

Financial Literacy and Participation in Risky Asset Markets: A Spurious Relationship?

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Abstract

I examine whether the well-documented association between financial literacy and financial behaviour is robust to variation on a more innate level: the propensity for financial planning. I find that individuals' propensity for financial planning is strongly positively related to stock market participation as well as membership in a voluntary workplace retirement savings scheme. This result holds even when controlling for financial literacy and a range of other demographic and control variables in a multivariate regression setting. Importantly, however, the positive association between financial literacy and risky asset market participation persists regardless of an individual's propensity for financial planning.

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1 Introduction

Recent studies conclude that financial literacy plays a key role in influencing financial behaviour. For example, Van Rooij, Lusardi and Alessie (2011) show that stock market participation is higher for individuals who display greater financial literacy. More financially literate individuals are also more likely to undertake retirement planning and attain higher levels of wealth at retirement (Lusardi and Mitchell, 2007, 2011c). Furthermore, financially literate individuals are less likely to fall victim to predatory lending practices (Moore, 2003), incur lower debt-related expenses and fees (Lusardi and Tufano, 2009) and are less likely to engage in high-cost methods of borrowing (Lusardi and Scheresberg, 2013).

Policymakers are increasingly looking towards the promotion of financial literacy as a means of encouraging financial independence and improving financial outcomes for individuals. Such goals have taken on additional urgency in the face of rapidly aging populations in many nations around the world. When the effectiveness of financial education in influencing behaviour is assessed, however, the results are often disappointing. For example, Cole and Shastry (2008) show that school financial literacy programmes mandated in US states have no effect on subsequent investment behaviour.² The validity of causal inferences between financial literacy and financial behaviour has also been called into question. For example, Hastings, Madrian and Skimmyhorn (2013) discuss the potential impact of unobserved variables. They suggest that traits such as patience and forward-looking behaviour might be associated with both financial literacy and financial outcomes.

In this study, I take such considerations into account and test whether the relationship between financial literacy and financial behaviour can be explained by differences among individuals on a more innate level: their propensity for financial planning. I address two main

² For a more detailed review of studies assessing the effectiveness of financial education programmes, see for example Hastings, Madrian and Skimmyhorn (2013).

research questions. First, I ask whether an individual's propensity for financial planning is associated with risky asset market participation independent of financial literacy. Second, I test whether the positive association between financial literacy and risky asset market participation is dependent on an individual's propensity for financial planning. My study is the first to examine the effect of the propensity for financial planning in the context of risky asset markets.

There are strong reasons to believe that the propensity for financial planning will influence the decision to participate in risky asset markets. The premise that goal setting and planning affect behavioural outcomes has long been recognised in the psychology literature (Ajzen, 1985; 1991, Gollwitzer, 1990; 1996). For example, Gollwitzer (1996) argues that planning enables individuals to better overcome obstacles hindering goal achievement such as distraction and giving up when faced with difficulties. Ameriks, Caplin and Leahy (2003) examine the link between a general propensity to plan, financial planning and wealth accumulation. They describe the channel by which the propensity to plan encourages wealth accumulation as "effortful self-control". Individuals with a higher propensity to plan are better placed to recognise and rectify inappropriate spending patterns to bring actual behaviour into line with more optimal and desired behaviour.

I expect a similar relationship to operate in the context of risky asset market participation. Variation in participation rates is generally accounted for in financial models by entry barriers and differences in abilities and incentives which allow individuals to overcome these barriers (Barnea, Cronqvist & Siegel, 2010). Just like planning propensity helps individuals overcome barriers to saving, I argue that the propensity for financial planning offers an important mechanism by which barriers to risky asset market participation may be overcome. For example, individuals who plan may be better able to recognise the potential long-term

benefits of participation, even in the event of short-term set-backs. Therefore, individuals with a higher propensity for financial planning should be more likely to invest in risky assets.

My second hypothesis tests whether the propensity for financial planning affects the relationship between financial literacy and financial outcomes. It is likely that individuals who plan would also be more likely to recognise and perceive as such the potential benefits of financial literacy.³ Thus, they would be more likely to actively enhance their financial literacy. Evidence in support of this is provided by Meier and Sprenger (2012), who show that more future-oriented or patient individuals are more likely to choose to acquire financial information. If such an effect operates, then the relationship between financial literacy and financial behaviour will likely be driven at least in part by a third underlying factor: the propensity for financial planning. I therefore expect that the positive relationship between financial literacy and risky asset market participation will be stronger for individuals with a higher propensity for financial planning.

There are some additional prior studies which have examined the role of planning in the context of economic behaviour, but these have focused primarily on retirement planning. For example, those who carry out retirement planning tend to have higher levels of wealth when they are close to retirement and are also more likely to hold high-return assets (Lusardi, 2001; Lusardi & Mitchell, 2007). Retirement planning also increases expectations of a comfortable retirement and enhances retirement satisfaction (Anderson, Li, Bechhofer, McCrone & Stewart, 2000; Elder & Rudolph, 1999). My study uses a much more general measure for the propensity for financial planning. In addition, I consider not only the effects of financial literacy and financial planning separately, but also their interaction.

³ This also relates to the observation made by Hastings, Madrian and Skimmyhorn (2013) (discussed above) that forward-looking behaviour could influence both affect both financial literacy and behaviour.

My analysis makes use of the 2009 and 2013 waves of the New Zealand Financial Knowledge Survey. Each wave collects detailed data relating to the financial knowledge, attitudes and behaviours of approximately 850 individuals as well as a comprehensive range of demographic information. I measure financial literacy by assessing responses to a range of questions testing financial knowledge. I measure propensity for financial planning by evaluating individuals' approaches to setting financial goals and producing financial plans. I consider two measures of participation in risky asset markets. First, I define stock market participation as ownership of individual stocks or mutual funds. The second measure is based on membership in KiwiSaver, a workplace retirement savings scheme unique to New Zealand. Including KiwiSaver membership as a measure of stock market participation presents unique advantages because KiwiSaver is likely to substantially reduce potential barriers to participation. Thanks to features such as automatic enrolment as well as employer and government contributions, KiwiSaver should provide an ideal opportunity for individuals to invest in risky assets.

My most important findings can be summarised as follows. First, the propensity for financial planning is strongly and positively correlated with risky asset market participation. Moreover, it loses almost none of its predictive power when financial literacy is included in the same multivariate regression. Nor, however, does financial literacy. A strong positive association between financial literacy and stock market participation persists for all groups of individuals, regardless of their propensity for financial planning.

My study makes two significant contributions. First, I test an important alternative explanation for the positive relation between financial literacy and financial behaviour. I find, however, that the relationship is robust and holds even for those individuals who demonstrate the lowest propensity for financial planning. Second, I provide new evidence to help explain

cross-sectional variation in risky asset market participation.⁴ I find that individuals' attitudes towards financial goal setting and planning hold considerable explanatory power independent of financial literacy.

2 Data and variables

2.1 Financial Knowledge Survey

Research in household finance has often been hindered by a lack of detailed and high quality survey data. Thanks to a relatively recently-launched initiative in New Zealand, I have access to a particularly rich dataset which includes not only measures of financial literacy, planning and behaviour, but also a comprehensive range of demographic variables.

The data consist of two waves of the New Zealand Financial Knowledge Survey, carried out in 2009 and 2013. The surveys are conducted on behalf of New Zealand's Commission for Financial Literacy and Retirement Income by the market research company, Colmar Brunton.⁵ The surveys are designed to be representative of the adult population of New Zealand. A stratified sampling approach is employed based on Statistics New Zealand area units and surveys are conducted using face-to-face interviews with an average duration of approximately one hour. The final samples for the 2009 and 2013 waves consist of 850 and 852 respondents respectively, with response rates of 62 and 59%.⁶

After removing nine observations with missing values for the financial literacy and financial planning questions, I am left with a total of 1,693 observations. The sample which I use in the

⁴ Contrary to the predictions of standard financial theory, it is a well-documented phenomenon that a significant number of individual investors fail to participate in the stock market (see for example, Campbell, 2006; Haliassos & Bertaut, 1995; Mankiw & Zeldes, 1991).

⁵ The Commission for Financial Literacy and Retirement Income is an autonomous Crown Entity established in 1993 with the goal of improving the financial wellbeing of New Zealanders.

⁶ A more detailed description of the methodology used in carrying out the Financial Knowledge Surveys together with a report of the results is available from Colmar Brunton (2009; 2013).

regressions and certain univariate analyses is slightly smaller since some respondents refused to answer specific questions.

2.2 Financial literacy variables

As discussed above, numerous studies have shown that financial literacy is an important driver of financial behaviour. It is likely that there exists a considerable amount of correlation between an individual's financial literacy and their propensity for financial planning. For example, a financially literate person may be more likely to recognise the potential benefits of financial planning. Similarly, a more literate person may be more likely to carry out financial planning simply because they are better equipped to produce a workable plan (and perceive themselves to be better equipped to do so). In order to differentiate the effects of financial literacy from those of financial planning, it is therefore important to include a well-constructed measure of financial literacy.

Prior studies have applied a range of techniques for measuring financial literacy. The most direct way involves asking survey respondents a series of questions designed to test their financial knowledge. While the exact questions differ among studies, three particular questions first designed for the 2004 US Household and Retirement Survey (HRS) by Lusardi and Mitchell (2011a) have become a standard for testing basic financial literacy. The questions test the three basic concepts of interest compounding, inflation and risk diversification.

Financial literacy as measured by these three basic questions has been shown to influence various aspects of financial behaviour, both in the US and internationally (see for example, Lusardi, Mitchell, and Curto, 2010; Lusardi and Mitchell, 2011c⁷). However, as Van Rooij, Lusardi and Alessie (2011) show, more advanced questions hold additional explanatory

⁷ Lusardi and Mitchell (2011c) summarise the results of a recent international project on financial literacy in which eight countries included the standard questions (or slightly modified versions thereof) in national surveys.

power for more complex financial behaviour such as stock market participation. In their study, they include both a basic and an advanced index of financial literacy. They find that it is the advanced index which is most strongly related to participation in the equity market.

The New Zealand financial knowledge survey incorporates questions testing financial literacy in a range of topics including money management, budgeting, debt management, home loans/mortgages, managing risk, saving, retirement planning, investing and consumer rights and responsibilities. The questions differ considerably in their level of difficulty and also allow respondents the option of stating that they do not know the answer to a question or to refuse to answer the question. The exact wording of the questions as well as the response rates are provided in Table A1 of the Appendix.

For my main measure of financial literacy, I construct a broad index comprised of responses to a total of 52 individual questions. The index measures the number of questions answered correctly by each respondent. Table 1 presents summary statistics for the financial literacy score index. As can be seen, the index is very consistent across the two waves of the survey. In the combined sample, the mean financial literacy score is 37.3 out of 52. There is a considerable amount of variation in financial knowledge across respondents with a 20th percentile of 31 and an 80th percentile of 45.

[TABLE 1]

2.3 Financial planning variables

My analysis makes use of three questions from the Financial Knowledge Survey in order to measure an individual's propensity for financial planning. The questions are as follows:

Financial Planning Question 1: Do you have financial goals?

Financial Planning Question 2 (If answered yes to above): Have these goals been written down or recorded somewhere?

Financial Planning Question 3: A financial plan is a written approach of the steps you plan to take to achieve your financial goals. Do you have a financial plan that is written down or recorded somewhere?⁸

These questions have a lot in common with those applied by Ameriks, Caplin and Leahy (2003) in order to measure financial planning. In their study, they formulate two input/output questions which respectively ask whether respondents have spent time developing a financial plan and whether information has been gathered and reviewed to formulate a specific plan. In this sense, Financial Planning Questions 1 and 2 may also be viewed as input questions whereas Question 3 is an output question.

However, the questions used in my study also have the advantage that they cater to a wide range of financial planning behaviour. The first question is quite general and requires only that individuals have thought about their financial goals. The second question requires somewhat greater effort and commitment to thinking about one's financial future because respondents must have recorded their financial goals in writing. Finally, the third question is associated with the highest degree of financial planning because individuals must have thought about (and recorded) a series of steps in order to achieve their financial goals.

Consistent with this, panel A of Table 2 shows that the majority of respondents (75.2%) answered yes to the first question in the combined 2009 and 2013 sample. For the second and third questions, this falls considerably to 25.7% and 23.1% respectively. It is also interesting to note that although the percentage of respondents who have financial goals remains very

⁸ In the 2009 wave, financial planning question 3 excludes the words 'or recorded somewhere'.

steady across the two waves, the number of people with written financial goals or financial plans is considerably higher in 2013.

[TABLE 2]

As my main measure of the propensity for financial planning, I aggregate responses to the three questions into a financial planning index similar to the one constructed for financial literacy. For each question answered in the affirmative, a score of 1 is added to the index. Summary statistics for the financial planning index are presented in panel B of Table 2. The mean score is 1.24 out of 3 in the combined sample. 23.6% of respondents show very little propensity for financial planning, with a score of zero. Just under half of respondents show some propensity for financial planning, with a score of 1. A considerable portion of respondents do show greater amount of commitment to financial planning. 12.5% and 17.5% of the sample attain financial planning scores of 2 and 3 respectively.

As discussed above, it is important that my measure of the propensity for financial planning is not simply another proxy for financial literacy. I later provide evidence to show that financial literacy and propensity for financial planning appear to be separate effects which are related in very different ways to demographic factors. It is also important to note that, given the way I define financial planning, individuals can exhibit a high propensity for financial planning even if they are financially illiterate. The first two financial planning questions relate simply to financial goals. Financial goals can be very general, requiring no amount of sophisticated financial knowledge. The final question relates to producing a plan in order to achieve financial goals. Again, such a plan may general, comprised for example of a series of savings targets. The Spearman correlation coefficient between the financial literacy quintiles and the financial planning score is 0.22. This is highly statistically significant but

considerably lower than would be expected if the two measures were essentially proxying for the same effect.

Table 3 provides a closer examination of the relationship between financial literacy and the propensity for financial planning in a univariate setting. It displays the percentage of respondents within each financial literacy quintile for each level of financial planning together with the mean literacy quintile for each level of planning. Among those individuals who have the lowest propensity for financial planning, 38.8% fall within the lowest financial literacy quintile and only 6.5% fall within the highest quintile. The mean literacy quintile for this group of individuals is 2.3. For the higher propensity for financial planning groups, patterns are not as clear. For example, the mean financial literacy quintile ranges between 3.0 and 3.3 for the remaining three propensity for financial planning groups.

[TABLE 3]

2.4 Demographic variables

Evidence from prior studies suggests that demographic and socioeconomic factors are correlated with financial behaviour (e.g. Campbell, 2006). In assessing the relationships between financial literacy and planning and market participation, it is therefore important to control for a comprehensive range of demographic variables. The Financial Knowledge Survey satisfies this requirement and collects data on demographic characteristics including age, gender, family status, ethnicity, education, wealth and income. Table A2 in the Appendix provides a complete description of all the demographic and other control variables which I include in my analysis.

2.5 Risky asset market participation variables

I use two different measures of participation in risky asset markets. Firstly, I consider whether individuals either own individual stocks or invest in unit trusts or mutual funds. This is similar to the measure employed by Van Rooij, Lusardi and Alessie (2011) and I refer to it as stock market participation.⁹ In my combined sample, the rate of participation in the stock market is 23.9%. Examining the 2009 and 2013 survey waves separately, participation falls from 26.1% to 21.7%.¹⁰

My second measure of participation in risky asset markets is unique to a New Zealand context and considers whether respondents are members of KiwiSaver. KiwiSaver is a voluntary workplace retirement savings scheme introduced by the New Zealand government in 2007. Members and their employers make regular contributions and also receive government benefits in the form of an initial lump-sum payment and member tax credits. However, the scheme is not government-guaranteed and members are free to choose their own KiwiSaver fund and fund managers. A variety of KiwiSaver funds are available and not all hold equity securities.¹¹

There are some important advantages of using KiwiSaver membership as an additional specification for risky asset market participation. Prior studies have pointed to fixed costs including entry costs and ongoing participation costs as representing potential barriers to market participation for certain investors, especially those with low wealth and incomes (e.g. Campbell, 2006; Vissing-Jorgensen, 2004). KiwiSaver presents relatively low entry costs and the employer and government contributions provide clear incentives for individuals to participate. Thus, KiwiSaver appears to provide an ideal opportunity for individuals who

⁹ It is possible that some of the mutual funds and unit trusts do not hold equity securities. The Financial Knowledge Survey data does not allow me to differentiate between these different types of funds.

¹⁰ The question relating to direct shareholdings in the 2013 wave excluded holdings in one's own business.

¹¹ For more information about the KiwiSaver scheme, see <http://www.kiwisaver.govt.nz/>.

understand its benefits to enter risky asset markets. To encourage membership, workers are automatically enrolled in KiwiSaver when they begin a new job. However, it is easy to opt out of the scheme and recent statistics published by the New Zealand Inland Revenue (2012) suggest that many people are making active choices in relation to their KiwiSaver schemes. For example, 68% of the 1.97 million members as at 30 June 2012 proactively opted in to KiwiSaver. Consistent with this, the KiwiSaver participation rate is much higher than the stock market participation rate. In the combined sample, 37.7% of respondents are KiwiSaver members. As would be expected given that KiwiSaver is still a fairly new initiative, the participation rate has increased strongly between 2009 and 2013 from 27.1% to 48.3%.

3 Methodology

As discussed above, my study involves testing two main hypotheses: whether propensity for financial planning influences risky asset market participation independent of financial literacy and whether market participation is influenced by an interaction effect between the propensity for financial planning and financial literacy. In order to test the first hypothesis, I begin with a univariate setting and sort respondents into groups separately based on their financial literacy quintile and their propensity for financial planning index score. I then calculate risky asset market participation rates within each group. This indicates how participation rates differ by financial literacy and propensity for financial planning separately, but also allows a comparison of the magnitudes of the two effects.

There are many additional factors which have been shown to affect risky asset market participation and I therefore adopt a multivariate regression setting to examine the effect of literacy and planning independent of each other and of a range of control variables. My main test uses a logistic regression specification in the following form:

$$\begin{aligned}
& MARKET_PARTICIPATION_i \\
& = \alpha + \sum \beta_j FIN_LIT_QUINT_{j,i} + \sum \gamma_k FIN_PLAN_SCORE_{k,i} \quad (1) \\
& + \sum \delta_l CONTROL_{l,i} + \varepsilon_i
\end{aligned}$$

$MARKET_PARTICIPATION_i$ is a dummy variable equal to 1 if a respondent participates in risky asset markets as defined by the participation measure and zero otherwise. (Separate regressions are carried out for the two specifications of market participation). $FIN_LIT_QUINT_{j,i}$ refer to separate dummy variables for the financial literacy quintiles 2 to 5 which take a value of 1 if a respondent's score falls into a given quintile and zero otherwise. Including separate quintile dummies rather than a composite index score allows for the possibility of non-linearity in the relationship between financial literacy and market participation. Similarly, $FIN_PLAN_SCORE_{k,i}$ denote separate dummy variables for financial planning index scores of 1 to 3 which take a value of 1 if a respondent attains a given score and zero otherwise. $CONTROL_{l,i}$ refer to a comprehensive range of demographic and other control variables. These are defined in detail in Table A2 of the Appendix. If the propensity for financial planning is a significant predictor of market participation independent of financial literacy, the coefficients γ_k would be expected to be positive and statistically significant. The size of the coefficients would also be expected to increase across the financial planning score dummies.

My second hypothesis relates to the nature of the relationship between the propensity for financial planning, financial literacy and risky asset market participation. Specifically, I examine whether a higher propensity for financial planning strengthens the relationship between financial literacy and market participation. Again, I begin with a univariate analysis in which I sort respondents into groups, this time based first on their propensity for financial planning and then on their financial literacy quintile. I compare how different levels of

financial literacy influence market participation across individuals with different propensities for financial planning. If the second hypothesis holds, then the rate at which market participation increases with financial literacy should be higher within the group of individuals which display a greater propensity for financial planning.

Again, I also examine the relationship in a multivariate setting in which I modify regression Equation 1 above as follows:

$$\begin{aligned}
 MARKET_PARTICIPATION_i & \\
 &= \alpha + \sum \beta_j FIN_LIT_QUINT_{j,i} + \sum \gamma_k FIN_PLAN_SCORE_{k,i} \\
 &+ \sum \theta_k FIN_PLAN_SCORE_{k,i} \times FIN_LIT_QUINT_i \\
 &+ \sum \delta_l CONTROL_{l,i} + \varepsilon_i
 \end{aligned} \tag{2}$$

In this specification, I include an interaction term between each of the three financial planning dummy variables (relating to financial planning scores of 1 to 3) and a categorical variable, $FIN_LIT_QUINT_i$, which takes a value equal to a respondent's financial literacy quintile. If greater propensity for financial planning strengthens the relationship between financial literacy and market participation, then the coefficients θ_k on the interaction terms would be expected to be significantly positive and increasing over the financial planning scores.

4 Results

4.1 Financial literacy and financial planning

I begin with a more detailed examination of financial literacy and propensity for financial planning, and, in particular, how these vary across demographic groups. Table 4 shows the percentage of respondents falling into different financial literacy quintiles according to various demographic groupings. The mean quintile for each group is also shown. A number

of distinct patterns emerge and these are generally very consistent with the results of prior studies. Firstly, the financial literacy score is hump-shaped with respect to age, rising steadily until age 54 before declining. Females appear to have somewhat lower levels of financial literacy than males. As expected, financial literacy rises monotonically with the level of the highest educational qualification. Differences are also apparent across ethnic groups, with Europeans and other ethnic groups tending to display considerably higher levels of literacy than Maori, Pacific Islanders and Asians. Financial literacy is higher for the employed than the unemployed, for those that recently received financial advice and is strongly positively related to wealth.

[TABLE 4]

In regard to the propensity for financial planning, patterns are less clear-cut. As shown in Table 5, the financial planning score is relatively steady across most age groups but drops considerably for those aged over 64. There is much less variation across gender and ethnicity than is the case for financial literacy. The Pearson chi square tests do not allow the hypothesis that the financial planning score is independent of gender and ethnicity to be rejected. Patterns across education and net wealth subgroups are also considerably weaker than was the case in relation to financial literacy. Respondents who are employed and those who have received financial advice during the last 12 months do appear to have a greater propensity for financial planning, however.

[TABLE 5]

In order to examine the relationships between financial literacy, financial planning and demographic variables in a multivariate setting, I estimate ordinal logistic regression models where the dependent variable is either the financial literacy quintile or the financial planning score. The results are displayed in Table 6. Financial literacy and propensity for financial

planning are clearly related. Higher levels of financial literacy are associated with higher propensities for financial planning and vice versa.

Of greater interest is the observation that the two effects are related to demographic variables in very different ways. For example, as before, there is an indication of a slightly hump-shaped relationship between financial literacy and age. In contrast, the propensity for financial planning is relatively steady before falling strongly for the oldest age group. The coefficient on the female dummy variable is negative though marginally insignificant for financial literacy. The tendency of females to display lower levels of financial literacy than males is a well-documented result and has been described as a puzzle in this area of the literature (e.g. Lusardi and Mitchell, 2011b). In contrast, the female dummy variable enters with a positive coefficient (significant at the 5% level) when the dependent variable is the financial planning score. This is of considerable interest and suggests that although females tend to have lower levels of financial knowledge than their male counterparts, they also tend to have a higher propensity for financial planning.

[TABLE 6]

Again consistent with prior results, financial literacy is strongly positively related to education. This is not the case for financial planning, which tends to remain steady regardless of education. While financial literacy rises steeply with respect to net wealth, propensity for financial planning tends to fall (though the coefficients are mostly insignificant). This suggests that the perceived benefit of financial planning might be lower among wealthier individuals: they may already have achieved their main financial goals. In the financial planning regressions, both the financial advice and the 2013 dummy variables return significantly positive coefficients. In contrast, the coefficients are negative (though insignificant) for financial literacy. Financial advice may therefore provide the most benefit

through encouraging people to undertake financial planning rather than through directly increasing their financial knowledge. The increase in the propensity for financial planning from 2009 to 2013 might in part be the result of efforts by various organisations to raise financial awareness in New Zealand. Nevertheless, financial literacy shows no increase in the regression model.

The correlation between financial literacy and propensity for financial planning highlights the importance of controlling for both when investigating the determinants of risky asset market participation. However, the strong differences in how the two variables vary across demographic factors indicate that the propensity for financial planning is not simply proxying for financial literacy.

4.2 Risky asset market participation

4.2.1 Univariate analysis

Table 7 displays how rates of stock market participation and KiwiSaver membership differ according to financial literacy, financial planning and demographic groupings. Both stock market participation and KiwiSaver membership are strongly positively related to financial literacy. The participation rate increases monotonically between the lowest and highest financial literacy quintiles from 10.8% to 45.6% for stock ownership and from 29.8% to 47.4% for KiwiSaver membership. A monotonic increase in risky asset market participation is also observable across financial planning scores. Stock ownership rises from 15.7% to 29.5% from the lowest to highest planning scores while KiwiSaver membership rises from 23.0% to 48.8%. Pearson Chi Squared tests indicate that the null hypothesis that the distribution of risky asset market participation is independent of financial literacy and financial planning can be strongly rejected.

[TABLE 7]

Several significant patterns are also apparent between rates of market participation and demographic variables. Stock ownership rises steadily with age before dropping slightly for those aged over 64. KiwiSaver membership tends to be close to 50% for most age groups but drops dramatically to 9.1% among those aged over 64. Respondents in this age group may have already retired when KiwiSaver was first introduced, withdrew their KiwiSaver funds at retirement or perceived the future benefits of joining KiwiSaver to be low given they were close to retirement.¹² Both stock ownership and KiwiSaver membership tend to rise with the level of education. Europeans tend to have higher stock market participation rates than other ethnic groups. Conversely, Europeans appear to have the lowest rates of participation in KiwiSaver. Consistent with prior evidence, stock ownership also rises with net wealth. For those with net wealth between zero and \$100,000, the participation rate is 15.8%. For those with net wealth \$601,000 or over, this rises to 57.5%. In contrast, KiwiSaver membership tends to remain fairly steady across net wealth groups. Individuals who sought financial advice during the past 12 months are considerably more likely to own stocks and be members of KiwiSaver.

4.2.2 Multivariate analysis

Table 8 presents the results of logistic regressions conducted according to the specification given in Equation 1. The regressions use two different dependent variables and respectively model the probability of participating in the stock market and being a member of KiwiSaver. For each dependent variable, two models are estimated. The first (models 1 and 3) include dummies relating to the top four financial literacy quintiles and a comprehensive range of control variables. The second (models 2 and 4) also add separate dummies indicating whether a respondent attained a financial planning score of 1, 2 or 3.

¹² However, government contributions (initial lump sum kick start and member tax credits) should make membership desirable even for those close to retirement.

As shown by the results for model 1, financial literacy is strongly positively associated with stock market participation. This is consistent with the findings of Van Rooij, Lusardi and Alessie (2011) for Dutch investors. The fact that only the two highest financial literacy quintile dummy variables are significant illustrates the non-linear nature of the relationship. Again, this is mirrored in the results of Van Rooij, Lusardi and Alessie (2011). Their study includes both an advanced and a basic index of financial literacy. While the advanced index is found to be a significant predictor of stock market participation, the basic index is insignificant.

When I add the financial planning score dummy variables in model 2, their coefficients are also positive and statistically significant at the 10% level or higher. The coefficients increase monotonically from the financial planning score of 1 to 3. Interestingly, the coefficients on the financial literacy variables remain much the same and lose almost none of their significance. These results suggest that both financial literacy and the propensity for financial planning are related to stock market participation independent of each other.

Associations between stock market participation and other demographic factors are generally consistent with the univariate results. Those who have higher levels of wealth and income and those who have received financial advice during the last 12 months are more likely to own stocks. Interestingly, education shows no significant association with stock ownership. Controlling for all the other demographic factors, there are no longer any significant differences in stock ownership across ethnicities. Respondents from 2013 are also significantly less likely to own stocks. This may be due to the increasing popularity of KiwiSaver funds which provide a substitute to owning stocks directly or through other mutual funds.

[TABLE 8]

When I model the probability of KiwiSaver membership (models 3 and 4 in Table 8), the financial literacy quintile dummies again increase monotonically and the highest quintile is significant at the 1% level. The coefficient on the highest quintile decreases only slightly and remains significant at the 5% level when financial planning scores are included as dummy variables. This demonstrates that financial knowledge is positively associated even with a type of market participation which requires less effort on the part of individuals, for which there are strong incentives and for which information is readily accessible. When the financial planning score dummy variables are included, the coefficient on the highest financial planning score dummy is positive and significant at the 10% level. Therefore, although the effect is not as strong as for stock market participation, KiwiSaver membership is positively related to both financial literacy and propensity for financial planning.

Consistent with the univariate results, KiwiSaver membership is highest within the youngest age group and lowest within the oldest age group. Having had education at the level of secondary school with certificate or above is generally associated with higher KiwiSaver membership. As the coefficients on the ethnicity dummies show, KiwiSaver membership continues to be higher for Maori and Pacific Islanders than Europeans. Unlike stock market participation, KiwiSaver membership appears to be unrelated to the level of net wealth. Those who received financial advice in the last 12 months are more likely to be KiwiSaver members (significant at the 10% level) and, as expected, the coefficient on the 2013 dummy variable is positive and highly significant.

4.3 Interaction between financial literacy and propensity for financial planning

4.3.1 Univariate analysis

In this section, I examine whether the positive association between risky asset market participation and financial literacy is strengthened by the propensity for financial planning.

Table 9 presents stock market participation and KiwiSaver membership rates by financial literacy quintile. This partition is conducted separately for each level of financial planning. If the hypothesis that financial literacy encourages risky asset market participation more for individuals which demonstrate higher propensities for financial planning is correct, then one would expect a steeper rise in participation rates within higher financial planning score groups.

[TABLE 9]

In relation to stock market participation, this is clearly not the case. Stock market participation rises monotonically across financial literacy quintiles within each individual financial planning score group. For example, for those individuals with the highest propensity for financial planning (a score of 3), the stock market participation rate rises from 10.5% in the lowest literacy quintile to 46.6% in the highest quintile. However, even among individuals who demonstrate the lowest propensity for financial planning (a score of 0), the participation rate increases from 8.6% to 34.6% across literacy quintiles. Pearson Chi Square tests strongly reject the hypothesis that stock market participation is independent of financial literacy for every financial planning group except the one corresponding to a planning score of 2 (which has a marginally insignificant p-value of 0.14). This is an important result as it indicates that financial literacy is strongly positively related to risky asset market participation regardless of an individual's propensity for financial planning.

Although not as strong, this result also tends to hold in relation to KiwiSaver membership. KiwiSaver membership increases between the lowest and highest financial literacy quintiles for each level of financial planning. For example, among individuals with the highest propensity for financial planning, KiwiSaver membership increases from 41.0% to 56.9%. For those with the lowest propensity for financial planning, membership rises from 21.7% to

30.8%. In the case of KiwiSaver membership, the null hypothesis that the membership rate is independent of financial literacy quintile can only be rejected for the group corresponding to a financial planning score of 2, however.

4.3.2 *Multivariate analysis*

The result that the interaction between financial literacy and the propensity for financial planning has little effect on risky asset market participation is confirmed when I estimate a multivariate logistic regression model according to the specification given in Equation 2. Table 10 shows the results of repeating regression models 2 and 4 from Table 8 and including interaction terms between each of the financial planning score dummy variables and a categorical variable equal to the financial literacy quintile within which a respondent falls. The coefficients on the interaction terms indicate whether the strength of the association between risky asset market participation and financial literacy differs among respondents with differing propensities for financial planning. An increase in the strength of the relationship between financial literacy and market participation with propensity for financial planning would be reflected in positive and increasing coefficients across the interaction terms.

[TABLE 10]

When I model the probability of stock market participation, this notion does not receive any support. The coefficients on the interaction terms are either negative or insignificant. (Indeed, one of the negative coefficients is marginally significant). Similarly, the second regression in Table 10 provides no convincing evidence of a strengthening association between financial literacy and KiwiSaver membership in accordance with the propensity for financial planning. Although the coefficient on the second interaction variable is positive and significant, the coefficient on the third interaction term is considerably smaller and insignificant. Overall, the multivariate regression results confirm the indications from the univariate analysis. The

propensity for financial planning shows a significant positive association with risky asset market participation and this is robust to the inclusion of financial literacy. However, there is no evidence of an interaction between propensity for financial planning and financial literacy which affects market participation.

5 Conclusion

In this study, I test whether the well-documented positive relationship between financial literacy and financial behaviour is dependent on an individual's propensity for financial planning. This is an important question because financial education programmes are promoted in many countries to encourage better financial outcomes. However, considerable disagreement still exists about whether the relationship can be interpreted as causal. I find that the positive association between financial literacy and risky asset market participation persists regardless of an individual's propensity for financial planning. Even for individuals with the lowest propensities for financial planning, stock market participation rises strongly with financial literacy. I therefore do not uncover any evidence which would argue against efforts to improve financial outcomes through promoting financial literacy.

In addition, I provide new evidence on the role of the propensity for financial planning as a separate factor influencing participation in risky asset markets. I find that the propensity to set financial goals and produce financial plans is significantly positively related to participation in the stock market as well as membership in the workplace retirement savings scheme, KiwiSaver. This result holds in a multivariate regression setting controlling for a range of demographic variables as well as financial literacy. I suggest that a higher propensity for financial planning might help reduce entry barriers faced by investors. For example, individuals with a higher propensity for financial planning might be better able to recognise the long-term benefits of investing in risky asset markets.

6 Appendix

[TABLE A1]

[TABLE A2]

7 References

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Table 1: Summary statistics for financial literacy scores

This table displays summary statistics for financial literacy scores for the 2009 and 2013 subsamples as well as the combined sample. The financial literacy score is calculated as the number of financial literacy questions (out of 52) which a respondent answers correctly. Data are from the 2009 and 2013 waves of the New Zealand Financial Knowledge Survey.

Summary statistics										
Year	n	Mean	Median	Standard deviation	Min	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Max
2009	845	37.2	39	8.5	5	30	36	41	45	52
2013	848	37.3	38	7.8	3	31	36	40	44	52
Combined	1693	37.3	38	8.1	3	31	36	40	45	52

Table 2: Summary statistics for propensity for financial planning questions and scores

This table displays summary statistics for propensity for financial planning questions and scores for the 2009 and 2013 subsamples as well as the combined sample. Panel A shows the percentage of respondents answering each of the three propensity for financial planning questions correctly. Panel B shows summary statistics for the propensity for financial planning score and the percentage of respondents with each score. The propensity for financial planning score is calculated as the number of financial planning questions (out of 3) to which a respondent answers 'yes'. Data are from the 2009 and 2013 waves of the New Zealand Financial Knowledge Survey.

Panel A: Responses to propensity for financial planning questions

Question	Percentage of respondents answering yes		
	2009	2013	Combined
Question 1 - Has financial goals	75.0	75.4	75.2
Question 2 - Financial goals written down	21.8	29.6	25.7
Question 3 - Financial plan written down	20.1	26.1	23.1

Panel B: Summary statistics for propensity for financial planning scores

Year	Summary statistics			Percentage of respondents with different financial planning scores			
	n	Mean	Median	0	1	2	3
2009	845	1.17	1.00	24.1	49.8	11.0	15.0
2013	848	1.31	1.00	23.1	42.8	14.0	20.0
Combined	1693	1.24	1.00	23.6	46.3	12.5	17.5

Table 3: Financial literacy by propensity for financial planning

This table displays the percentage of respondents within different financial literacy score quintiles by financial planning score group and the mean quintile for each financial planning score group. The financial literacy score is calculated as the number of financial literacy questions (out of 52) which a respondent answers correctly. The propensity for financial planning score is calculated as the number of financial planning questions (out of 3) to which a respondent answers 'yes'. A Pearson Chi Square test is performed for the null hypothesis that the distribution of respondents over the five literacy quintiles is independent of the financial planning score group. Data are from the 2009 and 2013 waves of the New Zealand Financial Knowledge Survey.

Propensity for financial planning score	Financial literacy score quintiles					Mean	N
	1 (low)	2	3	4	5 (high)		
0 (Low)	38.8	20.0	17.8	17.0	6.5	2.3	400
1	20.0	18.4	18.4	26.4	16.8	3.0	784
2	17.0	16.0	16.5	25.0	25.5	3.3	212
3 (High)	13.1	17.8	24.9	24.6	19.5	3.2	297
		$\chi^2 = 117.75$			p-value < .0001		

Table 4: Financial literacy scores by demographic variables

This table displays the percentage of respondents within different financial literacy score quintiles by demographic groups and the mean quintile for each demographic group. For each demographic variable, a Pearson Chi Square test is performed for the null hypothesis that the distribution of respondents over the five literacy quintiles is independent of the demographic variable. The financial literacy score is calculated as the number of financial literacy questions (out of 52) which a respondent answers correctly. Definitions of the demographic variables are provided in Table A2 in the appendix. Data are from the 2009 and 2013 waves of the New Zealand Financial Knowledge Survey.

Age	Financial literacy score quintiles					Mean	N
	1 (low)	2	3	4	5 (high)		
18-24 years	50.0	22.1	11.0	14.3	2.6	2.0	154
25-34 years	30.2	19.0	19.4	21.1	10.3	2.6	232
35-44 years	13.7	19.6	21.4	25.6	19.6	3.2	336
45-54 years	14.0	14.0	17.7	30.7	23.7	3.4	300
55-64 years	14.5	19.6	20.3	23.3	22.3	3.2	296
Over 64 years	29.1	17.9	20.5	22.1	10.4	2.7	375
		$\chi^2 = 169.12$		p-value < .0001			
Gender	Financial literacy score quintiles					Mean	N
	1 (low)	2	3	4	5 (high)		
Female	24.3	20.1	17.8	24.4	13.4	2.8	962
Male	20.9	16.1	20.9	22.7	19.3	3.0	731
		$\chi^2 = 17.25$		p-value = .0017			
Highest level of education	Financial literacy score quintiles					Mean	N
	1 (low)	2	3	4	5 (high)		
Secondary school without certificate or below	40.8	24.5	17.8	12.1	4.7	2.2	404
Secondary school with certificate	23.1	20.3	19.0	24.8	12.8	2.8	399
Technical, trade or other tertiary qualification	18.6	14.3	23.1	25.7	18.2	3.1	510
University graduate	9.8	16.6	17.9	28.9	26.8	3.5	235
University post graduate	5.8	13.0	10.9	38.4	31.9	3.8	138
		$\chi^2 = 237.21$		p-value < .0001			

Financial literacy score quintiles							
Ethnicity	1 (low)	2	3	4	5 (high)	Mean	N
European	18.1	16.8	20.2	25.7	19.3	3.1	1251
Maori	50.0	26.3	11.5	9.6	2.6	1.9	156
Pacific Islander	47.4	17.5	15.8	19.3	0.0	2.1	57
Asian	31.7	22.8	20.3	20.3	4.9	2.4	123
Other	16.0	20.8	17.9	27.4	17.9	3.1	106
$\chi^2 = 160.55$				p-value < .0001			
Financial literacy score quintiles							
Employment status	1 (low)	2	3	4	5 (high)	Mean	N
Employed	15.5	17.2	20.2	26.4	20.6	3.2	1004
Not employed	33.5	20.0	17.6	19.7	9.1	2.5	689
$\chi^2 = 102.46$				p-value < .0001			
Financial literacy score quintiles							
Net wealth	1 (low)	2	3	4	5 (high)	Mean	N
Negative	40.2	23.1	18.7	12.7	5.4	2.2	386
\$0-\$100,000	26.4	20.5	20.1	23.8	9.2	2.7	303
\$101,000-\$300,000	25.0	18.5	18.2	23.8	14.6	2.8	336
\$301,000-\$600,000	13.9	18.3	19.9	26.8	21.0	3.2	366
\$601,000 or over	5.6	10.3	18.9	33.8	31.5	3.8	302
$\chi^2 = 242.78$				p-value < .0001			
Financial literacy score quintiles							
Financial advice in last 12 months	1 (low)	2	3	4	5 (high)	Mean	N
Received financial advice in last 12 months	21.6	17.2	19.4	24.6	17.2	3.0	1271
Did not receive financial advice in last 12 months	25.9	22.3	18.2	21.3	12.3	2.7	413
$\chi^2 = 13.39$				p-value = .0095			

Table 5: Propensity for financial planning scores by demographic variables

This table displays the percentage of respondents with different propensity for financial planning scores by demographic groups and the mean score for each demographic group. For each demographic variable, a Pearson Chi Square test is performed for the null hypothesis that the distribution of respondents over the four propensity for financial planning scores is independent of the demographic variable. The propensity for financial planning score is calculated as the number of financial planning questions (out of 3) to which a respondent answers 'yes'. Definitions of the demographic variables are provided in Table A2 in the appendix. Data are from the 2009 and 2013 waves of the New Zealand Financial Knowledge Survey.

	Propensity for financial planning score				Mean	N
	0 (low)	1	2	3 (high)		
Age						
18-24 years	26.0	39.0	15.6	19.5	1.3	154
25-34 years	21.1	49.1	10.8	19.0	1.3	232
35-44 years	13.4	49.1	15.2	22.3	1.5	336
45-54 years	14.7	52.0	12.0	21.3	1.4	300
55-64 years	16.2	50.7	15.5	17.6	1.3	296
Over 64 years	46.4	37.1	8.0	8.5	0.8	375
	$\chi^2 = 164.99$		p-value < .0001			
	Propensity for financial planning score				Mean	N
	0 (low)	1	2	3 (high)		
Gender						
Female	22.0	48.0	12.3	17.7	1.3	962
Male	25.7	44.0	12.9	17.4	1.2	731
	$\chi^2 = 3.94$		p-value = .2683			
	Propensity for financial planning score				Mean	N
	0 (low)	1	2	3 (high)		
Highest level of education						
Secondary school without certificate or below	38.9	42.6	6.9	11.6	0.9	404
Secondary school with certificate	21.3	45.9	15.8	17.0	1.3	399
Technical, trade or other tertiary qualification	20.4	46.5	13.7	19.4	1.3	510
University graduate	16.6	46.4	14.9	22.1	1.4	235
University post graduate	9.4	58.0	10.9	21.7	1.4	138
	$\chi^2 = 93.65$		p-value < .0001			

Propensity for financial planning score						
Ethnicity	0 (low)	1	2	3 (high)	Mean	N
European	23.7	46.8	13.1	16.5	1.2	1251
Maori	26.3	37.2	11.5	25.0	1.4	156
Pacific Islander	28.1	50.9	7.0	14.0	1.1	57
Asian	20.3	44.7	12.2	22.8	1.4	123
Other	20.8	53.8	10.4	15.1	1.2	106
			$\chi^2 = 17.03$	p-value = .1484		
Propensity for financial planning score						
Employment status	0 (low)	1	2	3 (high)	Mean	N
Employed	13.1	51.7	14.4	20.7	1.4	1004
Not employed	38.9	38.5	9.7	12.9	1.0	689
			$\chi^2 = 151.55$	p-value < .0001		
Propensity for financial planning score						
Net wealth	0 (low)	1	2	3 (high)	Mean	N
Negative	26.9	44.8	11.4	16.8	1.2	386
\$0-\$100,000	21.1	46.2	11.9	20.8	1.3	303
\$101,000-\$300,000	26.8	40.2	15.8	17.3	1.2	336
\$301,000-\$600,000	24.0	52.2	10.1	13.7	1.1	366
\$601,000 or over	17.9	48.0	13.9	20.2	1.4	302
			$\chi^2 = 25.89$	p-value = .0111		
Propensity for financial planning score						
Financial advice in last 12 months	0 (low)	1	2	3 (high)	Mean	N
Received financial advice in last 12 months	17.5	48.7	13.1	20.7	1.4	1271
Did not receive financial advice in last 12 months	40.7	40.0	11.1	8.2	0.9	413
			$\chi^2 = 105.32$	p-value < .0001		

Table 6: Ordered logistic regressions: financial literacy and propensity for financial planning

This table displays the results of two ordered logistic regression models where the dependent variables are the financial literacy quintile and the financial planning score respectively. Standard errors are shown in parentheses. Intercepts are not shown. The financial literacy score is calculated as the number of financial literacy questions (out of 52) which a respondent answers correctly. The propensity for financial planning score is calculated as the number of financial planning questions (out of 3) to which a respondent answers 'yes'. Definitions of the demographic and control variables are provided in Table A2 in the appendix. Data are from the 2009 and 2013 waves of the New Zealand Financial Knowledge Survey. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels respectively.

Independent variables	DV = Financial literacy quintile		DV = Financial planning score	
Financial literacy quintile dummies (Base = Quintile 1)				
Financial literacy quintile 2			0.460***	[0.164]
Financial literacy quintile 3			0.685***	[0.169]
Financial literacy quintile 4			0.624***	[0.170]
Financial literacy quintile 5			0.897***	[0.194]
Financial planning score dummies (Base = Score 0)				
Financial planning score 1	0.331**	[0.134]		
Financial planning score 2	0.715***	[0.177]		
Financial planning score 3	0.630***	[0.164]		
Age dummies (Base = 18-24 years)				
25-34 years	0.393*	[0.225]	-0.455**	[0.223]
35-44 years	0.984***	[0.220]	-0.091	[0.220]
45-54 years	1.092***	[0.226]	-0.252	[0.225]
55-64 years	0.920***	[0.233]	-0.205	[0.234]
Over 64 years	0.865***	[0.250]	-0.902***	[0.252]
Female	-0.161	[0.103]	0.254**	[0.106]
Partner	-0.003	[0.137]	0.212	[0.140]
Child	-0.125	[0.122]	-0.124	[0.124]
Highest education dummies (Base = Secondary without certificate)				
Secondary school with certificate	0.969***	[0.151]	0.248	[0.155]
Technical, trade or other tertiary qualification	1.008***	[0.142]	0.338**	[0.146]
University graduate	1.637***	[0.184]	0.211	[0.189]
University post graduate	1.717***	[0.217]	0.216	[0.221]
Ethnic group dummy variables (Base = NZ/European)				
Maori	-1.494***	[0.186]	0.335*	[0.181]
Pacific Islander	-1.265***	[0.298]	-0.229	[0.294]
Asian	-1.329***	[0.203]	0.01	[0.205]
Other	-0.326*	[0.197]	-0.13	[0.204]
Not employed	-0.129	[0.132]	-0.329**	[0.134]
Not main income earner	-0.093	[0.121]	-0.102	[0.123]
Wealth group dummy variables (Base = negative)				
\$0 to \$100,000	0.198	[0.156]	-0.06	[0.159]
\$101,000 to \$300,000	0.399**	[0.161]	-0.093	[0.166]
\$301,000 to \$600,000	0.667***	[0.171]	-0.406**	[0.178]
\$601,000 or over	1.005***	[0.193]	-0.184	[0.199]
Income dummy variables (Base = less than NZ\$30,000)				
\$30,000 to \$50,000	0.442***	[0.157]	0.418***	[0.162]
\$50,000 to \$100,000	0.882***	[0.169]	0.290*	[0.175]
Over \$100,000	1.276***	[0.202]	0.574***	[0.210]
Financial advice in last 12 months	-0.055	[0.119]	0.774***	[0.123]
2013	-0.12	[0.096]	0.234**	[0.099]
n	1505		1505	

Table 7: Risky asset market participation by financial literacy, propensity for financial planning and demographic groups

This table displays rates of stock/mutual fund ownership and KiwiSaver membership by financial literacy quintile, propensity for financial planning score and demographic groups. For each variable, a Pearson Chi Square test is performed for the null hypothesis that the distribution of respondents across participation and non-participation is independent of the financial literacy quintile, propensity for financial planning score or demographic variable. The financial literacy score is calculated as the number of financial literacy questions (out of 52) which a respondent answers correctly. The propensity for financial planning score is calculated as the number of financial planning questions (out of 3) to which a respondent answers 'yes'. Definitions of the demographic variables are provided in Table A2 in the appendix. Data are from the 2009 and 2013 waves of the New Zealand Financial Knowledge Survey.

Variable	Stock market participation		KiwiSaver membership	
	n	Participation rate (%)	n	Participation rate (%)
Financial literacy quintile				
1 (Low)	379	10.8	383	29.8
2	306	15.4	311	36.0
3	322	19.9	321	37.7
4	400	31.5	399	40.1
5 (High)	270	45.6	270	47.4
	$X^2 = 133.08$	p-value < .0001	$X^2 = 22.45$	p-value = .0002
Financial planning score				
0 (Low)	395	15.7	396	23.0
1	777	24.6	782	39.3
2	210	29.0	211	44.1
3 (High)	295	29.5	295	48.8
	$X^2 = 22.94$	p-value < .0001	$X^2 = 56.50$	p-value < .0001
Age				
18-24 years	152	10.5	152	49.3
25-34 years	228	9.2	230	41.7
35-44 years	335	23.9	334	40.7
45-54 years	298	24.8	300	45.3
55-64 years	294	34.0	293	53.9
Over 64 years	370	29.7	375	9.1
	$X^2 = 65.57$	p-value < .0001	$X^2 = 182.83$	p-value < .0001

Gender				
Female	951	21.8	956	37.3
Male	726	26.7	728	38.2
	$\chi^2 = 5.56$	p-value = .0184	$\chi^2 = .1252$	p-value = .7234
Highest level of education				
Secondary school without certificate or below	401	16.0	403	23.1
Secondary school with certificate	397	22.7	395	44.1
Technical, trade or other tertiary qualification	506	24.3	507	38.5
University graduate	229	33.2	235	46.0
University post graduate	137	34.3	137	47.4
	$\chi^2 = 33.24$	p-value < .0001	$\chi^2 = 55.84$	p-value < .0001
Ethnicity				
European	1242	26.1	1245	35.2
Maori	156	14.7	155	43.9
Pacific Islander	56	14.3	57	50.9
Asian	119	20.2	122	49.2
Other	104	21.2	105	38.1
	$\chi^2 = 14.64$	p-value = .0055	$\chi^2 = 16.94$	p-value = .0020
Employment status				
Employed	994	25.7	1001	49.7
Not employed	683	21.4	683	20.2
	$\chi^2 = 4.07$	p-value = .0436	$\chi^2 = 149.86$	p-value < .0001
Net wealth				
Negative	382	7.6	382	36.6
\$0-\$100,000	297	15.8	302	44.0
\$101,000-\$300,000	334	15.6	336	34.5
\$301,000-\$600,000	363	27.5	365	36.7
\$601,000 or over	301	57.5	299	37.5
	$\chi^2 = 268.38$	p-value < .0001	$\chi^2 = 6.95$	p-value = .1386
Financial advice in last 12 months				
Received financial advice in last 12 months	1258	26.9	1264	41.1
Did not receive financial advice in last 12 months	410	15.1	411	28.0
	$\chi^2 = 23.40$	p-value < .0001	$\chi^2 = 22.56$	p-value < .0001

Table 8: Logistic regressions: risky asset market participation

This table displays the results of four logistic regression models. In models 1 and 2, the dependent variable is a dummy variable taking a value of 1 if a respondent owns stocks or mutual funds and a value of zero otherwise. In models 3 and 4, the dependent variable is a dummy variable equal to 1 if a respondent is a KiwiSaver member and zero otherwise. Standard errors are shown in parentheses. The financial literacy score is calculated as the number of financial literacy questions (out of 52) which a respondent answers correctly. The propensity for financial planning score is calculated as the number of financial planning questions (out of 3) to which a respondent answers 'yes'. Definitions of the demographic and control variables are provided in Table A2 in the appendix. Data are from the 2009 and 2013 waves of the New Zealand Financial Knowledge Survey. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels respectively.

Independent variables	DV = Stock market participation				DV = KiwiSaver membership			
	Model 1		Model 2		Model 3		Model 4	
Financial literacy quintile dummies (Base = Quintile 1)								
Financial literacy quintile 2	0.064	[0.283]	0.018	[0.285]	0.139	[0.205]	0.107	[0.206]
Financial literacy quintile 3	0.131	[0.277]	0.062	[0.279]	0.255	[0.212]	0.207	[0.214]
Financial literacy quintile 4	0.570**	[0.263]	0.512*	[0.264]	0.297	[0.215]	0.261	[0.216]
Financial literacy quintile 5	1.011***	[0.284]	0.925***	[0.286]	0.616***	[0.239]	0.575**	[0.241]
Financial planning score dummies (Base = Score 0)								
Financial planning score 1			0.404*	[0.216]			0.111	[0.178]
Financial planning score 2			0.572**	[0.271]			0.053	[0.226]
Financial planning score 3			0.644**	[0.252]			0.387*	[0.209]
Age dummies (Base = 18-24 years)								
25-34 years	-0.542	[0.424]	-0.516	[0.426]	-0.789***	[0.260]	-0.767***	[0.261]
35-44 years	0.33	[0.390]	0.338	[0.392]	-0.884***	[0.259]	-0.873***	[0.259]
45-54 years	-0.117	[0.396]	-0.101	[0.398]	-0.679**	[0.265]	-0.665**	[0.266]
55-64 years	0.465	[0.401]	0.463	[0.403]	-0.09	[0.276]	-0.069	[0.277]
Over 64 years	0.808*	[0.421]	0.889**	[0.425]	-2.190***	[0.332]	-2.150***	[0.334]
Female	0.117	[0.156]	0.094	[0.157]	-0.014	[0.131]	-0.024	[0.131]
Partner	-0.289	[0.210]	-0.315	[0.211]	0.189	[0.173]	0.18	[0.174]
Child	-0.262	[0.187]	-0.264	[0.188]	0.018	[0.145]	0.02	[0.145]
Highest education dummies (Base = Secondary without certificate)								
Secondary school with certificate	0.243	[0.234]	0.225	[0.236]	0.529***	[0.196]	0.532***	[0.196]
Technical, trade or other tertiary qualification	-0.15	[0.224]	-0.165	[0.225]	0.351*	[0.188]	0.342*	[0.189]
University graduate	0.217	[0.272]	0.198	[0.274]	0.371	[0.233]	0.37	[0.234]
University post graduate	-0.15	[0.301]	-0.171	[0.303]	0.463*	[0.271]	0.456*	[0.272]
Ethnic group dummy variables (Base = NZ/European)								
Maori	0.317	[0.288]	0.289	[0.290]	0.479**	[0.218]	0.451**	[0.219]
Pacific Islander	0.085	[0.539]	0.068	[0.543]	0.752**	[0.340]	0.762**	[0.341]
Asian	0.204	[0.312]	0.213	[0.311]	0.378	[0.239]	0.373	[0.240]
Other	-0.26	[0.301]	-0.247	[0.301]	0.126	[0.248]	0.125	[0.249]
Not employed	-0.115	[0.201]	-0.072	[0.202]	-0.829***	[0.163]	-0.823***	[0.164]
Not main income earner	-0.281	[0.184]	-0.274	[0.185]	-0.103	[0.149]	-0.097	[0.149]
Wealth group dummy variables (Base = negative)								
\$0 to \$100,000	0.521*	[0.285]	0.537*	[0.286]	0.174	[0.189]	0.175	[0.190]
\$101,000 to \$300,000	0.456	[0.290]	0.468	[0.291]	0.126	[0.206]	0.135	[0.206]
\$301,000 to \$600,000	0.992***	[0.288]	1.034***	[0.290]	0.228	[0.218]	0.251	[0.219]
\$601,000 or over	2.086***	[0.303]	2.117***	[0.305]	0.133	[0.246]	0.139	[0.247]
Income dummy variables (Base = less than NZ\$30,000)								
\$30,000 to \$50,000	0.562**	[0.251]	0.530**	[0.252]	0.269	[0.203]	0.245	[0.204]
\$50,000 to \$100,000	0.827***	[0.262]	0.795***	[0.262]	0.074	[0.218]	0.059	[0.220]
Over \$100,000	1.149***	[0.303]	1.104***	[0.303]	-0.14	[0.260]	-0.177	[0.261]
Financial advice in last 12 months	0.821***	[0.187]	0.744***	[0.190]	0.343**	[0.154]	0.298*	[0.156]
2013	-0.506***	[0.144]	-0.532***	[0.145]	1.181***	[0.124]	1.169***	[0.125]
Intercept	-3.501***	[0.462]	-3.763***	[0.479]	-1.212***	[0.316]	-1.271***	[0.329]
n	1491		1491		1498		1498	

Table 9: Risky asset market participation by financial literacy for different propensities for financial planning
This table displays rates of stock/mutual fund ownership and KiwiSaver membership by financial literacy quintile separately for respondents with different propensity for financial planning scores. Pearson Chi Square tests are performed for the null hypothesis that the distribution of respondents across participation and non-participation is independent of the financial literacy quintile. The financial literacy score is calculated as the number of financial literacy questions (out of 52) which a respondent answers correctly. The propensity for financial planning score is calculated as the number of financial planning questions (out of 3) to which a respondent answers 'yes'. Data are from the 2009 and 2013 waves of the New Zealand Financial Knowledge Survey.

Criteria	Stock market participation		KiwiSaver membership	
	n	Participation rate (%)	n	Participation rate (%)
All				
Financial literacy quintile 1 (lowest)	379	10.8	383	29.8
Financial literacy quintile 2	306	15.4	311	36.0
Financial literacy quintile 3	322	19.9	321	37.7
Financial literacy quintile 4	400	31.5	399	40.1
Financial literacy quintile 5 (highest)	270	45.6	270	47.4
	$\chi^2 = 133.08$	p-value < .0001	$\chi^2 = 22.45$	p-value = .0002
Financial planning score = 0				
Financial literacy quintile 1 (lowest)	152	8.6	152	21.7
Financial literacy quintile 2	79	11.4	80	28.8
Financial literacy quintile 3	70	14.3	71	14.1
Financial literacy quintile 4	68	30.9	67	25.4
Financial literacy quintile 5 (highest)	26	34.6	26	30.8
	$\chi^2 = 25.96$	p-value < .0001	$\chi^2 = 5.93$	p-value = .2048
Financial planning score = 1				
Financial literacy quintile 1 (lowest)	153	11.1	156	34.6
Financial literacy quintile 2	143	15.4	144	36.1
Financial literacy quintile 3	143	19.6	144	44.4
Financial literacy quintile 4	206	28.6	206	40.3
Financial literacy quintile 5 (highest)	132	49.2	132	40.9
	$\chi^2 = 68.56$	p-value < .0001	$\chi^2 = 3.88$	p-value = .4231
Financial planning score = 2				
Financial literacy quintile 1 (lowest)	36	19.4	36	30.6
Financial literacy quintile 2	32	21.9	34	35.3
Financial literacy quintile 3	35	22.9	34	38.2
Financial literacy quintile 4	53	32.1	53	45.3
Financial literacy quintile 5 (highest)	54	40.7	54	61.1
	$\chi^2 = 6.88$	p-value < .1424	$\chi^2 = 10.59$	p-value = .0315
Financial planning score = 3				
Financial literacy quintile 1 (lowest)	38	10.5	39	41.0
Financial literacy quintile 2	52	17.3	53	47.2
Financial literacy quintile 3	74	24.3	72	47.2
Financial literacy quintile 4	73	39.7	73	49.3
Financial literacy quintile 5 (highest)	58	46.6	58	56.9
	$\chi^2 = 23.03$	p-value = .0001	$\chi^2 = 2.60$	p-value = .6267

Table 10: Logistic regressions: risky asset market participation and interaction between financial literacy and propensity for financial planning

This table displays the results of two logistic regression models. In the first model, the dependent variable is a dummy variable taking a value of 1 if a respondent owns stocks or mutual funds and a value of zero otherwise. In the second model, the dependent variable is a dummy variable equal to 1 if a respondent is a KiwiSaver member and zero otherwise. Standard errors are shown in parentheses. The financial literacy score is calculated as the number of financial literacy questions (out of 52) which a respondent answers correctly. The propensity for financial planning score is calculated as the number of financial planning questions (out of 3) to which a respondent answers 'yes'. The financial literacy and financial planning interaction variables are the products of separate dummy variables for propensity for financial planning scores 1 to 3 respectively and a categorical variable equal to a respondent's financial literacy score quintile. Definitions of the demographic and control variables are provided in Table A2 in the appendix. Data are from the 2009 and 2013 waves of the New Zealand Financial Knowledge Survey. *, ** and *** denote statistical significance at the 10%, 5% and 1% levels respectively.

independent variables	DV = Stock market participation		DV = KiwiSaver membership	
Financial literacy quintile dummies (Base = Quintile 1)				
Financial literacy quintile 2	0.066	[0.299]	0.075	[0.220]
Financial literacy quintile 3	0.148	[0.347]	0.125	[0.276]
Financial literacy quintile 4	0.64	[0.417]	0.121	[0.352]
Financial literacy quintile 5	1.133**	[0.538]	0.32	[0.463]
Financial planning score dummies (Base = Score 0)				
Financial planning score 1	0.293	[0.526]	0.262	[0.375]
Financial planning score 2	1.744***	[0.652]	-1.348**	[0.550]
Financial planning score 3	0.895	[0.653]	0.074	[0.481]
Financial literacy and financial planning interaction variables				
Financial planning score 1 x Financial literacy quintile	0.028	[0.151]	-0.039	[0.125]
Financial planning score 2 x Financial literacy quintile	-0.334*	[0.182]	0.427***	[0.164]
Financial planning score 3 x Financial literacy quintile	-0.076	[0.182]	0.107	[0.151]
Age dummies (Base = 18-24 years)				
25-34 years	-0.465	[0.430]	-0.814***	[0.262]
35-44 years	0.372	[0.394]	-0.897***	[0.260]
45-54 years	-0.064	[0.400]	-0.696***	[0.267]
55-64 years	0.485	[0.404]	-0.065	[0.278]
Over 64 years	0.951**	[0.429]	-2.202***	[0.336]
Female	0.1	[0.158]	-0.026	[0.132]
Partner	-0.316	[0.213]	0.184	[0.175]
Child	-0.263	[0.189]	0.017	[0.146]
Highest education dummies (Base = Secondary without certificate)				
Secondary school with certificate	0.221	[0.237]	0.559***	[0.198]
Technical, trade or other tertiary qualification	-0.156	[0.226]	0.350*	[0.190]
University graduate	0.224	[0.275]	0.374	[0.235]
University post graduate	-0.176	[0.304]	0.483*	[0.274]
Ethnic group dummy variables (Base = NZ/European)				
Maori	0.262	[0.292]	0.465**	[0.220]
Pacific Islander	0.106	[0.547]	0.729**	[0.341]
Asian	0.205	[0.312]	0.377	[0.240]
Other	-0.263	[0.304]	0.154	[0.250]
Not employed	-0.063	[0.203]	-0.832***	[0.165]
Not main income earner	-0.284	[0.186]	-0.093	[0.150]
Wealth group dummy variables (Base = negative)				
\$0 to \$100,000	0.526*	[0.287]	0.184	[0.191]
\$101,000 to \$300,000	0.46	[0.292]	0.14	[0.208]
\$301,000 to \$600,000	1.019***	[0.291]	0.275	[0.220]
\$601,000 or over	2.119***	[0.306]	0.132	[0.247]
Income dummy variables (Base = less than NZ\$30,000)				
\$30,000 to \$50,000	0.520**	[0.253]	0.268	[0.205]
\$50,000 to \$100,000	0.807***	[0.263]	0.057	[0.221]
Over \$100,000	1.112***	[0.304]	-0.175	[0.262]
Financial advice in last 12 months	0.747***	[0.191]	0.318**	[0.157]
2013	-0.528***	[0.145]	1.167***	[0.126]
Intercept	-3.910***	[0.527]	-1.207***	[0.353]
n	1491		1498	

Table A1: Financial literacy questions and responses

This table displays the financial literacy questions used to calculate the financial literacy score. Response rates are shown separately for the 2009 and 2013 subsamples. Data are from the 2009 and 2013 waves of the New Zealand Financial Knowledge Survey.

No.	Question	Percentage of respondents					
		2009			2013		
		Correct	Incorrect	Don't know	Correct	Incorrect	Don't know
1	Now I am going to show you an example of a bank statement and I will ask you some questions about it. Please look closely at this bank statement and can you tell me: How much did she have at the end of the month in this account?	92.1	5.0	3.0	90.2	5.9	3.9
2	(Continued from previous) Has she saved money this month in this account?	81.4	12.1	6.5	78.3	14.6	7.1
3	(Continued from previous) How much has she saved this month in this account? Feel free to use the calculator to help you.	65.4	12.0	22.6	57.2	16.6	26.2
4	(Continued from previous) At this rate, how many months would it take her to save another \$10,000?	59.8	13.4	26.9	50.8	19.1	30.1
5	John needs to take out \$50 cash for the weekend and also pay for his groceries. Which of the following ways would John pay the least in fees and costs? a) get out enough cash from a bank teller to pay for the groceries and for the weekend b) pay using EFTPOS at the supermarket and take out cash at the same time c) write a cheque for the groceries and go to the ATM to take out the cash	60.8	34.8	4.4	61.8	34.9	3.3
6	Please tell me whether each of the following statements is true or false. If John pays off the full amount on his credit card each month he gets interest-free days on purchases.	65.4	14.8	19.8	62.7	18.2	19.1
7	(Continued from previous) If John only pays the minimum payment each month he still owes money after the minimum payment	85.6	4.3	10.2	84.8	5.8	9.4

8	If Elizabeth has a telephone bill due on the 20th of the month, are there advantages in paying the bill on or just before the day it is due?	75.0	21.8	3.2	76.7	19.8	3.5
9	What advantages are there? Anything else? (Correct responses are: Maximise interest earned on her money, Avoid being charged interest/fee for being overdue, She may/does qualify for a discount / reward for paying on time.)	68.6	2.8	28.5	70.9	5.1	24.1
10	I have here one set of cards with different terms on them and another set of cards that have definitions. There are more definition cards than terms. I would like you to find the best match between the terms and the definitions. a) Term deposit	85.6	8.8	5.7	87.4	8.4	4.2
11	(Continued from previous) b) Asset	75.0	18.3	6.6	75.1	19.7	5.2
12	(Continued from previous) b) Liability	64.3	27.9	7.8	65.9	29.1	5.0
13	(Continued from previous) b) Capital gain	67.1	25.3	7.6	64.6	29.4	6.0
14	(Continued from previous) b) Real rate of return	65.3	24.1	10.5	62.1	31.1	6.7
15	(Continued from previous) b) Savings	88.6	7.9	3.4	90.0	7.7	2.4
16	To know how much wealth you have, you need to measure your net worth. Which of these does "net worth" mean? a) the difference between your expenditure (what you spend) and income (what you earn or receive) b) the difference between your assets (all that you own) and your liabilities (all that you owe) c) the difference between your bank borrowings and savings d) none of the above. (This question was only asked if respondents indicated in a previous question that they knew what the term 'net worth' means.)	58.9	9.0	32.1	59.9	10.6	29.5

17	And now a question about tax. Is a person's gross salary before or after tax?	90.4	7.6	2.0	89.2	9.4	1.4
18	Which of the following is the best description of a budget? a) An accounting spreadsheet b) Spending as little as you possibly can c) A plan for what you earn and what you spend d) Knowing where all your money goes	81.7	17.8	0.6	83.6	16.2	0.2
19	If Bob personally guarantees a loan for John, and John does not make the repayments he is supposed to, which one of the following is Bob required to do? a) Bob has to represent John in court b) Bob has to take over the debt and make the repayments c) Bob has to help get the money from John	83.6	14.1	2.4	80.9	16.7	2.4
20	If Pete has \$2,000 owing on his credit card paying 19.5% interest, and another personal loan of \$500 at 11.5% interest, which would allow him to get rid of his debt faster? a) Repay the minimum amount on the credit card and repay the personal loan faster b) Pay off the credit card debt faster and pay only the minimum amount on the personal loan until the credit card debt is cleared c) Invest any available money in a term deposit paying 7% d) Transfer or consolidate the credit card debt into the personal loan and pay the lower interest rate	48.0	42.8	9.1	53.7	39.6	6.7
21	A home loan is what people usually call a mortgage. A home loan or mortgage is the money that is borrowed to pay for a house. I am going to read out some statements about minimising the amount of interest you pay on a home loan and would like you to tell me whether you think the statement is true, false, or whether you don't know. If you wanted to minimise the amount of interest you pay on your home loan you could pay half your monthly payment every fortnight. Is that true or false, or do you not know?	52.2	30.4	17.4	53.3	30.4	16.3

22	(Continued from previous). If you wanted to minimise the amount of interest you pay on your home loan you could increase the amount of your regular payments. Is that true or false, or do you not know?	87.3	5.8	6.9	90.3	5.0	4.7
23	(Continued from previous). If you wanted to minimise the amount of interest you pay on your home loan you could put some of your payments on your credit card and pay the credit card off every six months. Is that true or false, or do you not know?	83.1	4.5	12.4	78.9	8.3	12.9
24	Mike owns a house worth \$275,000 and has a home loan of \$125,000. What is his equity in the house? (This question was only asked if respondents indicated in a previous question that they knew what the term 'equity' means.)	62.4	2.7	34.9	63.1	4.2	32.7
25	In which of the following situations would it be better to have a 2 year fixed interest rate home loan rather than a variable or floating rate home loan? a) when your bank comes out with a better fixed interest rate than the other banks b) when interest rates are expected to increase over the next 2 years c) when interest rates are expected to fall over the next 2 years d) when the value of your house is going to increase over the next 2 years	61.1	25.3	13.6	63.9	24.2	11.9
26	With a fixed rate home loan the interest rate remains the same for the term of the loan. Is that true or false, or do you not know?	80.8	10.1	9.1	79.8	13.9	6.3
27	With a variable or floating rate home loan you can repay in part or in full at any time without penalty. Is that true or false, or do you not know?	48.3	23.1	28.6	50.7	20.4	28.9
28	With a revolving credit facility loan you are charged a penalty for making an early repayment. Is that true or false, or do you not know?	33.8	21.5	44.6	31.4	20.9	47.8

	If each of the following people had the same amount of yearly income, who would need the greatest amount of life insurance?						
29	a) A young single woman without children b) A young single woman with two children c) A young married woman without children.	93.4	5.3	1.3	94.2	4.4	1.4
30	David moved into Jane's house four years ago, as her partner. They have now decided to separate. Is David entitled to a share of Jane's house?	81.2	12.8	6.0	83.4	11.2	5.4
31	Jane has a job with a take home pay of \$1600 per month. She must pay \$400 for rent and \$200 for groceries each month. She also spends \$200 per month on transport. If she budgets \$200 each month for clothing, \$200 for restaurants and \$200 for everything else, how many months will it take her to save \$2,000?	78.8	14.3	6.9	75.1	16.4	8.5
32	Ben and Sarah are the same age and both put their money into a savings account earning interest. Sarah started saving when she was 20 and saved \$2,500 each year. Ben started saving when he was 40 and saved \$5,000 each year. They are now both 60. Do Ben and Sarah have the same amount of money saved, or does one have more than the other?	43.7	48.5	7.8	38.9	55.8	5.3
33	Who has more money? (Only asked if respondent answered previous question correctly).	36.4	7.0	56.6	31.8	6.5	61.7
34	Why do they have more money? (Only asked if respondent answered question 32 correctly).	35.3	7.1	57.6	31.1	6.8	62.0
35	If John currently has an income of \$30,000, how much income will he need in 5 years' time to be able to live at the same standard? a) \$30,000 b) Less than \$30,000 c) More than \$30,000	88.4	5.7	5.9	90.4	6.0	3.5
36	Why does he need more than \$30,000? (Only asked if respondent answered previous question correctly).	84.9	2.2	12.9	87.5	1.9	10.6

37	Which of the following term deposits would pay the most interest in total, or would they pay the same amount of interest? a) a one year term deposit at 7% interest per annum paid at maturity b) a one year term deposit at 7% interest per annum paid quarterly back into the term deposit c) they would pay the same amount of interest	58.3	26.7	14.9	55.5	32.8	11.7
38	If Nicky had \$100 in a savings account and the interest rate was 2% per year, after 5 years how much would Nicky have in her account if she left the money to grow? Would it be more than \$102, exactly \$102 or less than \$102?	85.4	10.5	4.0	84.8	11.8	3.4
39	If the interest rate on Anne's savings account was 1% per year and inflation was 2% per year, after 1 year, with the money in this account, would she be able to buy more than today, exactly the same as today, or less than today?	80.5	13.8	5.7	81.3	13.7	5.1
40	At what age are people entitled to NZ Super?	85.8	6.7	7.5	89.4	6.7	3.9
41	Do you know which of these amounts is closest to the after-tax amount of NZ Super for a single person living alone? (Options vary depending on the survey year).	34.4	32.2	33.4	46.8	29.7	23.5
42	This next question is also about NZ Super. It is not about government pensions from other countries. As far as you know, is NZ Super income tested?	47.1	27.3	25.6	51.5	27.0	21.5
43	Is New Zealand Superannuation asset tested?	53.1	19.2	27.7	55.1	20.3	24.6
44	Please tell me whether you think the following statements are true or false. An investment with a higher than average return is likely to have higher than average risk.	88.0	5.8	6.2	90.8	5.1	4.1
45	Which of the following aspects about an investment would make you think that it might be a scam? a) Promise of very high returns with little risk.	88.5	6.2	5.3	91.5	3.8	4.7

46	(Continued from previous question). b) Being told the offer is only being made to a select few people	92.3	3.9	3.8	92.6	3.4	4.0
47	(Continued from previous question). c) Being offered by a well known reputable financial organisation	79.5	13.0	7.5	76.7	14.6	8.7
48	(Continued from previous question). d) The minimum amount they say you have to invest keeps reducing	74.8	11.2	14.0	73.9	10.5	15.6
49	I will read out a number of statements about getting financial advice and I would like you to tell me whether you think the statement is true or false, or whether you don't know. It is important to find out how a financial adviser is being paid.	71.0	15.0	14.0	76.5	13.6	9.9
50	(Continued from previous question). b) Before handing money to a financial adviser, a person should ask about their qualifications and experience.	93.5	2.4	4.1	94.7	2.4	2.9
51	(Continued from previous question). Before investing, it is important to read and understand the Investment Statement that explains details about the investment.	96.6	0.1	3.3	98.2	0.4	1.4
52	(Continued from previous question). d) A financial advisor has to give you a disclosure statement	80.7	2.2	17.0	84.9	1.2	13.9

Table A2: Demographic and control variable definitions

This table displays the definitions of the demographic and control variables used in the study.

Variable	Definition
Age 18-24 years	Dummy variable equal to 1 if respondent is aged between 18 and 24 and 0 otherwise
Age 25-34 years	Dummy variable equal to 1 if respondent is aged between 25 and 34 and 0 otherwise
Age 35-44 years	Dummy variable equal to 1 if respondent is aged between 35 and 44 and 0 otherwise
Age 45-54 years	Dummy variable equal to 1 if respondent is aged between 45 and 54 and 0 otherwise
Age 55-64 years	Dummy variable equal to 1 if respondent is aged between 55 and 64 and 0 otherwise
Age Over 64 years	Dummy variable equal to 1 if respondent is aged over 64 and 0 otherwise
Female	Dummy variable equal to 1 if respondent is female and 0 otherwise
Partner	Dummy variable equal to 1 if respondent lives with a spouse or partner and 0 otherwise
Child	Dummy variable equal to 1 if there are children usually living in the respondent's household and 0 otherwise. Note: Children are defined as 15 and under in 2009 survey and 17 and under in 2013 survey
Secondary school without certificate or below	Dummy variable equal to 1 if the respondent's last completed level of formal education is secondary school without certificate or below and 0 otherwise.
Secondary school with certificate	Dummy variable equal to 1 if the respondent's last completed level of formal education is secondary school with certificate (level 1, 2 or 3) and 0 otherwise.
Technical, trade or other tertiary qualification	Dummy variable equal to 1 if the respondent's last completed level of formal education is a technical or trade qualification or other tertiary qualification and 0 otherwise.
University graduate	Dummy variable equal to 1 if the respondent's last completed level of formal education is university graduate and 0 otherwise.
University post graduate	Dummy variable equal to 1 if the respondent's last completed level of formal education is university post graduate and 0 otherwise.

NZ/European	Dummy variable equal to 1 if respondent's ethnicity is New Zealand European and 0 otherwise.
Maori	Dummy variable equal to 1 if respondent's ethnicity is Maori and 0 otherwise.
Pacific Islander	Dummy variable equal to 1 if respondent's ethnicity is Pacific Islander and 0 otherwise.
Asian	Dummy variable equal to 1 if respondent's ethnicity is Asian and 0 otherwise.
Other	Dummy variable equal to 1 if respondent's ethnicity is other and 0 otherwise.
Not employed	Dummy variable equal to 1 if respondent is not currently in paid employment.
Not main income earner	Dummy variable equal to 1 if respondent is not the main income earner in the household.
Net worth negative	Dummy variable equal to 1 if respondent's net worth is negative and 0 otherwise.
Net worth \$0 to \$100,000	Dummy variable equal to 1 if respondent's net worth is between NZ\$0 and NZ\$100,000 and 0 otherwise.
Net worth \$101,000 to \$300,000	Dummy variable equal to 1 if respondent's net worth is between NZ\$101,000 and NZ\$300,000 and 0 otherwise.
Net worth \$301,000 to \$600,000	Dummy variable equal to 1 if respondent's net worth is between NZ\$301,000 and NZ\$600,000 and 0 otherwise.
Net worth \$601,000 or over	Dummy variable equal to 1 if respondent's net worth is NZ\$601,000 or over and 0 otherwise.
Income up to NZ\$30,000	Dummy variable equal to 1 if respondent's household income is up to NZ\$30,000 and 0 otherwise.
Income \$30,001 to \$50,000	Dummy variable equal to 1 if respondent's household income is between NZ\$30,001 and NZ\$50,000 and 0 otherwise.
Income \$50,001 to \$100,000	Dummy variable equal to 1 if respondent's household income is between NZ\$50,001 and NZ\$100,000 and 0 otherwise.
Income Over \$100,000	Dummy variable equal to 1 if respondent's household income is over NZ\$100,000 and 0 otherwise.
Financial advice in last 12 months	Dummy variable equal to 1 if respondent has received financial advice or information in the past 12 months.
2013	Dummy variable equal to 1 if survey year is 2013 and zero otherwise.