Improving the Commonwealth Bank of Australia - Melbourne Institute Observed Financial Wellbeing Scale

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Abstract

In a first-of-its-kind analysis, Commonwealth Bank of Australia (CBA) and the Melbourne Institute: Applied Economic & Social Research (MI) developed two related yet distinct multi-item scales of Australians' financial wellbeing: The CBA-MI Reported and Observed Financial Wellbeing Scales. The CBA-MI Reported Financial Wellbeing Scale, which is formed from people's self-reports of their financial outcomes, has exceptionally strong measurement properties. However, the first version of the CBA-MI Observed Financial Wellbeing Scale, which was formed from bank-record indicators of financial outcomes, was coarser and more skewed than the Reported Financial Wellbeing Scale. This report describes an improved version of the Observed Financial Wellbeing Scale that is the sum of outcomes from categorical bank-record measures of customers' payment problems, frequency of low liquid balances, net spending, ability to raise funds for an unexpected expense, and savings balances. The revised scale has twice as many outcomes than the first version, is more reliable, and differentiates finely across all levels of financial wellbeing. We conduct correlation and multivariate regression analyses of the Reported and revised Observed Financial Wellbeing scales to examine their associations with personal and household characteristics, external conditions, and financial behaviours. Key *positive* characteristics or behaviours such as income, home-ownership, and good savings habits and *negative* characteristics or behaviours such as unemployment, difficulties with housing payments, or needing community support, are correlated with both scales in intuitive ways. Observed Financial Wellbeing is also strongly related to people's financial attitudes, capabilities, and behaviour, such as balancing savings and spending and having regular savings. The associations with several financial behaviours, including people's savings habits, spending restraint, credit card management, and preferences not to live on credit are much stronger than the associations with income. These characteristics can each be changed in positive directions to improve people's financial wellbeing, regardless of levels of income and wealth.

Contents

Executive Summary

In March 2018, in a first-of-its-kind analysis, Commonwealth Bank of Australia (CBA) and the Melbourne Institute: Applied Economic & Social Research (MI) developed two related, yet distinct, multi-item summative scales of Australians' financial wellbeing.

- The CBA-MI Reported Financial Wellbeing Scale is formed from people's responses to 10 questions about their perceptions and experiences of their financial outcomes.
- The CBA-MI Observed Financial Wellbeing Scale (version 1) is formed from five measures from customers' financial records that describe outcomes from their cash balances, savings, credit, and payments over a 12-month period.

Both scales are based on a careful conceptualisation of Australians' financial wellbeing and were developed through rigorous Item Response Theory (IRT) quantitative methods. Each scale has strong measurement properties, which were confirmed in alternate samples, and each is correlated with many financial and personal characteristics and thus externally valid. However, the properties of version 1 of the Observed Financial Wellbeing Scale, while good, are not as strong as those of the Reported Financial Wellbeing Scale. A strong Observed Financial Wellbeing Scale using banking data is valuable for many purposes and stakeholders.

This report describes results from a project that improved the Observed Financial Wellbeing Scale. As with the first version, the improved scale takes the sum of outcomes from five categorical bank-record measures and adjusts that sum so that the final values range from 0 to 100. The component measures describe customers' payment problems, frequency of low liquid balances, net spending, ability to raise funds, and savings balances. Each measure has four or five outcomes (compared to two or three for version 1), and the improved scale has twice as many possible outcomes (20 compared to 10 for version 1). The outcomes of the component measures include more positive financial conditions than the previous measures, allowing the scale to better discriminate between differences in high levels of financial wellbeing. The improved scale also has stronger agreement among the component measures (i.e., higher reliability) than version 1.

The Distribution of the Observed Financial Wellbeing Scale (version 2) and Its Components

We construct and analyse the improved Observed Financial Wellbeing Scale using a sample of people from an on-line survey who indicated that they did most or all of their banking with CBA. With the customers' permission, the survey responses were linked to transaction and account records from the bank.

Among these customers, scores from the improved Observed Financial Wellbeing Scale have an approximate 'bell shape' that ranges over all the possible outcomes from 0 to 100. The distribution is slightly skewed toward higher scale values and has a median value of 57.9. We apply descriptive categories to the scores and find that:

- 18.4 per cent of customers were 'having trouble' (had scores of 26.3 or below, which implied that they experienced the worst possible outcome for one or more observed financial wellbeing conditions)
- 31.3 per cent were 'just coping' (had scores of 31.6 - 52.6, which implied they

experienced a negative outcome for one or more observed conditions)

- 35.1 per cent were 'getting by' (had scores of 57.9 - 78.9, which implied the averages of their observed outcomes were in neutral or second-highest categories), and
- 15.2 per cent were 'doing great' (had scores of 84.2 or higher, which implied they experienced the best possible outcome for one or more observed conditions).

The improved Observed Financial Wellbeing Scale is positively related to the Reported Financial Wellbeing Scale—customers with high financial wellbeing on one scale also tend to have high financial wellbeing on the other. The scales have a (Spearman) correlation of 46 per cent, an improvement of 15%, or 6 percentage points. Thirty per cent of customers have scores that are in the same quintile of the distributions for the two scales, and 70 per cent have scores that are within one quintile of each other for the two scales.

Although most customers in our sample have neutral or positive outcomes for the components of the scale, substantial fractions have very negative outcomes:

- 8 per cent were in arrears for six months or more or had multiple severe payment problems,
- 12 per cent had liquid balances below one week's expenses for at least three-quarters of the year,
- 13 per cent spent more than 80 per cent of their inflows in 11 or 12 months of the year,
- 12 per cent could raise a month's expenses from their own account balances and available credit on 15 or fewer days per year, and
- 15 percent have a substantially fewer savings than people their own age.

Associations with Measured Characteristics

We present a conceptual model in which people's personal and household characteristics, external conditions and events, and financial behaviours contribute to their financial wellbeing (see Figure 5.1). We conduct unconditional correlation analyses to investigate whether these characteristics are associated with the improved Observed Financial Wellbeing Scale in ways that are consistent with the predictions of the model. This serves as a test of the external validity of the scale.

As expected, observed financial wellbeing is positively associated with customers' incomes and especially with the level of their self-reported transaction and savings account balances. More generally, the improved Observed Financial Wellbeing scale has:

Strong positive associations (correlations above 0.3) with:

- total bank deposits
- ability to balance spending and savings
- savings habits
- organisation for everyday spending

Strong negative associations (correlations below -0.3) with:

- difficulties paying rent and mortgage
- holding a car or personal loan
- overspending

Moderate positive associations (correlations between 0.1 and 0.3) with:

- total household income
- superannuation balances
- mortgage offset balances
- investment portfolio balances
- home ownership
- being retired
- education
- self-reported health
- having a sense of control in life
- having clear savings goals
- having a preference not to live on credit
- being a metropolitan resident
- social contact
- not needing community or government support
- holding a term deposit account
- holding a credit card
- holding a mortgage offset account
- holding a mortgage for an investment property
- holding an investment portfolio
- planning for one's financial future
- regularly reviewing finances
- credit card management
- willingness to sacrifice for the future

Moderate negative associations (correlations between -0.3 and -0.1) with:

- being a non-home owner
- the amount of rent and mortgage payments
- disabilities that impact work
- mental distress
- finding finances confusing
- number of dependent children at home
- unpaid care responsibilities that impact work
- experiencing a financial worsening
- needing community/government services but not being able to access them
- using emergency community/government services
- buying things one cannot afford
- putting off making financial decisions

The patterns of associations are similar to those for the Reported Financial Wellbeing Scale.

Multivariate Analyses

We also conduct *multivariate analyses* of the associations between financial wellbeing and people's characteristics. These analyses indicate the partial, or direct, associations of the characteristics holding the influences of other related characteristics constant. For example, the positive unconditional association between organised spending and financial wellbeing from the correlation analyses could appear if organised spenders have higher incomes, more schooling, or other financial behaviours that improve their financial wellbeing rather than organised spending having a direct relationship. Multivariate analyses adjust for this. Our multivariate analyses examine the same set of characteristics as the correlation analyses, except for the amounts of assets and debts, which we consider to be financial outcomes.

Many associations from the correlation analysis also appear in the multivariate analyses and therefore seem to reflect direct influences.

Positive associations that appear in both analyses:

- total household income
- home ownership
- education
- a preference not to live on credit
- being a metropolitan resident
- holding a term deposit account
- holding a mortgage offset account
- ability to balance spending and savings
- savings habits
- credit card management

Negative associations that appear in both analyses:

- difficulties paying rent and mortgage
- dependent children at home
- needing community/government services but not being able to access them
- using emergency community/government services
- holding a car or personal loan
- overspending

The multivariate analyses also point to a few characteristics that are associated with higher reported financial wellbeing but *lower* observed financial wellbeing, including

- greater understanding of financial products
- a greater sense of control in life
- experiencing a financial improvement
- putting off making financial decisions

As with the correlation analyses, the multivariate analyses indicate that people's incomes have a consistent positive association with the improved Observed Financial Wellbeing Scale; however, the strength of the association is modest. A doubling of annual income is only associated with a 1.0-point gain in observed financial wellbeing. The associations with several financial behaviours, including people's savings habits, spending restraint, credit card management, and preferences not to live on credit are much stronger than the associations with income.

Implications

The improved version of the CBA-MI Observed Financial Wellbeing Scale is a powerful tool for describing the financial wellbeing of Australians. The scale combines many elements of financial wellbeing outcomes, including day-to-day spending outcomes, precautionary credit and balance outcomes, and savings balance outcomes. The scale's strong positive association with the CBA-MI Reported Financial Wellbeing Scale and the consistent associations with many characteristics from our conceptual model increase our confidence in the measure.

The strong associations with people's financial behaviours and attitudes, including their savings habits, spending restraint, credit card management, and preferences not to live on credit, have important implications for public and private institutions because these characteristics can be changed. Helping people improve these behaviours can help them increase their financial wellbeing.

Several indicators of disadvantage including unemployment, the need and use of community and government support, and problems with housing affordability are strong predictors of low financial wellbeing in both the correlational and multivariate analyses. Helping people to escape the conditions of disadvantage should be a central concern, regardless of how much we might also help them change their financial behaviours.

Our results also suggest that the confidence that comes from feeling a strong sense of control over one's finances and having a good understanding of finances may be a hidden risk factor for financial problems. Programs and initiatives to help people gain financial knowledge and financial control may need to be mindful of not sparking false confidence.

1. Introduction

Financial wellbeing is a complex, multi-faceted condition. Although it has been examined in many studies, researchers have not coalesced around a single universal measure. In a first-of-its-kind analysis, Commonwealth Bank of Australia (CBA) and the Melbourne Institute: Applied Economic & Social Research (MI) have developed multi-item scales of Australians' financial wellbeing that draw on *self-reports* of people's experiences of financial outcomes and also incorporate *bank-record* indicators of financial outcomes. The research, which is described in an earlier report by Comerton-Forde et al. (2018), produced the CBA-MI Reported and Observed Financial Wellbeing Scales (version 1). Comerton-Forde et al. showed that each scale discriminates between differences in financial wellbeing across a wide range of levels and that they are correlated with many financial and personal characteristics of Australians.

The CBA-MI Reported Financial Wellbeing Scale is formed from people's responses to 10 questions that ask about their perceptions and experiences of how they are meeting their financial obligations, whether they have financial freedom to make choices, whether they are in control of their finances, and whether they are financially secure. The scale was developed after carefully analysing more than 30 well-performing survey items (many of which had been tested in previous research) and utilising rigorous Item Response Theory (IRT) modelling methods. Analyses revealed that the scale had excellent properties.

Version 1 of the CBA-MI Observed Financial Wellbeing Scale is formed from five measures that come from customers' financial records and that describe outcomes that can be observed in their cash balances, savings, credit, and payments over a 12-month period. This scale also has good properties, but it is coarser than the Reported Financial Wellbeing Scale. The team's initial collaboration was only able to consider 17 candidate bank-record measures, which were all developed for the first time and without prior analysis. Only seven measures performed well enough in preliminary analyses to be considered further. Formal IRT analyses revealed that two of the remaining measures did not contribute strongly to a scale. The analyses further indicated that only two or three outcomes for each of the other five measures contributed useful information. The resulting Version 1 observed scale has 10 possible outcomes (compared to 41 for the reported scale) and discriminates better between low, rather than high, levels of financial wellbeing due to the types of measures it includes. Validation tests of the observed scale showed that it is associated with people's financial and personal characteristics, but not as strongly as the reported scale.

Improving the Observed Financial Wellbeing Scale

This report describes results from a project to develop a second version of the Observed Financial Wellbeing Scale with more outcomes, higher reliability, and better discrimination at all levels of financial wellbeing than the first version. For its building blocks, we sought to construct component bank-record measures with more outcomes (our goal was five per measure) that spanned a wider range of high and low financial wellbeing than the original measures. Another goal was to measure more domains of financial wellbeing outcomes.

The project addressed the same overarching goals as the initial scale development effort.

These were to develop a scale of financial wellbeing that:

- could be implemented using actual data;
- was conceptually sound, statistically reliable, externally valid, and generalizable; and
- measured financial wellbeing as an outcome that is related to but separate from the many other underlying characteristics that contribute to financial wellbeing.

The project continued to rely on the definition and conceptual analysis of financial wellbeing developed by Comerton-Forde et al. (2018). It examined the team's existing survey data and utilised the same rigorous quantitative methodology.

The result is a second, improved version of the CBA-MI Observed Financial Wellbeing Scale. As with the first version of the scale, the second version is the sum of outcomes from five categorical bank-record measures. These describe customers' payment problems, frequency of low liquid balances, net spending, ability to raise funds for an unexpected expense, and savings balances. Unlike the components of the first version of the scale, each of the new measures has four or five outcomes, leading to a revised scale with 20 possible outcomes and less skew. Version 2 of the observed scale has higher reliability than version 1. The Observed Financial Wellbeing Scale remains distinct from the Reported Financial Wellbeing Scale but is more closely correlated with that scale in version 2.

The next section of this report provides our definition of financial wellbeing and describes our Reported and revised Observed Financial Wellbeing Scales. The following section describes our linked survey and bank-record data. The general distributions of the financial wellbeing scales and their components are presented in Section 4. Section 5 reports how the distributions of the Reported and revised Observed Financial Wellbeing Scales vary across people with different characteristics, and Section 6 provides a multivariate regression analysis of these relationships. Section 7 concludes.

2. Definition and Measurement of Financial Wellbeing

2.1 The Definition of Financial Wellbeing

Following the analysis by Comerton-Forde et al. (2018), we define 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.*

This definition is expressed in terms of financial outcomes that people achieve or experience, rather than all the conditions, characteristics, and behaviours that might contribute to those outcomes.

It incorporates CBA's conceptual framework for financial wellbeing, which emphasises three types of situations that are relevant to people's finances:

- 'everyday' situations that encompass their immediate, day-to-day and month-to-month financial outcomes,
- 'rainy day' situations that encompass outcomes that prepare them to maintain their wellbeing in unexpected, adverse events, and
- 'one day' situations that encompass outcomes that allow them to sustain their wellbeing over time and achieve long-term goals.

It also includes people's goals and objectives to meet their financial obligations, have the financial freedom to enjoy extra consumption and other fulfilling choices, control their finances, have security, and be free from financial worries. These goals and objectives are elements of previous definitions by Bray (2001), the Consumer Financial Protection Bureau (CFPB; 2015), Muir et al. (2017), and others.

Finally, the definition is informed by empirical analyses which revealed that financial wellbeing consists of financial outcomes that people experience, interpret, and can report, and outcomes that can be objectively observed in their financial accounts and transactions.

We measure financial wellbeing through two distinct, yet related, scales to provide the most complete representation possible of people's actual financial situation.

2.2 The CBA-MI Observed Financial Wellbeing Scale (version 2)

Version 2 of the CBA-MI Observed Financial Wellbeing Scale is formed from five items that come from customers' financial records. Item 1 has four possible outcomes, and all the other items have five, with the worst financial wellbeing outcomes assigned values of zero and better outcomes assigned higher values. Table 2.2 lists the items and possible outcomes.

Version 2 differs from version 1 by

- incorporating a larger set of payment problems (item 1),
- adding a measure of months in which spending exceeded 80% of inflows (item 3),
- including more categories of outcomes for each item and changing the category thresholds,
- adding higher-level expense thresholds to the top categories of the low-liquid-balance and ability-to-cover-expenses measures (items 2 and 4), and
- simplifying the age-norming procedure for the median savings measure (item 5).

These changes and the procedures for developing the scale are discussed in more detail in Appendix A.

A person's observed financial wellbeing scale value is formed by adding the outcomes to all five items and multiplying the sum by 100/19. This results in a 0-100 scale with 20 possible outcomes in which larger values indicate higher levels of observed financial wellbeing.

Unlike the other items in the Observed Financial Wellbeing Scale which distinguish between five categories of outcomes, quantitative testing indicated that the payment problems item (item 1) only distinguishes between four categories.

3   Improving the CBA-MI Observed Financial Wellbeing Scale

Table 2.2 CBA-MI Observed Financial Wellbeing Scale (version 2)

Item	Outcomes
1. Experienced payment problems in last year	0 - In arrears 6 or more months or multiple serious problems 1 - In arrears 2-5 months; had declines, dishonours, 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, dishonours, overlimit fees, or late fees 3 - Had no payment problems
2. Days in last year with low liquid balances	Liquid balances below average weekly expenses: 0 - 75% of the time or more 1 - 75-50% of the time 2 - 50-10% of the time 3 - 10% of the time or less, but sometimes less than 4 week's expenses 4 - Never below 4 week's expenses
3. 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
4. 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
5. Savings relative to people their own age (age-normed residual of customer's median daily savings balance during last year)	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

2.3 The CBA-MI Reported Financial Wellbeing Scale

The CBA-MI Reported Financial Wellbeing Scale is formed from people's responses to 10 questions on their perceptions and experiences of financial wellbeing outcomes. The questions were chosen through a rigorous quantitative procedure explained in detail in Comerton-Forde et al. (2018). Each question has five possible responses, with the worst outcomes assigned values of zero and the best outcomes, values of four. Appendix Table A.5 lists the questions and possible responses. A person's reported financial wellbeing scale value is formed by adding the responses to all 10 questions and multiplying the sum by 2½. This results in a 0-100 scale with 41 possible outcomes in which larger values indicate higher levels of reported financial wellbeing. Statistical analyses further indicated that reported financial wellbeing was distinct from observed financial wellbeing and that the two scales can be constructed with no overlapping items.

This report focuses on version 2 of the Observed Financial Wellbeing scale. Throughout, the report reproduces results for the Reported Financial Wellbeing Scale for completeness, even though that scale has not been changed.

2.4 Properties of the Scales

Simple Summations That Are Directly Tied to Component Conditions

Both scales are formed from simple summations of categorical responses, which are then multiplied by either 100/19 or 2½. This method restricts the ways that the underlying data contribute to the scales. The method treats each item as being equally informative about people's underlying reported or observed financial wellbeing. It also treats each unit (+1) increase in the response to a given item within a scale as having the same relationship with financial wellbeing as a unit increase in the response to any other item in the scale. We have compared the simple scales to more complex scales that allowed for differences in each item's reliability and indicative severity. The simple scales capture almost all the information of the more complex scales, yet they can be easily calculated. Also, their values can be directly tied to the component conditions, which means that just by knowing a person's score on the scales, one has information about that person's answers to the scale components.

A Measure of Relative Wellbeing with No Absolutes

The scores from the CBA-MI Reported and revised Observed Financial Wellbeing Scales have been developed to measure the *relative extent* of someone's financial wellbeing—they indicate higher or lower positions along a distribution. The scores do not identify specific, absolute 'good' or 'bad' conditions. A Reported Financial Wellbeing Scale score of 20 is lower than most scores, but the value does not necessarily indicate 'bad' financial wellbeing in an absolute sense. Similarly, a score of 80 is higher than most, but it does not necessarily represent 'good' financial wellbeing in an absolute sense. The most appropriate interpretation of the values is how someone's financial wellbeing compares to others'.

Descriptive Categories of Reported and Observed Financial Wellbeing

We recognise, however, that readers and users may want to place more meaning on the

score values. To help with this, we provide descriptive categories for ranges of score values based on the logical relationships between the values and the component conditions. The descriptive categories are based on the types of financial outcomes that people report, such as the best or worst categorical outcome, or the type of outcome their financial records indicate. We provide four descriptive categories for the scales and explain their meanings in Table 2.3.

Table 2.3 Descriptive Categories of the CBA-MI Financial Wellbeing Scales

Descriptive label	Scores	Explanation
Having trouble	Rep.: 0 – 22.5 Obs.: 0 – 26.3	Experienced the worst possible (0) outcome for one or more financial wellbeing conditions
Just coping	Rep.: 25 – 47.5 Obs.: 31.6 – 52.6	Experienced a negative outcome (1 or lower) for one or more conditions
Getting by	Rep.: 50 – 75 Obs.: 57.9 – 78.9	The averages of people's outcomes were in the neutral (2) or second-highest (3) categories
Doing great	Rep.: 77.5 – 100 Obs.: 84.2 – 100	Experienced the best possible outcome (4) for one or more conditions

We emphasise that the labels of the categories for both scales should be interpreted as descriptions, not absolute statements, of financial wellbeing. Scores near the adjoining thresholds of the categories—say, scores of 75.0 and 77.5 for the reported scale—imply very similar sets of underlying conditions. However, these descriptive categories contain information about the type and severity of outcomes a person might be experiencing that lead to their financial wellbeing score.

3. The On-line Survey, Bank Data, and Analysis Samples

This report develops and analyses the scales using responses to an on-line survey that was conducted with 5,682 CBA customers in the first week of August 2017. The report also uses CBA financial-record data linked to the customers' responses. The survey responses and bank-record data were used by Comerton-Forde et al. (2018) to develop the CBA-MI Reported Financial Wellbeing Scale and version 1 of the Observed Financial Wellbeing Scale. Their report describes the survey in more detail and provides the questionnaire, recruiting materials, and consent documents.

A critical consideration for recruiting customers for the survey was what the research team would be able to observe from their CBA financial records. While bank records are a rich source of data, their depiction of customers' financial activities is necessarily incomplete if customers conduct financial transactions or hold financial products with other institutions.

The team was interested in recruiting customers who use CBA as their main financial institution (MFI) and whose records would provide relatively complete descriptions of their

financial outcomes. However, the team also wanted a sample that could describe all of CBA's customers. To balance these needs, the survey sampled customers from three strata:

Stratum A: A nationally representative sample of 1,611 CBA customers.

Stratum B: A sample of 2,899 'sole-MFI' customers who were believed, based on their transactions data, to undertake their banking solely through CBA.

Stratum C: A sample of 1,172 'split-MFI customers' for whom CBA appears to be the main – but not sole – banking provider and for whom CBA has other financial data.

The analyses in this report use most, but not all, of the survey responses. We drop observations for 50 customers who did not answer all the financial wellbeing questions and observations for 1,162 people who reported not being MFI customers. The sample for our analyses consists of 4,470 people who reported being either sole- or split-MFI customers. We focus on MFI customers because we can calculate their observed financial wellbeing scores. A reliable observed scale has not yet been developed for non-MFI customers.

The distributions of the measured characteristics from the on-line survey and the linked bank records are reported in Haisken-DeNew et al. (2018).

4. Financial Wellbeing among the Survey Respondents

This section of the report shows the general distributions of the Observed and Reported Financial Wellbeing Scales and of the components of the scales across the MFI customers in the on-line survey. The material closely follows the analysis from an earlier report (Haisken-DeNew et al., 2018).

4.1 Distributions of the Financial Wellbeing Scales

Figure 4.1 shows the percentages of MFI customers with each score from version 2 of the Observed Financial Wellbeing Scale. Customers' scores ranged over all the possible outcomes from 0 to 100. The solid vertical line in the figure indicates the median value of observed financial wellbeing—that is, the value at which half of the sample report higher values and half report lower values. The median value and modal value (the value with the most responses) of the scale were each 57.9. The average value was 54. The distribution is slightly skewed towards higher scale values, meaning that customers were somewhat more likely to have good financial-record outcomes for a given condition than bad outcomes.

A quarter of customers had observed scale values that were 36.8 or less (the 25th percentile in the distribution, indicated by the dashed vertical line on the left). A quarter of customers had values that were 73.7 or higher (the 75th percentile indicated by the dashed vertical line on the right). Only a few people had values near the top or bottom ends of the scale.

Figure 4.1 is shaded to show the portions of customers in each of our descriptive categories for version 2 of the Observed Financial Wellbeing Scale.

- 18.4 per cent of customers had scores in the lowest category of 'having trouble' (shaded ■)

- 31.3 per cent had scores in the second lowest category of 'just coping' (shaded ■)
- 35.1 per cent had scores in the second highest category of 'getting by' (shaded ■),
  and
- 15.2 per cent had scores in the highest category of 'doing great' (unshaded □).

Figure 4.1 Distribution of Observed Financial Wellbeing (Version 2)
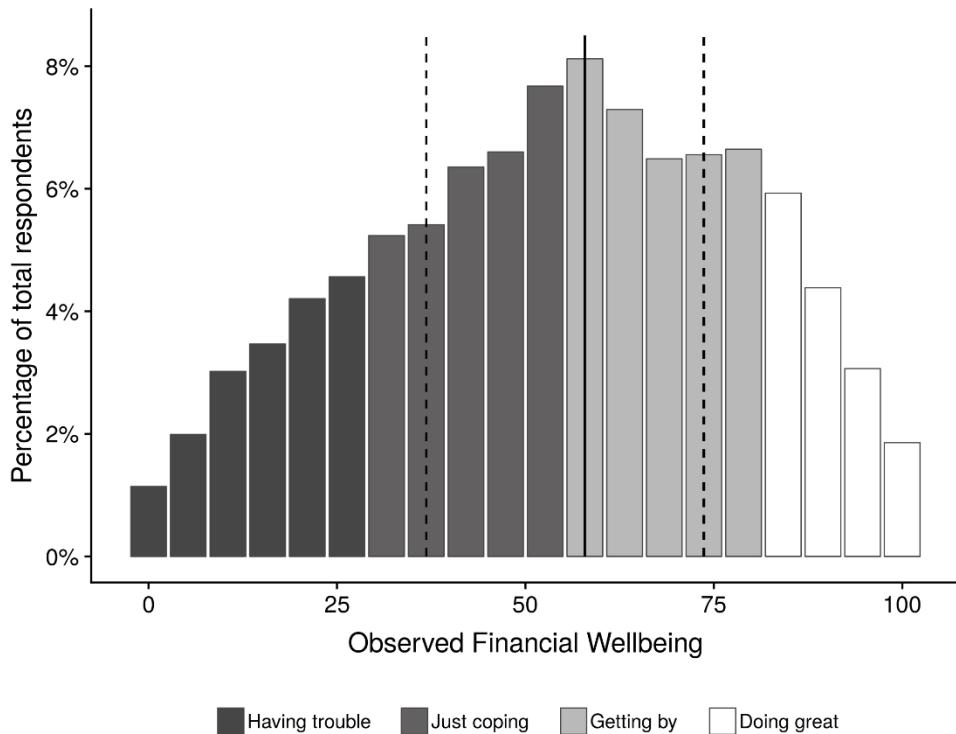
Figure 4.2 shows the percentages of MFI customers with each score from the Reported Financial Wellbeing Scale. As with observed financial wellbeing, customers' reported financial wellbeing scores spanned all the possible scale values. The median and modal values were 55, and the average was 53.2. The distribution was skewed towards higher values. The 25th percentile value was 40.0, and the 75th percentile value was 67.5. Few customers had scale values at the absolute top or bottom of the distribution.

For the descriptive categories of the Reported Financial Wellbeing Scale,

- 8.8 per cent of customers had scores in the lowest category of 'having trouble' (shaded ■)
- 30.8 per cent had scores in the second lowest category of 'just coping' (shaded ■)
- 47.9 per cent had scores in the second highest category of 'getting by' (shaded ■),
  and
- 12.5 per cent had scores in the highest category of 'doing great' (unshaded □).

Figure 4.2 Distribution of Reported Financial Wellbeing
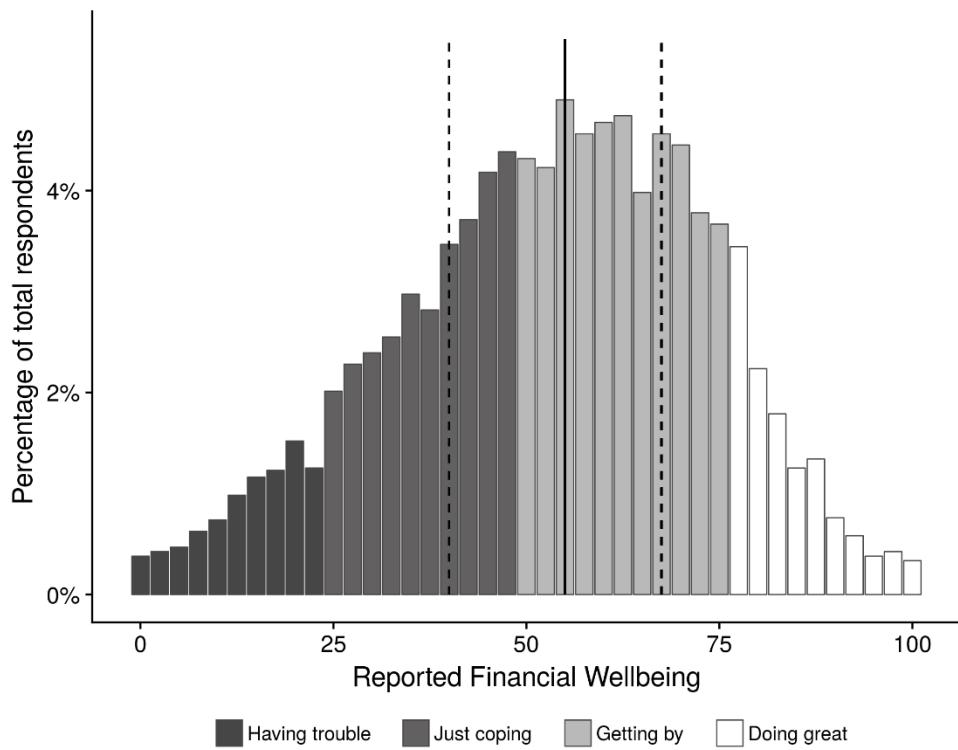
The Reported and Observed Financial Wellbeing Scales are positively related—customers with high reported financial wellbeing also tend to have high observed financial wellbeing. Formally, the sample values for the two scales had a positive (Spearman) correlation of 46 per cent. This correlation is 6 percentage points (15%) than the correlation between reported financial wellbeing and version 1 of the observed scale.

To convey the relationship between the scales, Figure 4.3 plots the percentages of customers with scores in each quintile of the two scale distributions. Consistent with the positive relationship between the two scales, 30 per cent of customers have scores that are in the same quintile of both distributions (these are the percentages along the principal upward sloping diagonal). If the scales were uncorrelated, we would only expect 20 per cent to be in the same quintile. When we expand the consideration to include customers whose quintile positions are close, 70 per cent have scores from the two scales that are within one quintile of each other. This compares to an expected percentage of 52 if the scores were unrelated. Only 11 per cent of customers have scores that are more than two quintiles apart, and a mere two per cent have scores that are in the top quintile of one scale and the bottom quintile of the other.

Figure 4.3 Distribution of Combined Financial Wellbeing

Quintiles of Financial Wellbeing

90%	0.8%	3%	3%	6%	8%
70%	2%	3%	3%	4%	6%
50%	3%	6%	4%	5%	5%
30%	4%	6%	3%	3%	2%
10%	8%	7%	2%	2%	1%
	10%	30%	50%	70%	90%

Reported (y-axis) / Observed (x-axis)
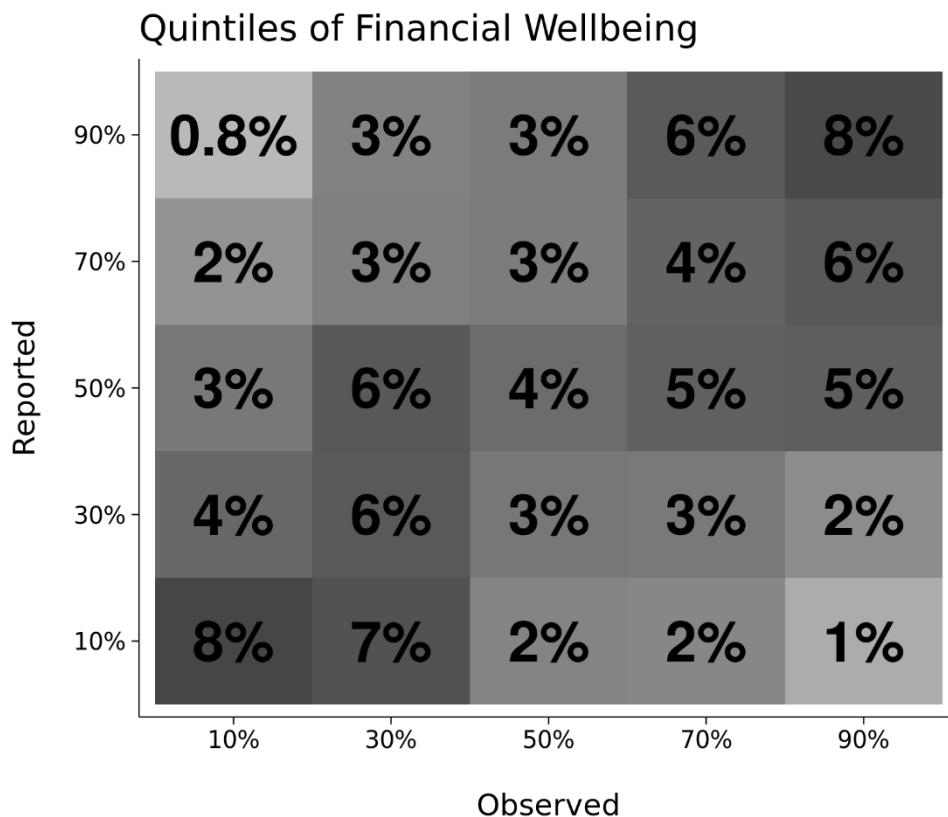
4.2 Distributions of Specific Financial Wellbeing Outcomes

Figure 4.4 shows the percentages of customers who gave each type of response to the 10 questions that make up the Reported Financial Wellbeing Scale or had each type of outcome for the five conditions that make up the revised Observed Financial Wellbeing Scale. Information for each question or bank-record measure is arranged as a stacked bar, with the worst financial wellbeing outcomes shown first, the next-worst outcomes shown second, and so on. Percentages of customers with each outcome are indicated within the bars (note that because of rounding, the percentages may not sum to 100). Conditions that are starred with an asterisk are reverse coded to allow comparability with the other indicators.

Everyday Financial Conditions

Nearly a quarter (23 per cent) of customers reported it was very difficult (seven per cent) or difficult (16 per cent) to meet necessary expenses in the preceding year. Another 41 per cent reported it was neither difficult nor easy, 23 per cent reported it was easy, and 13 per cent reported it was very easy to meet expenses.

Similar percentages of customers indicated that the statement about enjoying life because of the way they were managing their money did not apply to them or applied very little (25 per cent in the two lowest categories) or disagreed with the statement about being comfortable with their spending (24 per cent in the lowest two categories).

Figure 4.4 Distribution of Customers' Reported and Observed Financial Wellbeing Outcomes

Reported conditions

	Worst	2nd worst	Middle	2nd best	Best
How difficult was it for you to meet your necessary cost of living expenses?	7	16	41	23	13
I can enjoy life because of the way I am managing my money	8	17	45	26	5
My finances control my life*	10	19	35	27	10
I have money left over at the end of the month	10	19	30	23	17
Giving a gift ... would put a strain on my finances for the month*	7	12	27	32	22
I feel on top of my day to day finances	4	14	26	46	10
I am comfortable with my current levels of spending relative to the funds I have coming in	4	20	25	44	7
I could handle a major unexpected expense	19	18	38	19	6
I am securing my financial future	13	20	42	20	5
I am on track to have enough money to provide for my financial needs in the future	10	22	29	33	5

Observed conditions

	Worst	2nd worst	Middle	2nd best	Best
Payment problems (dishonours, declines, overlimits, payday loans, late fees and arrears)	8	17	38		37
Days in last year with liquid balances below one week s average expenses	12	17	23	24	24
Months spending more than 80% of inflows	13	33	26	20	8
Ability to cover expenses from available cash, savings and credit	12	19	24	25	20
Age-normed percentile of customer's median savings balance over last year	15	19	34	20	12

0%   25%   50%   75%   100%

■ Worst   ■ 2nd worst   ■ Middle   □ 2nd best   □ Best

Substantial minorities of respondents also said their finances often or always controlled their lives (29 per cent) or that they never or rarely had money left over at the end of the month (29 per cent). However, large percentages reported good outcomes for these conditions, with 37 per cent indicating that finances rarely or never controlled their lives and 40 per cent indicating that they often or always had money left over.

Few customers reported that giving a gift would always or often strain their monthly finances (19 per cent) or disagreed with the statement that they were on top of their finances (18 per cent). Majorities of customers gave positive responses for these conditions.

Rainy Day and One Day Financial Conditions

Much higher percentages of respondents said that they could not handle a major unexpected expense (37 per cent in the lowest two categories), could not secure their financial future (33 per cent in the lowest two categories), or were not on track to provide for future needs (32 per cent in the lowest two categories).

Overall, customers reported fewer problems in the everyday dimensions of meeting necessary expenses, having money left over, and being able to afford gifts, and more problems with the rainy day and one day conditions of being prepared for unexpected expenses, securing their financial futures, and being on track to provide for future needs. This is consistent with the CFPB (2017) and other researchers who have found that people tend to achieve financial wellbeing in day-to-day outcomes before achieving financial wellbeing for unexpected or future outcomes. Good rainy day and one day financial outcomes therefore indicate higher levels of financial wellbeing than good everyday outcomes.

The lower panel in Figure 4.4 shows how customers' *bank-record* financial wellbeing outcomes are distributed. Eight per cent of surveyed customers had chronic arrears or multiple severe payment problems, and another 17 per cent had severe payment problems or multiple moderate problems. However, 37 per cent had no payment problems.

About an eighth of customers had liquid balances below one week's expenses for 75 per cent of the year or more, and about a sixth had low balances for 50 to 75 per cent of the year. At the other end of the spectrum, 48 per cent of customers had low balances for less than 10 per cent of the year, and half of those always had balances above four weeks' expenses.

An eighth of customers spent more than 80 per cent of inflows for 11 or 12 months of the year, and a third spent more than 80 per cent of inflows for nine or 10 months. Only eight per cent of customers kept their spending below 80 per cent of inflows for nine or more months.

Many customers appeared to have difficulty raising one month's expenses from their available balances and credit if necessary—13 per cent could raise the money on less than 15 days during the year, 19 per cent could only do this on 16-90 days, and 24 per cent could do this on 91-330 days. The data also indicate that 15 per cent of customers had very low median daily savings balances, 19 per cent had low savings balances, 34 per cent had a moderate level of savings, 20 per cent had high savings, and 12 per cent had very high savings.

4.3 Distribution of Financial Wellbeing Outcomes by Descriptive Categories

Figure 4.5 shows how customers' specific financial wellbeing outcomes varied depending on their position within the Observed Financial Wellbeing Scale descriptive categories. The descriptive categories imply logical conditions on the component outcomes, and the figures help to show the range of conditions experienced by customers in each category.

Figure 4.5 Reported and Observed Financial Wellbeing Outcomes for Customers in Each Observed Financial Wellbeing Scale Descriptive Category

	Having trouble	Just coping	Getting by	Doing great
Reported conditions				
Difficulty meeting expenses	21 / 31 / 39 / 7 / 3	9 / 22 / 44 / 17 / 7	13 / 43 / 28 / 14	6 / 38 / 33 / 23
Enjoy life	22 / 29 / 39 / 9	10 / 23 / 46 / 19 / 3	4 / 13 / 48 / 30 / 5	7 / 43 / 40 / 8
Finances control my life*	22 / 25 / 32 / 14 / 8	13 / 24 / 36 / 20 / 7	7 / 17 / 35 / 30 / 11	5 / 11 / 34 / 37 / 13
Money left over	27 / 31 / 30 / 8 / 4	14 / 26 / 36 / 16 / 8	6 / 17 / 30 / 27 / 19	7 / 23 / 35 / 33
Gift would strain finances*	17 / 17 / 35 / 19 / 11	10 / 16 / 32 / 29 / 13	4 / 10 / 25 / 35 / 27	3 / 6 / 17 / 39 / 35
On top of finances	13 / 26 / 30 / 28 / 3	5 / 19 / 31 / 40 / 5	10 / 26 / 51 / 12	7 / 19 / 57 / 17
Comfortable with spending	10 / 29 / 28 / 31 / 3	5 / 26 / 30 / 35 / 4	18 / 24 / 47 / 8	11 / 19 / 57 / 11
Handle unexpected expense	44 / 22 / 25 / 6	28 / 24 / 34 / 11 / 3	12 / 18 / 44 / 20 / 6	4 / 10 / 41 / 34 / 11
Securing financial future	29 / 28 / 32 / 9 / 3	19 / 26 / 40 / 12 / 3	9 / 19 / 44 / 23 / 6	3 / 11 / 47 / 31 / 7
On track to provide for future	21 / 31 / 27 / 18	13 / 27 / 29 / 27 / 4	7 / 20 / 28 / 39 / 6	3 / 14 / 31 / 43 / 9
Observed conditions				
Payment problems	39 / 36 / 23	8 / 28 / 45 / 18	10 / 43 / 46	31 / 67
Low balances	66 / 33	10 / 39 / 45 / 6	4 / 27 / 53 / 15	14 / 85
Net spend	50 / 44 / 5	12 / 54 / 28 / 4	7 / 28 / 36 / 26 / 4	5 / 21 / 45 / 29
Cover unexpected expenses	63 / 32 / 4	12 / 45 / 32 / 8	5 / 40 / 42 / 13	33 / 65
Median savings	70 / 29	17 / 43 / 39	3 / 9 / 56 / 27 / 5	11 / 44 / 45

Legend: ■ Worst ■ 2nd worst ■ Middle ■ 2nd best □ Best

13   Improving the CBA-MI Observed Financial Wellbeing Scale

'Having Trouble' in Observed Financial Wellbeing

Customers in the lowest, 'having trouble', Observed Financial Wellbeing descriptive category have higher than average rates of the worst and second-worst outcomes for all the reported wellbeing conditions. They report fewer good financial outcomes than average, although modest proportions do report good outcomes. These customers also have very high rates of the worst bank-record outcomes, with 39 per cent having chronic arrears or multiple severe payment problems and half or more having the worst outcomes for the other measures. These customers also have higher than average rates of the second-worst bank-record outcomes.

'Just Coping' in Observed Financial Wellbeing

Reported financial wellbeing outcomes for customers in the second-lowest, 'just coping', category are slightly worse than those of the average customer. These customers also have somewhat lower than average rates of the worst outcomes for most of the bank-record conditions but much higher than average rates of the second-worst outcomes and slightly higher rates of the neutral outcomes. Nearly five-sixths of customers in this category had some type of payment problem, and almost none had the best outcomes for low balances, net spending, the ability to cover expenses, or median daily savings.

'Getting by' in Observed Financial Wellbeing

Reported financial wellbeing outcomes for customers in the second-highest, 'getting by', observed financial wellbeing category are better than those of the average customer. They have lower than average rates of the worst and second-worst reported outcomes and higher than average rates of the second-best and best reported outcomes. Very few customers in this category have the worst bank-record outcomes, and customers have very low rates of the second-worst outcomes. Just under half the customers in this category had no payment problems, and more than half had best or second-best outcomes for low balances and the ability to cover unexpected expenses.

'Doing Great' in Observed Financial Wellbeing

Customers in the highest, 'doing great', category indicate experiencing the worst and second-worst outcomes at much lower rates than average for all the reported wellbeing conditions. They also report lower than average rates of neutral outcomes for the everyday conditions and higher than average rates of neutral outcomes for the rainy and one day conditions. They have higher rates of the best and second-best reported outcomes.

No customers in this category have the worst outcome in any of the observed financial wellbeing conditions, and only a few have the second-worst outcomes. Only a third have any payment problems, and more than half have the best outcomes for low balances and the ability to cover unexpected expenses.

5. Associations between Financial Wellbeing and People's Characteristics

In an earlier report (Comerton-Forde et al. 2018), we developed a conceptual model of how people's financial wellbeing is determined. In the model, financial wellbeing is an outcome that results directly from people's financial behaviours, including their spending, saving, borrowing, discipline, management, planning, and budgeting. Behaviours are influenced by people's personal characteristics, household situations, resources, capabilities, needs, preferences, and attitudes. These characteristics can also directly affect financial wellbeing. Financial wellbeing and behaviours also depend on conditions that are external to the person and his or her household, such as the surrounding economic conditions and access to financial services and products. The major elements in our model and their relationships are summarised in Figure 5.1.

Figure 5.1 Conceptual Model of the Determinants of Financial Wellbeing
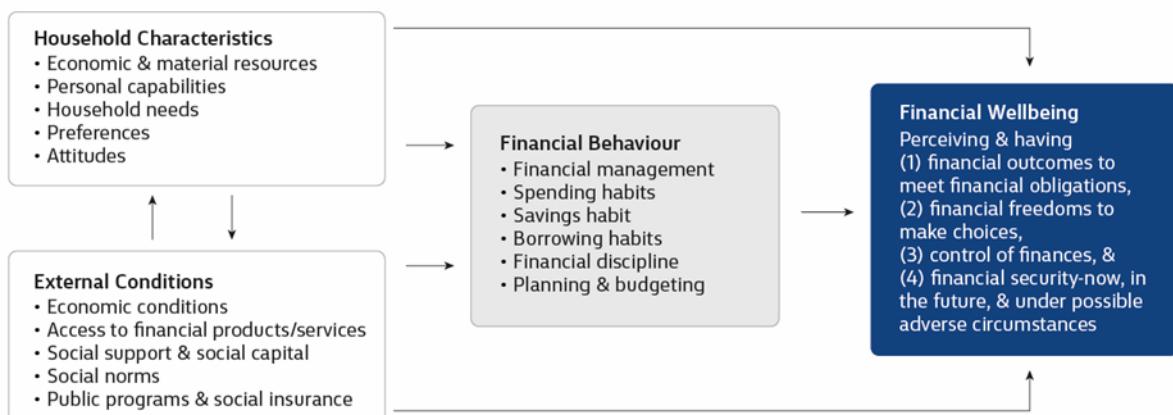
The conceptual model helps us understand the properties of financial wellbeing and to distinguish financial wellbeing from the conditions and behaviours that contribute to it. The model also gives us a framework for validating our scales of financial wellbeing by empirically examining how people's characteristics, conditions, and behaviours are associated with their financial wellbeing. We report those associations in this section.

5.1 Comparisons of Full Distributions

We begin our analysis by showing the full distributions of the Reported and Observed Financial Wellbeing Scales for customers who differ in terms of a few characteristics that can be described in terms of two or three mutually exclusive outcomes, such as gender (men or women) or metropolitan residence (metropolitan and non-metropolitan).

Figure 5.2 shows the percentages of women and men with different values of the Reported and Observed Financial Wellbeing Scales. Financial wellbeing tends to be lower for women. Women are uniformly more likely than men to have low levels of reported financial wellbeing and less likely to have high levels. There is also a relationship for observed financial wellbeing, but it is weaker and less uniform. Women are more likely than men to

have moderately low values of observed financial wellbeing; men are more likely than women to have moderately high values; but women and men are equally likely to have extremely high or low values.

Figure 5.2 Financial Wellbeing for Women and Men

**Figure 5.2 Financial Wellbeing for Women and Men**
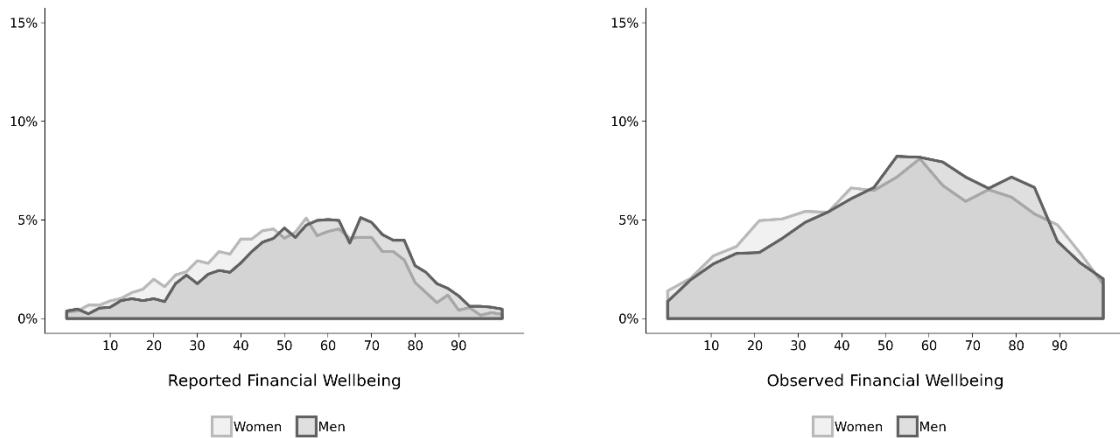
Figure 5.3 shows the distributions of reported and observed financial wellbeing for customers who live in and outside metropolitan areas. There is a modest tendency for metropolitan residents to have better reported and observed financial wellbeing.

Figure 5.3 Financial Wellbeing by Metropolitan Residence

Figure 5.3 Financial Wellbeing by Metropolitan Residence
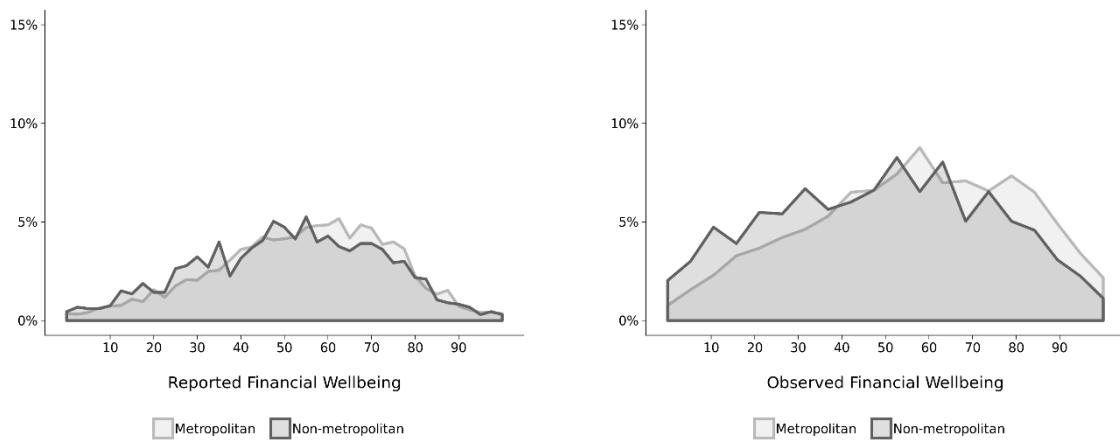
Figure 5.4 shows how the financial wellbeing scale values differ for people who own their homes outright without a mortgage, who own homes but hold a mortgage, and who do not own their homes. People who own their homes outright are uniformly more likely to have higher reported and observed financial wellbeing, while people who do not own their homes are almost uniformly more like to have lower reported and observed wellbeing. The lone exception to the pattern is that non-home-owners are as likely as mortgaged home owners to be in the highest observed financial wellbeing category.

Figure 5.4 Financial Wellbeing by Home Ownership
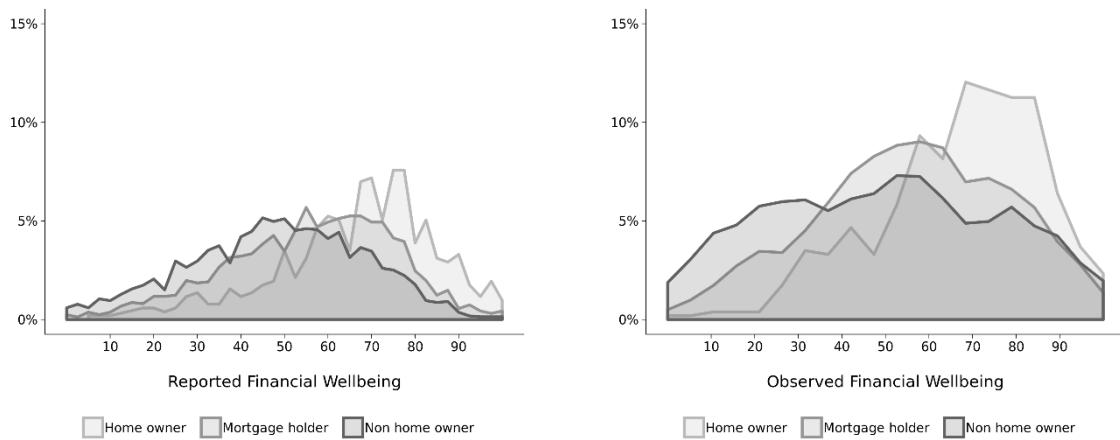
Figure 5.5 shows the distributions of reported and observed financial wellbeing among people who do and do not report having a long-term health condition, impairment, or disability that restricts their everyday activities. Both types of financial wellbeing are lower among people with limiting health conditions.

Figure 5.5 Financial Wellbeing by Limiting Health Conditions
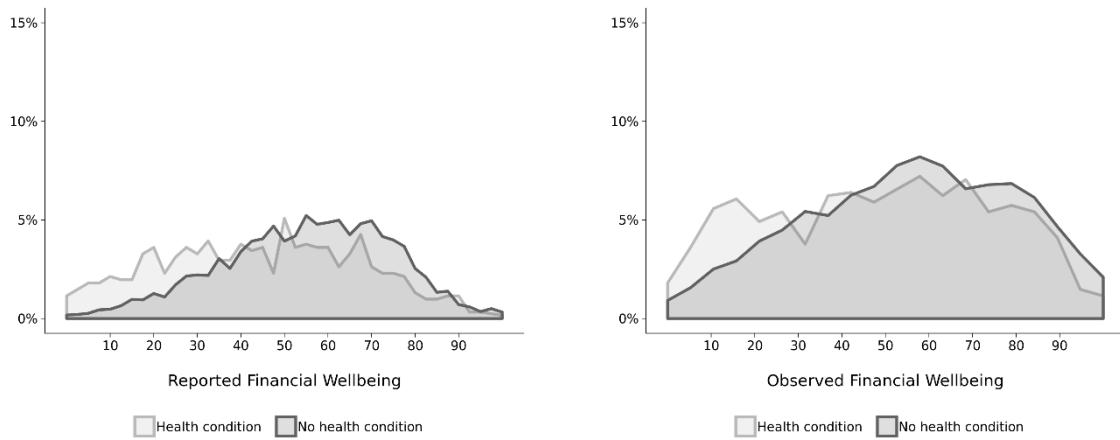
The top panels of Figure 5.6 show the distributions of reported and observed financial wellbeing for customers who did and did not report experiencing a major worsening in their financial situation over the preceding year, while the bottom panels show the distributions for customers who did and did not report a major improvement. A major worsening in financial circumstances is strongly associated with worse reported and observed financial wellbeing. Major improvements are moderately associated with better reported financial wellbeing but not consistently associated with better observed financial wellbeing.

Figure 5.6 Financial wellbeing by major changes in financial situation
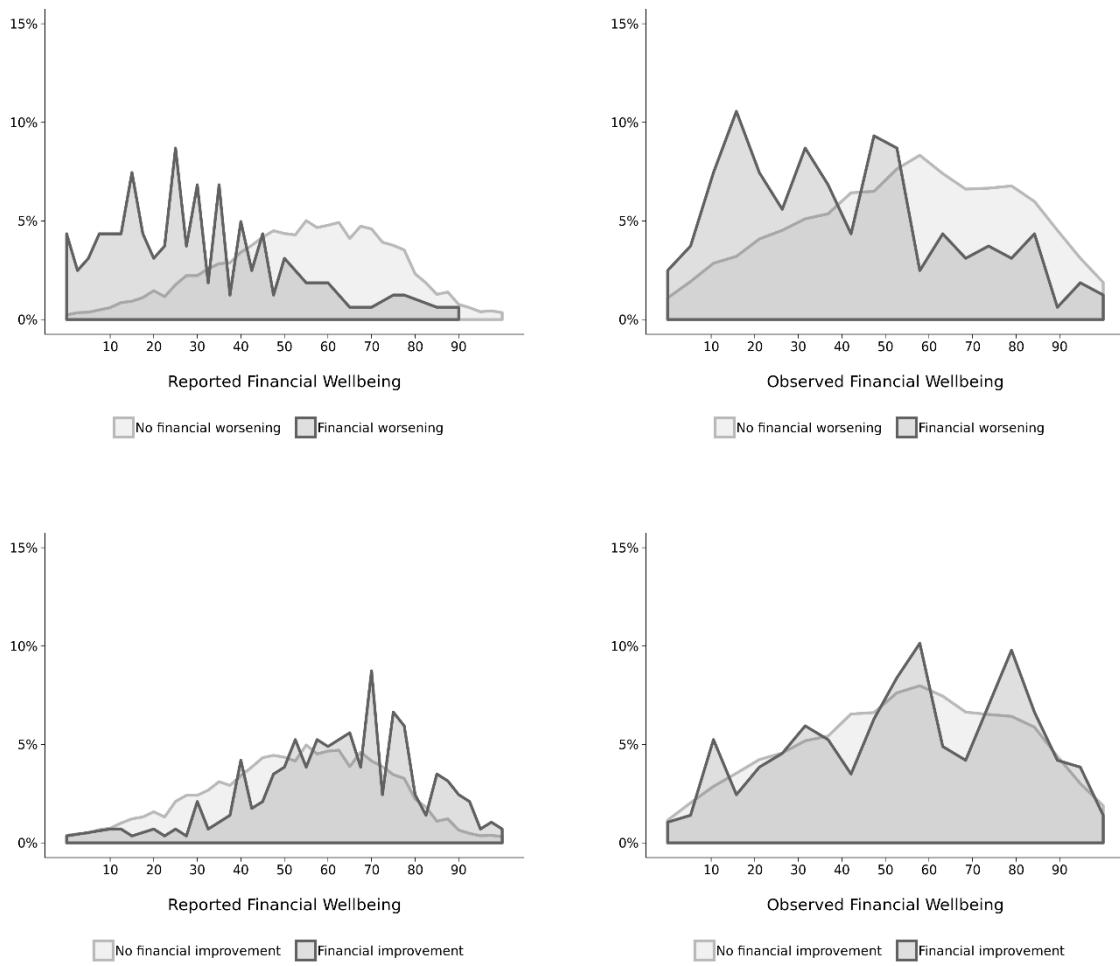
5.2 Correlations with Characteristics

The preceding figures show how reported and observed financial wellbeing differ at all parts of their distributions between customers with different characteristics. These comparisons are very comprehensive, but they are hard to produce for characteristics with more than a few outcomes. It is also difficult to compare relationships across characteristics.

A more compact and comparable way to describe the relationships is by calculating correlations; these are reported in Table 5.1. The table reports Spearman rank correlations, which capture in one simple number (ranging from -1 to +1) whether there is a monotonic relationship between two variables—that is, whether one variable tends to increase or decrease together. A correlation of +1 means that both variables always increase together; a correlation of -1 means that one variable always decreases as the other one increases; and a correlation of 0 means that increases or decreases in both variables are unrelated.

The table's first column of numbers lists the rank correlations between the characteristics and the Reported Financial Wellbeing Scale, and the second column list the rank correlations for the revised Observed Financial Wellbeing Scale. The rows of Table 5.1 list a

series of characteristics. Customers' personal and household characteristics appear first; their external conditions and events appear next; and their financial behaviours appear last. We consider correlations with absolute values between zero and 0.1 to be weak, between 0.1 – 0.3 to be modest (highlighted in light gold ▢), and larger than 0.3 to be strong (highlighted in gold ■). We only report correlations that at least a 95 percent chance of being different from zero (p-values smaller than 0.05).

Personal and household characteristics

Total household income is a key economic resource, and consistent with this, customers' household incomes are positively related with reported and observed financial wellbeing. The relationship is strong for reported financial wellbeing and moderately strong for observed financial wellbeing.

Another key resource is customers' assets, which increase their wealth. The amounts of bank deposits, superannuation balances, mortgage offsets, and investments are all positively associated with financial wellbeing. Bank deposits—the most widely held asset in our analysis—have an especially strong association with financial wellbeing.

Conversely, loan balances reduce customers' wealth. The estimates indicate that credit card and personal loan balances are negatively associated with observed financial wellbeing, but they have no relationship with reported financial wellbeing. Mortgage and investment loans are positively associated with both reported and observed financial wellbeing. The unexpected relationships may reflect the positive effects of either the assets that underlie these loans or the financial characteristics of customers that allow them to take out loans.

Housing can be a source of wealth which would add to financial wellbeing, but it can also increase expenses which would reduce financial wellbeing. Consistent with this, home ownership is moderately associated with financial wellbeing, though less strongly so for home owners with mortgages. The amount of monthly rent or mortgage payments is negatively associated with both types of financial wellbeing. Financial wellbeing is even more strongly associated with customers' reported difficulty in meeting their housing costs.

Most people obtain their incomes from employment. Full-time employment is associated with higher reported financial wellbeing, though not with higher observed financial wellbeing. Most types of limited work and non-employment are negatively associated with financial wellbeing. The exceptions to this pattern are full and semi-retirement situations, which are positively associated with financial wellbeing. Also, non-working student status is positively associated with observed financial wellbeing.

In addition to their financial resources, people's personal resources and capabilities are likely to affect financial wellbeing. The estimates indicate that more education and better general health are strongly positively associated with reported financial wellbeing and moderately positively associated with observed financial wellbeing, while disability and mental distress are negatively associated with both types of financial wellbeing. Unpaid care responsibilities, especially those that affect work, are also associated with lower financial wellbeing. The capacity to understand finances is strongly positively associated with reported financial wellbeing but less strongly associated with observed financial wellbeing.

Table 5.1 Correlations of Characteristics with Reported and Observed Financial Wellbeing

Variable	Reported Financial Wellbeing	Observed Financial Wellbeing
Personal and household characteristics		
Total household income per year	0.373	0.197
Total bank deposits	0.477	0.549
Total superannuation	0.299	0.129
Total credit card or personal loans	n.s.	-0.078
Total mortgages/investment loans	0.131	0.071
Total mortgage offset	0.177	0.122
Total investment portfolio	0.232	0.149
Home owner	0.281	0.226
Mortgage holder	0.103	0.047
Non-home owner	-0.231	-0.154
Rent/mortgage per month	-0.097	-0.154
Difficulty with mortgage/rent	-0.429	-0.302
Full-time worker	0.097	n.s.
Part-time worker	-0.075	-0.051
Unemployed	-0.145	-0.080
Not working, home duties	-0.059	-0.093
Other work status	-0.100	-0.051
Not working, student	-0.070	0.038
Semi-retired	0.092	0.045
Retired	0.153	0.121
Highest education	0.218	0.237
General health	0.325	0.137
Disability	-0.170	-0.087
Disability impacts work	-0.294	-0.127
Mental distress	-0.493	-0.182
Find finances confusing	-0.424	-0.177
Understand financial products	0.279	0.046
Control in life	0.457	0.145
Clear savings goal	0.357	0.200
Prefer not living on credit	0.154	0.238
Financial situation will look after itself	0.130	n.s.
People in household	-0.072	-0.052
Dependent children at home	-0.098	-0.167
Single	-0.075	n.s.
Not living with a partner	-0.081	-0.089
In de facto or cohabiting relationship	-0.031	-0.037
Married	0.162	0.071

Variable	Reported Financial Wellbeing	Observed Financial Wellbeing
Widowed	n.s.	n.s.
Provide unpaid care	-0.049	-0.069
Unpaid work impacts earning income	-0.274	-0.188
Male	0.126	0.045
Age	0.107	n.s.
Immigrant	n.s.	0.067
Metropolitan resident	0.069	0.128
External conditions and events		
Financial improvement	0.120	n.s.
Financial worsening	-0.206	-0.104
Fired	-0.097	-0.043
Promoted	0.065	n.s.
Retired	0.063	0.051
Separated from partner	-0.113	-0.090
Illness/injury of self	-0.120	-0.070
Social contact	0.303	0.166
Social support in crisis	0.070	0.049
Did not need comm./gov. support	0.301	0.191
Needed support but had no access	-0.291	-0.143
Used comm./gov. support but not reliant	-0.091	-0.072
Used specialised comm./gov. support	-0.088	n.s
Used emergency comm./gov. support	-0.096	-0.112
Financial behaviours		
Term deposit	0.166	0.184
Credit card	0.160	0.105
Personal/car loan	-0.199	-0.305
Mortgage for own home	0.068	n.s.
Mortgage offset account	0.191	0.175
Mortgage for investment property	0.152	0.117
Share investment portfolio	0.223	0.129
Car insurance	0.102	0.051
Home and contents insurance	0.153	0.077
Life or health insurance	0.067	n.s.
Number of banks	0.102	-0.043
Make sure to have money for bad times	0.635	0.534
Try to save money to fall back on in future	0.495	0.447
Try to save money regularly	0.410	0.371
Good job balancing spending and savings	0.578	0.414

Variable	Reported Financial Wellbeing	Observed Financial Wellbeing
Run short on money because overspend	-0.424	-0.322
Buy things but cannot afford them	-0.254	-0.207
Organised managing money day-to-day	0.461	0.304
Plan for financial future	0.451	0.256
Regularly sit down and review finances	0.273	0.112
Credit card management	0.296	0.262
Willing to sacrifice now to secure future	0.218	0.163
Put off making financial decisions	-0.291	-0.107
Approach to budgeting	0.120	0.048

Notes: Table reports rank correlation coefficients of the listed characteristics with each measure of financial wellbeing.

n.s.   Not significantly different from zero (p-value greater than 0.05).

☐   Modest correlation (absolute value between 0.1 and 0.3).

☐   Strong correlation (absolute value greater than 0.3).

Other personal characteristics include people's attitudes and preferences. The strength of customers' feeling of choice and control in their lives is positively associated with financial wellbeing. Clear savings goals and preferences for not living on credit also have moderate to large positive correlations. An attitude that a customer's financial situation will look after itself is positively associated with reported financial wellbeing but is unrelated to observed financial wellbeing.

Customers' demographic characteristics generally have modest associations with reported and observed financial wellbeing. Both types of financial wellbeing are higher for men, immigrants, and metropolitan residents. Observed financial wellbeing is positively associated with age, but reported wellbeing is not. Both types of financial wellbeing decrease with the number of people in the household and with the number of dependent children living at home. However, other aspects of household composition beyond just the number of people are also important. Being married is positively associated with reported and observed financial wellbeing, whereas living in a de facto relationship or not living with a partner are associated with lower financial wellbeing.

External conditions and events

The next panel in Table 5.1 lists results for external conditions and events. The positive events of a major financial improvement or a job promotion are positively correlated with reported financial wellbeing but not strongly correlated with observed financial wellbeing. The event of entering retirement is modestly positively associated with both types of financial wellbeing, while the negative events of a major financial worsening, being fired, separating from a partner, and suffering an illness or injury are negatively associated with both types of financial wellbeing.

Higher levels of social contacts and higher availability of social support in a crisis are positively associated with financial wellbeing, but the actual use of government or social support is negatively associated.

Financial behaviours

The last panel in Table 5.1 lists results for customers' financial behaviours, which our conceptual model places as the proximate determinants of financial wellbeing. The number of customers' banking relationships is positively associated with their reported financial wellbeing but negatively associated with their observed financial wellbeing. More banking relationships may reduce our ability to characterise financial wellbeing through CBA's customer records.

Holding term deposits, credit cards, mortgage offset accounts, mortgage investment loans, and car, home/contents, life, or health insurance are positively associated with both types of financial wellbeing. A mortgage for a customer's own home is positively associated with reported financial wellbeing but not with observed financial wellbeing. Holding a personal or car loan is negatively associated with both types of financial wellbeing.

Strong savings habits, positive spending behaviours, good financial management, good credit card management, making sacrifices for the future, and active financial planning and budgeting are all positively associated with reported and observed financial wellbeing. Many of these correlations are exceptionally strong. Indeed, the correlations for doing a good job balancing spending and savings and for building savings for bad times are among the highest that we estimated.

6. Multivariate Analysis

The correlations that we reported and analysed in the preceding section measure the total, *unconditional* association between people's measured characteristics and their financial wellbeing. A limitation of a correlation analysis is that it considers the associations between each characteristic and financial wellbeing separately and does not consider interrelationships between the characteristics. For example, people with mortgage amounts are likely to have higher incomes than other people, and higher incomes are likely to be associated with higher financial wellbeing. The estimated correlation between mortgages and financial wellbeing does not account for this interrelationship and might show a positive result because of the mutual positive associations of the two measures with income. Multivariate regression analyses address this issue. The estimates from these analyses better estimate the partial, or direct, association between each measured characteristic and financial wellbeing, *conditioning* on the associations of all the other measured characteristics.

For the multivariate regression analyses below, we change the way in which we analyse the data compared to the correlation analyses in Section 5. First, we have not included the amounts of bank deposits, superannuation balances, mortgage offsets, and investments in our analyses, because we consider these as potential financial wellbeing *outcomes*, rather than determinants of financial wellbeing. In multivariate analyses, including variables that

measure financial wellbeing as explanatory variables complicates the interpretation of all other results. However, we do account for whether people hold any of these assets at all, because this might capture important differences in access to financial products.[1] Second, we have removed observations from the sample if they are missing information regarding the measured characteristics, reducing our analysis sample size to 3,836 observations (from 4,770). Third, we have transformed some measures of characteristics to make their partial associations with financial wellbeing more directly interpretable.

Results from multivariate regressions of the Reported and Observed Financial Wellbeing Scales on our set of measured characteristics are reported in Table 6.1. As with the correlation analyses in Table 5.1, the characteristics are listed in the rows and organised into personal and household characteristics in the top section, external conditions and events in the middle section, and financial behaviours in the last section. The first two columns report the estimated regression coefficients (measures of partial association) and p-values of a t-test of the null hypothesis that the coefficient is equal to zero against a two-sided alternative hypothesis (measures of statistical importance) for reported financial wellbeing and the listed characteristics. The second two columns report the estimated regression coefficients and p-values for observed financial wellbeing and the characteristics. We focus our discussion of Table 6.1 on the coefficients that are statistically significant (p-value < 0.05, marked with a *) or that change substantially relative to the correlation analyses in Table 5.1.

Personal and household characteristics

The first row in Table 6.1 reports the partial association between total household income and the two scales of financial wellbeing. We have transformed the income measure by taking its natural logarithm. This leads to dollar changes in income having smaller effects on the transformed value as income increases. For small changes, the coefficients approximate the change in financial wellbeing that would occur with a percentage change in household income. The estimates show that, after holding other characteristics constant, a one percent increase in income is, on average, associated with a 0.018-point increase in reported financial wellbeing and a 0.014-point increase in observed wellbeing. A change from $20,000 to $40,000 is associated with a 1.3-point increase in reported financial wellbeing and a 1.01-point increase in observed financial wellbeing. A change from $20,000 to $100,000 is associated with a 2.9-point increase in reported financial wellbeing and a 2.4-point increase in observed financial wellbeing. These are relatively modest changes.[2]

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[1] Our other results do not change much if we exclude these measures.

[2] The multivariate analyses include respondents who did not report their total household incomes. This issue of non-reporting is well known in surveys (see Vermeulen 2016). Incomes are a sensitive topic, and many people are uncomfortable revealing this information. Our models include an indicator variable for non-reporting to account for the possibility that this behaviour occurs non-randomly. This method has the effect of assuming that everyone who does not report their income has a conditional average income.

Table 6.1 Regression Model Estimates of the Associations of Characteristics with Reported and Observed Financial Wellbeing

Coefficient	Reported Financial Wellbeing		Observed Financial Wellbeing	
	Coefficient	p-value	Coefficient	p-value
Personal and household characteristics				
Logarithm of total household income	1.822*	(0.000)	1.461*	(0.003)
Home owner	2.098*	(0.014)	5.696*	(0.000)
Mortgage holder	-0.059	(0.941)	2.409*	(0.067)
Rent/mortgage per month	0.104*	(0.001)	-0.019	(0.706)
Difficulty with mortgage/rent	-3.534*	(0.000)	-1.659*	(0.000)
Part-time worker	0.019	(0.971)	-0.471	(0.596)
Unemployed	-2.515*	(0.020)	-4.962*	(0.005)
Not working, home duties	0.932	(0.395)	-3.730*	(0.039)
Other work status	-1.464	(0.120)	-1.108	(0.475)
Not working, student	-0.700	(0.400)	1.979	(0.150)
Semi-retired	-0.565	(0.668)	-2.303	(0.289)
Retired	-2.000	(0.060)	-0.074	(0.966)
Highest education	0.179	(0.086)	1.229*	(0.000)
General health	0.606*	(0.007)	-0.466	(0.208)
Disability	2.847	(0.064)	-1.061	(0.676)
Disability impacts work	-0.790	(0.115)	0.280	(0.735)
Mental distress	-0.456*	(0.000)	-0.088	(0.256)
Find finances confusing	-1.447*	(0.000)	0.120	(0.763)
Understand financial products	0.643*	(0.010)	-1.354*	(0.001)
Control in life	1.324*	(0.000)	-0.543*	(0.007)
Clear savings goal	0.539*	(0.028)	-0.530	(0.189)
Prefer not living on credit	-0.203	(0.329)	1.124*	(0.001)
Financial situation will look after itself	3.001*	(0.000)	0.086	(0.799)
People in household	-0.420	(0.087)	0.463	(0.253)
Dependent children at home	-0.669	(0.055)	-3.339*	(0.000)
Single	-0.154	(0.781)	1.076	(0.238)
Not living with a partner	0.249	(0.767)	0.378	(0.785)
In de facto or cohabiting relationship	-0.795	(0.148)	-1.066	(0.239)
Widowed	-0.044	(0.977)	1.548	(0.537)
Provide unpaid care	1.321	(0.158)	0.434	(0.779)
Unpaid work impacts earning income	-0.655	(0.109)	-0.896	(0.184)
Male	1.568*	(0.000)	-0.648	(0.315)
Age	-0.369*	(0.000)	-0.473*	(0.003)
Age squared	0.003*	(0.010)	0.004*	(0.050)
Immigrant	0.504	(0.233)	1.445*	(0.038)
Metropolitan resident	-0.279	(0.499)	1.727*	(0.011)

Coefficient	Reported Financial Wellbeing		Observed Financial Wellbeing	
	Coefficient	p-value	Coefficient	p-value
External conditions and events				
Financial improvement	3.272*	(0.000)	-3.311*	(0.007)
Financial worsening	-6.424*	(0.000)	-1.540	(0.362)
Fired	-0.759	(0.412)	1.329	(0.384)
Promoted	1.175*	(0.045)	0.017	(0.986)
Retired	1.054	(0.388)	1.768	(0.380)
Separated from partner	0.130	(0.894)	-3.999*	(0.013)
Illness/injury of self	-0.451	(0.575)	-2.101	(0.114)
Social contact	0.163	(0.466)	0.142	(0.701)
Social support in crisis	0.529*	(0.004)	-0.065	(0.830)
Comm./gov. support needed but no access	-4.824*	(0.000)	-3.114*	(0.007)
Used comm./gov. support but not reliant	-1.751*	(0.023)	-4.265*	(0.001)
Used specialised comm./gov. support	-2.128	(0.113)	-2.453	(0.268)
Used emergency comm./gov. support	-3.860*	(0.014)	-14.538*	(0.000)
Financial behaviours				
Term deposit	1.338	(0.066)	6.833*	(0.000)
Credit card	-3.852*	(0.000)	-7.088*	(0.000)
Personal/car loan	-1.481*	(0.003)	-7.303*	(0.000)
Mortgage for own home	0.762	(0.331)	0.812	(0.530)
Mortgage offset account	-0.109	(0.867)	4.042*	(0.000)
Mortgage for investment property	1.272	(0.075)	1.438	(0.222)
Share investment portfolio	2.674*	(0.000)	-0.080	(0.945)
Car insurance	-0.102	(0.831)	1.308	(0.096)
Home and contents insurance	0.409	(0.465)	0.090	(0.922)
Life or health insurance	-0.437	(0.458)	1.385	(0.154)
Number of banks	-0.134	(0.570)	-2.458*	(0.000)
Make sure to have money for bad times	4.378*	(0.000)	4.823*	(0.000)
Try to save money to fall back on in future	0.355	(0.177)	1.666*	(0.000)
Try to save money regularly	-0.240	(0.318)	1.017*	(0.010)
Good job balancing spending and savings	2.091*	(0.000)	1.532*	(0.001)
Run short on money because overspend	-1.658*	(0.000)	-1.544*	(0.000)
Buy things but cannot afford them	0.135	(0.553)	-0.726	(0.053)
Organised managing money day-to-day	0.194	(0.459)	-0.235	(0.587)
Plan for financial future	2.480*	(0.000)	0.343	(0.471)
Regularly sit down and review finances	-0.148	(0.504)	-1.161*	(0.002)
Credit card management	0.977*	(0.000)	2.711*	(0.000)
Willing to sacrifice now to secure future	-0.572*	(0.026)	-0.872*	(0.040)
Put off making financial decisions	-0.730*	(0.001)	0.632	(0.084)
Approach to budgeting	-0.898*	(0.001)	-0.643	(0.135)

Notes: Table reports coefficients and p-values (in parentheses) from regressions of the financial wellbeing scales on the listed characteristics. In addition to the listed characteristics, the regressions include intercepts and indicators for the non-report of income, education, social contact, and social support.
* p-value < 0.05

As with the correlation analyses, owning a home without a mortgage is associated with higher reported and observed financial wellbeing compared to not owning. However, unlike those analyses, the multivariate results indicate that this difference is much stronger for observed (5.7 points) than reported (2.1 points) financial wellbeing. Home owners with a mortgage also have higher observed financial wellbeing compared to non-owners. Higher rent or mortgage payments are associated with higher reported financial wellbeing but not associated with observed financial wellbeing. The positive association with reported financial wellbeing might reflect home owners adding to their net wealth though higher mortgage payments. Housing wealth likely contributes to reported financial wellbeing, but it is not captured in our measure of observed financial wellbeing. Increased difficulty with rent or mortgage payments is strongly negatively associated with both reported and observed financial wellbeing.

Reported and observed financial wellbeing are lower among unemployed people than among full-time workers (-2.5 and -5 points, respectively). Observed financial wellbeing is also lower among people who do not work because of care responsibilities. Unlike the correlation analyses, none of the other work statuses has a statistically strong association with either type of financial wellbeing. The change in results may occur because these other statuses are associated with age, income, or family status.

The partial association between education and financial wellbeing largely disappears for reported financial wellbeing after accounting for differences in related characteristics but is still present for observed financial wellbeing. An additional year of education is associated with a 1.2-point increase in observed wellbeing.

After holding constant related characteristics, better general health is associated with higher reported financial wellbeing, and greater mental distress is associated with lower reported financial wellbeing. However, neither of these characteristics is associated with observed financial wellbeing.

People who find finances confusing have lower reported financial wellbeing than others, but there is no relationship with observed financial wellbeing. Understanding financial products is positively related to reported financial wellbeing but *negatively related* to observed financial wellbeing. These discordant relationships can arise if, after holding other characteristics constant, people who report understanding financial products feel more confident about their financial decision-making (captured in their reported wellbeing) but sometimes make more mistakes or take more risks managing their finances (captured in their observed wellbeing).

Among our attitudinal measures, a greater sense of control in life being, clear savings goals, and feeling that one's financial situation will look after itself are all positively related to

reported financial wellbeing. The latter two characteristics are not related to observed wellbeing, but control in life is slightly *negatively related* to observed wellbeing. As with financial understanding, this puzzling result might occur if, after conditioning on other characteristics, a greater sense of control leads to overconfidence and more financial risks or mistakes. People who prefer not living on credit have higher observed financial wellbeing but not reported financial wellbeing.

As with the correlation analyses, people's demographic characteristics have modest associations or no associations with financial wellbeing in our multivariate analyses. The number of people in a household is only weakly related to reported wellbeing and no longer associated with observed wellbeing. However, the number of dependent children at home is strongly negatively associated with observed financial wellbeing and weakly associated with reported financial wellbeing. Conditional on household size, the number of dependents, and other characteristics, we find little association between partnership status or caring responsibilities and financial wellbeing.

Reported financial wellbeing is 1.6 points higher for men than for women, but there are no statistically appreciable gender differences in observed financial wellbeing. Age has U-shaped associations (captured by the linear and squared terms in the regressions) with reported and observed financial wellbeing. The coefficients on the age terms imply that both financial wellbeing measures decrease with age until around age 65 and increase thereafter. Immigrants have a 1.4-point advantage in observed financial wellbeing compared to non-immigrants; however, unlike our correlation analyses, immigrants do not have an advantage in reported financial wellbeing. Similarly, metropolitan residents have higher observed financial wellbeing but not reported financial wellbeing.

External conditions and events

The first two lines of the second panel in Table 6.1 show that, after holding constant differences in other related characteristics, customers who report a recent financial improvement have higher reported financial wellbeing but *lower* observed financial wellbeing than other customers. Reciprocally, customers who recently had a financial worsening have much lower reported wellbeing but do not have a statistically significant difference in their observed wellbeing. These discordant results could arise if, for example, customers who report an improvement, immediately take up that slack by increasing their spending, which increases their financial enjoyment (reflected in the reported scale) but appear as overstretching their budget (reflected in the objective scale). Most of the other specific life events that we examine are unrelated to financial wellbeing. The exceptions are being promoted, which is associated with a 1.2-point increase in reported wellbeing, and partner separation, which is associated with a 4-point decrease in observed financial wellbeing. Again, the associations are net of any changes in income or mental health, which our model already considers.

In contrast to the associations in Table 5.1, stronger social contacts are no longer associated with financial wellbeing after holding constant other related characteristics. Having access to social support in a crisis is positively related to reported financial wellbeing but unrelated to observed financial wellbeing. The associations with community and government support are much larger. People who say they needed but could not access community or

government support have reported financial wellbeing that is 4.8 points lower and observed financial wellbeing that is 3.1 points lower than people who did not need this support at all. People who use community or government support occasionally also have lower reported and observed financial wellbeing compared to people who did not need support. Use of emergency support is associated with a 3.9-point drop in reported financial wellbeing and a sizeable 14.5-point drop in observed financial wellbeing. The large negative association with emergency support is not surprising, as this assistance is only provided to people with limited financial resources who have also suffered a crisis life event, such as homelessness or domestic violence.

Financial behaviours

The last panel in Table 6.1 shows that many financial behaviours are strongly related to financial wellbeing, even after holding constant other characteristics. Having term deposits and mortgage offset accounts is positively related to observed financial wellbeing, while having credit cards and personal loans is negatively related to both reported and observed wellbeing. Holding share products is positively related to reported, but not observed, financial wellbeing. Other types of financial products, including mortgages and insurance, do not have strong associations with the scales.

As with the correlation analyses, the multivariate analyses indicate that the number of banks that a customer uses is negatively associated with observed financial wellbeing. However, the number of banks is not associated with reported financial wellbeing. More banking relationships may mean that fewer financial resources are held within CBA accounts, leading to a negative relationship with the objective measure, which is based only on those accounts.

Precautionary savings for 'bad times' have an especially strong positive association with reported and observed financial wellbeing. Trying to save for future expenditure and trying to save regularly are also positively related to observed financial wellbeing, but not to reported financial wellbeing. All three types of savings behaviour are closely related. The weak associations for the other two types of savings behaviours in the multivariate analysis likely occur because almost everyone who saves for precautionary reasons also saves for these other reasons.

After accounting for other characteristics, doing a good job at balancing spending is positively associated with lower financial wellbeing, whereas overspending is associated with lower financial wellbeing. The multivariate analyses also indicate that financial forward planning is positively related to reported financial wellbeing. In contrast to the correlation analyses, the multivariate analyses indicate that regularly reviewing one's finances is *negatively* associated with observed financial wellbeing. This negative association could occur if low balances or other financial problems cause people to check their finances more frequently.

The multivariate estimates reproduce the finding from the correlation analyses that better credit card management is associated with higher reported and observed financial wellbeing. However, after accounting for other characteristics, willingness to make sacrifices today to secure one's financial future has *negative* associations with reported and observed

wellbeing, and having a more formal approach to budgeting (i.e., using mental or actual budgeting tools) is negatively associated with reported financial wellbeing. The association may reflect other aspects of people's financial situations that we are not able to measure, such as strained circumstances, that lead people to sacrifice, budget, or review their finances. Putting off financial decisions is negatively related to reported financial wellbeing.

7. Conclusion

7.1 Improving Our Measure of Observed Financial Wellbeing

In an earlier analysis (Comerton-Forde et al., 2018), researchers from Commonwealth Bank of Australia and the Melbourne Institute developed two multi-item scales of Australians' financial wellbeing: the CBA-MI Reported Financial Wellbeing Scale that drew on self-reports of people's experiences of financial outcomes and the CBA-MI Observed Financial Wellbeing Scale (version 1) that used bank-record indicators of financial outcomes. Each scale had strong measurement properties, but the properties of version 1 of the Observed Financial Wellbeing Scale were not as good as those of the Reported Financial Wellbeing Scale.

This report describes how we developed a second, improved version of the Observed Financial Wellbeing Scale. Version 2 of the CBA-MI Observed Financial Wellbeing Scale is the sum of outcomes from five categorical measures constructed from bank-record data, which describe customers' payment problems, frequency of low liquid balances, net spending, ability to raise funds for an unexpected expense, and savings balances. The new component measures include more outcomes than the earlier measures and describe more good financial outcomes, which produces a scale with less skew. The revised scale also has higher reliability than the original scale and, with 20 possible outcomes, has higher resolution.

As with the Reported Financial Wellbeing Scale, Version 2 of the Observed Financial Wellbeing Scale can be used to describe four categories of financial wellbeing. For both scales, the categories are defined as:

- 'Having trouble' – scores that imply that people experienced the worst possible outcome for one or more financial wellbeing conditions;
- 'Just coping' – scores that imply that people experienced a negative (worst or second worst) outcome for one or more conditions;
- 'Getting by' – scores that imply that the averages of a person's outcomes were in the neutral or second-highest categories for the respective measures; and
- 'Doing great' – scores that imply that people experienced the best possible outcome for one or more conditions.

We analyse data from an on-line survey of bank customers for whom CBA was their main financial institution. These customers tended to report or have slightly more neutral and positive financial outcomes than negative ones. For Version 2 of the Observed Financial Wellbeing Scale, 18.4 per cent of customers are categorised as 'having trouble'; 31.3 per cent, as 'just coping'; 35.1 per cent, as 'getting by'; and 15.2 per cent, as 'doing great'. For the Reported Financial Wellbeing Scale, 8.8 per cent of customers are categorised as 'having trouble'; 30.8 per cent are categorised as 'just coping'; 47.9 per cent are categorised as

'getting by'; and 12.5 per cent are categorised as 'doing great'. The two scales are positively related, such that customers with high reported financial wellbeing also tend to have high observed financial wellbeing.

7.2 Who Has High and Low Financial Wellbeing?

We also use the survey data to investigate the characteristics of customers with high and low financial wellbeing. We conduct two types of quantitative analyses: *unconditional correlation analyses*, which estimate the total association between each measured characteristic and financial wellbeing, and *multivariate regression analyses*, which estimate the net association between each measured characteristic and financial wellbeing *after accounting for mutual associations with other characteristics*. Many patterns of association are similar across the two methods. However, the multivariate analyses find fewer strong associations than the correlation analyses, and in a handful of cases, the two analyses find associations in opposite directions. Along the same lines, we see many similarities in the patterns of associations with each financial wellbeing scale, but we also see some differences. The analyses show that the two scales have *external validity* in the sense that they are related to other measures mostly in ways that we would expect.

Many robust findings across scales and analysis methods

Many common results appear regardless of the scale or the analytical method that is used. We consistently find that, as expected, higher household incomes are associated with higher reported and observed financial wellbeing. However, the relationships are modest. A doubling of annual income is only associated with a 1.3-point gain in reported financial wellbeing and a 1.0-point gain in observed financial wellbeing.

Other expected and robust positive results are that holding a term deposit, doing a good job balancing spending and savings, saving regularly for bad times, and managing a credit card well are associated with higher reported and observed financial wellbeing.

Conversely, unemployment, having difficulty making rent or mortgage payments, needing or using community or government support, holding a personal or car loan, and frequently running short on money because of overspending are associated with lower financial wellbeing. These negative associations must also be considered in the framework of multivariate conditional model. Thus, they occur over and above possible co-occurring problems with income or mental distress.

We also estimate that more education and holding a mortgage on an investment property are positively associated with reported and observed financial wellbeing and that the number of dependent children is negatively associated. However, the estimated associations with reported financial wellbeing in our multivariate models fall just short of statistical significance (have p-values slightly higher than 0.05), so they should be viewed as tentative.

Other findings

Several characteristics are strongly associated with both types of financial wellbeing in the correlation analyses and with one type of financial wellbeing in the multivariate analysis.

Thus, they appear to be robust for that type of financial wellbeing.

General health, having clear savings goals, social support, holding share investments, and undertaking forward financial planning are consistently positively related with *reported* financial wellbeing, while mental distress, finding finances confusing, experiencing a major financial worsening, and putting off financial decisions are consistently negatively related.

For *observed* financial wellbeing, the correlation and multivariate analyses consistently indicate that people who prefer not to live on credit, who hold mortgage offset accounts, who try to save regularly, and who save for resources to fall back on in hard times have higher financial wellbeing and that those who have recently separated from a partner have lower financial wellbeing.

There are also some associations that consistently appear for one type of financial wellbeing but never appear for the other type. Holding the attitude that finances will look after themselves, receiving a promotion, and experiencing a major financial improvement are positively associated with *reported* financial wellbeing in the correlation and multivariate analyses but not positively associated with observed financial wellbeing in either analysis. Indeed, major financial improvements have a significant *negative* association with observed financial wellbeing in the multivariate analyses. Similarly, the number of banking relationships is negatively associated with observed financial wellbeing in the correlation and multivariate analyses but positively associated with reported financial wellbeing in the correlation analyses and not associated with reported financial wellbeing in the multivariate analyses. The results suggest that these characteristics are uniquely related to each type of financial wellbeing. Other opposite-signed results in the multivariate analyses, including understanding financial products and feeling in control of life having positive associations with reported financial wellbeing but negative associations with observed financial wellbeing, also indicate differences in the ways that each type of wellbeing is determined.

7.3 Implications

Our analyses in this report provide several valuable insights. First, the improved version of the CBA-MI Observed Financial Wellbeing Scale is a powerful tool for describing the financial wellbeing of Australians. The scale combines many elements of financial wellbeing outcomes, including day-to-day spending outcomes, precautionary credit and balance outcomes, and savings balance outcomes. The scale's strong positive association with the CBA-MI Reported Financial Wellbeing Scale and the consistent associations with many characteristics from our conceptual model increase our confidence in the measure. Further improvements of the observed financial wellbeing scale in future research will focus on financial outcomes involving other financial institutions and non-financial wealth and broadening the scope to include non-MFI customers.

Second, the analyses show that the characteristics that commonly define socioeconomic status, such as income and education, are good predictors of financial wellbeing, but they are not as determining as one might think. Economic and personal resources are important, but people's financial behaviours including disciplined and balanced spending habits, saving regularly for bad times, and good credit card management, are even more potent predictors of financial wellbeing. This strongly suggests that helping people improve these behaviours

can be a realistic and cost-effective way to increase their financial wellbeing.

Third, several indicators of disadvantage including unemployment, the need and use of community and government support, and problems with housing affordability are strong predictors of low financial wellbeing. This should not be surprising, as we expect disadvantage to reduce people's opportunities to achieve financial wellbeing. However, the fact that these negative associations not only appear in correlation analyses but also in multivariate analyses that account for many other related characteristics indicates that disadvantage itself matters. Helping people to escape the conditions of disadvantage should be a central concern, regardless of how much we might also help them change their financial behaviours.

Finally, our results suggest that the confidence that comes from feeling a strong sense of control over one's finances and having a good understanding of finances may be a hidden risk factor for financial problems. Helping people get a better grip on their finances can be a powerful tool to increase financial wellbeing, as long as it comes from better knowledge, prudent behaviour and an appreciation of financial trade-offs and does not spark false confidence.

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Appendix A: Quantitative Analysis

A.1 Data Preparation and Linkage

To revise the Observed Financial Wellbeing Scale, we utilise the same analysis data set as Comerton-Forde et al. (2018). The data set links self-reported financial wellbeing measures from an on-line survey of CBA customers with observable measures constructed from their financial records. We focus on 4,470 survey respondents who answered all the survey's financial wellbeing outcome questions and for whom CBA was their main financial institution (MFI). The survey is described in Chapter 3 of this report and by Comerton-Forde et al. (2018).

A.2 Analyses with Self-Reported Measures

Our analyses of the self-reported measures focused on the 10 that Comerton-Forde et al. (2018) included in the Reported Financial Wellbeing Scale and seven others that they considered in exploratory factor analyses. The questions, sources, and situational domains are listed in Table A.1.

Table A.1. Candidate Self-Reported Financial Wellbeing Questions

Question	Source	Everyday finances	Rainy day finances	One day finances
What is your current level of debt?	Muir et al.*	x	-	-
I am behind with my finances	CFPB	x	-	-
My finances control my life	CFPB	x	-	-
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.	x	-	-
I feel on top of my day to day finances	FiftyFive5	x	-	-
I can enjoy life because of the way I'm managing my money	CFPB	x	-	
I have money left over at the end of the month	CFPB	x	-	-
I am comfortable with my current levels of spending relative to the funds I have coming in	FiftyFive5	x	-	-
I feel like I will never pay off all my debt	FiftyFive5	x	-	x
Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the month	CFPB	x	x	-
I could handle a major unexpected expense	CFPB	-	x	-

Question	Source	Everyday finances	Rainy day finances	One day finances
What is your current level of savings (including cash, bank deposits and other formal savings like bonds and term deposits)?	Muir et al.	-	x	x
I am concerned that the money I have or will save won't last	CFPB	-	x	x
I am securing my financial future	CFPB	-	-	x
Because of my money situation, I feel like I will never have the things I want in life	CFPB	-	-	x
I am making progress towards my financial goals	FiftyFive5	-	-	x
I am on track to have enough money to provide for my financial needs in the future.	Original	-	-	x

* Indicates question or responses were reworded from the original.

A.3 Financial-Record Measures

The project developed 13 candidate measures of financial wellbeing from the customer-record data. Table A.2 lists and describes these measures. Of these, nine were considered in subsequent analyses. Measures of total interest repayments, total loan repayments, and credit card and personal loan repayments were dropped because of their similarity to credit card and personal loan interest payments. A measure of net position constructed from Financial Health Check records was dropped because of low coverage and questions about data quality.

Table A.2. Candidate customer financial record measures

Measure	Description
Every day measures:	
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 principal paid on credit cards, debit and transaction accounts, and personal loans relative to total annual inflows.

Measure	Description
Total loan payments relative to inflows	Ratio of the total annual interest and principal paid on credit cards, debit and transaction accounts, personal loans, home loans, and investment loans relative to total annual inflows.
Unpaid credit card balances	Measure based on credit card statements and balances; categorise as 0) carried a balance above one month's expenses for six or more months; 1) did not hold a CBA credit card; 2) carried a balance above one month's expenses for two to five months or carried a smaller balance for six or more months; 3) carried balances for shorter periods; and 4) never carried a balance.
Experienced payment problems in last year	Measure based on arrears, payment declines for insufficient funds, dishonours, overlimit fees, late payment fees, and payday loans; categorised as 0) in arrears six or more months or multiple serious problems; 1) in arrears two to five months; had declines, dishonours, or overlimit fees nine or more months; had non-arrears late fees three or more months; had a payday loan; or had multiple moderate problems; 2) in arrears for one month; had declines, dishonours, or overlimit fees three to eight months; or had non-arrears late fees one to two months; 3) had fewer months of declines, dishonours, or overlimit fees; 4) had no payment problems.
Days in last year with 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 categorise 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 in last year when spending exceeded 80% of inflows	Count of the months in which outflows from customer's accounts exceeded 80% of inflows into the account. For customers with accounts open or active less than 12 months, we use a proportion.

Rainy day measures:

Measure	Description
Days in last year when customer has the ability to raise one or three months' expenses from savings or credit	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; categorised as 0) no transactions; 1) first to third deciles; 2) fourth to ninth deciles; 3) top decile

One day measures:

Measure	Description
Savings relative to people their own age	Median of the daily balances over the past 12 months calculated using the ending balance for each day; form residuals from median regressions of balances on a cubic spline in age.

Measure	Description
Net position less superannuation	Calculation of net position, less superannuation balances, from Financial Health Check data; form residuals from median regressions of IHS transformation of balance on a cubic spline in age; only available for customers with a Financial Health Check

A.4 Exploratory Factor Analyses of Linked Self-Reported and Financial-Record Data

We next conducted exploratory factor analyses with the combined set of 17 self-reported and nine financial-record financial outcome measures. Parallel analyses indicated that the 26 measures were explained by two factors. Factor loadings, unexplained variance results, and communality measures from the two-factor solution are shown in Table A.3.

Table A.3. 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

Question/measure	Loading 1st factor	Loading 2nd factor	Unexplained variance	Comm.
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**.

The results reveal a striking pattern. All but one of the self-reported measures align strongly on the first factor, and all the financial-record measures align on the second factor. The self-reported measure that aligns on the second factor is the self-report of an observable condition involving savings levels.

From this set, we

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

A.5 Item Response Theory Analyses and Scales

IRT models fit the response patterns of a series of indicators to an underlying latent measure. In our case, they relate outcomes from the financial-record and self-reported measures to an underlying score of financial wellbeing. IRT modelling has several advantages over other scale construction approaches. IRT models allow measures to:

- Differ in the level of financial wellbeing that they indicate (for example, an indicator for difficulty paying necessary expenses likely indicates a very low level of financial wellbeing, while an indicator for having sufficient savings to cover a major unexpected expense likely indicates a higher level of financial wellbeing);
- Differ in the strength of their association with financial wellbeing—some measures might be noisier and less discriminating than others;
- Be missing or incomplete

Using the revised candidate measure 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

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

where $\exp[\cdot]$ is an exponential operator.

Table A.4 reports the estimated severity and discrimination parameters for the model for the first latent variable, using the 10 self-reported measures.

Table A.4. IRT severity and discrimination parameter estimates—first latent variable

Item	δ_{i1}	δ_{i2}	δ_{i3}	δ_{i4}	α_i
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 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

* Responses reverse coded.

The estimates for the severity parameters, which all increase with response levels for every item, indicate that higher responses are associated with higher values of the underlying latent variable for every item and possible response category. The differences across items in the estimated discrimination parameters are relatively modest. The question about meeting necessary cost of living expenses has the strongest discrimination (least noise) regarding the underlying latent variable, while the question about finances controlling the respondent's life has the weakest discrimination. Analyses of Item Characteristic Curves (ICCs) from the model revealed that every response from every item contributed information to identifying the underlying latent variable. Based on the estimation and ICC results, we created a 0-100 scale, called the CBA-MI Reported Financial Wellbeing Scale, that consisted of the sum of the response values from the 10 questions, multiplied by 2.5. The scale has a correlation of 99.2 per cent with the predicted latent variable from the IRT model. It has a reliability coefficient (Cronbach's alpha) of 0.92. Table A.5 lists the items in the CBA-MI Reported Financial Wellbeing Scale.

Table A.5 CBA-MI 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.

We next fit an IRT specification of the second latent variable, using the five financial-record measures. Table A.6 reports the estimated severity and discrimination parameters for this model.

Table A.6. IRT severity and discrimination parameter estimates—second latent variable

Item	δ_{i1}	δ_{i2}	δ_{i3}	δ_{i4}	α_i
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. Months in last year when spending exceeded 80% of inflows	-1.778	-0.098	0.950	2.282	1.572
14. 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
15. Age-normed residual of customer's median savings balance	-1.068	-0.403	0.622	1.428	2.874

The estimates for the severity parameters increase with response levels for each item and indicate that higher responses are associated with higher values of the underlying latent variable. The differences across items in the estimated discrimination parameters are larger than for the first latent variable. The low-balance measure has the strongest discrimination regarding the underlying factor, while problem payments measure has the weakest discrimination. Analyses of ICCs from the model revealed that every response from every included item contributed information to identifying the underlying latent factor. Based on the estimation and ICC results, we created a 0-100 scale, called the CBA-MI Observed Financial Wellbeing Scale (version 2), that consisted of the sum of the response values from the five measures, multiplied by 100/19. The scale has a correlation of 98.0 per cent with the predicted factor from the IRT model and a reliability coefficient of 0.85.

A.6 Specification and Sensitivity Tests

Customers for the analysis sample

We initially conducted our quantitative analyses using the customers in our survey who indicated that they held all their financial products and conducted all their financial transactions with CBA. We compared the results from these analyses to results from analyses that used customers who indicated that CBA was their main financial institution but not their only financial institution. There were no substantial differences in the results between the two sets of customers. Accordingly, we pooled the data for both sets of customers; the detailed results contained in this report come from the pooled set of customers.

Other potential measures for our scales

Prior to conducting our formal IRT analyses, we used informal methods including inspection, exploratory factor analyses, and logic rules to reduce the set of items. We also estimated

separate IRT models for the reported and observed wellbeing scales. To examine the sensitivity of our results to these specification choices, we iteratively re-estimated both of our IRT models adding each of the excluded measures one at a time. For the reported financial wellbeing model, we added the seven excluded self-reported measures from the original set in Table A.1 and the nine financial-record measures from Table A.2 one at a time. For the observed financial wellbeing model, we added the 17 self-reported measures from Table A.1 and the four excluded financial-record measures from Table A.2. None of the added measures changed our results regarding our principal specifications, indicating that the measurement relationships for the 10 self-reported measures in the Reported Financial Wellbeing Scale and the five financial-record measures in Version 2 of the Observed Financial Wellbeing Scale do not change when additional measures are included. Moreover, ICC analyses of the resulting models confirm that most of the added measures fail to contribute consistently to the underlying scales, which formally indicates that these measures should not be included.

Confirmatory analyses

The construction of our two scales are based on results from formal statistical models and tests that indicate that the included items can differentiate between different levels of underlying latent factors, have good discrimination properties, and have high reliability. As we have discussed, however, we conducted many informal, exploratory, and preliminary formal analyses using the same analysis sample prior to conducting our formal analyses. These earlier analyses with the same sample undoubtedly led to stronger formal results, and some of our formal results might be artefacts of the sample. To test whether this was an issue, we undertook confirmatory analyses in which we re-estimated each of our IRT models and examined the results using alternative samples that had not been used in our primary analyses.

Our model of reported financial wellbeing was estimated using the MFI customers from the on-line survey. However, the survey also included many CBA customers who held most of their financial products or conducted most of their financial transactions with other institutions (non-MFI customers). We re-estimated our IRT model for reported financial wellbeing using these other customers who had not been included in our initial analyses and confirmed that the scale measurement relationships for these customers were similar to those who were included in our analysis sample.

Our model of observed financial wellbeing was estimated using MFI customers who participated in the on-line survey. We constructed a sample of CBA MFI customers who were not survey participants, using a random sample of identical size to the initial analysis, and re-estimated the IRT model of observed financial wellbeing for this alternative sample. These analyses also confirmed that the scale measurement relationships for our survey and non-survey samples were similar.

Differential item functioning

To be universal, the measurement relationships for our two scales—that is, the ways in which our items/measures function in 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 (owned home outright, owned home but paid a mortgage, did not own home),
- Household composition (lived alone, lived with a partner, lived in someone else's home, lived with roommates), and
- Work status (working or looking for work, student, retired, carer).

There were no substantial differences in item functioning across the different subgroups.

External validity

Guided by our conceptual model, we examined how each of our scales was associated with measures that are related to but distinct from financial wellbeing. These analyses, which are shown and discussed in Sections 5 and 6 of this report, revealed that both financial wellbeing scales were related to these other characteristics mostly in ways that we would expect.