some investment choice.

⁵ The terminology used in U.S. plans is defined benefit plans and defined contribution plans. The former is as used in Australia (DBF) whereas the latter is generally referred to as investment choice plan or investment accumulation account (IAA). The IAA term is preferred, as both plans have defined contributions. The essential difference between them is in the final payoff and hence the term IAA better captures this.

Choi, Laibson, Madrian, and Metrick (2002) provide a more recent review of U.S. employee choices and Mitchell and Piggott (2000) provide a comparison of the Australian and U.S. retirement systems. For a wider perspective of OECD countries see OECD (2000).

3.2 Gender and retirement decisions

A large literature has examined gender differences in risk taking and investment decision making. While not uniform, U.S. evidence suggests the existence of gender differences in risk aversion in general and in retirement investments. The Surveys of Consumer Finances conducted by the Federal Reserve Board have been an important source of data for these studies. For example, Sundén and Surette (1998) and Bajtelsmit, Bernasek and Jianakoplos (1999) used the data for retirement savings analysis while Jianakoplos and Bernasek (1998) used the data for broader investment decisions. Each provided evidence supporting a greater degree of risk aversion among women. Jianakoplos and Bernasek (1998) and Sundén and Surette (1998) further suggest that a combination of gender and marital status is more important than gender in isolation. A disadvantage of these studies is that they rely on risk measures adopted in the surveys which categorise investments as mostly stocks, mostly bonds, etc. whereas the current study has common investment options across individuals.

While the balance of literature would seem to support a greater level of risk aversion in investment decision by women, this is not uniform. Embrey and Fox (1997) found that although women were more risk-averse than men, the net worth of the individual was a more significant factor than gender in investment choice. Clark and Pitts (1999) found that enrolment in pension plans was not significantly different by gender.

Schubert, Brown, Gysler and Brachinger (1999) also presented evidence that does not support greater risk-averse decisions for women on the basis of experimental evidence, where they examined investment and insurance decisions as well as abstract gambling decisions. VanDerhei and Olsen (2000) found that women showed greater risk aversion in the allocation of funds to pension assets though Dwyer, Gilkeson and List (2002) found the level of risk aversion fell with increased financial education when they examined mutual funds more generally.

Graham, Standardi, Myers and Graham (2002) suggested that the reason for gender differences in attitudes to investment may not be the result of a difference in attitude to risk but rather to a difference in information processing. They discussed the possible links between the selectivity hypothesis of Meyers-Levy (1986) and the literature on investment decision-making. Meyers-Levy (1986) suggested that females are more comprehensive information processors than males. Females attempt to use all available cues and information whereas males use heuristics, focussing on single inference and highly salient cues. While both genders categorise information for ease of processing, males tend to use broad categories with few subcategories while women use more subcategories reflecting relatively detailed distinctions. This suggests a benefit for females in dealing accurately with more complex products and more detailed information.

The issue of complex products is relevant to retirement savings and investment though the evidence appears to be contradictory. Meyers-Levy and Maheswaran (1991) found that both males and females used a detailed processing strategy when cue incongruity was high. This appears to be somewhat at odds with Meyers-Levy

and Sternthal's (1991) who found that females were more likely than males to elaborate on cues, drawing subjective inferences from objective claims, and that they commenced this process at lower levels of task complexity. Therefore the gender differences were most likely to be observed when task demand was high.

Similarly Darley and Smith (1995) tested the selectivity hypothesis using aural messages for products perceived as low and medium risk and found that women were more sensitive to the change in risk level of the product. Stafford and Pearson (1997) found that women preferred advertisements containing both visual and verbal elements while males responded better to those with verbal elements alone. They suggested that, as predicted by the selectivity hypothesis, males preferred the relative simplicity of one of medium whereas women preferred the more comprehensive presentation. This latter finding was supported by Burke (2001) who examined the information sources used by employees to gain information about their firm. He found gender differences emerged and increased as one moved down through the employment hierarchy. At the partnership level there were no significant differences, at managerial level women showed a preference for interpersonal sources, at lower levels women placed more importance on a wider range of information sources.

Chung and Monroe (1998) explored the use of audit information by accounting students. In support of the selectivity hypothesis they found that females processed information more comprehensively than males and rated disconfirming information more highly whereas males were more likely to be hypothesis-confirming and this resulted from ignoring disconfirming information rather than from giving greater weight to confirming information. O'Donnell and Johnson (2001) studied practising

auditors firms and found that females demonstrated greater efficiency in information processing on more complex tasks while males were more efficient on less complex tasks.

The significance of gender difference in retirement savings has been acknowledged in Australia at the practitioner level by Quinlivan (1997) and at a policy level by King and Bækgaard (1999) and Economic Planning Advisory Council (1994). There remain however few studies to support its existence at the individual choice level and none that explore possible interactions with the gender effect. This paper will assist in closing this gap.

4.0 SSAU Survey

4.1 Sample overview

With the cooperation and assistance of Unisuper, a random sample of 10,000 members were mailed a questionnaire which focussed on their decision process and choice made. The survey was sent in October 1999, three months after the deadline for the decision and 2407 surveys were returned, representing a response rate of over 24%, these yielded 2399 useable surveys. The actual decision form sent by Unisuper attracted a 68.4% response rate.

UniSuper did not receive a decision form back from 31.6% of their members and as a result they were then assigned to the DBF. One of the IAAs was chosen by 33.3% of members while 35.1% chose to remain with the DBF. Therefore, of those who did make a decision, 49% chose an IAA and 51% the DBF. Of those who returned the survey 41.1% had chosen IAA, 45.2% DBF and 13.3% had failed to return the selection form.

4.2 Survey construction

The survey was structured to determine whether members felt equipped to make the decision, what their attitude was to making the decision, what resources members used in making the decision and finally what decision was made. This paper focuses on the final section, the decision made, with an exploration of the relationship between employee demographics, reported attitudes, resources used and the choice they made.

The questions relating to choice required yes/no responses and the questions relating to resource usage were informed from a pilot survey. Respondents were asked to indicate those resources they had used from a list, with the option of indicating other resources. A full discussion of the importance of the decision and the level of difficulty it posed to respondents is presented in Clark-Murphy and Gerrans (2001a). Systematic gender differences in resource usage and people consulted in making a decision is presented in Clark-Murphy and Gerrans (2001b).

5.0 Modelling the investment choice decision

Members were presented with a maximum of two decisions, depending on how they perceived the choice offered. The choice may have been perceived as between two things, the DBF and the IAA, or between five things, the DBF and each of the four IAA investment options. If members perceived two separate decisions, that is whether to move to an IAA first and then which investment strategy to select second, two separate decisions need to be modelled. The first model examines the choice between DBF and IAA and the second model examines the choice between the four investment

strategies for those who moved to the IAA.⁶ Alternatively these could be combined into a single ‘pooled’ model which treats the decision as being between five alternatives. Members were asked whether they had viewed the decision as between a choice between two alternatives, the defined benefit and accumulation, or five alternatives. It is therefore possible to segregate each group and model their decision based on their overall reported framework. There are however no significant differences in the results of a pooled model and two separate models and therefore only the results of the two separate models are presented below.

5.1 Modelling the choice between IAA and DBF

The hypothesis to be examined is that the decision to move to an IAA varies by gender as well as a range of other observable factors, including member demographics, reported attitudes, superannuation knowledge and “financial demographics”.

Chi-square tests suggested gender differences were significant in the expected counts in choice of IAA and DBF as well as marital status and age, and these were therefore included as explanatory variables. The attitudinal factor explored was the reported importance of the decision to the member. Superannuation knowledge was included based on the member’s own assessment of whether they considered themselves well informed when it came to making the decision.

Clark and Pitts (1999) include education level as an explanatory variable in choice though there is no necessary relationship between education level and financial knowledge or, more specifically here, superannuation knowledge. Hence in the

⁶ There was no opportunity for members to split their funds between the investment strategies.

current study respondents were asked whether they considered themselves informed (yes/no) when it came to make a decision. The financial demographics included were indicators for whether the member owned shares, their household income, and the proportion of their retirement funds that they expected the SSAU fund to provide. The resources members were provided with by SSAU, being their website, a mailout and a seminar were included to check for any systematic differences. Finally, the person that members indicated that they relied on the most in making their decision, being either a finance professional, friends, partner or work colleagues, were also included as explanatory variables. A logistic regression framework was utilised to examine the choices and equation (1) expresses the base regression as

$$\log\left(\frac{\text{Probabilit } y(IAA)}{\text{Probabilit } y(DBF)}\right) = B_0 + B_1 \text{Female} + B_2 \text{Married} + B_3 \text{Age} + B_4 \text{Importance} + B_5 \text{Informed} + B_6 \text{Shares} + B_7 \text{Income} + B_8 \text{SSAU \%} + \sum_{i=9}^{11} B_i \text{Resources} + \sum_{i=12}^{14} B_i \text{Consulted} \quad (1)$$

5.2 Gender Interactions

A problem shared by a number of previous papers has been the inability to disentangle the individual's choice from the influence of a partner or household.⁷ To a large extent this has been dictated by the nature of the data that has been available. Clark and Pitts (1999) provide evidence that suggests the reported gender effect may interact with marital status and find support for gender differences by marital status. Bajtelsmit and Bernasek (2001) also identify a marital effect, in particular the differences in decisions of single females. In view of this a second regression was performed in which the four gender and marital status interactions (female and married, female and not married, male and married, male and not married) were

included. Any difference in risk taking by married females relative to single females could be interpreted due to a male influence. Such an assumption is not ideal as the single category would undoubtedly also include relationships where a male influence is present.

The base model includes a variable for whether the member considered himself or herself informed when it came to make their decision. The role of information processing as a basis for investment attitude differences has been discussed. In view of this a third regression was performed which explored interactions for gender, marital status and whether the member considered themselves informed when they made their decision. The four gender and marital status interactions therefore provide eight interactions, for example, a married male who considered themselves informed.

A final interaction was included to explore whether the age of the member influenced the gender effect. In this fourth regression, the two age categories were combined with gender, marital status and informed interactions.

5.3 Model Estimation, Interpretation and Diagnostics

Each regression was estimated by a “forced” model in that all variables, significant or not, remain in the model as against forward stepwise estimation where only significant variables are included. Gallo (1996) suggests that all variables should remain in the model even if they are not significant. At the base of each regression, two pseudo R-squared measures are reported along with the Hosmer-Lemeshow c-statistic. For all models estimated and reported in the following section the chi-square

⁷ Thanks to an anonymous referee for emphasising this point.

value is not significant and therefore the null hypothesis that there is no difference between the observed and the predicted values cannot be rejected and hence the models appear to fit the data well.

6.0 Results

6.1 Choice of IAA or DBF Regressions

The choice presented to SSAU members may be described as whether to move to an IAA or to stay with the DBF. The initial information kit sent to members suggested a decision had to be made, as there was no default position, though a reminder notice sent to members indicated that the DBF would be the default option for those not returning the form. Of the 331 (13.8%) respondents who indicated that they did not return their choice form to SSAU, 228 (68.9%) indicated that they did so because they assumed or knew that the DBF was the default.

These respondents had effectively made a decision and should therefore be included in the analysis so as not to underweight the respondents choosing the DBF. The only significant demographic difference between those who chose the DBF and those who defaulted to it was in their age groups, with younger age groups over represented in assuming the DBF default would apply when compared with the proportions who actually chose the DBF option. There were some significant differences in some of the reported attitudes of these groups. T-tests indicate significant differences in the groups in terms of whether they felt well informed when they made the decision. Not surprisingly, a greater proportion of those who did not return the form did not feel well informed. Significant differences were also present between the groups in terms of whether they felt the decision important. Again not surprisingly, a greater

proportion (18%) of those who did not return the form did not consider the decision important when compared with those who returned the form and chose DBF (8%).

As each of the independent variables are categorical, the coefficient (B) indicates the direction and size of an increase in the log-odds of selecting the IAA given a one unit increase in the explanatory variable. There are two categories for: Age, Share Ownership, Importance, Informed, Work Colleagues, Friends/Partner, Professional, SSAU Website, SSAU Information Pack, SSAU Seminar. Each of the coefficients for these variables indicate if the member answered 'yes' to each question. That is 'yes' to share ownership, considered the decision important, etc.. For Gender the coefficient is for a female and for Marital Status if the member is married. The column headed "Exp(B)" in Table Three reports the change in the odds of choosing the IAA. For example using the estimates from the base model in Table Three, the log odds (odds) of choosing the IAA rather than the DBF were 0.9951 (2.7050) times higher for a member if they were in the younger age category relative to a member in the oldest age group.

The Household Income and SSAU proportion variables have more than two categories and each coefficient is in comparison to a baseline category of 'more than \$100,000' and 'don't know', respectively. The left side of Table Three reports the base model and the right side the results of three levels of interaction of gender with marital status, whether the member considered themselves informed and age.

In the base model the odds of choosing the IAA increased for each younger age category. Of the financial demographics, if the member owned shares, considered the

decision they had been given an important one or they considered themselves well informed, the odds of choosing the IAA increased. Household income or the SSAU proportion were not significant. None of the people that a member consulted had a significant impact on the odds of selecting the IAA. Of the resources that were provided by SSAU, both use of SSAU's website and the mailed information pack increased the odds of choosing the IAA.

Tables Four summarises the results of the key gender, marital status, informed and age interactions in a format that allows a rotation of each base category in calculating the odds. In doing so it allows a refinement of the statement of any gender effect.

Table Three Investment Accumulation Account and Defined Benefit Fund Choice

This table presents the results of the logistic regression of the choice between the Investment Accumulation Account (IAA) or remaining in the Defined Benefit Fund (DBF). Four separate regressions are summarised which explore the interaction between gender, marital status, whether the fund member felt informed and age. The left side of the table presents a full summary of the base model with no interaction whereas the right side presents the results when the model is reestimated with three different levels of interaction. The column headed "B" reports the direction and size of an increase in the log-odds of selecting the IAA given a one unit increase in the explanatory variable and the column headed "Exp(B)" presents the change in the odds. Significant coefficients at a 95 (90) percent confidence level are indicated with a double (single) asterisk.

Base Model			Model with Interaction Terms		
	B	Exp(B)		B	Exp(B)
Constant	-2.6333	0.0718**	Gender and Marital Status (base single female)		
Age (base > 44)			Married Male	0.4825	1.6201**
18-44 years	0.9951	2.7050**	Single Male	0.6051	1.8314**
Own Shares - Yes	0.3980	1.4888**	Married Female	0.2066	1.2295
Important - Yes	0.9014	2.4631**	Model -2 Log Likelihood 2232.598, Cox & Snell R ² .097, Nagelkerke R ² .130., Hosmer & Lemeshow test 1.537 (.992)		
Household Income (base > \$100,000)					
less than \$60,000	0.2328	1.2621	Gender, Marital Status, Informed (Single Female Informed)		
\$60,001-\$100,000	0.1082	1.1142	Married Male Not Informed	0.0586	1.0603
SSAU as %			Married Male Informed	0.5123	1.6692**
0 – 20%	0.1670	1.1817	Single Male Not Informed	-0.1211	0.8860
21 – 40%	0.0037	1.0037	Single Male Informed	0.7323	2.0798**
41 – 60%	-0.1307	0.8775	Married Female Not Informed	-0.2322	0.7928
61 – 80%	-0.2308	0.7939	Married Female Informed	0.2394	1.2705
81 – 100%	-0.0637	0.9383	Single Female Not Informed	-0.3522	0.7031
Work Colleagues	-0.1722	0.8418	Model -2 Log Likelihood 2214.746, Cox & Snell R ² .106, Nagelkerke R ² .142., Hosmer & Lemeshow test 1.537 (.992)		
Friends/Partner	0.1612	1.1750			
Professional	0.0366	1.0372	Gender, Marital, Informed, Age (Single Female Informed >44)		
SSAU Website	0.3563	1.4280**	married male/not informed 18-44	1.1351	3.1114**
SSAU Mailout	0.4627	1.5883**	married male/not informed >44	0.3604	1.4340
SSAU Seminar	-0.0238	0.9764	married male/informed 18-44	1.4507	4.2662**
Well Informed - Yes	0.4830	1.6209**	married male/informed >44	0.8573	2.3569**
Married - Yes	0.0681	1.0705	single-male/not informed 18-44	1.1572	3.1810**
Gender - Female	-0.3549	0.7012**	single-male/not informed >44	-0.1234	0.8839
			single-male/informed 18-44	1.8246	6.2004**
N=1759, Model -2 Log Likelihood 2234.304, Cox & Snell R ² .096, Nagelkerke R ² .129., Hosmer & Lemeshow test 7.390 (.490)			single male/informed >44	1.0777	2.9379**
			married female/not informed 18-44	0.8660	2.3773**
			married female/not informed >44	0.1889	1.2080
			married female/informed 18-44	1.7287	5.6334**
			marriage female/informed >44	0.1237	1.1316
			single female/not informed 18-44	0.4833	1.6214
			single female/not informed >44	0.2289	1.2572
			single female/informed 18-44	1.4563	4.2899**
			Model -2 Log Likelihood 2212.338, Cox & Snell R ² .107, Nagelkerke R ² .144., Hosmer & Lemeshow test 7.390 (.495)		

The table reports the odds ratio for the choice of IAA rather than DBF for each male member category relative to each other female member category. The shaded area indicates where member characteristics have been matched except for gender.

A gender effect does appear to be supported by the choices that have been made. In the base model of gender alone males (females) are more (less) likely to choose the IAA rather than the DBF. When an interaction for gender and marital status is included the odds of choosing the IAA are greatest (least) for a single male (female) relative to a single female (male). The additional interaction of being informed highlights however that a gender effect can be isolated only to males who considered themselves informed. Further the gender effect is reduced, but not eliminated, if the female considered herself informed. The odds of choosing the IAA rather than the DBF are greatest (least) for a single male informed (single female not informed) relative to a single female who is not informed (single male informed). The final layer of interaction in the table considers the interaction of age with each of the previous member interactions. Where significant odds are supported they are larger for the younger category. Whereas there were no significant differences in odds when gender, marital status and not informed interactions were considered, introducing age does support differences between age categories.

Perhaps most interestingly, there are reversals of a gender effect when age is considered. Both single and married informed females in the younger category have significantly *higher* odds of choosing the IAA compared with their male married and informed counterparts, though this is not present in the same age category. That is, the younger married informed female has a greater likelihood of choosing the IAA

Table Four Gender, Marital Status and Informed Interactions in Choice Between IAA and DBF

This table presents the odds of a particular member category choosing the IAA rather than remaining with the DBF relative to each other relevant member category. It in effect allows a rotation of each base category for the gender, marital status and informed interactions reported in each regression of Table Three. By reading down each column the gender effect can be isolated to each row which represents a more refined member category. For example the odds of an informed married male choosing the IAA rather than the DBF is 2.105 times that of a married female who considers herself not informed. To determine the same comparison but from a female to a male, the odds would be (1/2.105) or 0.475 times. The shaded area represents where member demographics are matched, or controlled for, except for gender. A blank cell denotes a member category referenced to itself and a “ns” denotes that the change in odd are not significant. All other reported values are significant at the 95 percent confidence level, except where a single asterisk denotes significance at the 90 percent confidence level

		Odds of Member Category Selecting IAA rather than DBF							
		Male							
Relative to Member Category	Female	1.426							
		Married			Single				
	Married Female	1.318			1.490				
	Single Female	1.620			1.831				
		Not Informed		Informed	Not Informed		Informed		
	Married Female Not Informed	ns		2.105	Ns		2.623		
	Married Female Informed	ns		1.314*	Ns		1.637		
	Single Female Not Informed	ns		2.374	Ns		2.598		
	Single Female Informed	ns		1.669	Ns		2.080		
		18-44	>44	18-44	>44	18-44	>44	18-44	>44
	Married Female Not Informed 18-44	3.111	ns	4.266	2.357	3.181	ns	6.200	2.938
	Married Female Not Informed >44	2.576	ns	3.532	1.951	2.633*	ns	5.133	2.432
	Married Female Informed 18-44	.552	.255	ns	.418	ns	.157	ns	.522*
	Married Female Informed >44	2.750	ns	3.770	2.083	2.811	ns	5.479	2.596
	Single Female Not Informed 18-44	ns	ns	2.631	Ns	ns	ns	3.824	Ns
	Single Female Not Informed >44	2.475	ns	3.394	1.875*	2.530*	ns	4.932	2.337*
	Single Female Informed 18-44	ns	.334	ns	.549	ns	.206	ns	Ns
	Single Female Informed >44	3.111	ns	4.266	2.357	3.181	ns	6.200	2.938

rather than the DBF. This likelihood is greater when this category is compared with married and single males in the older age category who did not consider themselves informed. In summary, a gender only regression hides valuable information that can further refine the presences of a gender effect or indeed not support it.

6.2 Choice of IAA Option Regressions

For those members who chose to move to the IAA, four investment strategies were available: Secure, Stable, Trustee's Selection and Shares. If risk is measured through variability of expected returns, the Secure and Stable options represent a lower risk than the existing mix of the DBF. The Trustees' Selection strategy has the same risk as the DBF, which it mirrors, and the Shares represent a higher risk. A discussion of the relative risk of each option should also recognise the change in risk 'pooling' when moving from the DBF to an IAA. In the DBF, while ostensibly the variability of returns is similar to that of the Trustee's Selection in the IAA, this risk is shared or pooled with all other members and the employer. The DBF payout multiple is ultimately linked to these returns and accumulated reserves but these multiples can absorb short-term fluctuations whereas the short-term risk is assumed directly by the member if they choose the Trustee's Selection option within the IAA.

Of the 973 (41%) members of the total sample who moved to the IAA, the largest number 476 (49%) chose the Trustee's Selection. The next largest group of 348 (36%) chose the riskier Shares strategy. The Stable strategy attracted 101 (10%) and the lowest risk option, offered by the Secure strategy attracted only 48 (5%). The following analysis examines these decisions.

The small number of respondents in the Secure strategy presents a problem from an analysis point of view as, given the number of explanatory variables, a number of cross-tabulations cells will have low or zero counts for such a small group. As a means of accommodating this, an alternative is to make three groups from the four options by combining the Secure and Stable options and designating this as the lowest risk option, which can be compared with the middle risk Trustee's Selection and higher risk Shares option.

Before this is done, it is sensible to check the group memberships for those who chose Secure or Stable to see how similar or different they are. T-tests of gender, importance of decision, whether they felt informed and marital status indicate no significant differences between the two groups. Chi-square tests for differences in household income, general/academic staff classification and employment level also indicate no significant differences. The only significant differences exist in age demographics between the groups and their choice, though there is no systematic pattern.

As there are now three categories for the dependent variable, (Secure/Stable, Trustees' Selection and Shares) a multinomial logistic regression can be used as against the binary logistic regressions used previously. In this instance there are three separate categories which produce two logits that compare the odds of one category to another which is expressed in equation (2).

$$\log\left(\frac{\text{Probability } y(\text{Option})}{\text{Probability } y(\text{Shares})}\right) = B_0 + B_1 \text{Female} + B_2 \text{Married} + B_3 \text{Age} + B_4 \text{Importance} + B_5 \text{Informed} + B_6 \text{Shares} + B_7 \text{Income} + B_8 \text{SSAU \%} + \sum_{i=9}^{11} B_i \text{Resources} + \sum_{i=12}^{14} B_i \text{Consulted} \quad (2)$$

where "Option" is either Secure/Stable or Trustee's Selection. Each category produces its own set of coefficients relative to the baseline category for each

independent variable. Table Five presents the coefficients for the regressions using a representative baseline category for the independent variables.

6.3 Interpreting IAA strategy regression coefficients

The multinomial regression in effect creates two binary logistic regressions, which are reported in Table Five. The Shares option was chosen as the base as it represents the 'riskiest' choice. The first is the Secure/Stable option against Shares and the Trustee's Selection option against Shares is reported in brackets. In turn each independent variable has a baseline comparison category. For example, the coefficient estimate for gender is the change in the log-odds of a female compared with a male choosing the Secure/Stable option against the Shares option. The same marital status, informed and age interactions are considered and reported as with the choice between IAA and DBF. The figures in the table compare the odds of choosing the lower risk option to a higher risk option.

The gender effect is explored with the same levels of interaction as with the choice between IAA and DBF. These are reported on the right side of Table Five and in Table Six a summary of all gender interaction is presented. The base model supports a gender effect in that males (females) are less (more) likely to choose each of the lower risk options. Introducing a marital status interaction isolates the gender effect to single females only, again for both choice combinations. Single males (females) were less (more) likely to choose the two lower risk options compared with single females (males), though the effect is also supported for married males compared with single females.

Introducing an interaction for whether the member considered themselves informed or not suggests that the gender effect is stronger for single males who considered themselves informed compared with single females who did not consider themselves informed. Again the effect is present for married males compared with single females but stronger for the informed member relative to the not informed member. If considering yourself informed is a function of education, education appears to impact on choice and reduces the gender effect.

Introducing age interactions further refines the gender effect and again introduces a reversal of the effect in some instances. The strongest gender effect can now be isolated to single males/females in the 18-44 age bracket. There are also some categories where a gender effect is not supported. For example, single males in the 18-44 age bracket who do not consider themselves informed have no significant differences to any female categories. There are two interesting examples of reversals in the effect. The married informed female and 18-44 age category does not display a gender effect as was also identified in the choice between the IAA and DBF. This category is *less* likely to choose the lower risk option compared with married males in the older age category. An apparent reversal in the gender effect is present in the same married female younger age category but also for those that considered themselves not informed.

Table Five Multinomial Logistic Regression Coefficient Estimates for IAA Strategy Choice

This table presents the results of the multinomial logistic regression of the strategy choice for those members who chose to move to an Investment Accumulation Account (IAA). Three strategies were available (in increasing risk): Secure/ Stable, Trustee's Selection and Shares. Two regressions are therefore reported. The first (second) reports the results for choosing the Secure/Stable (Trustee's Selection) strategy relative to the Shares option. Four separate regressions are summarised which explore the interaction between gender, marital status, whether the fund member felt informed and age. The left side of the table presents a full summary of the base model with no interaction whereas the right side presents the results when the model is reestimated with three different levels of interaction. The column headed "B" reports the direction and size of an increase in the log-odds of selecting the respective strategy relative to the Shares option given a one unit increase in the explanatory variable and the column headed "Exp(B)" presents the change in the odds. Significant coefficients at a 95 (90) percent confidence level are indicated with a double (single) asterisk. Model diagnostics are reported at the base of each set of regression.

Base Model			Model with Interaction Terms				
Secure/Stable versus Shares (Trustee Selection versus Shares)							
	B	Exp(B)		B	Exp(B)		
Constant			Gender and Marital Status (base single female)				
Age (base > 44)			Married Male	-.721(-.922)	.486*(.398**)		
18-44 years	-1.121(-.487)	.326**(.614**)	Single Male	-1.083(-.980)	.339**(.375**)		
Shares - Yes	-.239 (.160)	.787(1.174)	Married Female	-.983(-.691)	.374**(.501**)		
Important - Yes	(.842)	(2.320*)	n=765, Model -2 Log Likelihood 1396.738, Cox and Snell R ² .103,				
Household Income (base > \$100,000)			Nagelkerke R ² .119.				
< \$60000	.142(.311)	1.153(1.365)	GenderMarital Status Informed (base Single Female Informed)				
\$60001-\$100000	.200(.445)	1.222(1.561**)	Married Male Not Informed	-0.018(-.766)	.983(.465*)		
SSAU as %			Married Male Informed	-0.446(-1.028)	.640(.358**)		
0 – 20%	-.781(-.203)	.458*(.816)	Single Male Not Informed	-0.443(-.960)	.642(.383)		
21 – 40%	-.721(.076)	.486(1.080)	Single Male Informed	-0.793(-1.050)	.453(.350**)		
41 – 60%	-.162(.014)	.851(1.015)	Married Female Not Informed	-0.643(-1.032)	.526(.356**)		
61 – 80%	-.630(.081)	.532(1.085)	Married Female Informed	-0.605(-.662)	.546(.516*)		
81 – 100%	-.002(.304)	.998(1.355)	Single Female Not Informed	1.130(-.238)	3.097(.788)		
Colleagues	.275(.081)	1.317(1.085)	n=765, Model -2 Log Likelihood 1391.918, Cox and Snell R ² .108,				
Friends/Partner	.386(.297)	1.471(1.345)	Nagelkerke R ² .125.				
Professional	.298(.080)	1.347(1.083)	Gender, Marital, Informed,Age (Single Female Informed >44)				
SSAU Website	-.686(-.303)	.504**(.739*)	married male/not informed 18-44	-1.331(-1.995)	.264(.136**)		
SSAU Mailout	.823(.160)	2.278(1.173)	married male/not informed >44	0.163(-1.489)	1.177(.225*)		
SSAU Seminar	-.360(.167)	.698(1.182)	married male/informed 18-44	-1.866(-2.100)	.155**(.122**)		
Informed - Yes	-.434(.043)	.648(1.044)	married male/informed >44	-0.360(-1.866)	.697**(.151**)		
Married - Yes	-.295(-.278)	.745(.757)	single-male/not informed 18-44	-1.183(-2.924)	.306(.054**)		
Gender - Female	.072(.406)	1.074(1.501**)	single-male/informed 18-44	-2.412(2.031)	.089**(.131**)		
n=765, Model -2 Log Likelihood 1402.694, Cox and Snell R ² .095, Nagelkerke R ² .110.							
			single male/informed >44	-0.584(-2.468)	.558*(.085**)		
			married female/not inf 18-44	-1.402(2.212)	.246(.109**)		
			married female/not informed >44	-1.379(-1.929)	.252(.145**)		
			married female/informed 18-44	-1.771(-1.848)	.170*(.158**)		
			marriage female/informed >44	-0.547(-1.476)	.579(.228**)		
			single female/not informed 18-44	0.842(-2.270)	2.321(.103**)		
			single female/not informed >44	0.153(-.327)	1.166(.721)		
			single female/informed 18-44	-0.883(1.605)	.414(.201**)		
			n=765, Model -2 Log Likelihood 1361.395, Cox and Snell R ² .143, Nagelkerke R ² .165.				

Table Six Gender, Marital Status and Informed Interactions in IAA Choice

This table presents the odds of a particular member category choosing the Secure Stable (Trustee's Selection) rather than the Shares option relative to each other relevant member category. It in effect allows a rotation of each base category for the gender, marital status and informed interactions reported in each regression in Table Five. By reading down each column the gender effect can be isolated to each row which represents a more refined member category. For example the odds of an informed married male choosing the Secure/Stable rather than the Shares option is 0.207 times that of a single female who considers herself not informed. To determine the same comparison but from a female to a male, the odds would be (1/.207) or 4.831 times. The shaded area represents where member demographics are matched, or controlled for, except for gender. A blank cell denotes a member category referenced to itself and a "ns" denotes that the change in odd are not significant. All other reported values are significant at the 95 percent confidence level, except where a single asterisk denotes significance at the 90 percent confidence level.

		Odds of Member Category Selecting Secure/Stable (Trustee's Selection) rather than Shares Option						
		Male						
Relative to Member Category	Female	.931* (.666)						
		Married		Single				
	Married Female	ns (ns)		ns (ns)				
	Single Female	.486* (.398)		.339 (.375)				
		Not Informed	Informed	Not Informed	Informed			
	Married Female Not Informed	ns (ns)	ns (ns)	ns (ns)	ns (ns)			
	Married Female Informed	ns (ns)	ns (ns)	ns (ns)	ns (ns)			
	Single Female Not Informed	.317* (ns)	.207 (ns)	ns (ns)	.146 (ns)			
	Single Female Informed	.983 (.465*)	.640 (.358)	.642 (ns)	.453 (.350)			
		18-44	>44	18-44	>44	18-44	>44	18-44
	Married Female Not Informed 18-44	ns (ns)	4.785 (ns)	ns (ns)	2.685* (ns)	ns (ns)	ns (ns)	ns (ns)
	Married Female Not Informed >44	ns (ns)	ns (ns)	ns (ns)	ns (ns)	ns (ns)	ns (ns)	ns (ns)
	Married Female Informed 18-44	ns (ns)	6.916 (ns)	ns (ns)	4.097 (ns)	ns (ns)	ns (ns)	3.277* (ns)
	Married Female Informed >44	ns (ns)	ns (ns)	.268 (.536*)	ns (ns)	ns (ns)	.155 (ns)	ns (ns)
	Single Female Not Informed 18-44	.114 (ns)	ns (ns)	.066 (ns)	ns (ns)	.132* (ns)	ns (ns)	.038 (ns)
	Single Female Not Informed >44	ns (.189*)	ns (ns)	.133* (.170)	ns (.210*)	ns (.074)	ns (ns)	.076 (.182)
	Single Female Informed 18-44	ns (ns)	ns (ns)	ns (ns)	ns (ns)	ns (ns)	.217* (ns)	ns (ns)
	Single Female Informed >44	ns (.136)	ns (.225*)	.155 (.122)	.697 (.151)	.054	ns (ns)	.089 (.131)
								.558 (.085)

7.0 Conclusion

This paper has explored gender effects in the decisions of a sample of superannuation fund members who were presented with a choice between staying with a DBF or moving to one of four IAA strategies. Examination of the investment choices of members supports a gender effect, which is persistent across the broader choice between the DBF and the IAA as well as within the investment option choice for those members who chose the IAA. However the gender effect is not uniform and can be demonstrated as depending on marital status, whether the member considered themselves informed and age. There are also some notable reversals of a gender effect where married females in the younger age category have a greater likelihood of choosing the riskier option relative to their male married but older category counterparts.

With the benefit of these refinements, single females in the younger age category emerge as more likely selecting lower risk investment choices in this study. Further, across the majority of significant differences in choices, whether a member considered herself as informed reduced the likelihood that a female chose a lower risk option. If being informed is a function of education, education clearly has an influencing role in the choices that member make.

This paper suggests that where studies have previously explored gender alone, they may be missing some valuable information. Future work needs to explore similar interaction terms to help further refine the effect.

References

- Allen, D., Brailsford, T., Bird, R. and Faff, R. (2002). A review of research on the past performance of managed funds. Report prepared for the Australian Securities and Investments Commission. Sydney, New South Wales.
- Australian Prudential Regulation Authority (2003) APRA Superannuation Trends - September Quarter 2002, Australian Prudential Regulation Authority, Sydney, New South Wales.
- Bajtelsmit, V. L., Bernasek, A. and Jianakoplos, N. A. (1999) Gender differences in defined contribution pension decisions, *Financial Services Review*, 8, 1-10.
- Bajtelsmit, V. L. and Bernasek, A. (2001) Risk Preferences and the Investment Decisions of Older Americans, *The Public Policy Institute Working Paper* 2001-11.
- Bateman, H. and Piggott, J. (2000) Australia's Mandatory Retirement Saving Policy: A View from the New Millennium, Retirement Economics Group, University of New South Wales, Sydney
- Bird, R., Chin, H. and McCrae, M. (1983) 'The Performance of Australian Superannuation Funds, *Australian Journal of Management*, 8, 49-69.
- Burke, R. J. (2001) Information sources: is there a gender issue. *Corporate Communications*, 6(1), 7-11.
- Choi, J.J., Laibson, D., Madrian, B.C. and Metrick, A. (2002) Defined Contribution Pensions: Plan Rules, Participant Decisions, and the Path of Least Resistance, *Tax Policy and the Economy*, 16, 76-114.
- Chung, J., and Monroe, G. S. (1998) Gender differences in information processing: An empirical test of the hypothesis-confirming strategy in an audit context. *Accounting and Finance*, 31(6), 702-723.
- Clare, R. and Connor, D. 1999, The Superannuation Market In Australia, ASFA Research Centre, Sydney.
- Clark, R. L. and Pitts, M. M. (1999) Faculty Choice of a Pension Plan: Defined Benefit versus Defined Contribution, *Industrial Relations*, 38, 18-45.
- Clark-Murphy, M. and Gerrans, P. (2001a) Choices and Retirement Savings: Some Preliminary Results on Superannuation Fund Member Decisions, *Economic Papers*, 20 (3), 29-42.
- Clark-Murphy, M. and Gerrans, P. (2001b) Consultation and Resource Usage in Retirement Savings Decisions: Australian Evidence of Systematic Gender Differences, *Financial Services Review*, 10, 273-290.
- Darley, W. K., & Smith, R. E. (1995) Gender differences in information processing strategies: An empirical test of the selectivity model in advertising response. *Journal of Advertising*, 24(1), 41-56.
- Drew, M. E. and Stanford, J. (2001) Asset Selection and Superannuation Fund Performance: A Note for Trustees, *Economic Papers*, 20, 57-65.
- Economic Planning Advisory Council (1994) Women and Superannuation, Economic Planning Advisory Council, Canberra.
- Gallery, N., Gallery, G. and Brown, K. (2000) Academics' educated choice: No, Thanks, Superfunds, July, 22-26.
- Gallo, J. J. (1996) Making Sense of Logistic Regression, *Family Medicine*, 28 (2), 141-143.
- Graham, J. F., Stendardi Jr, E. J., Myers, J. K., & Graham, M. J. (2002) Gender Differences in Investment Strategies: An Information Processing Perspective. *International Journal of Bank Marketing*, 20 (1), 17-26.

- Gustman, A. L. and Steinmeier, T. L. (1992) The Stampede Toward Defined Contribution Pension Plans: Fact or Fiction, *Industrial Relations*, 31, 361-369.
- Hersch, J. (1996) Smoking, seat belts, and other risky consumer decisions: differences by gender and race, *Managerial Decision Economics*, 17 (5), 471-481.
- Insurance and Superannuation Commission (1998) Member investment choice - analysis update, ISC Bulletin.
- Jianakoplos, N. A. and Bernasek, A. (1998) Are Women More Risk Averse, *Economic Inquiry*, 36, 620-630.
- King, A. and Bækgaard, H. (1999), Australian Retirement Incomes, National Centre for Social and Economic Modelling, University of Canberra, Canberra.
- Mitchell, O. and Piggott, J. (2000), Developments in Retirement Provision: Global Trends and Lessons from Australia and the US, Retirement Economics Group, University of New South Wales, Sydney.
- Meyers-Levy, J. (1986) Gender differences in information processing: a selectivity interpretation. In P. Cafferata & A. Tybout (Eds.), *Cognitive and Affective Responses to Advertising* (pp. 219-260). Lexington, MA: Lexington Books.
- Meyers-Levy, J., & Maheswaran, D. (1991) Exploring differences in males and females processing strategies. *Journal of Consumer Research*, 18, 63-70.
- Meyers-Levy, J., & Sternthal, B. (1991) Gender differences in the use of message cues and judgments. *Journal of Marketing Research*, 28, 84-96.
- O'Donnell, E., and Johnson, E. N. (2001). The effects of auditor gender and task complexity on information processing efficiency, *International Journal of Auditing*, 5, 91-105.
- Quinlivan, B. (1997) Women and money: Six ways to win, *Personal Investment*, July, 40-51.
- Sawicki, J. and Ong, F. (2000) Investor's response to the performance of professional fund managers: Australian evidence, *Pacific-Basin Finance Journal*, 8, 505-528.
- Schubert, R., Brown, M., Gysler, M. and Brachinger, H. W. (1999) Gender and economic transactions - financial decision making: Are women really more risk-averse?, *American Economic Review*, 89, 381-385.
- Stafford, M. R., & Pearson, R. (1997) Gender differences in the processing of advertising information for services. Paper presented at the Conference of the American Academy of Advertising.
- Sunden, A. E. and Surette, B. J. (1998) Gender differences in the allocation of assets in retirement savings plans, *American Economic Review*, 88, 207-210.
- Vos, E., Brown, P. and Christie, S. (1995) A Test of Persistence in the Performance of New Zealand and Australian Equity Mutual Funds, *Accounting Research Journal*, 8, 19-34.
- Yann Campbell Hoare Wheeler (1999) Women's Economic Status: "Equal Worth" - Final Report: Output 4, Yann Campbell Hoare Wheeler, Sydney.