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Financial literacy and retirement planning in Australia

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Abstract

We implement a customized survey to a representative sample of 1,024 Australians to examine the relationship between financial literacy and retirement planning. Overall we find aggregate levels of financial literacy similar to comparable countries with the young, least educated, unemployed and those not in the labor force most at risk. However, unlike the international norm, we find that financial skills increase with age. The role played by the Australia's mandatory private retirement arrangements, system of defaults, and interactions with the means-tested safety net pension at older ages remain open questions.

Keywords: Financial literacy; retirement planning
JEL classifications: G23; G28; D14

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1. Introduction

Australia was one of the first of the developed countries to introduce mandatory private saving as the main earnings-related component of retirement income provision. Consequently, almost all adult Australians are required to interact with increasingly complex private and public arrangements for retirement accumulation and decumulation, and are exposed to investment, inflation and longevity risks. From early stages, the efficient functioning of the system has depended on participants being well informed and having sufficient financial skills.

Australia's retirement income system, comprises a means tested Age Pension financed from general tax revenues, a mandatory employer financed defined contribution scheme known as the Superannuation Guarantee, and tax incentives to encourage voluntary superannuation contributions and other private savings. Age Pension eligibility is determined by residence (at least 10 years) and a comprehensive means test. All income and assets (except the family home) are assessed with specific and differing rules for superannuation savings, financial assets, income from employment and other income and assets.

Under the Superannuation Guarantee, employers are required to make a minimum contribution of 9 per cent (soon increasing to 12 per cent) on behalf of all employees aged 18–65 who earn at least 7 per cent of average earnings. Voluntary saving for retirement (within the superannuation system) is encouraged through concessionary tax arrangements. On reaching preservation age, Australian retirees have the discretion to take their retirement accumulation as a lump sum and/or a phased withdrawal product (known as an account-based pension) and/or an annuity. Currently the split is 50:50 between lump sums and account-based pensions with only miniscule interest in annuities (Bateman and Piggott, 2011).

While the taxation of retirement savings in Australia differs from the international norm by applying taxes on both contributions to, and the earnings of, superannuation funds (and exempting most benefits taken after age 60), the rates of tax applied are concessional for most people when compared to other forms of saving. However, the implementation is quite complex: contribution taxes differ by source (employer, employee and self-employed), income of contributor (with a refund for low income earners and a tax penalty for those on high incomes) and amount (currently excess contributions tax applies to so-called concessional contributions in excess of $25,000 per annum). A feature of these arrangements has been increasing complexity due to ongoing reforms and constant tinkering over the past 25 years (Bateman, Chomik and Piggott, 2013).

Currently around 75 percent of retired Australians receive an Age Pension (around two thirds at the full rate and one third at a part rate) (Australian Government, 2012), over 90 percent of all and 95 percent of full time workers are covered by the mandatory Superannuation Guarantee and around one third make additional

voluntary superannuation contributions (ABS, 2012). In other words, a significant number of Australian workers and retirees must interact with these arrangements.

While Australian retirement savers do not have to decide whether to participate in the private retirement saving arrangements, they are responsible for a succession of decisions relating to the entity in which superannuation savings are managed and accumulate (including whether to self-manage), account management (such as consolidation of multiple accounts), choice of investment option or options (from increasingly long menus of single and multi-manager diversified and single options, and often individual asset classes), whether to make or increase voluntary contributions (where the tax rules differ by type and amount of contributions), whether to seek and use financial advice and which benefit(s) to take at retirement.

Initial policy for superannuation emphasized individual decision-making supported by comprehensive financial product disclosure. However, a policy re-think has led to an increased role for defaults in the accumulation phase - specifically fund choice (entity for management) and asset allocation with a standard design for default superannuation and investment options to be mandatory from 2014 (Ellis, 2012). However, those approaching and in retirement will still have no opt-out from the interaction of the menu of retirement benefits with comprehensive income and asset testing of the Age Pension. This particularly affects households in the middle of the income and wealth distributions where eligibility thresholds and tapers have most impact (Bateman, Eckert, Geweke, Iskhakov, Louviere, Satchell and Thorp, 2012b). While financial advice is readily available, it is not clear whether ordinary Australians have the skills and experience to discern advice quality (ASIC, 2012).

All of the above suggests that Australian workers and retirees face considerable challenges navigating the complex financial products and policies required for retirement planning. Previous literature has identified poor levels of financial literacy and superannuation knowledge across the Australian population but has not specifically linked objective measures of financial literacy with retirement planning (ANZ, 2011). Croy, Gerrans and Speelman (2010) investigate how self-assessed (rather than objective) financial knowledge relates to two financial behaviors, specifically the intention to contribute extra to superannuation funds and the intention to change investment allocations. Bateman, Eckert, Geweke, Louviere, Satchell and Thorp (2012a) measure financial literacy consistent with our proposed approach but do not relate financial literacy to financial behaviors, such as retirement planning. [1]

We use a new customized survey implemented to a representative sample of 1,024 Australians over age 18 from the Pureprofile Web Panel of over 600,000 Australians to examine the relationship between financial literacy and retirement planning.

[1] Gerrans, Clark-Murphy and Truscott (2009) and ASIC (2011) provide useful summaries of research related to Australian financial literacy undertaken in the past few years.

Overall we find aggregate levels of financial literacy similar to comparable countries with the young, least educated, unemployed and those not in the labor force most at risk. However, unlike the international norm we find that financial skills increase with age. The role played by the mandatory private retirement arrangements, the accumulation phase defaults and the interaction with the means tested public pension arrangements at older ages remain open questions.

This paper is laid out as follows. In Section 2 we describe the important features of our dataset and present summary statistics related to financial literacy. Section 3 examines how the measured financial literacy relates to retirement planning and Section 4 concludes.

2. Data overview and summary statistics

To study the relationship between financial literacy and retirement planning, we commissioned a new survey of the Australian population. The survey used the Pureprofile Web Panel and was fielded in June 2012 via the internet. The Pureprofile online panel includes over 600,000 Australians. Our final sample of 1,024 individuals was designed to be representative of the general adult population of Australia. Survey respondents were required to be over 18. Pureprofile compensated individuals completing the survey for their participation. Respondents were not required to be the head of the household or the person responsible for making financial decisions.

In terms of response rates, a traditional response rate measure could not be computed because online surveys are administered in a different manner than standard telephone and paper surveys. Therefore, we report the completion rate, a commonly used metric for measuring responses to online surveys. For this survey, Pureprofile sent survey invitations to individuals meeting the study criteria in their established pool. Out of the 1,245 who entered the survey, 1,024 (82.2%) completed all the questions. A small number (6.1%) were screened out due to non-consent or because the quota for the demographic they represented had been filled. The remaining 11.7% started the survey but did not complete it.

While the focus of this paper is on retirement planning and basic financial literacy responses, the survey also included questions to test the respondent's knowledge of Australia's superannuation system. In addition, measures of personality traits, numeracy skills, financial behavior, attitude towards and use of financial planners and perceptions of time until retirement were included. These factors will be studied in future papers.

2.1 Findings regarding financial literacy

In order to evaluate the financial literacy of Australians, we asked survey participants three questions that addressed basic concepts in economics and finance. The responses to these questions provide financial literacy measures that

are comparable with results from other papers.[2] The three questions were developed by Lusardi and Mitchell (2011a) and have been frequently used in other literature, including a series of papers published in a special issue of the Journal of Pension Economics and Finance which focused on financial literacy and retirement planning in eight countries (Alessie et al. 2011; Alemenberg and Säve-Söderbergh, 2011; Bucher-Koenen and Lusardi, 2011; Fornero and Monticone, 2011; Klapper and Panos, 2011; Lusardi and Mitchell, 2011b; Sekita, 2011). The countries studied included Germany, the Netherlands, Sweden, Japan, Italy, U.S., Russia and New Zealand.

The wording of the questions is as follows (correct answers are underlined):

1) *Understanding of Interest Rate (Numeracy):* Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?
    a. <u>More than $102</u>
    b. Exactly $102
    c. Less than $102
    d. Do not know
    e. Refuse to answer

2) *Understanding of Inflation.* Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?
    a. More than today
    b. Exactly the same
    c. <u>Less than today</u>
    d. Do not know
    e. Refuse to answer

3) *Understanding of Risk Diversification.* Buying shares in a single company usually provides a safer return than buying units in a managed share fund.[3]
    a. True
    b. <u>False</u>
    c. Do not know
    d. Refuse to Answer

The first two questions address economic topics important to saving for retirement including calculating interest and the effect of inflation on purchasing power. The

[2] These basic literacy questions have been asked in other surveys using Pureprofile's Web Panel by the authors. However, there is a low probability that individuals in this sample have seen the questions before in one of these surveys.

[3] This question was slightly reworded for the Australian context from the original. The original sentence read "Buying a single company's stock usually provides a safer return than a stock mutual fund."

third question is related to investments and is designed to capture the concept of diversification.

Table 1 provides a summary of respondents' answers. Two stars denote the correct answers for each question. The sample is broken down into two groups: the full sample, which includes retired and non-retired individuals aged 18 to 85, and the working adult sample, which includes non-retired participants aged 26 to 65. The latter sample will be the main focus of the paper. Demographics for the working group compared to the national population in this age group can be found in Appendix A.

Overall, there is little difference between the two samples. In both samples, more respondents answered the interest rate question correctly compared to any other question. In fact, roughly 83 percent correctly recognized that their money would grow due to interest earnings to more than $102. Respondents' accuracy fell with the inflation question. About 69 percent of the respondents answered this question correctly and almost 13 percent responded that they did not know the answer. The most challenging question for Australians to answer was the risk diversification question. Over one third of the respondents indicated that they did not know the answer to this query and only slightly over half were able to correctly answer the question.

Considering the questions together, a positive correlation between the correct responses in each question was found but these correlations were never greater than .35. The positive but low correlations are consistent with Lusardi and Mitchell's (2011b) findings. As they suggest in their paper, the low correlations may indicate that the three financial questions address different areas of financial literacy. In total, only 63 percent of both samples correctly answered the interest and inflation questions. This percentage falls significantly to approximately 42 percent when responses to the risk diversification question are incorporated. Even more importantly, nearly half of the respondents (approximately 41 percent) answered 'do not know' to at least one financial question. This is notable because Lusardi and Mitchell (2011a) find that those individuals that tend to respond 'do not know' often know the least.

2.2 Who is financially illiterate?

Table 2 breaks down the responses to the financial literacy questions by socio-demographic characteristics. The table reports statistics related to each question separately and for the questions combined. Obvious patterns in financial literacy emerge.

For each question, younger individuals tend to respond less accurately than their older counterparts. This is consistent with findings in other countries (Lusardi and Mitchell, 2011c). The pattern is most evident in the last column, where the percentage of the sample that answers all the questions correctly is reported. In this

case, only 31 percent of individuals under 35 answer all the questions correctly compared to 58 percent of those greater than 65. This pattern reverses itself when examining the 'do not know' responses. In this case, over half of the respondents under 35 answer 'do not know' to at least one question compared to only 26 percent of the oldest group. The differences between age groups are largest for the inflation and risk questions.

Women also answer relatively less questions correctly compared to men. While for the interest rate question the responses are fairly consistent across the sexes, the differences are more marked for the questions related to inflation and risk. In addition, similar to prior work, women are more likely to respond do not know. In the full sample, over half of the women responded do not know to at least one question, while only 31 percent of males responded similarly.

Relative to the findings for other socio-demographic groupings, the education results are less clear-cut. In order to allow for comparisons with similar studies from different countries, we mapped the Australian education responses to the ISCED97 classification system. This system was developed by the UN and is used by them, as well as the OECD and Eurostat. Educational attainment increases with the ISCED97 education levels. Participants who have earned a high school education or less correspond to an ISCED97 Level 0 through 3 classification. Level 4 includes individuals who have received a certificate or equivalent from a Technical and Further Education (TAFE) institution or a similar school. TAFE institutes provide vocational education and training in Australia. Level 5 includes respondents with bachelor degrees, master degrees, graduate diplomas and graduate certificates from a university or equivalent school. In addition, advanced diplomas and diplomas from a university or TAFE institute are included in this category. The highest level is 6 and it includes Ph.D.s. Unfortunately, the number of respondents in this category is too small to make valid comparisons with other educational categories.

Consistent with earlier findings, there is not much separation on the interest question between categories. All respondents tend to answer this question correctly. We find financial literacy is higher for individuals with college educations and advanced degrees (Level 5) compared to those with only a high school education or less (Level 1-3). However, individuals with basic vocational training (Level 4) do not show a consistent pattern of performance relative to other categories. In fact, the Level 4 group underperforms all other education groups in their responses to the risk diversification question. This category includes a very wide range of experiences and abilities, ranging from self-employed skilled tradespeople and designers, for example, to individuals who did not graduate from high school and received only very basic training for low-skill employment. Indeed, high school graduates falling into ISCED levels 1-3 may have much more advanced mathematical and economics education than a person who did not complete high school but gained a technical certificate at ISCED level 4. The size and diversity of this group may account for uneven results on the literacy questions.

Finally, we find that categorizing people by employment status highlights groups with lower literacy. For example, respondents who appear to face the most challenges answering the questions are those that are either not employed and actively seeking work or those who are not in the labor force because they are caregivers, students or cannot participate for some other reason. We found that only 28 (29) percent of those in the not employed (not in the labor force) group could answer all the questions correctly compared to 44 percent of workers, 48 percent of self-employed workers and 57 percent of the retired group.

In total, it appears that financial illiteracy is more prevalent among certain demographic groups. These groups are younger individuals, women, those with less education and those who are not employed or not in the labor force.

3. Planning for Retirement

In this section, we investigate whether financial literacy relates to retirement planning in Australia. Prior research suggests that different measures of financial sophistication and literacy relate to important investment behaviors. For example, Calvet, Campbell and Sodina (2009) find a relationship between financial sophistication and investment mistakes. Other papers suggest connections between financial literacy and stock market participation, borrowing and mutual fund selection (Lusardi and Tufano, 2009; Chistelis et al. 2010; van Rooj et al. 2011; Hastings and Mitchell, 2011). Finally, a growing body of research finds that financial literacy relates to retirement planning which may lead to greater wealth (for example, Ameriks, Caplan and Leahy, 2003; Behrman et al., 2010; Lusardi, 2009; Lusardi and Mitchell, 2011a). It is these papers and recent findings from other countries that provide the motivation for the following analysis.

In order to assess how financial literacy relates to retirement planning, we asked participants the following question about their retirement planning efforts:

Have you ever tried to work out how much you need to save for retirement?

This question has been slightly modified for the Australian context from the retirement planning question posed in the U.S. Health and Retirement Survey (HRS) and used in Lusardi and Mitchell's papers (2011a,b).[4] The question requires a simple yes or no reply. For this analysis, we restrict our sample to individuals who indicated they are not retired from the workforce and are aged 25-65. This was necessary given the focus on retirement planning and to allow comparability with other studies.

We found that only 32 percent of the non-retired sample of 764 individuals have attempted to work out how much they need to save. The patterns found within each

[4] The original question was worded "Have you tried to figure out how much you need to save for retirement?"

socio-demographic group seem to mirror the relationships observed with financially literacy. While significance is not tested, males plan more than females and individuals not working by choice or who are seeking jobs appear to plan less. In terms of planning and age, a notable increase in planners is evident in the 50-65 year old age group (48 percent) relative to those under 50. For those under 50, the percentage planning ranges from 27 to 29 percent depending on the age category.

To determine whether planning relates positively to the financial literacy questions, we divided the non-retired sample into two groups: planners and non-planners. Table 3 reports the percentage of each group that answered each financial literacy question correctly. In terms of accuracy, planners were more successful answering each question compared to non-planners. The largest difference we found relates to the risk diversification question. For this question, 67 percent of the planners chose the right answer versus 47 percent of the non-planners. Similar differences are found once all the literacy questions are combined. We found that just over half (55 percent) of the planners answered all three questions correctly versus only 35 percent of the non-planners. Furthermore, non-planners seemed to be less confident or at least more willing to reveal their lack of knowledge by responding 'do not know.' Approximately half of the non-planners answered at least one question 'do not know' compared to only a quarter (25 percent) of the planners.

3.1 A multivariate model of planning and financial literacy

In this section, we examine the relationship between financial literacy and retirement planning using a multivariate regression framework. Using an indicator variable for retirement planning as the dependent variable, we estimate an Ordinary Least Squares (OLS) model. The dependent variable equals one if respondents answered affirmatively to our retirement planning question and zero otherwise. Consistent with prior literature, we include numerous control variables including indicator variables for homeownership, self-employment, and unemployment. We also control for each respondent's household income. We include age and age squared to allow flexibility in the relationship between age and retirement planning. Possible liquidity constraints and household income shocks are captured by two variables: an indicator variable that equals one if the individual or someone in respondent's family has ever experienced a drastic and unexpected fall in savings or income and a variable representing the number of children in the household.

We report the results from four specifications using different financial literacy measures. The financial literacy measure in the first specification, 'all three correct,' is an indicator variable that equals one if the respondent answered all the financial literacy questions correctly and zero if not. The measure in the second specification, 'total number correct,' equals the number of questions answered correctly out of the three. The third specification includes separate indicator variables for each financial literacy question. The variable equals one if the specific question is answered correctly. The final measure in the last specification is the sum of the 'do not know' responses of each participant.

The regression results reveal that all four measures demonstrate a significant relationship between financial literacy and retirement planning. The first specification suggests that the probability of being a planner increases by 12.5 percent if individuals can answer all three questions correctly. In the second specification, each question answered correctly raises the chances of planning by nearly 6 percentage points. In the third specification, only the risk question out of the three literacy questions is statistically significant and positively related to retirement planning. This is consistent with Lusardi and Mitchell's (2011b) findings for the U.S. Responding 'do not know' also has significant explanatory power. In fact, the chances of being a planner decrease by 11.3 percent for each 'do not know' response.

The regression results also suggest that certain demographic factors relate to planning. Here we find a non-linear relationship exists between age and planning, captured by the quadratic age variable. For example, the net effect of total age on planning in equation one is negative up to age 55 and becomes increasingly positive approaching and into retirement. However the marginal effect of an additional year of age is positive from approximately 28 years. So while only respondents over 55 years are more likely to plan than not, the probability of planning rises with age from early adulthood. Earlier surveys show that retirement planning is sporadic at best among Australian pre-retirees (Agnew et al. 2012).

Education also relates to planning. In the estimation, attaining a level 5 degree of education is positively related to being a planner (13 percentage points). Level 6 (PhD) does not significantly relate to planning but this may be affected by the few respondents in this group. In addition, Level 4 education, which includes basic vocational training, does not appear to improve the probability of being a planner versus individuals with a high school or lower education probably for the reasons discussed above. Homeownership, which is concentrated in the upper two-thirds of the wealth distribution, also positively relates to planning (8 percentage points). As well as being wealthier, homeowning households have successfully managed a long-term financial contract with a bank or mortgage provider and are likely to have built up some financial competence that spillover into retirement planning. Overall, the largest affect on retirement planning is widow status. This is most likely because, following the demise of a spouse, individuals are forced to carefully consider their finances if they have not already done so. Interestingly, income was not a significant factor in this estimation but does play a large role in the findings from other countries (for example, Lusardi and Mitchell, 2011b).

In total, the results presented are similar to findings from other countries. However, like these other studies, the causality between financial literacy and retirement planning cannot be determined using the reported OLS regressions. As noted by others, individuals may become more financially literate precisely because they plan, and/or both planning and financial knowledge may be driven by underlying characteristic. This is an endogeneity problem that requires more sophisticated

estimation techniques. Other considerations include the possibility of errors in the measurement of financial literacy (Lusardi and Mitchell, 2011b; van Rooij et al. 2011). Since endogeneity and mismeasurement can affect estimated coefficients in different directions, we cannot forecast the sign of possible bias with any certainty.

To address these issues, we use an instrumental variables (IV) approach. The challenge of using IV estimation is finding valid instruments that are well-correlated with financial literacy measures but independent of the error process. Motivated by Alessie, van Rooij and Lusardi (2011), we constructed instruments based on the financial experiences of the respondent's siblings and parents. Specifically, we asked if the respondents had siblings and then inquired whether their oldest sibling was in a worse, better or similar financial situation. From these responses, we created indicator variables for siblings in worse and better financial situations. Alessie, van Rooij and Lusardi (2011) propose these variables as suitable instruments for financial literacy because while individuals cannot control a sibling's financial situation, they can learn from their siblings' financial experiences. In addition, we ask respondents what they think about the financial situation of their parents. We also include an indicator variable that equals one if they have ever received workplace education.[5]

Table 5 reports the results from the first and second stage of an IV estimation using Generalized Method of Moments estimation (GMM) that allows for computation of robust standard errors. We report only the IV results for the financial literacy variable (all questions are answered correctly) because the proposed instrumental variables were strongest in this case. The first stage F-statistics were the largest for this specific measure, at 4.01. While significant, this statistic is small by conventional standards and indicates that our instrumental variables may be weak. When instrumental variables are weak, the IV estimator may be biased and inconsistent and therefore offer little improvement on the OLS estimator (Staiger and Stock,

[5] We used the exact methodology for constructing the instrumental variables as used in Alessie, van Rooij and Lusardi (2011). Regarding siblings, we asked the following question, "Would you say that your oldest [brother/sister] is in worse, better, or about the same financial situation than you?" To measure parent's financial understanding we asked, "How would you assess your parent's understanding of financial matters? Think about the parent that is or was mostly responsible for the major financial decisions." Respondents ranked the parent's knowledge using a 7-point scale (1 was very low and 7 was very high). Consistent with Alessie, Van Rooij and Lusardi (2011), we created an indicator variable that equaled one if the parent was judged to have intermediate or high knowledge measured by a response of 4 or greater to the question. We also included an indicator equal to 1 if respondents did not answer the question or answered 'do not know'. Finally, we asked the following question about workplace education "Did any of the firms you have worked for (including your current employer) offer financial education programs such as retirement seminars?" An indicator variable was coded 1 if the respondents answered yes.

1997). Further, the extent of bias correction offered by the IV estimator is proportional to the explanatory power of the instruments in the first-stage regression. On the other hand, we find that the Hansen J statistic in the second stage is sufficiently large to not reject the over-identifying restrictions and confirm the exogeneity of the instruments

The second stage reveals a positive and significant coefficient on the instrumented financial literacy variable. However, given the potential weakness in the instruments mentioned earlier we recommend caution in interpreting these results and want to be careful not to overstate our findings. That said, our results support that financial literacy may lead to greater retirement planning. Future work should focus on identifying stronger instruments to confirm this result.

4. Discussion and conclusions

Since Australia's superannuation system requires mandatory participation by most workers, it also requires a series of defaults (e.g., account formation, contribution rates, investment options, insurance contracts) to support participants who do not actively choose. Nevertheless, all members have the opportunity to make decisions about important facets of their retirement savings plan. These include voluntary additional contributions, changes to investments, changes to insurance provisions, joining several accounts together, or indeed, whether to move out of a large commercial provider into a self-managed retirement savings fund. In addition, at retirement, defaults are not uniform across the system, and active decisions about the management of accumulations are often required.

For the rest of the world, Australia presents an interesting natural experiment in financial literacy evolution: it is a developed economy where, in principle at least, almost all adults must interact with the financial markets as individual, long term investors and with considerable freedom to construct their own portfolios. Sound and informed choices require a basic understanding of finance and product features. An interesting and obvious question is whether general compulsion and pervasive social experience improve or degrade measured financial literacy over time. The results reported here offer a baseline for future comparison as well as an assessment of the effect of the gradual introduction of a mandatory retirement savings system now approaching maturity, on population financial competence. This paper reveals that, despite the features of the mandatory system, not all Australians are knowledgeable of the financial basics nor are they actively preparing for retirement. In addition, the results highlight certain demographic groups that are most at risk for low literacy, including the young, women, the least educated and the unemployed. Results for Australia a not markedly worse, but neither better than, other comparable countries (Bateman et al. 2012a) and at risk groups are similarly populated.

These results raise the obvious question: Why is financial literacy not better and why does the mandatory system not compel people to plan for retirement at higher

rates? Finding the answer to this question is a challenge for future research. The solution will be essential to any efforts to develop and test methods for improving financial awareness. While our study does not provide the answers, we can propose several possible explanations that should warrant attention in future research. For one, while the observed lack of knowledge could be a function of the mandatory nature of the Australian retirement system and the system's default structure, the fact that literacy is not markedly worse in Australia than in other anglosphere countries suggests not. The relatively high compulsory employer contribution rate may well encourage many Australians to feel that, since they are following government policy prescriptions, their retirement is secure and therefore does not require their active attention. On the other hand, we find that both literacy and planning continue to improve with age, unlike some other similar countries where knowledge advances to middle age and then begins to decay (Lusardi and Mitchell, 2011c). This indicates that eventually many people begin taking notice and acquire some skill. Alternatively, individuals may not realize they have a knowledge gap. In our survey, we asked individuals to assess their own knowledge of finance and only 14 percent of our sample considered themselves below average. These findings are consistent with the 8 percent figure reported in a large corporate survey conducted by ANZ (2011). The ANZ survey also found that participants' perceived need for further financial education declined with their self-assessed knowledge. Thus, many Australians may not realize they need more education when in fact they do.

While future research is required to determine whether these explanations are valid or if there is an alternative cause for the observed low literacy, this paper does highlight important deficiencies, as well as reveal a connection between knowledge and retirement planning. Our findings are similar to those around the world suggesting that more research is needed regarding methods for educating consumers so that they can make more informed choices.

Appendix A:

	Survey Respondent Population %	25-64 yrs Australian Population %		Survey Respondent Population %	25-64 yrs Australian Population %
Gender			*Marital Status*		
Male	46%	49%	Never Married	23%	27%
Female	54%	51%	Divorced/Separated	10%	14%
Age			Widowed	2%	2%
25-29 years	17%	13%	Married or long term relationship	66%	58%
30-34 years	18%	13%	*Income*		
35-39 years	17%	13%	$1-$20,799 (i.e. less than $399 a week)	18%	19%
40-44 years	14%	13%	$20,800-$51,999 (i.e. $400-$999 a week)	30%	32%
45-49 years	11%	13%	$52,000-$103,999 (i.e. $1,000-$1,999 a week)	37%	27%
50-54 years	9%	13%	$104,000 (i.e. $2,000 a week) or more	10%	9%
55-59 years	9%	11%	Negative or Nil Income	5%	6%
60-65 years	7%	11%	Not Stated	0%	7%
Work Status			*Highest level of Education*		
Employed[a]	77%	71%	Secondary School or less (ISCED97 Level 0-3)	21%	45%
Unemployed	7%	3%	TAFE certificate or equivalent (ISCED97 Level 4)	24%	21%
Not in the labor force	16%	25%[b]	Diploma, Bachelors or Masters degree (ISCED97 Level 5)	54%	33%
Retired	0%	not broken out	PhD or equivalent (ISCED97 Level 6)	1%	1%

Note: Source for population statistics: Australian Bureau of Statistics Census of Population and Housing, Australia, 2011

a Employed includes full-time, part-time and workers classified away from work

b Census records only those 'not in the labor force.' Also, includes those not stating their labor force status.

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Table 1: Summary statistics on three financial literacy questions (%)

		Full Sample (%)	Age 25-65 (%)
(A) Interest Question		Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?	
>$102	**	83.11%	82.59%
=$102		4.10%	4.32%
<$102		5.57%	5.89%
DK		6.45%	6.28%
RF		0.78%	0.92%
(B) Inflation Question		Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?	
More		9.77%	9.42%
Exactly the same		7.23%	7.33%
Less	**	69.34%	69.90%
DK		12.99%	12.57%
RF		0.68%	0.79%
(C) Risk Question		Buying shares in a single company usually provides a safer return than buying units in a managed share fund.	
Correct (false)	**	54.69%	53.80%
Incorrect (true)		6.74%	5.89%
DK		37.60%	39.01%
Refuse		0.98%	1.31%
(D) Cross-question consistency			
Interest and Inflation		62.89%	62.57%
All correct		42.68%	41.75%
None correct		8.59%	8.51%
At least 1 DK		41.31%	42.54%
All DK		4.49%	4.45%
Number of Observations		1,024	764

Table 2: Distribution of Responses to Financial Literacy Questions by Age, Sex, Education, and Employment Status (%)

	Interest		Inflation		Risk		Overall 3 measures		n
	Correct	DK	Correct	DK	Correct	DK	3 correct	>=1 DK	
Age									
<35	79%	8%	55%	19%	42%	50%	31%	54%	359
36-50	85%	6%	69%	13%	58%	35%	44%	39%	324
51-65	86%	5%	86%	6%	62%	29%	52%	32%	239
>65	86%	5%	82%	9%	71%	22%	58%	26%	102
Sex									
Male	85%	7%	74%	11%	62%	29%	52%	31%	490
Female	82%	6%	65%	14%	48%	46%	34%	51%	534
Education									
ISCED97 Level 1-3	81%	8%	63%	19%	53%	41%	38%	47%	264
ISCED 97 Level 4	81%	8%	66%	16%	43%	49%	34%	53%	238
ISCED 97 Level 5	85%	4%	74%	9%	61%	31%	49%	33%	510
ISCED 97 Level 6	67%	17%	67%	17%	50%	33%	50%	33%	12
Employment Status									
Self-employed	82%	6%	80%	11%	56%	35%	48%	38%	84
Not employed	70%	15%	51%	30%	38%	51%	28%	57%	74
Not in the labor force*	85%	4%	63%	16%	43%	49%	29%	54%	156
Working**	83%	6%	70%	11%	56%	37%	44%	40%	648
Retired	88%	6%	81%	10%	70%	21%	57%	25%	146

Total Sample Size: 1,024

Note: The 'not in labor force' category includes individuals who indicate that they are not in the labor force because they are a caregiver, a student or for some other reason. The 'working' category includes part-time and full-time workers. It also includes self-employed workers. Therefore, the sum of all the employment categories will add to greater than the sample size as 84 self-employed workers are doublecounted. Data are unweighted and DK indicates respondent does not know.

Table 3. Financial literacy of planners and non-planners (%)

	Planners	Non-Planners
Interest Rate Question		
Correct	88%	80%
DK	1%	9%
Inflation Question		
Correct	77%	67%
DK	5%	16%
Risk Diversification Question		
Correct	67%	47%
DK	23%	47%
Summary		
Correct: Interest and Inflation	71%	59%
Correct: all three	55%	35%
>=1 DK	25%	51%
Average number of questions correct	2.32	1.94
Average number of DKs	0.29	0.72
Sample Size	250	514

Note: Sample consists of 764 non-retired respondents aged 25-65. DK indicates respondent does not know.

Table 4. OLS estimates of retirement planning on financial literacy

Dependent Variable=1 if planner (0 else)	(1)	(2)	(3)	(4)
All three correct	0.125***			
	(0.04)			
Total number correct		0.059***		
		(0.02)		
Inflation correct			0.054	
			(0.04)	
Interest correct			-0.022	
			(0.04)	
Risk correct			0.136***	
			(0.04)	
Total number DKs				-0.113***
				(0.02)
Age	-0.055***	-0.056***	-0.058***	-0.058***
	(0.01)	(0.01)	(0.01)	(0.01)
Age squared	0.001***	0.001***	0.001***	0.001***
	(0.00)	(0.00)	(0.00)	(0.00)
Male	-0.009	-0.002	-0.005	-0.001
	(0.04)	(0.04)	(0.04)	(0.03)
Education, ISCED97 Level 4	0.068	0.067	0.073	0.070
	(0.05)	(0.05)	(0.05)	(0.04)
Education, ISCED97 Level 5	0.131***	0.131***	0.133***	0.114***
	(0.04)	(0.04)	(0.04)	(0.04)
Education, ISCED97 Level 6	-0.049	-0.023	-0.021	-0.020
	(0.14)	(0.14)	(0.14)	(0.13)
Single	-0.037	-0.037	-0.037	-0.029
	(0.04)	(0.04)	(0.04)	(0.04)
Divorced or separated	0.087	0.092	0.090	0.094
	(0.06)	(0.06)	(0.06)	(0.06)
Widow	0.315**	0.319**	0.330**	0.280**
	(0.14)	(0.14)	(0.14)	(0.14)
Number of children	-0.003	-0.003	-0.003	0.001
	(0.02)	(0.02)	(0.02)	(0.02)
Income, $20,800-$41,599	-0.070	-0.061	-0.064	-0.051
	(0.05)	(0.05)	(0.05)	(0.05)
Income, $41,600-$67,599	0.027	0.029	0.025	0.021
	(0.05)	(0.05)	(0.05)	(0.05)
Income, Greater than $67,600	0.059	0.066	0.056	0.062
	(0.05)	(0.05)	(0.05)	(0.05)
Homeowner	0.086**	0.088**	0.086**	0.089**
	(0.04)	(0.04)	(0.04)	(0.04)
Self-employed	0.013	0.014	0.019	0.017
	(0.06)	(0.06)	(0.06)	(0.06)
Not working	0.018	0.031	0.025	0.041
	(0.07)	(0.07)	(0.07)	(0.07)
Had income shock	0.009	0.009	0.011	0.005
	(0.03)	(0.03)	(0.03)	(0.03)
Constant	1.134***	1.077***	1.133***	1.322***
	(0.29)	(0.30)	(0.30)	(0.29)
Observations	751	751	751	751
R-squared	0.122	0.119	0.128	0.139

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: IV Estimates of financial literacy impact on retirement planning

Dependent Variable=1 if planner (0 else)	IV
All three correct	0.845***
	(0.27)
Age	-0.058***
	(0.02)
Age squared	0.001***
	(0.00)
Male	-0.091*
	(0.05)
Education, ISCED97 Level 4	0.071
	(0.06)
Education, ISCED97 Level 5	0.060
	(0.06)
Education, ISCED97 Level 6	-0.111
	(0.23)
Widow	0.455**
	(0.19)
Single	-0.036
	(0.05)
Divorced or separated	0.078
	(0.08)
Number of children	0.010
	(0.02)
Income, $20,800-$41,599	-0.055
	(0.06)
Income, $41,600-$67,599	-0.004
	(0.06)
Income, Greater than $67,600	-0.067
	(0.08)
Homeowner	0.027
	(0.06)
Self-employed	0.035
	(0.08)
Not working	0.034
	(0.09)
Had income shock	-0.053
	(0.05)
Constant	1.147***
	(0.37)
Observations	751
R-squared	-0.386
F-statistic first stage	4.01
P-value F-statistic	0.0013
Hansen J Statistic	4.283
P-Value Hansen	0.36908

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1