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Using Survey and Banking Data to Measure Financial Wellbeing

Carole Comerton-Forde
Edwin Ip
David C. Ribar
James Ross
Nicolas Salamanca
Sam Tsiaplias

Commonwealth Bank of Australia and
Melbourne Institute Financial Wellbeing
Scales Technical Report No. 1
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Carole Comerton-Forde

School of Banking and Finance, University of New South Wales

Edwin Ip

BehaviourWorks Australia, Monash University

David C. Ribar

Melbourne Institute: Applied Economic & Social Research, University of Melbourne

James Ross

Commonwealth Bank of Australia

Nicolás Salamanca

Melbourne Institute: Applied Economic & Social Research, University of Melbourne

Sam Tsiaplias

Melbourne Institute: Applied Economic & Social Research, University of Melbourne

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For correspondence e-mail <david.ribar@unimelb.edu.au>.

**Melbourne Institute: Applied Economic & Social Research
The University of Melbourne**

Victoria 3010 Australia

Telephone +61 3 8344 2100

Fax +61 3 8344 2111

E-mail melb-inst@unimelb.edu.au

WWW Address melbourneinstitute.unimelb.edu.au

Abstract

An enormous research literature has considered and measured various aspects of financial wellbeing. Although several self-reported metrics have been developed, none has been universally adopted, and none harnesses the advantages of linking data from customer financial records with self-reported information from personal responses. This study conceptualizes, develops, tests, and validates multi-item scales of the financial wellbeing of the customers of a major Australian bank using self-reported survey data from the customers that are matched with their financial records. The study develops its scales using Item Response Theory models which produce two distinct, yet related, scales of financial wellbeing:

- a Reported Financial Wellbeing Scale that is formed from responses to 10 questions about whether people meet their financial obligations and have financial freedom, control, and security, and
- an Observed Financial Wellbeing Scale that is formed from five financial-record measures of customers' financial net positions, spending, and payments.


The Reported and Observed Financial Wellbeing Scales are distinct, both in the sense that they are constructed from different measures and in the sense that they represent different underlying constructs. However, they have a positive (Spearman) correlation of 40 per cent. The Item Response Theory models show that each scale reliably differentiates between a wide range of outcomes and that the components within each scale have similar power to discriminate. We validate the scales by examining how they correlate with characteristics that are conceptually linked to financial wellbeing. Both scales are positively associated with income, home ownership, metropolitan residence, financial windfalls, financial knowledge, thrifty attitudes, and good financial habits and negatively related to poor health and financial setbacks.

JEL classification: D1, I3

Keywords: Financial wellbeing, scale, bank record data, Item Response Theory, Australia

Contents

Abstract.....	ii
Contents.....	iii
Executive Summary.....	iv
1. Introduction	1
1.1 Goals and Criteria	1
1.2 Approach	2
2. Background.....	2
2.1 Conceptualisations	2
2.2 Measurement	3
2.3 Lessons.....	5
3. Conceptual Analysis of Financial Wellbeing.....	6
3.1 The Definition of Financial Wellbeing.....	6
3.2 Relating the Perceived and Observable Components of Financial Wellbeing	7
3.3 Conceptual Model of How Financial Wellbeing is Determined.....	8
3.4 Implications for Measurement	10
4. The CBA-MI Financial Wellbeing Scales	11
4.1 The CBA-MI Reported Financial Wellbeing Scale (version 1)	11
4.2 The CBA-MI Observed Financial Wellbeing Scale (version 1).....	13
5. Financial Wellbeing in Our Sample.....	14
5.1 On-line Survey	14
5.2 Distribution of Financial Wellbeing	15
5.3 Financial Wellbeing for Different Types of CBA Customers	18
6. Conclusion	28
References	31
Appendix A. Description of the On-line Survey	33
A.1 Considerations.....	33
A.2 Sampling Strata	33
A.3 Recruitment.....	34
A.4 Description	34
A.5 Linking to CBA Financial-Record Data	35
Appendix B: CommBank Financial Wellbeing Survey Instrument	36
Appendix C: Recruiting E-mails and Participant Information Statements.....	53
Invitation e-mail.....	53
Reminder e-mail	55
Plain Language Statement and Consent Form	57
Appendix D. Quantitative Analysis.....	59
D.1 Data Preparation and Linkage.....	59
D.2 Preliminary Analyses with Self-Reported Measures	59
D.3 Financial-Record Measures	62
D.4 Exploratory Factor Analyses of Linked Self-Reported and Financial-Record Data.....	64
D.5 Item Response Theory Analyses.....	65
D.6 Specification and Sensitivity Tests	68



Our vision is to excel at securing and enhancing the financial wellbeing of people, businesses and communities.

Commonwealth Bank of Australia (2017, p. 2)

1. Introduction

The corporate vision of Commonwealth Bank of Australia (CBA) is ‘to excel at securing and enhancing the financial wellbeing of people, businesses and communities’ (CBA 2017, p. 2). Tracking progress towards that vision requires an operational measure of Australians’ financial wellbeing. A measure is necessary to help CBA understand its customers’ wellbeing and develop more thoughtful and beneficial products. A measure is also needed for researchers, policymakers, businesses, and community groups to document the distribution of financial wellbeing across different segments of society, monitor trends in financial wellbeing, and evaluate the effectiveness of policy, product, capability, and behavioural interventions.

Recognising these needs, CBA has collaborated with researchers from the Melbourne Institute: Applied Economic and Social Research and the Department of Finance at the University of Melbourne to conceptualise, develop, and test operational measures of the financial wellbeing of CBA’s customers and Australians generally. A uniquely innovative element of this project is the inclusion of both data that could be observed from customers’ financial records and data that customers could report about the financial outcomes they perceive and experience. This report describes the resulting CBA-MI scales of customers’ *reported financial wellbeing* and *observed financial wellbeing*.

1.1 Goals and Criteria

The collaboration addressed several goals. The central and overarching goal was to produce scales of financial wellbeing that were both operational and durable as a proof of concept. By operational, we mean that the scales could be implemented using actual data, and not just specified as a thought exercise. By durable, we mean that the scales needed to be conceptually sound, statistically reliable, externally valid, and generalisable. In terms of its conceptualisation, the scales needed to measure financial wellbeing as an outcome that is related to but separate from the many other underlying characteristics and behaviours that contribute to financial wellbeing. A distinct and separate outcome measure is necessary to study how underlying characteristics affect financial wellbeing and to test the effectiveness of interventions. Another conceptual goal was to create scales around CBA’s existing three-part conceptualisation of every day, rainy day, and one day financial wellbeing. The collaboration also sought to develop scales that were applicable to Australians generally.

The collaboration operated under several other criteria. It constructed the scales using consumer financial data from CBA’s customer records and self-reported data from its customers. This required

the collaboration to specify measures from both sources, to develop methods for gathering the data, and to collect the data. The project also operated under a strict four-month proof-of-concept timeline. Additionally, the project team mutually agreed at its first formal meeting that the self-reported data would be collected through a large-scale, on-line survey.

1.2 Approach

To achieve these goals and meet the other criteria, the collaboration adopted a two-phase approach. Phase 1 was a specification phase, and these specifications were implemented and tested in phase 2.

The specification phase occurred in June and July 2017. The research team developed a preliminary conceptualisation of financial wellbeing that guided the development of its scale. The team specified and refined measures of financial wellbeing from CBA's customer records that could serve as candidates for inclusion in a scale. It considered and developed a set of self-reported measures of financial wellbeing and specified how an on-line survey would be conducted, whom it would sample, and what it would ask.

The implementation phase was conducted in August and September 2017. During the first week in August, CBA and its survey partner, FiftyFive5, fielded the on-line survey with a sample of digitally-engaged customers. Self-reported data from the survey were linked to the customers' financial records. The linked data were used to create the scales, and the scales were tested and analysed using additional data from the survey and bank records. The team also developed final definitions and a conceptual model of financial wellbeing. This report describes the outcomes from the implementation phase.

The remainder of this report is organised as follows. Section 2 reviews previous research that has specified or implemented scales of financial wellbeing and that inform both our conceptualisation of financial wellbeing and our empirical analysis. Section 3 offers our definition and conceptualisation of financial wellbeing and provides a theoretical model of how financial wellbeing is determined. Section 4 introduces and describes the CBA-MI Reported and Observed Financial Wellbeing Scales. Section 5 reports how financial wellbeing varies among CBA's customers. Section 6 concludes and offers directions for future research.

2. Background

An enormous literature has considered various aspects of financial health, especially from the fields of financial services and financial planning (see, e.g., Greninger et al. 1996; Joo 2008). Several definitions and conceptualisations of financial wellbeing have been offered, including comprehensive considerations of Australians' financial wellbeing by Bray et al. (2011) and Muir et al. (2017). However, no definition or measure has been universally adopted. We review the existing conceptualisations and measurement approaches below.

2.1 Conceptualisations

Joo (2008) has offered one of the broadest conceptualisations of financial wellbeing. Based on a comprehensive review of previous studies of wellbeing, Joo theorises that financial wellbeing is a multidimensional concept defined in terms of a broad set of characteristics and outcomes, including people's satisfaction with their financial situation, the objective status of their financial situation, financial attitudes, and financial behaviours. Joo's conceptualisation provides a wide-ranging picture of someone's financial health, and measures based on this type of conceptualisation can be used in

descriptive analyses of the levels and distribution of financial wellbeing in a population. However, this breadth is also a weakness. Because Joo includes attitudes, behaviours, and objective circumstances as components of wellbeing, Joo's conceptualisation cannot be used to investigate how these characteristics separately contribute to wellbeing. That is, it cannot distinguish causes from consequences.

Other conceptualisations of financial wellbeing have been motivated by a desire to study how changes in characteristics such as financial literacy, attitudes, and financial inclusion affect financial wellbeing. Accordingly, they have been framed more narrowly in terms of *end outcomes*. Several conceptualisations have been based primarily in terms of objective outcomes. For example, Parker et al. (2016) characterise people's financial wellbeing in terms of their spending, saving, borrowing and planning outcomes. Bray (2001) focuses on financial deprivation and distinguishes among people's experiences with financial hardships, financial management problems, and financial exclusion. In a subsequent analysis, Bray et al. (2011) consider a wider range of financial outcomes by adding a domain of material affluence to the previous set of outcomes. A Norwegian study by Kempson et al. (2017) frames financial wellbeing in terms of meeting commitments, financial comfort, and financial resilience. Kempson et al. also hypothesise that financial wellbeing includes people's future security, but they omit this from their final conceptualisation because Norway's strong retirement protections already address this issue. Their study shows the importance of considering context in conceptualising financial wellbeing and why country-specific approaches may be needed.

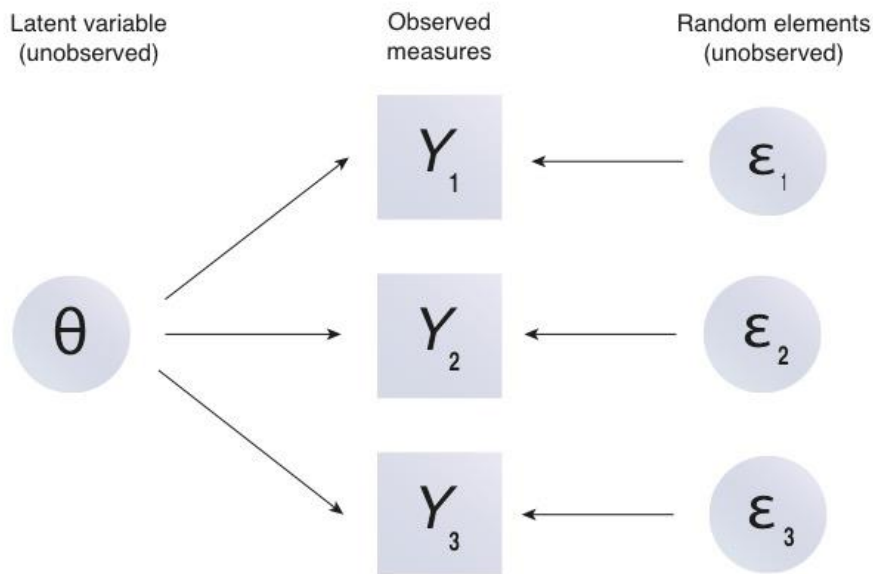
Some conceptualisations have also blended subjective and objective elements. The U.S. Consumer Financial Protection Bureau (CFPB, 2015) differentiates between people's present and future circumstances but also between their desires for financial freedom and for security and control. Based on these considerations, the CFPB (2015, p.5) defines financial wellbeing as a condition with four components: having control over day-to-day, month-to-month finances; having the capacity to absorb a financial shock; being on track to meet financial goals; and having the financial freedom to make the choices that allow people to enjoy their lives. Muir et al. (2017) consider domains of people meeting expenses with some money left over, being in control of their finances, and feeling secure with their financial situation. Vlaev and Elliot (2014) similarly include conditions of meeting expenses with funds left over and financial satisfaction in their conceptualisation but see people's objective financial outcomes and sense of financial control as conditions that contribute to these outcomes. Bruggen et al. (2017) argue that financial wellbeing is linked to people's perceptions of their current and anticipated desired living standards and financial freedom.

These existing conceptualisations helped to inform our conceptual approach which is described in detail in section 3.

2.2 Measurement

All the conceptualisations described in section 2.1 are developed to guide the construction of measures of financial wellbeing. An initial practical consideration is the general measurement approach. Financial wellbeing is not captured by a single indicator and cannot be measured directly. Instead, it is measured indirectly as one or more latent, or unobserved, variables. To do this, we and most existing research adopt a 'scale' approach. The scale approach assumes that a set of observed measures, say Y_1 , Y_2 , and Y_3 , follows from or are results of an underlying latent outcome, say θ . Each of the observed measures also depends on some random elements, or noise, say ϵ_1 , ϵ_2 , and ϵ_3 . Because of the noise elements, none of the observed measures is a perfect measure of the latent outcome. Figure 2.1 shows these relationships, with boxes indicating measures that we can observe, circles indicating variables that we cannot observe, and arrows indicating the directions of relationships.

Figure 2.1. Scale relationship between a latent variable and observed measures



The next consideration are the measures that might be included in a scale. Joo (2008) and Parker et al. (2016) offer recommendations for items to include in possible scales but do not implement or test empirical scales. For example, Parker et al. recommend two categories of indicators for each of their four domains of outcomes. In their framework, spending outcomes include indicators for spending less than income and paying bills on time and in full; saving outcomes include having sufficient living expenses in liquid savings and having sufficient long-term savings or assets; borrowing outcomes have indicators of having a sustainable debt load and having a prime credit score; and planning outcomes include indicators of having appropriate insurance and planning for expenses. Each set of indicators could, in turn, include self-reported measures or objectively determined measures.

Most of the other studies move beyond general specifications to actually construct empirical scales based on their conceptualisations. However, these scales are all formed using self-reported measures, rather than a combination of self-reported and financial-record measures, as used within our analysis. The CFPB (2017) and Prawitz et al. (2006) have conducted the most careful and thorough analyses. The CFPB begins with qualitative interviews of consumers and financial experts. From the narrative interview responses, the CFPB identifies themes and uses these to develop candidate sets of subjective questions. The CFPB uses cognitive interviewing to refine the questions. The CFPB then fields and analyses three successive quantitative surveys in which it uses Item Response Theory (IRT) models to identify 10 measures that cover its four conceptual domains but also align into a single scale of financial wellbeing.

Prawitz et al. (2006) develop the InCharge Financial Distress/Financial Wellbeing (IFDFW) scale, which measures 'perceptions about financial wellbeing and stress about one's financial condition'. Their development process includes an extensive review of the conceptualizations of financial wellbeing that identified a total of 58 relevant concepts, attributes, and objects; a summary of the opinions of 52 experts (i.e., a 'Delphi' study) to reduce these to 10 key measurement items; and two surveys to assess the validity of these items that reduce them to the final eight-item IFDFW scale. The IFDFW scale has been used in several other studies (e.g. Gutter and Copor, 2011; Taft et al., 2013), illustrating its validity in various institutional backgrounds.

Bray (2001) and Bray et al. (2011) also develop scales from sets of highly reliable measures. Rather than develop new questions, Bray (2001) and Bray et al. (2011) use questions whose reliability has been demonstrated through their extensive use in large-scale Australian household surveys. Bray (2001) and Bray et al. (2011) use factor analyses to identify measures that belong in their scales and find that each scale can be represented by a single underlying factor.

Kempson et al. (2017) and Muir et al. (2017) undertake qualitative analyses to refine their conceptual approaches and to develop initial measures. Kempson et al. form several new questions based on their qualitative analyses, while Muir et al. rely more on existing banks of questions that were selected based on interviews with everyday Australians and financial experts. Each research team uses factor analyses to construct scales and finds that their scales can be represented by single factors.

Delafrooz and Paim (2013), Vlaev and Elliott (2014), and FiftyFive5 (2016) also develop multi-item measures of financial wellbeing but with less initial conceptual guidance. Vlaev and Elliott construct a single-factor scale from three items involving financial satisfaction, life satisfaction, and meeting expenses. Delafrooz and Paim construct a scale of financial wellness using a set of nine self-reported subjective and objective measures. They also construct a separate scale of financial stress that mixes items of stress related to people's financial situation with general questions about stress. FiftyFive5 constructs a single index with sub-indices for domains of fulfilment, resilience, and sustainability. However, the FiftyFive5 index includes many behavioural, attitudinal, and capability-related characteristics, so it is not formally a scale.

To our knowledge, there has been no attempt to build an overarching financial wellbeing scale from objective measures. However, studies have considered individual objective measures. Greninger et al. (1996) is an especially useful objective study. Greninger et al. conduct a Delphi study with 156 financial experts to identify key financial thresholds and benchmarks that are associated with financial wellbeing. Their analysis uncovers approximately a dozen indicators in the areas of liquidity, savings, asset allocation, inflation protection, tax mitigation, housing expenses, and credit. As with the specifications from Parker et al. (2016), these provide initial guidance for forming objective indicators.

2.3 Lessons

Although researchers have developed several definitions and measures of financial wellbeing, including several focused on the Australian context, no definition or metric has been universally adopted. In addition, we are not aware of existing scales that combine data from customer records with self-reported information from personal responses. Nevertheless, previous studies provide much helpful information to guide us towards such a scale. The existing conceptualisations have substantial overlaps. Several, including those by Bray (2001), Bray et al. (2011), Kempson et al. (2017), and Parker et al. (2016), emphasise objective conditions, and the conceptualisations by the CFPB (2015) and Muir et al. (2017) combine subjective and objective conditions.

Many studies also construct empirical scales, though always with self-reported measures from surveys. The empirical scales provide a rich set of candidate measures, including some measures from Bray (2001), Bray et al. (2011), and the CFPB (2015) that have been either extensively used or rigorously tested. Researchers have generally reported that they can find measures that align with their proposed conceptual domains. More than this, they find that measures can be represented by a single factor and combined into a single scale. Studies also identify many potential objective measures that would be good candidates for a scale.

3. Conceptual Analysis of Financial Wellbeing

We conduct a *conceptual analysis*, or thought analysis, which considers what financial wellbeing is, what it consists of, and how it is determined. This includes developing a formal definition of financial wellbeing, describing its components, and developing a model that considers financial wellbeing as an outcome. The definition of financial wellbeing and description of components tell us what our scales are measuring. The conceptual model of how financial wellbeing is determined helps us understand the properties of financial wellbeing—for instance, how we would expect financial wellbeing to differ between people at different life stages or with different economic opportunities. The model also clarifies the definition of financial wellbeing and provides a logical basis for testing and validating our scales.

3.1 The Definition of Financial Wellbeing

Our approach to defining people’s financial wellbeing considers wellbeing in terms of *outcomes* that people achieve or experience, rather than all the conditions, characteristics and behaviours that might contribute to those outcomes. We consider outcomes so that we and other researchers can study how underlying characteristics affect financial wellbeing and test the effectiveness of interventions.

Our approach also draws on the conceptual framework that Commonwealth Bank of Australia has developed. CBA’s framework emphasises how outcomes fit into three types of *situations* that are relevant to people’s personal finances. These are people’s:

- ‘every day’ finances that encompass people’s immediate, day-to-day and month-to-month financial outcomes,
- ‘rainy day’ finances that encompass outcomes that prepare people to maintain their wellbeing if there are unexpected, adverse events, and
- ‘one day’ finances that encompass outcomes that allow people to sustain their wellbeing over time and achieve long-term goals.

In developing our definition, we reviewed and considered other definitions that were put forward generally by the CFPB (2015) and more specifically for Australia by Bray (2001) and Muir et al. (2017).

Our definition is further informed by our empirical analyses, which revealed that wellbeing had two primary components. The first component involves financial outcomes that people experience and interpret through a personal, subjective lens and that they can report. The second component involves financial outcomes that can be objectively observed in people’s financial records, accounts, and transactions.

We define people’s financial wellbeing as

the extent to which people both perceive and have:

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

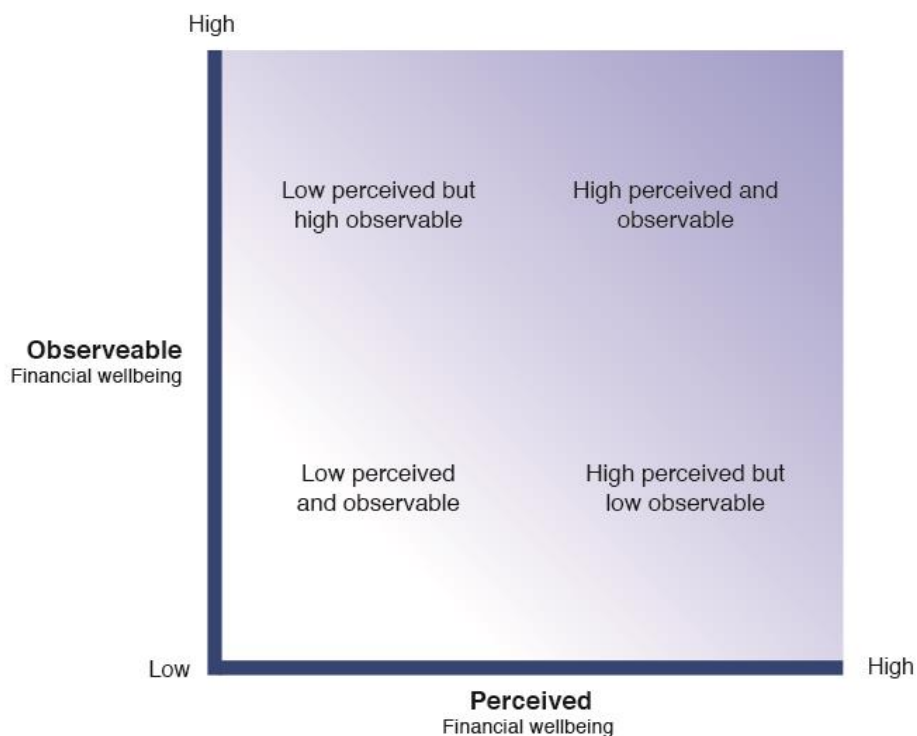
The definition has several dimensions, including situational/temporal, functional, and subjective/objective dimensions. The situational/temporal dimensions correspond to CBA’s

conceptualisation and indicate that financial wellbeing involves outcomes now (every day), in the future (one day), and under possible adverse circumstances (rainy day). The functional dimensions are the goals and objectives that people and financial planners have identified for people to meet their financial obligations, to have the financial freedom to enjoy additional consumption and other fulfilling choices, to control rather than be controlled by their finances, and to have security and be free from financial anxiety. Lastly, the definition includes financial outcomes as people perceive and experience them and outcomes that are manifest in people’s financial positions and transactions. The definition also describes degrees of wellbeing—it is not an either/or condition.

3.2 Relating the Perceived and Observable Components of Financial Wellbeing

As mentioned above, people’s overall financial wellbeing consists of outcomes as they perceive and experience them and outcomes as they can be objectively and independently observed. Both sets of components are interrelated, yet they capture different facets of financial wellbeing. People’s overall financial wellbeing is characterised by whether they have better or worse perceived financial wellbeing and better or worse objectively observable financial wellbeing. For many people, their perceived and observable financial wellbeing align, but for some people, they do not. The two-component categorisation of financial wellbeing is depicted in Figure 3.1.

Figure 3.1. Two-component categorisation of overall financial wellbeing



Below we discuss the combined categorisations in more detail.

High perceived and observable financial wellbeing

People in this category have unambiguously good financial wellbeing. They experience and perceive good financial outcomes, and they also have good objective financial outcomes. Their positive

subjective assessments of their financial condition align with their positive objective outcomes. People in this category are meeting many of their every day, rainy day, and one day objectives, though it is possible that they are missing some objectives.

Low perceived and observable financial wellbeing

People in this category have unambiguously poor financial wellbeing. They experience and perceive bad financial outcomes, and they also have bad objective financial outcomes. Their negative subjective assessments of their financial condition align with their negative objective outcomes. People in this category are not meeting many of their every day, rainy day, and one day objectives, though they might be meeting some objectives. They frequently report financial problems and seldom report financial successes. They also either have low savings or low access to funds, run low account balances, or run into payment problems.

Low perceived but high observable financial wellbeing

People in this category have ambiguous financial wellbeing. They have good objective financial outcomes, but they do not derive a sense of wellbeing from their finances. Their negative subjective assessments of their financial condition are not aligned with their positive objective outcomes. People in this category tend to report financial problems but not financial successes. Yet they have savings, access to funds, adequate account balances, and/or few payment problems.

High perceived but low observable financial wellbeing

People in this category also have ambiguous financial wellbeing. They experience and perceive good financial outcomes, but they have bad objective financial outcomes. Their subjective assessments of their financial condition are not aligned with their objective outcomes. People in this category report being successful in many of their every day, rainy day, and/or one day objectives, yet their financial statements indicate that they have low savings or access to funds, low account balances, or problems making payments.

3.3 Conceptual Model of How Financial Wellbeing is Determined

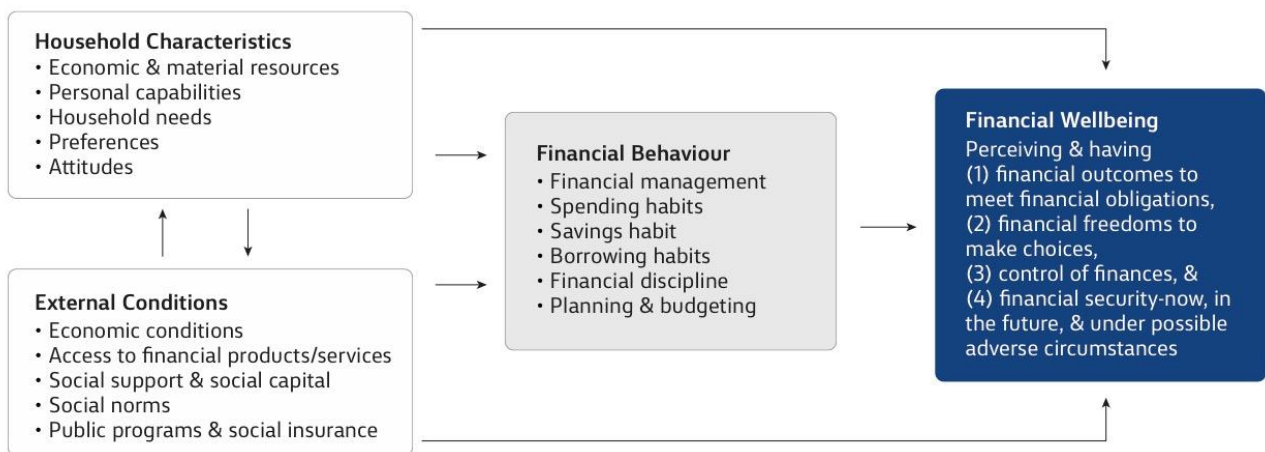
We conceptualise financial wellbeing as having three general sets of determinants: *financial behaviour*, *household characteristics*, and *external conditions*. Our focus regarding the determinants of financial wellbeing is financial behaviour, which we see as directly determined by household characteristics and external conditions. The relationships among these general sets of determinants is shown in Figure 3.2.

Our conceptualisation is based on a simplified and abstract description of people's financial behaviour. In this model, we divide people's (remaining) lifetimes into discrete periods (for example, working life and in retirement). In each of these periods, people care principally about the amounts of goods and services that they can consume. The consumption of these goods and services generates what we observe as financial behaviour. For now, we assume that all the goods and services are interchangeable so that we only consider the total expenditures on them (it is possible to distinguish between capital goods and simpler perishable goods, necessary and luxury goods, etc.).

To effectuate this expenditure, people use their available household economic and material resources. Within each period, people receive a net income which equals their earnings from work plus the interest and dividends from their savings and investments but less the interest they pay on any debts. In addition to this net income, people can add to their current available resources through a process of dis-saving by drawing down any accumulated wealth or by borrowing against

future income and wealth. They can also add to their future available resources by saving—either by adding to their savings and investments or by paying down their debts. People’s economic and material resources are not solely determined by their own actions. They are also affected by the economic conditions around them, including the aggregate economic growth, unemployment rate, interest rates, and so on. Finally, people can also draw on publicly-provided resources such as public programs and social insurance, and on community-based resources such as social support and social capital to make their expenditure decisions.

Figure 3.2 Conceptual Model of the Determinants of Financial Wellbeing



People derive satisfaction and pleasure from their current expenditures and their beliefs over how much they will be able to spend in the future in several ways. First, people derive more marginal satisfaction from each additional dollar of expenditure at low levels of expenditures and less from each additional dollar at higher levels. People care about their expenditures in the current period, but they also care about expenditures in future periods. However, people discount their future expenditures; the further away the future is, the less they care about it in the current period. People also discount expenditures that are uncertain; receiving \$100 for sure is more satisfying than a 50-50 chance of receiving either \$200 or nothing. This correspondence between people’s derived satisfaction and their expenditures is characterised by their preferences and attitudes.

People’s derived satisfaction from expenditures also depends on what they consider as an acceptable level of expenditure given their situation. Therefore, people’s satisfaction from expenditures is affected by their household needs (e.g., their household’s size and their life stage) and by the social norms they are subjected to (e.g., the typical level of expenditure in their community). Finally, people will make expenditure decisions in the best way their personal capabilities—their financial knowledge, information, training, and ability to make sound decisions—allow them to. These decisions will be bounded by their access to financial products and services, which will determine their options.

To make financial decisions, people attempt to set their expenditures to maximise their satisfaction while bounded by the constraints their economic resources, household needs, and their own attitudes and capabilities impose on them. The way people solve this problem results in financial behaviours, which are the main determinants of their financial wellbeing.

Financial behaviours directly contribute to people's financial wellbeing, since they influence people's expenditures. These behaviours can be categorised based on whether they respond to people's desire to secure current or future expenditure, or to insure against rainy days. People spending in a responsible manner will improve their financial security in the future, and will be able to make mistakes without catastrophic consequences. Because people care about future expenditure and discount risky expenditure, responsible spending should lead to greater financial wellbeing.

Financial behaviours can also be categorised based on the way they add to people's wellbeing: whether behaviours are meant to ensure people can meet their needs and cover their necessary expenses, or whether features of people's expenditure enhance their sense of satisfaction. For example, purposefully spending below what a person could afford might seem suboptimal, but it could still improve their financial wellbeing if it improves their financial position in the future or improves their experience of other current expenditures because they do not worry as much about the future.

Finally, the contribution of financial behaviours to financial wellbeing needs to be seen within the frame of the general wellbeing achievable by that household at any given moment, and this wellbeing will be directly determined by their household characteristics and their external conditions. For example, all else equal, a household with less resources will also have lower financial wellbeing. Similarly, a household in a favourable economic environment will have higher financial wellbeing than a household in a poorly-performing economy, even if both households have the exact same characteristics. Because of this, the receipt of \$100 contributes more to the wellbeing of a small disadvantaged household than to the wellbeing of a larger and more advantaged household, yet advantaged households will generally have higher financial wellbeing than disadvantaged ones. Moreover, people's attitudes will influence the wellbeing they perceive from objectively equal expenditures. For example, a person who is unwilling to take risk will benefit more from a given expenditure on insurance than someone who is willing to take risk.

Our conceptual model of financial wellbeing shares many elements with the frameworks of financial capabilities and stress of Bray et al. (2011), the CFPB (2015), and Muir et al. (2017). Both Bray et al. and the CFPB see financial wellbeing as chiefly driven by financial behaviours, which are in turn determined by people's resources. Bray et al. also consider household resources as a key determinant of financial behaviour and focus more on the role of ecological conditions by explicitly distinguishing between formal institutions (e.g., access to banking, the quality of financial services) and informal ones (e.g., social links such as parents and friends). However, in their model, attitudes and household needs play a less prominent role. In the CFPB's categorisation, like in ours, attitudes and capabilities are direct determinants of financial behaviour, and they further develop an explicit categorisation of financial behaviours. However, they do not explicitly distinguish between household resources and ecological conditions, and they give little consideration to people's 'rainy day' exposure. Muir et al. structure their framework in a nested approach, which suggests that societal influences can affect communities, which in turn affect households, individuals' behaviour, and finally their financial wellbeing. The 'outer levels' can also influence a person's financial behaviour and wellbeing directly.

3.4 Implications for Measurement

Our conceptual analysis above is helpful for developing a scale of financial wellbeing in two ways. First, it motivates and delineates the differences between the determinants of financial behaviours, the financial behaviours themselves, and the financial wellbeing they produce. Second, the framework provides us with a set of candidate measures for the determinants of financial behaviours and wellbeing outcomes.

Our conceptualisation places financial wellbeing as the key outcome. To measure financial wellbeing, we will focus on measuring relevant outcomes from people’s decision-making process. Objectively observable markers are the easiest to identify based on our model. Relevant financial wellbeing outcomes include markers such as people’s net financial position and whether they are late for payments or owe money to financial institutions. This outcomes approach aligns with the approaches of Bray et al. (2011), Parker et al. (2016), and Kempson et al. (2017).

Our scale of financial wellbeing also includes reportable markers in each of our conceptual domains such as people’s self-reported ability to meet regular expenses, instances of having money left over at the end of the month, their perceived capacity to handle unexpected expenses, and their sense of control over their own finances. These markers are each related to people’s observable financial circumstances, though they may have additional subjective elements. Because of this, it is crucial to account for these along with the observable components of financial wellbeing.

Our conceptualisation places financial behaviours as key determinants of financial wellbeing but not as wellbeing outcomes themselves. Relevant financial behaviours include observable markers in the financial records such as opening a direct deposit savings account, setting up an automatic payment system for bills, or seeking financial advice from a professional. Other elements of our model—namely household resources, ecological conditions, household needs, and attitudes and capabilities—are also important determinants but are not considered as outcomes. It is important to measure the determinants so we can correlate them with our measures of financial wellbeing to better establish their properties and to test the premise of our model. For many of these elements we have observable markers in the financial records, such as household income and household size. For others, such as preferences and attitudes, we rely on survey items.

4. The CBA-MI Financial Wellbeing Scales

4.1 The CBA-MI Reported Financial Wellbeing Scale (version 1)

The CBA-MI Reported Financial Wellbeing Scale (version 1) 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. These perceptions and experiences are considered under every day, rainy day, and one day circumstances. Each question has five possible responses, with the worst financial wellbeing outcomes assigned values of zero and the best financial wellbeing outcomes assigned values of four. The questions were drawn from several sources, including six from the CFPB (2015), one from Muir et al. (2017), two from FiftyFive5 (2017), and one that we developed. Table 4.1 lists the questions, sources, and possible responses.

The items cover all the functional and situational/temporal elements of the definition of financial wellbeing. Item 1 addresses meeting financial obligations; items 2 and 6 address financial freedom; items 5, 8 and 9 address control over finances; and items 3, 4, 7 and 10 address financial security. Similarly, items 1, 2, 8 and 9 address everyday situations; 3 and 7 address rainy day situations; and 4 and 10 address one day situations. Quantitative testing, which is described in Appendix D, indicated that all five responses to all 10 items contributed to the measurement of reported financial wellbeing.

Table 4.1 CBA-MI Reported Financial Wellbeing Scale (version 1)

Item (Source)	Responses
<p>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? (Muir et al. 2017)</p>	<p>0 - Very difficult 1 - Difficult 2 - Neither difficult nor easy 3 - Easy 4 - Very easy</p>
<p>How well do the following statements describe you or your situation? (CFPB 2015)</p> <p>2. I can enjoy life because of the way I'm managing my money</p> <p>3. I could handle a major unexpected expense</p> <p>4. I am securing my financial future</p>	<p>0 - Not at all 1 - Very little 2 - Somewhat 3 - Very well 4 - Completely</p>
<p>How often do the following statements apply to you? (CFPB 2015)</p> <p>5. My finances control my life *</p> <p>6. I have money left over at the end of the month</p> <p>7. Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the month *</p>	<p>0 - Never 1 - Rarely 2 - Sometimes 3 - Often 4 - Always</p>
<p>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 (FiftyFive5 2017 and Comerton-Forde et al. 2018):</p> <p>8. I feel on top of my day to day finances</p> <p>9. I am comfortable with my current levels of spending relative to the funds I have coming in</p> <p>10. I am on track to have enough money to provide for my financial needs in the future</p>	<p>0 - Disagree strongly 1 - Disagree 2 - Neither agree nor disagree 3 - Agree 4 - Agree strongly</p>

* Negative statement that is reverse-coded in scale.

A person's reported financial wellbeing scale value is formed by adding the responses to all 10 questions and multiplying the sum by 2.5. This results in a 0-100 scale in which larger values indicate higher amounts of reported financial wellbeing.

**Reported Financial Wellbeing Scale =
 Sum of responses to items 1 to 10 multiplied by 2.5**

4.2 The CBA-MI Observed Financial Wellbeing Scale (version 1)

The CBA-MI Observed Financial Wellbeing Scale is formed from five additional measures numbered 11-15 below that come from customers' financial records and that describe their every day, rainy day, and one day circumstances. Except for item 12, each measure has three possible outcomes, with the worst financial wellbeing outcomes assigned values of zero and the best outcomes assigned values of two. Table 4.2 lists the measures and possible outcomes.

Table 4.2. CBA-MI Observed Financial Wellbeing Scale (version 1)

Item	Outcomes
11. Number of months in last year with payment dishonours	0 - 7 or more months 1 - 1 to 6 months 2 - None
12. Any payday loans in last year?	0 - Yes 1 - No
13. Days in last year with liquid balances below one week's average expenses	0 - 75% or more 1 - 1% to 75% 2 - Never
14. Days in last year during which customer had the ability to raise one month's expenses from savings or available credit	0 - 25% or less 1 - 25% to 99% 2 - Always
15. Age-normed percentile of customer's median savings balance over last year	0 - Below 35 th percentile 1 - 35 th to 90 th percentile 2 - Above 90 th percentile

A person's observed financial wellbeing scale value is formed by adding the outcomes from all five items and multiplying the sum by $100/9$. This results in a 0-100 scale in which larger values indicate higher amounts of observed financial wellbeing.

$$\text{Observed Financial Wellbeing Scale} = \text{Sum of outcomes from items 11 to 15 multiplied by } 100/9$$

The items in the scale address the functional and situational/temporal elements of our definition of financial wellbeing. All the items are measures that are constructed from records of people's financial positions or of their spending, savings, borrowing, or payment outcomes. Items 11 and 12 encompass elements of meeting financial obligations; item 13 addresses conditions that give rise to financial freedom; and items 14 and 15 describe outcomes that provide control and security. The

items also span our situational space with items 11 and 13 addressing every day finances; items 12 and 14 addressing rainy day finances; and item 15 addressing one day finances.

Unlike the items from the reported financial wellbeing scale, which could distinguish between five levels of outcomes, our quantitative testing indicated that the items from the observed financial wellbeing scale could only distinguish between three—or in the case of payday loans, two—levels of outcomes. Quantitative testing further indicated that observed financial wellbeing was distinct from reported financial wellbeing and that none of the items in the scales overlapped.

Both of our scales are formed from simple summations of categorical responses. This method imposes restrictions on the underlying data. It treats each item as being equally informative about people's underlying reported or observed financial wellbeing. The method also treats each unit increase in a given response outcome as having the same relationship with underlying financial wellbeing as a unit increase in any other response outcome. For example, the difference between someone just agreeing (value 3) or agreeing strongly (value 4) that she or he is on track to have enough money to provide for her or his financial needs in the future adds exactly the same to our measure of wellbeing as the difference between someone finding it difficult (value 2) or neither difficult or easy (value 3) to meet her or his necessary cost of living expenses. We compared our simple scales to more complex scales based on Item Response Theory model estimates that allowed for differences among items in terms of their reliability and response differences. Our simple scale of reported financial wellbeing was correlated 99.2 per cent with a more flexible IRT scale, and our simple scale of observed financial wellbeing was correlated 98.0 per cent with a more flexible IRT scale. Therefore, our simple scales are appropriate and capture almost all the information of more flexible but complex scales.

5. Financial Wellbeing in Our Sample

5.1 On-line Survey

To obtain the data to develop and analyse our financial wellbeing scales, we conducted an on-line questionnaire survey of 5,682 CBA customers in the first week of August 2017 and linked the responses from the survey to financial-record data for the same customers. A detailed description of the survey is given in Appendix A, the questionnaire is listed in Appendix B, and recruiting and informed consent materials are listed in Appendix C.

Before recruiting customers for the survey, we carefully considered what we would be able to observe from their financial records. Although the records are a rich source of data, the bank's view of its customers is incomplete or limited in number of ways. Most importantly, the bank only observes financial activities that customers conduct through CBA. The extent to which customers use other financial institutions will influence the completeness of the bank's observation of the customers' financial wellbeing. Customers who use CBA as their main financial institution (MFI) and use more products with CBA will provide more complete pictures. To balance the need to have a sample that could describe all of CBA's customers with the need to have adequate numbers of respondents with high-quality financial-record data, the survey used a stratified sampling approach with three strata:

Stratum A: A nationally representative sample of CBA customers. Invitations were e-mailed to approximately 60,000 customers from this sample, and 1,611 customers provided responses.

Stratum B: A sample of sole-MFI customers for whom CBA has a relatively complete view of

their financial position and transaction behaviours. These are customers believed to undertake their banking solely through CBA and who are identified by reference to information collected through transactional data. This sample was selected to ensure that we had enough customers for whom we have a complete view of their financial-record data. Approximately 180,000 e-mail invitations were sent to this sample, and 2,899 customers responded.

Stratum C: A sample of ‘high-visibility’ split-MFI customers for whom CBA appears to be the main – but not sole – banking provider but for whom CBA also has either recent product application or Financial Health Check data. This sample is selected to allow us to construct a view of the financial wellbeing of non-exclusive CBA customers. CBA e-mailed invitations to approximately 60,000 customers from this sample, and 1,172 customers responded.

Subjects for the on-line survey were CBA adult customers with e-mail addresses who had not opted out of on-line research and marketing communications from the bank. Subjects were sent an e-mail invitation from CBA that contained a unique survey link; CBA retained a master list of the survey links so that responding subjects could be matched to their financial-record data. The invitation e-mail contained a Plain Language Statement describing the risks and benefits of participation, and the first page of the on-line survey linked to and administered a consent document. If consent was given, the first few questions of the survey asked additional screeners to confirm the respondent’s location and age, and to ensure that no one under 18 completed the survey. A single reminder e-mail was sent to customers who did not respond to the initial survey invitation.

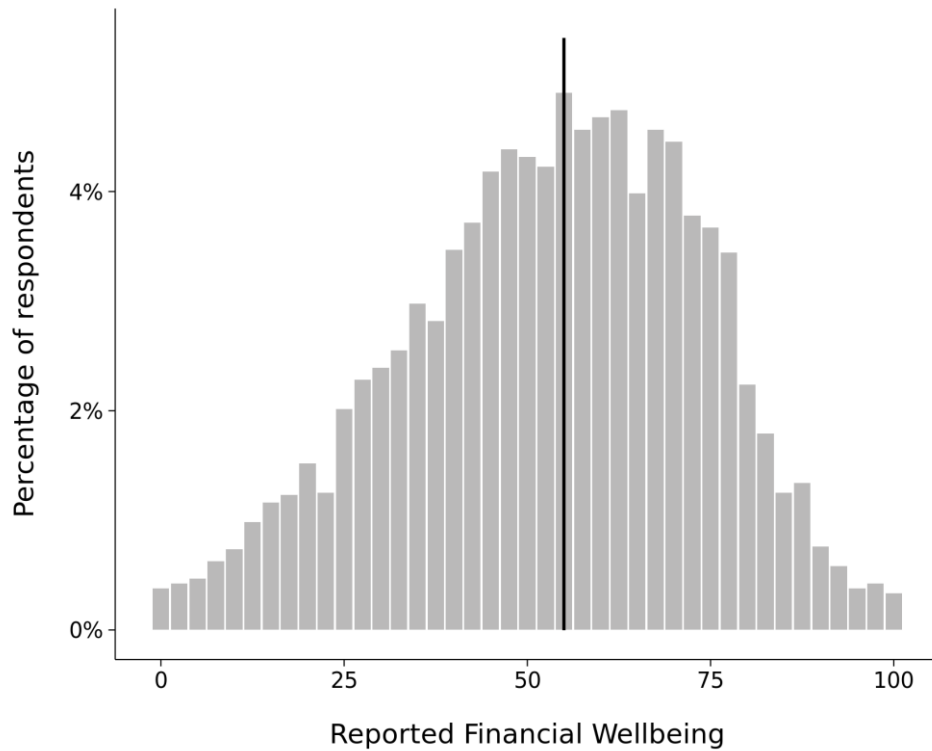
After asking the screening questions, the survey asked about the subject’s perceptions and experiences with financial outcomes, including 33 questions about financial wellbeing. The survey also asked people about major life events, intermediate financial behaviours, banking relationships, household financial holdings, loans, financial circumstances, financial literacy, financial habits, attitudes, and many demographic and economic characteristics. The survey instrument is reproduced in Appendix B.

We dropped observations for 50 customers who did not answer all the financial wellbeing questions. We initially conducted analyses using a subset of survey respondents who reported conducting all their financial transactions and holding all their financial products through CBA. Further analyses, however, revealed that the scale measurement relationships for these customers were indistinguishable from customers who reported conducting most of their financial transactions and holding most of their financial products through CBA. Because the two groups were so similar, we combined the samples in our analyses, resulting in a sample of 4,470 customers who were mostly sampled through Strata B and C but also partly through Stratum A.

5.2 Distribution of Financial Wellbeing

Figure 5.1 shows the percentages of MFI customers in our on-line survey with each level of reported financial wellbeing. Customers’ scale values ranged over the entire set of possible outcomes from 0 to 100. The black vertical line in the figure indicates the median value of reported financial wellbeing—that is, the value at which half of the sample reports better values and half reports lower values. The median value and modal value (value with the most responses) of the reported financial wellbeing scale among the MFI customers were each 55.

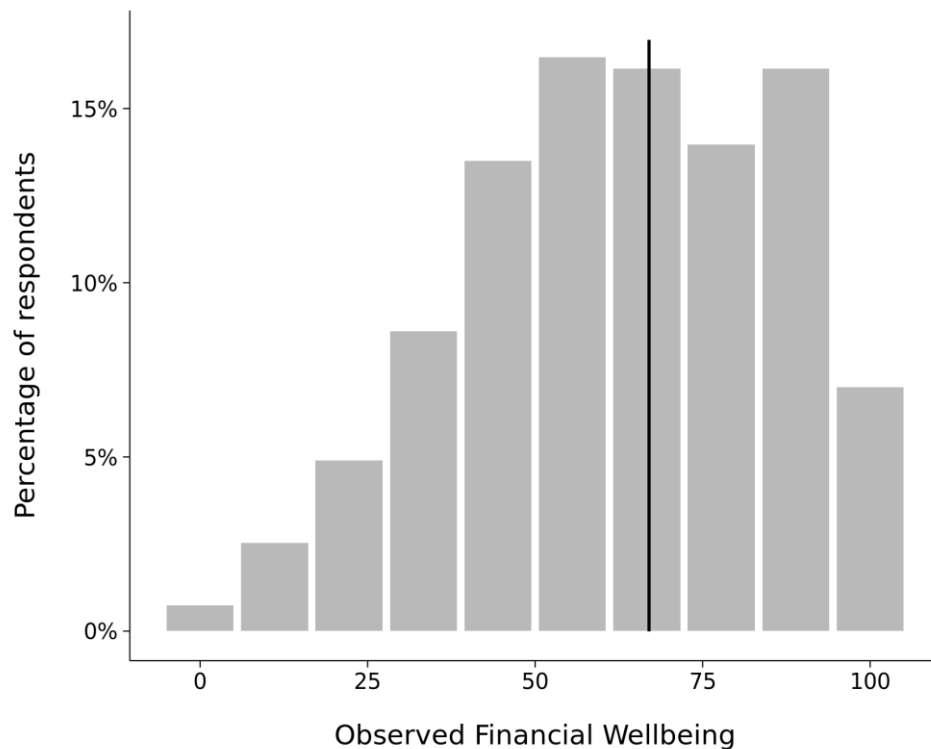
Figure 5.1 Distribution of Reported Financial Wellbeing



As the figure indicates, the distribution is skewed towards higher scale values, meaning that people were somewhat more likely to report experiencing or perceiving good outcomes for a given condition than neutral or bad outcomes. Only a small percentage of people had values at or near the top and bottom ends of the scale (about one per cent had scores of 5 or lower and about one per cent had scores of 95 or higher).

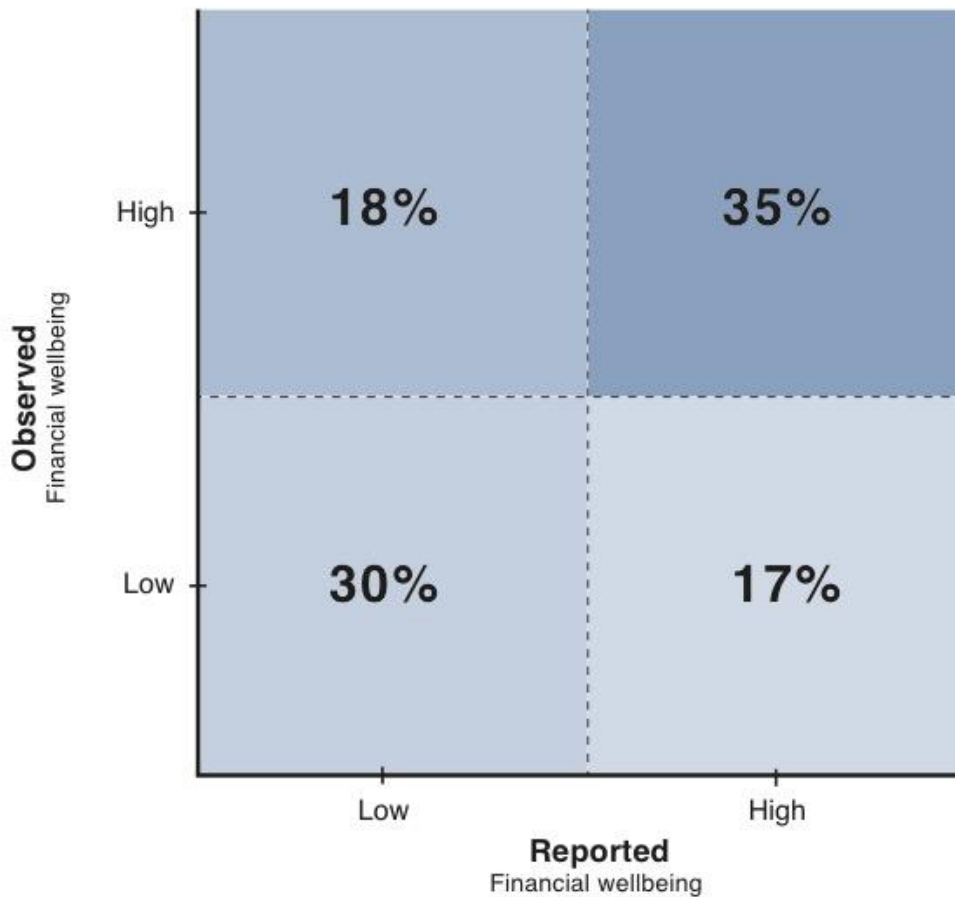
Figure 5.2 shows the percentages of MFI customers in our on-line survey with each level of observed financial wellbeing. As with reported financial wellbeing, customers' values of observed financial wellbeing spanned all the possible values of the score. The median value of observed financial wellbeing was 67, and the modal value was 56. The distribution was skewed towards higher values, and relatively few customers had scale values at the top or bottom of the distribution.

Figure 5.2 Distribution of Observed Financial Wellbeing



Although reported and observed financial wellbeing are distinct scales, they are positively related—people with high reported financial wellbeing also tend to have high observed financial wellbeing. Formally, the sample responses from the scales had a positive (Spearman) correlation of 40 per cent. Another way to convey the relationship is to plot the percentages of customers with both scores at or above the median values, both scores below the median values, and scores that are at or above the median value on one scale and below the median value on another. We do this in Figure 5.3 and organise the results in the same way as Figure 3.1. Consistent with the positive relationship between the two scales, most people—about two-thirds—have values on the two scales that are both at or above the median (35 per cent) or below the median (30 per cent). About a sixth of customers (17 per cent) have values of reported financial wellbeing that are at or above the median but values of observed financial wellbeing that are below the median, while a sixth of customers (18 per cent) have values of observed financial wellbeing that are at or above the median but values of reported financial wellbeing that are below the median.

Figure 5.3 Distribution of combined financial wellbeing



5.3 Financial Wellbeing for Different Types of CBA Customers

In this section we report how reported and observed financial wellbeing vary for CBA customers with different sets of characteristics.

Figure 5.4 shows the percentages of women and men with different values of the reported and observed financial wellbeing scales. In general, 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. The relationship with gender is also apparent 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 5.4 Financial wellbeing for women and men

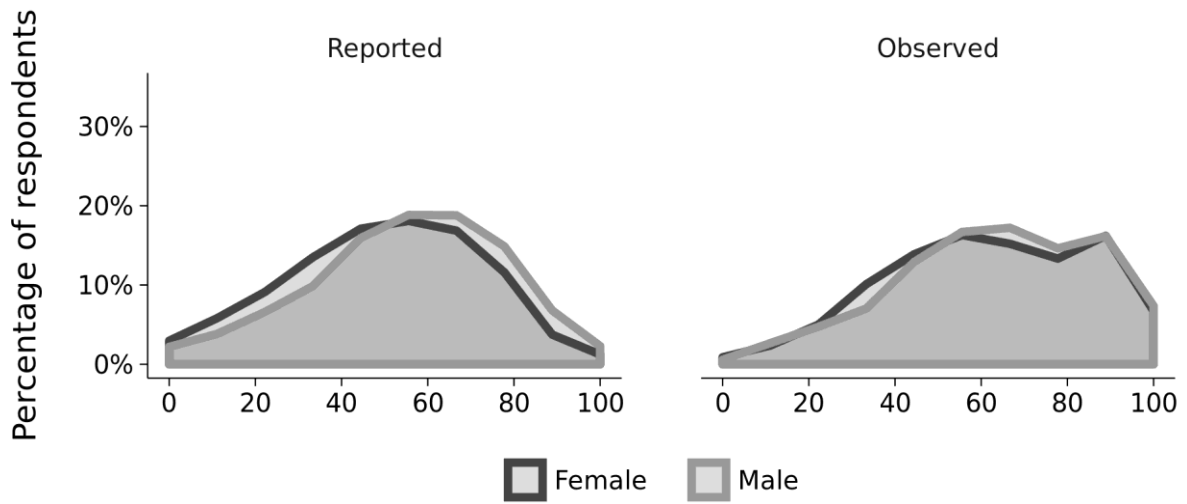


Figure 5.5 shows how the reported and observed financial wellbeing scale values differ for people who own their homes outright (without a mortgage), people who own homes but hold a mortgage, and people who do not own their homes. People who own their homes outright are uniformly more likely to have higher reported and observed financial wellbeing, while people who do not own their homes are uniformly more likely to have lower reported and observed wellbeing.

Figure 5.5 Financial wellbeing by housing tenure



Figure 5.6 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 uniformly lower among people with limiting health conditions. The association is especially pronounced for reported financial wellbeing but also apparent for observed financial wellbeing.

Figure 5.6 Financial wellbeing by limiting health conditions

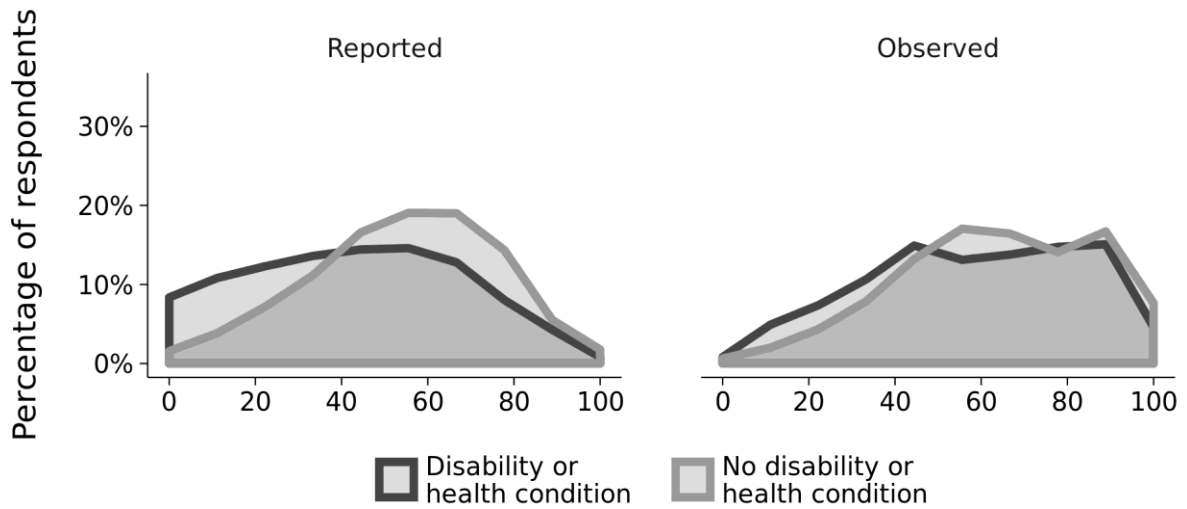
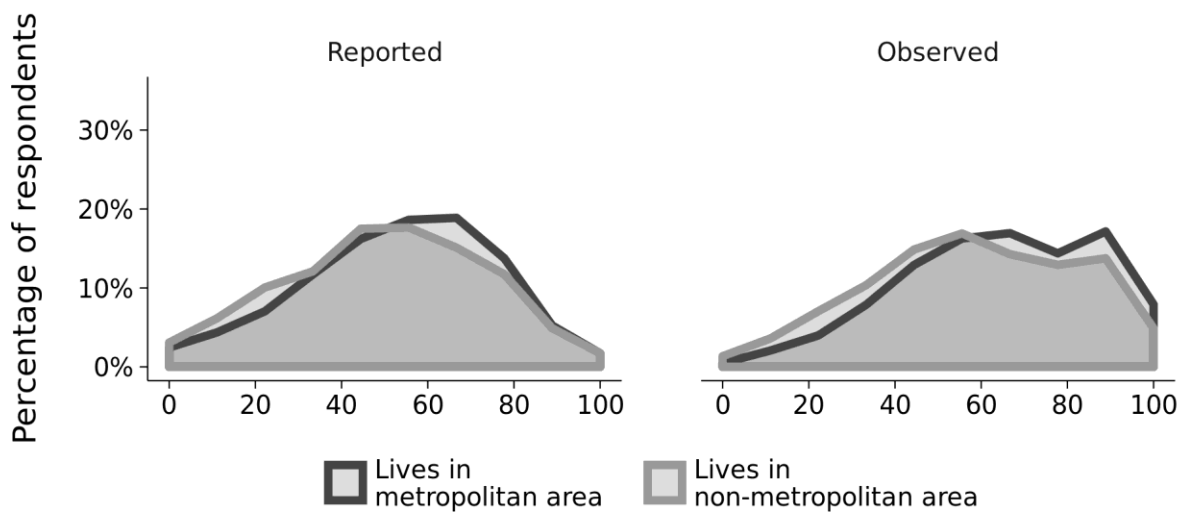


Figure 5.7 shows the distributions of reported and observed financial wellbeing for customers who live inside and outside metropolitan areas. There is a modest but uniform tendency for metropolitan residents to have better reported and observed financial wellbeing.

Figure 5.7 Financial wellbeing by metropolitan residence



The top panels of Figure 5.8 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 in their situation. A major worsening in financial circumstances is strongly and uniformly associated with worse reported and observed financial wellbeing. Major improvements are strongly and uniformly associated with better reported financial wellbeing but not consistently associated with observed financial wellbeing.

Figure 5.8 Financial wellbeing by major changes in financial situation

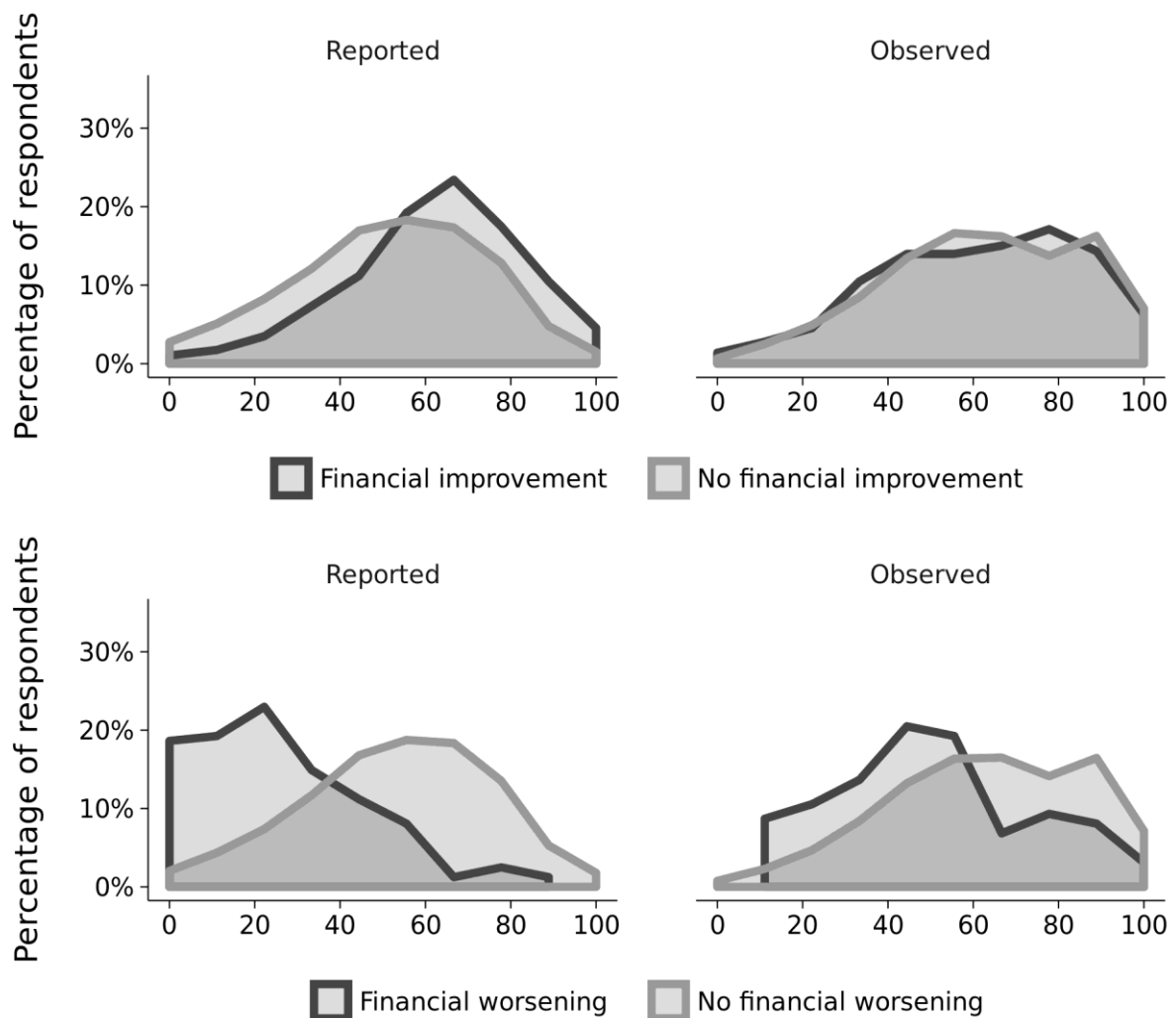
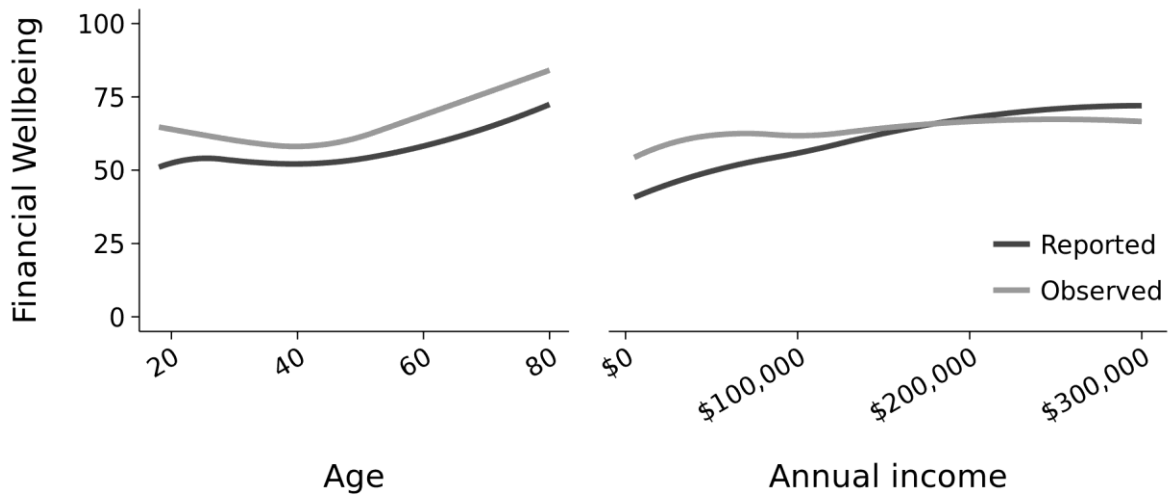


Figure 5.9 is organised in a different way than our previous figures. Figure 5.9 shows how the median values of the reported and observed financial wellbeing scales differ with people’s ages (left panel) and with their annual household incomes (right panel). The graph on the left reveals that people’s median reported financial wellbeing (the dark gray line) does not differ much between young adults and middle-age adults; however, after age 50, median reported financial wellbeing increases with age until people reach their 70s. In contrast, people’s observed financial wellbeing (the light gray line) is negatively associated with age from people’s late 20s to early 40s but increases afterwards. The age pattern in observed financial wellbeing is consistent with people acquiring more financial responsibilities and obligations early in adulthood but having fewer responsibilities and greater financial resources later in adulthood. The graph on the right reveals that people’s median reported and observed financial wellbeing generally increase with income. The relationship between income and reported financial wellbeing is uniformly positive. The relationship between income and observed financial wellbeing is positive across most of the range of incomes, but weaker than for reported wellbeing.

Figure 5.9 Median financial wellbeing by age and income



The next figures also show the relationship between customers' characteristics and the median values of their reported and observed financial wellbeing. However, because the characteristics that we consider take on just a few values, we display the results using bar charts. Figure 5.10 shows how median reported (left) and observed (right) financial wellbeing differ for customers who live with a partner, live without a partner but with others, and live alone. Living with other adults usually provides access to additional resources and lowers per-person living costs; however, it can also lead to a loss of financial control. The figures indicate that people who live alone tend to have worse reported and observed financial wellbeing than people living with other adults.

Figure 5.10 Median financial wellbeing by household living arrangements

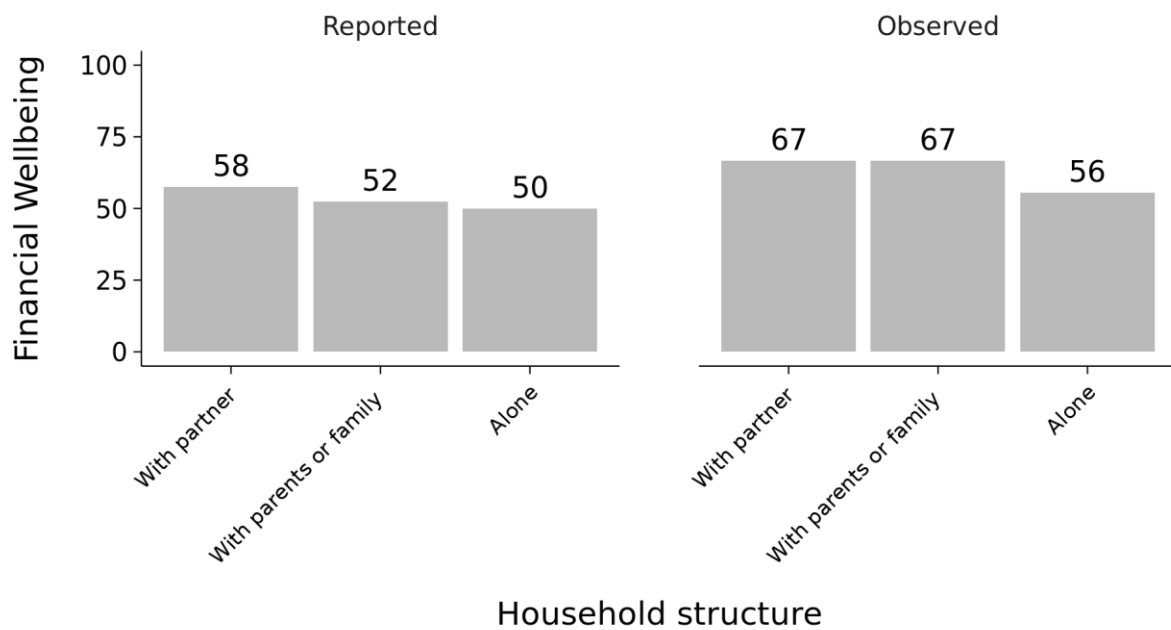


Figure 5.11 shows how median reported and observed financial wellbeing differ among people in different work situations. Customers who are retired have the highest reported and observed financial wellbeing, while customers who are out of a job but not students or carers have the worst reported wellbeing, and those with home duties have the worst observed wellbeing. The high levels of financial wellbeing among retirees is consistent with the age distributions that we considered earlier. Customers who are working have the next highest levels of observed and reported financial wellbeing. Students have lower values of reported financial wellbeing but the same levels of observed financial wellbeing as workers. Although students have low incomes, their relatively high levels of observed financial wellbeing might reflect their low levels of financial responsibilities. People who are not working because of home duties generally have low reported and observed financial wellbeing, which is consistent with their reduced incomes but greater expenses from additional dependents.

Figure 5.11 Median financial wellbeing by work status

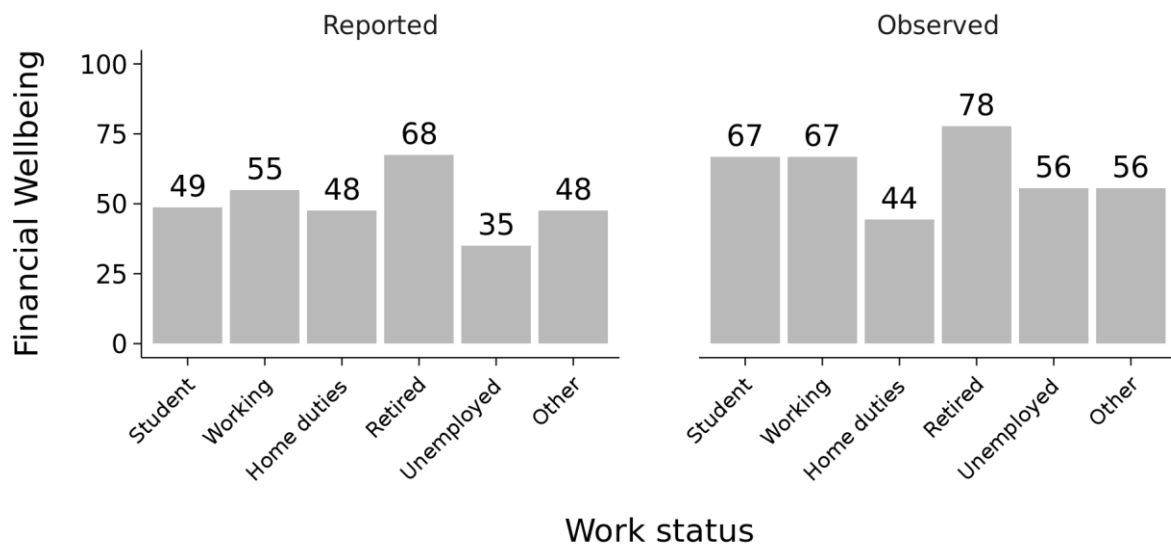


Figure 5.12 shows how median reported and observed financial wellbeing differ among people with different levels of completed schooling. People who completed nine or fewer years of school and people with Certificate I or II credentials have low levels of financial wellbeing while people who completed a bachelor's degree or more schooling have high levels of financial wellbeing. Financial wellbeing generally increases with the amount of secondary schooling and with the attainment of Certificate III or IV credentials, instead of I or II credentials.

Figure 5.12 Median financial wellbeing by completed schooling

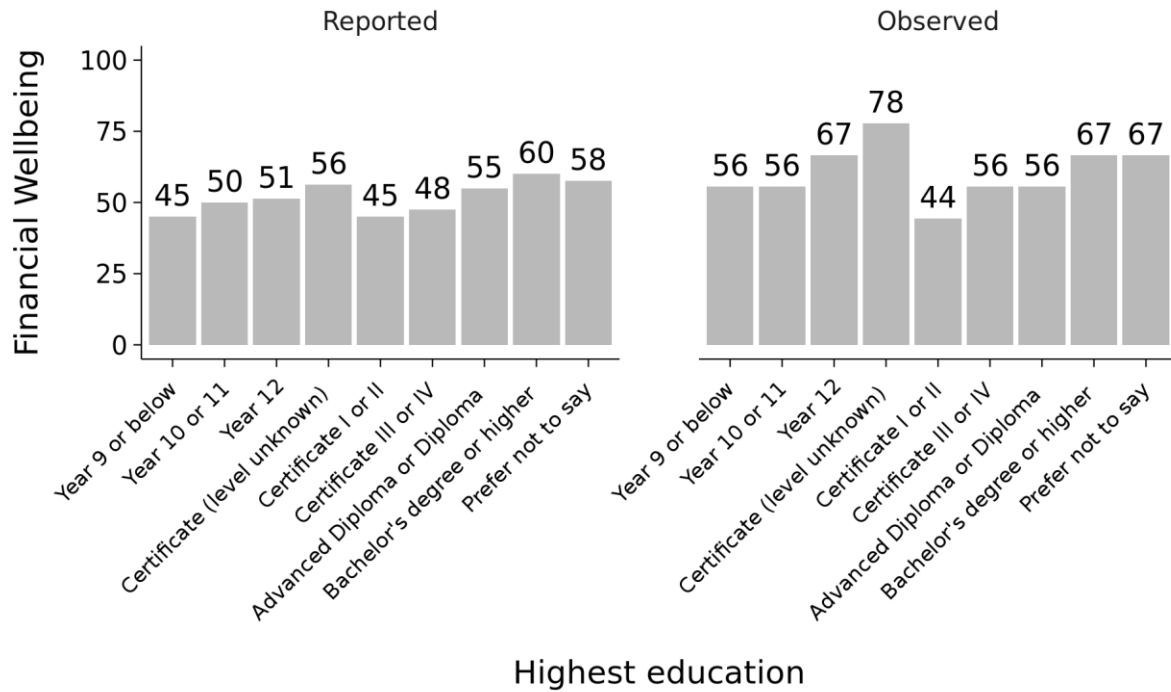


Figure 5.13 shows how median reported and observed financial wellbeing vary with customers' self-assessed overall health status. As with the results for limiting health conditions, reported financial wellbeing is worst for people who report poor overall health and best for people who report excellent health. There is a weaker positive association between observed financial wellbeing and self-assessed health status.

Figure 5.13 Median financial wellbeing by self-assessed health status

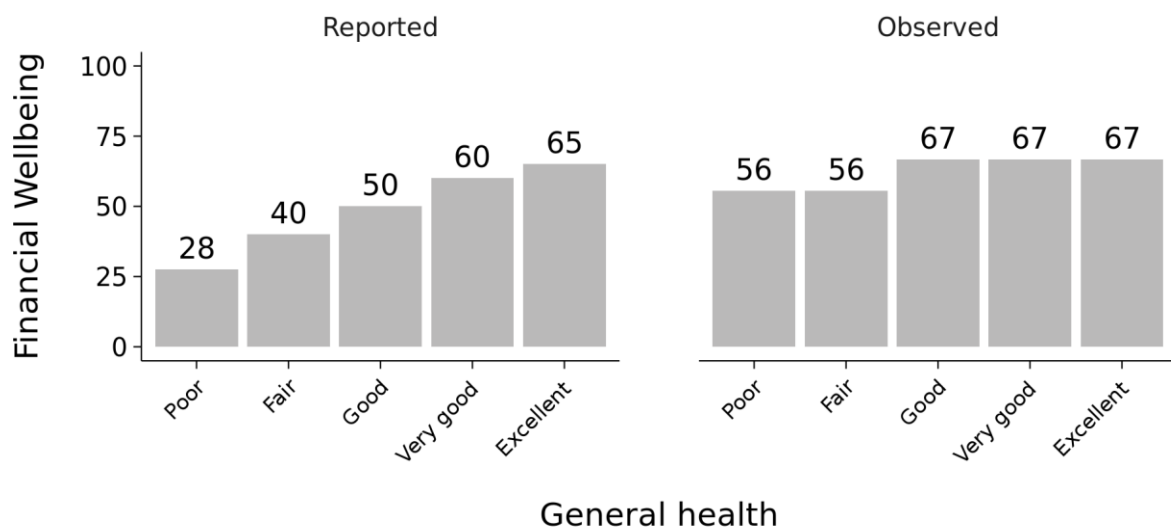
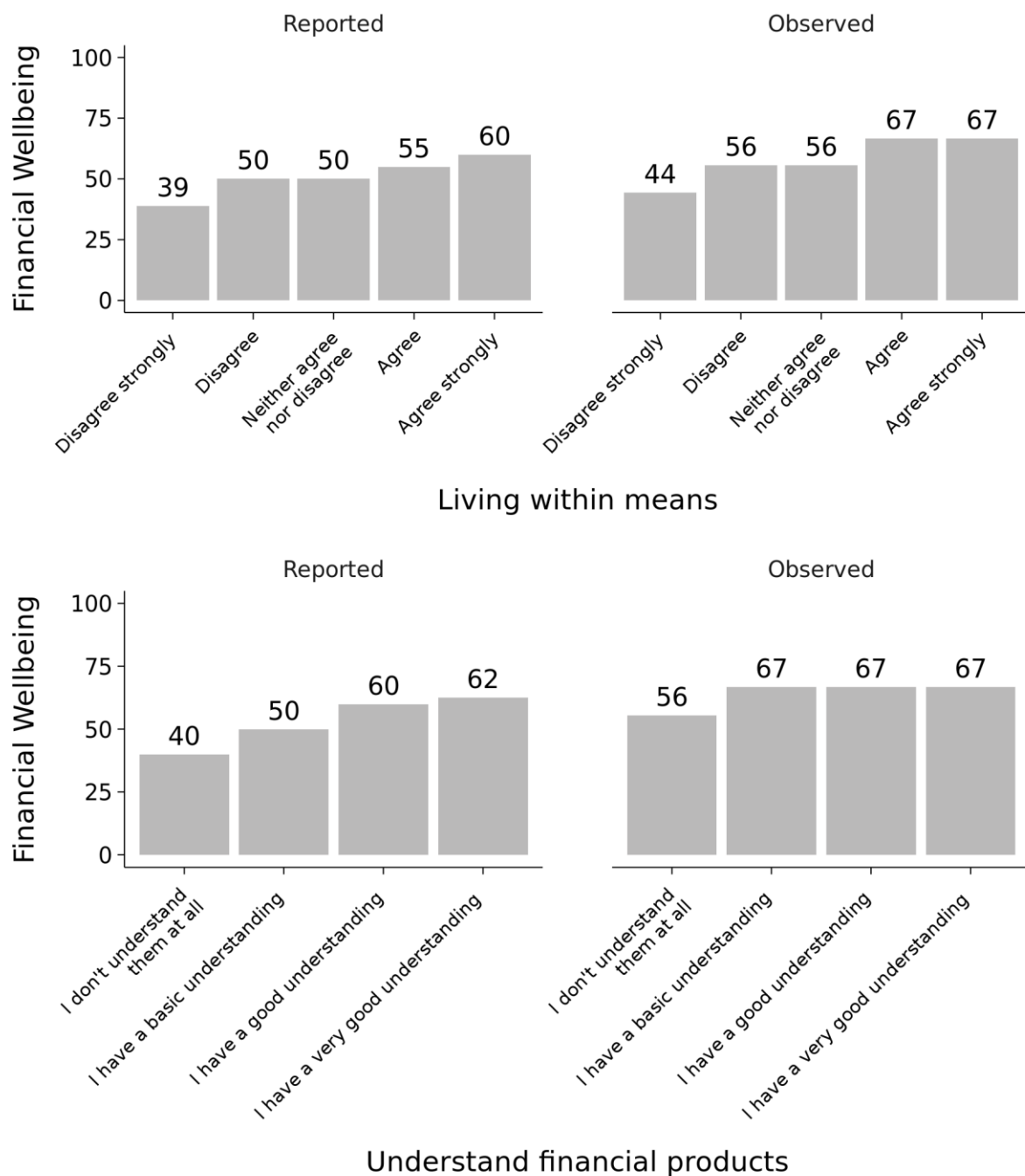
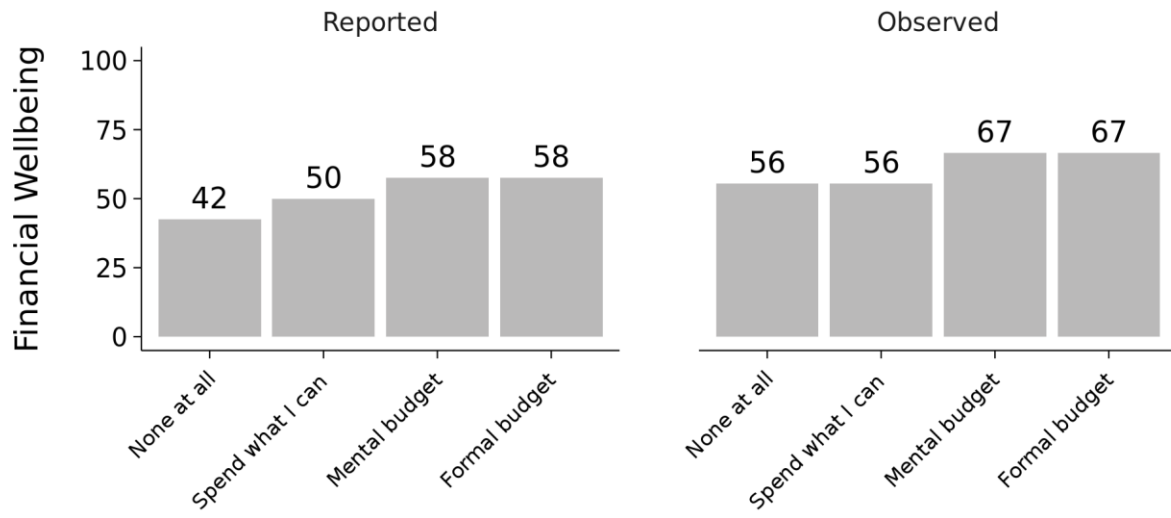


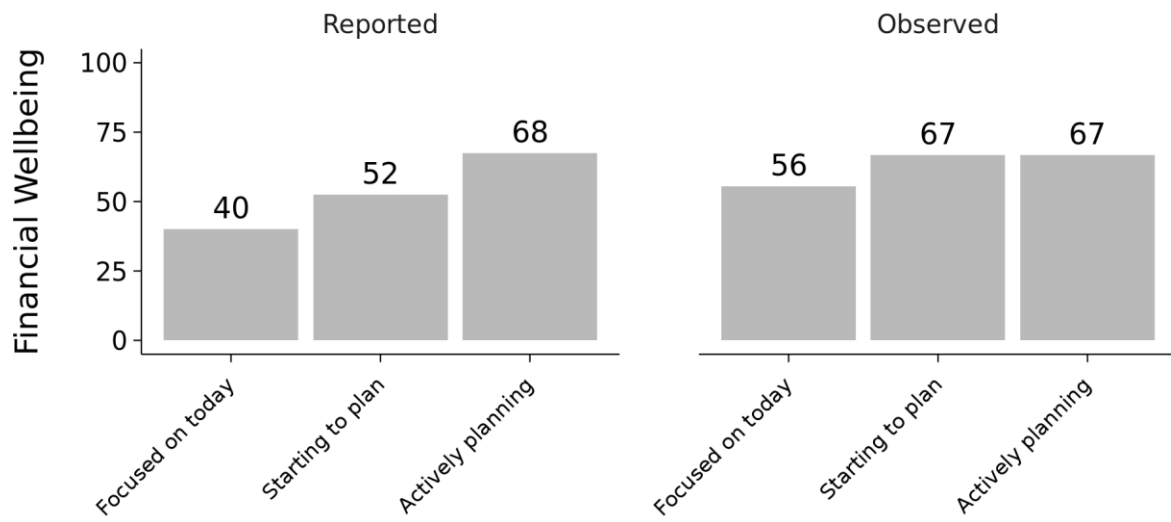
Figure 5.14 shows how median reported and observed financial wellbeing differ with several financial attitudes, capabilities, and behaviours. These include whether people prefer to live within their means and not on credit (first panel), how much they understand financial services and products (second panel), their budgeting behaviour (third panel), their planning horizons and behaviour (fourth panel), and their savings and spending habits (fifth panel). The patterns in the graphs mostly fit with expectations. People with stronger preferences for living within their means, better understanding of financial matters, better budgeting, better and longer-term planning behaviour, and more regular savings habits tend to have better reported and observed financial wellbeing, though the associations with observed financial wellbeing tend to be weaker.

Figure 5.14 Financial wellbeing by financial attitudes, capabilities and behaviours

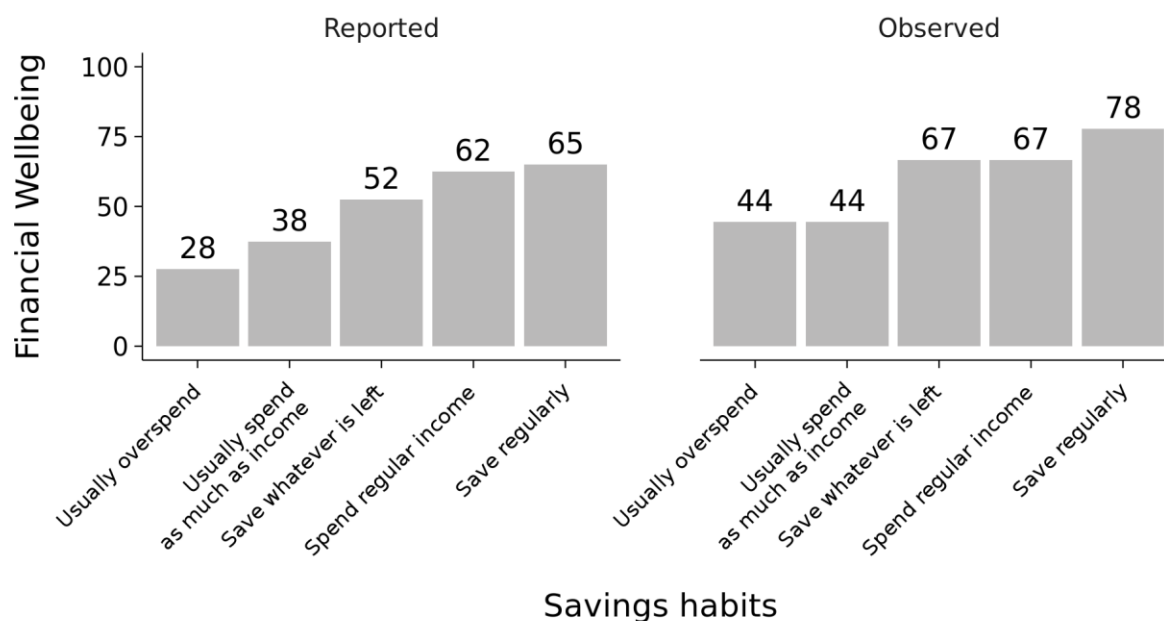




Approach to budgeting



Financial forward-planning



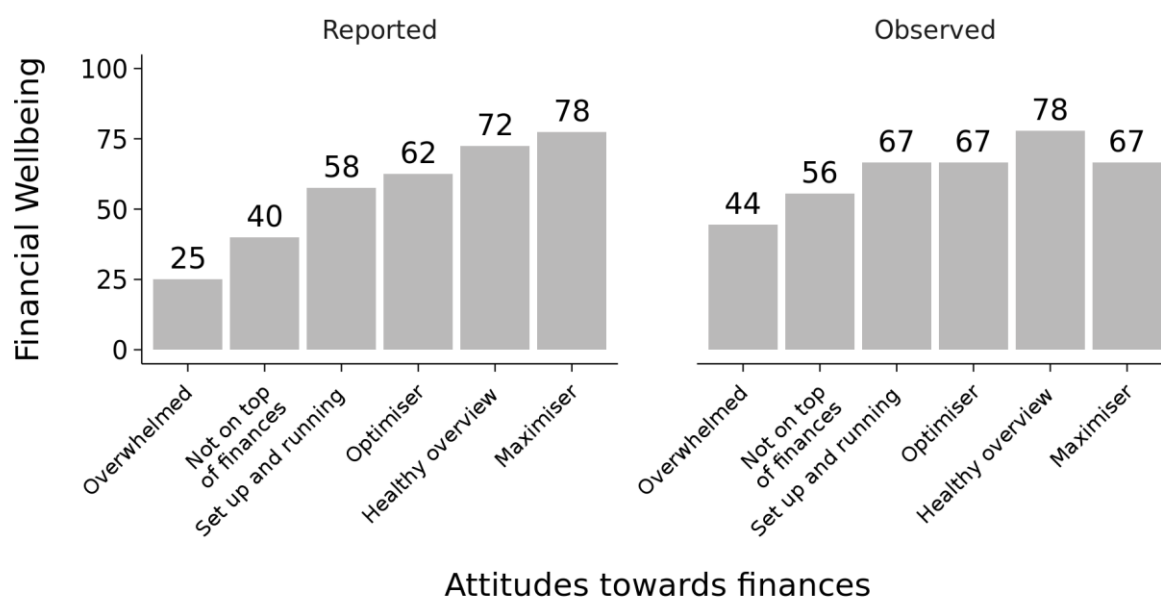
Lastly, survey respondents were presented with six short statements that described financial feelings and behaviours and were asked to pick the statement that best described them. CBA has used these statements in other research as profilers of customers’ financial types. The statements and short labels for the types (the labels were not shown to the respondents) are listed below. Although the statements encompass multiple conditions, they are ordered from a bad set of descriptions to a good set of descriptions.

Statement of behavioural type	Short label
I find my finances overwhelming. There’s not much left for me to spend after my everyday expenses are paid. I tend to avoid thinking too much about my finances as it worries me.	Overwhelmed
I’m not really on top of my finances. I tend to spend money when I have it, don’t really save or stick to a budget. I don’t do much research into financial matters.	Not on top of finances
My finances are all set up and running, there is probably room to optimise them but I feel that there are more important things in life to worry about. I keep a bit of a budget (usually in my head) and do a little research here and there.	Set up and running
I’m on top of my finances and enjoy managing them. I’m constantly looking at ways to optimise them and willing to put in the time and effort. I’m quite disciplined and will cut back on spending to achieve a savings goal. I keep a detailed budget and do a lot of research.	Optimiser
I have a healthy overview of my finances and am happy to get into the detail when I need to. I’m comfortable with my financial position and I have investments working for my future. I always try to have a healthy buffer in place so I can still enjoy the good things in life.	Healthy overview

I'm on top of my finances and actively maximising my wealth for the future. I manage my own portfolio and investments and it's important for my money to work hard for me. I keep a detailed budget and enjoy engaging with the details of my finances.

Figure 5.15 shows how median reported and observed financial wellbeing differed with the typologies. The ordering of people's reported financial wellbeing exactly follows the typologies, and the ordering of people's observed financial wellbeing mostly follows the typologies.

Figure 5.15 Median financial wellbeing by financial behaviour type



6. Conclusion

This report documents how Commonwealth Bank of Australia and the Melbourne Institute: Applied Economic and Social Research jointly developed two scales of financial wellbeing: the CBA-MI Reported Financial Wellbeing Scale and the CBA-MI Observed Financial Wellbeing Scale.

CBA-MI define people's financial wellbeing as the extent to which people both perceive and have: (1) financial outcomes in which they meet their financial obligations, (2) financial freedom to make choices that allow them to enjoy life, (3) control of their finances, and (4) financial security—now, in the future, and under possible adverse circumstances. The definition has situational/temporal dimensions, functional dimensions, and perceived and objectively observable dimensions.

The CBA-MI Reported Financial Wellbeing Scale is the empirical counterpart to the perceived situational/temporal and functional components. The scale is constructed as the sum of the responses to 10 questions, each with five possible outcomes, that ask about the elements of the definition.

The CBA-MI Observed Financial Wellbeing Scale is the empirical counterpart to the objectively observable situational/temporal and functional components. It is constructed as the sum of five

financial-record measures, each with two or three possible outcomes, that are constructed from bank record data.

To develop its scales, the CBA-MI research team reviewed previous conceptualisations and measures of financial wellbeing. The team, with their research partner, FiftyFive5, fielded a large on-line survey of CBA customers' that asked many questions about customers' financial wellbeing and about their financial and personal circumstances. The team linked the survey responses to CBA customer records of people's financial positions and financial transactions and used these data to develop many novel measures of customers' observed financial wellbeing. With the combined survey and customer-record data, the team undertook preliminary data analyses and exploratory factor analyses to refine the set of candidate measures for its scales. It then estimated formal Item Response Theory models to arrive at its final scales. It also undertook confirmatory analyses of its scale procedures in independent samples and validated its scales against other measures.

A key innovation in this project is the use of linked self-reported and customer-record data to measure financial wellbeing. Although previous studies, including the CFPB (2015), Kempson et al. (2017), FiftyFive5 (2017), and Muir et al. (2017), had developed scales based on self-reported measures, no one had constructed an operational scale using bank-record data, and no one had investigated financial wellbeing using self-reported data in combination with customer records. Our analyses show that each of these data sources captures distinct, yet related, aspects of people's financial wellbeing.

Consistent with the research by the CFPB (2015), Kempson et al. (2017), Muir et al. (2017), and others, the CBA-MI Reported Financial Wellbeing Scale incorporates elements of meeting financial obligations and responsibilities, having discretionary spending, being in control, and establishing financial security. Our scale has strong overlaps with the CFPB, from which it draws six items, but it is strengthened by the addition of an item from Muir et al. on necessary expenses, items from FiftyFive5 about being on top of day-to-day finances and being comfortable with net spending and savings, and a new item that we constructed about being on track to meet future financial needs. The availability of many validated and well-performing self-reported items from previous research gave us a deep pool of initial measures to test. The finding that six of the 10 items from the CFPB scale worked well among CBA's Australian bank customers should not come as much of a surprise given the extensive and rigorous testing that went into the CFPB scale items. Two of the four alternative items in the CBA-MI Reported Financial Wellbeing Scale ask about more concrete circumstances than the related CFPB items. For example, where the CFPB scale asks about 'just getting by' financially, the CBA-MI scale asks the Muir et al. question about meeting necessary expenses, complete with a list of those expenses. The CBA-MI scale also asks directly about spending relative to savings. Another difference between the CFPB and CBA-MI scales is that many more CBA-MI items are framed positively—all the CFPB items that are excluded from the CBA-MI scale are either framed negatively or ambiguously. The results from our analysis suggest that Australians respond more consistently to a scale with more concrete and objective content and more positively framed items.

Quantitative analyses show that the CBA-MI Reported Financial Wellbeing Scale discriminates between differences in wellbeing across a wide range of levels and is strongly correlated with many financial and personal characteristics of CBA customers. The correlations are in directions that we would expect based on our conceptual model. For example, reported financial wellbeing is higher for homeowners, is lower for people with health conditions, and increases with income—these associations suggest that the scale is valid.

The CBA-MI Observed Financial Wellbeing Scale is constructed from fewer measures, and the measures have less variation. The observed financial wellbeing scale discriminates more strongly

between differences in wellbeing at low levels of financial wellbeing (two of its five items measure financial problems) than at high levels. It is also less strongly correlated than the reported financial wellbeing scale with CBA customers' financial and personal characteristics. Because there were almost no examples from existing research of measures of financial wellbeing from bank-record data, nearly all the measures in our scale were newly developed. We had fewer candidate measures to consider for inclusion in the scale and had less existing evidence about the likely performance of the measures. Despite these challenges, the CBA-MI Observed Financial Wellbeing Scale has strong statistical properties. The five items have high inter-item reliability. All five items performed well and were shown to discriminate between different levels of financial wellbeing in formal IRT analyses. The resulting scale correlates with characteristics identified in our conceptual model in ways that suggest that the scale is valid. Future research by the CBA-MI team will investigate ways to improve this measure. We have assigned version numbers to the scales because future improvements in the scales may lead to different versions.

The project's most important substantive finding is the distinction between reported and observed financial wellbeing. Our quantitative analyses showed that these are separate components of financial wellbeing. The two components are positively related—people with good reported financial wellbeing tend to have good observed financial wellbeing and vice versa. However, the relationship is far from perfect. As we describe in this report, about one third of the customers from our study had wellbeing that was above the median in one dimension but below the median in the other. This indicates that the way that people perceive and experience financial outcomes can be different from an outsider's objective observation of those outcomes. Having identified these divergences, future research by the CBA-MI team will work to increase our understanding the reasons for them.

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