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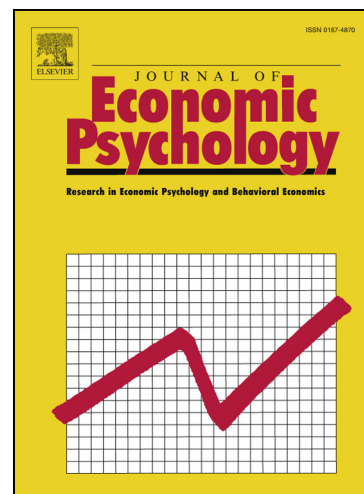
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The significance of financial self-efficacy in explaining women's personal finance behaviour

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Abstract

Much policy attention has been placed on enhancing individuals' financial knowledge and literacy, chiefly through financial education programs. However, managing one's personal finances takes more than financial knowledge and literacy: an individual also needs a sense of self-assuredness, or 'self-belief', in their own capabilities. This personal attribute is known within the psychology literature as 'self-efficacy'. This paper examines the significance of an individual's financial self-efficacy in explaining their personal finance behaviour, through the application of a psychometric instrument. Using a 2013 survey of Australian women, financial self-efficacy emerges as one of the strongest predictors of the type and number of financial products that a woman holds. Specifically, our analysis reveals that women with higher financial self-efficacy – that it, with greater self-assuredness in their financial management capacities – are more likely to hold investment and savings products, and less

likely to hold debt-related products. Even alongside other important factors – such as education, financial risk preferences, age and household income – the explanatory power of financial self-efficacy is found to be significant at the 1% critical level. Moreover, the significance of financial self-efficacy is independently identified from that of financial literacy factors, which bears important implications for the development of policies aiming to improve financial outcomes.

Keywords

financial self-efficacy; personal finance

JEL Classification Numbers

D03 Behavioral Microeconomics – Underlying Principles

D14 Household Saving; Personal Finance

PsycINFO Classification

2200 Psychometrics & Statistics & Methodology

1. Introduction and background

The past decade has seen governments in many countries establish national financial literacy strategies in an attempt to improve the financial wellbeing of their citizens. Chiefly, these strategies have sought to improve financial literacy through financial education programs. (Asian Development Bank 2013; Australian Securities and Investment Commission 2013; Financial Literacy and Education Commission 2011; Financial Services Authority 2006; Hira 2010; OECD 2012, 2013b). In many instances, sub-groups of the population who are more vulnerable to financial disadvantage, such as women, have been afforded particular policy attention (OECD 2013c, 2013d). Despite these heavy investments in financial education,

most countries have experienced little observable improvements in financial literacy (OECD 2013a). Furthermore, it appears that the effectiveness of many of these financial education programs has not been adequately evaluated (Fox & Bartholomae 2008; Fox, Bartholomae & Lee 2005; McCormick 2009; Xiao et al. 2010) and indicators of financial stress and financial anxiety persist (Dowling, Corney & Hoiles 2009). Collectively, these observations suggest that the financial education policies pursued so far have had their shortcomings. In this light, a key motivation behind our study is the realisation that narrowly-focused efforts to improve financial literacy via financial education have meant that other factors potentially contributing to overall financial wellbeing appear to have been overlooked. While it is generally agreed that financial literacy entails equipping individuals with the knowledge and cognitive skills needed to understand the financial sector and handle their financial matters, other factors also play an important role (OECD 2013c). Being able to successfully manage one's personal finances also entails psychological and attitudinal traits: an individual needs to have the motivation to seek out financial information, the ability to control emotions that can affect their decision-making, and assurance in their own decision-making and financial management capacities (Atkinson & Messy 2011; The Social Research Centre 2011). Possessing these attributes means that an individual is more likely to have a positive sense of control over their financial future, and to have the impetus and capability to take competent and rational action, thereby achieving more favourable outcomes (Guo et al. 2013). In analysing individuals' personal finance behaviour, there is scope for economic models to more fully incorporate psychometric instruments that capture an individual's sense of confidence in, and control over, their financial management capacities, so as to generate a more complete picture of the factors contributing to their financial outcomes. Indeed, it has been argued that research in the field of personal finance behaviour needs to more effectively encompass psychological theories that explain how personal behaviours are formed (Xiao

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2008). This paper pursues this objective by augmenting a standard economic model of personal finance behaviour with a psychometric scale that measures an individual's sense of their capacity to successfully manage their finances and accomplish their financial goals – their financial self-efficacy.

In behavioural psychology, the general concept of self-efficacy refers to an individual's sense of self-agency, borne out in a belief that they can accomplish a given task and, more broadly, cope with life's challenges (Bandura 1994, 2006a, 2006b; Gecas 1989). Self-efficacy can be manifested through various elements of personal behaviour, such as how well a person perseveres in the face of adversity, whether they have an optimistic or pessimistic attitude about their future, and whether they think in self-enhancing or self-debilitating ways (Bandura 2006b). If we are to apply the concept of self-efficacy to the context of personal finance management, it could be reasoned that individuals who have a greater sense of self-assuredness in their financial management capacities are more likely to approach any financial difficulties they encounter as 'challenges to be mastered, rather than as threats to be avoided' (Bandura 1994, p. 71). Such an attitude is likely to result in accomplishment and, consequently, more favourable personal financial outcomes.

Methodologies to measure how well an individual manages challenges in their life in general – a 'generalised' model of self-efficacy – have been long established (Schwarzer & Jerusalem 1995). While these methodologies have been tailored to apply to several specific realms of human behaviour, such as the pursuit of health, parenting, career, education and retirement goals, approaches to measuring financial self-efficacy are a relatively recent development. Our study applies the Financial Self-Efficacy Scale (FSES) developed and validated by Lown (2011). This scale was derived from the generalised scale of self-efficacy established by Schwarzer and Jerusalem (1995) and is consistent with the principles for constructing self-

efficacy scales advised by Bandura (2006a). We demonstrate the econometric applicability of this financial self-efficacy instrument in a standard model of economic behaviour, employing it as an explanatory variable to assess its significance in predicting observed behavioural outcomes. While we are aware of a small number of previous studies that have assessed the explanatory power of the related concepts of 'investment self-efficacy' (Forbes & Kara 2010), 'entrepreneurial self-efficacy' (Kickul, Wilson, Marlino & Barbosa 2008) and 'economic self-efficacy' (Grabowski, Call & Mortimer 2001), there appear to be even fewer studies that have similarly tested the explanatory power of the financial self-efficacy scale: Dietz, Carrozza and Ritchey (2003) offer one example where the financial self-efficacy scale has been applied as an explanatory variable, to explore the use of retirement plans. Most previous studies in the field of personal finance have simply focused on validating the internal consistency of the financial self-efficacy scale or examining measures of correlation between the scale and personal characteristics or other psychological or behavioural outcomes of interest (for instance, Amatucci & Crawley 2011; Danes & Haberman 2007; Engleberg 2007; Gutter, Copur & Garrison 2009; Sizoo, Jozkowski, Malhotra & Shapero 2008). From another perspective, other studies have looked at the extent to which an individual's engagement with financial planning is affected by their level of self-esteem – a somewhat similar yet still distinct concept from financial self-efficacy (Neymotin 2010).

In our study, we assess the direct explanatory power of the FSES instrument by examining the relationship between an individual's level of financial self-efficacy and observable aspects of their personal finance behaviour. Specifically, we look at the types of financial products that an individual holds, and draw an inference that their engagement with financial products reflects how well they are managing their personal finances and how financially responsible and forward-thinking they are. This inference is consistent with other studies that posit that certain actions – namely, budgeting, saving and demonstrating control over one's

spending – are indicators of forward-thinking and responsible financial behaviour, which ultimately results in better financial outcomes for the individual (Perry & Morris 2005). We hypothesise that the types of financial products that are likely to enhance an individual's financial security and financial outcomes in the future – namely, investments in shares and property, mortgages, savings and insurance – are indicative of an individual having greater capacity to manage their finances and to plan for the future, while the accumulation of liabilities such as loans and credit cards are indicative of an individual is struggling in their capacity to plan ahead and manage their finances. We therefore hypothesise that the higher an individual's level of financial self-efficacy, the more likely they are to have acquired investments in shares and property, mortgages, savings and insurance, and the less likely they are to have acquired loans and credit cards.[1] While the previous studies cited in this paper have generally found that financial self-efficacy is significantly correlated to a range of other behavioural and psychological outcomes relating to personal finance, we are not aware of any studies that have examined the significance of financial self-efficacy with respect to an individual's engagement with financial products, or have sought to distinguish the significance of financial self-efficacy from that of financial literacy.

A further contribution of our study is that we apply the FSES instrument to a sample that is relatively larger in size, and more diverse in characteristics, than the samples used in many previous studies, fortifying the statistical robustness of our assessment of the instrument. Commonly, in cases where some form of financial self-efficacy construct has been applied, it has been applied to a relatively small or narrow sample, such as students or youths (Danes & Haberman 2007; Grabowski, Call & Mortimer 2001; Lim, Heckman, Letkiewicz & Montalto

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[1] At the same time, we recognise that it is almost a requisite to hold a credit card in today's financial system, where online transactions are often the most cost-effective, and sometimes the only available, means of payment. Therefore, holding a credit card might not necessarily reflect unfavourable financial behaviour, if it is responsibly managed (for example, if credit card repayments are paid in time to avoid interest charges). We presume that a financially-responsible individual might hold a credit card, but would also need hold other, more secure financial products (such as a savings account or investments) to support their credit card liabilities.

2014; Sugahara, Suzuki & Boland 2010), women entrepreneurs (Amatucci & Crawley 2011) or employers from a single organisation (Lown 2011), which has sometimes required the scale to be tailored to suit the selected sample. In some instances, a reduced version of the financial self-efficacy scale has been subsumed into a broader index measuring another outcome of interest (for example, Weaver, Sanders, Campbell & Schnabel 2009).

Although we are designing our study to capture a heterogeneous representation of the population, our analysis focuses specifically on women in the interests of our study serving greater policy relevance. It is well recognised that, compared to men, women generally display weaker self-confidence in their abilities, have lower levels of financial literacy, are more conservative in their risk-taking tendencies, and – partly as a consequence of each of these experiences – are more likely than men to experience financial disadvantage (Charness & Gneezy 2012; Dwyer, Gilkeson & List 2002; Hackett & Betz 1981; Hira 2010; Hira & Loibl 2008; Lusardi & Mitchell 2008; Mottola 2013; Powell & Ansic 1997; Webster, Ellis & Bryan 2004; Wong & Carducci 1997). By focusing on women's personal finance behaviour, our findings contribute to policymakers' pursuit to overcome the discrepancy in financial outcomes that is generally observed between men and women.

2. Methodology and statistical framework

Our outcome of interest is the type of financial products that a woman holds. We begin by modelling the independent probability that an individual holds a given financial product, employing a binary probit model specification. The probit model is founded on a latent variable model, whereby the true likelihood (y_{im}*) that an individual has a particular financial product cannot be observed directly but can be estimated as a probability (y_{im}) that takes a value between zero and one, with i representing the individual and m representing the type of

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financial product. To allow for the possibility that the likelihood of holding a particular financial product could be affected by the other types of financial products that the individual holds, we regressed the likelihoods simultaneously as a multivariate probit specification. Following Cappellari and Jenkins (2003), the multivariate probit model can be expressed as:

$$y_{mi}* = \beta_1' \, X_{mi} + \beta_2' \, L_{mi} + \beta_3' \, R_{mi} + \beta_4' \, P_{mi} + \varepsilon_{mi} \qquad (1)$$

$$y_{mi} = \begin{cases} 1 \; if \; y_{mi}{}^* > 0 \\ 0 \; otherwise \end{cases}$$

where $m = 1, \dots, M$

In equation (1), y_{mi} denotes the probability outcomes for each of the M different types of financial products, X_{mi} denotes a vector of socio-demographic characteristics serving as control variables, L_{mi} denotes a vector of variables that contribute to financial literacy, R_{mi} denotes the individual's financial risk preferences, and P_{mi} denotes the psychometric instrument that we are adding to the standard framework, with β_1 to β_4 representing the respective estimated coefficients. Note that since the focus of our analysis is to isolate the relationship between the psychometric instrument (P_{mi}) and the individual's behavioural outcomes (y_{mi}), all of the other explanatory variables included in the right-hand side of the equation (L_{mi} and R_{mi}) also effectively serve as control variables. The error terms, denoted by ε_{mi}, follow a multivariate normal distribution, each with a means of zero and a variance-covariance matrix V, where V has values of 1 on the leading diagonal and correlations $\rho_{jk}=\rho_{kj}$ as off-diagonal elements. Estimation was performed using a simulated maximum likelihood method, applying the Geweke-Hajivassiliou-Keane (GHK) smooth recursive conditioning simulator. An alternative specification of the probit is the linear probability model, which can

be estimated using a system of Seemingly Unrelated Regression Equations (SURE).[2] Because the estimated outcomes of the linear specification model are not bounded by zero and one, its properties are deemed inferior to the probit specification for the purposes of a probability model, hence we used the probit model for our estimation results.

In the second part of our analysis, we estimated the likelihood that a given individual holds multiple financial products. Although the notion of examining multiple holdings of financial products lends itself to the adoption of a 'count' model, such as a Poisson, we needed to accommodate the fact that our explanatory variable of interest – financial self-efficacy – can be associated with the likelihood of holding a given financial product in either a positive or negative way. Hence, grouping together all of the financial products to create a single 'count' outcome variable, and using the FSES instrument as a regressor, would not be appropriate. Since we are interested in distinguishing the link between financial self-efficacy and the outcome variable, we grouped together the financial products on the basis of whether they were found to be positively or negatively related to the FSES instrument in the first stage of our analysis. Using these two groups of financial products as our outcome variables, we conducted an ordered probit to estimate the likelihood that the individual holds progressively more products within the given group. To allow for the possibility that the likelihood of holding a given product in one group can be affected by how many products the individual also holds in the other group, we regressed the ordered probits for the two groups simultaneously, in the form of a bivariate ordered probit specification. We adopted the bivariate probit model specification expressed by Sajaia (2008) and assumed the latent variables in our model can be expressed by:

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[2] We used the linear specification to test the robustness of the probit specification: we found that the SURE linear model generated the same coefficient signs and significance levels as the probit model for all of the variables.

$$y_{1i}^* = \beta_{11}'X_{1i} + \beta_{12}'L_{1i} + \beta_{13}'R_{1i} + \beta_{14}'P_{1i} + \varepsilon_{1i} \tag{2}$$

$$y_{2i}^* = \beta_{21}'X_{2i} + \beta_{22}'L_{2i} + \beta_{23}'R_{2i} + \beta_{24}'P_{2i} + \gamma y_{1i}^* + \varepsilon_{2i} \tag{3}$$

$$\text{where } y_{1i} = \begin{cases} 1 \; if \; y_{1i}^* \leq c_{11} \\ 2 \; if \; c_{11} < y_{1i}^* \leq c_{12} \\ \quad \vdots \\ J \; if \; c_{1J-1} < y_{1i}^* \end{cases} \qquad y_{2i} = \begin{cases} 1 \; if \; y_{2i}^* \leq c_{21} \\ 2 \; if \; c_{21} < y_{2i}^* \leq c_{22} \\ \quad \vdots \\ K \; if \; c_{2K-1} < y_{2i}^* \end{cases} \tag{4}$$

In the above equations, y_{1i} and y_{2i} denote the respective probability outcomes for the two groups of financial products, for individual i. Our two groups of financial products contain J and K number of financial products respectively. As per the multivariate probit model, X denotes a vector of independent socio-demographic characteristics, L denotes a vector of variables that contribute to financial literacy, R denotes the individual's financial risk preferences, and P represents the psychometric instrument, again with β representing the respective estimated coefficients. The error terms, ε_i and ε_i, are distributed as bivariate standard normal with correlation ρ and the explanatory variables satisfy the conditions of exogeneity such that the expected value of the correlation between each explanatory variable and the respective error term is zero. To capture the inter-relation between the two groups, γ represents an unknown scalar, while c represents the unknown cutoff points underlying the probit specification, which satisfy the condition that $c_{11} < c_{12} < \dots < c_{1J-1}$ and $c_{21} < c_{22} < \dots < c_{2K-1}$.

To improve the stability of the estimated coefficients constructed from the maximum likelihood simulation process, we set the number of draws undertaken in the simulation process to a value that is at least equivalent to the square root of the sample size, as per

Cappellari and Jenkins (2003). We set the initial value of the pseudo-random number seed used in simulation process to be consistent across each of the probits used in the model.

3. Data

Our analysis uses data from a random sample of Australian women, collected via an online survey in 2013.[3] The survey collected responses from a total of 2192 individuals. After allowing for item non-response, largely for the survey questions relating to income, 1542 individuals were used in the estimation sample. As the outcome variables in our model, we use a range of potential financial products that can be held by the individual. The types of financial products included in the survey were: investment (such as property or shares); mortgage; savings account; credit card; loan or other type of credit; private health insurance; and life insurance.[4]

To construct our main explanatory variable of interest – the FSES instrument – we used the six items in our survey for which individuals responded to a statement about their self-perceived capacity to manage their finances and their confidence to do so. These six statements replicated those used by Lown (2011) when constructing the financial self-efficacy scale. Participants were asked to respond to each of the six statements with one of the following options, based on a Likert-type scale: 'exactly true', 'moderately true', 'hardly true' or 'not true at all'. The six statements, and the participants' respective responses, are listed in Table 1. The responses to each question were assigned a value from 1 to 4, with higher scores corresponding to higher levels of perceived financial self-efficacy. Each participant's scores for the six items were summed to produce a total score that could range from a potential minimum value of 6 to a maximum possible value of 24. This sum

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[3] The survey was approved by the RMIT University Ethics Committee.
[4] Life insurance also included payment or income protection insurance, and critical illness insurance.

constituted the individual's score on the FSES. In our sample, the distribution of scores ranged from 6 to 24, with a mean of 15.37 and a standard deviation of 4.14. The spread of scores followed a normal distribution, as illustrated in Figure 1.

[Insert Table 1 here]

[Insert Figure 1 here]

We utilised several measures to statistically validate the construction of our FSES instrument and thereby demonstrate its reliability when applied to our sample. Firstly, to assess the internal consistency of the six items used to construct the FSES instrument, we computed Cronbach's alpha (Cronbach 1951; Garson 2012). The FSES scores generated a Cronbach's alpha value of 0.8145, indicative of high internal consistency. Secondly, to assess the strength of correlation underlying all six survey items, we used principal components analysis. As seen in Table 2, the results of the principal components analysis showed that the six survey items used to construct the FSES loaded heavily onto a single factor, indicating that our constructed instrument is effectively capturing a common element of behaviour, which is its objective.

[Insert Table 2 here]

Next we systematically selected a range of other variables relating to an individual's background and socio-demographic characteristics, to include in the model as control variables. The inclusion of these variables enabled us to isolate the link between financial self-efficacy and the observed behavioural outcomes, independent of any other confounding factors.

Firstly among these control variables, we sought to include variables that would enable us to fulfil the fundamental aim of our analysis: to distinguish the significance of financial self-efficacy from that of financial literacy. We therefore included a set of factors that contribute towards building a woman's level of financial literacy over her lifetime: her general level of education (through which she can develop the fundamental literacy and numeracy skills needed to subsequently acquire financial knowledge and develop financial literacy); whether or not she has ever attended a financial education course (which is designed to impart financial knowledge and thus facilitate the development of financial literacy); and several aspects of her upbringing that could influence her financial literacy later in life (namely, how positively she rates her childhood experiences with money; and, as a teenager, whether she received money from her parents, whether she earned money by working, and whether she had responsibility for managing a bank account). Regarding these factors associated with an individual's upbringing, previous studies show that an individual's formative experiences with money management can shape their financial literacy later in their adult life, particularly through the process of socialisation (Gutter, Copur & Garrison 2013; Lee & Mortimer 2009). For example, individuals who were granted responsibility for managing a bank account as teenagers are likely to not only have learnt the cognitive skills required to effectively manage their own personal finances in adulthood, but also to have observed their parents exhibiting responsible money management behaviour and developed an awareness of the importance of good money management.

Secondly among our set of control variables, we acknowledge that an important potential influence on the types of financial products that an individual holds is their personal preference for risk (Grable 2000). For instance, individuals with a higher tolerance for risk might be more likely to take out loans or credit cards, while those with risk-averse personalities might be more inclined to save and purchase insurance. Hence, also among our

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set of control variables, we included a variable that captures this aspect of an individual's personality. Our survey data contained an item asking respondents how willing they would be to take a financial risk if they had some spare cash for an investment, with the options for answers including: 'not willing to take any risk', 'would take an average risk for an average return', 'would take an above-average risk for an above-average return' and 'would take a substantial risk for a substantial return'. This survey item, capturing an individual's self-assessed attitudes towards financial risk-taking, has been applied in similar analyses of economic behaviour (for example, see West and Worthington 2014). Other studies examining broader dimensions of economic behaviour have applied similarly-constructed survey items that capture an individual's inclination to take risks in general (Dohmen et al. 2011).

Thirdly, as part of our set of control variables, we acknowledge that the types of financial products an individual holds is also likely to be related to their particular demographic and socio-economic circumstances, which is often reflective of their stage of life (Hogarth & O'Donnell 2000; Worthington 2009). For example, when people are in the early stages of their adult life, they are more likely to be saving for a home or taking out a mortgage to purchase a home, whereas they are more likely to own their homes outright by the time they reach an older age or have reached a higher income level. To control for the effects of a woman's socio-economic and demographic characteristics, we included this set of variables in our model: age; household income; labour force status; whether or not she has a partner; whether or not she has dependent children; remoteness of geographical location; whether or not she speaks a language other than English at home; whether or not she is Australian-born; whether or not she is Indigenous; and her father's and mother's levels of education. The inclusion of the partnership variable is also important for serving as a proxy for the nature of an individual's decision-making process within a household, as women who have a partner

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are more likely to undertake decisions concerning financial products jointly rather than independently.[5]

Summary statistics of the data used in the analysis, presented in Table 3, indicate the breadth of diversity within our sample. Among some key characteristics, our respondents' ages are spread from 18 to over 60; their education levels range from below Year 12 (equivalent to not completing secondary school) to university postgraduate qualifications; their household income brackets span from below $30,000 to upwards of $150,000; and, with respect to labour force status, our sample encompasses respondents who are employed, unemployed and not active labour market participants. Thus, compared to many previous studies that have applied the FSES instrument, our sample is more heterogeneous in terms of such socio-demographic characteristics.

[Insert Table 3]

4. Results

The results of the multivariate probit model, modelling the likelihood of an individual having each of the financial products, are reported in Table 4. The model criteria – in particular, the significance of the correlation values between the error terms presented in Table 5 – confirm that it is necessary to jointly model the likelihood of holding each of the financial products as a simultaneous set of equations, rather than as seven separate models.

The coefficient results reveal that, even when controlling for financial risk preferences and the factors contributing to financial literacy, women with higher levels of financial self-efficacy have a stronger probability of having an investment, mortgage or savings account,

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[5] Splitting the sample according to a woman's partnered or single status, however, was not sensible in this context due to sample size concerns.

while being less likely to have a credit card or loan. Each of these relationships is statistically significant at the 1% critical level. The likelihood of a woman having any of the insurance products, however, is found to be unrelated to their level of financial self-efficacy, which suggests that there are other factors driving individual's insurance decisions: we speculate that the financial rebates and tax offsets that can be claimed in Australia for holding an appropriate level of private health insurance are likely to be an incentive.[6]

Turning to the coefficient results for the other explanatory variables, factors contributing to financial literacy were found to have a statistically significant association with the likelihood of holding certain financial products. Namely, higher levels of general education are associated with a stronger likelihood of holding an investment, mortgage or savings account. Undertaking a financial education course is linked to a significantly higher likelihood of having an investment, mortgage or life insurance, as well as a loan. Formative experiences were generally not found to be strongly related to financial product holdings, with the exception that women who had responsibility for managing a bank account as a teenager have a stronger inclination to hold investments later in their adult life, while those who had a relatively negative childhood experience with money have a stronger propensity to hold a loan.

The significance of the financial risk preferences variable demonstrates the need to control for this factor in the model. As might be expected, women in our sample who are more willing to take financial risks were found to have a stronger likelihood of holding an investment or credit card, while those who are more financially risk-averse have a greater propensity to hold a savings account. Aversion to financial risk was found to be correlated to

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[6] The Australian Government provides tax offsets and rebates on the costs of certain medical services to eligible individuals who hold an appropriate level of private health insurance, depending on their income level. Details are available from the Australian Taxation Office: https://www.ato.gov.au/Individuals/Medicare-levy/In-detail/Medicare-levy-surcharge/Private-health-insurance-rebate-and-Medicare-levy-surcharge/

the likelihood of holding private health insurance, but not in the direction we expected. We did not find support for our initial hypothesis that risk-averse individuals are more likely to take the precautionary measure of purchasing insurance, and, hence, that the decision to take out private health insurance could be regarded as a measure to guard against financial risk. Rather, our finding implies that the decision is driven by other measures. As noted earlier, the rebates and tax offsets offered through Australia's tax system are likely to be a strong financial incentive. An individual's assessment of their own health status, outside of the scope our model, is also likely to be a strong predictor (Cohen & Siegelman 2010; Doiron, Jones & Savage 2008). Our detection that financially risk-averse individuals are actually less likely to hold private health insurance aligns with other behavioural studies specific to the Australian private health insurance market: for example, an analysis of individuals' responses to an increase in premiums found that those who dropped their insurance were characterised by being lower financial risk-takers (Knox, Savage, Fiebig & Salale 2007). It could be inferred that financial risk-taking tendencies interact with an individual's price sensitivity, and their personal assessment of the costs and benefits associated with purchasing this financial product, to explain their observed behaviour: financially risk-averse individuals might be less likely to hold private health insurance because they place higher weight on the costs associated with purchasing this product, and hence expect to derive lower net financial returns.[7]

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[7] While the full determinants behind an individual's insurance decisions might be outside of the scope of our model, we retained the insurance products in our model, as we are still concerned with detecting the nature of the relationship between these products and our explanatory variables of interest. Furthermore, we verified that their inclusion does not change the coefficient signs or significance levels that are jointly estimated for the other financial products.

Among the other socio-demographic characteristics included as control variables in the model, age, household income and partnership status are shown to be particularly powerful predictors of a woman's financial product holdings. The finding that women from higher income households have a stronger propensity to take out private health insurance reinforces our assertion that tax incentives are a key determinant behind private health insurance decisions, given that the rebates and tax offsets that can be claimed are proportionally higher for higher-earning households.

[Insert Table 4 here]

[Insert Table 5 here]

Using the coefficients from the multivariate probits that were jointly estimated for each financial product, we predicted the probability that a woman in our sample holds all seven of the financial products included in our survey, compared to the probability that she holds none of them. This comparison gives an indication of the full range of outcomes that are possible in terms of women's financial product holdings. We found that, while controlling for the spectrum of characteristics included in our analysis, there is a 13.21% chance that a woman holds all seven financial products, compared a 2.73% chance that she holds none of them. Pivotal to the key focus of our analysis, these probability values can be refined in relation to the individual's respective financial self-efficacy score. As can be clearly seen in Figure 2, lower FSES values are associated with a higher probability of holding none of the financial products, whereas higher FSES values are associated with a higher probability of holding all seven of them.

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[Insert Figure 2 here]

The next step of our analysis was to specifically model whether financial self-efficacy bears a significant association with the total count of financial products held. The total count of financial products held can be indicative of an individual's financial sophistication, because it is generally considered that holding multiple types of financial products can be a strategic way to diversify risks in the financial sector. Hence, having a relatively larger number of financial products can be interpreted as a sign of greater financial sophistication, leading to greater financial wellbeing. To accommodate the fact that the financial self-efficacy variable was found to be positively associated with some financial products, yet negatively associated with others, we needed to differentiate between the types of financial products on this basis. We created two groups on the basis of the relationship between the financial product and the FSES variable, and summed up the total number of products that each individual held within each of these two groups. For this part of the analysis, it was deemed unnecessary to include the financial products that were found to have no statistically significant relationship with financial self-efficacy in the single-product probit equations.[8]

The estimation results of the bivariate probit model for our two groups of financial products are presented in Table 6. The likelihood ratio test of independent equations confirms the validity of regressing a joint probability model. Furthermore, the significance of the cutoff threshold values validates our application of the ordered probit specification to model these count-based outcomes. The coefficients reveal that financial self-efficacy has a cumulative association with women's financial product holdings, such that women with higher levels of financial self-efficacy are inclined to have progressively more of the positively-signed financial products, while women with lower levels of financial self-efficacy are inclined to

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[8] When we tested to see if the exclusion of these products affected the joint significance of our subsequent estimation, we detected no difference.

have progressively more of the negatively-signed products. Once the products have been grouped in this way, the variable for personal financial risk preferences loses significance, yet many of the variables contributing to financial literacy retain their predictive power.

[Insert Table 6 here]

Figure 3 shows the predicted probabilities of a given individual in the sample having each of the possible combinations of financial products, generated by the bivariate probit model. To assess the appropriateness of the specification of the model's functional form, we compared the predicted probabilities for each outcome to the actual proportions observed in our sample. As can be seen in Figure 3, the model performed well in terms of the accuracy with which it reflects the sample data, indicative of a well-specified functional form. Next, we take a closer inspection of the predicted probability values. The most likely outcome for a woman to experience, with a predicted probability of 21.80%, is to hold all three products from the first group (those that were positively related to financial self-efficacy) and both products from the second group (those that were inversely related to financial self-efficacy). Given that the products in the first group – investments, mortgages and savings – can be deemed to be indicative of more favourable or responsible financial behaviour, while the debt-related products in the second group – credit cards and loans – are indicative of less favourable or responsible financial behaviour, it is of interest to identify the probability of holding combinations that constitute the extremes of these groups: there is only a 1.66% chance that a woman holds the most favourable combination of financial products (all three products from the first group and none from the second group), while there is a 1.48% chance that she holds the least favourable combination (none from the first group and both from the second group). At the same time, there is a 3.58% chance that she holds no products from either group: the

absence of any form of financial products might also be considered a weak financial status as it suggests a lack of engagement in any type of financial activity.

[Insert Figure 3 here]

Since the core focus of our analysis is to identify the explanatory power of the FSES instrument, we are interested in examining the predicted probabilities of our outcome variable on the basis of the individual's level of financial self-efficacy. Figure 4 presents the predicted probability values of the selected combinations of financial products, disaggregated by the individual's observed FSES score. Clear associations are revealed: women with progressively higher FSES scores are expected to hold all three of the investment/mortgage/savings products, while women with progressively lower FSES scores are expected to hold none of these favourable financial products, yet to hold both of the debt-related products.

[Insert Figure 4 here]

5. Conclusion

Based on our survey sample of 1542 Australian women, a statistically significant relationship has emerged between a woman's level of financial self-efficacy and elements of her personal finance behaviour, namely, the types and number of financial products that she holds. Importantly, our analysis detected this relationship while simultaneously controlling for a range of other key characteristics, including a woman's personal financial risk preferences and factors contributing to her financial literacy. The results of our multivariate probit model showed that women who have higher levels of financial self-efficacy are more likely to have an investment, mortgage or savings account, while being less likely to have a credit card or loan. This first group of products can be taken to be indicative of forward-thinking,

responsible financial behaviour, whereas the products belonging to the second group relate to debt, which could be considered indicative of weaker financial planning capacity and potentially poorer financial prospects. These findings therefore suggest that a woman's financial self-efficacy – her sense of self-assuredness in her financial management capacities – could exert a real bearing on her personal finance outcomes.

Moreover, the strength of the association between a woman's financial self-efficacy and her likelihood of holding financial products appears to be cumulative, such that higher levels of financial self-efficacy are associated with a stronger likelihood of a woman having at least two, or even all three, of the investment/mortgage/savings group of products, while lower levels of financial self-efficacy are associated with a greater likelihood of having both of the debt-related products. As an additional insight, levels of financial self-efficacy were found to have no bearing on how likely it is that a woman in our sample had taken out private health insurance or life insurance. Nor does the insurance decision appear to be associated with risk aversion. This implies that the insurance decision is driven by other factors: in particular, the rebates and tax deduction incentives that are a prominent feature of Australia's tax policy settings are likely to be a strong factor behind individuals' decisions to take out private health insurance.

Our finding that financial self-efficacy has a role in explaining a woman's personal finance behaviour that is above-and-beyond that of financial literacy bears important implications for policy efforts targeted at improving financial literacy, such as financial education programs. While financial education programs can have a role in improving women's financial outcomes, our results suggest that a woman's self-assuredness in her own capacity to manage her finances is also a significant factor that should not be overlooked. Since we know, from the large body of research already undertaken, that women have lower average levels of

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confidence in their own abilities than men, the findings of our analysis have significant implications for strategies aiming to bridge the discrepancies in financial outcomes observed between men and women. The key message emerging from our analysis is that policy efforts to improve women's financial outcomes should ideally encompass a broader set of elements than financial education programs. Policy efforts to build women's financial literacy via education need to be complemented by tools to enhance their self-assuredness, or self-belief, in their own capacity to manage their personal finances and successfully handle any financial challenges they may encounter. Indeed, our findings present an invitation for future research to more closely identify the determinants of financial self-efficacy, so that policies to improve women's financial outcomes can be more effectively designed and implemented.

Acknowledgements

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Table 1. Responses to Financial Self-Efficacy Scale (FSES) items (%)

Survey item	Exactly true	Moderately true	Hardly true	Not true at all	Total
It is hard to stick to my spending when unexpected expenses arise	26.6	43.9	20.4	9.1	100.0
It is challenging to make progress toward my financial goals	28.3	43.8	20.4	7.5	100.0
When unexpected expenses occur, I usually have to use credit	15.1	25.4	25.1	34.4	100.0
When faced with a financial challenge, I have a hard time figuring out a solution	7.9	24.4	40.8	26.9	100.0
I lack confidence in my ability to manage my finances	6.4	21.7	32.7	39.2	100.0
I worry about running out of money in retirement	26.5	34.5	20.7	18.4	100.0

Note: Based on the sample of respondents used in the estimation (*n*=1542).

Table 2

Factor Analysis using Principal-Component factors

Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor 1	3.1777	2.3753	0.5296	0.5296
Factor 2	0.8024	0.0809	0.1337	0.6633
Factor 3	0.7214	0.1342	0.1202	0.7836
Factor 4	0.5873	0.2086	0.0979	0.8815
Factor 5	0.3787	0.0463	0.0631	0.9446
Factor 6	0.3325	.	0.0554	1.0000

Factor loadings and unique variances

Survey item	Factor 1	Uniqueness
Survey item 1	0.7659	0.4135
Survey item 2	0.7748	0.3996
Survey item 3	0.6481	0.5799
Survey item 4	0.8037	0.3540
Survey item 5	0.7010	0.5086
Survey item 6	0.6583	0.5666

Likelihood ratio test (independent vs. saturated)

$\chi^2(15)$	3070.54
Prob>χ^2	0.0000
Retained factors	1
No. of parameters	6

Note: Based on the sample of respondents used in the estimation (*n*=1542).

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Table 3. Summary statistics of estimation sample

Variable	Mean	Std. dev.	Min.	Max.
Outcome variables				
Individual financial products				
Investment	0.431	0.495	0	1
Mortgage	0.619	0.486	0	1
Savings account	0.804	0.398	0	1
Credit card	0.800	0.400	0	1
Loan	0.526	0.500	0	1
Private health insurance	0.672	0.470	0	1
Life insurance	0.406	0.491	0	1
Grouped financial products				
Count of positively-signed products	1.853	0.973	0	3
Count of negatively-signed products	1.326	0.725	0	2
Explanatory variables				
Psychometric instrument				
Financial self-efficacy scale (FSES) score	15.201	4.156	6	24
Factors contributing to financial literacy				
General education (Base group: Below Year 12)				
Year 12	0.159	0.366	0	1
Apprenticeship/Other further education/On-the-job training	0.317	0.466	0	1
University undergraduate qualification	0.212	0.409	0	1
University postgraduate qualification	0.130	0.337	0	1
Financial education course (0=No 1=Yes)	0.160	0.367	0	1
Formative experiences				
Positive childhood experience with money [a]	2.344	0.911	0	4
Received money from parents as a teenager (0=No 1=Yes)	0.510	0.500	0	1
Earned money by working as a teenager (0=No 1=Yes)	0.649	0.477	0	1
Had responsibility for managing a bank account (0=No 1=Yes)	0.544	0.498	0	1
Financial risk preferences				
Willingness to take financial risk [b]	0.730	0.794	0	3
Other socio-demographic characteristics				
Age (Base group: 18-29 years)				
30-39 years	0.208	0.406	0	1
40-49 years	0.207	0.405	0	1
50-59 years	0.174	0.379	0	1
60+ years	0.238	0.426	0	1
Household income (Base group: <$30,000)				
$30,000 < $60,000	0.289	0.454	0	1
$60,000 < $90,000	0.210	0.407	0	1
$90,000 < $120,000	0.163	0.369	0	1
$120,000 < $150,000	0.087	0.282	0	1
$150,000 <	0.072	0.259	0	1
Labour force status (Base group: Not in labour force)				
Employed (0=No 1=Yes)	0.481	0.500	0	1
Unemployed (0=No 1=Yes)	0.065	0.246	0	1
Other socio-demographic characteristics				
Partnered (0=No 1=Yes)	0.641	0.480	0	1
Dependent children (0=No 1=Yes)	0.349	0.477	0	1
Remoteness (0=Urban 1=Rural)	0.084	0.277	0	1
Language other than English spoken at home (0=No 1=Yes)	0.116	0.320	0	1
Australian-born (0=No 1=Yes)	0.751	0.433	0	1
Indigenous (Aboriginal/Torres Strait Islander) (0=No 1=Yes)	0.012	0.107	0	1
Mother's highest level of education [c]	0.729	1.094	0	3
Father's highest level of education [c]	1.003	1.172	0	3

Note: Descriptive statistics of estimation sample (*n*=1542). [a] Classified as: 0=Very negative; 1=Negative; 2=Neither positive nor negative; 3=Positive; 4=Very positive. [b] Classified as: 0=Not willing to take any risk; 1=Average risk; 2=Above-average risk; 3=Substantial risk. [c] Classified as: 0=Below Year 12 or 'don't know'; 1=Year 12; 2=Apprenticeship or Other further education; 3=University.

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Table 4. Coefficient results of multivariate probit of likelihood of having each financial product

Variables	Financial product						
	Investment	Mortgage	Savings account	Credit card	Loan	Private health insurance	Life insurance
Psychometric instrument							
Financial self-efficacy score	0.051***	0.032***	0.053***	-0.029***	-0.035***	0.011	-0.011
	(5.64)	(3.48)	(5.32)	(-2.77)	(-4.10)	(1.14)	(-1.22)
Factors contributing to financial literacy							
General education							
Year 12	0.073	0.167	0.060	0.059	0.158	0.171	0.005
	(0.58)	(1.33)	(0.46)	(0.44)	(1.35)	(1.38)	(0.04)
Apprentice/Other further edu./On-the-job training	0.275**	0.379***	0.249**	0.285**	0.339***	0.336***	0.173*
	(2.53)	(3.49)	(2.19)	(2.38)	(3.38)	(3.11)	(1.68)
University undergraduate qualification	0.360***	0.284**	0.155	0.217	0.215*	0.575***	0.126
	(2.86)	(2.25)	(1.16)	(1.54)	(1.83)	(4.45)	(1.05)
University postgraduate qualification	0.459***	0.375**	0.454***	0.288*	0.125	0.675***	0.335**
	(3.23)	(2.56)	(2.82)	(1.76)	(0.95)	(4.42)	(2.49)
Financial education course	0.661***	0.263**	0.181	0.074	0.335***	0.149	0.331***
	(6.56)	(2.46)	(1.58)	(0.63)	(3.53)	(1.37)	(3.54)
Formative experiences							
Positive childhood experience with money	0.029	0.043	-0.065	-0.035	-0.139***	0.042	0.012
	(0.71)	(1.03)	(-1.44)	(-0.73)	(-3.54)	(1.00)	(0.30)
Received money from parents as a teenager	0.018	0.007	0.157*	0.029	0.095	0.093	0.092
	(0.23)	(0.09)	(1.92)	(0.34)	(1.35)	(1.20)	(1.27)
Earned money by working as a teenager	-0.033	0.047	0.006	0.023	0.143*	0.092	0.017
	(-0.42)	(0.59)	(0.07)	(0.26)	(1.93)	(1.14)	(0.22)
Had responsibility for bank account as a teenager	0.256***	0.045	0.083	0.087	0.043	0.054	0.005
	(3.36)	(0.58)	(1.02)	(1.02)	(0.60)	(0.70)	(0.07)
Financial risk preferences							
Willingness to take financial risk	0.190***	0.061	-0.148***	0.127**	-0.003	0.102**	0.065
	(4.07)	(1.30)	(-2.99)	(2.41)	(-0.08)	(2.13)	(1.42)

Other socio-demographic characteristics

Age

30-39 years	0.389***	0.791***	-0.002	0.718***	0.267**	0.587***	0.500***
	(3.16)	(6.73)	(-0.02)	(5.88)	(2.39)	(5.02)	(4.11)
40-49 years	0.688***	0.957***	0.114	0.891***	0.484***	0.721***	0.761***
	(5.38)	(7.78)	(0.89)	(6.92)	(4.23)	(5.98)	(6.09)
50-59 years	1.242***	1.490***	0.336**	1.198***	0.594***	1.206***	1.010***
	(9.15)	(11.00)	(2.36)	(8.28)	(4.84)	(8.98)	(7.69)
60+ years	1.306***	1.785***	0.153	1.637***	0.582***	1.720***	1.149***
	(9.33)	(12.67)	(1.08)	(10.81)	(4.63)	(12.04)	(8.43)

Household income

$30,000 < $60,000	0.286**	0.196*	0.109	0.052	0.041	0.382***	0.213*
	(2.46)	(1.75)	(0.94)	(0.45)	(0.39)	(3.37)	(1.92)
$60,000 < $90,000	0.361***	0.279**	0.391***	0.474***	0.087	0.511***	0.309**
	(2.71)	(2.14)	(2.81)	(3.36)	(0.72)	(3.88)	(2.42)
$90,000 < $120,000	0.317**	0.645***	0.173	0.608***	0.143	0.834***	0.522***
	(2.15)	(4.46)	(1.15)	(3.88)	(1.07)	(5.70)	(3.74)
$120,000 < $150,000	0.596***	0.679***	0.388**	0.806***	0.254*	0.996***	0.748***
	(3.56)	(3.94)	(2.10)	(4.11)	(1.65)	(5.68)	(4.65)
$150,000 +	0.672***	0.588***	0.252	0.767***	0.349**	1.160***	0.627***
	(3.71)	(3.14)	(1.28)	(3.51)	(2.06)	(5.59)	(3.64)

Labour force status

Employed	0.077	0.172*	0.113	0.332***	0.124	0.180**	0.136
	(0.89)	(1.92)	(1.19)	(3.40)	(1.52)	(2.03)	(1.62)
Unemployed	-0.299*	-0.153	-0.355**	0.127	-0.088	0.342**	-0.044
	(-1.80)	(-0.98)	(-2.34)	(0.78)	(-0.59)	(2.19)	(-0.28)

Other characteristics

Partnered	0.281***	0.480***	0.015	0.180**	0.177**	0.152*	0.256***
	(3.26)	(5.72)	(0.17)	(1.96)	(2.24)	(1.78)	(3.13)
Dependent children	0.005	0.287***	0.010	0.054	0.027	-0.127	0.081
	(0.05)	(3.22)	(0.11)	(0.55)	(0.32)	(-1.42)	(0.95)

Remoteness	0.063	0.008	-0.214	-0.289**	-0.027	-0.115	0.176
	(0.47)	(0.06)	(-1.62)	(-2.14)	(-0.22)	(-0.90)	(1.41)
Language other than English	-0.087	-0.246**	-0.168	-0.258*	-0.410***	0.072	-0.091
	(-0.70)	(-1.99)	(-1.29)	(-1.94)	(-3.43)	(0.58)	(-0.75)
Australian-born	0.144	-0.005	0.078	0.038	0.155*	0.268***	0.003
	(1.62)	(-0.06)	(0.80)	(0.37)	(1.86)	(2.92)	(0.03)
Indigenous	-0.981**	-0.026	-0.264	-0.509	-0.139	-1.059***	-0.033
	(-2.22)	(-0.07)	(-0.80)	(-1.48)	(-0.44)	(-2.79)	(-0.09)
Mother's education	0.002	0.015	-0.009	-0.025	-0.029	0.094**	-0.002
	(0.05)	(0.35)	(-0.19)	(-0.53)	(-0.74)	(2.18)	(-0.06)
Father's education	-0.001	-0.018	0.050	0.039	0.022	0.024	0.018
	(-0.03)	(-0.47)	(1.18)	(0.88)	(0.61)	(0.62)	(0.50)
Constant	-3.020***	-2.436***	-0.384	-0.413	-0.221	-2.146***	-1.734***
	(-12.04)	(-10.02)	(-1.56)	(-1.63)	(-1.01)	(-8.88)	(-7.48)

Model criteria

Number of observations	1542
Number of draws	40
Log likelihood	-5426.22
Wald χ^2 (210 df)	1129.05
Prob>χ^2	0.0000

Note: z-values in parentheses. *** Significant at 1% level. ** Significant at 5% level. * Significant at 10% level.

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Table 5

Correlations between the error terms (ρ) for each pair of financial products

Financial product	Investment	Mortgage	Savings account	Credit card	Loan	Private health insurance
Mortgage	0.406***					
	(9.53)					
Savings account	0.287***	0.129**				
	(5.81)	(2.52)				
Credit card	0.321***	0.344***	0.252***			
	(6.36)	(7.16)	(4.83)			
Loan	0.144***	0.332***	0.239***	0.448***		
	(3.26)	(7.89)	(5.11)	(10.21)		
Private health insurance	0.416***	0.322***	0.279***	0.383***	0.239***	
	(9.57)	(7.24)	(5.73)	(8.42)	(5.38)	
Life insurance	0.323***	0.301***	0.139***	0.278***	0.276***	0.313***
	(7.68)	(6.87)	(2.84)	(5.46)	(6.79)	(7.01)
χ^2 (21df)	607.94					
Prob>χ^2	0.0000					

Note: z-value in parentheses. *** Significant at 1% level. ** Significant at 5% level. * Significant at 10% level.

Table 6

Results of bivariate ordered probit: Coefficient estimates of the likelihood of having progressively more financial products in each group

Variables	Group of financial products	
	Group 1	**Group 2**
	(Investment, Mortgage, Savings account)	(Credit card, Loan)
Psychometric instrument		
Financial self-efficacy score	0.057***	-0.034***
	(7.57)	(-4.43)
Factors contributing to financial literacy		
General education		
Year 12	0.149	0.126
	(1.48)	(1.20)
Apprentice/Other further education/On-the-job training	0.386***	0.341***
	(4.41)	(3.73)
University undergraduate qualification	0.338***	0.232**
	(3.32)	(2.18)
University postgraduate qualification	0.518***	0.174
	(4.43)	(1.46)
Financial education course	0.499***	0.266***
	(5.86)	(3.04)
Formative experiences		
Positive childhood experience with money	0.002	-0.106***
	(0.05)	(-2.97)
Received money from parents as a teenager	0.085	0.059
	(1.39)	(0.91)
Earned money by working as a teenager	0.004	0.099
	(0.06)	(1.49)
Had responsibility for bank account as a teenager	0.160***	0.069
	(2.62)	(1.07)

Financial risk preferences

Willingness to take financial risk	0.049	0.048
	(1.28)	(1.19)
Other socio-demographic characteristics		
Age		
30-39 years	0.459***	0.519***
	(4.84)	(5.23)
40-49 years	0.721***	0.728***
	(7.32)	(7.04)
50-59 years	1.271***	0.918***
	(11.78)	(8.24)
60+ years	1.374***	1.088***
	(12.38)	(9.51)
Household income		
$30,000 < $60,000	0.251***	0.030
	(2.77)	(0.32)
$60,000 < $90,000	0.445***	0.250**
	(4.25)	(2.30)
$90,000 < $120,000	0.481***	0.352***
	(4.16)	(2.92)
$120,000 < $150,000	0.708***	0.468***
	(5.20)	(3.33)
$150,000+	0.683***	0.520***
	(4.64)	(3.38)
Labour force status		
Employed	0.140**	0.225***
	(1.98)	(3.04)
Unemployed	-0.303**	-0.002
	(-2.46)	(-0.01)
Other socio-economic characteristics		
Partnered	0.326***	0.203***
	(4.83)	(2.87)

Dependent children	0.123*	0.045
	(1.72)	(0.60)
Remoteness	-0.065	-0.126
	(-0.62)	(-1.14)
Language other than English	-0.197**	-0.346***
	(-1.97)	(-3.34)
Australian-born	0.082	0.109
	(1.14)	(1.45)
Indigenous	-0.394	-0.355
	(-1.48)	(-1.27)
Mother's education	0.003	-0.026
	(0.10)	(-0.74)
Father's education	0.002	0.035
	(0.07)	(1.07)
Constant (atrho)	0.360***	
	(10.65)	

Model criteria

Log likelihood	-3087.28
Wald χ^2 (30 df)	493.45
Prob>χ^2	0.0000
Number of observations	1542

Values of cutoffs (c) and correlation between error terms (ρ)

c_{11}	1.195***
	(6.23)
c_{12}	2.513***
	(12.79)
c_{13}	3.441***
	(16.99)
c_{21}	-0.340*
	(-1.72)
c_{22}	0.881***

	(4.42)
ρ	0.346***
	(11.59)
Likelihood ratio test of independent equations	
χ^2 (1 df)	115.31
Prob>χ^2	0.0000

Note: z-value in parentheses. *** Significant at 1% level. ** Significant at 5% level. * Significant at 10% level.

Figure 1

Distribution of observed Financial Self-Efficacy Scale (FSES) scores, based on the sample of respondents used in the estimation (*n*=1542).

Figure 2

Predicted probability of holding none or all seven types of financial products, based on multivariate probit results, disaggregated by observed FSES score. Linear trendlines have been added to the two data series. Predictions are based on the sample of respondents used in the estimation (*n*=1542).

Figure 3

Predicted probabilities of holding combinations of financial products, based on bivariate ordered probit results. Numbers inside the parentheses denote the number of financial products held from Group 1 and Group 2 respectively. Estimates are based on the sample of respondents used in the estimation (n=1542).

Figure 4

Predicted probabilities of holding selected combinations of financial products, based on bivariate ordered probit results, disaggregated by observed FSES score. Numbers inside the parentheses denote the number of financial products held from Group 1 and from Group 2 respectively. Predictions are based on the sample of respondents used in the estimation (n=1542).

Observed Financial Self-Efficacy Scale (FSES) score

Combination of count of financial products
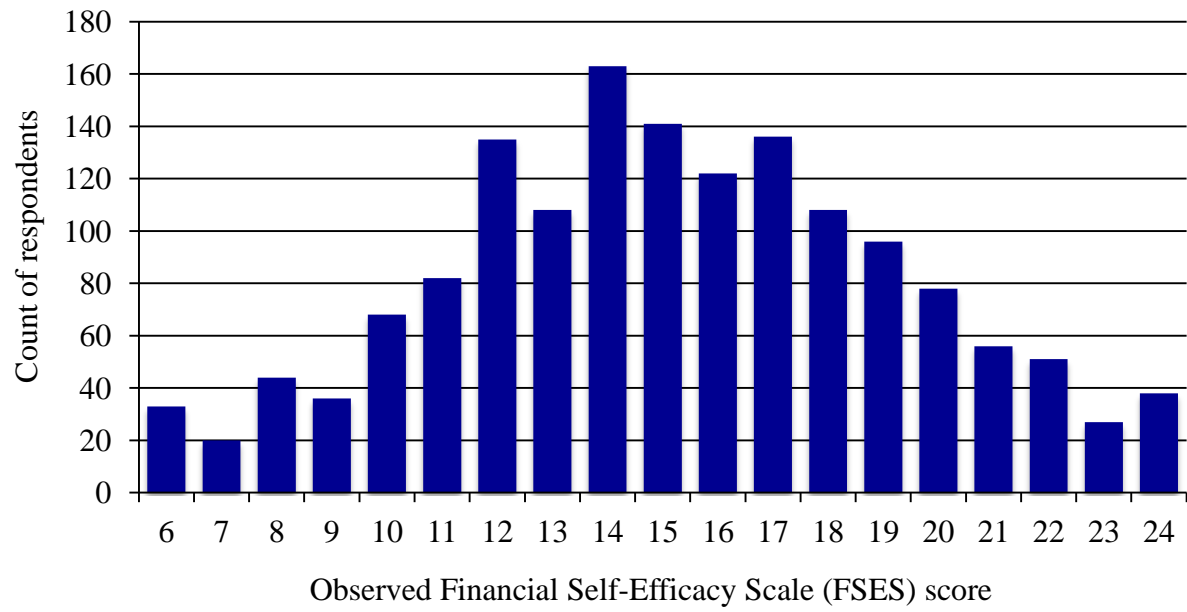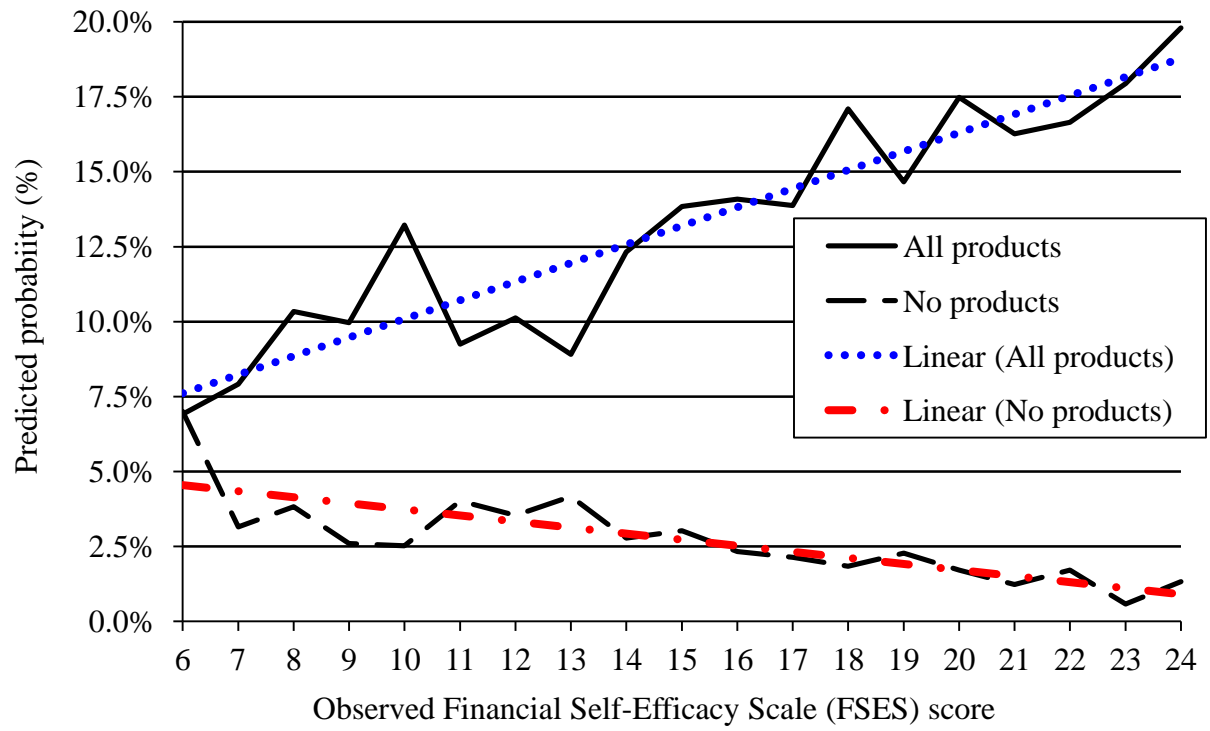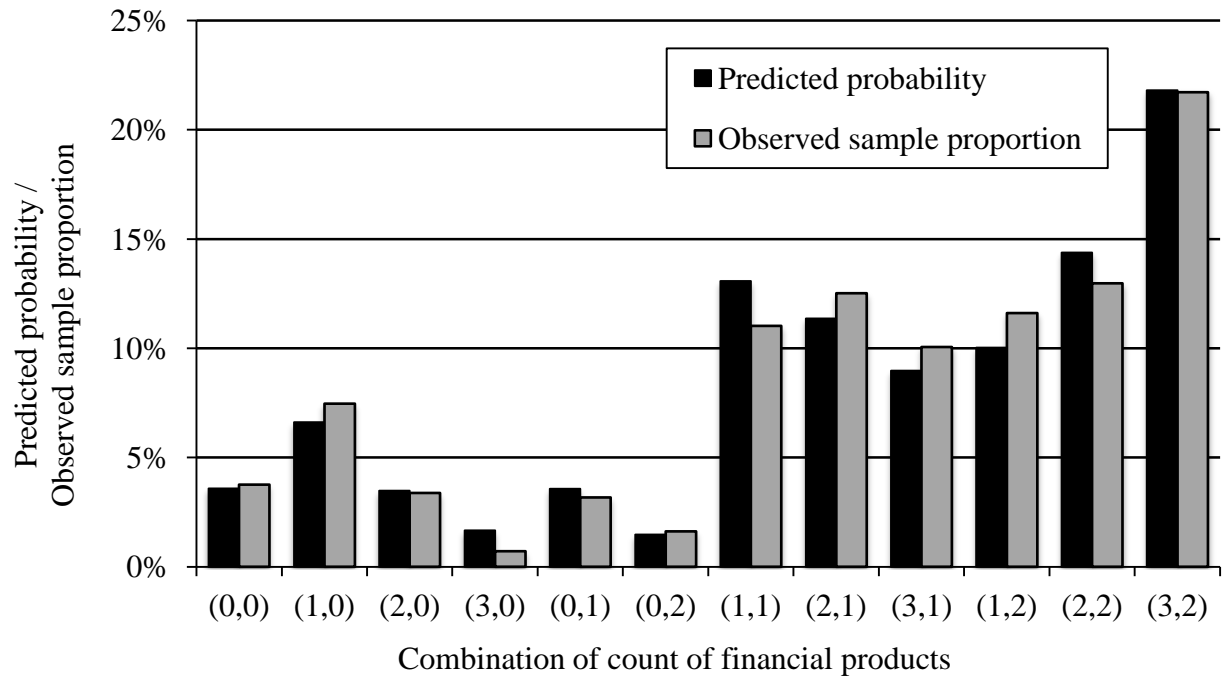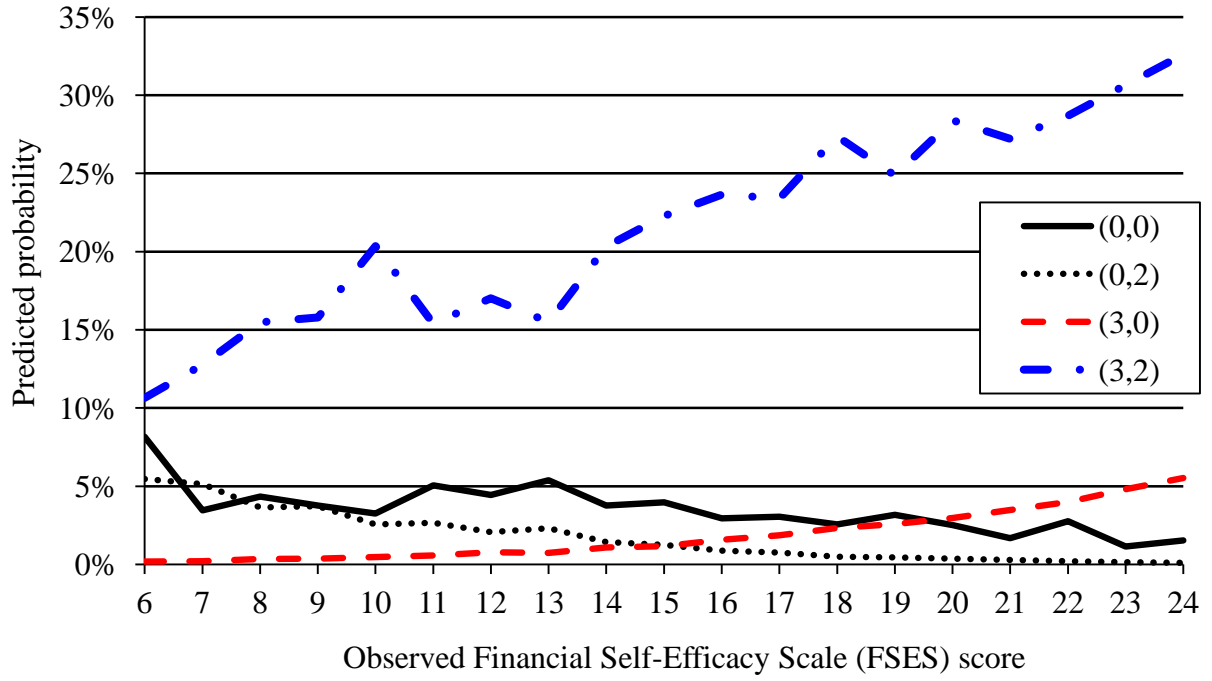
Highlights

- Financial self-efficacy has an explanatory role in personal finance behaviour.
- Higher financial self-efficacy is associated with investment and savings products.
- Lower financial self-efficacy is associated with debt-related products.
- Financial self-efficacy is independently identified from financial literacy factors.