

Longer-Term Impacts of University Level Undergraduate Financial Literacy Education

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Executive Summary

What was done?

This paper presents a longitudinal evaluation of students who completed a one-semester university undergraduate level personal finance unit in 2013. These students (the Unit group) were surveyed prior to and immediately after the semester. A Control group were drawn from the student's peers and administered the same surveys. The students were surveyed again in 2014, and 2015, with the FLA grant enabling a further survey in 2016. The grant enabled a larger sample of students to be reached in 2016 which also provides benefits for tracking the students in the future.

What are the key results?

A key factor in longitudinal surveys is attrition in the sample. While this is observed in the Unit and Control groups over time, analysis suggests that key characteristics of the samples do not systematically vary over time, in particular when comparing 2013 and 2016 surveys.

Notwithstanding this, the analysis is careful in controlling for confounding effects which may be due to sample attrition.

Objective Financial Literacy

The improvement in objective financial literacy observed for the Unit group at the completion of the unit in 2013, appears robust over time. That is, significant positive effects are evident in 2016, three years after completion of the course. This was evident using a Basic and Advanced measure of financial literacy. The Basic measure contained questions which focussed on concepts such as inflation and compounding whereas the Advanced measure focussed on concepts such as diversification and investment volatility (Appendix 2 contains the full scales).

Estimated effect sizes are classified as small for the Basic measure and moderate for the Advanced measure.

A new more comprehensive financial literacy scale which was first assessed for the groups in 2014 (based on a validated scale developed by Fernandes et al. (2014) in their meta-analysis of financial literacy) indicates that those in the Unit group had higher scores, sustained to 2016. While a pre- and post-comparison is not available for the more comprehensive measure it is noted that when the Basic and Advanced scales were administered before the unit was run, there was no difference in scores.

Objective Financial Literacy - Decay

There is some evidence of decay in the estimated effect sizes. However, the decay is not robust and is as much attributed to an improving performance of those in the Control group than a deterioration in the Unit group. Notwithstanding, effects at each survey after the baseline assessment support a significant positive effect for unit completion which remain small for the Basic scale and moderate for the Advanced scale. A comparison of the two groups in 2016 indicates a significant outperformance of the Unit group. Estimations within gender sub-samples suggest a decay for female students when the Advanced measure is used but this is not observed in the Basic score.

Collectively these results for the objective measures suggest that the previously reported positive effects of course completion are sustained three-years after completion. There is no supporting evidence for a decay in effect overall but suggestion of a decay for female students in the Advanced measure.

Objective Financial Literacy - No evidence of overconfidence

There is no observed overconfidence, or evidence of an “illusion of knowledge” as has been claimed but not empirically supported (Willis 2013). We classified students into three groups: over-confident (predicted they had more correct than they did); under-confident (predicted they had fewer correct than they do); and calibrated (predicted correctly). Completion of the unit was associated with a reduction in likelihood of a student being classified as under- or over-confident. That is, they were more likely to be calibrated in terms of what they knew as correct at the end of the course and this result is maintained to 2016.

Subjective Financial Literacy

The same pattern observed for objective financial literacy measures is observed for subjective measures with effect sizes larger. The self-assessments by students who completed the unit improved for knowledge of investing, superannuation knowledge, financial decision making ability and satisfaction managing finances. Overall, the effect size is small for financial decision making ability where there is no evidence of decay between 2013 and 2016. For the three other self-assessments the strong positive effect sizes estimated immediately after the unit, while there is decay by 2016, in each case the effect size remains moderate.

Subjective Financial Literacy – Gender

Small and moderate effect size improvements in financial decision making ability and satisfaction managing personal finances, respectively, for those who completed the unit were isolated only to female students. There remained significant and of the same size in 2016. For males the moderate effect size for satisfaction with managing your personal finances dissipated by 2016 and there was no positive effect estimated for financial decision making ability. For both investing knowledge and superannuation knowledge while effect sizes declined over the surveys they remained moderate three years after the unit for females. For males only the self-assessed investing knowledge was significant in 2016, for those completing the unit, though it showed a decline from a moderate to a small effect size.

Financial Behaviours

Beyond examining change in financial literacy cognitive resources an assessment of change in “positive” financial behaviours was also examined. Students were asked whether they had performed four “core” positive financial behaviours in the previous six-months (or three-months for the first survey): tracked spending; established financial goal(s); established a budget; and ensured/checked enough set aside for an emergency. At baseline the majority of students indicated that they had performed each behaviour with the highest for tracking expenditure (90 – 92 percent) and lowest budgeting (65 – 77 percent). Notwithstanding the high baseline behaviour rates, those who completed the unit reported an immediate increase in each of the reported behaviours. However, these increases were not maintained in subsequent surveys with the performance of behaviours no higher in the Unit group relative to the Control group by 2016.

The frequency of other positive financial behaviours were also assessed including: considering affordability before purchasing; paying bills on time; watching finances; and consulting independent sources of information. For three of four behaviours there was a boost in

frequency, with small effect sizes. The small effect sizes were, in part, due to high baseline rates of behaviour. The small positive effect size is only maintained for one behaviour (affordability) whereas it dissipates for frequency of consulting independent sources.

Importance of Information Sources

Given their widespread use in the teaching of the unit, it was expected that the importance attached to independent or “authority” sources of information (e.g. MoneySmart) would increase for those in the Unit group. Notwithstanding a high baseline score attached to these sources a small positive effect size was estimated for those in the Unit group which was maintained to 2016. There is a shared reduction across all students over survey waves in the importance attached to family/friends and unsolicited information as sources, reflecting a general outcome expected of university studies.

Conclusions and Future Directions

The report documents positive outcomes from a semester long unit three years after its completion. Typically, small to moderate effects are observed in changes to financial literacy which are sustained over the three-year period. However, further investigation of why this does not translate into sustained effects on positive financial behaviours is needed. Immediate, post unit-completion, effects are not sustained. Whether student characteristics highlighted here as influential (e.g. personality traits, socialisation) can be utilised better in the design and deliver of such units is worth future investigation. More work is also needed focused on the interaction of cognitive and behavioural aspects of financial literacy. This presupposes that behaviour change *should* be expected to flow from such interventions and instructors and course designers need to consider the positive and normative emphasis of these units. While the evidence presented here is “longer” than previously investigated, at three years, it remains short. Ongoing work will continue to track students in the Unit and Control groups as they move to further study and/or become established in the workforce.

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1 Introduction and Unit overview

Evidence for the correlation between measured financial literacy and positive financial outcomes is well documented (for reviews see Hastings et al. 2013; Miller et al. 2014) and has “done much to confirm the causal impact of financial literacy on economic decision-making” (Lusardi and Mitchell 2014: 37). Lusardi et al. (2017) suggest that in addition to wealth differences due to permanent income and chance they can “attribute another 30–40 percent of wealth inequality to financial knowledge” via the “endogenous variation in the returns that people can obtain on their savings, particularly on information-intensive assets” (Lusardi et al. 2017: 433). Fernandes et al. (2014) caution, however, that the strength of the relationship is weak when omitted variable bias is controlled for. Further, corresponding evidence for the long-term effects of financial education *interventions*, or *manipulated* financial literacy (Fernandes et al. 2014), is less clear. This is particularly so for university level interventions where empirical evidence is sparse. This is despite calls of “an urgent need” for countries to improve the financial literacy of students at all levels (OECD 2017) and to add such courses to university curricula specifically (Lusardi and Wallace 2013). This is the primary contribution of this paper. It provides evidence on financial literacy and financial behaviour intentions for those who completed a semester-length personal financial education unit, up to three years after unit completion.

While financial literacy can be accumulated it can also depreciate due to either obsolescence or decay (Lusardi and Mitchell 2014). In their meta-analysis Fernandes et al. (2014) report significant decay rates. They document that while effect sizes from interventions increase with the length of intervention, no financial literacy or financial behaviour is significantly associated with a financial education intervention, irrespective of the length of instruction, by 24 months after its delivery. This decay is a considerably higher rate than the baseline depreciation rate of six percent per annum assumed by and Lusardi et al. (2017) who model the trade-off in the marginal benefits of financial knowledge acquisition, manifested in the additional return accessed

through the use of sophisticated investment products, against the costs of acquisition and knowledge depreciation. Lusardi et al. (2017) estimate an overall humped-shape age and financial knowledge profile, peaking in the 60s.

This paper examines a cohort of students who completed a semester long, first-year level, undergraduate personal finance unit. This sample was first reviewed by Gerrans and Heaney (in press). Their evaluation identified clear positive effects for those completing the unit in terms of basic and advanced measures of financial literacy, intentions to perform positive financial behaviours, and self-assessed ability and confidence in making financial decisions. This paper revisits these students along with a control group of their peers and examines follow-up surveys administered in each of the three years since the unit was completed. This permits an assessment of longer term impacts and investigation of depreciation in financial literacy, as a cognitive resource, performance of positive financial behaviours, positive financial behaviour intentions, and confidence in financial information search.

2 Empirical Evidence

Evidence on the impact of university level financial education courses is primarily found in cross-sectional surveys and in individual course evaluations. The former do not permit a pre-post comparison and typically are unable to control for course duration or quality. An example is Peng et al. (2007) who found a positive association between completion of a college level personal finance course and investing knowledge using a sample drawn from a U.S. mid-western university. Lyons (2008) similarly used a college sample and found lower incidence of credit card problems for those who had completed, or were currently completing, a college course. Mandell (2009) reported lower levels of financial literacy among students who had completed a personal money management or personal finance course though there was no control for respondent characteristics and no tests of significance. Xiao et al. (2012) used a sub-sample of first-year university students with a credit card and found positive effects for those who had completed a

college level personal finance course on subjective credit knowledge, but not objective knowledge. Further, having completed a university level personal financial management class was positively associated with risky credit behaviours in their sample. Wagner (2015) used the U.S. National Financial Capability Study (NFCS) and found positive effects from college level courses and positive long-term behaviours (e.g. having an emergency fund, investments outside of workplace retirement savings) more so than short-term behaviours (e.g. covering bills, paying credit card in full). The advantage of these studies includes their generally large sample size. However, a significant limitation of each of the above studies is the inability to control for heterogeneity in course quality, topics taught, and importantly baseline information on participants.

Evidence of impact from individual interventions, while providing more detail of the nature of the course and its delivery, also have the limitation of being short-term. This includes evaluation of a two-day, pass-fail credit unit (Gross 2005), a 90 minute seminar (Borden et al. 2008), and two lectures (Bowen and Jones 2006). Each reported positive effects on knowledge, attitudes, or positive behaviour intentions. Semester length family economics classes have been shown to produce equivalent outcomes as peer led credit and budgeting counselling (Maurer and Lee 2011). Eades et al. (2013) provided evidence from several U.S. colleges where positive outcomes were attributed to college counselling clinics. An initial evaluation, at the end of the semester, of the sample used in the current analysis is presented in Gerrans and Heaney (in press). They also presented positive outcomes in financial literacy, positive behaviour intentions, and confidence in information search. Longer term evaluations are not available and this paper provides this evidence.

The next section reviews the survey and sample construction with a review of the sample composition over time.

3 Survey Construction and Student Profile

A detailed description of the first offering of the Managing Your Personal Finances unit in 2013 can be found in Gerrans and Heaney (in press). Appendix 1 provides a summary of unit structure and coverage. Gerrans and Heaney (in press) used administrative records to identify that males were marginally more likely to enrol, along with those from Science majors. There were no differences in the unit enrolments in terms of age, domestic/international split, and academic performance using entry scores. Along with the students enrolled in the unit a control group was formed from the broader population in 2013. The original sample consisted of 865 students who completed a pre-course (baseline) survey. Of these, 282 treatment group students completed both pre- and post-survey along with 200 students drawn from the broader university who had not enrolled and served as a control group. Table 1 (all supporting tables are presented in Appendix 3) presents a baseline comparison of the Unit and Control group which suggests that they were, as with the administrative records, very similar in terms of key characteristics.

These students with pre and post surveys in 2013 have been followed since with an annual survey in November each year. The survey instrument has been supplemented with new scales but the same set of knowledge, attitudes, and behaviours have been tracked and form the basis of the analysis in this paper. The 2014 and 2015 surveys were incentivised with entry into prize draws for a small number of \$50 gift vouchers for completions. The 2016 survey was incentivised with a \$25 voucher for a completed survey.

3.1 Key Survey Measures

The annual survey has tracked measures of financial literacy (objective and subjective), financial attitudes, and financial behaviours.

3.1.1 Financial Literacy - Objective

Two measures of financial literacy were estimated across each wave. A “Basic” measure comprised four questions: the impact of compounding (compounding); inflation (inflation); time value of money (TVM); and an inflation/money illusion (money illusion). These questions are derived from those previously developed (Lusardi and Mitchell 2009; van Rooij et al. 2011) and utilised widely in national surveys (e.g. the US Health and Retirement Study and De Nederlandsche Bank Household Survey). These have also been administered in Bateman et al. (2012) and Gerrans and Heaney (in press) where the latter utilised them for the 2013 pre and post analysis of the sample examined here. The set of questions comprising the Advanced scale are also from the same source and include: the relative risk between shares and bonds (risky assets); returns over the long term (returns assets); volatility over the long term (volatility); and the result of diversification (diversification). A third measure was administered based on the 13-item scale developed by Fernandes et al. (2014) (FLN). This scale incorporates each of the questions in the advanced scale plus questions related to investing and managed funds (four), bonds (one), diversification (one), retirement savings (one), and questions examining debt (credit card, mortgage). Because this scale was not administered in the pre-survey no isolated benefit can be assessed for a pre-post but a comparison can still be made of the relative level of the Unit and Control groups.

3.1.2 Self-Assessments of Financial Literacy and Financial Behaviours

In addition to the three objective financial literacy measures, self-assessments of components of financial literacy were also included. Assessments of financial decision-making ability, investing knowledge, superannuation knowledge, and satisfaction managing personal finances were also

sought on a seven-point scale (extremely poor 1, to extremely good 7). Reported engagement in four positive financial behaviours were also collected. The four behaviours were: developed a budget; established a financial goal(s); tracked spending; and checked whether enough emergency funds.

3.1.3 Additional Correlates of Financial Literacy

Previous empirical studies have identified a range of financial literacy correlates that were also included in the surveys as controls. Self-assessed maths ability was included given the demonstrated relationship between numeracy and financial literacy. Measures for the Big-Five personality domains were also included. The five domains are: Agreeableness; Extraversion; Openness; Conscientiousness; and Neuroticism (John et al. 1991). Measures of risk tolerance and future time perspective were also included using the scales developed by Jacobs-Lawson and Hershey (2005). Risk tolerance has been found to be positively associated with financial literacy (Gerrans and Heaney in press). Indicators were included for whether the student had completed prior studies in a related subject (accounting, finance, business): at high-school; since; or both. Finally, a measure of how much financial matters were discussed at home was included to capture possible socialisation effects (Shim et al. 2010) which may be positively related to a student's financial literacy. Such a measure of the extent to which financial matters were discussed at home was a significant predictor of student's financial literacy in the assessment of the 2013 pre-post samples by Gerrans and Heaney (in press).

3.2 Pre, Post-Surveys and Respondent Attrition

Tracking students over a three-year span produces attrition in respondents which can compromise the analysis particularly here where the composition of the Unit and Control groups may change both within the group and between groups. A comparison of survey numbers across the five surveys is presented in Table 2. A total of 2,072 surveys were completed over the period by 865 students. Figure 1 provides a comparison of the baseline (pre-survey) objective financial

literacy of those who completed the pre-survey with those who also completed subsequent surveys, broken down by gender and whether they were a member of the Unit or Control.

Figure 2 provides a similar breakdown using self-assessed measures of financial literacy and

Figure 3 provides a gender breakdown.

One-way ANOVA tests of mean scores by the maximum number of surveys were undertaken followed by individual t-tests, with Bonferroni adjustment, of mean test scores for those with one, two, three, four and five surveys. The overall F-test for Basic mean scores for the Control group was significant (2.79, p-value 0.0275). A further comparison indicates that there was only one significant¹ difference between those with one and four surveys where those with four surveys had a higher baseline score (3.20 vs 2.75). For the Advanced means, neither the overall F-test was significant or any individual paired comparison.

The same tests were undertaken for the four self-assessed financial literacy measures: Financial Decision Making Ability; Investing Knowledge; Superannuation Knowledge; and Satisfaction Managing Finances. The only significant result was for Satisfaction Managing Finances with the Control group (F-test 4.28, p-value<0.01). A further comparison indicated that there was one significant difference between those with one only and four surveys where mean scores for those with four surveys was significantly higher than the one only mean (5.3 vs 4.5).

There was no significant difference in the gender composition by number of surveys completed. Similar tests were conducted for each of the Big-5 personality domains. No significant differences were suggested in terms of Agreeableness and Openness. In the other domains some differences were suggested but not consistently or large in absolute terms. A significant difference in Conscientiousness scores by number of surveys completed was estimated in the Control group. Those who completed four or five surveys scored higher in the trait than those

¹ All references to statistical significance is at 95% confidence level unless otherwise stated.

who completed one survey (3.80 vs 3.50, scale has max score of five). Those who completed five surveys had a lower mean Extraversion score (2.9 vs 3.5) than those completing only one.

Neuroticism mean scores were significantly different between those with one and three surveys in the Control group.

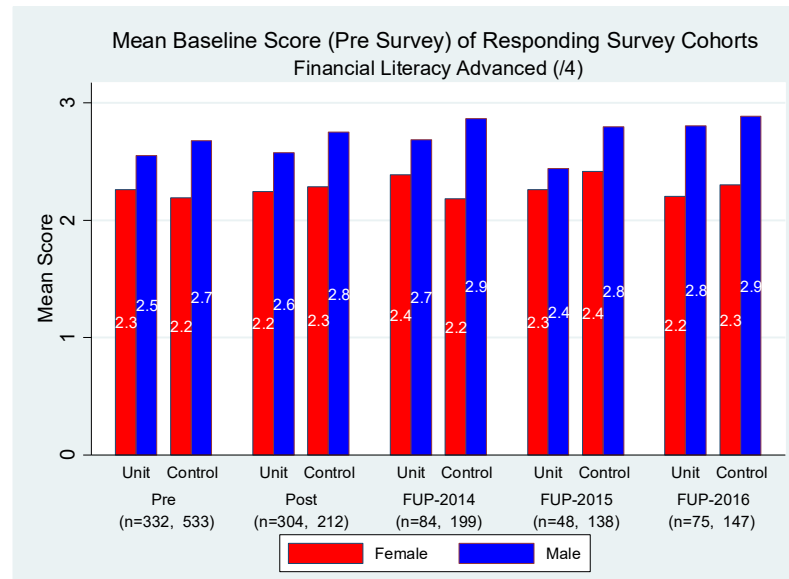
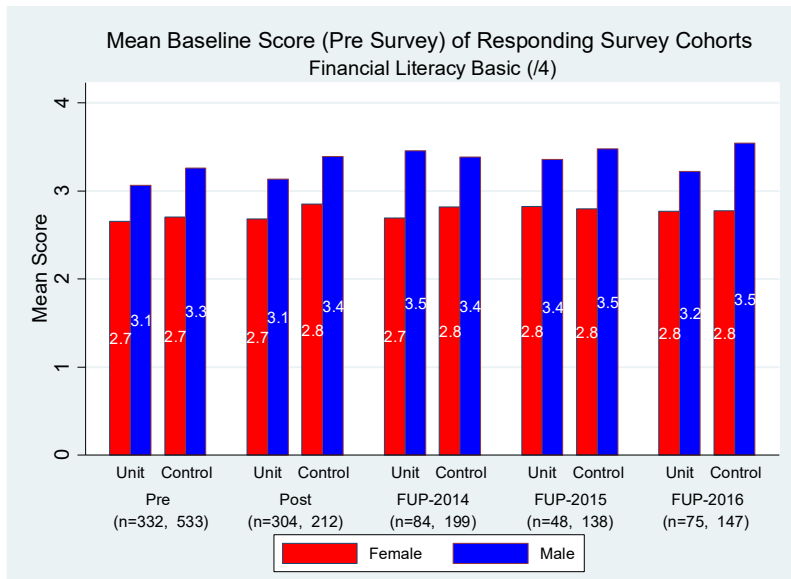


Figure 1 Comparison of Objective Financial Literacy Scores for Unit and Control Samples at Baseline

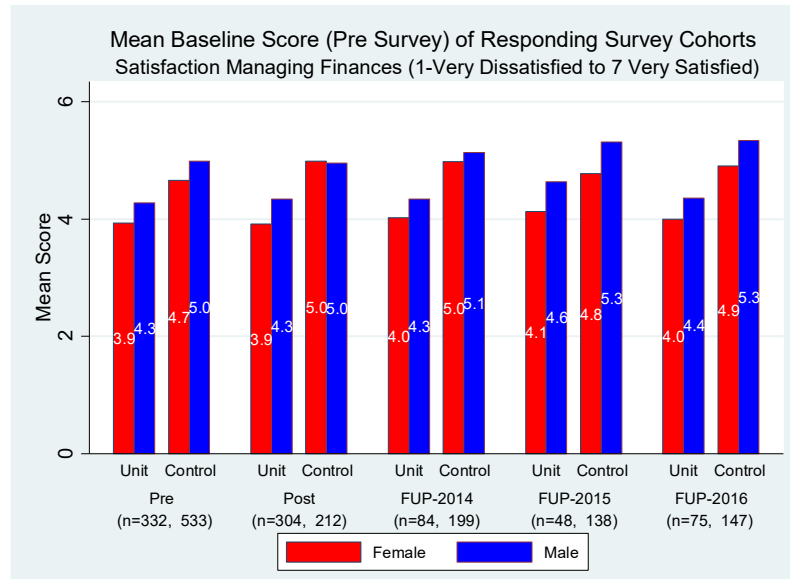
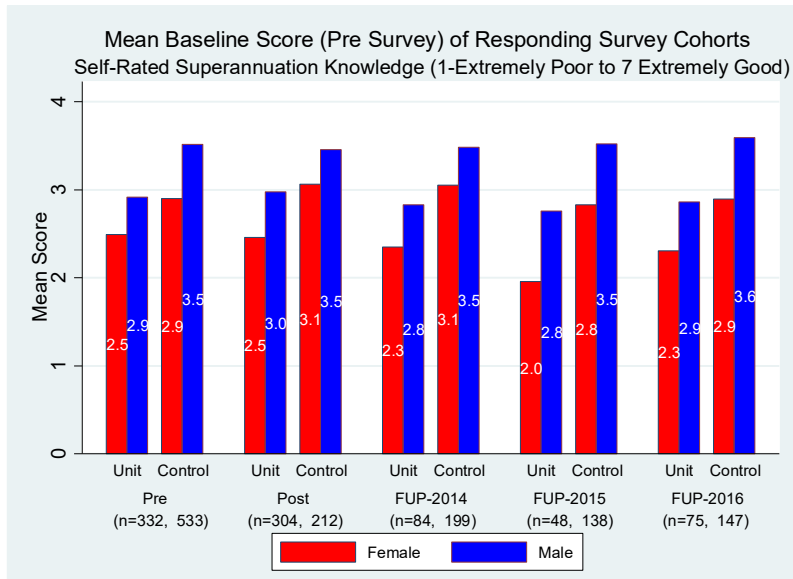
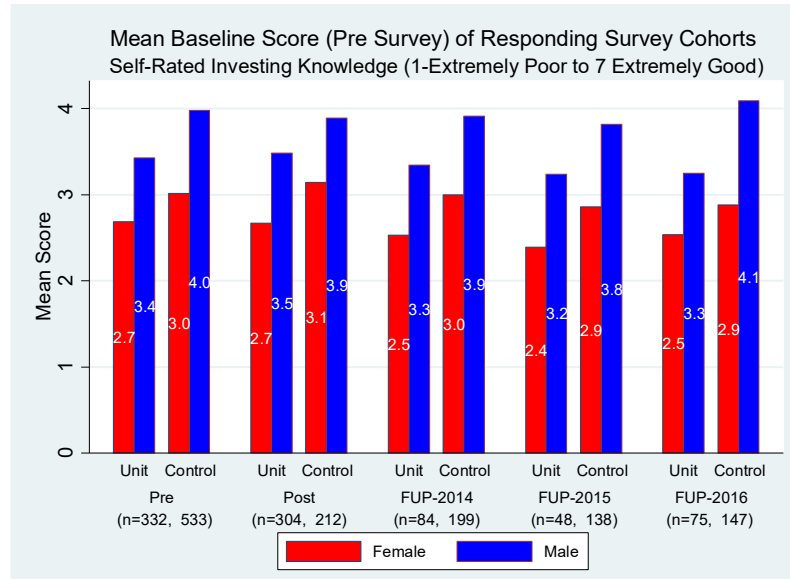
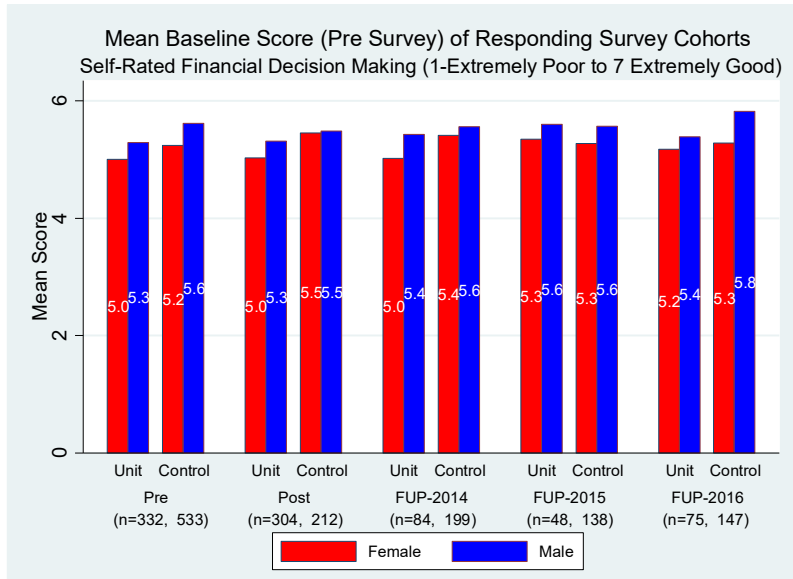


Figure 2 Comparison of Self-Rated Financial Literacy Measures for Unit and Control Samples at Baseline

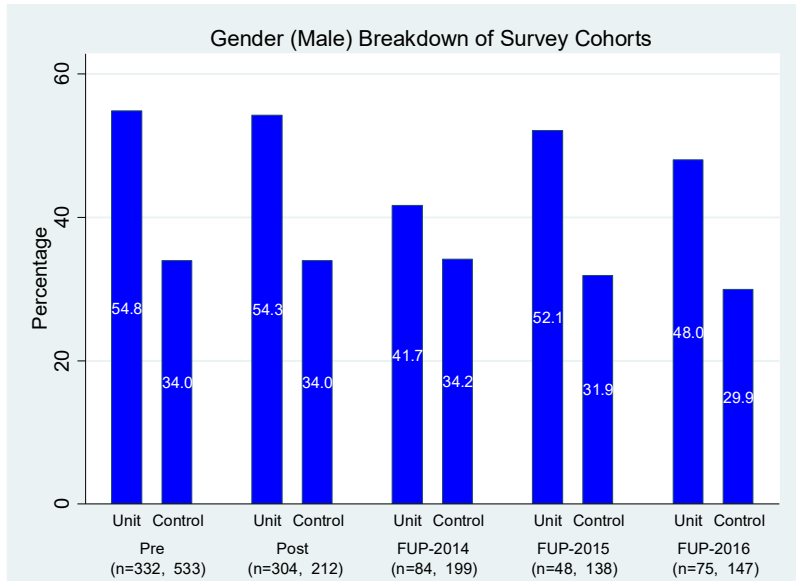


Figure 3 Comparison of Gender Breakdown for Unit and Control Samples at Baseline

A final analysis employed a multinomial logistic regression to investigate whether, when adjusting for a wider range of respondent characteristics, we can predict those who complete one, two, three, four, or five surveys. We employ demographics, measures of financial literacy, personality traits, and indicators of financial behaviours as discussed in section 3.1.

Table 3 presents the estimated odds ratio² of dropping out, or not completing each of two to five surveys relative to one survey. In addition to the summary variables previously reported (indicators for Unit enrolment, Female, study major, whether studied accounting/finance/business previously) a range of other student characteristics were included. The student's baseline Basic and Advanced scores were included with indicators for whether they scored higher than the median score of two on either. Maths ability was also included along with the Big-Five personality domains. Future time perspective, and an indicator for whether financial matters were discussed at home, was also included.

The results suggest there was a greater likelihood that those in the Unit group completed the follow up surveys, though this was not true when it came to the 2016 follow-up survey. Apart from those characteristics that were suggested in the previous one-way ANOVA tests (higher Conscientiousness more likely, higher Extraversion less likely) significant differences appear isolated to a particular number of surveys rather than across each number. There is a suggestion that those with higher Basic scores complete more surveys though this is only significant for two or four relative to one survey. Each of the estimations that follow control for each of the above variables to minimise potential bias.

² The odds derive from the probabilities. The odds of dropping out are the probability of dropping out divided by the odds of not dropping out. For example, if the probability of dropping out are 50 percent then the odds are equal to $(0.50)/(1-0.5)$, which is one. Odds larger (smaller) than one mean the outcome is increased (decreased). The odd-ratio compares one odds against another. For example, the odds of completing two surveys divided by the odds of completing one survey.

4 Method and Analysis

4.1 Estimators and controls

We first examine the objective measures of financial literacy (Basic and Advanced), discussed in section 3.1.1, and investigate the role attributable to unit completion and the extent to which any difference is sustained. The regression framework used further attempts to reduce the impact of non-random selection and attrition by estimating mixed model regressions with individual random effects using maximum likelihood (Vittinghoff et al. 2010, p.390).

In the regressions, in addition to using the raw score or sum of correct answers, we follow the approach of van Rooij et al. (2011) to construct a financial literacy index using the iterated principal component method to extract a Bartlett factor score. Whereas van Rooij et al. (2011) use indicators for “don’t know” responses we score “don’t know” responses as the probability of a correct answer excluding “don’t know” responses, which von Gaudecker (2015) notes can be considered as equivalent. For example, where a question has five answers as options excluding “don’t know” response, if “don’t know” was selected a score of 0.25 is assigned. The same factor analysis is used to construct a financial literacy index.

Given the repeated observations, estimating the factor score presents a choice of which observation sample to estimate the factor structure with: Pre, Post, or both.³ We use two specifications. The first estimates a factor score using the pooled sample across the two groups, but separately within surveys. The second estimates a score pooling both groups and surveys. We note the caution advised by Moeller (1998) of the pitfalls of standardization in longitudinal studies. Standardizing across individuals within each Pre and Post time period produces a zero mean at both times (the first factor estimation presented in the tables), even though we may expect an increase over time for the Unit group. Alternatively, when standardising across individuals across the Pre and Post-

³ In addition to the issue of repeat observations is the question of whether the scale is estimating the same latent financial literacy measure for those in the Unit group.

assessments (the second estimation tabulated) “the information about the time-point-specific relative rank-order gets mixed with the mean-level change” (Moeller 1998: 2).

The regression includes the same set of control variables used in the original analysis of the 2013 pre- and post-surveys (Gerrans and Heaney in press). These include: demographics (Female, Age, Ethnicity); financial demographics (Assets, Income, Debt); and study characteristics (Major, and Previous Study – High school, High School and Since). The Big 5 personality domains, risk attitude (Risk Tolerance), future time perspective (FTP), a measure of numeracy using a self-assessment of maths ability (Maths Ability), and exposure to informal financial education socialisation via discussion of finances at home (Discussed) are also included. Indicators were also included for enrolment in the Unit (Control as the base), and for survey wave. The interaction of these terms is of most interest as it isolates the difference in financial literacy for those enrolled in the Unit group at the completion of the unit and each of the survey time points. As the FLN financial literacy measure was only added in 2014 there is no ability to compare a pre- post unit completion effect for the Unit group. Average scores can nonetheless be compared for the groups.

4.2 Results

The significance, or otherwise, of the controls is as per the reported results of Gerrans and Heaney (in press). Most noteworthy is the persistent negative female coefficient, higher scores of Commerce first-major⁴, robust positive coefficient for Maths Ability, Assets, Age, for those with Previous study (High School and Since), and Discussed but only for the Advanced score. Asian ethnicity students also scored lower on the Advanced measure and FLN measures.

Figure 4 utilises the estimated results and presents the predicted scores at each time period for those in the Unit and Control groups. This further illustrates the Unit and Survey interaction coefficient

⁴ While consistent with a large body of evidence some exceptions have been reported, for example Mandell and Klein (2009) found those who study science, social science or engineering, rather than those who study business or economics with better scores and female students.

reported in Table 4. The spike in scores for those in the Unit group at the completion of the unit (Post) is observed for both the Basic and Advanced scales.

To estimate an effect size we follow Feingold (2013) who suggested “the standard deviation of the outcomes rather than of difference scores should be used to ensure comparability of effect sizes”. Consistent with this approach we adjust the Post*Unit coefficients by the pooled standard deviation of scores at baseline. We also estimate confidence intervals following Feingold (2015) by first determining the confidence intervals for the Post*Unit coefficients and then adjusting these by the pooled standard deviation of scores at baseline. The effect size for the Basic measure is small at the end of the unit.⁵ For example, for the raw Basic score the effect size is 0.37 (95 percent confidence levels (CIs) 0.20-0.54) and 0.34 (CIs 0.18-0.51) using the pooled samples factor score. For the Advanced scale, the effect size is moderate: 0.59 (CIs 0.42-0.76) using the raw score and 0.54 (CIs 0.36-0.72) using the pooled samples factor score).

There is a suggestion of decay in effects after the 2013-post coefficient. However, a joint test of equality of the interaction coefficients fails to reject equality (for Raw scores Basic: χ^2 (3df) 4.83, p-value 0.1848 ; Advanced χ^2 (3df) 5.27, p-value 0.1464). Tests of equality of various pairings of coefficients (e.g. Post*Unit vs 2016*Unit) suggests only one significant difference: between the Post-2013 and 2014 are significantly different for Basic within the Control group. All other comparisons are not significant. The mean effect size for the raw score of Basic remains small (0.25, CIs 0.0614-0.41) and the Advanced score moderate (0.53, CIs 0.29-0.78).

The estimations for the FLN measures, which were only assessed from 2014 onwards, suggest that those enrolled in the Unit have significantly higher scores. The estimated effect size is small (0.21, CIs 0.04-0.370 using the raw FLN score). While a pre-post comparison is not possible, recall that there were no significant differences between the groups at baseline for either the Basic and Advanced scores.

⁵ Following J. Cohen, *Statistical Power Analysis for the Behavioral Sciences* (2nd edn.; Hillsdale, NJ: Erlbaum, 1988). 0.2 represents a small effect, 0.5 a moderate effect, and 0.8 a strong effect.

Another result of interest is the positive coefficients for the Post-2013, 2014, 2015, 2016 survey coefficients. That is, there is a general drift up for those in the Control group. This may either reflect a learning effect from the survey instrument itself or a reflection of accumulation of financial literacy through students' experience over time. The significant Unit effects are in addition to these increasing scores.

4.3 Gender differences

Estimations by gender (using the raw scores), reported in Table 5, highlight that for Basic the significant effects are driven by females as the male coefficients are not significant. While a test fails to reject equality of coefficients for females at 95 percent confidence level it is rejected at 90 percent and individual paired tests suggest a decay in effects with the 2014 and 2016 estimates lower than the 2013-Post. For the Advanced measure, there is no evidence of decay for males whereas there is for females. Each of the subsequent surveys have lower interaction coefficients than for 2013-Post.

4.4 Summary – Unit Effects and Objective Financial Literacy

The estimated results suggest that the previously reported effects of course completion are sustained three-years after completion. There is no supporting evidence for a depreciation in effect overall. However, estimations by gender suggest a depreciation for female students in the Advanced measure. Notwithstanding, effects at each survey after the baseline assessment support a significant positive effect for unit completion.

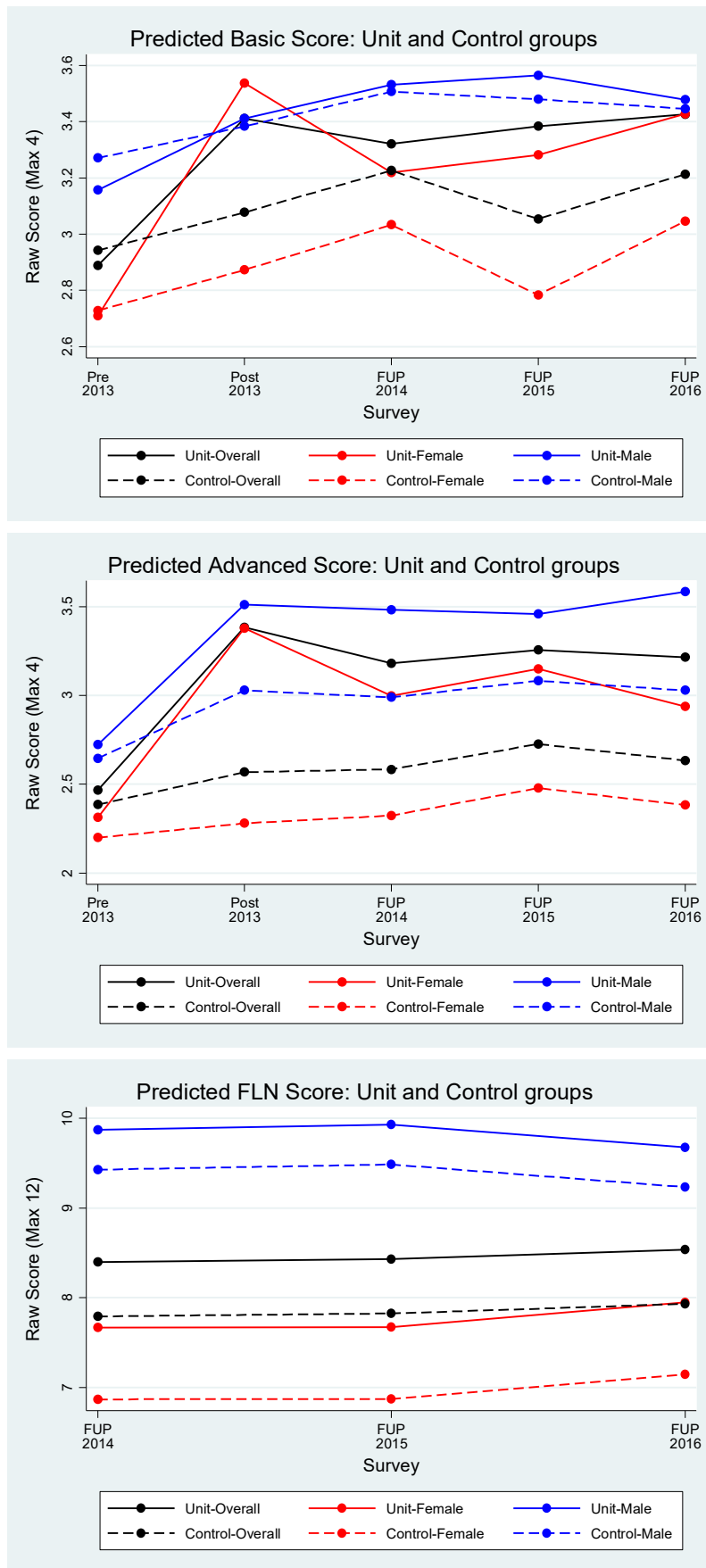


Figure 4 Predicted Raw Financial Literacy Scores Pre and Post by Gender

4.5 Under and Over-confidence in Objective Measures

At the end of the four Basic questions and four Advanced questions students were asked how many questions they thought they had answered correctly. This number minus the number of correct answers can be interpreted as a measure of confidence. A positive (negative) value indicates a student who is over (under) confident. That is, they think they have more (less) correct responses than is true. Those with the correct number of correct responses are classified as “calibrated”. Willis (2013) has suggested that providing further information may lead to the “illusion of knowledge” and over-confidence. The estimation provides evidence as to whether this is evident either immediately after the unit or sustained in subsequent surveys. A multinomial logit model was estimated with the three confidence groups as the outcome and the same set of variables as previous included plus two additional variables. The first is the financial literacy score and the second is the number of questions answered with a “don’t know” response as it is assumed that a student answering the number of correct answers would exclude questions they had answered with a don’t know.

The results in Table 6 suggest that students are generally calibrated. One exception where the odds are increased of over-confidence (2013-Post) is not associated with the Unit group. Those completing the unit do not have higher odds of over-estimating the number of correct answers. Where the coefficients are significant the odds are reduced for either being in the under- or over confident groups relative to having the correct number, or being correctly calibrated.

4.6 Financial Literacy Subjective Assessments

In addition to the objective measures of financial literacy, subjective measures related to financial literacy were also collected. Allgood and Walstad (2016) provided evidence that actual (objective) and perceived (subjective) financial literacy are both influential in predicting financial behaviours. In the current surveys students were asked to rate their: ability to make day to day financial decisions; knowledge of what is required to invest in financial assets; and knowledge of what is

required to invest in Superannuation. A seven point scale from extremely poor (1) to extremely good (7) was used. In addition, students were asked how satisfied they were with their ability to manage their personal finances (very dissatisfied (1) to very satisfied (7)).

Figure 5 presents estimated survey assessments by gender for the Unit and Control groups based on the estimated results presented in Table 7 and by gender in Table 8. The results have similarities with the objective assessments previously reported but there are some notable differences. A gender difference is again evident in the subjective estimations. Female students are consistent in rating themselves lower in each assessment, though it is not significant for day-to-day decision making. Ratings are significantly higher for Commerce and Science majors relative to those with Humanities majors. A general positive association is observed for Assets and Income. Those scoring higher on Conscientiousness, F²TP, those who had previous studies, and those discussed with the family (Discussed) had higher subjective assessments. Higher levels of debt (Debt), those scoring higher on Neuroticism, and Asian ethnicity students had lower self-assessments. Finally, the unexplained financial literacy coefficient is positive, and significant, for each measure. Thus the self-ratings appear to have a basis in objective financial literacy.

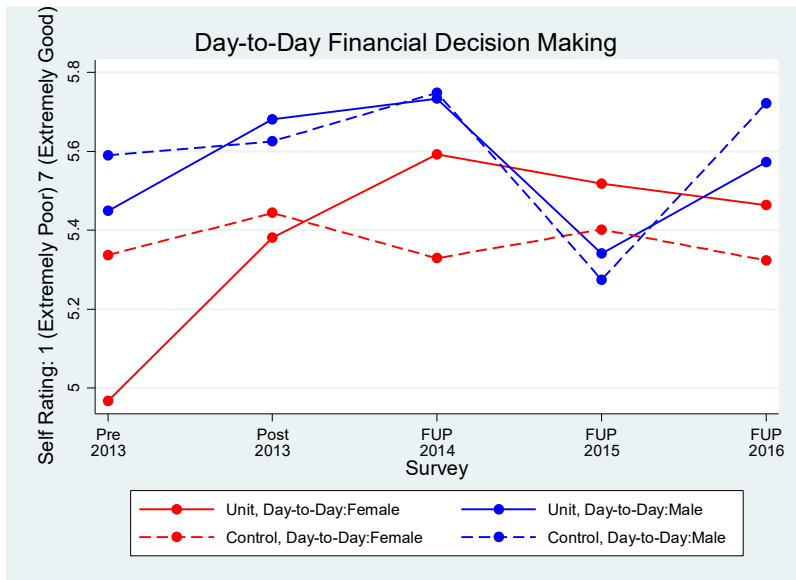
The Post-2013*Unit coefficient is significant and positive for each measure. Completing the Unit increased self-assessments which is observed in the spike in predicted assessments in 2013-Post in Figure 5. The estimated effect size is small for financial decision making ability immediately after the unit (0.17, CIs 0.03-0.31) and remains so in 2016 (0.21, CIs 0.01-0.41). The three other self-assessments have a larger effect size immediately after the unit. For investing knowledge (0.89, CIs 0.74-1.03) and superannuation knowledge (0.99, CIs 0.84-1.15) the effect sizes can be classified as strong and for satisfaction managing personal finances the effect size is moderate (0.67, CIs 0.53-0.81). However, the subsequent years' coefficients are lower suggesting a decay in subjective assessments though effect sizes remain moderate three years after the unit is completed. A test of the equality of all coefficients is not rejected for decision making ability and

satisfaction managing finances. Tests for the 2013-Post and 2016 coefficients also do not reject equality. For investing and superannuation knowledge the tests do reject equality and 2016 coefficients are significantly lower than the 2013-Post coefficients.

4.6.1 Financial Literacy Subjective Assessments by Gender

When each estimation is made within gender, reported in Table 8, the significant Unit and survey interactions appear robust only for female students. In each survey since the unit was completed in 2013, at least small to moderate effect sizes are estimated for female students across the self-assessments. Immediately after the unit was completed the effect size for financial decision making ability was small for female students (0.24, CIs 0.04-0.44). The tests reject a difference in effect sizes over subsequent surveys. For satisfaction managing finances the moderate effect size for female students immediately after the unit (0.75, CIs 0.55-0.95) is also maintained through subsequent surveys and again a formal test of equality of effects is not rejected. For males there is no significant effect for financial decision making ability immediately after the unit or subsequently. For satisfaction managing personal finances in the male sub-sample, the moderate effect size immediately after the unit becomes small and not significant by 2016.

For both the superannuation and investing knowledge self-assessments, effect sizes are strong immediately after the unit for female students (1.01, CIs 1.21-1.91 and 1.08, CIs 1.28-1.91 respectively). However, subsequent effect sizes are significantly lower. A test for equality of effects is rejected and a test between the 2013 and 2016 coefficients support the latter as significantly lower. Notwithstanding, the effect sizes remain moderate in 2016 for investing and superannuation knowledge for females (0.61, CIs 0.44-1.43 and 0.53, CIs 0.22-1.32 respectively). For male students only the investing knowledge effect remains significant, and small, in 2016 (0.41, CIs 0.10-1.31). For superannuation knowledge, while the effect size remains positive in 2016 it is not significant.



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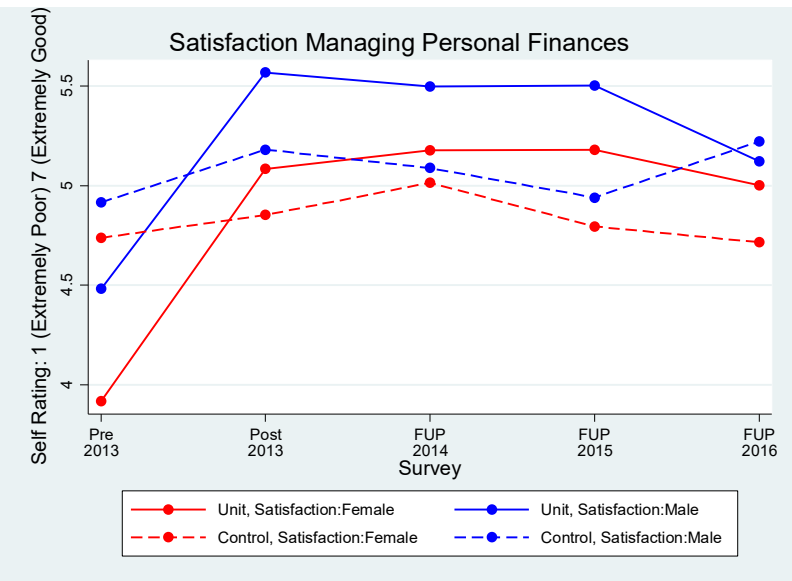
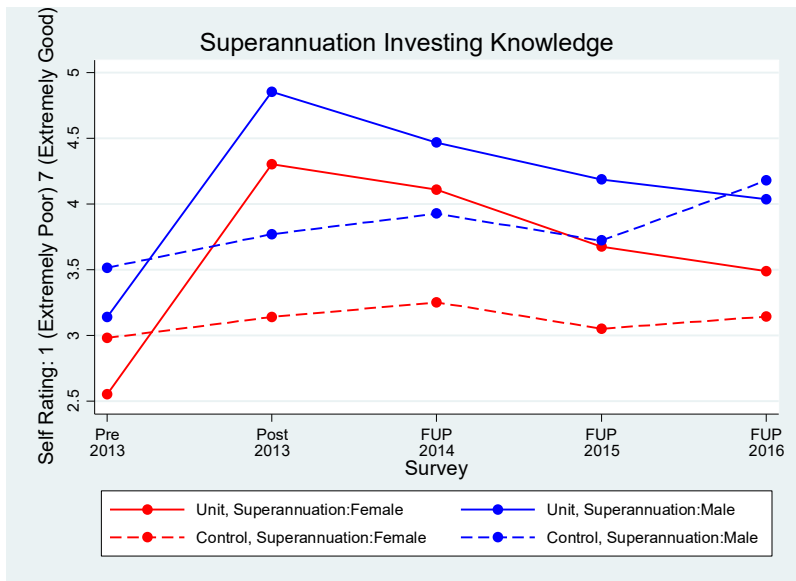
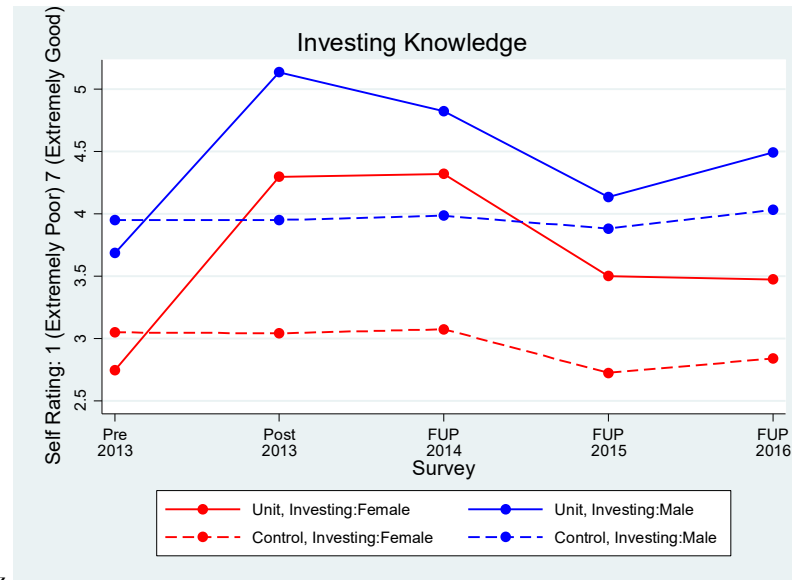


Figure 5 Self Assessments of Day-to-Day Decision Making Ability, Investing Knowledge, Super Knowledge, Satisfaction Managing Finances

4.7 Core Financial Behaviours

The immediate pre-post analysis of the 2013 sample in Gerrans and Heaney (in press) did not allow a significant time period to observe, or report, behaviour change. With three years elapsed a greater opportunity is available. Students were asked whether they had performed four positive financial behaviours over the previous 6-months (3-months for the Post-survey): 1) tracked your spending (Track) ; 2) established a financial goal(s) (Goal); established a budget or spending plan (Budget); and 4) ensured/checked had enough set aside for an emergency (Emergency). The baseline probability (Pre) to perform each of the behaviours (reported at the top of Table 9) is high. The lowest (65 percent) is for Budget and Emergency (71 percent) for the Unit group. For Track, both groups have very high baseline behaviour rates (90 percent and 92 percent for Unit and Control groups respectively).

A logistic regression of each behaviour was estimated and the odds that a student performed the behaviour are reported in Table 9. First, the performance of each behaviour is generally higher for females, those scoring higher on Conscientiousness, Openness, Future Perspective, and for those who discussed family finances more frequently at home (Discussed). The indicators of previous studies are mixed. Surprisingly, those with previous studies at high school had lower odds for Budget or Emergency. In contrast those with previous studies at high school and since had higher odds for Goal. The odds of having performed most of the behaviours is positively associated for Income and Assets. The financial literacy residual is only positively associated with Track. At baseline, those enrolled in the unit had no difference in odds for all behaviours except Budget which was lower.

Figure 6 presents the predicted probability of each behaviour for each group over each survey. Notwithstanding the high baseline probabilities a clear increase in the odds for each behaviour is estimated for those in the Unit group immediately after unit completion. However, the increase in odds of each behaviour intentions for those in the Unit group is not maintained over

subsequent surveys. Behaviour remains at relatively high levels but the gap between the groups dissipates by 2016. When the same regressions are estimated within gender (not tabulated) the results are maintained. To investigate whether there is a differential impact by personality traits, the sample was split by median conscientiousness score and re-estimated (not tabulated) and separately split by median FTP and re-estimated. It is possible that the pattern observed of a boost immediately post unit completion followed by a decay is different for those who are “more” conscientiousness (score higher) or have more of a future time perspective. However, in each case the same pattern is observed.

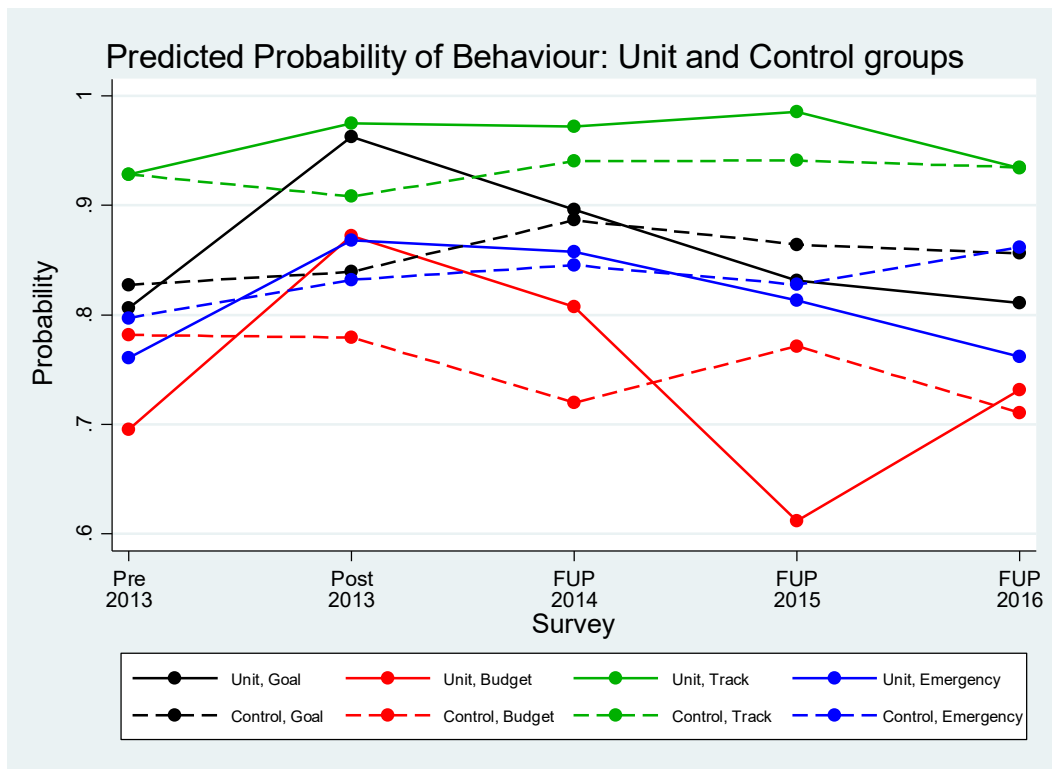


Figure 6 Intention to Perform Core Financial Behaviours

4.8 Other Positive Behaviours

A further set of questions focussed on a set of positive behaviours as proposed by (OECD-INFE 2011). These sought how often (Never (1) to Always (5)) the student engaged in four separate positive behaviours: “Before buying something I carefully consider whether I can afford it” (Afford); “I pay my bills on time” (Bills); “I keep a close personal watch on my financial affairs” (Watch); and “Before committing to a financial decision I consult independent sources of information/advice”. Baseline frequency rates, reported at the top of the columns in Table 10, are high with Consult the lowest (3.0 for Unit and 3.2 for Control) and Bills the highest (4.5 for both groups). Estimated results from regressions are presented in Table 10 and the predicted behaviour scores are presented in Figure 7.

Female students had significantly lower scores on Bills and Watch but significantly higher scores on Consult. There was generally no difference in scores between different majors. Scores for Afford and Consult were significantly higher for Asian students whereas Watch was lower for Asian students. The performance frequency for each of the positive financial behaviours was significant and negatively associated with Debt level whereas Income was only positively associated with Watch and Assets was not significant for any.

A number of the personality traits were significant with Conscientiousness and Future Time Perspective positively associated with each behaviour. Agreeableness was positively associated with Afford and Bills while Extraversion and Risk Tolerance was negatively associated with Afford and Bills. Previous studies was not robustly associated with the behaviours though a negative relationship was estimated with Bills. Finally, having discussed family finances at home was positively associated with the frequency of undertaking each behaviour.

An increased frequency is estimated for three of the positive behaviours (Afford, Watch, Consult) for those in the Unit group immediately after the course. The effect sizes for Afford and Consult are small (0.21, CIs 0.05-0.33, 0.22 CIs 0.06-0.49 respectively) in part attributable to

ceiling effects due to high baseline scores. The effect size for Watch does not reach the minimum effect size and Bills is not significant. The small effect size for Afford is sustained to 2016 whereas for Consult it is no longer significant. In summary, while there is evidence of a sustained increase in some positive financial behaviours there more common result is an immediate post-Unit increase which dissipates.

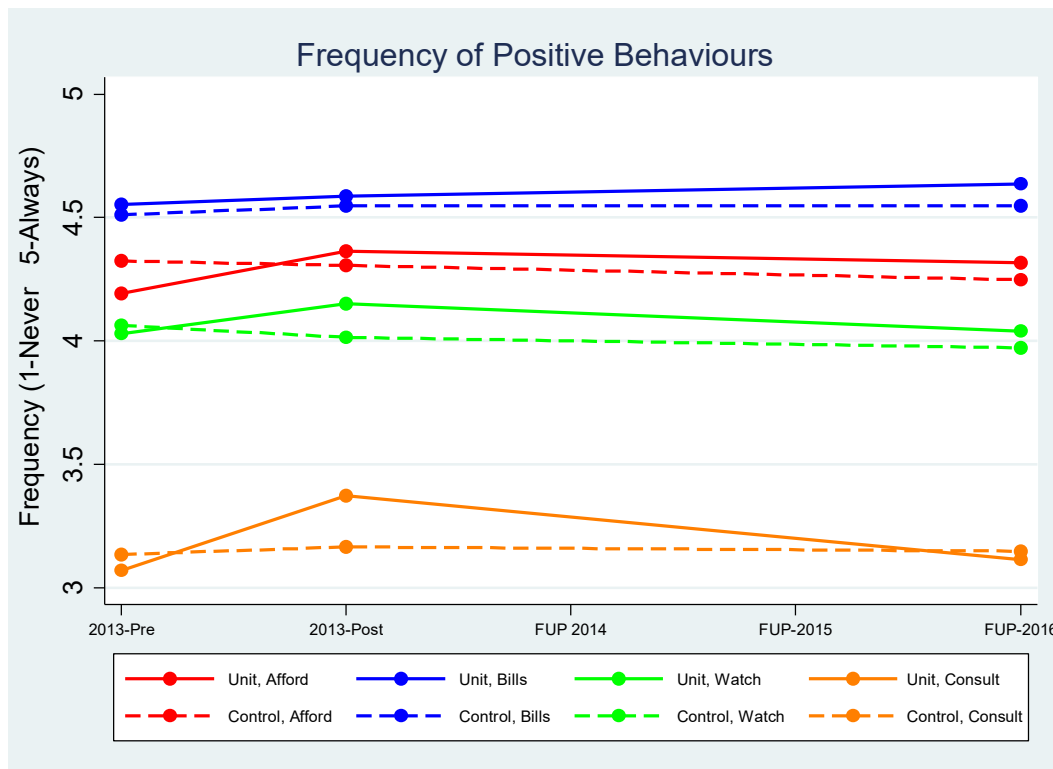


Figure 7 Reported Performance of Positive Financial Behaviours

4.9 Information Sources

A final set of questions, based on (OECD-INFE 2011), sought ratings of the importance (not at all important (1) to extremely important (5)) of a variety of information sources when making financial decisions. These sources are grouped as Unsolicited (e.g. mail, email, company brochure); Advertisements (e.g. Newspaper, TV advertisement); Independent/Authority (Moneysmart (ASIC), Govt Agency, Financial Counsellor); and Family/Friends. As they were referenced through the unit it was expected that the Independent/Authority sources would increase in importance relative to Ads, Unsolicited, as well as Family and Friends.

Table 11 presents estimated results from a regression with rating importance of each of the information sources in turn. Female students rated Family/Friends and Unsolicited sources more highly while older students and those with previous studies (Since high School) had significantly lower scores. Scores on Agreeableness and FTP were positively associated with scores for each of the information sources. The residual (unexplained) financial literacy score, and having discussed finances at home, were associated with higher ratings for Authority sources. Overall, Figure 8 identifies a clear distinction between the importance attached to Unsolicited and Advertisements (lower) against the two other sources.

In terms of differences between the Unit and Control groups a significant increase in the importance of Authority sources of information is observed for those in the Unit group immediately after completion of the unit. The effect size comfortably exceeds the small threshold (0.44, CIs 0.26-0.62) and the effect size remains in 2016 (0.26, CIs -0.03-0.56). While the Family/Friends and Unsolicited information scores are significantly lower at unit completion, the effect size does not reach the minimum threshold (-0.17 in both cases).

A closer look at the results in Table 11 reveals that there is in fact a common decline in the importance ratings for both groups for Family/Friends, Advertisements, and Unsolicited. The students reflect a fundamental expectation as they progress through their studies – a more sceptical/discerning mind when it comes to information sources. Those completing the course don't have an additional reduction, relative to the Control group, but they do have a reduction in the average score.

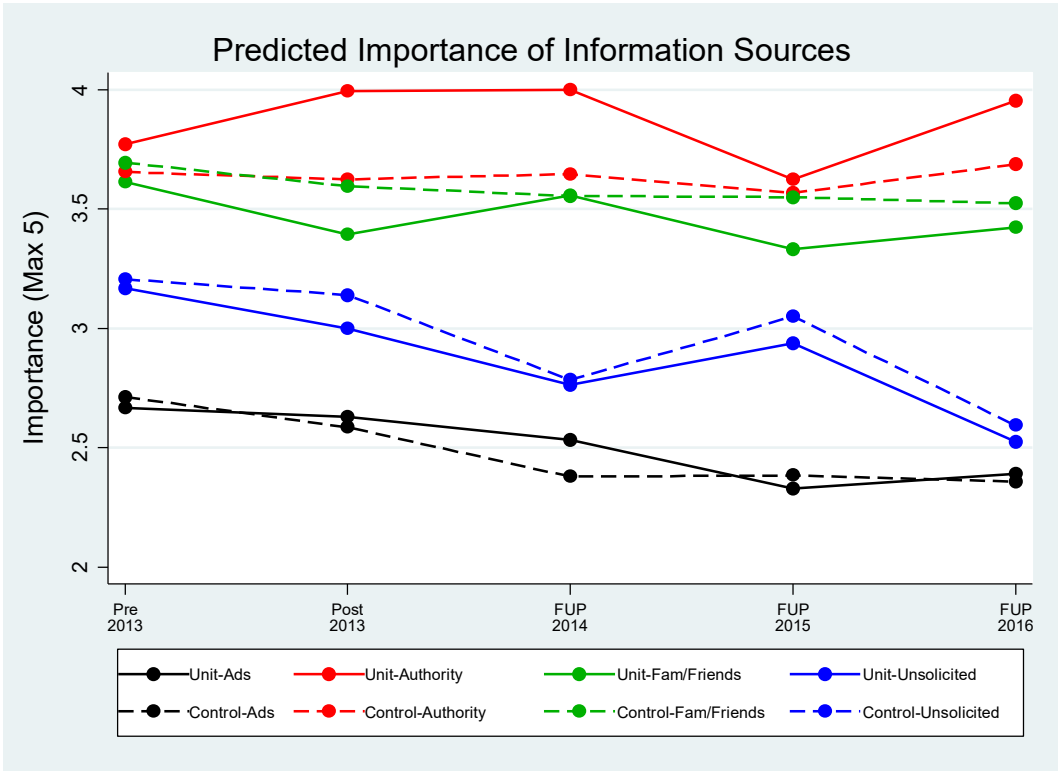


Figure 8 Importance of Information Sources

5 Conclusion

This paper has provided much needed longitudinal evidence of the impact of a personal finance unit delivered to university undergraduates. We build on Gerrans and Heaney (in press) by considering assessments three years after students completed a semester long unit relative to their peers who did not complete the unit.

As evidence suggests that both actual (objective) and perceived (subjective) financial literacy are influential in predicting financial behaviours (Allgood and Walstad 2016), each was assessed. A Basic scale of four items (e.g. compounding, inflation) and an Advanced scale (e.g. diversification) were assessed. The subjective self-assessments included ability (financial decision making), knowledge (investing, superannuation), and satisfaction (managing personal finances).

The results identify sustained improvements in objective financial literacy three years after students completed the unit. The estimated effect sizes (Cohen 1988) are small for the Basic scale and moderate for the Advanced scale. There is some evidence of decay but this finding is not robust. Where identified it appears the decay is attributable to a marginal increase in scores for those in the Control group rather than a decrease in the Unit group. There is not evidence of the average rates of decay reported in the meta-analysis of Fernandes et al. (2014). In terms of self-assessed measures positive effects from completing the unit are evident immediately after the unit which range from small effect sizes for financial decision making ability and strong effects for the two knowledge items and overall satisfaction. As with the objective measures there is some decay where the strong effects become moderate in 2016. On closer inspection the positive result for decision making ability and satisfaction appears isolated to female students. For the two knowledge items the results were more robust for female students whereas for males evidence of a positive effect was isolated to investing knowledge where the effect size declines from moderate to small between 2013 and 2016.

Evidence of behaviour change is not as robust over time. While the performance of positive financial behaviours were significantly higher for those in Unit group immediately after the unit was completed in many cases these small effects dissipated over time. The exception is for a small sustained positive effect for checking the affordability of purchases which remained in 2016. In some cases the lack of an effect can in part be attributed to a ceiling effect because the frequency of behaviour was very high at baseline. However, the pattern of a short-term but not sustained boost to positive performance is more common. Explicit behaviour change was not a nominated outcome of the unit. In addition to financial literacy, personality traits, preferences, social norms, and values are expected to be reflected in financial behaviours as they were here. Those designing courses choose whether they emphasise positive or normative approaches when it comes to financial behaviours, and choose how explicit they are about this. Future research could usefully investigate this relative emphasis and its role on subsequent financial behaviours. Finally, a key part of the personal finance unit was to build awareness and analysis of information sources. Identifying the importance of independent sources of information is important to build decision making once the unit is completed. The importance attached to independent sources was significantly higher (small effect size) immediately after the unit and was maintained to 2016. A notable pattern for all students was a decline in the importance attached to family/friends and unsolicited information sources.

It is worth highlighting those characteristics identified as significant in explaining both the cognitive aspects of financial literacy and the possible predispositions to positive financial behaviours which are not amenable to change by completion of a semester unit. For both the objective and subjective measures, maths ability is a significant predictor. The significance of cognitive skills in explaining economic outcomes has previously been documented (e.g. Lusardi 2012; Smith et al. 2010). Choosing to focus on improving these skills in the unit is balanced against a desire to reach students in majors where maths ability is not seen as required or a

chosen focus of those students. The estimations of behaviour change also highlighted the role of several personality traits in explaining reported behaviour. For example, those scoring higher on the conscientiousness scale or those with a stronger future time perspective had higher likelihood of performing the behaviours with longer term payoffs. Such traits are also not expected to be amenable to influence from course completion. Finally, financial socialisation (Shim et al. 2010) is identified as significant in predicting both financial literacy and positive financial behaviours. Having discussed finances at home was positively associated with the advanced objective financial literacy scale, each of the subjective financial literacy items, and the likelihood or frequency of performing each of the positive financial behaviours. Having previous studies in a related field is generally, but not always, associated with higher levels of objective and subjective financial literacy, and financial behaviours. First, this underscores the need to include these characteristics when making evaluations. Second, this highlights an area worth future research focus. How can large education interventions/units such as those delivered at undergraduate level best cater for, and leverage off, these predispositions?

Appendix 1: Organisation of the unit “Managing Your Personal Finances”

Course Overview

Managing Your Personal Finances, was developed to meet the requirements of a “broadening unit” offered by the Business School. Students are required to complete four broadening units drawn from any discipline outside that of their degree program. The unit had no pre-requisites and was developed for first-year second-semester. There were 11 weeks of lectures and tutorials as well as a mid-semester exam and a final exam. The two exams were a mixture of multiple choice and short answer questions. The unit assessment included marks for tutorial participation (10%), weekly reflective journal (10%), group assignment (15%), mid semester exam (20%) and the final exam (45%).

There are ten topics covered in lectures: the financial planning process; savings; debt; personal taxation; investments and diversification; rent or buy: home ownership; insurance; consumer law; behavioural finance; and long-term planning – retirement, marriage and; a review topic in week 11. Delivery of the lectures was shared between the authors, who also designed the unit and two lawyers who conducted the consumer law lecture. Each week, approximately 105 minutes were set aside for lectures and 45 minutes were available for the weekly tutorials.

The tutorials were managed by three individuals, two tutors who had completed their finance major and one PhD student working in the finance area. The tutorial participation grade was based on contributions to weekly assigned readings and questions drawn from a text, videos, websites and additional articles.

A key objective of the unit was the development of a personal financial plan which required collation of personal financial information. To ensure no contravention of financial services legislation covering provision of personal financial advice, it was emphasised that no personal advice was provided through the unit and that it was not expected that personal financial data was shared. The personal financial plan was therefore a personal document and not submitted for assessment.

The personal financial plan was facilitated by a weekly reflective journal. The weekly reflective journal included questions related to particular aspects of the task of developing a personal financial plan. Students posted their reflections on the questions in a graded online journal. Examples of actual questions asked included:

1. What is your experience of price changes?
2. How should inflation be included in your personal financial plan?
3. The text suggests that debt allows you to better smooth your life time consumption. Do you think it makes sense for an undergraduate student to borrow to finance their time at university?

The group assignment included two key tasks. The first was evaluating the financial position of a young couple utilising financial ratios introduced in the unit. The second required application and analysis of time value of money principles using online calculators to solve savings and loan calculations.

The book “Your Money Milestones”, by Moshe Milevsky, was the required text. It was chosen from a large range of personal finance texts because of its strong thematic approach, which was set around key money milestones and its incorporation of simple mathematic principles (addition, subtraction, division and multiplication) as a means of illustrating application of personal finance principles. The book also blends research from the personal finance literature, which provides a strong evidence based approach to the topics. Finally, the text emphasised the pivotal role of human capital in consideration of personal financial decisions.

Appendix 2: Financial Literacy Scales

Basic Financial Literacy

1. (Compounding) Suppose you had \$100 in a savings account and the interest rate is 20 per cent per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total?

Ans: More than \$200; Exactly \$200; Less than \$200; Don't know

2. (Inflation) Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. After 1 year, how much would you be able to buy with the money in this account?

Ans: More than today; Exactly the same; Less than today; Don't know

3. (Time Value of Money) Assume a friend inherits \$10,000 today and his sibling inherits \$10,000 3 years from now. Who is richer because of the inheritance?

Ans: My friend; His sibling; They are equally rich; Don't know

4. (Money Illusion) Suppose that in the year 2020, your income has doubled and prices of all goods have doubled too. In 2020, how much will you be able to buy with your income?

Ans: More than today; Exactly the same; Less than today; Don't know

Advanced Financial Literacy

1. (Risky Assets) Is the following statement true or false? Shares are normally riskier than bonds.

Ans: True; False; Do not know

2. (Returns Assets) Considering a long time period (e.g. 10 or 20 years), which asset normally gives the highest return?

Ans: Savings account; Shares; Bonds; Don't know

3. (Volatility Assets) Considering a long time period (e.g. 10 or 20 years), which asset normally displays the highest fluctuations?

Ans: Savings account; Shares; Bonds; Don't know

4. (Diversification Assets) When an investor spreads his/her money among different assets, does the risk of losing money:

Ans: Increase; Decrease; Stay the same; Don't know

FLN (Fernandes et al. 2014)

1) Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy:

Ans: More than today with the money in this account; Exactly the same as today with the money in this account; Less than today with the money in this account; Don't know.

2) Do you think that the following statement is true or false? "Bonds are normally riskier than shares."

Ans: True, False, Don't know

3) Considering a long time period (for example 10 or 20 years), which asset described below normally gives the highest return?

Ans: Savings accounts; Shares; Bonds; Don't know.

4) Normally, which asset described below displays the highest fluctuations over time?

Ans: Savings accounts; Shares; Bonds; Don't know.

5) When an investor spreads his money among different assets, does the risk of losing a lot of money:

Ans: Increase; Decrease; Stay the same; Don't know.

6) Do you think that the following statement is true or false? "If you were to invest \$1000 in a share managed fund, it would be possible to have less than \$1000 when you withdraw your money."

Ans: True; False; Don't know.

7) Do you think that the following statement is true or false? "A share managed fund combines the money of many investors to buy a variety of shares."

Ans: True; False; Don't know.

8) After age 65, you have to withdraw at least some money from your superannuation fund.

Ans: True; False; Don't know.

9) Do you think that the following statement is true or false? "A 15-year mortgage typically requires higher monthly payments than a 30-year mortgage, but the total interest paid over the life of the loan will be less."

Ans: True; False; Don't know.

10) Suppose you had \$100 in a savings account and the interest rate is 20% per year and you never withdraw money or interest payments. After 5 years, how much would you have on this account in total?

Ans: More than \$200; Exactly \$200; Less than \$200; Don't know.

11) Which of the following statements is correct?

Ans: Once one invests in a managed fund, one cannot withdraw the money in the first year; Managed funds can invest in several assets, for example invest in both shares and bonds; Managed funds pay a guaranteed rate of return which depends on their past performance; None of the above; Don't know .

12) Which of the following statements is correct? If somebody buys a bond of firm B:

Ans: He owns a part of firm B; He has lent money to firm B; He is liable for firm B's debts; None of the above; Don't know.

13) Suppose you owe \$3,000 on your credit card. You pay a minimum payment of \$30 each month. At an Annual Percentage Rate of 12% (or 1% per month), how many years would it take to eliminate your credit card debt if you made no additional new charges?

Ans: Less than 5 years; Between 5 and 10 years; Between 10 and 15 years; Never; Don't know.

Numeracy ([Fernandes et al. 2014](#))

1) Imagine that we roll a fair, six-sided die 1,000 times. Out of 1,000 rolls, how many times do you think the die would come up as an even number? Of the values below, which is the most likely outcome?

Ans: 157; 298; 512; 754; 919; The above answers are all equally likely; I do not know.

2) In the BIG BUCKS LOTTERY, the chances of winning a \$10.00 prize are 1%. What is your best guess about how many people would win a \$10.00 prize if 1,000 people each buy a single ticket from BIG BUCKS?

Ans: 1; 2; 10; 100; 110; The answers above are equally likely; I do not know.

3) If the chance of getting a disease is 20 out of 100, this would be the same as having a _____% chance of getting the disease.

Ans: 0.02; 0.2; 2; 2.0; 20; 25; 200; I do not know.

4) In the ACME PUBLISHING SWEEPSTAKES, the chance of winning a car is 1 in 1,000. What percent of tickets of ACME PUBLISHING SWEEPSTAKES win a car?

Ans: 0.001%; 0.01%; 0.1%; 1.0%; 1.1%; None of the above; I do not know.

5) If the chance of getting a disease is 10%, how many people would be expected to get the disease out of 1,000?

Ans: 1; 10; 11; 50; 100; 110; 1,000; I do not know

Consumer Confidence in Financial Information Search ([Fernandes et al. 2014](#))

For each of the statements below please indicate to what extent you disagree or agree that they describe you: 1=strongly disagree to 6=strongly agree.

- (1) I am confident in my ability to recognize a good financial investment.
- (2) I know what investments to look for to get the most return on my money.
- (3) I know the right questions to ask when making financial investment decisions
- (4) I have the skills required to make sound financial investments.
- (5) I know the right sources to consult to make wise financial decisions

Appendix 3: Supporting Table Results

Table 1 Respondent Summary at Baseline

	Unit	Control
Age (years)	19.6	20.9
Female (percent)	45.2	66.0
Live at home (percent)	71.4	71.9
International students (percent)	8.7	8.1
Have superannuation (percent)	61.4	63.2
Work and study (percent)		
No work, studying fulltime	32.8	34.3
< 10hrs work per week plus study	25.0	28.3
10-20 hours work per week plus study	31.9	29.1
> 20 hours work per week plus study	10.2	8.3
Income (percent)		
< \$10,000	66.3	68.5
\$10,000 - \$24,999	27.1	22.1
>= \$25,000	6.6	9.4
Assets (percent)		
Personal effects only	22.0	32.3
< \$5,000	31.3	24.4
\$5,000-\$19,999	34.3	30.6
>=\$20,000	12.3	12.8
Debt (percent)		
No Debt	79.2	76.5
< \$5,000	11.1	13.7
\$5,000-\$19,999	6.6	6.0
>=\$20,000	3.0	3.8
Previous study (percent)		
No	55.4	49.2
Completed at high school	14.2	19.5
Completed at high school and since	14.5	15.9
Completed only since high school	16.0	15.4
Major (percent)		
Commerce Single/Double	7.5	13.7
Arts/Humanities Single or Double	13.9	22.1
Sciences Single or Double	67.5	37.5
Arts/Humanities and Science	1.2	2.8
Sciences and Arts/Humanities	1.5	8.1
Commerce & Humanities	5.1	8.1
Commerce & Science	3.3	7.7
Science	1.2	2.8
Science & Humanities	1.5	8.1
Ethnicity (percent)		
Other	9.6	9.9
Asian	15.4	24.4
British/European	7.2	10.7
Aust/NZ	67.8	55.0

Table 2 Survey Summary

	Unit	Control	Total
2013 - Pre	332	533	865
2013 - Post	304	212	516
Follow-up 2014	84	199	283
Follow-up 2015	48	138	286
Follow-up 2016	75	147	222
Total Observations	843	1,229	2,072
Students	332	533	865

Table 3 Likelihood of Completing Different Number of Surveys

This table presents the estimated odds for completing up to five surveys relative to only completing one survey only. Relative risk ratios are reported with robust standard errors reported in brackets clustered by individual and significance is reported by *** p<0.01, ** p<0.05, * p<0.1.

	Two	Three	Four	Five
Unit	9.0039*** (3.6926)	4.3779*** (2.0063)	7.9170*** (4.3475)	2.0767 (1.6689)
Fin. Literacy Basic	1.7247* (0.4841)	1.4912 (0.4425)	2.8808*** (1.0969)	1.5864 (0.6094)
Unit*Fin. Lit. Basic	1.3428 (0.7126)	1.3340 (0.7725)	1.1523 (0.7622)	1.6468 (1.3059)
Fin. Literacy Advanced	0.5926* (0.1631)	0.6816 (0.2113)	1.4679 (0.4726)	1.0646 (0.3983)
Unit*Fin. Lit. Advanced	1.6927 (0.8922)	1.8385 (1.0676)	0.4282 (0.2700)	2.5868 (1.9967)
Female	1.1014 (0.2633)	1.0654 (0.2874)	1.3155 (0.4258)	1.0394 (0.3695)
Major (base Sciences):				
Commerce Single/Double	1.3856 (0.4867)	0.8397 (0.3518)	0.4716 (0.2615)	0.5145 (0.3547)
Arts/Humanities Single or Double	0.8158 (0.2457)	1.0441 (0.3341)	0.8763 (0.3357)	1.0500 (0.4924)
Arts/Humanities and Science	1.7058 (1.3756)	1.4705 (1.4095)	3.2982 (2.9482)	6.5435** (5.8065)
Sciences and Arts/Humanities	0.9374 (0.4441)	1.2120 (0.6078)	1.0080 (0.5834)	2.8592* (1.5601)
Commerce & Humanities	1.4680 (0.5957)	1.3242 (0.6266)	1.3451 (0.7556)	2.5087 (1.4658)
Commerce & Science	0.7812 (0.3338)	0.5044 (0.2870)	1.6249 (0.7968)	1.4273 (0.9310)
Age	0.9670 (0.0246)	1.0102 (0.0246)	0.9985 (0.0240)	1.0121 (0.0239)
Ethnicity (base Aust/NZ):				
Other	0.5574* (0.1904)	0.5925 (0.2303)	1.4064 (0.5742)	1.4931 (0.7605)
Asian	0.6433* (0.1700)	0.7153 (0.2073)	0.7993 (0.3038)	0.8434 (0.3379)
British/European	1.1658 (0.3750)	0.9707 (0.3694)	0.8352 (0.3557)	0.3349 (0.2407)
Income	1.1298 (0.1942)	0.6189** (0.1347)	1.0136 (0.2336)	1.1404 (0.2855)
Assets	0.9776 (0.1147)	1.1302 (0.1348)	0.9881 (0.1331)	0.9638 (0.1662)
Debt	0.9401 (0.1353)	0.8719 (0.1449)	0.8992 (0.1770)	0.8046 (0.1642)
Maths ability	1.0171 (0.0951)	1.0218 (0.1075)	1.0801 (0.1181)	1.2963* (0.1924)
Personality type (BFI):				
Extraversion	0.8558 (0.1237)	0.5812*** (0.0988)	0.6982* (0.1286)	0.6488* (0.1515)
Agreeableness	0.7812 (0.1454)	0.8341 (0.1795)	1.3737 (0.3336)	0.6113** (0.1465)
Conscientiousness	1.7336*** (0.3076)	1.6713** (0.3438)	2.5030*** (0.5835)	2.9941*** (0.8610)
Neuroticism	1.0751 (0.1802)	1.3407 (0.2547)	1.4160* (0.2946)	1.3013 (0.2914)
Openness	0.9273	1.1484	1.0786	0.9558

	(0.1772)	(0.2520)	(0.2854)	(0.3194)
Risk Tolerance	0.8866	0.8074*	0.7684**	0.6247***
	(0.0914)	(0.0964)	(0.1007)	(0.1053)
FTP	1.0360	1.1078	0.9566	0.9670
	(0.0931)	(0.1145)	(0.1168)	(0.1288)
Previous study (base none):				
High School	1.0988	1.1567	0.4304**	1.0082
	(0.3258)	(0.3557)	(0.1800)	(0.4237)
High School & Since	1.3041	0.9805	0.4891	0.7331
	(0.4097)	(0.3631)	(0.2130)	(0.3603)
Since High School	1.5359	1.2889	1.4989	1.3117
	(0.4590)	(0.4340)	(0.5284)	(0.5691)
Discussed	1.0488	0.9470	1.1269	1.1316
	(0.1097)	(0.1045)	(0.1468)	(0.1596)
<hr/>				
LL		-1117.6		
Chi-2		312.5		
df		124		
Observations		865		
Nagelkerke Pseudo R-Squared		0.343		
<hr/>				

Table 4 Financial Literacy and Unit Completion

This table presents maximum likelihood estimates from linear mixed model regressions with individual random effects for three measures of financial literacy estimated three ways. Each measure is estimated as a raw score of correct answers. A second measure (Factor) uses the predicted Bartlett score from a factor analysis using the iterated principal factor method. A third measure (Factor Adj.) is a second factor score where “don’t know” responses have been recoded as the probability of a correct answer by chance in the question. Standard errors (bracketed) are clustered by individual. Significance is noted *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

	Basic Raw	Basic Factor	Basic Factor Adj.	Advanced Raw	Advanced Factor	Advanced Factor Adj.	FLN Raw	FLN Factor	FLN Factor Adj.
Post-2013	0.1357** (0.0546)	-0.3309*** (0.0813)	0.2105*** (0.0778)	0.1831*** (0.0669)	-0.5500*** (0.0867)	0.1347* (0.0818)			
FUP-2014	0.2851*** (0.0598)	-0.1875** (0.0883)	0.4127*** (0.0839)	0.1990*** (0.0730)	-0.2428*** (0.0841)	0.2011** (0.0909)			
FUP-2015	0.1123 (0.0706)	-0.3286*** (0.0988)	0.1768* (0.0996)	0.3411*** (0.0855)	-0.2359** (0.1070)	0.3790*** (0.0986)	0.0334 (0.1495)	-0.0413 (0.0693)	0.0548 (0.0710)
FUP-2016	0.2720*** (0.0669)	-0.3365*** (0.1168)	0.4125*** (0.0935)	0.2491*** (0.0892)	-0.3829*** (0.1293)	0.2468** (0.1058)	0.1401 (0.1503)	-0.1581** (0.0766)	-0.0203 (0.0721)
Unit	-0.0533 (0.0720)	-0.0184 (0.1037)	-0.0243 (0.1016)	0.0809 (0.0870)	-0.0330 (0.1017)	0.0018 (0.1011)	0.6053** (0.2568)	0.0985 (0.1424)	0.1442 (0.1538)
Post-2013*Unit	0.3872*** (0.0884)	0.4367*** (0.1280)	0.5041*** (0.1233)	0.7361*** (0.1060)	0.8195*** (0.1305)	0.7420*** (0.1243)			
FUP-2014*Unit	0.1482 (0.1193)	0.1943 (0.1747)	0.1748 (0.1682)	0.5163*** (0.1313)	0.4411*** (0.1471)	0.4848*** (0.1618)			
FUP-2015*Unit	0.3828*** (0.1138)	0.4022** (0.1672)	0.4707*** (0.1694)	0.4499*** (0.1394)	0.5115*** (0.1798)	0.4084** (0.1652)		-0.0058 (0.1662)	-0.0810 (0.1725)
FUP-2016*Unit	0.2660*** (0.1030)	0.3196* (0.1881)	0.2996** (0.1515)	0.4999*** (0.1286)	0.7922*** (0.1783)	0.5797*** (0.1443)		0.2584* (0.1563)	0.1786 (0.1567)
Female	-0.2001*** (0.0620)	-0.3379*** (0.0891)	-0.3172*** (0.0854)	-0.2323*** (0.0705)	-0.1823** (0.0795)	-0.1664** (0.0768)	-1.1767*** (0.2421)	-0.4879*** (0.1158)	-0.4871*** (0.1141)
Commerce Major (base Sciences):	0.0847 (0.0970)	0.0803 (0.1433)	0.0561 (0.1416)	0.5677*** (0.0980)	0.3629*** (0.1297)	0.4001*** (0.1257)	1.2761*** (0.3178)	0.5283*** (0.1446)	0.5269*** (0.1472)
Arts/Humanities	-0.0690 (0.0794)	-0.1723 (0.1159)	-0.1311 (0.1128)	-0.0882 (0.0877)	-0.1063 (0.1000)	-0.0847 (0.0968)	-0.4221 (0.3262)	-0.1814 (0.1471)	-0.2275 (0.1472)
Arts/Humanities & Science	-0.0365 (0.2149)	-0.1684 (0.3192)	-0.1237 (0.3147)	-0.0604 (0.2150)	-0.0877 (0.2338)	-0.0904 (0.2298)	-0.3376 (0.6620)	-0.1266 (0.2678)	-0.1205 (0.2659)
Sciences & Arts/Humanities	-0.0204 (0.1247)	-0.0680 (0.1843)	-0.0792 (0.1778)	0.0507 (0.1571)	0.0376 (0.1583)	0.0581 (0.1536)	-0.6863 (0.5012)	-0.2736 (0.2103)	-0.2684 (0.2064)
Commerce & Humanities	0.0696 (0.1073)	0.0165 (0.1517)	0.0387 (0.1505)	0.4516*** (0.1161)	0.4817*** (0.1312)	0.4896*** (0.1250)	1.0805*** (0.3827)	0.4895*** (0.1737)	0.4986*** (0.1699)
Commerce & Science	0.1613 (0.1376)	0.1985 (0.1802)	0.1715 (0.1778)	0.4481*** (0.1472)	0.3794** (0.1586)	0.4028** (0.1581)	0.1019 (0.4569)	0.0650 (0.2144)	0.0660 (0.2153)
Age	0.0178*** (0.0040)	0.0282*** (0.0060)	0.0265*** (0.0056)	0.0342*** (0.0054)	0.0274*** (0.0067)	0.0270*** (0.0063)	0.0849*** (0.0170)	0.0374*** (0.0076)	0.0361*** (0.0075)
Ethnicity (base Aust/NZ): Other	0.0703 (0.0925)	0.1080 (0.1333)	0.1300 (0.1296)	-0.2130* (0.1135)	-0.3246** (0.1318)	-0.3055** (0.1267)	-0.1115 (0.3249)	-0.0704 (0.1375)	-0.0982 (0.1398)

Asian	-0.1055 (0.0768)	-0.1009 (0.1112)	-0.0821 (0.1068)	-0.2275*** (0.0820)	-0.2622*** (0.0944)	-0.2542*** (0.0906)	-0.7524** (0.2923)	-0.3622*** (0.1297)	-0.3628*** (0.1294)
British/European	0.0745 (0.0923)	0.1653 (0.1284)	0.1796 (0.1217)	-0.0468 (0.1069)	-0.0632 (0.1153)	-0.0603 (0.1125)	0.1606 (0.3609)	0.1084 (0.1573)	0.1232 (0.1546)
Income	0.0273 (0.0354)	0.0651 (0.0538)	0.0501 (0.0501)	-0.0137 (0.0414)	-0.0565 (0.0512)	-0.0530 (0.0479)	-0.0349 (0.1046)	0.0107 (0.0504)	0.0019 (0.0486)
Assets	0.0890*** (0.0250)	0.0985*** (0.0377)	0.1113*** (0.0355)	0.0905*** (0.0284)	0.0833** (0.0345)	0.0887*** (0.0326)	0.2535*** (0.0875)	0.0922** (0.0403)	0.1066*** (0.0402)
Debt	-0.0257 (0.0245)	-0.0238 (0.0381)	-0.0212 (0.0348)	-0.0439 (0.0293)	-0.0689* (0.0368)	-0.0578* (0.0340)	-0.1093 (0.0729)	-0.0691** (0.0344)	-0.0526 (0.0328)
Maths Ability	0.1515*** (0.0241)	0.1667*** (0.0342)	0.1652*** (0.0327)	0.0866*** (0.0288)	0.0901*** (0.0327)	0.0922*** (0.0315)	0.4321*** (0.1078)	0.1783*** (0.0489)	0.1804*** (0.0489)
BFI Personality: Extraversion	-0.1062*** (0.0374)	-0.1405** (0.0548)	-0.1603*** (0.0534)	-0.0896** (0.0407)	-0.1294*** (0.0455)	-0.1305*** (0.0440)	-0.3421** (0.1419)	-0.1528** (0.0597)	-0.1740*** (0.0607)
Agreeableness	-0.0849* (0.0502)	-0.1580** (0.0727)	-0.1581** (0.0717)	-0.1022* (0.0554)	-0.0967 (0.0631)	-0.1102* (0.0601)	-0.5161*** (0.1943)	-0.2005** (0.0864)	-0.2040** (0.0854)
Conscientiousness	0.0177 (0.0448)	0.0170 (0.0640)	0.0279 (0.0624)	0.1029** (0.0515)	0.1129* (0.0596)	0.0995* (0.0571)	-0.3005* (0.1709)	-0.0870 (0.0751)	-0.0899 (0.0749)
Neuroticism	-0.1223*** (0.0453)	-0.1693*** (0.0646)	-0.1736*** (0.0636)	-0.0561 (0.0485)	-0.0739 (0.0540)	-0.0757 (0.0528)	-0.4675*** (0.1668)	-0.1925** (0.0748)	-0.1959*** (0.0744)
Openness	0.0359 (0.0556)	0.0875 (0.0804)	0.0888 (0.0780)	-0.0631 (0.0640)	-0.0809 (0.0687)	-0.0808 (0.0662)	-0.0214 (0.2122)	0.0207 (0.0930)	0.0388 (0.0935)
Risk Tolerance	-0.0181 (0.0226)	-0.0479 (0.0326)	-0.0399 (0.0313)	0.0529** (0.0247)	0.0589** (0.0279)	0.0467* (0.0269)	0.1411* (0.0773)	0.0551 (0.0371)	0.0430 (0.0363)
FTP	-0.0165 (0.0249)	-0.0234 (0.0354)	-0.0236 (0.0347)	0.0983*** (0.0273)	0.0819** (0.0323)	0.0826*** (0.0311)	0.1569 (0.1030)	0.0452 (0.0476)	0.0477 (0.0465)
Previous study (H School, base none):	0.0611 (0.0756)	0.1717 (0.1050)	0.1742* (0.1023)	0.2753*** (0.0867)	0.2067** (0.0955)	0.2240** (0.0932)	0.3635 (0.2783)	0.1489 (0.1222)	0.1870 (0.1193)
High School & Since	-0.0192 (0.0816)	0.0686 (0.1143)	0.0732 (0.1130)	0.1615* (0.0920)	0.1383 (0.1166)	0.1442 (0.1132)	0.3098 (0.2989)	0.0919 (0.1471)	0.0944 (0.1463)
Since High School	0.0871 (0.0724)	0.1233 (0.1057)	0.1238 (0.1038)	0.1112 (0.0829)	0.1261 (0.0938)	0.1155 (0.0905)	0.0779 (0.2734)	0.0885 (0.1256)	0.0862 (0.1277)
Discussed	0.0371 (0.0277)	0.0212 (0.0396)	0.0230 (0.0387)	0.1305*** (0.0297)	0.1043*** (0.0357)	0.1117*** (0.0346)	0.0897 (0.1070)	0.0451 (0.0468)	0.0458 (0.0471)
Constant	2.4194*** (0.4174)	-0.2857 (0.5902)	-0.6353 (0.5796)	0.6752 (0.4580)	-1.0798** (0.5158)	-1.3655*** (0.4989)	7.6931*** (1.6907)	-0.2969 (0.7688)	-0.3353 (0.7662)
Variance (individual)	0.3461	0.6698	0.6722	0.4057	0.4294	0.4132	3.0790	0.6103	0.6030
Variance (residual)	0.4976	1.1129	0.9838	0.7147	1.1172	1.0142	1.6716	0.3685	0.3681
-2LL	-2620.0	-3410.2	-3313.9	-2945.6	-3324.8	-3236.1	-1435.0	-897.0	-895.0
Chi-2	411.7	236.2	376.6	651.7	314.3	471.7	334.3	324.7	321.8
df	35	35	35	35	35	35	29	31	31
Obs	2072	2067	2067	2072	2072	2072	691	691	691
Individuals	865	865	865	865	865	865	407	407	407

Table 5 Financial Literacy and Unit Completion by Gender – Raw Scores

This table presents a gender breakdown of the estimations presented in Table 4. The results are maximum likelihood estimates from linear mixed model regressions with individual random effects for three measures of financial literacy. Standard errors (bracketed) are clustered by individual and significance is reported by *** p<0.01, ** p<0.05, * p<0.1.

	Basic		Advanced		FLN	
	Female	Male	Female	Male	Female	Male
Post-2013	0.1450** (0.0725)	0.1133 (0.0760)	0.0813 (0.0813)	0.3831*** (0.1123)		
FUP-2014	0.3049*** (0.0787)	0.2367*** (0.0848)	0.1243 (0.0912)	0.3442*** (0.1185)		
FUP-2015	0.0556 (0.0937)	0.2093** (0.0927)	0.2796*** (0.1055)	0.4378*** (0.1387)	0.0035 (0.2074)	0.0571 (0.1859)
FUP-2016	0.3182*** (0.0895)	0.1758** (0.0758)	0.1836 (0.1133)	0.3828*** (0.1360)	0.2793 (0.2063)	-0.1940 (0.1791)
Unit	-0.0188 (0.1022)	-0.1142 (0.1029)	0.1144 (0.1180)	0.0785 (0.1309)	0.8012** (0.3514)	0.4430 (0.3669)
Post-2013*Unit	0.6832*** (0.1263)	0.1414 (0.1169)	0.9849*** (0.1491)	0.4056*** (0.1561)		
FUP-2014*Unit	0.2053 (0.1775)	0.1380 (0.1372)	0.5615*** (0.1862)	0.4149** (0.1841)		
FUP-2015*Unit	0.5176*** (0.1854)	0.2004 (0.1351)	0.5568*** (0.2057)	0.2972 (0.1950)		
FUP-2016*Unit	0.4002*** (0.1479)	0.1461 (0.1290)	0.4403** (0.1814)	0.4771*** (0.1768)		
Major (base Sciences):						
Commerce	-0.0376 (0.1415)	0.2050* (0.1239)	0.5644*** (0.1359)	0.5835*** (0.1357)	1.6478*** (0.4465)	0.7942* (0.4451)
Arts/Humanities	-0.1287 (0.1031)	-0.0075 (0.1283)	-0.1902* (0.1096)	0.0271 (0.1487)	-0.4795 (0.4155)	-0.3100 (0.5143)
Arts/Humanities & Science	-0.0209 (0.2467)	-0.0907 (0.4412)	-0.1385 (0.2836)	0.0996 (0.2623)	-0.2191 (0.8480)	-0.7844 (0.7536)
Sciences & Arts/Humanities	0.0026 (0.1582)	-0.0275 (0.1981)	-0.0769 (0.2180)	0.2964 (0.1942)	-0.7901 (0.6164)	-0.3057 (0.7314)
Commerce & Humanities	-0.0175 (0.1451)	0.1853 (0.1475)	0.3074* (0.1619)	0.5999*** (0.1547)	0.8852 (0.6069)	1.1353*** (0.4203)
Commerce & Science	0.3109 (0.3184)	0.1003 (0.1342)	0.4122 (0.3228)	0.4633*** (0.1665)	-0.6318 (0.8956)	0.8392* (0.4954)
Age	0.0164*** (0.0047)	0.0210*** (0.0068)	0.0326*** (0.0066)	0.0380*** (0.0081)	0.0810*** (0.0199)	0.1211*** (0.0272)
Ethnicity (base Aust/NZ):						
Other	0.1546 (0.1253)	-0.0717 (0.1410)	-0.1567 (0.1450)	-0.2977* (0.1753)	0.4314 (0.4149)	-0.8336** (0.4171)
Asian	-0.1457 (0.0959)	-0.0436 (0.1298)	-0.3344*** (0.1105)	-0.0617 (0.1227)	-0.7530** (0.3680)	-0.7231 (0.5064)
British/European	0.0814 (0.1301)	0.0709 (0.1141)	-0.1290 (0.1455)	0.1099 (0.1314)	0.0047 (0.4751)	0.9252** (0.4647)
Income	0.0157 (0.0507)	0.0137 (0.0455)	-0.0007 (0.0547)	-0.0466 (0.0598)	-0.0834 (0.1451)	-0.0229 (0.1319)
Assets	0.0735** (0.0326)	0.1127*** (0.0396)	0.0571 (0.0362)	0.1315*** (0.0453)	0.2118** (0.1061)	0.2259* (0.1262)
Debt	-0.0171 (0.0338)	-0.0300 (0.0356)	-0.0218 (0.0403)	-0.0517 (0.0413)	-0.0297 (0.1000)	-0.1873* (0.1042)
Maths Ability	0.1521*** (0.0292)	0.1271*** (0.0417)	0.0561* (0.0328)	0.1077* (0.0558)	0.4462*** (0.1317)	0.1717 (0.1883)
Personality type (BFI):						
Extraversion	-0.1167** (0.0502)	-0.0883 (0.0546)	-0.0398 (0.0537)	-0.1791*** (0.0634)	-0.4357** (0.1787)	-0.2660 (0.2245)

Agreeableness	-0.1349** (0.0628)	-0.0317 (0.0793)	-0.1519** (0.0704)	-0.0479 (0.0868)	-0.7110*** (0.2344)	0.0282 (0.3286)
Conscientiousness	-0.0002 (0.0601)	0.0495 (0.0672)	0.0993 (0.0674)	0.1175 (0.0804)	-0.2277 (0.2203)	-0.4666* (0.2767)
Neuroticism	-0.1367** (0.0644)	-0.1047* (0.0623)	-0.0975 (0.0632)	-0.0295 (0.0749)	-0.5549*** (0.2083)	-0.4027 (0.2752)
Openness	0.0505 (0.0726)	0.0058 (0.0851)	-0.0420 (0.0842)	-0.1263 (0.0930)	0.0344 (0.2735)	-0.1847 (0.2887)
Risk Tolerance	-0.0630* (0.0323)	0.0254 (0.0298)	0.0239 (0.0338)	0.0843** (0.0367)	-0.0091 (0.1133)	0.3387*** (0.0947)
FTP	-0.0608** (0.0302)	0.0530 (0.0433)	0.0723** (0.0339)	0.1335*** (0.0406)	0.1579 (0.1277)	0.0643 (0.1581)
Previous study (base none):						
High School	0.1390 (0.1028)	-0.0234 (0.1072)	0.3417*** (0.1176)	0.2344* (0.1224)	0.3077 (0.3775)	0.4234 (0.3992)
High School & Since	0.1218 (0.1119)	-0.2179* (0.1203)	0.2733** (0.1200)	0.0442 (0.1337)	0.3144 (0.3993)	0.3334 (0.4832)
Since High School	0.1441 (0.1082)	0.0404 (0.1004)	0.2046* (0.1234)	0.0148 (0.1086)	-0.0090 (0.4063)	0.2385 (0.3671)
Discussed	0.0592 (0.0375)	0.0107 (0.0418)	0.1253*** (0.0386)	0.1355*** (0.0462)	-0.0159 (0.1439)	0.3060* (0.1626)
Constant	2.8034*** (0.5493)	1.8463*** (0.6817)	1.0418* (0.5771)	0.2413 (0.7944)	8.0720*** (2.1565)	6.6675** (2.6369)
Variance (individual)	0.3600	0.3038	0.4514	0.2895	3.3144	2.3491
Variance (residual)	0.5442	0.3968	0.7178	0.6987	2.0110	0.9081
-2LL	-1588.2	-993.1	-1749.8	-1174.4	-941.2	-466.6
Chi-2	261.7	140.9	352.2	290.1	136.7	125.8
df	34	34	34	34	28	28
Obs	1220	852	1220	852	439	252
Individuals	502	363	502	363	256	151

Table 6 Confidence and Unit Completion

This table presents results from a maximum likelihood estimation of multinomial logit mixed model regressions with individual random effects for a measure of under and over-confidence. The relative risk ratios of underestimating or overestimating the number of questions correct are presented relative to the group who are calibrated in that they correctly identified how many questions they had correct. Explanatory variables as described in Table 4. Standard errors (brackets) are clustered by individual with significance reported by *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

	Basic		Advanced	
	Under	Over	Under	Over
Survey				
Post-2013	0.9318 (0.1849)	0.8345 (0.1860)	0.4723*** (0.1073)	3.4238*** (0.7330)
FUP-2014	0.7869 (0.1720)	0.6383* (0.1543)	0.9541 (0.1820)	0.8352 (0.2213)
FUP-2015	0.7840 (0.2026)	0.5944* (0.1766)	0.7354 (0.1616)	0.3809** (0.1469)
FUP-2016	0.6629* (0.1595)	0.4105*** (0.1222)	0.6311** (0.1440)	0.7098 (0.2226)
Unit	1.3306 (0.2713)	1.2473 (0.2580)	1.1435 (0.2001)	1.0839 (0.2508)
Post-2013*Unit	0.3841*** (0.1117)	0.4697** (0.1462)	0.3448*** (0.1233)	1.4801 (0.4555)
FUP-2014*Unit	0.4323** (0.1800)	0.5379 (0.2344)	0.5030** (0.1722)	0.9088 (0.4156)
FUP-2015*Unit	0.3398** (0.1718)	0.4636 (0.2547)	0.6527 (0.2677)	0.9312 (0.6210)
FUP-2016*Unit	0.6029 (0.2397)	0.5151 (0.2857)	0.5779 (0.2169)	0.9543 (0.4820)
Don't knows	0.6352*** (0.0842)	1.0171 (0.1155)	0.5230*** (0.0307)	0.6371*** (0.0483)
Female	1.9164*** (0.3292)	1.5909*** (0.2709)	2.1817*** (0.3507)	0.8493 (0.1262)
Major (base Sciences):				
Commerce Single/Double	0.4391*** (0.1207)	0.7664 (0.2001)	0.2618*** (0.0638)	0.8431 (0.1888)
Arts/Humanities Single or Double	1.6182** (0.3365)	2.0625*** (0.4471)	0.8250 (0.1427)	1.0744 (0.2228)
Arts/Humanities and Science	0.8621 (0.3618)	0.7156 (0.3406)	0.6906 (0.2909)	0.8946 (0.3750)
Sciences and Arts/Humanities	1.0391 (0.3175)	0.8703 (0.3527)	1.5141 (0.3845)	0.3954** (0.1675)
Commerce & Humanities	0.9385 (0.2519)	0.9597 (0.2983)	0.8853 (0.2534)	1.1063 (0.3370)
Commerce & Science	0.9485 (0.2914)	0.8498 (0.2829)	0.5002** (0.1479)	0.7346 (0.2026)
Age	0.9884 (0.0148)	0.9656* (0.0194)	0.9729** (0.0135)	0.9871 (0.0129)
Ethnicity (base Aust/NZ):				
Other	0.9617 (0.2485)	0.8020 (0.2107)	0.5752*** (0.1235)	0.7669 (0.1850)
Asian	1.5940** (0.3097)	1.1151 (0.2121)	1.0030 (0.1699)	0.9686 (0.1792)
British/European	0.4892*** (0.1287)	0.4826*** (0.1344)	0.9981 (0.2140)	1.3282 (0.3112)
Income	1.0620 (0.1161)	0.9725 (0.1235)	1.2989*** (0.1292)	0.9266 (0.1074)
Assets	0.9153 (0.0663)	0.9912 (0.0813)	0.8520** (0.0548)	0.9413 (0.0695)
Debt	1.0748 (0.0809)	1.1779* (0.1099)	1.0112 (0.0680)	1.0788 (0.0914)

Maths Ability	0.9350 (0.0560)	0.9469 (0.0662)	0.8629*** (0.0494)	1.1316* (0.0775)
Personality type (BFI):				
Extraversion	1.0953 (0.1101)	1.1284 (0.1211)	0.8499* (0.0781)	0.9226 (0.0888)
Agreeableness	1.2367* (0.1576)	1.5014*** (0.2170)	1.1340 (0.1290)	1.1120 (0.1384)
Conscientiousness	0.8402 (0.1061)	0.7922* (0.1002)	1.0974 (0.1285)	0.9215 (0.1038)
Neuroticism	1.5029*** (0.1727)	1.3140** (0.1698)	1.0737 (0.1081)	0.9370 (0.1022)
Openness	0.8839 (0.1257)	0.7879* (0.1117)	0.8647 (0.0989)	1.1856 (0.1585)
Risk Tolerance	0.9827 (0.0650)	0.9969 (0.0704)	0.9054* (0.0539)	0.9437 (0.0610)
FTP	0.9556 (0.0583)	1.1538** (0.0780)	1.0289 (0.0576)	0.9962 (0.0595)
Previous study (base none):				
High School	1.1186 (0.2193)	1.3913* (0.2742)	1.0068 (0.1680)	0.9579 (0.1885)
High School & Since	0.8639 (0.1962)	1.5771** (0.3513)	1.0433 (0.2242)	1.3021 (0.2801)
Since High School	0.7892 (0.1619)	0.7735 (0.1766)	1.0743 (0.1915)	0.8544 (0.1595)
Discussed	0.9794 (0.0679)	1.0653 (0.0811)	0.9146 (0.0643)	1.0655 (0.0748)
-2LL		-1958.5		-1829.2
Obs		2072		2072
Individuals		865		865

Table 7 Self-Assessments of Financial Literacy Components

This table presents results from a maximum likelihood estimation of linear mixed model regressions with individual random effects for subjective measures of financial literacy. Each outcome is measure on a seven point Likert scale which for the first three columns are from Extremely Poor (1) to Extremely Good (7) and the last column from Very Dissatisfied (1) to Very Satisfied (7). The measure of financial literacy used is the residual from a regression of each respective measure of financial literacy and the set of variables as described in Table 4. Standard errors (bracketed) are clustered by individual and significance is reported by *** p<0.01, ** p<0.05, * p<0.1.

	Financial Decision Making Ability	Investing Knowledge	Superannuation Knowledge	Satisfaction Managing Finances
Survey				
Post-2013	0.0851 (0.0651)	0.0032 (0.0800)	0.1983** (0.0797)	0.1637** (0.0712)
FUP-2014	0.0536 (0.0663)	0.0366 (0.0928)	0.3253*** (0.0925)	0.2449*** (0.0787)
FUP-2015	-0.0513 (0.0816)	-0.2300** (0.1026)	0.1303 (0.1192)	0.0620 (0.0950)
FUP-2016	0.0457 (0.0880)	-0.1061 (0.1120)	0.3284*** (0.1210)	0.0994 (0.1063)
Unit	-0.2516*** (0.0802)	-0.3034*** (0.0999)	-0.4274*** (0.1015)	-0.6687*** (0.0932)
Post-2013*Unit	0.2215** (0.0916)	1.4810*** (0.1237)	1.5249*** (0.1224)	0.9695*** (0.1029)
FUP-2014*Unit	0.4140*** (0.1068)	1.3501*** (0.1569)	1.1190*** (0.1689)	0.9045*** (0.1395)
FUP-2015*Unit	0.2486 (0.1526)	0.8290*** (0.2157)	0.9324*** (0.2308)	1.0680*** (0.1758)
FUP-2016*Unit	0.2681** (0.1325)	0.8734*** (0.1981)	0.5736*** (0.2162)	0.7733*** (0.1810)
Fin. Lit. Resids	0.0692** (0.0321)	0.1938*** (0.0316)	0.1553*** (0.0345)	0.0721** (0.0309)
Female	-0.0895 (0.0722)	-0.4072*** (0.0862)	-0.1919** (0.0856)	-0.1362* (0.0806)
Major (base Sciences):				
Commerce	0.1457 (0.0926)	0.5413*** (0.1428)	0.4570*** (0.1357)	0.3305*** (0.1189)
Arts/Humanities	-0.0158 (0.0883)	-0.0936 (0.1096)	-0.0729 (0.1109)	0.1618* (0.0980)
Arts/Humanities & Science	0.1231 (0.2640)	-0.2780 (0.2687)	-0.5698** (0.2269)	0.0712 (0.2473)
Sciences & Arts/Humanities	-0.0478 (0.1735)	-0.0492 (0.1784)	-0.1252 (0.1530)	0.2100 (0.1571)
Commerce & Humanities	0.2175** (0.0945)	0.2357 (0.1442)	0.2656* (0.1422)	0.2176 (0.1407)
Commerce & Science	0.0954 (0.1278)	0.3440** (0.1560)	0.3233* (0.1667)	0.1943 (0.1400)
Age	0.0081 (0.0056)	0.0312*** (0.0083)	0.0403*** (0.0071)	0.0103 (0.0064)
Ethnicity (base Aust/NZ):				
Other	0.0240 (0.0967)	-0.0905 (0.1300)	-0.1347 (0.1246)	0.1004 (0.1167)
Asian	-0.2723*** (0.0787)	-0.1096 (0.1017)	-0.3196*** (0.0991)	-0.3533*** (0.0882)
British/European	-0.0244 (0.0927)	-0.0972 (0.1352)	-0.2578** (0.1281)	0.0065 (0.1190)
Income	0.1267*** (0.0398)	0.0312 (0.0533)	0.2098*** (0.0558)	0.0517 (0.0495)
Assets	0.1125*** (0.0292)	0.1807*** (0.0356)	0.1816*** (0.0381)	0.1305*** (0.0332)
Debt	-0.0806*** (0.0290)	-0.0431 (0.0389)	-0.0466 (0.0422)	-0.1078*** (0.0408)
Maths Ability	0.2835***	0.1685***	0.1254***	0.1798***

	(0.0291)	(0.0330)	(0.0337)	(0.0305)
Personality type (BFI):				
Extraversion	-0.0037 (0.0445)	-0.0363 (0.0537)	0.0320 (0.0517)	-0.0928* (0.0516)
Agreeableness	-0.0355 (0.0521)	-0.0839 (0.0694)	-0.0466 (0.0678)	-0.0382 (0.0617)
Conscientiousness	0.2928*** (0.0551)	0.1368** (0.0664)	0.1364** (0.0655)	0.3534*** (0.0598)
Neuroticism	-0.0147 (0.0484)	-0.1522*** (0.0583)	-0.0751 (0.0618)	-0.1832*** (0.0538)
Openness	-0.0073 (0.0618)	0.0472 (0.0725)	0.0527 (0.0725)	-0.0591 (0.0690)
Risk Tolerance	0.0132 (0.0257)	0.2724*** (0.0331)	0.2267*** (0.0342)	0.0316 (0.0316)
FTP	0.1392*** (0.0276)	0.1443*** (0.0333)	0.1315*** (0.0350)	0.1111*** (0.0314)
Previous study (base none):				
High School	0.0299 (0.0813)	0.5443*** (0.1045)	0.2406** (0.1024)	0.1211 (0.0961)
High School & Since	0.2150*** (0.0795)	0.7509*** (0.1256)	0.0888 (0.1191)	0.1996* (0.1065)
Since High School	0.0858 (0.0804)	0.3302*** (0.1036)	0.1644 (0.1029)	0.0982 (0.0948)
Discussed	0.1082*** (0.0318)	0.2561*** (0.0391)	0.1631*** (0.0393)	0.2074*** (0.0343)
Constant	1.3901*** (0.4481)	-0.8305 (0.5587)	-1.2437** (0.5392)	1.9281*** (0.4785)
Variance (individual)	0.3772	0.6162	0.5199	0.5070
Variance (residual)	0.6101	1.0887	1.2022	0.8418
-2LL	-2802.0	-3380.9	-3424.5	-3129.1
Chi-2	486.6	1537.5	1224.8	711.8
df	36	36	36	36
Obs	2072	2072	2072	2072
Individuals	865	865	865	865

Table 8 Day to day Financial Decision Making, Financial Knowledge, Super Knowledge, and Satisfaction Managing Finances - Gender

This table re-estimates Table 7 within each gender. Results are presented from a maximum likelihood estimation of linear mixed model regressions with individual random effects for a measure of confidence. Each outcome is measure on a seven point Likert scale which for the first three columns are from Extremely Poor (1) to Extremely Good (7) and the last column from Very Dissatisfied (1) to Very Satisfied (7). The measure of financial literacy used is the residual from a regression of each respective measure of financial literacy and the set of variables as described in Table 4. Standard errors (bracketed) are clustered by individual and significance is reported by *** p<0.01, ** p<0.05, * p<0.1.

	Financial Decision Making Ability		Investing Knowledge		Superannuation Knowledge		Satisfaction Managing Finances	
	Female	Male	Female	Male	Female	Male	Female	Male
Survey								
Post-2013	0.1066 (0.0807)	0.0360 (0.1093)	-0.0081 (0.1026)	0.0014 (0.1274)	0.1603 (0.1015)	0.2540** (0.1281)	0.1152 (0.0900)	0.2650** (0.1132)
FUP-2014	-0.0080 (0.0803)	0.1589 (0.1151)	0.0251 (0.1134)	0.0352 (0.1624)	0.2713** (0.1197)	0.4102*** (0.1483)	0.2769*** (0.0980)	0.1724 (0.1305)
FUP-2015	0.0649 (0.1025)	-0.3151** (0.1303)	-0.3246** (0.1303)	-0.0663 (0.1621)	0.0713 (0.1483)	0.2047 (0.1981)	0.0574 (0.1176)	0.0242 (0.1530)
FUP-2016	-0.0136 (0.1158)	0.1322 (0.1227)	-0.2098 (0.1347)	0.0818 (0.1933)	0.1633 (0.1469)	0.6618*** (0.1982)	-0.0220 (0.1302)	0.3058* (0.1730)
Unit	-0.3701*** (0.1104)	-0.1399 (0.1227)	-0.3040** (0.1301)	-0.2659* (0.1570)	-0.4297*** (0.1321)	-0.3768** (0.1586)	-0.8206*** (0.1251)	-0.4338*** (0.1408)
Post-2013*Unit	0.3068** (0.1272)	0.1953 (0.1396)	1.5570*** (0.1788)	1.4489*** (0.1764)	1.5924*** (0.1602)	1.4596*** (0.1844)	1.0522*** (0.1420)	0.8200*** (0.1514)
FUP-2014*Unit	0.6333*** (0.1434)	0.1245 (0.1626)	1.5473*** (0.2005)	1.1026*** (0.2476)	1.2874*** (0.2262)	0.9181*** (0.2486)	0.9847*** (0.1898)	0.8438*** (0.2038)
FUP-2015*Unit	0.4858** (0.1887)	0.2068 (0.2347)	1.0791*** (0.2866)	0.5184 (0.3294)	1.0536*** (0.3261)	0.8420** (0.3395)	1.2046*** (0.2291)	0.9962*** (0.2759)
FUP-2016*Unit	0.5099*** (0.1705)	-0.0085 (0.2054)	0.9368*** (0.2535)	0.7286** (0.3066)	0.7754*** (0.2808)	0.2345 (0.3319)	1.1055*** (0.2400)	0.3338 (0.2712)
Fin. Lit. Resids	0.0488 (0.0367)	0.1085* (0.0619)	0.1557*** (0.0388)	0.2418*** (0.0548)	0.1298*** (0.0398)	0.1868*** (0.0637)	0.0834** (0.0394)	0.0433 (0.0509)
Major (base Sciences):								
Commerce Single/Double	0.1153 (0.1226)	0.2207 (0.1483)	0.1883 (0.2067)	0.9822*** (0.1922)	0.2406 (0.1876)	0.7485*** (0.1980)	0.1017 (0.1725)	0.7398*** (0.1507)
Arts/Humanities Single or Double	-0.0588 (0.1045)	-0.0218 (0.1742)	-0.2329* (0.1311)	0.2246 (0.2182)	-0.1665 (0.1406)	0.1350 (0.1896)	0.0575 (0.1158)	0.2174 (0.1846)
Arts/Humanities and Science	0.1717 (0.2810)	-0.0636 (0.5714)	-0.3095 (0.3378)	-0.3117 (0.3718)	-0.7279** (0.2862)	-0.3516 (0.3683)	-0.0358 (0.2993)	0.2869 (0.4294)
Sciences and Arts/Humanities	-0.3718 (0.2288)	0.4802** (0.1896)	-0.1551 (0.2273)	0.0949 (0.2721)	-0.1730 (0.1969)	-0.0109 (0.2312)	-0.0719 (0.1958)	0.6767*** (0.2500)

Commerce & Humanities	0.1037 (0.1343)	0.3342** (0.1317)	0.1114 (0.1717)	0.4742* (0.2488)	0.0722 (0.1766)	0.5960*** (0.2203)	-0.0059 (0.1896)	0.5106*** (0.1965)
Commerce & Science	-0.3080 (0.2687)	0.2417 (0.1531)	0.1574 (0.3134)	0.5008*** (0.1856)	0.2158 (0.2642)	0.4096* (0.2159)	-0.1742 (0.2601)	0.3685** (0.1651)
Age	0.0060 (0.0065)	0.0189** (0.0096)	0.0304*** (0.0100)	0.0379*** (0.0138)	0.0384*** (0.0089)	0.0475*** (0.0123)	0.0106 (0.0065)	0.0144 (0.0144)
Ethnicity (base Aust/NZ):								
Other	0.0937 (0.1351)	-0.0968 (0.1351)	0.1539 (0.1875)	-0.5114*** (0.1630)	-0.0439 (0.1734)	-0.2896* (0.1568)	0.1556 (0.1729)	0.0139 (0.1394)
Asian	-0.3265*** (0.1023)	-0.1273 (0.1213)	-0.0053 (0.1328)	-0.2786* (0.1531)	-0.2708** (0.1289)	-0.4230*** (0.1569)	-0.3786*** (0.1123)	-0.2553* (0.1407)
British/European	-0.0457 (0.1139)	0.0638 (0.1525)	-0.1089 (0.1633)	-0.0044 (0.2174)	-0.3479** (0.1704)	-0.0450 (0.1922)	-0.1186 (0.1519)	0.3157* (0.1685)
Income	0.1642*** (0.0482)	0.0594 (0.0661)	0.0862 (0.0718)	-0.0918 (0.0755)	0.2100*** (0.0758)	0.2014** (0.0814)	0.0881 (0.0675)	-0.0092 (0.0730)
Assets	0.0637* (0.0364)	0.1889*** (0.0475)	0.1591*** (0.0435)	0.2210*** (0.0602)	0.2192*** (0.0498)	0.0968* (0.0557)	0.0991** (0.0418)	0.1762*** (0.0556)
Debt	-0.0347 (0.0388)	-0.1500*** (0.0452)	-0.0470 (0.0493)	-0.0243 (0.0608)	-0.0203 (0.0561)	-0.0830 (0.0644)	-0.0349 (0.0516)	-0.2183*** (0.0663)
Maths Ability	0.2600*** (0.0334)	0.3294*** (0.0514)	0.1416*** (0.0407)	0.2029*** (0.0580)	0.1045*** (0.0396)	0.1296** (0.0620)	0.1422*** (0.0356)	0.2538*** (0.0511)
Personality type (BFI):								
Extraversion	-0.0387 (0.0550)	0.0647 (0.0699)	-0.0308 (0.0678)	-0.0035 (0.0806)	0.0283 (0.0669)	0.0204 (0.0804)	-0.0877 (0.0646)	-0.0841 (0.0806)
Agreeableness	-0.0543 (0.0687)	-0.0280 (0.0786)	-0.0751 (0.0866)	-0.0871 (0.1119)	-0.0479 (0.0874)	-0.0528 (0.1008)	0.0091 (0.0815)	-0.1236 (0.0928)
Conscientiousness	0.2861*** (0.0730)	0.3180*** (0.0790)	0.0688 (0.0882)	0.2838*** (0.1048)	0.1020 (0.0867)	0.2178** (0.0997)	0.3504*** (0.0744)	0.3768*** (0.0966)
Neuroticism	-0.0141 (0.0605)	-0.0323 (0.0781)	-0.2010*** (0.0755)	-0.0591 (0.0920)	-0.1699** (0.0810)	0.0543 (0.0932)	-0.1988*** (0.0643)	-0.1801** (0.0916)
Openness	0.0221 (0.0762)	-0.1045 (0.0995)	0.0807 (0.0895)	-0.0937 (0.1214)	0.1082 (0.0930)	-0.1190 (0.1199)	-0.0411 (0.0852)	-0.1340 (0.1045)
Risk Tolerance	0.0224 (0.0350)	0.0034 (0.0376)	0.2776*** (0.0462)	0.2550*** (0.0476)	0.2467*** (0.0406)	0.1961*** (0.0584)	0.0367 (0.0403)	0.0369 (0.0514)
FTP	0.1344*** (0.0349)	0.1342*** (0.0441)	0.1385*** (0.0399)	0.1427** (0.0567)	0.1245*** (0.0412)	0.1447** (0.0603)	0.0868** (0.0388)	0.1452*** (0.0519)
Previous study (base none):								
High School	0.0119 (0.1099)	0.0643 (0.1196)	0.6723*** (0.1364)	0.4063*** (0.1573)	0.3473** (0.1372)	0.0812 (0.1553)	0.1703 (0.1304)	0.0284 (0.1404)
High School & Since	0.1382	0.2957***	0.7495***	0.7801***	-0.0710	0.3221*	0.1938	0.1728

	(0.1241)	(0.1072)	(0.1774)	(0.1772)	(0.1728)	(0.1657)	(0.1433)	(0.1561)
Since High School	0.0951	0.1162	0.3329**	0.3985***	0.2052	0.1526	-0.0186	0.1997
	(0.1110)	(0.1160)	(0.1558)	(0.1329)	(0.1490)	(0.1388)	(0.1430)	(0.1269)
Discussed	0.1245***	0.0755*	0.2764***	0.2227***	0.1831***	0.1424**	0.2360***	0.1648***
	(0.0417)	(0.0440)	(0.0516)	(0.0585)	(0.0476)	(0.0647)	(0.0456)	(0.0493)
Constant	1.6024***	0.9884	-0.8818	-1.3859	-1.1733*	-1.1379	1.8987***	1.6515**
	(0.5748)	(0.7115)	(0.7020)	(0.9646)	(0.6974)	(0.8919)	(0.6059)	(0.7704)
Variance (individual)	0.3772	0.3198	0.6372	0.5116	0.5624	0.3961	0.4907	0.4440
Variance (residual)	0.6258	0.5627	1.0730	1.0843	1.1534	1.2483	0.8612	0.7938
-2LL	-1660.1	-1110.9	-1986.9	-1372.9	-2004.8	-1400.6	-1847.1	-1255.9
Chi-2	305.3	271.0	648.6	683.2	656.4	554.1	372.1	444.5
df	35	35	35	35	35	35	35	35
Obs	1220	852	1220	852	1220	852	1220	852
Individuals	502	363	502	363	502	363	502	363

Table 9 Core Financial Behaviours and Unit Completion

This present estimated odds ratio for reported behaviours in the previous six-months: established financial goals; established/reviewed a budget; tracked expenditure; and established/reviewed available emergency funds. Results are presented from a maximum likelihood estimation of logistic mixed model regressions with individual random effects. The measure of financial literacy used is the residual from a regression of each respective measure of financial literacy and the set of variables as described in Table 4. Standard errors (bracketed) are clustered by individual and significance is reported by *** p<0.01, ** p<0.05, * p<0.1.

	Goal 74.7 (Unit) 80.1 (Control)	Budget 64.8 (Unit) 76.9 (Control)	Track 90.1 (Unit) 91.9 (Control)	Emergency 70.8 (Unit) 78.6 (Control)
Survey				
Post-2013	1.1300 (0.3094)	0.9824 (0.2371)	0.7130 (0.2420)	1.3943 (0.3613)
FUP-2014	1.9686** (0.6406)	0.6294* (0.1516)	1.2811 (0.5097)	1.6009 (0.4877)
FUP-2015	1.4879 (0.5601)	0.9226 (0.2682)	1.2935 (0.6470)	1.3343 (0.4691)
FUP-2016	1.3566 (0.5181)	0.5907* (0.1790)	1.1351 (0.5580)	1.9218* (0.7367)
Unit	0.8164 (0.2208)	0.5322*** (0.1249)	0.9993 (0.3318)	0.7323 (0.1897)
Post-2013*Unit	9.8922*** (4.7182)	4.5313*** (1.6209)	5.2428*** (2.6517)	2.0199** (0.7066)
FUP-2014*Unit	1.4000 (0.7290)	3.7090*** (1.6849)	2.5369 (2.1804)	1.5613 (0.8124)
FUP-2015*Unit	0.8585 (0.5114)	0.6370 (0.3305)	5.2783* (5.1520)	1.1888 (0.7555)
FUP-2016*Unit	0.7723 (0.4533)	2.1716 (1.0380)	0.9839 (0.7506)	0.5257 (0.2812)
Fin. Literacy Residual	0.9700 (0.1047)	0.9322 (0.0891)	1.2897* (0.1725)	0.9498 (0.0991)
Female	1.4592 (0.3644)	1.7030** (0.3603)	2.1094** (0.6636)	1.4423 (0.3480)
Major (base Sciences):				
Commerce Single/Double	1.0921 (0.4499)	1.6022 (0.5476)	1.1894 (0.5248)	2.6499** (1.0468)
Arts/Humanities Single or Double	1.4677 (0.4543)	1.3749 (0.3618)	1.4450 (0.5338)	0.8198 (0.2331)
Arts/Humanities and Science	1.3944 (1.0108)	1.0170 (0.6407)	1.0203 (0.7303)	0.3978* (0.2078)
Sciences and Arts/Humanities	1.1196 (0.5656)	0.6799 (0.2546)	0.8285 (0.4584)	0.5321 (0.2191)
Commerce & Humanities	2.2886* (1.1137)	1.5011 (0.5494)	4.3973** (2.7110)	2.4377* (1.2451)
Commerce & Science	1.1087 (0.5060)	1.7090 (0.7184)	1.6085 (0.9124)	2.3502* (1.0340)
Age	1.0099 (0.0229)	1.0300 (0.0209)	0.9841 (0.0288)	1.0200 (0.0227)
Ethnicity (base Aust/NZ):				
Other	0.8237 (0.3162)	1.7039 (0.5681)	1.3607 (0.6473)	1.8095* (0.6405)
Asian	0.6241* (0.1729)	0.9366 (0.2203)	1.4810 (0.5181)	2.2910*** (0.6431)
British/European	0.6382 (0.2272)	0.4990** (0.1574)	0.7904 (0.3415)	1.4312 (0.5701)
Income	1.5016** (0.2633)	1.2914* (0.1837)	1.4024 (0.3109)	1.7230*** (0.2968)
Assets	1.2925** (0.1371)	1.0773 (0.0950)	1.1679 (0.1695)	1.3596*** (0.1509)
Debt	1.1649 (0.1547)	1.0366 (0.1071)	0.9492 (0.1316)	0.8513 (0.1001)

Maths Ability	0.9610 (0.0918)	1.0944 (0.0889)	1.0226 (0.1266)	0.8331** (0.0748)
Personality type (BFI):				
Extraversion	0.9357 (0.1454)	0.9909 (0.1316)	1.0031 (0.1875)	0.8517 (0.1320)
Agreeableness	1.4973** (0.3012)	1.1978 (0.2009)	1.1485 (0.2660)	1.1408 (0.2077)
Conscientiousness	1.5806** (0.3018)	1.5665*** (0.2497)	1.5124** (0.3104)	1.6209*** (0.2842)
Neuroticism	1.4061** (0.2321)	1.1525 (0.1659)	0.9793 (0.1919)	1.1399 (0.1801)
Openness	2.3406*** (0.5025)	1.4514** (0.2593)	1.0544 (0.2492)	1.7225*** (0.3339)
Risk Tolerance	1.1663 (0.1201)	0.9390 (0.0712)	1.0788 (0.1359)	1.0813 (0.0944)
FTP	1.4445*** (0.1378)	1.1700* (0.0938)	1.1895 (0.1328)	1.1038 (0.0955)
Previous study (base none):				
High School	0.8466 (0.2537)	0.6061** (0.1508)	1.3270 (0.5060)	0.6104* (0.1648)
High School & Since	2.1452** (0.8011)	0.7998 (0.2410)	0.8607 (0.3605)	0.7390 (0.2514)
Since High School	0.7545 (0.2250)	0.7435 (0.1827)	0.8868 (0.3147)	0.7751 (0.2225)
Discussed	1.3031** (0.1485)	1.3140*** (0.1219)	1.3840** (0.1840)	1.2998** (0.1384)
-2LL	-778.4	-1031.2	-471.1	-905.3
Chi-2	121.0	108.9	67.2	105.4
df	36	36	36	36
Obs	2072	2072	2072	2072
Individuals	865	865	865	865

Table 10 Frequency of Positive Behaviours

This table present estimations from a maximum likelihood estimation of a linear mixed model regression with individual random effects of responses to how often the following behaviours are performed: The four behaviour statements were: “Before buying something I carefully consider whether I can afford it” (Afford); “I pay my bills on time” (Bills); “I keep a close personal watch on my financial affairs” (Watch); and “Before committing to a financial decision I consult independent sources of information/advice” (Never (1) to (Always (5)). Baseline mean scores are shown at the top of columns. The measure of financial literacy used is the residual from a regression of the raw Advanced scale and the set of variables as described in Table 4. Standard errors (bracketed) are clustered by individual and significance is reported by *** p<0.01, ** p<0.05, * p<0.1.

	Afford 4.2 (Unit) 4.3 (Control)	Bills 4.5 (Unit) 4.5 (Control)	Watch 4.0 (Unit) 4.1 (Control)	Consult 3.0 (Unit) 3.2 (Control)
Survey: Post-2013	-0.0185 (0.0508)	0.0360 (0.0508)	-0.0474 (0.0614)	0.0303 (0.0807)
FUP-2014	-0.0768 (0.0715)	0.0366 (0.0598)	-0.0901 (0.0736)	0.0132 (0.0998)
Unit	-0.1327** (0.0628)	0.0416 (0.0525)	-0.0343 (0.0670)	-0.0666 (0.0879)
Post-2013*Unit	0.1907*** (0.0704)	-0.0015 (0.0699)	0.1707** (0.0821)	0.2739** (0.1101)
FUP-2016*Unit	0.2027* (0.1199)	0.0466 (0.0953)	0.1015 (0.1169)	0.0313 (0.1653)
Fin. Literacy	-0.0134 (0.0248)	0.0199 (0.0224)	0.0315 (0.0258)	-0.0010 (0.0381)
Female	-0.1960*** (0.0597)	-0.0137 (0.0480)	-0.1079* (0.0615)	0.1546* (0.0821)
Major (base Sciences)Commerce Single/Double	-0.0728 (0.0987)	0.0218 (0.0842)	0.0232 (0.1015)	-0.1279 (0.1320)
Arts/Humanities Single or Double	0.0262 (0.0698)	-0.0650 (0.0642)	-0.1175 (0.0779)	-0.1455 (0.0949)
Arts/Humanities and Science	0.1282 (0.1813)	0.1095 (0.1247)	-0.0444 (0.1642)	-0.4358* (0.2480)
Sciences and Arts/Humanities	0.1352 (0.1084)	0.0921 (0.0993)	-0.0240 (0.1370)	-0.2462 (0.1612)
Commerce & Humanities	0.1083 (0.1052)	0.1550* (0.0855)	-0.0158 (0.1034)	0.1092 (0.1431)
Commerce & Science	0.0521 (0.1261)	-0.0953 (0.1236)	-0.0700 (0.1211)	0.1941 (0.1895)
Age	0.0034 (0.0061)	0.0002 (0.0044)	0.0100** (0.0050)	0.0221*** (0.0066)
Ethnicity (base Aust/NZ): Other	0.0976 (0.0809)	-0.0134 (0.0754)	0.0475 (0.0893)	0.1081 (0.1239)
Asian	0.1706*** (0.0655)	0.0267 (0.0563)	-0.1186* (0.0696)	0.1542* (0.0923)
British	-0.0038 (0.1083)	0.0692 (0.0813)	-0.1667 (0.1056)	0.0671 (0.1338)
European	0.0421 (0.1170)	-0.0254 (0.1040)	0.0016 (0.1191)	-0.1992 (0.1580)
Income	-0.0692 (0.0441)	0.0229 (0.0326)	0.1083*** (0.0400)	-0.0603 (0.0523)
Assets	-0.0188 (0.0262)	0.0264 (0.0220)	0.0071 (0.0261)	0.0454 (0.0351)
Debt	-0.0606* (0.0337)	-0.0799*** (0.0271)	-0.0536* (0.0319)	-0.0792** (0.0390)
Maths Ability	0.0539** (0.0216)	0.0500** (0.0203)	0.0349 (0.0244)	-0.0465 (0.0285)
Personality type (BFI):Extraversion	-0.1143*** (0.0356)	-0.0583* (0.0310)	-0.0570 (0.0382)	-0.0163 (0.0483)
Agreeableness	0.1036** (0.0450)	0.0699* (0.0392)	0.0357 (0.0500)	-0.0120 (0.0599)
Conscientiousness	0.2056*** (0.0431)	0.1929*** (0.0385)	0.3367*** (0.0475)	0.1101* (0.0610)
Neuroticism	-0.0186	0.0086	-0.0071	-0.0179

	(0.0402)	(0.0324)	(0.0437)	(0.0558)
Openness	0.1097**	-0.0410	-0.0205	0.0574
	(0.0510)	(0.0425)	(0.0507)	(0.0661)
Risk Tolerance	-0.0821***	-0.0583***	-0.0242	0.0336
	(0.0244)	(0.0204)	(0.0246)	(0.0338)
FTP	0.1176***	0.0645***	0.1319***	0.1815***
	(0.0240)	(0.0217)	(0.0248)	(0.0297)
Previous Study (Base: None) High School	0.0275	-0.1171**	0.0367	-0.1009
	(0.0715)	(0.0590)	(0.0707)	(0.0977)
High School & Since	0.0089	-0.1401**	-0.0387	0.0404
	(0.0732)	(0.0705)	(0.0765)	(0.1055)
Since High School	-0.0191	-0.0507	-0.0080	0.0853
	(0.0680)	(0.0622)	(0.0743)	(0.0943)
Discussed	0.0792***	0.0530**	0.1246***	0.1221***
	(0.0254)	(0.0238)	(0.0292)	(0.0367)
Constant	2.5546***	3.3561***	1.6811***	1.1661**
	(0.3713)	(0.3228)	(0.3935)	(0.5016)
Variance (individual)	-0.6478	-0.9578	-0.6690	-0.4549
Variance (residual)	-0.4750	-0.5142	-0.3648	-0.0500
-2LL	-1865.1	-1689.5	-1983.3	-2447.9
Chi-2	188.6	114.3	244.8	162.8
df	33	33	33	33
Obs	1603	1603	1603	1603
Individuals	865	865	865	865

Table 11 Information Sources, Confidence in Information Search and Unit Completion

This table present estimations from a maximum likelihood estimation of a linear mixed model regression with individual random effects. Five groups of information sources are based on their assessed level of importance (Not at all Important (1) to Extremely Important (5)) using ten different information items. The measure of financial literacy used is the residual from a regression of the raw Advanced scale and the set of variables as described in Table 4. Standard errors (bracketed) are clustered by individual and significance is reported by *** p<0.01, ** p<0.05, * p<0.1.

	Ads	Authority	Family & Friends	Unsolicited	Confidence Info.Search
Survey					
Post-2013	-0.1278** (0.0530)	-0.0307 (0.0379)	-0.0988** (0.0450)	-0.0666* (0.0374)	
FUP-2014	-0.3345*** (0.0557)	-0.0085 (0.0453)	-0.1395*** (0.0445)	-0.4227*** (0.0373)	
FUP-2015	-0.3291*** (0.0681)	-0.0880 (0.0578)	-0.1445** (0.0672)	-0.1559** (0.0786)	0.0168 (0.0666)
FUP-2016	-0.3545*** (0.0689)	0.0328 (0.0572)	-0.1705*** (0.0638)	-0.6130*** (0.0516)	0.0168 (0.0744)
Unit	-0.0456 (0.0536)	0.1157*** (0.0409)	-0.0808 (0.0526)	-0.0371 (0.0439)	0.2960*** (0.0947)
Post-2013*Unit	0.0891 (0.0718)	0.2529*** (0.0519)	-0.1220* (0.0627)	-0.1030* (0.0531)	
FUP-2014*Unit	0.1985** (0.0966)	0.2365*** (0.0695)	0.0832 (0.0759)	0.0174 (0.0739)	
FUP-2015*Unit	-0.0101 (0.1282)	-0.0582 (0.1235)	-0.1383 (0.1149)	-0.0756 (0.1504)	
FUP-2016*Unit	0.0781 (0.1207)	0.1496* (0.0869)	-0.0214 (0.1016)	-0.0311 (0.0844)	
Fin. Lit. Resids	-0.0437** (0.0210)	0.0515*** (0.0158)	0.0068 (0.0175)	0.0250 (0.0162)	0.0808* (0.0453)
Female	0.0634 (0.0470)	0.0479 (0.0365)	0.1394*** (0.0448)	0.1472*** (0.0380)	-0.1931** (0.0984)
Major (base Sciences):					
Commerce Single/Double	0.0903 (0.0685)	0.0611 (0.0574)	-0.1281* (0.0674)	-0.0546 (0.0637)	0.5111 (0.3124)
Arts/Humanities Single or Double	0.0600 (0.0615)	0.0318 (0.0454)	-0.0169 (0.0573)	0.0439 (0.0471)	0.2622 (0.2422)
Arts/Humanities and Science	0.0360 (0.1209)	-0.0146 (0.1212)	-0.1181 (0.0906)	0.0303 (0.0886)	0.3831 (0.3185)
Sciences and Arts/Humanities	-0.1504 (0.1001)	0.0308 (0.0716)	0.1248 (0.0914)	-0.0249 (0.0823)	-0.0779 (0.2512)
Commerce & Humanities	-0.0756 (0.0791)	0.1570*** (0.0597)	-0.1244 (0.0994)	-0.0146 (0.0707)	0.7129*** (0.2207)
Commerce & Science	-0.0168 (0.0935)	0.1062 (0.0675)	-0.0667 (0.0918)	0.0163 (0.0718)	0.5802*** (0.2061)
Age	0.0033 (0.0057)	0.0038 (0.0035)	-0.0103*** (0.0037)	-0.0134*** (0.0032)	0.0257* (0.0153)
Ethnicity (base Aust/NZ):					
Other	0.1288* (0.0779)	-0.0366 (0.0531)	0.0366 (0.0709)	0.0880 (0.0576)	-0.4662** (0.2076)
Asian	0.2419*** (0.0526)	-0.0282 (0.0416)	0.2500*** (0.0502)	0.0629 (0.0467)	-0.0706 (0.1936)
British/European	-0.0417 (0.0714)	-0.1386** (0.0643)	-0.0080 (0.0714)	-0.1127** (0.0557)	0.6581*** (0.2191)
Income	-0.0134 (0.0319)	0.0355 (0.0263)	0.0411 (0.0305)	-0.0229 (0.0260)	-0.1195 (0.0738)
Assets	-0.0543*** (0.0204)	-0.0176 (0.0166)	0.0054 (0.0192)	-0.0365** (0.0168)	0.0539 (0.0562)
Debt	-0.0121 (0.0251)	-0.0093 (0.0187)	0.0213 (0.0213)	0.0031 (0.0205)	-0.0971* (0.0510)
Maths Ability	-0.0105 (0.0177)	0.0173 (0.0152)	-0.0123 (0.0169)	0.0269* (0.0155)	0.1844** (0.0862)

Personality type (BFI):					
Extraversion	0.0711** (0.0309)	-0.0394* (0.0224)	0.1011*** (0.0285)	0.0491** (0.0238)	-0.0603 (0.0984)
Agreeableness	0.1008*** (0.0378)	0.0757** (0.0323)	0.0850** (0.0360)	0.1401*** (0.0312)	-0.3362** (0.1424)
Conscientiousness	-0.0085 (0.0388)	0.0077 (0.0285)	-0.0718** (0.0331)	0.0207 (0.0314)	0.1934* (0.1055)
Neuroticism	0.0361 (0.0333)	-0.0049 (0.0249)	0.0577* (0.0335)	0.0231 (0.0265)	-0.3970*** (0.1093)
Openness	-0.0305 (0.0444)	-0.0149 (0.0328)	-0.0036 (0.0365)	-0.0777** (0.0303)	0.1071 (0.1217)
Risk Tolerance	0.0385* (0.0207)	-0.0043 (0.0153)	-0.0075 (0.0165)	0.0514*** (0.0161)	0.2492*** (0.0521)
FTP	0.0688*** (0.0189)	0.0752*** (0.0164)	0.0423** (0.0176)	0.0383*** (0.0147)	0.0847 (0.0672)
Previous study (base none):					
High School	0.0275 (0.0598)	0.0408 (0.0437)	-0.0802 (0.0535)	0.0091 (0.0486)	0.1870 (0.1944)
High School & Since	0.0675 (0.0628)	0.0044 (0.0487)	-0.0089 (0.0616)	-0.0457 (0.0548)	0.2917 (0.2223)
Since High School	-0.0390 (0.0580)	0.0452 (0.0417)	-0.1349** (0.0624)	-0.0948** (0.0478)	0.0236 (0.1593)
Discussed	-0.0132 (0.0216)	0.0478*** (0.0158)	0.0400* (0.0212)	-0.0056 (0.0178)	0.0272 (0.0661)
Constant	1.7470*** (0.2972)	2.7939*** (0.2456)	2.9733*** (0.2954)	2.4619*** (0.2681)	1.6441 (1.1524)
Variance (individual)	0.1489	0.0961	0.1699	0.1032	0.3636
Variance (residual)	0.3959	0.2323	0.2940	0.2645	0.2852
-2LL	-2245.9	-1712.2	-2029.6	-1835.1	-282.1
Chi-2	208.3	201.8	192.8	616.8	175.5
df	36	36	36	36	29
Obs	2072	2072	2072	2072	252
Individuals	865	865	865	865	151

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