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ABSTRACT

Measuring Financial Wellbeing with Self-Reported and Bank-Record Data*

This study develops multi-item scales of the financial wellbeing of customers of a major Australian bank using self-reported survey data that are matched with the customers' financial records. Using Item Response Theory (IRT) models, the study develops: First a Reported Financial Wellbeing Scale that is formed from responses to 10 questions about people's experiences and perceptions of financial outcomes, and second an Observed Financial Wellbeing Scale that is formed from five financial-record measures of customers' account balances, net spending, and payment problems. The IRT models show that each scale reliably differentiates between a wide range of outcomes and that the components within each scale have similar power to discriminate. We validate the scales by estimating Least Absolute Shrinkage and Selection Operator machine-learning models of how they correlate with other measurable characteristics. Savings habits, spending habits, credit card behavior, household income, education, difficulties with housing payments, and the use of and access to social or government support are each associated with both types of financial wellbeing.

JEL Classification: D1, I3

Keywords: financial wellbeing, bank-record data, financial behavior, item response theory models, machine-learning, LASSO

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1. Introduction

People's financial wellbeing is an issue of substantial social and research concern. External forces, such as health and economic crises, volatile incomes, rising housing costs, and growing personal responsibility to finance educations and retirements, put more pressure on people's use of financial tools. Wider and more sophisticated sets of financial products increase the choices that people face but can also add to risks. Researchers, regulators, financial institutions, and consumers need valid and reliable measures of financial wellbeing to understand how financial wellbeing is changing, how personal and external circumstances contribute to financial wellbeing, and how policies, products, and interventions can improve financial wellbeing.

Because of its complexity, financial wellbeing has tended not to be well or consistently measured, with many analyses relying on measures of convenience rather than measures that are carefully conceived or rigorously developed. However, better measures are coming into use, including financial wellbeing scales for the United States (Consumer Financial Protection Bureau [CFPB], 2015; Netemeyer et al., 2018; Prawitz et al., 2006) and Norway (Kempson et al., 2017). A limitation of these measures is that they solely rely on self-reports. Thus, they incorporate subjective perceptions of people's financial circumstances. Netemeyer et al. (2018) have shown that these can be manipulated by positive and negative framing. Survey answers are also subject to misreporting from recall error, miscomprehension, social desirability bias, and other problems (Bound et al., 2001). Summative measures based on people's financial records have been proposed (see, e.g., Parker et al., 2016), which can overcome these problems. However, to our knowledge, no individual-level scale of financial wellbeing has been implemented from financial-record data.

This paper reports results from a unique business and academic collaboration to

collect self-reported and bank record data on Australians' financial outcomes, rigorously develop multi-item scales of financial wellbeing from both sources of data, and quantitatively analyze the determinants of financial wellbeing. Our data come from an on-line survey of 5,682 customers of one of Australia's largest banks. The survey asked questions about customers' financial wellbeing outcomes that were used as candidate items for scales. The questions were based on a careful conceptualization of financial wellbeing and were mostly drawn from questions that that had been used in previous research. The survey also asked about people's personal and household characteristics, external conditions, and financial behaviors. Importantly, the respondents gave permission for their bank records to be linked to their survey answers. The bank-record data were used to form additional candidate measures of financial wellbeing, which were also based on our conceptualization.

From these data, we develop the first individual-level financial wellbeing scale to use bank-record data, an *Observed Financial Wellbeing Scale* that is formed from five measures of customers' cash balances, savings, credit, and payments from their financial records. We are also the first to use linked self-reported and bank-record data and construct a *Reported Financial Wellbeing Scale* that is formed from responses to 10 questions about people's perceptions and experiences of their financial outcomes.

The scales are developed through rigorous quantitative analyses, including factor analyses and Item Response Theory (IRT) graded-response models. The factor analyses show that the self-reported and bank-record data lead to two distinct scales. Results from the IRT models indicate that every outcome for each item contributes unique information to the scales and that the items function similarly across different population groups. The scales have very high reliability, and though distinct, they are strongly positively correlated. We confirm these properties in alternative samples. Both scales are easy to construct, interpret, and scale up. They can therefore be used as validated and powerful measures of financial wellbeing of

broad populations by researchers and financial institutions. However, they are also simple enough for consumers, counselors, and financial educators.

We use the other data from the survey and some additional bank-record measures in supervised machine-learning analyses of the characteristics that contribute to financial wellbeing. Our data include more than 100 measures that might serve as explanatory variables. We estimate Least Absolute Shrinkage and Selection Operator (LASSO) models (Tibshirani, 1996) that select the best predictors of financial wellbeing from among the entire set of available measures in a data-driven way without us having to impose initial and possibly arbitrary exclusions. These machine-learning analyses reveal that people's savings habits are especially strong correlates of their reported and observed financial wellbeing. The models also indicate that household income, education, spending habits, credit card behavior, difficulties with housing payments, and the use of and access to social or government support are associated with both types of financial wellbeing. However, showing some of the distinctions between the two financial wellbeing measures, a better self-assessed understanding of finances, recent financial improvements, and a willingness to put off financial decisions are associated with higher reported financial wellbeing but lower observed financial wellbeing. Overall, these results suggest that financial wellbeing is most closely related to modifiable saving and spending behaviors, highlighting the scope for programs that improve these behaviors—such as spending trackers, financial advisors, financial education—to improve people's financial wellbeing.

Our work makes several important contributions. Our Observed Financial Wellbeing Scale is a first-of-its-kind, consumer-oriented, measure of wellbeing that is transparent, easy to implement by other financial institutions, and can be scaled to measure consumer wellbeing across large subpopulations. This scale provides a unique opportunity for financial institutions to quantify the social impact of their products and to improve the welfare of their

customers and their own market impact by providing tailored products and services. Consumer welfare could also be improved even by simply providing a measure of financial wellbeing which they can monitor and act upon. Our Reported Financial Wellbeing Scale provides an excellent complementary measure of financial wellbeing; it is rigorously developed and evaluated, transparent and simple to implement, and covers a broader set of distinct constructs most other financial wellbeing measures developed to date. Importantly, both the Reported and Observed Financial Wellbeing Scales use only outcome-based measures, which means they can be used to analyze the determinants of financial wellbeing without simultaneity concerns. For all these reasons we believe there can be large social gains from the widespread adoption of these scales.

2. Previous Studies

Financial wellbeing is multi-faceted and complex. Because of its complexity, studies have varied considerably in their definitions and measurement of financial wellbeing (see Joo [2008] for a comprehensive review), and no single definition or measure has been universally adopted.

Conceptualizations. Measures of financial wellbeing should be grounded in a conceptualization and definition. However, many studies omit these and simply analyze measures they have at hand, such as financial satisfaction (Bonke and Browning, 2009; Brown and Gray, 2016), subjective prosperity (Brown and Gray, 2016), and net wealth (Schmeiser and Seligman, 2013). The drawbacks with this informal approach are that it may omit relevant elements or worse, not genuinely align with financial wellbeing. We can only assess the adequacy of an empirical measure if we have a conceptualization to compare it to.

Formal conceptualizations of financial wellbeing tend to have multiple elements with varying degrees of breadth. Joo (2008) has offered one of the broadest conceptualizations, which includes people's satisfaction with their financial situation, the objective status of

finances, financial attitudes, and financial behaviors. Joo's conceptualization paints an extensive picture of people's financial situations. However, its exceptional breadth carries an analytical weakness, as it cannot be used to test how attitudes, behaviors, and other financial circumstances *separately* contribute to wellbeing because the conceptualization builds these in as components. We want our measure to be used in these types of analyses and therefore, focus on conceptualizations based on financial outcomes.

Among the outcome-oriented conceptualizations, some consider subjective elements. The U.S. Consumer Financial Protection Bureau [CFPB] (2017) defined financial wellbeing as having control over day-to-day and month-to-month finances, being able to absorb a financial shock, being on track to meet financial goals, and having financial freedom. Brüggen et al. (2017) defined financial wellbeing in terms of (*a*) people's perceptions of current and anticipated desired living standards and (*b*) financial freedom. Kempson et al. (2017) framed financial wellbeing in terms of meeting commitments, financial comfort, and financial resilience. Prawitz et al. (2006) considered stress, satisfaction, meeting regular and unexpected expenses, and financial freedom, while Netemeyer et al. (2018) considered current money management stress and future financial security.

Other conceptualizations have objective elements. Parker et al. (2016) characterized financial wellbeing in terms of spending, saving, borrowing, and planning outcomes. Greninger et al. (1996) offered ratios and thresholds of objective indicators, while Bray (2001) focused on financial hardships, financial management, and financial exclusion.

A few conceptualizations combine subjective and objective elements. Muir et al. (2017) considered domains of meeting expenses with money left over, being in control of finances, and feeling secure. Arber et al. (2014) considered the ability to make ends meet and problems with household expenditures, and Shim et al. (2009) considered satisfaction, debt positions, and economizing outcomes.

Despite differences in the outcomes covered, the conceptualizations share many features. Nearly all have temporal elements of present and future outcomes. Many cover financial functions, such as spending, saving, or borrowing, or financial benefits, such as providing freedom, control, or security. Several are sensitive to context. For example, Kempson et al. (2017) developed a conceptualization for Norway, which omits long-term future security because of the strength of that country's retirement system.

Measurement. Each conceptualization was developed to guide the measurement of financial wellbeing. An initial consideration is the general measurement approach. Because financial wellbeing is multi-faceted, it is not likely to be captured by a single indicator. Accordingly, most studies measure financial wellbeing through a scale approach in which a set of observed indicators follows from one or more underlying latent outcomes. Scales also help to address random measurement error in individual component items.

All the existing scale measures are formed from *self-reported* indicators. The CFPB (2017) developed a 10-item scale with a single, underlying latent variable. Prawitz et al. (2006) developed the InCharge Financial Distress/Financial Wellbeing (IFDFW) scale as an eight-item self-reported scale. The IFDFW scale has been used subsequently by Gerrans et al. (2014), Gutter and Copor (2011), O'Neill et al. (2006), and Taft et al. (2013). Other self-reported scales have been developed by Bray (2001), Bray et al. (2011), Delafrooz and Paim (2013), FiftyFive5 (2016), Garon et al. (2018), Kempson et al. (2017), Muir et al. (2017), Riitsalu and Murakas (2019), and Vlaev and Elliott (2014).

Financial institutions have traditionally used non self-reported measures to analyze consumer behavior, and researchers have also analyzed such measures in their work. Credit scores are the most salient example of this practice (see e.g., Meier and Sprenger, 2010; 2012), yet they often incorporate financial outcome, behavior, and other data and are therefore unsuitable for exploring some of their determinants. Despite recent developments in

psychological and behavioral measures using administrative record data (e.g., Gladstone et al. 2019, Garbinski et al., 2020), there is no existing outcome measure of financial wellbeing that exclusively uses non self-reported outcomes.

Existing scale measures also differ in the statistical formality of their design. CFPB (2017), Kempson et al. (2017), Netermeyer et al. (2018), and Prawitz et al. (2016), have used rigorous psychometric procedures to form scales. Others, including Delafrooz and Paim (2013), Riitsalu and Murakas (2019), and Vlaev and Elliott (2014), have proceeded less formally. Formal methods are needed to establish the properties of the scales, including their dimensions and whether individual items belong in them.

Covariates. Studies find that people's economic resources are key determinants of financial wellbeing, with higher levels of personal or household income being associated with greater financial wellbeing (Bonke and Browning, 2009; Brown and Gray, 2016; Schmeiser and Seligman, 2009; Shim et al., 2009). Other personal resources, including education (Brown and Gray, 2016; Taft et al., 2013), self-control (Netemeyer et al., 2018; Shim et al., 2009) and financial literacy (Gerrans et al., 2014; Riitsalu and Murakas, 2019; Schmeiser and Seligman, 2009; Shim et al., 2009), are also associated with higher financial wellbeing. In the case of financial literacy, self-assessed knowledge tends to have stronger associations with financial behavior and wellbeing than objective knowledge (Allgood and Walstad, 2016; Lusardi and Mitchel, 2014; Riitsalu and Murakas, 2019; Schmeiser and Seligman, 2013).

Resources in the form of family and social support can also contribute to financial wellbeing (Brown and Gray, 2016; Shim et al., 2009). However, larger households and increased numbers of children are associated with lower financial wellbeing.

Research has also identified especially strong associations between financial wellbeing and financial behaviors (Delafrooz and Paim, 2013; Gutter and Copur, 2011; Netemeyer et al., 2018; Shim et al., 2009) and attitudes, such as risk tolerance, materialism,

and self-efficacy (Netemeyer et al., 2018; Shim et al., 2009).

Lessons. Although researchers have developed several definitions and measures of financial wellbeing, no definition or metric has been universally adopted. In addition, the existing studies have not built a summative, outcome-focused financial wellbeing scale from financial record measures nor combined self-reported and financial record data. Where subjective and objective self-reported components have been combined, conceptualizations have not distinguished between these components or explained how they can lead to separate dimensions of financial wellbeing. Several conceptualizations combine financial outcomes and potential determinants of financial wellbeing in their measures, which makes them unsuitable for rigorously exploring the determinants of financial wellbeing. Differences across the existing scales and evidence that the measurement of financial wellbeing depends on country context (e.g., Kempson et al., 2017) demonstrate the need for a formal and rigorous scale development process.

3. Conceptualization of Financial Wellbeing

Definition. We define financial wellbeing in terms of financial outcomes that people experience, rather than all the conditions, characteristics, and behaviors that might contribute to those outcomes. Our definition is informed by several considerations.

First, financial wellbeing has objective components, or attainments, $\boldsymbol{w}$, that can be observed in people's financial records or reports of their financial outcomes. Financial wellbeing also has subjective components that people report based on their own valuation of the objective attainments, $v(\boldsymbol{w})$. Second, our definition incorporates temporal elements of people's financial situations, including outcomes that they face day-to-day or month-to-month, outcomes that prepare them to weather unexpected adverse events, and outcomes that allow them to sustain their wellbeing over time and achieve long-term goals. Third, the definition includes goals and objectives that people and financial planners commonly identify

(Brüggen et al., 2017; CFPB, 2017; Kempson et al., 2017; Muir et al., 2017; Netemeyer et al., 2018; Prawitz et al., 2006). These goals are for people to meet their financial obligations, have the financial freedom to enjoy extra consumption and make choices, have agency and control over their finances, and be secure and free from financial worries. Fourth, it considers financial wellbeing along a continuum, rather than as a binary either/or condition. From these considerations, we define people's financial wellbeing as:

> *the extent to which people both perceive and have:*
>
> 1. *financial outcomes in which they meet their financial obligations*
> 2. *financial freedom to make choices that allow them to enjoy life*
> 3. *control of their finances, and*
> 4. *financial security—*
>
> *now, in the future, and under possible adverse circumstances.*

We formally distinguish between the objective elements of *observable financial wellbeing*, $\boldsymbol{w}$, and the subjective elements of *perceived financial wellbeing*, $v(\boldsymbol{w})$.

Conceptual model. We conceptualize financial wellbeing as having three general sets of determinants: household characteristics, external conditions, and financial behavior. We overview the relationships in Figure 1. To simplify the present discussion, we assume that household characteristics and external conditions are largely outside people's control and that people's autonomous actions take place as financial behaviors.

[Figure 1 about here]

Formally, we consider people's financial behavior through a series of time periods. We assume that people care about the goods and services that they can purchase and use in each period. People's economic resources to make purchases in each period come from their earnings, investment income, borrowing, wealth, and other sources. External conditions (largely outside of people's control) and financial behaviors (largely in their control) also

determine the goods and services they consume. Moreover, economic resources and external conditions also enable people to adopt different financial behaviors. If people spend less than they earn, they can more easily increase their savings. If they spend more than they earn, they must borrow or deplete their wealth.

Our model also imposes some conceptual restrictions, such as financial behaviors or external conditions not *contemporaneously* affecting personal and household characteristics. These restrictions ease the conceptualization of dynamics in financial wellbeing and do not preclude effects on *future* personal and household characteristics. Today's financial behaviors can, for example, improve tomorrow's household material resources. In addition, we make the non-contentious assumption that resources and characteristics are known in the current period but uncertain and subject to shocks in future periods.

We assume that people undertake financial behaviors to maximize their current and expected future consumption, subject to their personal and household characteristics and external conditions. People's objective access to more of this consumption is captured by *observable financial wellbeing*, $\boldsymbol{w}$, whereas their subjective enjoyment of this consumption—also influenced by their behaviors, characteristics, and external conditions—is captured by their *perceived financial wellbeing*, $v(\boldsymbol{w})$.

4. Data

Our empirical analyses use responses to an on-line survey that was conducted in August 2017 with 5,682 customers of one of Australia's largest banks. The analyses also use financial-record data linked to these customers' responses. The questionnaire and other survey details are reported in Web Appendices C and D.

A key consideration for recruiting survey subjects was what we would be able to see from their bank records. Records from the bank are a rich source of data, but their depiction of customers' financial activities is incomplete if customers conduct financial transactions or

hold products with other institutions (which are not observed in our bank record data). We were especially interested in recruiting people who use the bank as their main financial institution (MFI) because their records would describe most or all of their financial outcomes. We additionally wanted a sample that described all the bank's customers. To balance these needs, we sampled from three strata:

1. A nationally representative sample of 1,611 of the bank's customers.
2. A sample of 2,899 'sole-MFI' customers whose transactions data indicated that they conducted their banking solely through the bank.
3. A sample of 1,172 'split-MFI customers' for whom the bank appears to be their main banking institution, but not their only bank.

Potential survey subjects were adult customers with e-mail addresses who had not opted out of on-line research and marketing communications from the bank. Subjects were sent an e-mail invitation from the bank that contained a unique survey link. Invitations were sent to approximately 300,000 bank customers. As in most online surveys, ours had a low response rate, yet Haisken-DeNew et al. (2018) show that reweighting the survey data to make them representative of the Australian population has negligible effects on their results. If subjects clicked on the link and gave consent, the survey asked the person's age to check that an adult was answering and the person's residential location to check that he or she lived in Australia. After the screening questions, the survey asked about the person's perceptions and experiences with financial outcomes, including questions about financial wellbeing. The survey also asked about major life events, financial behaviors, banking relationships, household financial holdings, loans, financial capacity, financial habits, attitudes, and many demographic and economic characteristics.

We conduct our empirical analyses with two principal samples. For both samples, we drop observations for 50 people who did not answer all the financial wellbeing questions and

for 1,162 people who reported not being MFI customers. Our analysis sample for developing the financial wellbeing scales consists of the remaining 4,470 people who are all either sole- or split-MFI customers. For the multivariate machine-learning analyses of the determinants of the scales (Section 6), we exclude an additional 949 observations for people with missing values for any of the other survey variables, leaving an analysis sample with 3,531 observations.

5. Developing the Scales

Our survey asked 33 questions about financial outcomes for possible inclusion in the scales; the questions are listed in Web Appendix Table A1. All the questions corresponded to elements of our conceptual definition of financial wellbeing, and almost all had been validated in earlier analyses, including Bray (2001), CFPB (2017), Fiftyfive5 (2016), and Muir et al. (2017). In addition, we used the conceptual definition to develop 12 measures of financial wellbeing from the financial-record data and linked these to the survey records. The bank-record measures are listed in Web Appendix Table A2.

We conducted preliminary quantitative analyses of the individual items, correlation analyses, and exploratory factor analyses to reduce the set of candidate measures to 17 self-reported items and nine bank-record items. We then performed an exploratory factor analysis on the reduced set of items. The analysis indicated that the combined set of measures were well explained by two factors. Inspection of orthogonally rotated factor loadings revealed that all but one of the self-reported measures align strongly on the first factor and that all the financial-record measures align on the second factor. The results from the factor analysis conform with our conceptualization of financial wellbeing having distinct perceived and observable components.

Using the results from the factor analysis, we further reduced the set of scale items to 10 self-reported measures and five bank-reported measures. With this reduced set, we

estimated formal Item Response Theory models of the relationships of the self-reported measures with one underlying scale and of the relationships of the bank-record measures with another scale. The IRT results indicated that the items for each scale had comparable discrimination and that every outcome from every item contributed information to a scale. Details of our scale development procedures are reported in Web Appendix A.

Based on these analyses, we measure financial wellbeing through two scales. The Reported Financial Wellbeing Scale is formed by adding the responses to 10 self-reported 0-4 Likert items, which are listed in Table 1, that describe people's perceptions and experiences of financial outcomes. We multiply the sum of the responses by 2.5 to produce a 0-100 scale with 41 possible outcomes in which larger values indicate higher levels of financial wellbeing. We interpret the scale as a measure of people's perceived financial wellbeing. In our sample, the median value was 55, and the average value was 53.2.

[Table 1 about here]

The Observed Financial Wellbeing Scale is formed by adding outcomes from five ordered-categorical bank-record measures, which are listed in Table 2, that describe customers' payment outcomes, net spending, balances, and available funds. We multiply the sum by 100/19 to produce a 0-100 scale with 20 possible outcomes. We interpret this scale as a measure of people's observable financial wellbeing. In our sample, the median value was 57.9, and the average was 54.0.

[Table 2 about here]

The distributions for the scales are shown in Figure 2. Both scales are slightly skewed towards higher values but cover the entire range of possible values. The scales are distinct, but strongly positively related, with a Spearman rank correlation of 46 per cent.

[Figure 2 about here]

Both scales are formed from simple summations of categorical responses. We have

compared the scales to more complex scales based on predicted values from IRT models. The summative reported scale is correlated 99.2 percent with the IRT empirical Bayes mean prediction, and the summative observed scale is correlated 98.0 percent with the IRT empirical Bayes mean prediction. The reported and observed scales have high reliability, with Cronbach's alpha coefficients of 0.92 and 0.85, respectively.

6. Data-Driven Predictors of Financial Wellbeing

We use additional measures that are available in our survey and from customers' bank records to estimate multivariate machine-learning models of the determinants of people's reported and observed financial wellbeing. From the survey, we have 103 potential explanatory variables. All the variables were included in the survey based on our conceptual model and based on that model, describe the respondents' personal and household characteristics (including measures such as household income, home ownership, employment status and savings preferences); external conditions and events (including changes in household financial situation, illnesses, and natural disasters among others); and financial behaviors (including ownership of term deposits, credit cards, personal loans, and savings and spending behaviors). For financial behaviors, the survey asked several questions of saving and spending behavior that were closely related. Based on exploratory factor analyses, we combine measures of whether respondents (*a*) make sure to have money for bad times, (*b*) try to save money regularly, and (*c*) try to save to fall back on in the future to form a scale of savings behavior. We also combine measures of whether respondents (*a*) consider they are doing a good job balancing spending and savings, (*b*) run short on money because overspend, and (*c*) buy things they cannot afford to form a scale of spending behavior. The data also include five variables derived from the customers' financial records which measured gambling transactions, government support use, and contact with the bank via telephone, in-branch visits, and online. Table 3 provides descriptive statistics of all the explanatory

variables considered in our analyses.

[Table 3 about here]

All of the explanatory variables were included in the survey or formed from the bank records because they are plausible predictors of financial wellbeing, and entering the analysis, we do not make any assumptions regarding which of them might be excluded from our models. Instead we reduce the number of predictors in a systematic, data-driven way using Tibshirani's (1996) Least Absolute Shrinkage and Selection Operator. LASSO estimates multivariate linear regression coefficients that minimize (*a*) the sum of squared differences between a dependent variable and its linear predictions *plus* (*b*) a penalty term based on the sum of absolute values of model coefficients. Let FWB_i be the dependent variable—either the Reported or Observed Financial Wellbeing Scale value—for the i^{th} customer, and let X_{ij} be the j^{th} potential explanatory variable for the customer. Our LASSO estimates $\left(\hat{\beta}_0, \hat{\beta}_1, \ldots, \hat{\beta}_J, \hat{\lambda}\right)$ solve

$$\left(\hat{\beta}_0, \hat{\beta}_1, \ldots, \hat{\beta}_J, \hat{\lambda}\right) = \arg\min \left\{ \sum_{i=1}^{N} \left(FWB_i - \beta_0 - \sum_{j=1}^{J} \beta_j X_{ij} \right)^2 + \lambda \sum_{j=1}^{J} \left|\beta_j\right| \right\},$$

where the β_j terms are model coefficients and λ (> 0) is a shrinkage weight. The term $\lambda \sum_j \left|\beta_j\right|$ on the right-hand side of this equation penalizes solutions with β_j that are large in absolute magnitude, which effectively shrinks multivariate coefficient estimates. Importantly for our analyses, this shrinkage sets coefficients on weak or redundant predictors of financial wellbeing to zero, eliminating them from the model. We leverage this property of LASSO to make a data-driven selection that keeps the best predictors of financial wellbeing. We consider all $J = 103$ potential predictors of financial wellbeing in our data and estimate our models with 3,531 observations for which we have complete information on all predictors and outcomes.

Two complications of LASSO are that (*a*) its coefficient estimates are biased and (*b*) its selection of a subset of predictors of financial wellbeing from the data affects inference on the coefficients of the predictors that are retained for our models. We address these problems by (*a*) estimating OLS coefficients on the variables that are selected by LASSO (we refer to this second procedure as post-OLS) to produce unbiased estimates and (*b*) by calculating correct post-selection upper and lower confidence bounds on our post-OLS estimates using a method recently developed by Lee et al. (2016).

Figures 3 and 4 report our LASSO estimated coefficients (hollow circles), with their corresponding post-OLS estimated coefficients (filled circles) and corresponding post-selection confidence intervals which are usually not symmetric around those estimates. For these figures and in the underlying LASSO models, the outcome variables—the Reported and Observed Financial Wellbeing scales—as well as all regressors were rescaled to have a standard deviation of one.

We have also made the following decisions for estimating the models in this section: (*a*) the relation between financial wellbeing and continuous predictors (age and household income) were estimated using restricted cubic splines with knots at each quartile in the predictor distribution; (*b*) values of λ were chosen at 0.0302 and 0.0301 for Reported and Observed financial wellbeing models following three-fold cross validation and applying the "one-standard-error" rule from Hastie, Tibshirani, and Wainwright (2015); and (*c*) missing values of household income for 9.9 percent of our sample were imputed at the sample mean.

[Figures 3 and 4 about here]

The first thing to note from Figures 3 and 4 is that LASSO sets many coefficients of predictors to zero. Out of a total of 103 coefficients, 79 are set to zero for the reported financial wellbeing model, and 63 are set to zero for the observed financial wellbeing model. Moreover, one of the 24 predictors with a non-zero coefficient has a statistically insignificant

relationship with reported financial wellbeing, whereas seven of the 40 predictors with non-zero coefficients have statistically insignificant relationships with observed financial wellbeing. Given that we made typical choices for regularization in our models, these results indicate there are relatively few independent key predictors of reported and observed financial wellbeing in our data and that variable selection is warranted.

Figures 3 and 4 show that the single best positive predictor of both reported and observed financial wellbeing is good savings behaviors, as measured by our subscale. A standard deviation increase in the savings behaviors subscale is associated with a 0.29 standard deviation increase in reported financial wellbeing (about 6 points on the scale) and a 0.33 standard deviation increase in observed financial wellbeing (about 8 points in the scale). These are strong associations, especially since they are partial associations that hold constant other characteristics correlated with good savings behaviors in our model. Our spending behavior subscale is also a positive predictor of reported and observed financial wellbeing, though its partial association with both scales is not as strong as savings behavior. A one standard deviation increase in the good spending behaviors measure is associated with 1.4 more points on the Reported Financial Wellbeing Scale and 1.5 more points on the Observed Financial Wellbeing Scale. The LASSO results also indicate that income and education are positive predictors of both types of financial wellbeing, while unemployment, difficulties with housing payments, the number of dependent children at home, needing but not being able to access community or government support, personal or car loans, and not holding a credit card are negative predictors.

To simplify the discussion and interpretation of our main findings, Table 4 presents the partial associations of the statistically significant predictors of reported and observed financial wellbeing only. The table expresses these partial associations as implied relationships of each predictor with the financial wellbeing scales in easy-to-understand units.

These estimates still account for all predictors selected by LASSO in each model and should be interpreted as partial associations—that is, associations between the predictor and the financial wellbeing measures *holding all other predictors in each model constant*. Results from the complete LASSO and post-OLS analyses are reported in Web Appendix Table A5.

[Table 4 about here]

Several personal and household characteristics are good predictors of both reported and observed financial wellbeing. Each additional $10,000 in household income is related to a 0.4 point increase in the Reported Financial Wellbeing Scale and a 0.1 point increase in the Observed Financial Wellbeing Scale. Being unemployed is related to a decrease of 2.7 points relative to full-time employment in the Reported Financial Wellbeing Scale and 5.9 points in the Observed Financial Wellbeing Scale. Experiencing difficulty paying mortgage or rent is also associated with lower reported and observed financial wellbeing, consistent with living costs stress putting pressure on people's finances even after accounting for income differences. Higher education is related to better financial wellbeing, with people with postgraduate degrees enjoying 2.3 and 9.3 points higher reported and observed financial wellbeing compared to people with only primary education. Each additional dependent child at home is associated with a decrease of 1 point in the Reported Financial Wellbeing Scale and 2.9 points in the observed scale.

Other personal and household characteristics predict reported but not observed financial wellbeing. These include gender, good general health, mental distress, finding finances confusing, having a strong sense of control in life, and believing that one's financial situation will look after itself.

Conversely, observed but not reported financial wellbeing is predicted by business and home ownership, being a student, preferring not to live on credit, having unpaid work that interferes with earning income, metropolitan residence, and state of residence. Finally,

reporting a better understanding of financial products is associated with higher reported financial wellbeing but lower observed financial wellbeing. This is consistent with some people being overconfident about their understanding of financial products, leading them to report a higher financial wellbeing but also to make mistakes that decrease their objective financial wellbeing. It could also be that people with a good understanding of financial products also have more complex financial situations which are difficult to capture in objective financial wellbeing measures.

The partial associations of several external conditions and events are different for reported and observed financial wellbeing. Reporting a financial improvement is associated with a 3.6 point increase in reported financial wellbeing but a 3 point decrease in observed financial wellbeing. This could occur if people increase their spending in anticipation of such financial improvements which are not yet reflected in the Observed Financial Wellbeing Scale. Reporting a financial worsening is associated with a 7.3 point decrease in reported financial wellbeing but no significant change in observed financial wellbeing. Conversely, partner separation, illness or death in the family, and experiencing a weather disaster are associated with lower observed financial wellbeing but not reported financial wellbeing. Needing government support yet having no access to it is negatively associated with both reported and observed financial wellbeing. Similar discordances between the predictors of reported and observed financial wellbeing have also been found in other studies. Tenney and Kalenkoski (2019), for example, find that that while investment-to-assets is a good predictor of subjective financial wellbeing, debt-to-assets or liquidity-to-assets ratios are much weaker predictors.

In addition to the good savings and spending subscales discussed above, two other financial behaviors are strongly associated with both reported and observed financial wellbeing: having a personal or car loan and always carrying credit card debt. Personal or car

loans are associated with a 2 point reduction in reported financial wellbeing and a 6.5 point reduction in observed financial wellbeing. People who always carry debt in their credit cards have a 4.8 point lower reported financial wellbeing score and a 10.6 point lower observed financial wellbeing score compared to people who always pay their credit card balances on time. Owning financial products such as term deposits and mortgages are generally associated with higher observed financial wellbeing but not with reported financial wellbeing. An exception is holding investment shares, which is associated with higher reported financial wellbeing.

We see differences in some other behaviors. Being organized with day-to-day money management and planning for one's financial future are positively associated with reported but not observed financial wellbeing. However, regularly reviewing finances, some types of credit card behavior, and a structured approach to budgeting are negatively associated with observed financial wellbeing but not associated with reported financial wellbeing. The results for reviewing finances and structured budgeting may reflect reverse causality with people with lower financial wellbeing needing to undertake these activities. Being responsible for managing large purchases and paying bills at home are associated with higher observed financial wellbeing but not reported financial wellbeing.

Finally, most characteristics measured through bank record data, including gambling transactions and contact with the bank either through a branch or through the telephone, are negatively associated with observed but not reported financial wellbeing. The exception is receiving government benefits which is negatively related to both types of financial wellbeing.

Sensitivity analyses. To support the interpretation of our findings we consider two sensitivity analyses. First, we verify that LASSO is not arbitrarily shrinking to zero the coefficients of good predictors that are collinear with one another. This is a known issue with

LASSO and other high-dimensional supervised machine-learning techniques that rely on sparseness. To do this, we first estimate the correlations between our regressors to see which of them could be collinear. Some high collinearity cases come from regressors whose values depend on one another (e.g., whether a respondent is disabled and whether the respondent's disability impacts their earnings). None of these regressors end up included in our LASSO models, so there is no concern about LASSO arbitrarily selecting regressors in these instances.

A more common case for collinearity comes from regressors which are functionally dependent on one another. This occurs for our cubic spline polynomial terms for age and household income. For these regressors LASSO could have arbitrarily chosen which polynomial terms to include in the model, leading us to misidentify the functional dependence of financial wellbeing on age or household income. To verify that this was not the case we estimate Zhou and Hastie's (2005) elastic net models, which also shrink coefficient estimates but less sharply than LASSO and much less often to zero. Web Appendix Figures B1 and B2 show that LASSO mostly shrinks coefficients of variables with small Elastic Net coefficients to zero, and that the Elastic Net and LASSO coefficient estimates are similar for both models. Moreover, the Elastic Nets procedure also shrinks all the cubic spline polynomial coefficients of age and household income to zero, suggesting that the linear dependence between financial wellbeing and these two variables is robust to the model being used to estimate it. This is consistent with Collins and Urban (2020), who show a linear and mild evolution of financial wellbeing over the lifecycle. Overall, these results suggest that LASSO is correctly identifying the predictors of financial wellbeing and correctly identifying their functional dependence.

In a second sensitivity analysis, we estimate financial wellbeing models including all potential regressors using OLS and compare the coefficients with those estimated by LASSO.

Web Appendix Figures B3 and B4 show that non-zero LASSO coefficients are very similar to OLS coefficients. This suggests that LASSO is not severely biasing coefficient estimates of good predictors and that, as intended, it is effective in selecting predictors of financial wellbeing.

7. Discussion

Our strict focus on data-driven methods to construct and analyze measures of financial wellbeing yields powerful insights. For constructing the measures, our approach confirms our conceptualized separation between subjective and objective aspects of financial wellbeing. It also helps us reduce an immense set of candidate measures of financial wellbeing into a compact set which spans the domains of our conceptualization yet is small enough to facilitate further analyses. Finally, our use of Item Response Theory models allows us to verify that our component measures all contribute to the scales, have similar discrimination, and can be summed to produce easily implementable scales. The IRT results also show that these measurement relationships are similar across different groups. These features define the Reported and Observed Financial Wellbeing Scales as particularly useful tools to measure financial wellbeing in Australia.

Our data-driven approach to analyze the characteristics associated with reported and observed financial wellbeing also yields useful insights. First, the LASSO greatly reduces the set of predictive characteristics for each type of financial wellbeing. These data reductions will focus our future research efforts on the strongest associations and will hasten the process of understanding and improving financial wellbeing.

Second, although many important predictors remain after implementing the LASSO, our results highlight three crucial behaviors related to financial wellbeing: good savings behavior, good spending behavior, and careful management of credit. A better understanding of the nuanced relationship between these financial behaviors and financial wellbeing will be

crucial for designing better financial products and interventions to improve people's financial wellness.

Third, people's socioeconomic characteristics such as income, education or unemployment are also important for their financial wellbeing. Yet their partial associations are less strong than many of the financial behaviors we considered. This has a critical implication: people from many types of socioeconomic backgrounds and levels of wealth and income can enjoy high financial wellbeing. Our results suggest that a direct path to better financial wellbeing is to adopt financially sound behaviors, and people across the socioeconomic spectrum can adopt these.

Fourth, our results also point out that credit card debt and gambling are strongly associated with lower financial wellbeing. What is not clear is if credit card mismanagement and gambling cause lower financial wellbeing, or whether they are whether credit card debt and the need to gamble are symptoms of other underlying issues. Yet these strong negative associations do suggest that future research should investigate the potential role of these products in exacerbating bad financial outcomes. The Reported and Observed Financial Wellbeing Scales can play an important role in assessing the social cost of these products.

Finally, our results show that having a sense of control and the discipline to plan for the future are strong predictors of Reported Financial Wellbeing. This suggests that financial planning and literacy interventions as well as other interventions based on positive psychology could be an effective way to improve people's financial wellbeing.

8. Conclusions

In this article we report the development of the first multi-item financial wellbeing scales that combine people's self-reported perceptions and experiences of their financial outcomes with bank-record measures of their cash balances, savings, credit, and payments.

The rigorous development of the Reported Financial Wellbeing and Observed Financial Wellbeing Scales produced transparent, discerning, and easy to implement scales that can be used to systematically explore the potential determinants of financial wellbeing.

We use further survey and bank-record data in supervised machine-learning analyses to explore which characteristics contribute to financial wellbeing. These additional data include over 100 measures that were available as explanatory variables, yet our methods allow us to find the best predictors of financial wellbeing in a data-driven way while also maintaining our ability to correctly infer statistically significant associations. These models reveal that people's savings habits are especially strong correlates of their reported and observed financial wellbeing. Other strong correlates for both types of financial wellbeing include spending habits, credit card behavior, difficulties with housing payments, and the use of and access to social or government support. After accounting for differences in these financial behaviors, socioeconomic characteristics such as household income and education have much more modest correlations with financial wellbeing.

Our results illustrate the possibility of combining self-reported and bank-record measures to construct simple and functional financial wellbeing measures, and the huge benefits that these measures can bring in improving people's financial wellbeing. The Observed Financial Wellbeing Scale, in particular, is easy to generalize to many bank customers and provides a useful tool to monitor bank customer's financial wellbeing and offer assistance if they find themselves in financial difficulties. At the bank level, the Observed Financial Wellbeing Scale can become an invaluable tool to evaluate the effectiveness of financial literacy and wellbeing interventions and the welfare impact of existing and new financial products. At the same time, by combining self-reported objective and subjective information, the Reported Financial Wellbeing scale provides depth to the measure of financial wellbeing that cannot be accessed through bank record data. The simple

structure of the scale makes it easy to use by consumers. Both scales complement one another to provide a comprehensive and nuanced view of financial wellbeing.

Our results also illustrate the potential benefits of rigorously constructing and analyzing financial wellbeing measures. Two key lessons are that (*a*) financial behaviors are particularly strong correlates of both reported and observed financial wellbeing, and (*b*) many of these behaviors are modifiable. If at least part of these strong correlations is driven by a causal link between financial behaviors and financial wellbeing, this implies we can increase financial wellbeing for many people by helping them modify their financial behaviors. Importantly, modifying these behaviors will likely be more easily achieved than improving people's overall socioeconomic standing by increasing their income or education. More research is needed to determine whether financial behaviors are indeed causally related to financial wellbeing but the strong correlations we find give us reason to believe that by using our financial wellbeing scales we might soon find innovative and effective ways to improve people's lives. The scales also give us a tool to test any such interventions.

Figure 1. Conceptual Model of the Determinants of Financial Wellbeing

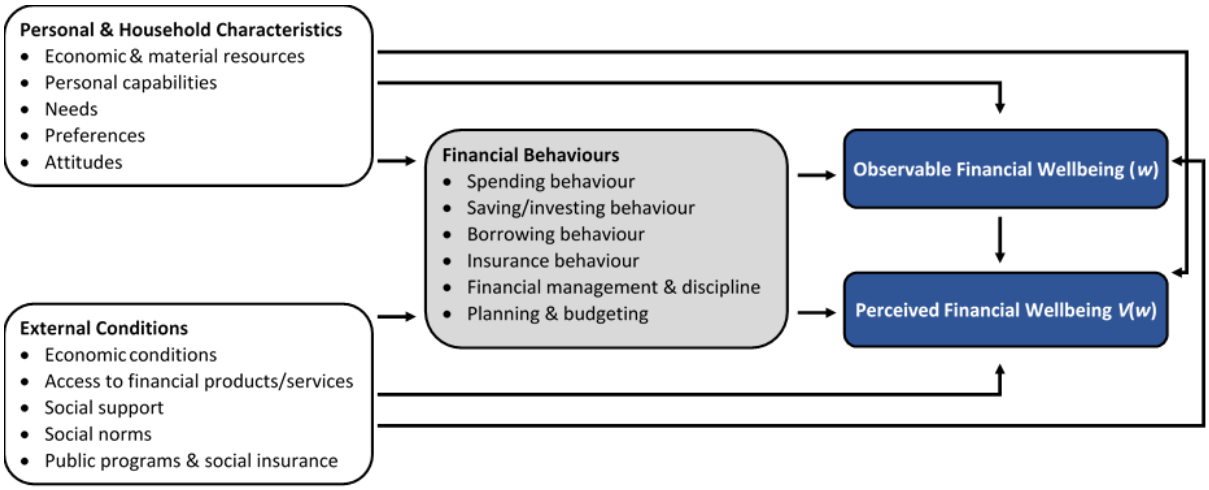
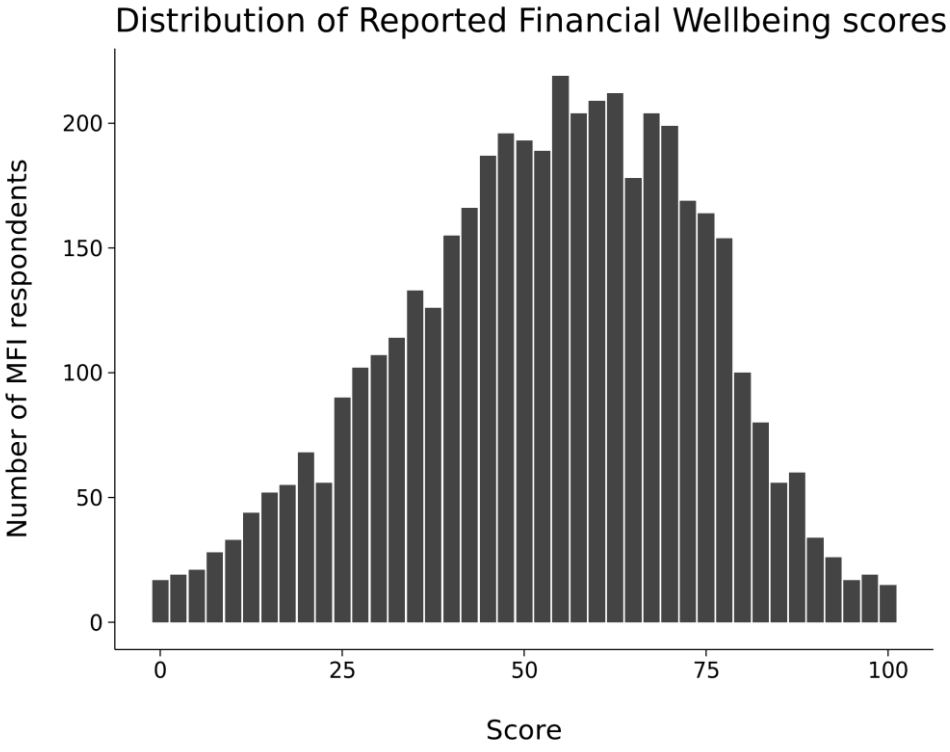


Figure 2. Distributions of the Financial Wellbeing Scales



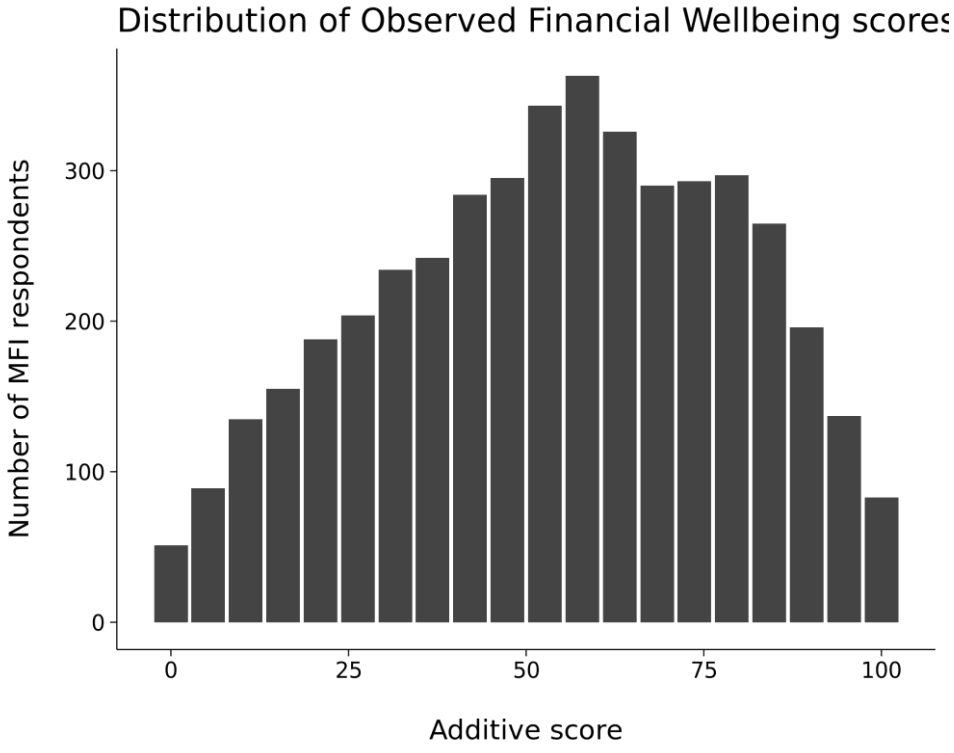
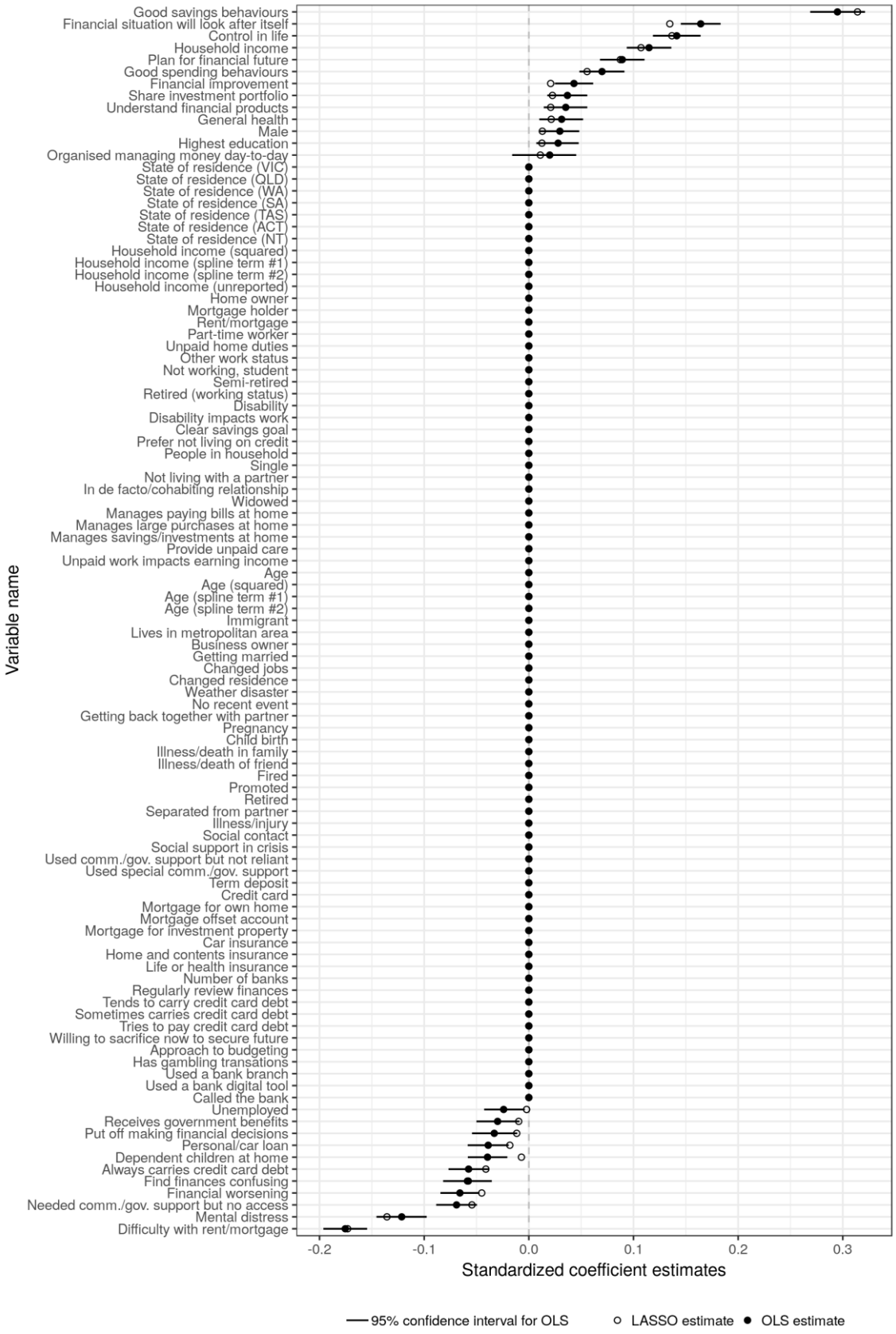
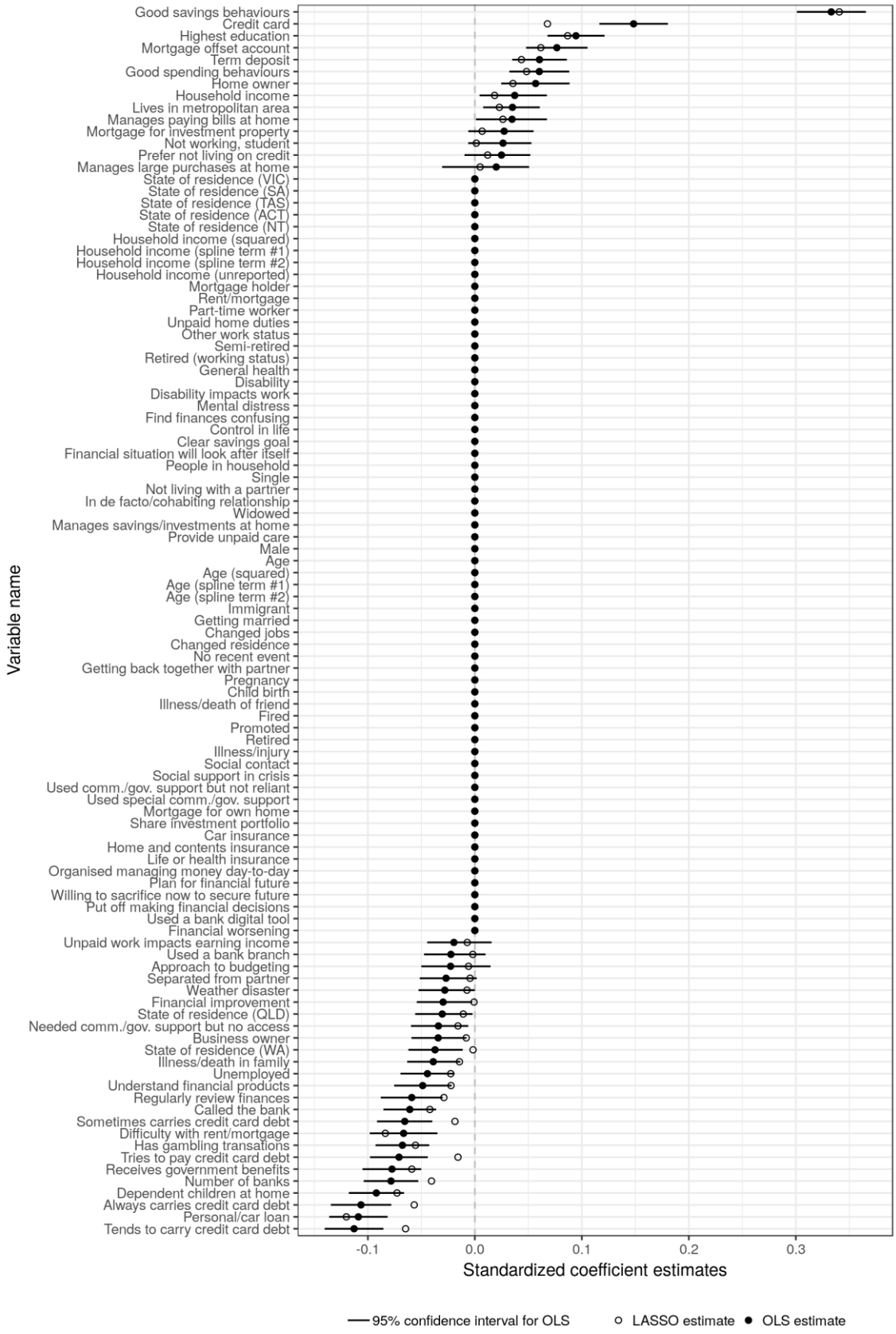


Figure 3. The Predictors of Reported Financial Wellbeing



This figure includes standardized coefficients, some of which are set to zero by the LASSO estimator. The λ parameter of the LASSO estimator chosen at 0.0302 using three-fold cross-validation and Hastie, Tibshirani, and Wainwright's (2015) "one-standard-error" rule. N = 3,531; RMSE = 11.2065.

Figure 4. The Predictors of Observed Financial Wellbeing



This figure includes standardized coefficients, some of which are set to zero by the LASSO estimator. The λ parameter of the LASSO estimator chosen at 0.0301 using three-fold cross-validation and Hastie, Tibshirani, and Wainwright's (2015) "one-standard-error" rule. N = 3,531; RMSE = 17.8354.

Table 1. The Reported Financial Wellbeing Scale Components

Question	Responses
1. In the last 12 months, how difficult was it for you to meet your necessary cost of living expenses like housing, electricity, water, health care, food, clothing or transport?	0 - Very difficult 1 - Difficult 2 - Neither difficult nor easy 3 - Easy 4 - Very easy
How well do the following statements describe you or your situation? **2.** I can enjoy life because of the way I'm managing my money **3.** I could handle a major unexpected expense **4.** I am securing my financial future	0 - Not at all 1 - Very little 2 - Somewhat 3 - Very well 4 - Completely
How often do the following statements apply to you? **5.** My finances control my life * **6.** I have money left over at the end of the month **7.** Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the month *	0 - Never 1 - Rarely 2 - Sometimes 3 - Often 4 - Always
When it comes to how you think and feel about your finances, please indicate the extent to which you agree or disagree with the following statements: **8.** I feel on top of my day to day finances **9.** I am comfortable with my current levels of spending relative to the funds I have coming in **10.** I am on track to have enough money to provide for my financial needs in the future	0 - Disagree strongly 1 - Disagree 2 - Neither agree nor disagree 3 - Agree 4 - Agree strongly

***** *Negative statement that is reverse-coded in scale.*

Table 2. The Observed Financial Wellbeing Scale Components

Item	Outcomes
11. Payment problems in last year	0 - In arrears 6 or more months or multiple serious problems 1 - In arrears 2-5 months; had declines, dishonors, or overlimit fees 9 or more months; had late fees 3 or more months; had a payday loan; or had multiple moderate problems 2 - Had fewer months of arrears, declines, dishonors, overlimit fees, or late fees 3 - Had no payment problems
12. Days in last year with low liquid balances	0 - Less than 1 week's expenses 75% or more 1 - Less than 1 week's expenses 75-50% 2 - Less than 1 week's expenses 50-10% 3 - Less than 1 week's expenses 10% or less but sometimes less than 4 week's expenses 4 - Never below four week's expenses
13. Months in last year when spending exceeded 80% of inflows	0 - 11 or 12 months 1 - 9 or 10 months 2 - 7 or 8 months 3 - 4, 5, or 6 months 4 - 3 or fewer months
14. Days in last year during which customer had the ability to raise one or three month's expenses from savings or available credit	0 - Could raise 1 month's expenses 15 or fewer days 1 - Could raise 1 month's expenses 15-90 days 2 - Could raise 1 month's expenses 91-330 days 3 - Could raise 1 month's expenses 330 or more days but sometimes could not raise 3 month's expenses 4 - Could always raise 3 month's expenses
15. Age-normed residual of customer's median savings balance	0 - Below -2.5 standard deviations 1 - -2.5 to -1 standard deviations 2 - -1 to +1 standard deviations 3 - +1 to +2.5 standard deviations 4 - Above +2.5 standard deviations

Table 3. Descriptive Statistics (N=3,531)

Question/measure	Mean	Std. Dev.	Min	Max
Reported financial wellbeing score	53.60	20.45	0	100
Observed financial wellbeing score	54.26	24.49	0	100
Personal and household characteristics				
Yearly household income (in $10,000)	9.30	6.26	0	25
Unreported household income	0.10	0.30	0	1
Business owner	0.10	0.29	0	1
Home owner	0.15	0.35	0	1
Mortgage holder	0.32	0.47	0	1
Rent/mortgage per month (in $)	1054.09	937.12	0	3000
Difficulty with rent/mortgage	2.14	0.96	1	5
Full-time worker	0.53	0.50	0	1
Part-time worker	0.17	0.38	0	1
Unemployed	0.04	0.18	0	1
Unpaid home duties	0.03	0.18	0	1
Other work status	0.05	0.21	0	1
Not working, student	0.07	0.26	0	1
Semi-retired	0.03	0.16	0	1
Retired	0.09	0.29	0	1
Years of education	13.52	1.80	7	15
General health	3.58	0.99	1	5
Disability	0.85	0.36	0	1
Disability impacts work	1.46	1.14	1	5
Mental distress	5.94	5.44	0	24
Find finances confusing	2.43	0.97	1	5
Understand financial products	2.66	0.83	1	4
Control in life	8.29	2.04	1	11
Clear savings goal	3.47	0.96	1	5
Prefer not living on credit	4.00	0.96	1	5
Financial situation will look after itself	2.25	0.94	1	5
People in household	2.69	1.04	1	4
Dependent children at home	1.48	0.78	1	3
Married	0.43	0.49	0	1
Single	0.30	0.46	0	1
Not living with a partner	0.06	0.24	0	1
In de facto/cohabiting relationship	0.19	0.39	0	1
Widowed	0.02	0.12	0	1
Provide unpaid care	0.19	0.39	0	1
Unpaid work impacts earning income	1.38	0.90	1	5
Male	0.47	0.50	0	1
Age (in years)	40.68	15.37	18	80
Immigrant	0.31	0.46	0	1
Lives in metropolitan area	0.70	0.46	0	1
Resides in NSW	0.30	0.46	0	1
Resides in ACT	0.05	0.21	0	1
Resides in NT	0.01	0.09	0	1
Resides in QLD	0.18	0.39	0	1
Resides in SA	0.06	0.24	0	1
Resides in TAS	0.03	0.18	0	1
Resides in VIC	0.28	0.45	0	1
Resides in WA	0.09	0.29	0	1

Question/measure	Mean	Std. Dev.	Min	Max
External conditions				
Recent financial improvement	0.06	0.25	0	1
Recent financial worsening	0.04	0.19	0	1
Recently fired	0.04	0.20	0	1
Recently promoted	0.11	0.32	0	1
Recently retired	0.03	0.16	0	1
Recent separated from partner	0.04	0.19	0	1
Recent illness/injury	0.06	0.25	0	1
Recent child birth	0.04	0.19	0	1
Recently changed jobs	0.20	0.40	0	1
Recently changed residence	0.24	0.43	0	1
Recently back together with partner	0.01	0.10	0	1
Recently married	0.03	0.18	0	1
Recent illness/death in family	0.11	0.31	0	1
Recent illness/death of friend	0.04	0.20	0	1
Recent pregnancy	0.05	0.21	0	1
Recent weather disaster	0.02	0.12	0	1
No recent event	0.36	0.48	0	1
Social contact	3.35	0.96	1	5
Social support in crisis	3.04	1.45	1	5
No comm./gov. support needed	0.83	0.38	0	1
Needed comm./gov. support but no access	0.09	0.29	0	1
Used comm./gov. support but not reliant	0.06	0.24	0	1
Used special comm./gov. support	0.02	0.14	0	1
Financial behaviors				
Term deposit	0.07	0.26	0	1
Credit card	0.61	0.49	0	1
Personal/car loan	0.21	0.41	0	1
Mortgage for own home	0.29	0.46	0	1
Mortgage offset account	0.14	0.35	0	1
Mortgage for investment property	0.12	0.32	0	1
Share investment portfolio	0.08	0.28	0	1
Car insurance	0.38	0.49	0	1
Home and contents insurance	0.34	0.47	0	1
Life or health insurance	0.14	0.35	0	1
Number of banks	1.55	0.80	1	5
Good savings behaviors	9.34	3.70	0	16
Good spending behaviors	5.97	1.77	0	8
Organized managing money day-to-day	3.34	1.01	1	5
Plan for financial future	2.16	0.75	1	3
Regularly review finances	3.43	1.00	1	5
Has no credit card debt	0.74	0.44	0	1
Tries to pay credit card debt	0.09	0.29	0	1
Sometimes carries credit card debt	0.04	0.19	0	1
Tends to carry credit card debt	0.07	0.26	0	1
Always carries credit card debt	0.07	0.25	0	1
Willing to sacrifice now to secure future	3.67	0.82	1	5
Put off making financial decisions	2.68	0.97	1	5
Structured approach to budgeting	2.91	0.78	1	4
Manages large purchases at home	0.14	0.35	0	1
Manages paying bills at home	0.14	0.35	0	1
Manages savings/investments at home	0.11	0.32	0	1

Question/measure	Mean	Std. Dev.	Min	Max
Bank record measures				
Receives government benefits	0.24	0.43	0	1
Has gambling transactions	0.20	0.40	0	1
Used a bank branch	0.32	0.46	0	1
Used a bank digital tool	0.95	0.23	0	1
Called the bank	0.17	0.38	0	1

Table 4. Partial Associations Between Reported and Observed Financial Wellbeing and Its Statistically Significant Predictors with at Least 95% Confidence After LASSO Selection

Characteristic name	Change in characteristic from	Partial association with Reported Financial Wellbeing	Partial associatio Observed Financia Wellbein
Personal and household characteristics			
Household income	Every additional $10,000 per year	0.4	0.1
Business owner	No → Yes	n.s.	-2.8
Home owner	No → Yes	n.s.	4.0
Difficulty with rent/mortgage	No → Yes	-3.7	-1.7
Unemployed	Full time worker → Unemployed	-2.7	-5.9
Not working, student	Full time worker → Not working, student	n.s.	2.5
Highest education	Primary → Postgraduate	2.3	9.3
General health	Poor → Excellent	2.6	n.s.
Mental distress	Median → Level of mental illness	-3.2	n.s.
Find finances confusing	Strongly disagree → Strongly agree	-5.0	n.s.
Understand financial products	Not at all → Very well	2.6	-4.3
Control in life	None → Complete control	14.2	n.s.
Prefer not living on credit	Strongly disagree → Strongly agree	n.s.	2.6
Financial situation will look after itself	Strongly disagree → Strongly agree	14.3	n.s.
Dependent children at home	Each additional child	-1.0	-2.9
Unpaid work impacts earning income	No → A lot	n.s.	-1.1
Male	No → Yes	1.2	n.s.
Lives in metropolitan area	No → Yes	n.s.	1.9
State of residence	NSW → QLD	n.s.	-1.9
State of residence	NSW → WA	n.s.	-3.1
External conditions and events			
Recent financial improvement	No → Yes	3.6	-3.0
Recent financial worsening	No → Yes	-7.3	n.s.
Recent separated from partner	No → Yes	n.s.	-3.5
Recent illness/death in family	No → Yes	n.s.	-3.1
Recent weather disaster	No → Yes	n.s.	-5.5
Community/government support	No need → Need but no access	-4.9	-2.9
Financial behaviors			
Term deposit	No → Yes	n.s.	5.7
Credit card	No → Yes	n.s.	7.4
Personal/car loan	No → Yes	-2.0	-6.5
Mortgage offset account	No → Yes	n.s.	5.4
Mortgage for investment property	No → Yes	n.s.	2.1
Share investment portfolio	No → Yes	2.7	n.s.
Number of banks	Each additional bank	n.s.	-2.4
Good savings behaviors	25th pctile → 75th pctile	8.2	11.0
Good spending behaviors	25th pctile → 75th pctile	1.6	1.7
Organized managing money day-to-day	Not at all → Completely	1.6	n.s.
Plan for financial future	Focused on today → Actively planning	4.9	n.s.
Regularly review finances	Strongly disagree → Strongly agree	n.s.	-5.8
Credit card management	No card → Try to pay debt	n.s.	-6.1
Credit card management	No card → Sometimes carry debt	n.s.	-8.5

Characteristic name	Change in characteristic from	Partial association with Reported Financial Wellbeing	Partial associati Observe Financia Wellbein
Credit card management	No card → Tend to carry debt	n.s.	-10.8
Credit card management	No card → Always carry debt	-4.8	-10.6
Put off making financial decisions	Strongly disagree → Strongly agree	-2.8	n.s.
Structured approach to budgeting	No budget → Formal budget	n.s.	-2.2
Manages large purchases at home	No → Yes	n.s.	1.4
Manages paying bills at home	No → Yes	n.s.	2.5
Bank record measures			
Receives government benefits	No → Yes	-1.4	-4.4
Has gambling transactions	No → Yes	n.s.	-4.2
Used a bank branch	No → Yes	n.s.	-1.2
Called the bank	No → Yes	n.s.	-4.0

Estimates statistically indistinguishable from zero at the 95% confidence level are marked by "n.s."

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Measuring Financial Wellbeing with Self-Reported and Bank-Record Data

Web Appendices

Appendix A. Development of the Financial Wellbeing Scales

Preliminary analyses. Our on-line survey included 33 questions about financial outcomes for possible inclusion in the scales; the questions are listed in Table A1. We immediately dropped three measures because of problematic distributions or exceptionally weak associations with the other measures. Several other sets of questions addressed similar outcomes or had minor variations in conditions or wording. From these sets of questions, we dropped 13 questions that had the weakest associations with the other self-reported items or high complexity in an exploratory factor analysis. This left 17 candidate measures for the subsequent formal analyses.

We developed 12 candidate measures of financial wellbeing from the financial-record data, which are listed in Table A2. We dropped three measures that were similar to other measures but had relatively weak associations.

Exploratory factor analyses. We conducted an exploratory factor analysis with the remaining self-reported and financial-record measures. Parallel analyses indicated that the measures were explained by two factors. Factor loadings (with an orthogonal rotation), unexplained variance, and communality measures from the two-factor solution are shown in Table A3. The results reveal that all but one of the self-reported measures align strongly on the first factor and that all the financial-record measures align on the second factor.

From this set, we dropped the measures for

- self-reported debt and savings levels because they covered observable conditions and had high communality;
- being behind in finances, never paying off debt, money not lasting, never having the things wanted in life, and making progress towards financial goals because they overlapped with other questions and had higher unexplained variances;
- unpaid credit card balances, necessary spending, and insurance products because they had low factor loadings and high unexplained variance; and
- interest payments measure because of the high number of customers who were observed with no payments.

Using the revised set of 10 self-reported measures and five financial-record measures, we fit two-parameter IRT graded response models separately for latent variables corresponding to the first and second factors. Let θ be a latent variable that represents someone's financial wellbeing. Let Y_i be the ordered categorical measure of a person's response to item i, where Y_i can take on the values 1, …, J. Let δ_{ij} the 'severity level', or differentiation parameter, of response category j from item i, and let α_i be the discrimination parameter for item i. The two-parameter graded response model assumes that the probability that someone gives a categorical response of j or higher to item i is

$$\text{Prob}(Y_i \geq j) = \frac{\exp\left[\alpha_i(\theta - \delta_{ij})\right]}{1 + \exp\left[\alpha_i(\theta - \delta_{ij})\right]}$$

where exp[] is an exponential operator.

The top panel of Table A4 reports estimated severity and discrimination parameters for the model for the first latent variable, using the 10 self-reported measures. The estimated discrimination parameters are very close across items, indicating similar discrimination. Analyses of Item Characteristic Curves (ICCs) revealed that every response from every item

contributed information to identifying the underlying latent variable.

We fit a similar IRT specification of the second latent variable, using the five remaining financial-record measures, and report results in the bottom panel of Table A4. The differences across items in the estimated discrimination parameters are larger than for the first latent variable. However, analyses of ICCs from the model revealed that every response from every included item contributed information to identifying the underlying latent factor.

The scales. Based on these results, we measure financial wellbeing through two scales. The Reported Financial Wellbeing Scale is formed by adding the responses to the 10 self-reported items from Table A4 and multiplying the sum by 2.5. This results in a 0-100 scale with 41 possible outcomes in which larger values indicate higher levels of reported financial wellbeing. The Observed Financial Wellbeing Scale is formed by adding the outcomes to the five bank-record items from Table A4 and multiplying the sum by 100/19 to produce a 0-100 scale with 20 possible outcomes. The scales have a positive (Spearman) correlation of 46 per cent. The summative reported scale is correlated 99.2 percent with the IRT prediction, and the summative observed scale is correlated 98.0 percent with the IRT prediction. The reported scale has a reliability coefficient (Cronbach's alpha) of 0.92, and the observed scale has a reliability coefficient of 0.85.

Additional analyses. We select items for the scales based on a series of steps including initial item inspection, exploratory factor analyses, and logic rules to reduce the set of items. To examine the robustness of our results to these choices, we iteratively re-estimated our IRT models adding each of the excluded measures one at a time. None of the added measures changed our results regarding our principal specifications.

Our formal analyses were preceded by many informal analyses on the same analysis sample. To test whether our formal results were artefacts of the sample. we performed confirmation analyses in which we re-estimated our IRT models with two alternative

samples. The first alternative sample consisted of non-MFI customers from the survey who were excluded from our main analysis sample. We used this sample to re-estimate our IRT model for reported financial wellbeing and confirmed that the scale measurement relationships were similar to those for the main analysis sample. For the second alternative sample, we randomly drew bank MFI customers who were not survey participants from the bank-record data. We used this sample to re-estimate the IRT model of observed financial wellbeing and confirmed that the scale measurement relationships were similar to those of our survey sample.

To be universal, the measurement relationships for the scales should be the same for anyone with the same underlying values of reported or observed wellbeing, regardless of the person's other circumstances. Following the method of Kim and Cohen (1998), we conducted differential item functioning tests for customers in our analysis sample who differed in their housing tenure, household composition, and work status. There were no substantial differences in item functioning across the different subgroups.

Table A1. Candidate Self-Reported Financial Wellbeing Questions

Question	*Source*
How satisfied are you with your financial situation?	Multiple
Given your current needs and financial responsibilities, would you say that you (and your family) are … {*'prosperous' to 'very poor'*}	HILDA
What is your current level of debt?	Muir et al.*
I am just getting by financially	CFPB
I am behind with my finances	CFPB
My finances control my life	CFPB
In the last 12 months, how difficult was it for you to meet your necessary cost of living expenses like housing, electricity, water, health care, food, clothing or transport?	Muir et al.
I feel on top of my day to day finances	FF5
My financial situation is largely outside of my control	Muir et al.
In the last 12 months, did any of the following happen to you because of a shortage of money?	
- Could not pay electricity, gas or telephone bills on time	Bray
- Could not pay mortgage or rent on time	Bray
- Pawned or sold something	Bray
- Went without meals	Bray
- Asked for financial help from friends or family	Bray
- Asked for help from welfare/community organisations	Bray
I can enjoy life because of the way I'm managing my money	CFPB
I have money left over at the end of the month	CFPB
I am comfortable with my current levels of spending relative to the funds I have coming in	FF5
I am comfortable with my current levels of debt and my ability to repay it	FF5
Which of the below statements best describes your/your family's rent/mortgage payments? {*'I am behind on my payments' to 'I don't have any payments'*}	Original
I feel like I will never pay off all my debt	FF5
When was the last time you bought something special for yourself - something that you wouldn't normally buy?	Muir et al.
Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the month	CFPB
I could handle a major unexpected expense	CFPB
I feel that I have enough set aside that I could manage financially if I was to lose my source of income for a period of time	FF5
Suppose you faced an emergency expense tomorrow that is equal to one month of your income. What statement best describes your ability to meet this expense? {*'I could easily raise the money' to 'I don't think I could raise the money'*}	Kempson et al.*
What is your current level of savings?	Muir et al.
I am concerned that the money I have or will save won't last	CFPB
I am securing my financial future	CFPB
Because of my money situation, I feel like I will never have the things I want in life	CFPB
I feel optimistic and upbeat about financial future	FF5*
I am confident about meeting my expenses later in retirement	Original
I am making progress towards my financial goals	FF5
I am on track to have enough money to provide for my financial needs in the future.	Original

** Indicates question or responses were reworded from original*

Table A2. Candidate financial-record measures

Measure	*Description*
Credit card and personal loan interest payments relative to inflows	Ratio of the total annual interest paid on credit cards, debit and transaction accounts, and personal loans relative to total annual inflows.
Total interest payments relative to inflows	Ratio of the total annual interest paid on credit cards, debit and transaction accounts, personal loans, home loans, and investment loans relative to total annual inflows.
Credit card and personal loan payments relative to inflows	Ratio of the total annual interest and principle paid on credit cards, debit and transaction accounts, and personal loans relative to total annual inflows.
Total loan payments relative to inflows	Ratio of the total annual interest and principle paid on credit cards, debit and transaction accounts, personal loans, home loans, and investment loans relative to total annual inflows.
Unpaid credit card balances	0) carried a balance above one month's expenses for six or more months; 1) did not hold a [BANK] credit card; 2) carried a balance above one month's expenses for 2-5 months or carried a smaller balance for 6 or more months; 3) carried balances for shorter periods; 4) never carried a balance.
Payment problems	0) in arrears 6 or more months or multiple serious problems; 1) (serious problems) in arrears 2-5 months; had declines, dishonors, or over-limit fees 9 or more months; had non-arrears late fees 3 or more months; had a payday loan; or had multiple moderate problems; 2) had fewer or less frequent problems; 3) had no payment problems.
Low liquid balances	Proportion of year in which cash and savings balances were below one or four weeks' expenses.
Necessary spending relative to inflows	Based on transactions debit and credit card account records, we categorize spending as necessary, discretionary, or unknown and remove the customer's largest 1% of transactions by value; we form a measure of necessary spending relative to the maximum of inflows or total spending
Months when spending exceeded 80% of inflows	Counts of the months in which outflows from customer's accounts exceeded 80% of inflows into the account.
Ability to cover one or three months' expenses	Proportion of days in last year customer's cash and savings balances plus available credit and redraws were more than one or three months' expenditures.
Insurance products	Measure formed from deciles of customers' expenditures on insurance products; categorized as 0) no transactions; 1) first to third deciles; 2) fourth to ninth decile; 3) top decile
Median daily savings balance	Median of the daily balances over the past 12 months; form residuals from median regressions of balances on a cubic spline in age.

Table A3. Exploratory factor analysis results—two-factor solution

Question/measure	*Loading 1st factor*	*Loading 2nd factor*	*Unexplained variance*	*Comm.*
Self-reported outcomes:				
What is your current level of debt?	**0.42**	**0.27**	0.65	1.7
I am behind with my finances	**0.62**	0.14	0.52	1.1
My finances control my life	**0.66**	-0.05	0.60	1.0
How difficult was it for you to meet your necessary cost of living expenses?	**0.75**	0.11	0.35	1.0
I feel on top of my day to day finances	**0.81**	0.01	0.35	1.0
I can enjoy life because of the way I'm managing my money	**0.76**	0.05	0.39	1.0
I have money left over at the end of the month	**0.67**	0.19	0.40	1.2
I am comfortable with my current levels of spending …	**0.70**	-0.01	0.51	1.0
I feel like I will never pay off all my debt	**0.63**	0.01	0.60	1.0
Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the month	**0.76**	0.01	0.42	1.0
I could handle a major unexpected expense	**0.71**	0.15	0.37	1.1
What is your current level of savings?	**0.39**	**0.57**	0.33	1.8
I am concerned that the money I have or will save won't last	**0.65**	-0.17	0.65	1.1
I am securing my financial future	**0.74**	0.02	0.43	1.0
Because of my money situation, I feel like I will never have the things I want in life	**0.69**	-0.11	0.58	1.0
I am making progress towards my financial goals	**0.76**	-0.08	0.47	1.0
I am on track to have enough money to provide for my financial needs in the future	**0.87**	-0.12	0.33	1.0
Financial-record measures:				
Credit card and personal loan interest payments relative to inflows	0.08	**0.52**	0.69	1.0
Unpaid credit card balances	0.16	**0.29**	0.85	1.5
Payment problems	0.12	**0.57**	0.60	1.1
Low liquid balances	-0.09	**0.96**	0.16	1.0
Necessary spending relative to inflows	0.06	0.14	0.97	1.3
Months when spending exceeded 80% of inflows	0.07	**0.57**	0.63	1.0
Ability to cover 1 or 3 month's expenses	0.02	**0.79**	0.36	1.0
Insurance products	0.14	-0.01	0.98	1.0
Age-normed median daily savings balance	0.00	**0.82**	0.32	1.0
Proportion of variance explained	0.33	0.16		

Note: Factor loadings with absolute values at or above 0.2 are displayed in **bold font**.

Table A4. IRT severity and discrimination parameter estimates

Item	δ_{i1}	δ_{i2}	δ_{i3}	δ_{i4}	α_i
Model 1 – First latent variable					
1. How difficult was it for you to meet your necessary cost of living expenses?	-1.907	-0.914	0.458	1.404	2.473
2. I can enjoy life because of the way I'm managing my money	-1.821	-0.873	0.630	2.117	2.365
3. I could handle a major unexpected expense	-1.093	-0.386	0.885	1.997	2.364
4. I am securing my financial future	-1.479	-0.559	0.900	2.197	2.112
5. My finances control my life *	-2.016	-0.845	0.558	2.025	1.438
6. I have money left over at the end of the month	-1.639	-0.694	0.313	1.212	2.237
7. Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the month *	-1.973	-1.157	-0.141	0.979	2.101
8. I feel on top of my day to day finances	-2.226	-1.117	-0.171	1.588	2.464
9. I am comfortable with my current levels of spending relative to the funds I have coming in	-2.569	-0.979	-0.030	2.126	1.759
10. I am on track to have enough money to provide for my financial needs in the future	-1.666	-0.576	0.365	2.045	2.275
Model 2 – Second latent variable					
11. Payment problems in last year	-2.570	-1.132	0.677	-	1.099
12. Days in last year with low liquid balances	-1.197	-0.541	0.120	0.842	4.227
13. Days in last year during which customer had the ability to raise one or three month's expenses from savings or available credit	-1.184	-0.455	0.345	1.214	2.581
14. Age-normed residual of customer's median savings balance	-1.068	-0.403	0.622	1.428	2.874
15. Months in last year when spending exceeded 80% of inflows	-1.778	-0.098	0.950	2.282	1.572

** Responses reverse coded*

Table A5. Coefficients of Predictors of Reported and Observed Financial Wellbeing

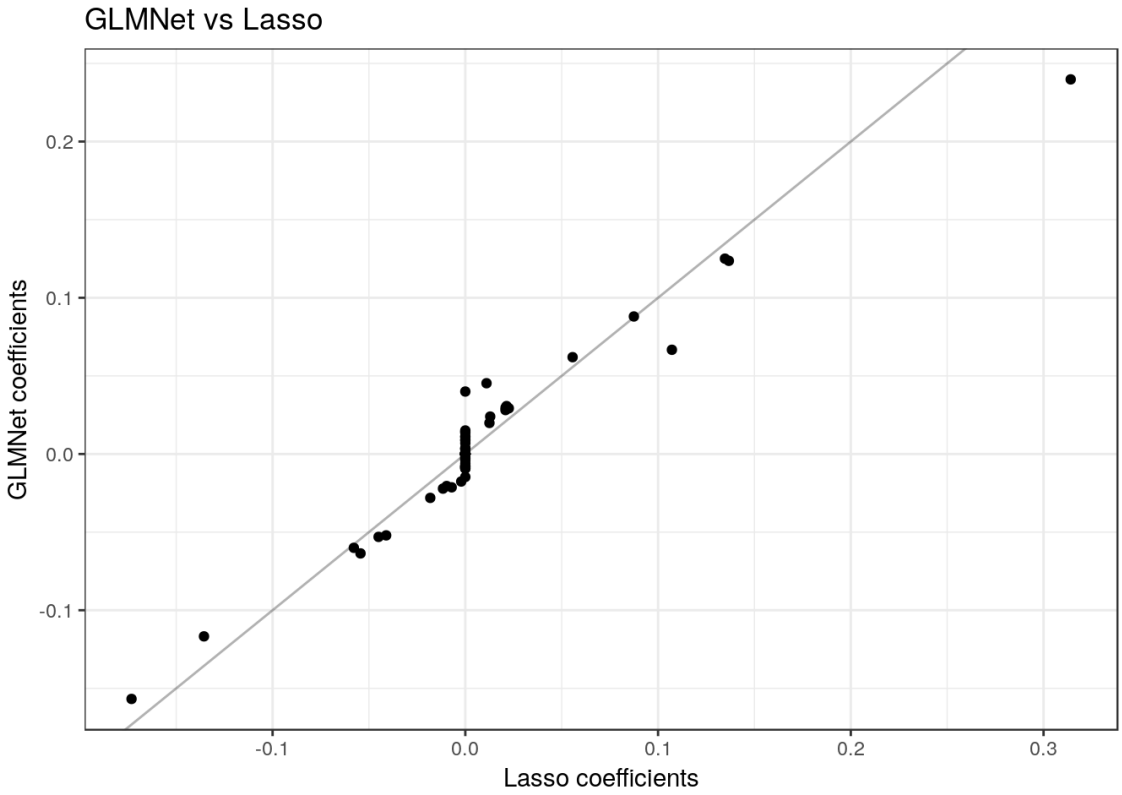
	Std. Reported FWB			*Std. Observed FWB*		
Std. variable	*LASSO*	*Post-OLS*	*95% CI*	*LASSO*	*Post-OLS*	*95% CI*
Personal and household characteristics						
Yearly household income	0.107	0.115	(0.094,0.136)	0.018	0.037	(0.004,0.067)
Unreported household income	0			0		
Business owner	0			-0.008	-0.034	(-0.059,-0.008)
Home owner	0			0.036	0.057	(0.025,0.088)
Mortgage holder	0			0		
Rent/mortgage per month	0			0		
Difficulty with rent/mortgage	0.173	0.175	(0.155,0.196)	0.084	0.067	(0.035,0.098)
Part-time worker	0			0		
Unemployed	-0.002	-0.024	(-0.043,-0.004)	-0.023	-0.044	(-0.069,-0.019)
Unpaid home duties	0			0		
Other work status	0			0		
Not working, student	0			0.001	0.026	(-0.006,0.053)
Semi-retired	0			0		
Retired	0			0		
Highest education	0.013	0.028	(0.007,0.048)	0.087	0.094	(0.068,0.121)
General health	0.021	0.031	(0.01,0.052)	0		
Disability	0			0		
Disability impacts work	0			0		
Mental distress	-0.136	-0.121	(-0.146,-0.098)	0		
Find finances confusing	0.058	0.059	(0.035,0.082)	0		
Understand financial products	0.021	0.035	(0.014,0.056)	-0.022	-0.049	(-0.075,-0.022)
Control in life	0.137	0.141	(0.119,0.164)	0		
Clear savings goal	0			0		
Prefer not living on credit	0			0.012	0.025	(-0.01,0.052)
Financial situation will look after itself	-0.135	-0.164	(-0.183,-0.145)	0		
People in household	0			0		
Dependent children at home	-0.007	-0.039	(-0.058,-0.021)	-0.073	-0.092	(-0.118,-0.066)
Single	0			0		
Not living with a partner	0			0		
In de facto/cohabiting relationship	0			0		
Widowed	0			0		
Provide unpaid care	0			0		
Unpaid work impacts earning income	0			0.007	0.02	(-0.016,0.044)
Male	0.013	0.03	(0.01,0.048)	0		
Age	0			0		
Immigrant	0			0		
Lives in metropolitan area	0			0.023	0.035	(0.008,0.061)
Resides in ACT	0			0		
Resides in NT	0			0		
Resides in QLD	0			-0.011	-0.03	(-0.056,-0.002)
Resides in SA	0			0		
Resides in TAS	0			0		
Resides in VIC	0			0		
Resides in WA	0			-0.002	-0.037	(-0.062,-0.011)
External conditions						
Recent financial improvement	0.021	0.043	(0.025,0.061)	-0.001	-0.03	(-0.054,-0.002)
Recent financial worsening	-0.045	-0.066	(-0.084,-0.047)	0		

	Std. Reported FWB			*Std. Observed FWB*		
Std. variable	*LASSO*	*Post-OLS*	*95% CI*	*LASSO*	*Post-OLS*	*95% CI*
Recently fired	0			0		
Recently promoted	0			0		
Recently retired	0			0		
Recent separated from partner	0			-0.004	-0.027	(-0.051,0.002)
Recent illness/injury	0			0		
Recent child birth	0			0		
Recently changed jobs	0			0		
Recently changed residence	0			0		
Recently back together with partner	0			0		
Recently married	0			0		
Recent illness/death in family	0			-0.014	-0.039	(-0.063,-0.014)
Recent illness/death of friend	0			0		
Recent pregnancy	0			0		
Recent weather disaster	0			-0.007	-0.028	(-0.053,0)
No recent event	0			0		
Social contact	0			0		
Social support in crisis	0			0		
Needed comm./gov. support but no access	-0.054	-0.069	(-0.088,-0.05)	-0.016	-0.034	(-0.06,-0.006)
Used comm./gov. support but not reliant	0			0		
Used special comm./gov. support	0			0		
Financial behaviors						
Term deposit	0			0.044	0.06	(0.035,0.086)
Credit card	0			0.068	0.148	(0.116,0.18)
Personal/car loan	-0.018	-0.039	(-0.058,-0.019)	-0.12	-0.109	(-0.136,-0.082)
Mortgage for own home	0			0		
Mortgage offset account	0			0.062	0.077	(0.048,0.105)
Mortgage for investment property	0			0.007	0.027	(-0.006,0.055)
Share investment portfolio	0.023	0.037	(0.018,0.056)	0		
Car insurance	0			0		
Home and contents insurance	0			0		
Life or health insurance	0			0		
Number of banks	0			-0.041	-0.078	(-0.104,-0.053)
Good savings behaviors	0.314	0.295	(0.269,0.321)	0.341	0.333	(0.301,0.365)
Good spending behaviors	0.056	0.07	(0.048,0.091)	0.048	0.06	(0.032,0.088)
Organized managing money day-to-day	0.011	0.02	(-0.016,0.045)	0		
Plan for financial future	0.087	0.089	(0.068,0.11)	0		
Regularly review finances	0			-0.029	-0.059	(-0.088,-0.03)
Tries to pay credit card debt	0			-0.016	-0.071	(-0.098,-0.044)
Sometimes carries credit card debt	0			-0.019	-0.066	(-0.091,-0.04)
Tends to carry credit card debt	0			-0.065	-0.113	(-0.14,-0.086)
Always carries credit card debt	-0.041	-0.058	(-0.077,-0.038)	-0.057	-0.106	(-0.135,-0.078)
Willing to sacrifice now to secure future	0			0		
Put off making financial decisions	0.012	0.033	(0.011,0.054)	0		
Approach to budgeting	0			-0.006	-0.023	(-0.05,0.015)
Manages large purchases at home	0			0.005	0.02	(-0.031,0.051)
Manages paying bills at home	0			0.026	0.035	(0.001,0.067)
Manages savings/investments at home	0			0		
Bank record measures						

	Std. Reported FWB			*Std. Observed FWB*		
Std. variable	*LASSO*	*Post-OLS*	*95% CI*	*LASSO*	*Post-OLS*	*95% CI*
Receives government benefits	-0.01	-0.03	(-0.05,-0.009)	-0.059	-0.077	(-0.105,-0.05)
Has gambling transactions	0			-0.055	-0.068	(-0.093,-0.043)
Used a bank branch	0			-0.002	-0.022	(-0.047,0.01)
Used a bank digital tool	0			0		
Called the bank	0			-0.042	-0.061	(-0.085,-0.036)

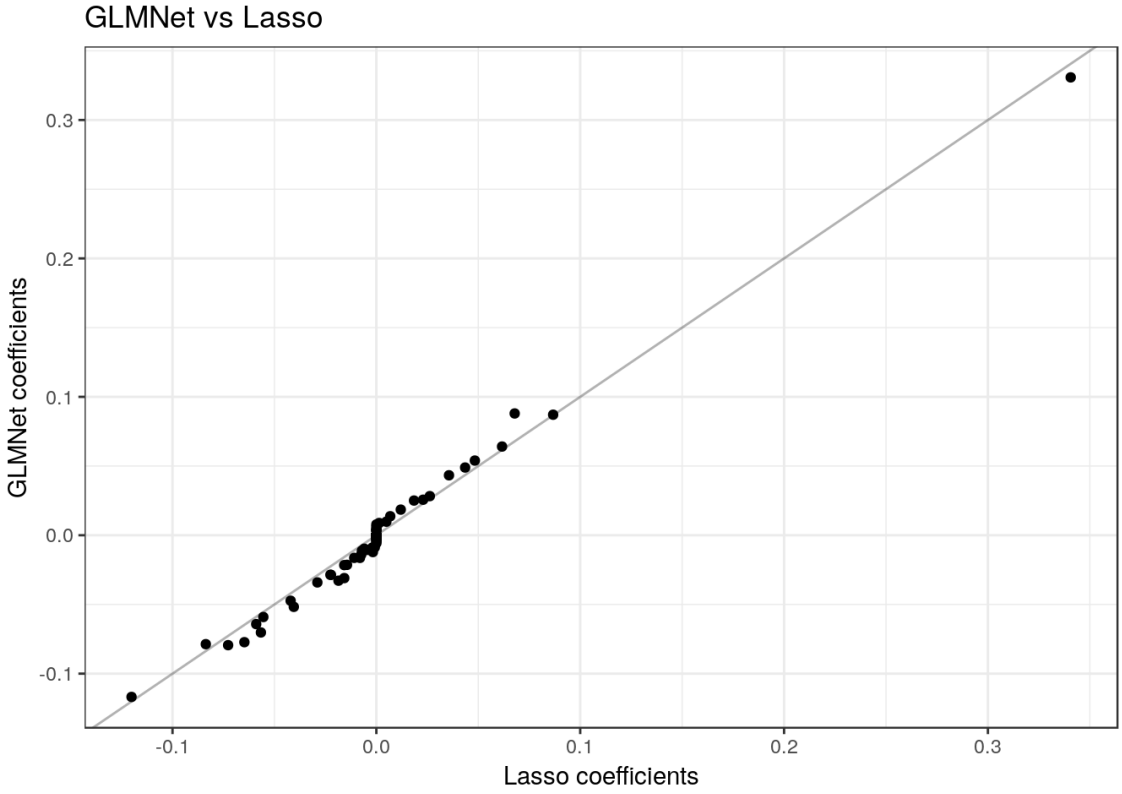
Appendix B. Additional Figures and Tables

Figure B1. LASSO vs Elastic Net Coefficients in Reported Financial Wellbeing Models



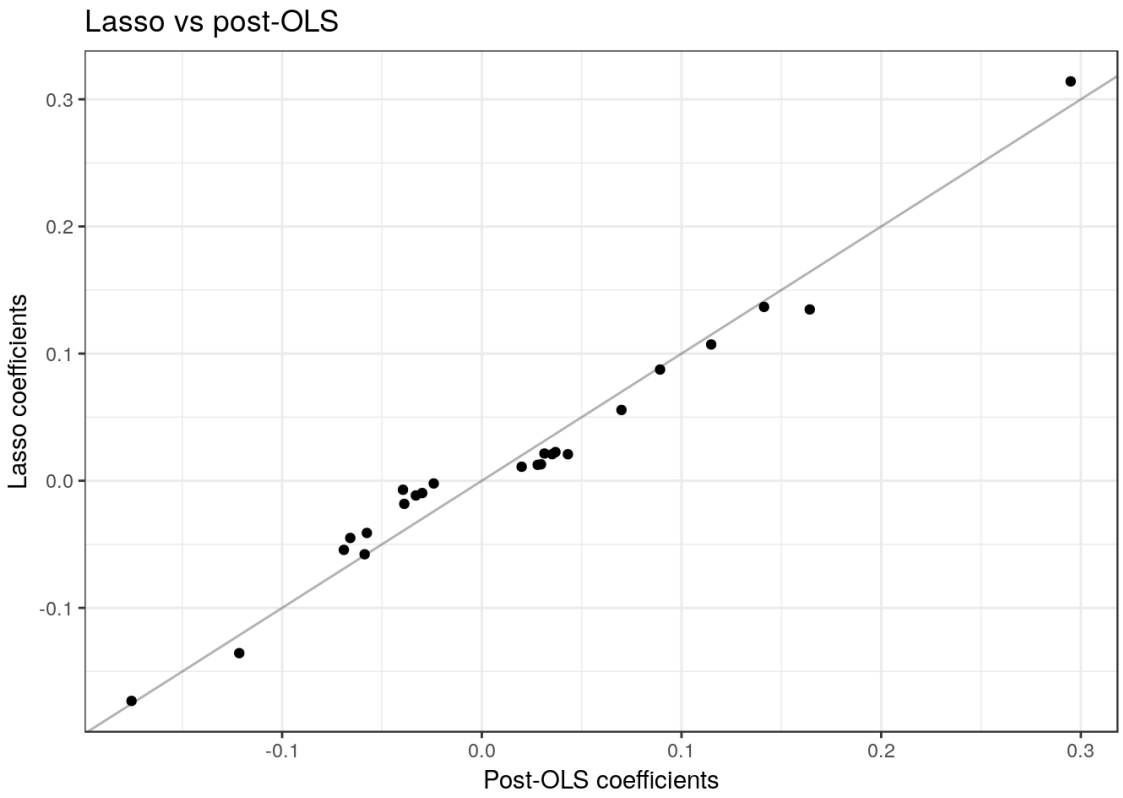
This figure includes standardized coefficients, some of which are set to zero by the LASSO estimator. The α and λ parameters of the Elastic Net estimator chosen at 0.086 and 0.1803, respectively, using 10-fold cross-validation and Hastie, Tibshirani, and Wainwright's (2015) "one-standard-error".

Figure B2. LASSO vs Elastic Net Coefficients in Observed Financial Wellbeing Models



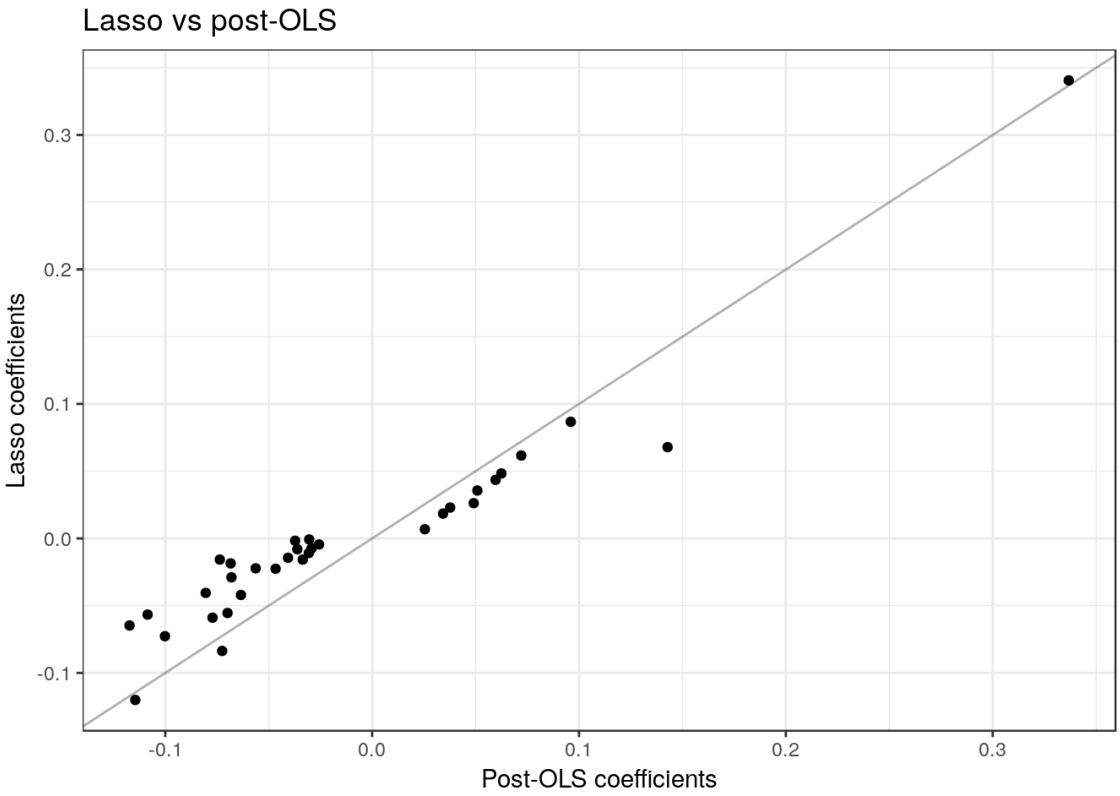
This figure includes standardized coefficients, some of which are set to zero by the LASSO estimator. The α and λ parameters of the Elastic Net estimator chosen at 0.515 and 0.0404, respectively, using 10-fold cross-validation and Hastie, Tibshirani, and Wainwright's (2015) "one-standard-error".

Figure B3. LASSO vs Post-OLS Coefficients in Reported Financial Wellbeing Models



This figure only includes standardized coefficients, not set to zero by the LASSO estimator.

Figure B4. LASSO vs Post-OLS Coefficients in Observed Financial Wellbeing Models



This figure only includes standardized coefficients, not set to zero by the LASSO estimator.

Appendix C. Financial Wellbeing Survey Instrument

Programmer instructions:

- All responses single response unless otherwise indicated as multiple ***(MR)***
- Randomise indicated statements between respondents, *not* within respondent
- All respondents are eligible – no termination points
- Include flat-line checks – if same code across all pop up "For this question, you cannot have the same answer for every statement, please can you re-check and revise your answers"
- Each screen needs an 'escape hatch' to comply with university ethics – a link that someone can click before exiting the survey that requests that the data collected be deleted

Questionnaire outline:

SECTION ORDER		*KEY QUESTIONS*	*ROLE*
A1	***Profilers***	*Basic demographics*	*Profiling*
C	***Subjective financial wellbeing measures***	*Financial situation, goals, attitudes and behaviours across every day, rainy day and one day elements of financial wellbeing*	*Creation of Subjective Financial Wellbeing Index*
A2	***Further profilers***	*Snapshot of household set-up*	*Profiling*
B	***My banking and financial set-up***	*My currently financial set-up – relationships, products, snapshot of footings and [BANK] share of wallet/footings. Individual vs household level and financial systems*	*Context & alignment to internal classification data*
D	***Additional subjective and stated behavioural measures***	*Known influencers, needs, attitudes, engagement and behaviour used to bring to life and understand key drivers of financial wellbeing*	*Further understanding, profiling and commercialising the index*
F	***Classification***	*Further demographic, household and socioeconomic classifiers*	*Further profiling*

Survey introduction screen

SCREEN 1:

Great, thanks for taking part!

To make life easier, if you need to complete the survey over multiple sessions you can simply close your browser and re-click on your original survey link to start back where you left off.

At the end of the survey, we'll ask you to choose which of one of the three charities that support Australians in vulnerable financial circumstances you'd like [BANK] to donate to on your behalf.

Before we get started, please take a moment to read the following research consent form.

[^INSERT CONSENT STATEMENT]

I agree **[NEXT BUTTON LABEL CHANGE FOR THIS SCREEN]**

PROGRAMMER NOTE: STORE BUTTON CLICKS AS A 'SURVEY CONSENT' VARIABLE IF NOT CLICKED, THEN SURVEY TERMINATED.

SECTION A1: Initial profilers

SHOW INTRO AND A2A-A4 ON SAME SCREEN

Before you start the survey, we would like to ask you a few questions to make sure that we are surveying a good cross section of the community.

A2a Please type in your age? _____ *(please enter below)* ***TERMINATE IF <18***

A2b ***HIDDEN QUESTION: PLEASE CODE AGE INTO THE FOLLOWING:***

1. 18-21
2. 22-24
3. 25-29
4. 30-34
5. 35-39
6. 40-44
7. 45-49
8. 50-54
9. 55-59
10. 60-64
11. 65-69
12. 70-74
13. 75-79
14. 80+

A3 And are you…

1. Male
2. Female
3. Other <Please specify>

A4a Please type in your postcode: _____

A4b **HIDDEN QUESTION: STATE:**

1. NSW
2. VIC
3. QLD
4. WA
5. SA

6. TAS
7. ACT
8. NT

A4c HIDDEN QUESTION: PLEASE CODE INTO METRO AND RURAL:

1. Metro
2. Rural

SECTION C: Subjective financial wellbeing measures (and related ecological questions)

We'd now like to ask you some questions about your **financial situation** as well as about some of your **financial experiences, goals, attitudes and behaviours**. Firstly…

C3a Which, if any, of these major events that have happened in your life over the past 12 months? *Please select all that apply*

PROGRAMMER: ROTATE ORDER OF CODES 1-16, ALLOW MULTIPLE RESPONSE

1. Got married
2. Separated from spouse or long-term partner
3. Got back together with spouse or long-term partner after a separation
4. Pregnancy / pregnancy of partner
5. Partner or I gave birth to, or adopted a new child
6. Serious personal injury or illness to self
7. Serious illness or death of an immediate or close family member
8. Serious illness or death of a close friend
9. Retired from the workforce
10. Fired or made redundant by an employer
11. Changed jobs (i.e., employers)
12. Promoted at work
13. Major improvement in financial situation (e.g., received an inheritance, significant bonus, etc)
14. Major worsening in financial situation (e.g., went bankrupt)
15. Changed residence
16. A weather-related disaster (e.g., flood,bushfire, cyclone)
17. None of these

C2a How **satisfied** are you with your **financial situation**?

Please pick a number between 0 and 10, where 0 means totally dissatisfied' and '10 means totally satisfied'.

Totally dissatisfied					**Neutral**			**Totally satisfied**		
0	1	2	3	4	5	6	7	8	9	10

C2b Given your current needs and financial responsibilities**, would you say that you (and your family) are...**

Please select one response only

1. Prosperous
2. Very comfortable
3. Reasonably comfortable
4. Just getting along
5. Poor
6. Very poor

C4a What is your **current level of savings** (including cash, bank deposits and other formal savings like bonds and term deposits)?

Please select one response only. Please consider monthly income as the sum total of the post-tax income that you (or the main income earner in your household) generate from all sources.

1. I have no savings
2. I have savings equal to less than 1 month's income
3. I have savings equal to 1-3 month's income
4. I have savings equal to 4-6 month's income
5. I have savings equal to more than 6 month's income

C4b **What is your current level of debt?**

Please select one response only

1. More debts than I can pay back
2. Debts that I am just managing to pay back
3. Debts that I am paying back comfortably
4. Debts that I am paying back very comfortably
5. No debts

C5a **How well** do the following statements describe you or your situation?

	RANDOMISE ORDER	**Not at all**	**Very little**	**Somewhat**	**Very well**	**Completely**
A	I could handle a major unexpected expense	1	2	3	4	5
B	I am securing my financial future	1	2	3	4	5
C	Because of my money situation, I feel like I will never have the things I want in life	1	2	3	4	5
D	I can enjoy life because of the way I'm managing my money	1	2	3	4	5
E	I am just getting by financially	1	2	3	4	5
F	I am concerned that the money I have or will save won't last	1	2	3	4	5

G	I am very organised when it comes to managing my money day to day	1	2	3	4	5
H	I do a good job of balancing my spending and savings	1	2	3	4	5
I	I run short of money because I overspend	1	2	3	4	5
J	I am impulsive and tend to buy things even when I can't really afford them	1	2	3	4	5
K	I try to save money to have something to fall back on in the future	1	2	3	4	5
L	I try to save some money regularly even if it is only a small amount	1	2	3	4	5
M	I always make sure I have money saved for bad times	1	2	3	4	5

C5b **How often** do the following statements apply to you?

	RANDOMISE ORDER	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
A	Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the month	1	2	3	4	5
B	I have money left over at the end of the month	1	2	3	4	5
C	I am behind with my finances	1	2	3	4	5
D	My finances control my life	1	2	3	4	5
E	I feel optimistic and upbeat about my financial future	1	2	3	4	5
F	I am confident about meeting my expenses later in retirement	1	2	3	4	5

C6a In the last 12 months, **how difficult was it for you to meet your necessary cost of living expenses** like housing, electricity, water, health care, food, clothing or transport?

Please select one response only

1. Very difficult
2. Difficult
3. Neither difficult nor easy
4. Easy
5. Very easy

C6b When was the last time you bought **something special for yourself** – something that you wouldn't normally buy?

Please select one response only

1. Within the last week
2. Within the last month
3. Within the last 3 months

4. Within the last 12 months
5. More than a year ago
6. I've never bought something special for myself

C7a And when it comes to how you **think and feel about your finances**, please indicate the extent to which you agree or disagree with the following statements.

	RANDOMISE ORDER SPLIT OVER 3 SCREENS	**Disagree strongly**	**Disagree**	**Neither agree nor disagree**	**Agree**	**Agree strongly**
A	I am making progress towards my financial goals	1	2	3	4	5
D	I prefer to live within my means and am not comfortable living on credit	1	2	3	4	5
E	I am willing to make sacrifices today for a secure financial future tomorrow	1	2	3	4	5
F	I find managing my finances difficult and confusing	1	2	3	4	5
G	I feel like I will never pay off all my debt	1	2	3	4	5
H	I often put off making financial decisions	1	2	3	4	5
J	I feel on top of my day to day finances	1	2	3	4	5
L	I am comfortable with my current levels of spending relative to the funds I have coming in	1	2	3	4	5
M	I am comfortable with my current levels of debt and my ability to repay it	1	2	3	4	5
N	I am confident in my ability to manage my day to day finances	1	2	3	4	5
O	I feel that I have enough set aside that I could manage financially if I was to lose my source of income for a period of time	1	2	3	4	5
Q	I have some clear savings goals that I am working towards	1	2	3	4	5
S	I regularly sit down and review my finances to ensure everything is on track	1	2	3	4	5
W	My financial situation is largely outside of my control	1	2	3	4	5
X	My financial situation will look after itself and I don't think or worry about it	1	2	3	4	5
Z	I am on track to have enough money for my financial needs in the future	1	2	3	4	5

C7b And **how often** do you (or your household) do each of the following?

	RANDOMISE ORDER	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
A	Save money so that you could cover major unexpected expenses or a fall in income	1	2	3	4	5

B	Use a credit card/ overdraft or borrow money to buy food or to pay expenses because you have run short of money	1	2	3	4	5
C	Borrow money to pay off debts	1	2	3	4	5
D	Overdraw on your bank account/s	1	2	3	4	5

C8a In the last 12 months, did any of the following happen to you **because of a shortage of money?**

	RANDOMISE ORDER	**Yes**	**No**
A	Could not pay electricity, gas or telephone bills on time	1	2
B	Could not pay the mortgage or rent on time	1	2
C	Pawned or sold something	1	2
D	Went without meals	1	2
E	Asked for financial help from friends or family	1	2
F	Asked for help from welfare/community organisations	1	2

C9a Suppose you faced an **emergency expense** tomorrow that is **equal to one month of your income**. What statement best describes **your ability to meet this expense**?

Please select one response only

1. I could easily raise the money
2. I could raise the money, but it would involve sacrifices (such as, reduced spending, using more credit than I would like)
3. I would have to do something drastic to raise the money (such as taking out personal lending, payday lending, pawning or selling a possession, applying for additional credit, borrowing from family or friends)
4. I don't think I could raise the money

SECTION A2: Further household questions

We'd now like to ask you a few more questions about you and your household.

A5a Which of the following best describes your work status?

1. Working full time (35 hours or more per week)
2. Working part time (less than 35 hours per week)
3. Home duties
4. Semi-retired (still doing some work, but less than 35 hours per week)
5. Fully retired (not working at all)

6. Unemployed
7. Student attending school / university
8. Other (please specify)

A5b (ASK IF WORKING FULL TIME, PART TIME OR SEMI-RETIRED, A5A=1/2/4)
Are you happy with the amount of hours you're currently working?

1. I'd like to be working more hours
2. I'm happy with the amount of hours I'm working
3. I'd like to be working less hours

A6a Which of the following best describes your household?

1. Live alone
2. Live with a partner (married or de facto)
3. Living with parents
4. Living with partner (married or de facto) and parents
5. Living with other family members
6. Living with flatmates or friends

A6b And do you have any **dependent children** of any age?
That is, that you support financially.

1. Yes, living in my household (please type in how many _____)
2. Yes, living in another household (please type in how many _____)
3. No

A6c (ASK IF A6B=1/2) Which of the following age groups do your dependent children fall?
Please select all that apply. ***MR***

1. 0-2 years
2. 3-5 years
3. 6-11 years
4. 12-14 years
5. 15-18 years
6. Over 18 years

A6d At present, how many people in total live in your household?
Please type a number into the box below.
[INSERT TEXT BOX]

A7a Where you live, do you…?

1. Live at home or elsewhere without paying rent or board
2. Rent
3. Own your home with a mortgage
4. Own your home outright (no mortgage)
5. Other (please specify)

A7b (ASK IF RENTING OF PAYING MORTGAGE, A7A=2/3, OTHERWISE SKIP AND AUTOFILL CODE 5)
Which of the below statements best describes you/ your family's [**^INSERT IF A7A=2** "rent", **IF A7A=3** "mortgage"] payments?
Please select one response only

1. I am behind on my payments
2. I am just managing to make my payments
3. I am managing to make my payments but with some strain on my budget
4. I make my payments comfortably
5. I don't have any payments

SECTION B: My banking and financial set-up

We'd now like to ask you some questions about **your current banking and how you go about managing your personal and household finances.** To start with…

B1a Which of these banks or financial institutions do you hold personal **banking** products or accounts with? ***(MR)***
Please select all that apply.

B1b **In total, how many different** banks in total do you hold personal banking products or accounts with?

1. One bank only
2. Two banks
3. Three banks
4. Four banks
5. Five or more banks

B1c And which do you consider to be your **main** financial institution?
By main financial institution we are referring to the bank where you hold the account/s that you mainly use for your day to banking and transactions.
SHOW SELECTED AT B1a

	ROTATE ORDER OF BRANDS	***B1a HOLD PRODUCTS***	***B1c. MFI***
A	AMP	1	1

B	ANZ	2	2
C	Bank of Melbourne	3	3
D	Bank of Queensland	4	4
E	Bank SA	5	5
F	Bankwest	6	6
G	Bendigo Bank	7	7
H	Citibank	8	8
I	Commonwealth Bank	9	9
J	HSBC	10	10
K	ING	11	11
L	Macquarie Bank	12	12
M	NAB	13	13
N	RAMs	14	14
O	St.George	15	15
P	Suncorp	16	16
Q	Westpac	17	17
R	A Building Society (please specify)	18	18
S	A Credit Union (please specify)	19	19
T	An industry superfund	20	20
U	Other (please specify)	21	21
V	Unsure	99	NA

B1d Thinking about the **transactional banking in your household** (eg. paying bills and day to day spending), how much is **done through your main financial institution**, from accounts held in your name?

1. All of it
2. Most of it
3. Some of it
4. Very little of it
5. None of it

B2a Which of the following banking, investment or insurance products or services do you **currently** have or use? ***(MR)***
Please select all that apply.

1. Everyday transaction account (with EFTPOS or Debit Card)
2. Savings account
3. Term deposit
4. Credit card
5. Personal loan/car loan
6. Home loan/ mortgage for a home you live in
7. Home loan/ mortgage for an investment property
8. A mortgage offset account (that offsets mortgage interest with your deposits/savings)
9. Investment or margin loan (for investing in shares)
10. Managed funds or share portfolio (outside of superannuation)
11. Home & contents insurance

12. Car insurance
13. Life insurance (life, trauma/TPD, income)
14. Annuities/ allocated pensions (outside of superannuation)

B2b And which of the following financial institutions do you hold the following products and services with?
Please select all that apply

	<DOWN THE SIDE> INSERT SPECIFIC 'BANKING' PRODUCTS SELECTED AT B2A.	***<ACROSS THE TOP> INSERT <u>BRANDS SELECTED AT B1A</u> PROGRAMMER TO INCLUDE 'OTHER'***								

B3 Using the table below, please provide your **best estimate of the total value you hold** in each of the following…

	B3a. YOUR CURRENT BANK DEPOSITS (transaction account, savings, term deposits) [SHOW ALL]	***B3b. YOUR CREDIT CARDS OR PERSONAL LOANS [SHOW IF B2A=4/5]***	***B3c. YOUR MORTGAGES OR INVESTMENT LOANS (values still owing on all loans) [SHOW IF B2A=6/8]***	***B3d. YOUR MORTGAGE OFFSET OR REDRAW [SHOW IF B2A=6/7]***	***B3e. YOUR LIFE INSURANCE COVERAGE [SHOW IF B2A=12]***	***B3f. YOUR INVESTMENT PORTFOLIO [ONLY SHOW IF B2A=7/10]***	***B4g. YOUR SUPER-ANNUATION [SHOW ALL]***
Less than $1,000	1	1	1	1	1	1	1
$1,000 - $1,999	2	2	2	2	2	2	2
$2,000 – $4,999	3	3	3	3	3	3	3
$5,000 - $9,999	4	4	4	4	4	4	4
$10,000 - $14,999	5	5	5	5	5	5	5
$15,000 - $19,999	6	6	6	6	6	6	6
$20,000 - $49,999	7	7	7	7	7	7	7
$50,000 - $99,999	8	8	8	8	8	8	8
$100,000 - $199,999	9	9	9	9	9	9	9

$200,000 - $299,999	10	10	10	10	10	10	10
$300,000 - $399,999	11	11	11	11	11	11	11
$400,000 - $499,999	12	12	12	12	12	12	12
$500,000 - $599,999	13	13	13	13	13	13	13
$600,000 - $699,999	14	14	14	14	14	14	14
$700,000 - $799,999	15	15	15	15	15	15	15
$800,000 - $999,999	16	16	16	16	16	16	16
$1,000,000 - $1,499,999	17	17	17	17	17	17	17
$1,500,000 - $1,999,999	18	18	18	18	18	18	18
$2,000,000 - $2,499,999	19	19	19	19	19	19	19
$2,500,000 - $2,999,999	20	20	20	20	20	20	20
$3,000,000 or more	*21*	*21*	*21*	*21*	*21*	*21*	*21*
Unsure (please attempt to provide best guess before selecting this)	*22*	*22*	*22*	*22*	*22*	*22*	*22*
I do not wish to answer this question	*23*	*23*	*23*	*23*	*23*	*23*	*23*
I don't have this	*24*	*24*	*24*	*24*	*24*	*24*	*24*

B4a (ASK IF RENT OR PAY A MORTGAGE, A7A=2/3) You mentioned you [**^INSERT IF A7A=2** "rent", **IF A7A=3** "have a mortgage". How much are your [**^INSERT IF A7A=2** "**rental payments**", **IF A7A=3** "**mortgage payments**"] each month?
SHOW IF RENT (A7A=2) AND HOUSE SHARE (A6A=5/6) If you share housing/boarding please only select the amount that you are contributing to the total.

1. Less than $500
2. $500-999
3. $1,000-1,499
4. $1,500-1,999
5. $2,000-2,499
6. $2,500-2,999
7. $3,000-3,499

8. $3,500-3,999
9. $4,000-4,499
10. $4,500-4,999
11. $5,000-5,499
12. $5,500-5,999
13. $6,000-6,499
14. $6,500-$6,999
15. $7,000 or more

B5b Which of the following best describes who in your household does the following?

	RANDOMISE ORDER	**Always me**	**Usually me**	**Shared equally between myself and another in household**	**Usually another in household**	**Always another in household**	**Always/ usually someone not living in my household (eg. relative)**
A	Paying bills and managing day to day spending	1	2	3	4	5	6
B	Managing large household purchases (eg. major appliances, cars, etc)	1	2	3	4	5	6
C	Savings, investments and borrowings	1	2	3	4	5	6

B5c **(ASK IF LIVE WITH PARTNER, A6A=2/4)** Which of the following best describes how your banking and finances are structured in your household?

1. All joint accounts
2. A mix of joint accounts and personal/individual accounts
3. All accounts held individually

SECTION D: Additional subjective and stated behavioural measures (incl. CSI ecological questions)

D1a How much understanding do you have about financial services and products?

1. I have a very good understanding
2. I have a good understanding
3. I have a basic understanding
4. I don't understand them at all

D1b Which of the following statements best describes you in relation to your finances?

1. I'm primarily focussed on my finances today and haven't put much thought into planning for my financial future
2. I'm starting to think about planning for my financial future but have not yet taken active steps towards this
3. I am actively planning for my financial future

D2a Which of the following best describes your **current approach to budgeting**?
Please select one response only.

1. I have a formal budget that's documented (e.g. spreadsheet, book or online tool) that calculates my outgoing expenses and the amount of money I need to allocate each week or month
2. I have a 'mental' budget – no documentation or spreadsheets, but I still keep track of my finances and spending
3. I don't really work to a budget – I just spend what I think I can afford at the time
4. I don't work to a budget at all

D2b Which of the following statements comes closest to describing your (and your family's) **savings habits**?
Please select one response only

1. Don't save: usually spend more than income
2. Don't save: usually spend about as much as income
3. Save whatever is left over at the end of the month – no regular plan
4. Spend regular income, save other income
5. Save regularly by putting money aside each month

D2c **(SHOW IF HAVE A CREDIT CARD, B2A=4)** Which of the following best describes how you manage your **credit card payments**?

1. I **always pay** my credit card/s off at the end of each month
2. I **try to pay** my credit card/s off at the end of each month
3. I **sometimes** pay my credit card/s off at the end of each month
4. I **tend to carry** credit card debt over each month
5. I **always carry** credit card debt over each month

D3a Below are six different statements describing how people feel and behave with their finances. Which **one** of these statements do you feel best describes you when it comes to your finances?

PROGRAMMER: SHOW SLIDE RULE ACROSS TOP. DON'T SHOW CODES OR LABELS – ONLY STATEMENT DESCRIPTIONS

1 **Struggling Survivor**	2 **Impulsive Survivor**	3 **Coaster**	4 **Optimiser**	5 **Overseer**	6 **Maximiser**
I find my finances overwhelming. There's not much left for me to spend after my everyday expenses are paid. I tend to avoid thinking too much about my finances as it worries me.	I'm not really on top of my finances. I tend to spend money when I have it, don't really save or stick to a budget. I don't do much research into financial matters.	My finances are all set up and running, there is probably room to optimise them but I feel that there are more important things in life to worry about. I keep a bit of a budget (usually in my head) and do a little research here and there.	I'm on top of my finances and enjoy managing them. I'm constantly looking at ways to optimise them and willing to put in the time and effort. I'm quite disciplined and will cut back on spending to achieve a savings goal. I keep a detailed budget and do a lot of research.	I have a healthy overview of my finances and am happy to get into the detail when I need to. I'm comfortable with my financial position and I have investments working for my future. I always try to have a healthy buffer in place so I can still enjoy the good things in life.	I'm on top of my finances and actively maximising my wealth for the future. I manage my own portfolio and investments and it's important for my money to work hard for me. I keep a detailed budget and enjoy engaging with the details of my finances.

SECTION F: Classification

Last, a few final questions about you and your household.

F1a In which of the following broad groups does your total (pre-tax) **household annual** income fall?

(IF RETIREE (A5A=4/5): *Please include the value of any allocated pensions or annuities here.*

SHOW CODEFRAME

1. Under $10,000 per year (under $385 per fortnight)
2. $10,000 to $19,999 per year ($385 to $769 per fortnight)
3. $20,000 to $29,999 per year ($770 to $1,154 per fortnight)
4. $30,000 to $39,999 per year ($1,155 to $1,538 per fortnight)
5. $40,000 to $49,999 per year ($1,539 to $1,923 per fortnight)
6. $50,000 to $59,999 per year ($1,924 to $2,308 per fortnight)
7. $60,000 to $69,999 per year ($2,309 to $2,692 per fortnight)
8. $70,000 to $79,999 per year ($2,693 to $3,077 per fortnight)
9. $80,000 to $89,999 per year ($3,078 to $3,462 per fortnight)
10. $90,000 to $99,999 per year ($3,463 to $3,846 per fortnight)
11. $100,000 to $109,999 per year ($3,847 to $4,231 per fortnight)
12. $110,000 to $119,999 per year ($4,232 to $4,615 per fortnight)
13. $120,000 to $129,999 per year ($4,616 to $5,000 per fortnight)
14. $130,000 to $139,999 per year ($5,001 to $5,385 per fortnight)
15. $140,000 to $149,999 per year ($5,386 to $5,769 per fortnight)
16. $150,000 to $199,999 per year ($5,770 to $7,692 per fortnight)

17. $200,000 to $249,999 per year ($7,693 to $9,615 per fortnight)
18. $250,000 or more per year ($9,616 or more per fortnight)
19. Prefer not to say

F1b Do you own a business, either solely or in partnership with others?

1. Yes
2. No

F1c (ASK IF F1B=1, OTHERWISE SKIP AND AUTOFILL AS CODE 1 "PERSONAL ONLY")
Are the accounts you hold with [BANK] used for…

1. Personal banking only
2. A mix of personal and business banking
3. Business banking only

F1d Which of the below best describes your income?

1. I earn a **fixed salary** (ie. a regular amount each week, fortnight, month, etc)
2. I earn a **wage** (ie. paid by the hour or day) but it is **largely consistent** from month to month
3. I earn a **wage** (ie. paid by the hour or day) and it **varies considerably** from month to month
4. I earn **varied amounts** from month-to-month based on sale of goods or services, project-based work, casual work contracts, etc
5. I am on a **fixed pension**
6. I own/run a business **(SHOW IF F1B=1)**
7. I do not earn an income

F1e And do you have any other sources of income?
Please select all that apply. ***MR***

1. Income generated by others (partner, parent, child, etc) that contributes to the running of the household
2. Property investment returns (eg. rental yields)
3. Non-property investment returns (eg. interest, dividends, etc)
4. Work bonuses
5. I own/run a business **(SHOW IF F1B=1)**
6. Other (please specify)

F3a Which of the following best describes your current situation?

1. Single
2. Married
3. De facto / living with a partner
4. Widowed
5. Divorced
6. Separated

99. Prefer not to say

F3b What is the highest level of education that you have **already** completed?
If you were educated in a country other than Australia, please choose the closest option from the list

1. Year 9 or below
2. Year 10 or 11
3. Year 12
4. Certificate (level unknown)
5. Certificate I or II
6. Certificate III or IV
7. Advanced Diploma or Diploma
8. Bachelor's degree or higher

99. Prefer not to say

F4a Over the past 30 days, about how often did you feel…

	RANDOMISE ORDER	**All of the time**	**Most of the time**	**Some of the time**	**A little of the time**	**None of the time**	**Don't know**
A	Nervous	1	2	3	4	5	99
B	Hopeless	1	2	3	4	5	99
C	Restless or fidgety	1	2	3	4	5	99
D	So depressed that nothing could cheer you up	1	2	3	4	5	99
E	That everything was an effort	1	2	3	4	5	99
F	Worthless	1	2	3	4	5	99

F4b Over the past 12 months, how would you describe your level of contact with social connections? Social connections refer to **connections with family, friends, work colleagues, neighbours or clubs**.

1. I am isolated or alone most of the time
2. I have occasional contact
3. I have regular contact with more distant social connections
4. I have regular contact with close connections

98. Don't know

F4c How likely are you to get financial support from your social connections (family, friends, work colleagues, neighbours, clubs etc.) in times of crisis?

1. Always/Very Likely
2. Fairly likely
3. Unsure
4. Fairly unlikely
5. Never/Very unlikely

F4d How much support have you had from community or government organisations to help with your financial situation over the past 12 months?

1. I did not need any community or Government support
2. I've needed support, but I had no access to it
3. I receive emergency support services (e.g. food-banks or vouchers)
4. I receive specialised support services (e.g. meals on wheels, financial counselling, no interest loan, homecare services)
5. I used their support occasionally, but I was not reliant on them

F5a In the last two weeks did you spend time providing unpaid care, help or assistance to family members or others because of a disability, a long term illness or problems related to old age?

1. Yes
2. No

IF NO TA F5a SKIP F5b

F5b To what extent do you feel that the unpaid work you provided in the last week has impacted your ability to work and earn an income?

1. Impacted a lot
2. Impacted a little
3. Did not impact much
4. Not impacted at all

F5c Do you have any long-term health condition, impairment or disability that restricts you in your everyday activities, and has lasted or is likely to last, for 6 months or more?

1. Yes
2. No

IF YES SELECTED AT F5C ASK F5D

F5d To what extent does your disability affect your ability to work?

1. Impacts a lot

2. Impacts a little
3. Does not impact much
4. No impact at all

F6a In general, would you say your health is:

1. Excellent
2. Very good
3. Good
4. Fair
5. Poor

F6b Some people feel they have completely free choice and control over their lives, while other people feel that what they do has no real effect on what happens to them.

Please use this scale where 1 means "no choice at all" and 10 means "a great deal of choice" to indicate how much freedom of choice and control you feel you have over the way your life turns out.

No choice at all					Neutral					A great deal of choice
0	1	2	3	4	5	6	7	8	9	10

F7a What country were you born in?
Please select the one that best applies

1. Australia
2. New Zealand
3. Pacific Islands
4. UK
5. Europe
6. North America or Canada
7. South America
8. China
9. Japan
10. Another Asian country (eg. Vietnam, Thailand, Korea)
11. India, Pakistan, Bangladesh or Sri Lanka
12. A Middle Eastern country (e.g. Lebanon, Turkey, Iraq)
13. Africa
14. Other (please specify)

F7b And around how many years have you lived in Australia?
ASK IF NOT BORN IN AUSTRALIA - CODE 2-98 F7A [INSERT TYPE IN BOX]
PROGRAMMER NOTE: YEARS MUST BE LESS THAN AGE PROVIDED AT A2A

F8a Finally, which of the below three charities would you like us to donate to on your behalf?
[BANK] will donate $1,000 for every 500 completed surveys up to a total of $5,000. We will distribute the final donation across the three charities based on the final responses to this question. All of these charities are currently supported by [BANK].

RANDOMISE ORDER CHARITIES ARE SHOWN

1. **Domestic Violence NSW** – [BANK] have worked with them to develop the Addressing Financial Abuse Guide
2. **AIME (Australian Indigenous Mentoring Experience)** – [BANK] have developed a financial capability workbook for indigenous youth and their mentors
3. **St Vincent de Paul NSW** – [BANK] are working with this charity on a financial capability module to support community workers with financially vulnerable clients

That's the end of our survey. Thanks for your time.
If you have any specific feedback about this survey, please type it into the box below.

Appendix D. Invitation E-mail, Reminder Email, Plain Language Statement, and Consent Form

Invitation e-mail

[CARTOON IMAGE OF MAN WITH QUESTIONS]

[SENTENCE 'HELP US UNDERSTAND' AND BANK LOGO]

Dear <Name>,

We believe that we have an important role to play in helping Australians improve their financial wellbeing. That's why we've partnered with researchers at the [UNIVERSITY] to understand and measure the financial wellbeing of Australians.

We'd value your input and would like to invite you to answer a few survey questions, which should take around 15-20 minutes to complete. To thank you for your time, we'll make a donation to 3 charity partners who support Australians in vulnerable financial circumstances, up to a total of $5,000. You'll be able to choose the charity by voting at the end of the survey.

Participation in this research is voluntary and responses will remain completely confidential.

Attached to this email is an information statement, describing the research and how we will use and protect your data. We encourage you to read and keep the statement in case you have questions or concerns about the research.

If you'd like to take part in shaping the future of financial wellbeing for Australians, click on the link to start.

[BUTTON 'START NOW' LINKING TO BEGINNING OF SURVEY]

Yours sincerely,
The [BANK] Team.

[IN SMALLER FONT SIZE:]

Your privacy is important to us - please be assured we have not provided your personal details to any third parties. We will never send an email that asks you to provide your log in or password details.

This survey will expire on Friday 11th August.

About the Survey
Participation in this study is voluntary and your responses will remain confidential. We'll link your survey responses to information we have about how you use our products and services. This will help the [UNIVERSITY] gain a more complete understanding of how different financial behaviours contribute to financial wellbeing.

Your confidentiality and privacy will be protected and the information will be used for research purposes only. At no point will our research partners have access to any of your personal information, and how you respond to the survey will have no impact on your current or future relationship with us or on any products or services that you use now or in the future. This research is only about gaining a better understanding financial wellbeing.

The survey will be conducted by independent survey company [SURVEYING PARTNER] for market research purposes only. No personal information will be shared with [SURVEYING PARTNER]. Should you wish to check the bona fides of this research company, the Australian Market & Social Research Society can be contacted on 1300 364830.

View the [BANK] Privacy Policy [LINK]

View [BANK'S SURVEYING PARTNER] Privacy Policy [LINK]

If you wish to be removed from this survey please click here.

If you have any technical problems with the survey you can email our survey partners at [CONTACT EMAIL].

If you have any questions or comments about this research, or no longer wish to receive email invitations to take part in [BANK] surveys, please contact [BANK] directly at [CONTACT EMAIL]

Reminder e-mail

[CARTOON IMAGE OF MAN WITH QUESTIONS]

[SENTENCE 'HELP US UNDERSTAND' AND BANK LOGO]

Dear <Name>,

There's still time to share your input before the survey closes on Friday 11th August.

Your responses to the survey will help us and researchers at the [UNIVERSITY] understand and measure the financial wellbeing of Australians.

The survey should take around 15-20 minutes to complete.

To thank you for your time, we'll make a donation to 3 charity partners who support Australians in vulnerable financial circumstances, up to a total of $5,000. You'll be able to choose the charity by voting at the end of the survey.

Participation in this research is voluntary and responses will remain completely confidential.

Attached to this email is an information statement, describing the research and how we will use and protect your data. We encourage you to read and keep the statement in case you have questions or concerns about the research.

To begin the survey click the link below or copy and paste the link below into your browser.

[BUTTON 'START NOW' LINKING TO BEGINNING OF SURVEY]

Yours sincerely,
The [BANK] Team.

[IN SMALLER FONT SIZE:]

Your privacy is important to us - please be assured we have not provided your personal details to any third parties. We will never send an email that asks you to provide your log in or password details.

This survey will expire on Friday 11th August.

About the Survey
Participation in this study is voluntary and your responses will remain confidential. We'll link your survey responses to information we have about how you use our products and services. This will help the [UNIVERSITY] gain a more complete understanding of how different financial behaviours contribute to financial wellbeing.

Your confidentiality and privacy will be protected and the information will be used for research purposes only. At no point will our research partners have access to any of your personal information, and how you respond to the survey will have no impact on your current or future relationship with us or on any products or services that you use now or in the future. This research is only about gaining a better understanding financial wellbeing.

The survey will be conducted by independent survey company [SURVEYING PARTNER] for market research purposes only. No personal information will be shared with [SURVEYING PARTNER]. Should you wish to check the bona fides of this research company, the Australian Market & Social Research Society can be contacted on 1300 364830.

View the [BANK] Privacy Policy [LINK PROVIDED]

View [SURVEYING PARTNER]’s Privacy Policy [LINK PROVIDED]

If you wish to be removed from this survey please click here.

If you have any technical problems with the survey you can email our survey partners at [CONTACT EMAIL].

If you have any questions or comments about this research, or no longer wish to receive email invitations to take part in [BANK] surveys, please contact [BANK] directly at [CONTACT EMAIL]

Plain Language Statement

[UNIVERSITY LOGO]

Plain Language Statement
Measuring Financial Well-Being

Introduction

You are invited to complete a survey on financial well-being as part of a research project. The survey should take no longer than 15-20 minutes in total. The research is carried out by the [UNIVERSITY] and the [BANK]. Your participation is voluntary and you are free to withdraw from the survey at any time and ask for unprocessed data to be deleted.

How will my confidentiality be protected?

With your agreement, the researchers involved in this project will link the answers you provide in the survey with information about the products and services that you use from [BANK]. This allows us to gain a more complete understanding of how different factors contribute to financial well-being. The information will be used by researchers at the [UNIVERSITY] and at [BANK]; it will be used only for research purposes and will have no impact on your current or future relationship with the [BANK] or on any products or services that you are currently using or may choose to use in the future. The processed data will remain confidential, non-identifiable and securely stored by researchers. Anonymous results from the research may be published in academic journals and presented at conferences. The non-identifiable data will be retained for five years from the last publication so that other researchers may review the accuracy and consistency of the analysis in the future upon request.

Who can I contact if I have any concerns about the project?

This research project has been approved by the Human Research Ethics Committee of [BANK]. If you have any concerns or complaints about the conduct of this research project, which you do not wish to discuss with the research team, you should contact the Manager, Human Research Ethics, Research Ethics and Integrity, [BANK], [CONTACT DETAILS]. All complaints will be treated confidentially. In any correspondence please provide the name of the research team or the name or ethics ID number of the research project.

Investigators

Principal Investigator:

[UNIVERSITY PRINCIPAL INVESTIGATOR CONTACT DETAILS]

[BANK] Co-Investigators:

[BANK PRINCIPAL INVESTIGATOR CONTACT DETAILS]

[UNIVERSITY CONTACT DETAILS AND LOGO]

Consent Form

Project Title: Measuring Financial Well-Being

This is a project designed to help understand the financial well-being of Australians. My participation is completely voluntary. If, prior to processing the data, I do not wish for my data to be included in the project, I may request to have my responses withdrawn from the data set.

With my permission, the researchers in this project would like to link my survey answers to information on the products and services that I use from [BANK]. I understand that this is entirely for research purposes and will not affect my current or future relationships or standing with the [BANK]. I also understand that confidentiality of data will be preserved subject to any legal requirements and my data will become non-identifiable upon processing.

If I have any questions about this research project, I can contact its principal researcher [UNIVERSITY PRINCIPLAN RESEARCHER NAME AND CONTACT INFORMATION]. If I have any concerns about the treatment of research participants, I can contact the Human Research Ethics Committee at [UNIVERSITY, PHONE AND FAX NUMBERS].

By clicking "I agree", I declare myself fully informed and I agree to participate on a purely voluntary basis.

Appendix E. Research Methods Transparency

Researcher Characteristics: Three of the authors have PhDs in economics and extensive experience in quantitative data analysis and directed the analyses for this article. A fourth author has a PhD in Science in Marine Biology and the fifth author is currently completing a Masters Degree in Mathematics. These authors also have extensive experience in data science and machine learning, and processed the data and implemented the analyses for this article. None of the authors of this study had direct interaction with survey respondents or was directly involved in the data collection for this article.

Maintaining Participants' Rights: For primary research, indicate how participants' rights were safeguarded (i.e., by IRB approval or national policy for safeguarding participant rights). Describe procedures for managing/archiving data, anonymization and deidentification of data, and procedures for ensuring data security.

Survey participants were originally provided survey links containing single-use unique identifiers. The mapping between these single-use identifiers and the bank customer identifiers was known only to the researchers at the bank, and not to the survey provider or to the survey participants. After completing the survey, participants' responses were transmitted as a password-protected attachment from the surveying firm to the bank and stored on secured servers of the bank. At this point, the one-time unique identifiers in the survey were joined to the bank customer identifiers, so that the remaining bank record data could be associated to each survey respondent. The data is permanently stored on a backed up and secured in the bank server, inside a protected database accessible only by the current researchers. Only the researchers working at the bank have access to the data files and the data was not copied or stored elsewhere. At no point have research partners outside the bank had access to any of the personal information or survey participants.