Developing a short form version of the Commonwealth Bank-Melbourne Institute Reported Financial Wellbeing Scale

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Executive Summary

In previous work in collaboration with Commonwealth Bank of Australia (CBA), researchers from the Melbourne Institute developed two scales of financial wellbeing for Australian customers, namely the CBA-MI Reported Financial Wellbeing Scale and the CBA-MI Observed Financial Wellbeing Scale version 2. Both scales have excellent measurement and statistical properties and adequately measure customers' financial wellbeing. This report is specifically aimed at revisiting the CBA-MI Reported Financial Wellbeing Scale (in this report termed *R-10* for brevity). The R-10 scale consists of 10 items that measure three distinct temporal domains of financial wellbeing, namely six 'every day' outcomes, two 'rainy day' outcomes, and two 'one day' outcomes. These scale components are listed in the table below.

The aim of this report is to develop a short-form version of the CBA-MI Reported Financial Wellbeing Scale that reduces the number of questions, yet:

a) *still covers* all three temporal domains of financial wellbeing in similar proportions,
b) reduces the respondent's cognitive load,
c) reduces the questions asked with reverse-coding,
d) focuses on more perception-based measures as opposed to potentially more confronting factual measures, and
e) maximises the discriminatory properties of the retained questions to maintain the excellent statistical properties of the scale.

The benefits of reduced items in the scale come from lower survey respondent burden, lower data collection/implementation costs and sources of error and potentially lower non-response or attrition rates.

The 5-Item CBA-MI Reported Financial Wellbeing Scale

Following rigorous statistical quantitative testing, we developed a Reported Financial Wellbeing Scale that (a) contains *only half* the questions of the original R-10 scale with five items (in this report termed *R-5* for brevity) but *maintains the same relative proportions* as in R-10 for each of the three financial wellbeing scale time domains with three 'every day' outcomes, one 'rainy day' outcome, and one 'one day' outcome, (b) reduces the number of question blocks from four to two, (c) eliminates reported scale question components with reverse-coding, and (d) maintains the high informational content of the reported scale components.

Our testing reveals that the R-5 scale retains excellent statistical properties and closely follows the R-10 scale. The original R-10 and the new R-5 are strongly correlated (95% Spearman rank correlation) and both are highly associated with customers' *observed* bank-record financial wellbeing scale, yet to a slightly lesser extent (dropping only slightly from a 46% rank correlation for the R-10 scale to a 43% rank correlation for the R-5 scale).

Using multivariate regression analysis, we test statistically the stability of the R-10 and R-5 scales by examining the stability of the association of socio-demographic indicators and financial behaviours with the financial wellbeing scales themselves.

Components of the 10- and 5-item CBA-MI Reported Financial Wellbeing Scale

Domain	Group	Q	Question Text and Source	Possible Responses	R-10	R-5
Every Day	I.	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)	0 - Very difficult 1 - Difficult 2 - Neither difficult nor easy 3 - Easy 4 - Very easy	☑	☒
	II.		How well do the following statements describe you or your situation? (CFPB, 2015)			
Every Day		2	I can enjoy life because of the way I'm managing my money	0 - Not at all 1 - Very little 2 - Somewhat 3 - Very well 4 - Completely	☑	☑
Rainy Day		3	I could handle a major unexpected expense		☑	☑
One Day		4	I am securing my financial future		☑	☒
	III.		How often do the following statements apply to you? (CFPB, 2015)			
Every Day		5	My finances control my life *	0 - Never 1 - Rarely 2 - Sometimes 3 - Often 4 - Always	☑	☒
Every Day		6	I have money left over at the end of the month		☑	☒
Rainy Day		7	Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the month *		☑	☒
	IV.		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)			
Every Day		8	I feel on top of my day to day finances	0 - Disagree strongly 1 - Disagree 2 - Neither agree nor disagree 3 - Agree 4 - Agree strongly	☑	☑
Every Day		9	I am comfortable with my current levels of spending relative to the funds I have coming in		☑	☑
One Day		10	I am on track to have enough money to provide for my financial needs in the future		☑	☑

Notes: * Negative statement that is reverse-coded in the scale. The R-10 scale contains question groups I through IV. The R-5 scale only contains questions 2 and 3 of question group II and all questions from group IV. Both R-10 and R-5 scales have the same relative proportion of 'every day', 'rainy day' and 'one day' questions.

To do this we examine the multivariate regression coefficients of the socio-demographic and financial behaviour correlates for the different scales. Focusing on R-10 and R-5, we compare the regression results in three separate dimensions:

- Is a coefficient of one financial wellbeing scale significantly different from zero, e.g. do women have more, less, or the same financial wellbeing as men for a given financial wellbeing scale?
- Is a coefficient for one financial wellbeing scale significantly different from the coefficient obtained for the same correlate, but for a different financial wellbeing scale, e.g. is the extent to which women have more, less, or the same financial wellbeing as men the same, comparing two different financial wellbeing scales such as R-10 and R-5?
- Comparing all coefficients simultaneously, are all coefficients of one financial wellbeing scale significantly different from those coefficients of a different financial wellbeing scale, i.e. comparing across all indicators simultaneously, are the indicators collectively similar or different?

Our multivariate regression analysis demonstrates that with only minor exceptions, individual characteristics are closely related in similar ways to the R-10 and R-5 measures:

- Most significant correlates of the financial wellbeing scales are significantly different from zero in both reported scales.
- Most insignificant correlates in R-10, are also insignificant in R-5.
- No significant correlates change signs when moving from R-10 to R-5.
- Whilst *in total* the coefficient magnitudes *unsurprisingly* do change significantly from R-10 to R-5, the magnitudes of many coefficients remain largely *stable and qualitatively unchanged*, indicating a high degree of stability.

Given its fewer component items, the new R-5 scale naturally contributes less total information on financial wellbeing and is coarser when compared to the R-10 measure, and this is evident in the statistical tests. Nevertheless, the combined results in this report suggest that the R-5 scale is an *immediately viable short-form alternative* to the R-10 scale for measuring the self-reported financial wellbeing of Australian customers. The R-5 scale has the advantage of requiring fewer questions/response structures, reducing survey duration and respondent cognitive and survey burden, yet behaves in a manner very similar to the R-10 scale, providing qualitatively the same insights.

1. Introduction

To understand better the financial wellbeing of Australians, Comerton-Forde et al. (2018) and Haisken-De New et al. (2019) developed novel financial wellbeing scales (CBA-MI Reported Financial Wellbeing Scale and CBA-MI Observed Financial Wellbeing Scale) for Commonwealth Bank of Australia customers.

The existing work on the CBA-MI Financial Wellbeing scales has been successful in understanding (a) how Australians' financial wellbeing can be measured and (b) the way socio-demographic and financial correlates relate to the scales. Considering CBA's continued commitment to improve Australians' understanding of their financial wellbeing and increasing adoption of the financial wellbeing instruments across organisations, in this report we explore whether we can better optimise the balance between measure granularity and survey response and respondent burden considerations for the self-reported measure. Thus, we aim to create a short-form survey measure that is simpler and easier for organisations to implement, and quicker and easier for customers to complete, yet remaining true to the original Reported Financial Wellbeing measure.

This report revises the published CBA-MI Reported Financial Wellbeing Scale (see Table 1), which consists of 10 items that measure various aspects of reported financial wellbeing. Our aim is to reduce the number of questions required to provide a statistically meaningful self-reported measure across all conceptual dimensions of financial wellbeing.

We construct a 5-item version of the CBA-MI Reported Financial Wellbeing Scale with the aim of minimising the loss of information, yet still ensuring that customers' financial wellbeing can be reliably measured across all financial wellbeing dimensions.[1] Relative to the original CBA-MI Reported Financial Wellbeing Scale, we examine the properties of the 5-item scale and demonstrate how the scale performs as a measure of reported financial wellbeing. We also examine how the 5-item scale relates to the CBA-MI Observed Financial Wellbeing Scale.

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[1] This report for CBA in Australia and the underlying analysis follows, by design, closely the report and analysis for ASB Bank Limited, the CBA affiliate in New Zealand (see Botha and de New, 2020).

Table 1 Components of the 10- and 5-item CBA-MI Reported Financial Wellbeing Scale

Domain	Group	Q	Question Text and Source	Possible Responses	R-10	R-5
Every Day	I.	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)	0 - Very difficult 1 - Difficult 2 - Neither difficult nor easy 3 - Easy 4 - Very easy	☑	☒
	II.		How well do the following statements describe you or your situation? (CFPB, 2015)			
Every Day		2	I can enjoy life because of the way I'm managing my money	0 - Not at all	☑	☑
Rainy Day		3	I could handle a major unexpected expense	1 - Very little 2 - Somewhat	☑	☑
One Day		4	I am securing my financial future	3 - Very well 4 - Completely	☑	☒
	III.		How often do the following statements apply to you? (CFPB, 2015)			
Every Day		5	My finances control my life *	0 - Never	☑	☒
Every Day		6	I have money left over at the end of the month	1 - Rarely 2 - Sometimes	☑	☒
Rainy Day		7	Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the month *	3 - Often 4 - Always	☑	☒
	IV.		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)			
Every Day		8	I feel on top of my day to day finances	0 - Disagree strongly	☑	☑
Every Day		9	I am comfortable with my current levels of spending relative to the funds I have coming in	1 - Disagree 2 - Neither agree nor disagree	☑	☑
One Day		10	I am on track to have enough money to provide for my financial needs in the future	3 - Agree 4 - Agree strongly	☑	☑

Notes: * Negative statement that is reverse-coded in the scale. The R-10 scale contains question groups I through IV. The R-5 scale only contains questions 2 and 3 of question group II and all questions from group IV. Both R-10 and R-5 scales have the same relative proportion of 'every day', 'rainy day' and 'one day' questions.

2. Defining and conceptualising financial wellbeing

2.1 Definition of Financial Wellbeing

To measure people's financial wellbeing, we must first be clear about the definition of financial wellbeing. Financial wellbeing is a complex, multi-faceted concept, and researchers have developed many different definitions. We adopt the definition from Comerton-Forde et al. (2018) that was the basis for the CBA-MI financial wellbeing scales, with financial wellbeing defined 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 incorporates several important considerations. First, it 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.

Second, it incorporates *temporal, or situational, elements* of people's finances. These include situations that involve:

- people's immediate day-to-day and month-to-month financial outcomes ('every day' outcomes),
- outcomes that prepare people to maintain their wellbeing in unexpected, adverse events ('rainy day' outcomes), and
- outcomes that allow people to sustain their wellbeing over time and achieve long-term goals ('one day' outcomes).

Third, it 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), Brüggen et al. (2017), the U.S. Consumer Financial Protection Bureau (CFPB, 2015), Muir et al. (2017), and others.

Finally, the definition allows financial wellbeing to consist of financial outcomes that people experience, interpret, and can report, and outcomes that can be objectively observed in their financial accounts and transactions.

2.2 Conceptual Model

Financial wellbeing is also framed within a conceptual model that helps us understand the properties of financial wellbeing and how it is determined. In short, household characteristics, external conditions, and financial behaviour are conceptualised as the three main determinants of financial wellbeing. Household characteristics and external conditions are outside people's control, whereas financial behaviours are due to people's actions and decisions. Given the emphasis of this report on developing a short-form version of the existing 10-item CBA-MI Reported Financial Wellbeing Scale, the detailed features of the conceptualisation are not discussed here but are available in Comerton-Forde et al. (2018) and Haisken-DeNew et al. (2019).

3. The Financial Wellbeing Scales

3.1 The Reported Financial Wellbeing Scales

3.1.1   The 10-item Reported Financial Wellbeing Scale

The CBA-MI Reported Financial Wellbeing Scale (Table 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. Each question has five possible responses, with the worst outcome assigned a value of zero and the best outcome assigned a value of four. Nine of the 10 questions were originally drawn from other sources, including six from the CFPB (2015), one from Muir et al. (2017), and two from FiftyFive5 (2017). Table 1 lists the questions, original sources, and possible responses.

The ten scale items are denoted by each of the three scale domains: 'every day', 'rainy day' and 'one day'. A person's reported financial wellbeing scale value is formed by 'reverse coding' the answers to questions 5 and 7 so that higher values indicate better outcomes, adding the responses to all 10 questions, and multiplying the sum by 2½. This produces a 0-100 scale with 41 possible discrete values, in which larger values indicate higher reported financial wellbeing.

The questions in the 10-item Reported Financial Wellbeing Scale (henceforth termed *R-10* for brevity) cover all the functional and situational/temporal elements of the definition of financial wellbeing. Question 1 addresses meeting financial obligations; questions 2 and 6 address financial freedom; questions 5, 8, and 9 address control over finances; and questions 3, 4, 7, and 10 address financial security. Similarly, questions 1, 2, 8, and 9 address present situations; questions 4 and 10 address anticipated future situations; and question 7 addresses unexpected situations.

3.1.2   Exploring a Short Form Reported Financial Wellbeing Scale

There are strong cost incentives for data collectors to restrict collecting information only to those questions of most relevance. Whilst there are many detailed and nuanced questions one

could ask to construct a detailed reported financial wellbeing scale, the practical issue remains that the more questions asked in an online survey, due to respondent fatigue there is the possibility that (a) it becomes less likely that a respondent will complete the question, increasing *item non-response*, (b) it becomes less likely that the respondent will complete the survey, increasing cross-sectional *unit non-response*, (c) and it becomes less likely that the respondent will complete the next survey in a longitudinal questionnaire or increasing *longitudinal attrition*. Hence this report explores the possibilities for reducing the number of questions asked, (a) thereby avoiding respondent fatigue and burden, and (b) saving surveyor resources, thereby having the potential to increase the possibility of higher response rates and data quality at lower cost.

Our aim is to produce a reported financial wellbeing scale similar to the original 10-item CBA-MI Reported Financial Wellbeing Scale, but with fewer component items. We test the sensitivity of the CBA-MI Reported Financial Wellbeing Scale when reducing the number of reported components to 5, exactly half of the original battery of questions. In so doing, we keep the same proportion of questions addressing current 'every day' expenditure (60%), unexpected 'rainy day' savings (20%) and more distant future 'one day' savings (20%).

The analysis that follows will provide guidance as to: (a) which specific scale components are dropped or kept producing the 5-item scale, (b) the feasibility of this endeavor and the potential implications for the scales, and (c) the extent to which the socio-demographic and individual correlates continue to predict the financial wellbeing scales in a similar manner.

3.1.3   The 5-item Reported Financial Wellbeing Scale

The main goal of this report is to develop a shorter version of the R-10 scale that would consist of only half the items. We therefore set out to construct a (self-) reported scale that includes 5 items, but still covered all the dimensions of financial wellbeing. Based on the objective of reducing respondent cognitive load and on the results of quantitative testing (see Appendix B for more technical detail), questions 1, 4, 5, 6 and 7 were dropped from the scale. Table 1 lists the resulting 5-item Reported Financial Wellbeing Scale (termed the *CBA-MI Reported Financial Wellbeing Scale 5* and for brevity henceforth referred to as *R-5* in this report) items.

Whereas the original R-10 scale had 6 questions in the 'every day' dimension and 2 questions each in the 'rainy day' and 'one day' dimensions, the R-5 scale contains half of the questions in *each* dimension; 3 in 'every day' and 1 each in 'rainy day' and 'one day'. Thus, the R-5 scale still covers *all* dimensions of financial wellbeing, with questions 2, 8, and 9 addressing present situations ('every day' expenses); question 3 addressing unexpected situations ('rainy day' expenses); and question 10 addressing anticipated future situations ('one day' expenses). Further, the R-5 measure maintains the *same compositional weight* as the R-10: R-10 contains 10 items with 6 'every day', 2 'rainy day' and 2 'one day' components and R-5 contains only half the number of components at 5, but kept in original proportion: 3 'every day', 1 'rainy day' and 1 'one day'.

The responses to the 5 questions were summed together and the sum multiplied by 5 to produce a 0-100 scale with 21 possible discrete values in which larger values indicate higher reported financial wellbeing.

3.2 The Observed Financial Wellbeing Scale

The CBA-MI Observed Financial Wellbeing Scale, version 2 (Haisken-DeNew et al., 2019) is formed from five additional measures numbered 11-15 in Table 3.2 that come from records of customers' spending, savings, credit, and payment outcomes. Measure 11 has four possible outcomes, and all the other measures have five, with the worst financial wellbeing outcomes assigned values of zero and better outcomes assigned higher values.

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

The measures in the scale also address the functional and situational/temporal elements of the definition of financial wellbeing. Measure 11 encompasses elements of meeting financial obligations; measure 12 addresses conditions that give rise to financial freedom; and measures 14 and 15 describe outcomes that provide control and security. The measures also span our situational space with measures 11, 12, and 13 addressing situations in the present; measure 15 addressing anticipated situations in the future; and measure 14 addressing unexpected situations.

Quantitative testing, which is described in Appendix B, indicated that observed financial wellbeing was distinct from reported financial wellbeing and that none of the items in the scales overlapped. As with the Reported Financial Wellbeing Scales, testing also showed that all the outcomes to all the measures in Table 3.2 contributed to the measurement of observed financial wellbeing.

Table 3.2 Components of the Observed Financial Wellbeing Scale

Domain	Q	Measure	Possible Outcomes	OBS
Present	11	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 or dishonours or was over-limit 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 events, or late fees 3 - Had no payment problems	☑
Present	12	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	☑
Present	13	Months in last year when spending exceeded 80% of inflows	0 - 11 or 12 months 1 - 9 or 10 months 2 - 7 or 8 months 3 - 4, 5, or 6 months 4 - 3 or fewer months	☑
Unexpected Situations	14	Days in last year during which customer had the ability to raise 1 or 6 months' expenses from savings or available credit	0 - Could never 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 months' expenses 4 - Could always raise 3 months' expenses	☑
Antcipated Future	15	Savings relative to people their own age (age-normed residual of customer's median	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	☑

3.3 Properties of the Scales

Simple Summations

All financial wellbeing scales are formed from simple summations of categorical responses, which are then multiplied by an appropriate constant to arrive at the 0 to 100 scales. This method restricts the way the underlying data contribute to the scales. It 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 a person's score on the scales gives us information about that person's self-reported answers or bank-record measures.

A Measure of Relative Wellbeing

The scores from the Reported and 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

To place more meaning on the score values, 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 the categories and explain their meanings in Table 3.3, which are unchanged from Haisken-DeNew et al. (2019).

Table 3.3 Descriptive Categories of the CBA 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.: 25.0 – 47.5 Obs.: 31.6 – 52.6	Experienced a negative outcome (1 or lower) for one or more conditions
Getting by	Rep.: 50.0 – 75.0 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

It is important to remember that 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 similar sets of underlying conditions.

4. The Data

For the main analysis, we use data from an on-line survey of 4,470 CBA customers conducted during August 2017. With the customers' permission, their survey responses were linked to their financial records. Detailed descriptions of the survey, procedures, recruitment materials, and instruments are discussed in Comerton-Forde et al. (2018), with more detailed information on the distributions of measured characteristics reported in Haisken-DeNew et al. (2018). Characteristics of the survey respondents are reported in Table A.1 of Appendix A.

5. Distribution of Financial Wellbeing

Figure 5.1 shows the percentages of main-bank customers in the on-line survey with each level of reported financial wellbeing, for each self-reported scale, and in each of the four descriptive categories. Customers' scale values ranged over the entire set of possible outcomes from 0 to 100. 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—was 55 for both R-10 and R-5. The modal value (value with the most responses) was 55 for R-10 and 60 for R-5, whereas the average value was 53.2 for R-10 and 52.6 for R-5. The distributions are skewed towards higher scale values, meaning that customers were somewhat more likely to report good or neutral wellbeing outcomes than bad outcomes.

Figure 5.1 Distributions of Reported Financial Wellbeing
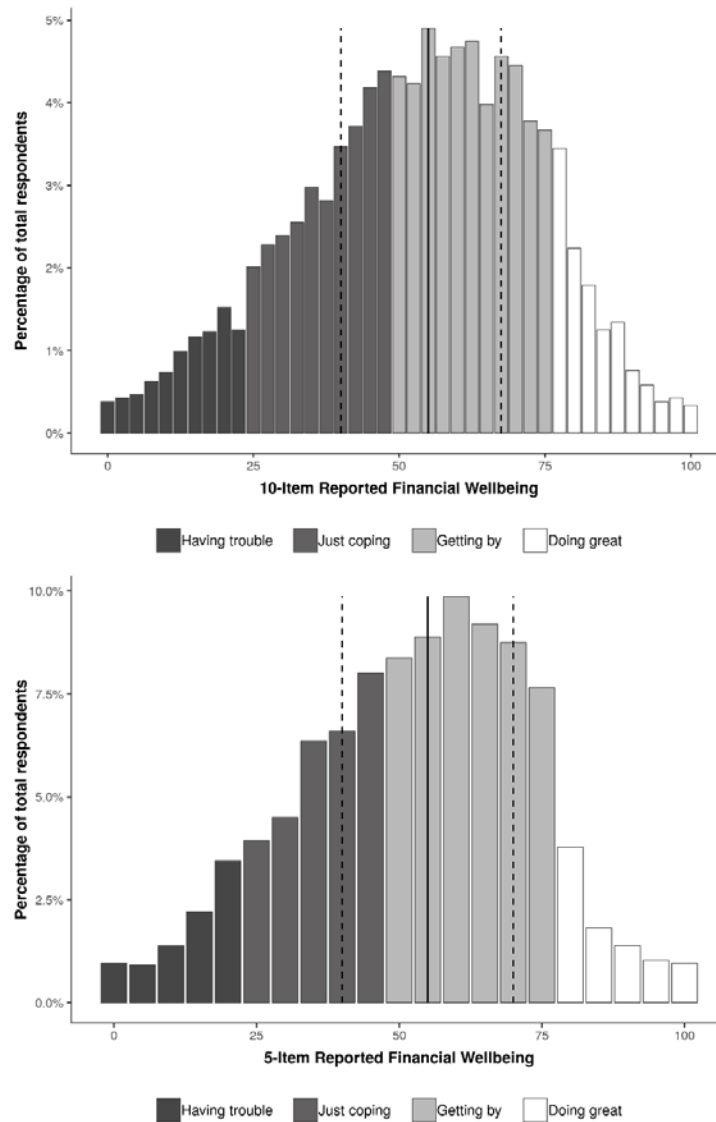
Figure 5.1 is shaded to show the portions of customers in each of descriptive category for the Reported Financial Wellbeing Scales. For the R-10 scale,

- 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
- 12.6 per cent had scores in the highest category of 'doing great' (shaded white).

For the R-5 scale,

- 8.9 per cent of customers had scores in the lowest category of 'having trouble'

(shaded ■)
- 29.4 per cent had scores in the second lowest category of 'just coping' (shaded ■)
- 52.7 per cent had scores in the second highest category of 'getting by' (shaded ■), and
- 9.0 per cent had scores in the highest category of 'doing great' (shaded white).

There is significant overlap of the customers in the descriptive categories across both self-reported scales. Similar proportions of customers have scores in the 'having trouble' and 'just coping' categories on both scales. A slightly higher portion of customers have scores in the 'getting by' category in the R-5 scale relative to the R-10, whereas a slightly higher portion of customers have scores in the 'doing great' category in the R-10 scale relative to the R-5.

Figure 5.2 shows kernel density depictions of the R-10 and R-5 distributions. Ideally, the distributions should be as close to each other as possible, if removing a measure component were to affect people in a similar manner across the financial wellbeing distribution. Comparing R-10 to R-5, clearly more mass from the right of the distribution has shifted to the left of the distribution. From 40-60 and 75-90 on the scale, R-5 has less mass, which is equally compensated for more mass spread out over 60-75 on the scale. Despite the small differences, both reported financial wellbeing scale distributions are very close to each other.

Figure 5.2 Kernel Density Distributions of Reported Financial Wellbeing Scales
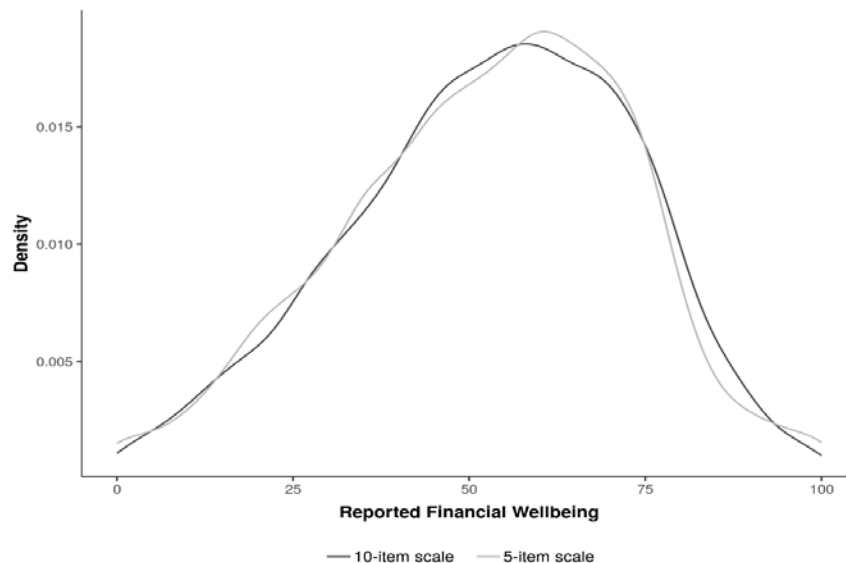
Figure 5.3 plots the R-10 and R-5 distributions simultaneously to enable comparisons that take account of each scale's number of outcomes. Consistent with Figure 5.2 and as expected, the distributions are similar in terms of their coverage at different values of the 0-100 scale. The R-5 has fewer discrete outcomes than the R-10, which is why the former contains a higher percentage of responses at each value.

Figure 5.3 Distributions of R-10 and R-5 Financial Wellbeing Scales
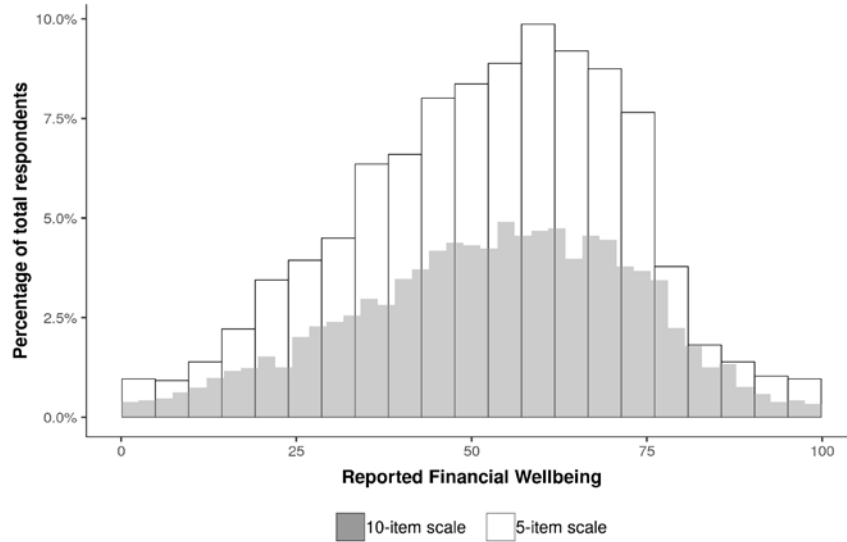
Figure 5.4 shows the percentages of customers in the survey with each level of observed financial wellbeing. As with the reported financial wellbeing scales, customers' values of observed financial wellbeing spanned all the possible values of the scale. The median and modal value of observed financial wellbeing were each 57.9, and the average was 54. A quarter of customers had scores of 26.3 or below, and a quarter had scores of 73.7 and above. The distribution was not especially skewed, and relatively few customers had values at the top or bottom of the distribution.

Figure 5.4 Distribution of Observed Financial Wellbeing
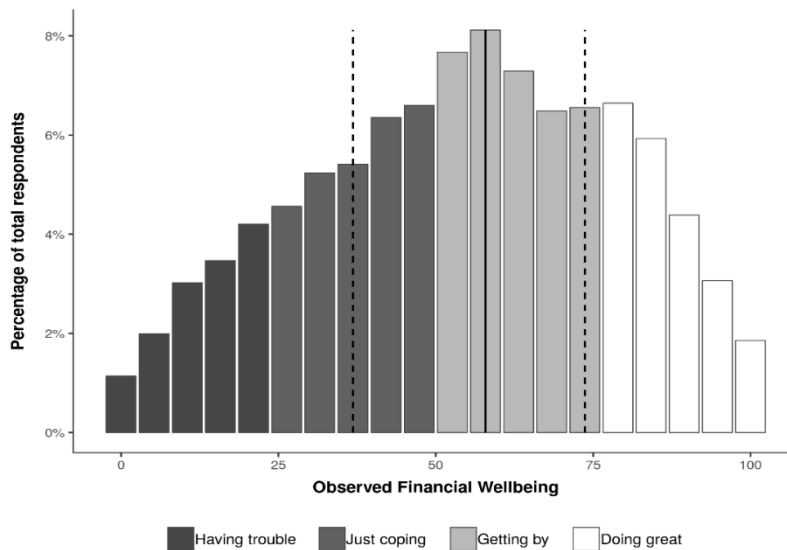
For the Observed Financial Wellbeing Scale,

- 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' (shaded white).

Although the Reported and Observed Financial Wellbeing Scales are distinct, they are strongly positively related—that is, customers with high reported financial wellbeing tend to have high observed financial wellbeing and vice versa. Table 5.1 presents Spearman (rank) correlations between the various financial wellbeing scales. As we would expect, the correlation between the self-reported scales are very high: The correlation between the R-10 and R-5 scale is 95.2%. Correlations of the observed scale with the self-reported scales are very similar, ranging only from 42.9% for the R-5 scale to 46.5% for the R-10 scale. Hypothesis tests of statistical independence between all scales are strongly rejected with p-values less than 0.001, suggesting the scales are highly correlated among themselves.

Table 5.1 Spearman Correlation Matrix of Reported Scales and Observed Scale

	R-10	R-5	OBS
10-item Reported Scale	1.000		
5-item Reported Scale	0.952	1.000	
Observed Scale	0.465	0.429	1.000

To illustrate the relationships between the scales, Figure 5.5 plots the percentages of customers with scores in each of the four descriptive categories of the various scale distributions. In Appendix A, Figure A.1 also contains heat maps of the financial wellbeing scales where we consider quintiles instead of the four descriptive categories. If the scales were uncorrelated, we would only expect about 20 per cent of customers to be in the same category. However, it is clearly the case that the scales are indeed highly correlated.

Plotting the R-10 categories against the R-5 categories in Figure 5.5, 82.1 per cent of customers fall in the same category in both distributions. The remaining 17.9 per cent are only within one category of each other, and no customers are more than one category apart on the two self-reported scales. Consistent with the positive relationship between the reported and observed scales, 40.5 per cent (40.3 per cent) of customers have scores that are in the same category of the R-10 (R-5) and observed scale distributions. The heat maps therefore show that there is substantial overlap between the R-10 and R-5 scales in terms of the proportion of customers in each descriptive category, and that both the R-10 and R-5 scales are very similar in terms of their relationship with the observed scale.

Figure 5.5 Heat Maps of Financial Wellbeing Scales, by Descriptive Categories
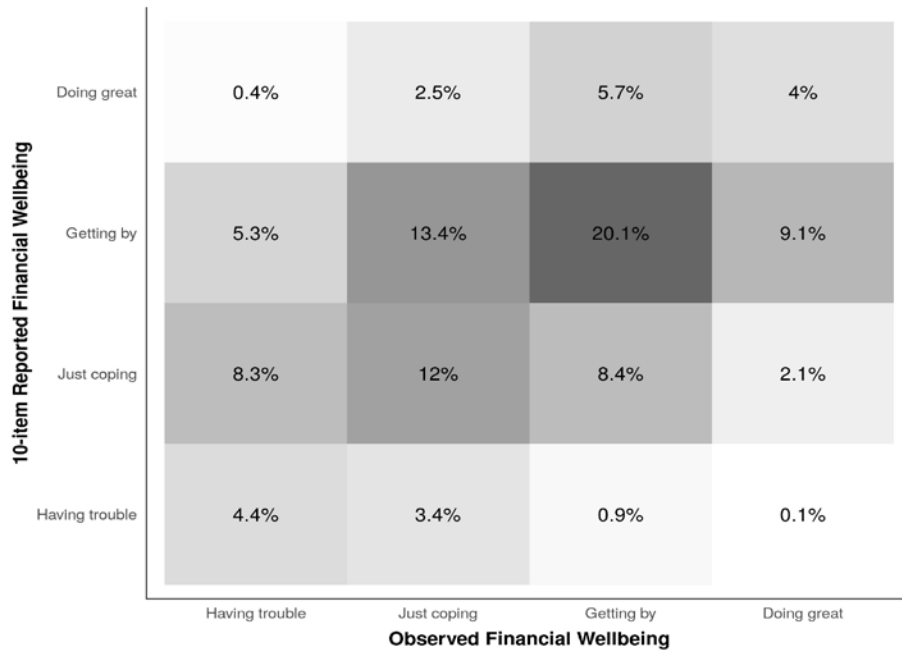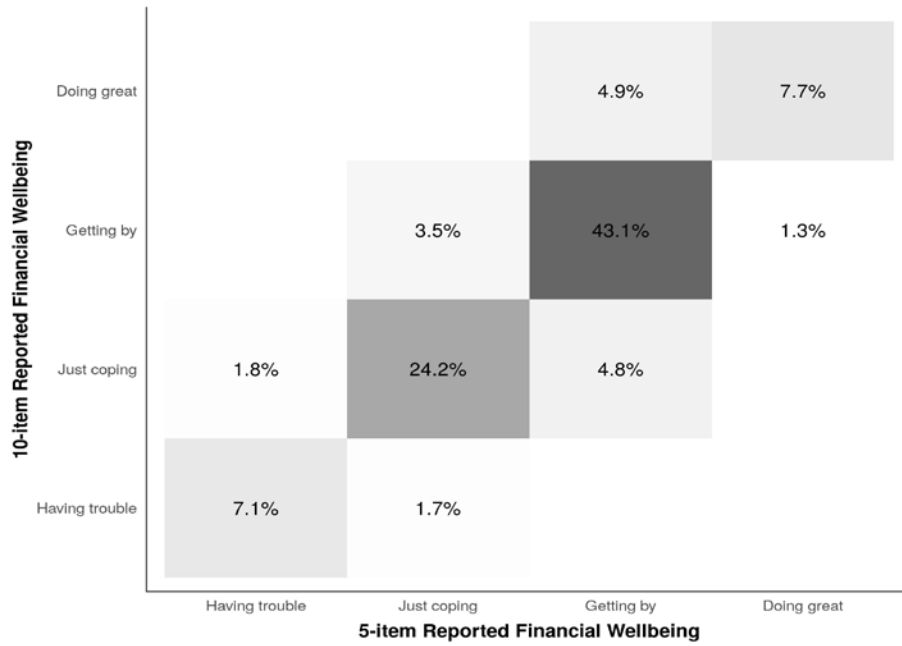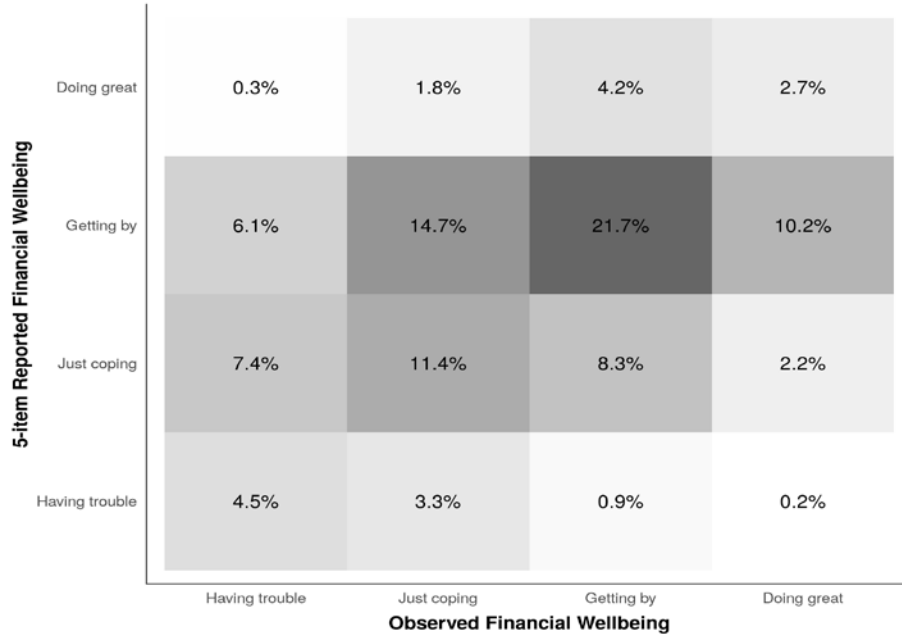
6. Associations between Financial Wellbeing and People's Characteristics

In this section we examine how the Reported and Observed Financial Wellbeing Scales vary depending on people's characteristics. We consider characteristics that were included in the on-line survey and that also correspond to the elements in our conceptual model. These include measures of people's personal and household characteristics, their external conditions, and their financial behaviours.

6.1 Comparisons of Full Distributions

We begin by showing the full distributions of the Reported and Observed Financial Wellbeing Scales for customers who differ in terms of several characteristics that can be described in terms of two mutually exclusive outcomes, such as gender (men or women) or home ownership (owning a home or not owning a home).

Figure 6.1 shows the percentages of women and men with different values of the Reported and Observed Financial Wellbeing Scales. Financial wellbeing tends to be somewhat lower for women than for men. Women were more likely than men to have low levels of reported financial wellbeing and less likely to have high levels, though the differences are modest. The distributions for men and women are very similar across both self-reported scales. There is also a relationship for observed financial wellbeing, but it is weaker and less uniform.

Figure 6.1 Women's and Men's Financial Wellbeing
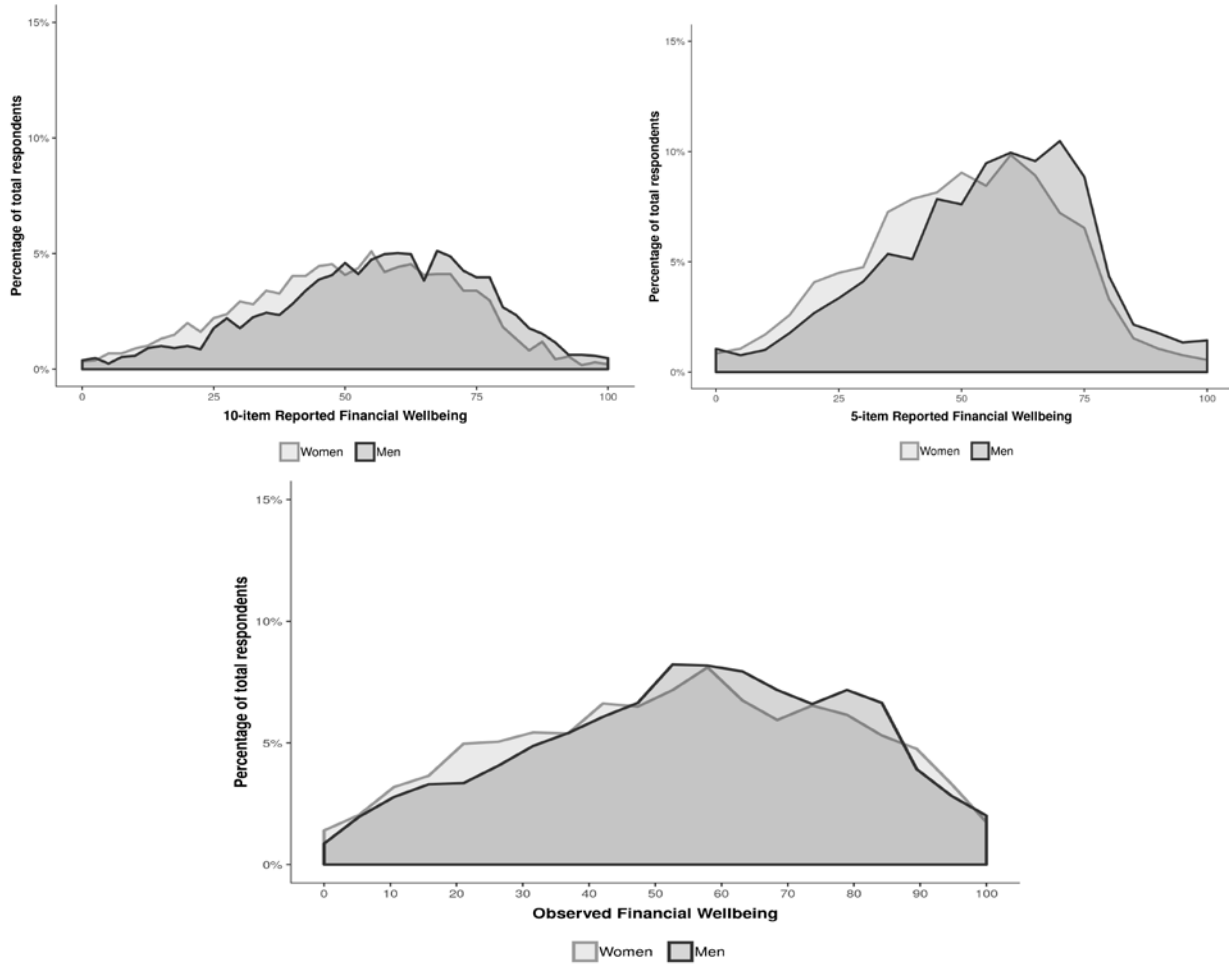
Figure 6.2 shows the distributions of financial wellbeing for customers who do and do not own their homes. Home owners (which includes people with mortgages and people who own their homes outright) have substantially higher distributions of reported and observed financial wellbeing than non-home-owners. The distributions between homeowners and non-homeowners are similar for the two reported scales, thus homeowners have much higher levels of reported financial wellbeing regardless of the reported scale considered.

Figure 6.2 Financial Wellbeing by Home Ownership
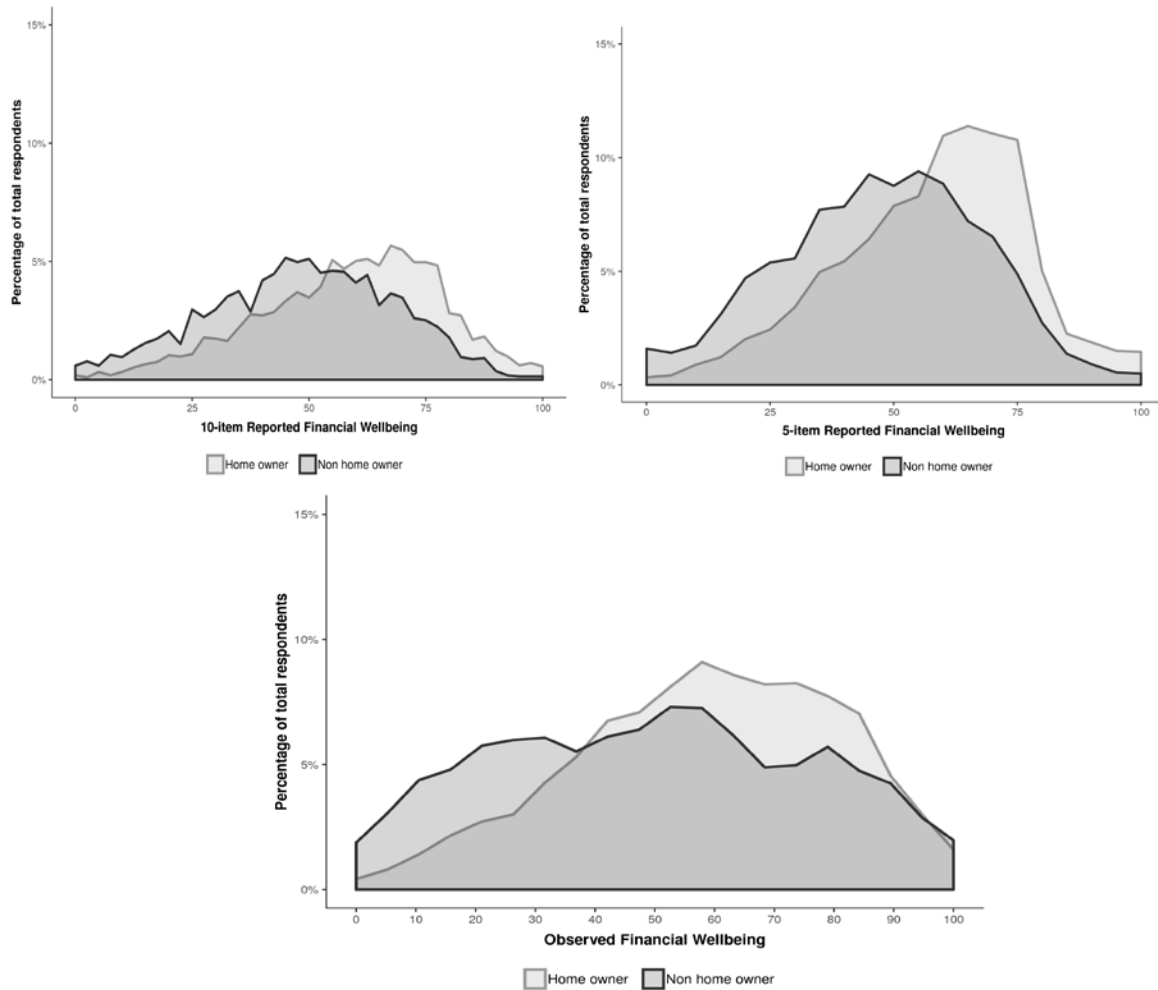
Figures 6.3 and 6.4 show the distributions of financial wellbeing for customers who did and did not report a major worsening in their financial situation, such as going bankrupt, during the previous year. The bottom panels show the distributions for customers who did and did not report major improvements, such as receiving an inheritance or getting a large bonus. Each type of change is associated with reported and observed financial wellbeing in ways that we would expect, with financial worsenings being associated with lower financial wellbeing and improvements being associated with better financial wellbeing. Again, for both financial worsening and improvement, the distribution patterns are very similar across the two reported financial wellbeing scales.

An interesting pattern is that worsenings, or losses, have a much stronger association with financial wellbeing than improvements, or gains. The questions in the survey did not ask about the specific size of the financial changes, so it is possible that the worsenings were quantitatively larger than the gains. However, the patterns are consistent with people being more sensitive to losses than gains.

Figure 6.3 Financial Wellbeing Following Financial Worsening
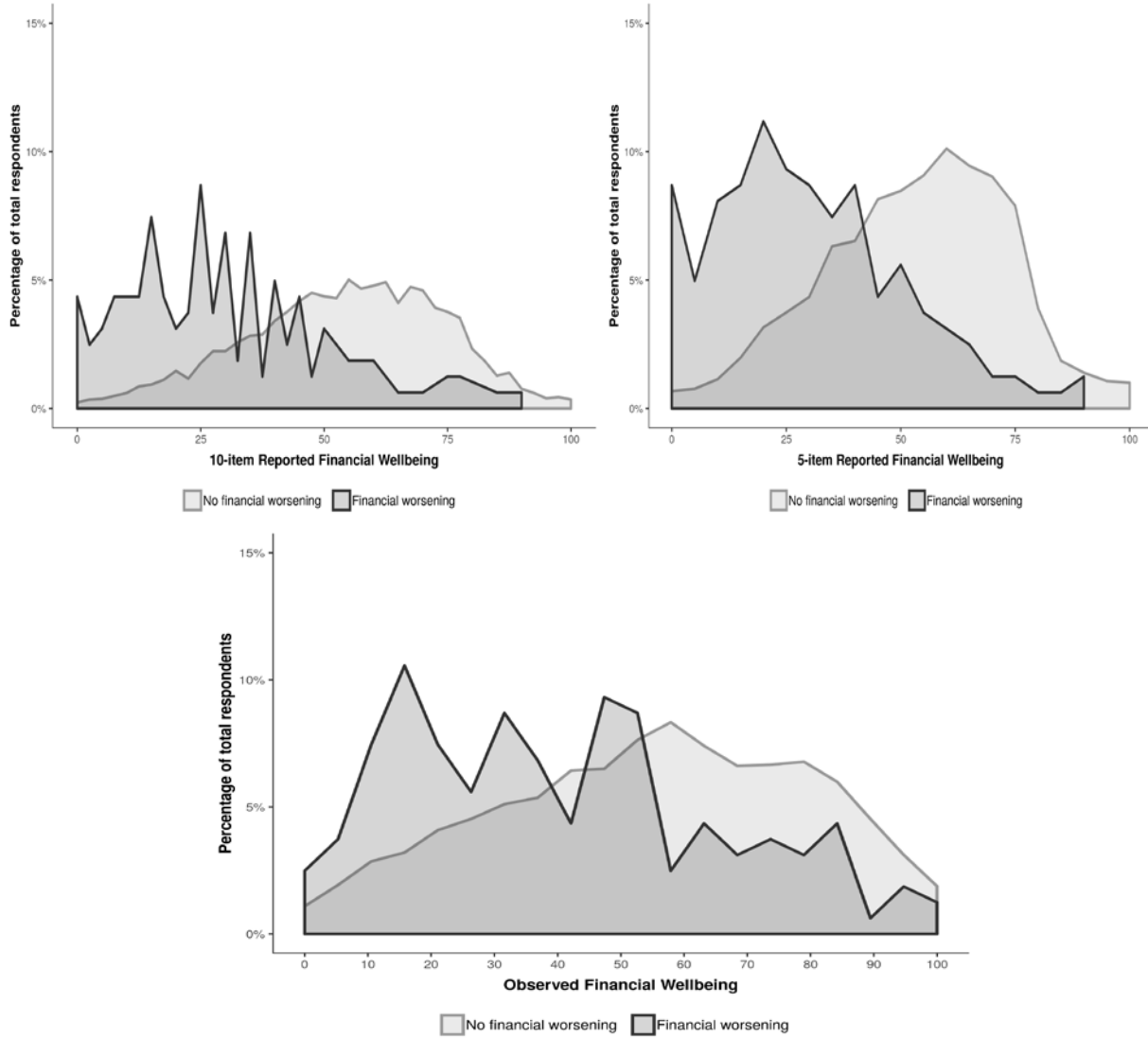
Figure 6.4 Financial Wellbeing Following Financial Improvement
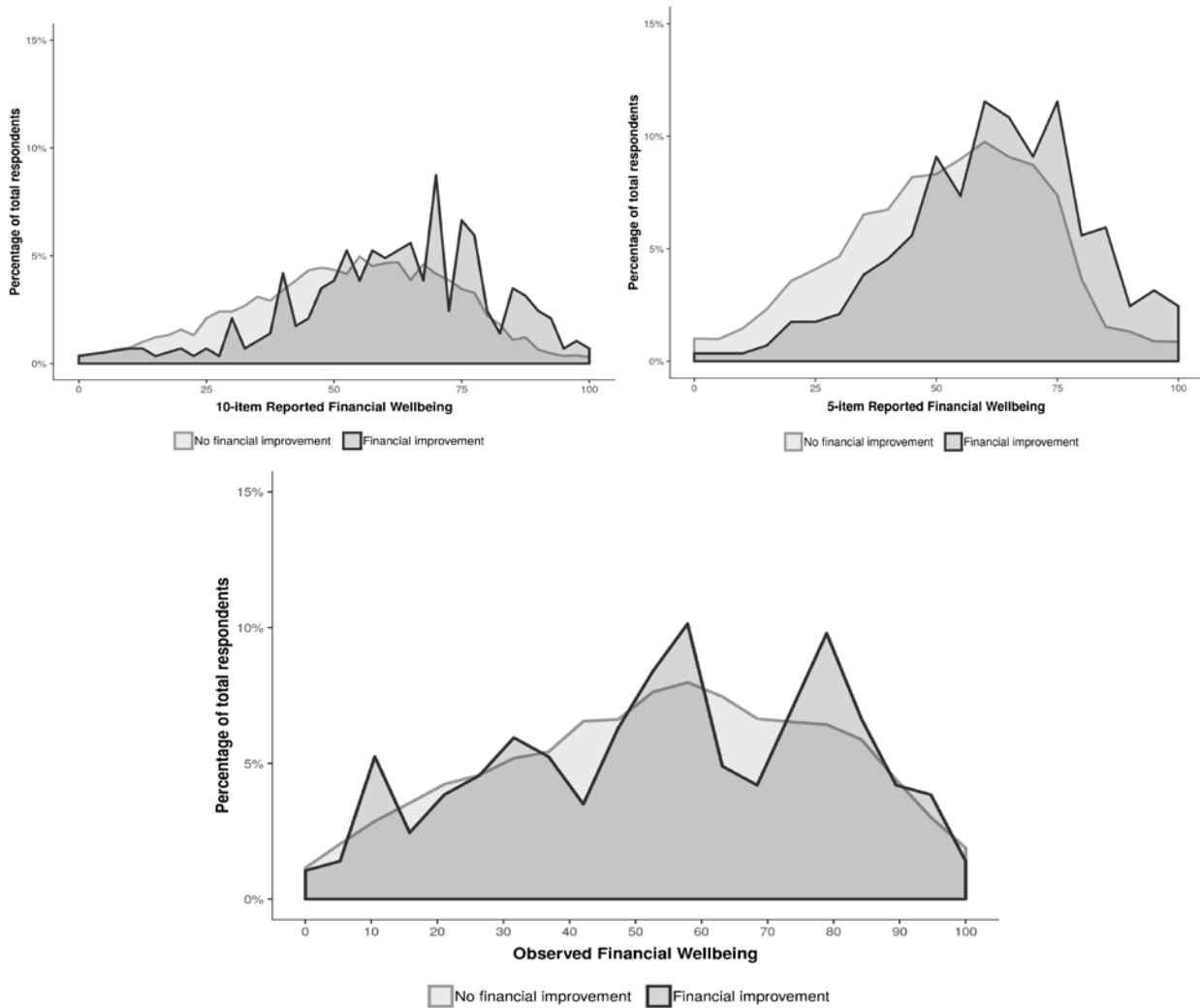
Figure 6.5 presents the financial wellbeing distributions for customers according to their area of residence. Observed financial wellbeing is higher for metropolitan residents relative to non-metropolitan residents. Customers living in metropolitan areas appear to have slightly higher reported financial wellbeing compared to non-metropolitan residents, although the difference seems minor. The distributions are again very similar between the two self-reported financial wellbeing scales.

Figure 6.5 Financial Wellbeing by Area of Residence
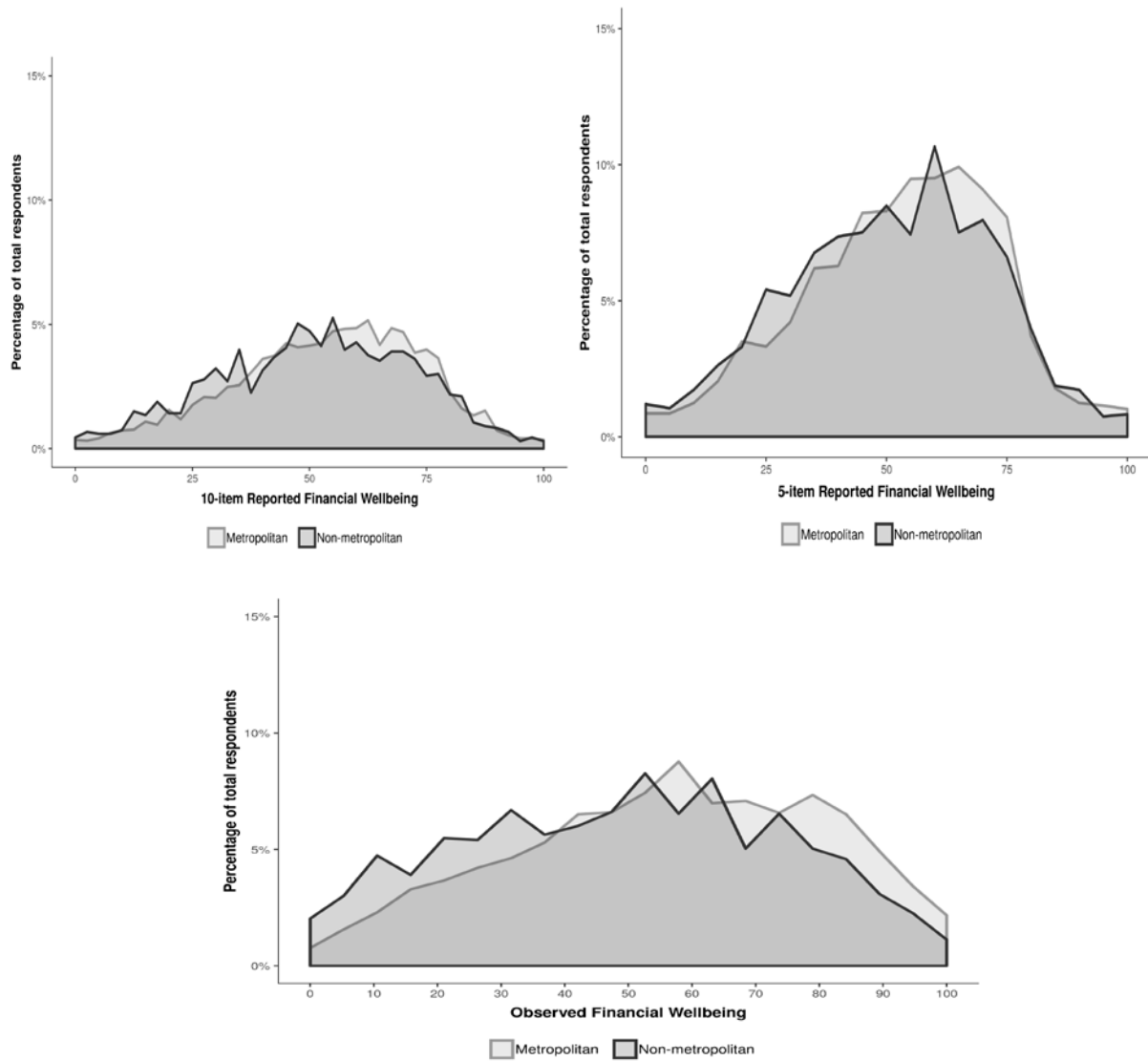
Finally, Figure 6.6 shows the distributions of financial wellbeing for customers who reported a long-term health condition and those who did not. The reported and observed financial wellbeing distributions are substantially higher for customers with no health condition when compared to customers reporting a health condition. The distribution patterns for the two reported scales are also similar across health condition status.

Figure 6.6 Financial Wellbeing by Health Condition Status
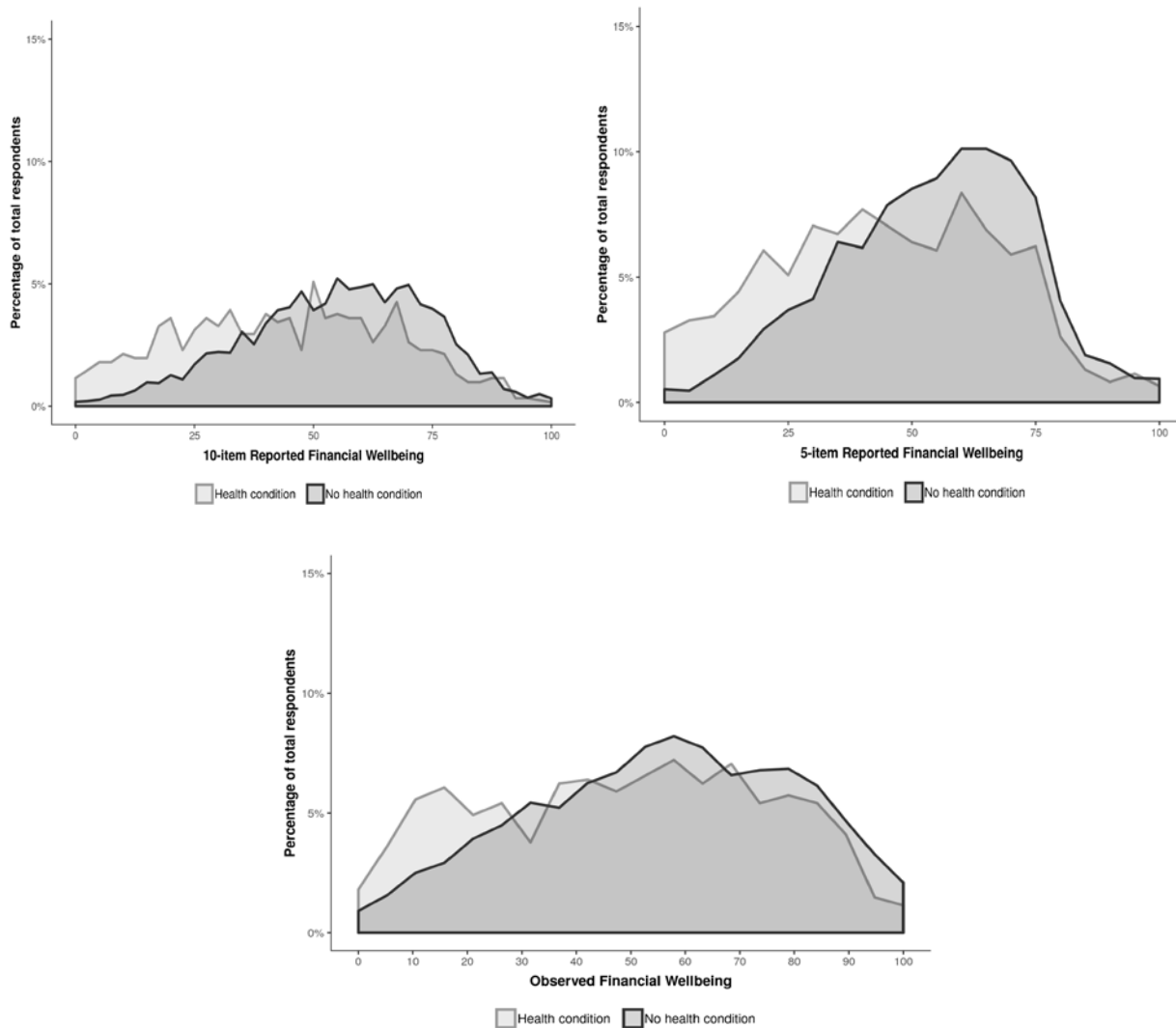
6.2 Correlations and differences across self-reported scales

To explore further the relationships between financial wellbeing and individuals' characteristics, we report Spearman rank correlations in Table 6.2. Spearman correlations range from -1 to +1 and indicate whether there is a positive or negative relationship between two variables. A correlation of +1 implies that both variables always increase perfectly together; a correlation of -1 means that one variable always increases as the other one increases; and a correlation of 0 means that increases or decreases in both variables are entirely unrelated.

The table's first two columns of numbers list the rank correlations between the characteristics and the Reported Financial Wellbeing Scales, and the last column lists the rank correlations for the Observed Financial Wellbeing Scale. The rows of Table 6.2 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 grey ▢), and larger than 0.3 to be strong (highlighted in medium grey ▢). We only report correlations that have at least a 95 percent chance of being different from zero.

Given the objective of this report, although we briefly discuss some of the correlations of each characteristic with a specific financial wellbeing scale, our most important focus is on differences and similarities of the correlation coefficients across the two self-reported scales.

Correlations of Characteristics with Financial Wellbeing

As expected, household income is positively correlated with reported and observed financial wellbeing, with the relationship being particularly strong for reported financial wellbeing. Total bank deposits are strongly positively associated with reported and observed financial wellbeing, and there is a somewhat weaker positive association with total superannuation and investment portfolio funds.

In terms of home ownership status, owning a home outright is positively related to both reported and observed financial wellbeing, suggesting that home ownership is a source of wealth. Not owning a home is associated with lower reported and observed financial wellbeing. The amounts of housing payments are only weakly negatively related to financial wellbeing, whereas having difficulty paying the rent or mortgage is strongly related to lower reported and observed financial wellbeing.

Higher education, and better reports of self-rated health status are positively associated with reported and observed financial wellbeing, though for health the correlation is strongest with reported financial wellbeing. Mental distress is strongly negatively related to reported and observed financial wellbeing, with the relationship being much stronger for reported financial wellbeing.

Finding finances confusing is negatively associated with both types of financial wellbeing but especially reported financial wellbeing, whereas a better understanding of financial products is related to higher reported and to a much lesser extent observed financial wellbeing. Customers' perceptions of control in life as well as having clear savings goals are moderately positively related to observed financial wellbeing and strongly positively related to reported financial wellbeing. Preferring not to live on credit is moderately associated with higher reported and observed financial wellbeing, whereas a customer's belief that their financial situation will look after itself is positively related to reported financial wellbeing.

Greater social contact is associated with higher reported and observed financial wellbeing. Not requiring government or community support is positively correlated with both types of financial wellbeing, while needing such support but not having access is negatively associated with reported financial wellbeing.

Having a personal or car loan is strongly associated with lower observed financial wellbeing and to a lesser extent reported financial wellbeing. Good financial management and financial planning, good spending habits, and strong savings behaviours are all strongly positively associated with reported and observed financial wellbeing. Most of these correlations are very high, and generally higher than the other listed correlations. Good saving behaviours, especially precautionary saving, are especially important.

Differences across Reported Financial Wellbeing Scales

Comparing the correlation coefficients across the reported scales reveal that the coefficients remain remarkably consistent from one reported scale to another, both in terms of magnitude and statistical significance. In all but three instances, all significant correlation coefficients in R-10 are also significant in R-5. Similarly, apart from one exception, insignificant correlations in R-10 remain insignificant in R-5.

In most instances, the absolute correlation magnitude tends to decrease slightly when moving from the R-10 to the R-5. However, there are also many exceptions. Overall, the univariate correlations between different individual characteristics and financial wellbeing are very similar, regardless of the self-reported scale considered. In terms of the correlation analyses, therefore, the results suggest substantial similarities between the R-10 and R-5 scales.

Table 6.2 Correlations of Characteristics with Reported and Observed Financial Wellbeing

Variable	R-10	R-5	OBS
Personal and household characteristics			
Total household income per year	0.373	0.323	0.197
Total bank deposits	0.477	0.447	0.549
Total superannuation	0.299	0.280	0.129
Total credit card or personal loans	n.s.	n.s.	-0.078
Total mortgages/investment loans	0.131	0.117	0.071
Total mortgage offset	0.177	0.162	0.122
Total investment portfolio	0.232	0.221	0.149
Home owner	0.281	0.287	0.226
Mortgage holder	0.103	0.092	0.047
Non-home owner	-0.231	-0.229	-0.154
Rent/mortgage per month	-0.097	-0.109	-0.154
Difficulty with mortgage/rent	-0.429	-0.404	-0.302
Full-time worker	0.097	0.070	n.s.
Part-time worker	-0.075	-0.073	-0.051
Unemployed	-0.145	-0.142	-0.080
Not working, home duties	-0.059	-0.053	-0.093
Other work status	-0.100	-0.088	-0.051

Variable	R-10	R-5	OBS
Not working, student	-0.070	-0.063	0.038
Semi-retired	0.092	0.099	0.045
Retired	0.153	0.174	0.121
Highest education	0.218	0.200	0.237
General health*	0.325	0.319	0.137
Disability	-0.170	-0.147	-0.087
Disability impacts work*	-0.294	-0.268	-0.127
Mental distress*	-0.493	-0.471	-0.182
Find finances confusing	-0.424	-0.429	-0.177
Understand financial products*	0.279	0.281	0.046
Control in life	0.457	0.449	0.145
Clear savings goal	0.357	0.365	0.200
Prefer not living on credit	0.154	0.169	0.238
Financial situation will look after itself	0.130	0.130	n.s.
People in household	-0.072	-0.071	-0.052
Dependent children at home	-0.098	-0.088	-0.167
Single	-0.075	-0.076	n.s.
Not living with partner	-0.081	-0.073	-0.089
In de facto or cohabiting relationship	-0.031	n.s.	-0.037
Married	0.162	0.157	0.071
Widowed	n.s.	n.s.	n.s.
Provide unpaid care	-0.049	-0.037	-0.069
Unpaid work impacts earning income	-0.274	-0.272	-0.188
Male	0.126	0.125	0.045
Age	0.107	0.115	n.s.
Immigrant	n.s.	n.s.	0.067
Metropolitan resident	0.069	0.052	0.128
External conditions and events			
Financial improvement	0.120	0.117	n.s.
Financial worsening	-0.206	-0.191	-0.104
Fired	-0.097	-0.096	-0.043
Retired	0.063	0.075	0.051
Promoted	0.065	0.045	n.s.
Separated from partner	-0.113	-0.100	-0.090
Illness/injury of self	-0.120	-0.106	-0.070
Social contact*	0.303	0.289	0.166
Social support in crisis*	0.070	0.065	0.049
Did not need comm./gov. support	0.301	0.269	0.191
Needed support but had no access	-0.291	-0.268	-0.143
Used comm./gov. support but not reliant	-0.091	-0.071	-0.072
Used specialised comm./gov. support	-0.088	-0.065	n.s.

Variable	R-10	R-5	OBS
Used emergency comm./gov. support	-0.096	-0.089	-0.112
Financial behaviours			
Term deposit	0.166	0.162	0.184
Credit card	0.160	0.144	0.105
Personal/car loan	-0.199	-0.194	-0.305
Mortgage for own home	0.068	0.061	n.s.
Mortgage offset account	0.191	0.175	0.175
Mortgage for investment property	0.152	0.141	0.117
Share investment portfolio	0.223	0.211	0.129
Car insurance	0.102	0.097	0.051
Home and contents insurance	0.153	0.150	0.077
Life or health insurance	0.067	0.049	n.s.
Number of banks	0.102	0.095	-0.043
Make sure to have money for bad times	0.635	0.618	0.534
Try to save money to fall back on in future	0.495	0.484	0.447
Try to save money regularly	0.410	0.401	0.371
Good job balancing spending and savings	0.578	0.589	0.414
Run short on money because overspent	-0.424	-0.403	-0.322
Buy things but cannot afford them	-0.254	-0.257	-0.207
Organised managing money day-to-day	0.461	0.487	0.304
Plan for financial future	0.451	0.442	0.256
Regularly sit down and review finances	0.273	0.296	0.112
Credit card management*	0.296	0.277	0.262
Willing to sacrifice now to secure future	0.218	0.231	0.163
Put off making financial decisions	-0.291	-0.294	-0.107
Approach to budgeting*	0.120	0.144	0.048

Notes: Table reports rank (Spearman) correlation coefficients of the listed characteristics with each measure of financial wellbeing. R-10 and R-5 are the 10-item and 5-item reported financial wellbeing scales, respectively. OBS is the objective financial wellbeing scale. * Responses reverse-coded.

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).

6.3 Multivariate Regression Analysis

Although the correlation analyses provide useful insights, they are unconditional in nature. Multivariate regression analysis allows us to examine the association of one correlate with respect to a financial wellbeing scale, whilst simultaneously controlling for the association of all

other correlates. This provides a much clearer picture of the relative importance and significance of the correlates.

To test the sensitivity of the different financial wellbeing scales to the correlates, we compare the regression results between each of the two reported scales and the observed scale. We estimate the models via Seemingly Unrelated Regression, which is otherwise identical to standard multivariate linear regression, but additionally allows us directly to test hypotheses about coefficients across different equations, for example whether the regression coefficients are equal in magnitude and sign. This will be crucial when examining the regression coefficients over different financial wellbeing scales. Table 6.3.1 reports the regression results.

Overall, the explanatory variables or correlates of the financial wellbeing scales explain a large portion of the scales' variation, as measured by the regression's R^2. A model that yields an R^2 of 1 (or 100%) explains perfectly the variation in the financial wellbeing scales; conversely an R^2 of 0 (or 0%) explains no variation of the financial wellbeing scale. In Table 6.3.1, the R-10 regression has an R^2 of 0.708 or 70.8% of the total financial wellbeing variation. Dropping the five measures from the R-10 scale decreases the R^2 to 66.6% in the R-5 regression. Despite the changes to the composition of the reported financial wellbeing instruments, the decrease in explained variation is very small, whereas the portion of explained variation for each of the scales is still very high. The observed financial wellbeing scale has a lower total explained variation of 45.7%, which is still substantial for a micro-econometric model.

We next compare the regression results in three separate dimensions:

(a) Is a coefficient of one financial wellbeing scale *significantly different from zero?*

(b) Is a coefficient for one financial wellbeing scale *significantly different from the coefficient obtained for the same correlate, but for a different financial wellbeing scale*?

(c) Comparing all coefficients *simultaneously*, are *all coefficients* of one financial wellbeing scale significantly different from those coefficients of a different financial wellbeing scale?

We retain the "R-10" and "OBS" columns as benchmarks for the R-10 and Observed Financial Wellbeing Scale respectively, which remain unchanged from Haisken-DeNew et al. (2019). These columns are reproduced here for easy and intuitive reference. We augment the original table with an additional column for the newly analysed R-5 scale.

6.3.1 Testing Whether Coefficients are Significantly Different from Zero

In Table 6.3.1, we first compare the regression coefficients for R-10 to those of R-5. We aim to identify whether, and the extent to which, individuals' characteristics associate differently with the reported financial wellbeing scales.

Qualitatively there are 28 correlates that are significantly different from zero under R-10 as well as R-5 and there are 35 correlates that are insignificant under R-10 as well as R-5, which

indicate a high degree of stability. There are 10 correlates that change significance: 5 gaining significance and 5 losing significance. There are also no situations in which a significant coefficient changes its sign. This further indicates a high degree of stability qualitatively in how the individuals' characteristics are associated with the R-10 and R-5 scales.

Across both self-reported scale specifications, there are some clear and consistent patterns. Consistently associated with *higher* levels of reported financial wellbeing are: household income, being a home owner, rent/mortgage per month, general health, understanding financial products, having control of one's life, having a clear savings goal, being confident that one's financial situation will take care of itself, being male, having experienced a financial improvement, being promoted, receiving social support during a crisis, having a share investment portfolio, making sure there is money available for bad times ahead, doing a good job balancing spending and savings, planning for future finances, and good credit card management.

Consistently associated with significantly *lower* levels of financial wellbeing across our self-reported measures are: having difficulty with rent or the mortgage per month, being unemployed, mental distress, finding finances confusing, experiencing a financial worsening, needing support but not getting access to support, using emergency community of government support, having a credit card, having a personal or car loan, running short of money due to overspending, and putting off financial decisions.

There are some correlates for which the significance changes between the self-reported scales. Variables that are significant in the R-10 scale but not the R-5 scale include: getting promoted, using community or government support but not being reliant on it, having a personal or car loan, willingness to make sacrifices for the future, and approach to budgeting. Variables that are significant in the R-5 scale but not in the R-10 scale include education, providing unpaid care, having unpaid work impacting on ability to earn an income, holding a mortgage for an investment property, and being organised with everyday spending. Overall, however, these are minor differences and there is a large degree of qualitative stability between both self-reported measures in terms of statistical significance of individual coefficients.

There is a strong correlation between R-10 and the observed financial wellbeing measure. From the factor loadings in the factor analysis reported in Appendix A, the reported and observed measures are identifying *similar yet distinct constructs*. We find that this distinction remains quite stable, whether examining R-10 or R-5 and comparing to the observed financial wellbeing measure.

Table 6.3.1 Multivariate Regression Results

Variable	R-10 Coeff.	R-10 p-value	R-5 Coeff.	R-5 p-value	OBS Coeff.	OBS p-value	Notes
Personal and household characteristics							
Logarithm of total household income	1.823	(0.000)	1.176	(0.000)	1.461	(0.003)	a
Home owner	2.098	(0.014)	2.282	(0.014)	5.696	(0.000)	bc
Mortgage holder	-0.059	(0.941)	-0.492	(0.568)	2.409	(0.067)	
Rent/mortgage per month	0.104	(0.001)	0.074	(0.029)	-0.019	(0.707)	b
Difficulty with mortgage/rent	-3.534	(0.000)	-2.928	(0.000)	-1.659	(0.000)	abc
Part-time worker	0.020	(0.971)	-0.064	(0.912)	-0.471	(0.596)	
Unemployed	-2.515	(0.020)	-2.703	(0.021)	-4.962	(0.005)	
Not working, home duties	0.932	(0.395)	0.845	(0.476)	-3.730	(0.039)	bc
Other work status	-1.464	(0.120)	-1.141	(0.262)	-1.108	(0.475)	
Not working, student	-0.701	(0.400)	-0.766	(0.395)	1.979	(0.150)	
Semi-retired	-0.565	(0.668)	0.448	(0.753)	-2.304	(0.289)	
Retired	-2.000	(0.060)	-0.846	(0.462)	-0.074	(0.966)	a
Highest education	0.179	(0.086)	0.225	(0.047)	1.229	(0.000)	bc
General health	0.606	(0.007)	0.898	(0.000)	-0.466	(0.208)	abc
Disability	2.847	(0.064)	2.651	(0.111)	-1.061	(0.676)	
Disability impacts work	-0.790	(0.115)	-0.504	(0.353)	0.280	(0.735)	
Mental distress	-0.456	(0.000)	-0.417	(0.000)	-0.088	(0.256)	bc
Find finances confusing	-1.447	(0.000)	-1.461	(0.000)	0.120	(0.763)	bc
Understand financial products	0.643	(0.010)	0.567	(0.037)	-1.354	(0.001)	bc
Control in life	1.324	(0.000)	1.382	(0.000)	-0.543	(0.007)	bc
Clear savings goal	0.539	(0.028)	0.673	(0.011)	-0.530	(0.189)	bc
Prefer not living on credit	-0.203	(0.329)	0.103	(0.646)	1.124	(0.001)	abc
Financial situation will look after itself	3.001	(0.000)	3.270	(0.000)	0.086	(0.799)	abc
People in household	-0.420	(0.087)	-0.495	(0.062)	0.463	(0.253)	c
Dependent children at home	-0.669	(0.055)	-0.026	(0.946)	-3.339	(0.000)	abc
Single	-0.154	(0.781)	-0.109	(0.855)	1.076	(0.238)	
Not living with partner	0.249	(0.767)	-0.081	(0.929)	0.378	(0.785)	
In de facto or cohabiting relationship	-0.795	(0.148)	-0.318	(0.592)	-1.066	(0.239)	
Widowed	-0.044	(0.977)	-0.494	(0.764)	1.548	(0.537)	
Provide unpaid care	1.321	(0.158)	2.098	(0.038)	0.434	(0.779)	
Unpaid work impacts earning income	-0.655	(0.109)	-0.988	(0.026)	-0.896	(0.184)	
Male	1.568	(0.000)	1.601	(0.000)	-0.648	(0.315)	bc
Age	-0.369	(0.000)	-0.381	(0.000)	-0.473	(0.003)	
Age squared	0.003	(0.009)	0.003	(0.008)	0.004	(0.050)	
Immigrant	0.504	(0.233)	-0.242	(0.597)	1.445	(0.038)	a c
Metropolitan resident	-0.279	(0.499)	-0.302	(0.499)	1.727	(0.011)	bc

Variable	R-10 Coeff.	R-10 p-value	R-5 Coeff.	R-5 p-value	OBS Coeff.	OBS p-value	Notes
External conditions and events							
Financial improvement	3.272	(0.000)	3.728	(0.000)	-3.311	(0.007)	bc
Financial worsening	-6.424	(0.000)	-6.152	(0.000)	-1.540	(0.363)	bc
Fired	-0.759	(0.412)	-1.655	(0.099)	1.329	(0.384)	
Promoted	1.175	(0.045)	0.651	(0.305)	0.017	(0.986)	
Retired	1.054	(0.388)	1.104	(0.403)	1.768	(0.380)	
Separated from partner	0.130	(0.894)	1.414	(0.182)	-3.999	(0.013)	abc
Illness/injury of self	-0.451	(0.575)	-0.402	(0.645)	-2.101	(0.114)	
Social contact	0.163	(0.466)	0.183	(0.450)	0.142	(0.702)	
Social support in crisis	0.529	(0.004)	0.591	(0.003)	-0.066	(0.830)	
Needed support but had no access	-4.824	(0.000)	-3.784	(0.000)	-3.114	(0.007)	a
Used comm./gov. support but not reliant	-1.751	(0.023)	-0.033	(0.969)	-4.265	(0.001)	a c
Used specialised comm./gov. support	-2.128	(0.113)	0.718	(0.621)	-2.453	(0.268)	a
Used emergency comm./gov. support	-3.860	(0.014)	-3.562	(0.035)	-14.538	(0.000)	bc
Financial behaviours							
Term deposit	1.338	(0.066)	1.022	(0.194)	6.833	(0.000)	bc
Credit card	-3.852	(0.000)	-4.241	(0.000)	-7.088	(0.000)	b
Personal/car loan	-1.481	(0.003)	-0.753	(0.169)	-7.303	(0.000)	abc
Mortgage for own home	0.762	(0.331)	1.294	(0.127)	0.812	(0.530)	
Mortgage offset account	-0.109	(0.867)	0.069	(0.922)	4.042	(0.000)	bc
Mortgage for investment property	1.272	(0.075)	1.513	(0.050)	1.438	(0.222)	
Share investment portfolio	2.674	(0.000)	2.492	(0.001)	-0.080	(0.945)	b
Car insurance	-0.102	(0.831)	-0.077	(0.881)	1.308	(0.096)	
Home and contents insurance	0.409	(0.465)	0.692	(0.253)	0.090	(0.922)	
Life or health insurance	-0.437	(0.459)	-1.247	(0.051)	1.385	(0.154)	a c
Number of banks	-0.134	(0.570)	-0.074	(0.771)	-2.458	(0.000)	bc
Make sure to have money for bad times	4.378	(0.000)	4.117	(0.000)	4.823	(0.000)	a
Try to save money to fall back on in future	0.355	(0.177)	0.161	(0.572)	1.666	(0.000)	bc
Try to save money regularly	-0.240	(0.319)	-0.348	(0.180)	1.017	(0.010)	bc
Good job balancing spending and savings	2.091	(0.000)	2.605	(0.000)	1.532	(0.001)	a c
Run short on money because overspent	-1.658	(0.000)	-1.118	(0.000)	-1.544	(0.000)	a
Buy things but cannot afford them	0.135	(0.553)	0.121	(0.623)	-0.726	(0.053)	b
Organised managing money day-to-day	0.194	(0.459)	1.066	(0.000)	-0.235	(0.587)	a c
Plan for financial future	2.480	(0.000)	2.201	(0.000)	0.343	(0.471)	bc
Regularly sit down and review finances	-0.148	(0.505)	0.171	(0.477)	-1.161	(0.002)	abc
Credit card management	0.977	(0.000)	0.989	(0.000)	2.711	(0.000)	bc
Willing to sacrifice now to secure future	-0.572	(0.026)	-0.229	(0.409)	-0.872	(0.040)	a
Put off making financial decisions	-0.730	(0.001)	-0.565	(0.018)	0.632	(0.084)	bc
Approach to budgeting	-0.898	(0.001)	-0.506	(0.073)	-0.643	(0.135)	a

Notes: Seemingly Unrelated Regression; N = 3,836. Significantly different coefficients across equations: a = R-10 vs. R-5, b = R-10 vs. OBS, c = R-5 vs. OBS. ▨ Statistically significant from zero at 95% confidence level.

6.3.2 Testing Whether Coefficients are Significantly Different Across Scales

The *test of identical coefficients* is a formal statistical test to aid in the interpretation of the extent to which coefficients are changing between the financial wellbeing scales. The last column of Table 6.3.1 summarises the results of the pairwise comparisons from χ^2 (Chi-squared) tests of coefficients between two different financial wellbeing scales, the full results of which are presented in Table 6.3.2. All things being equal, the larger the χ^2 statistic is, the higher is the degree of certainty that two coefficients are *not* statistically identical. The blue shaded χ^2 statistics in Table 6.3.2 indicate a statistically significant difference between the regression coefficients.

Ideally all the χ^2 tests would be insignificant, which would represent a situation in which each correlate behaved identically for each reported or observed financial wellbeing scale. Obviously, this will not be the case in practice, as moving from R-10 to R-5 decreases the total information available on financial wellbeing.

In Table 6.3.1, we compare the magnitude range of the correlates over the two self-reported measures to illustrate the relative stability of the associational relationships. The association between income and financial wellbeing remains moderate to small. Moving from an income of $20,000 to $100,000 is equivalent to an increase of 1.61 natural log points of income (from 9.903 to 11.513). In the R-10 measure, that would be associated with an increase in financial wellbeing of 2.9-points on the 0 to 100 scale. Similarly, in the R-5 scale, that would be associated with an increase in financial wellbeing by 1.9-points on the 0 to 100 scale. We can compare statistically the magnitude of the coefficients between the two self-reported scales. The coefficients of R-5 are statistically different from R-10, although qualitatively similar.

Compared to not owning a home, the association of owning a home to reported financial wellbeing increases slightly from an additional 2.1-points on the R-10 scale to 2.3-points on the R-5 scale. The tests on coefficient-equality indicate that the effect for owning a home is statistically identical for both reported scales. Similarly examining the status of being unemployed for the reported scales, we find that although the coefficients are individually statistically different from zero, they are not statistically different from each other.

This would be qualitatively the same for other correlates statistically different from zero, but not from each other over the two self-reported scales, such as for: other work status, income from property investment, income from other investment, desire to work less hours, self-rated health, finding finances confusing, having control in life, being separated or divorced, experiencing a financial improvement or worsening, started studying, had social support in a crisis, needed support but had no access, holding a term deposit account, holding joint and individual accounts with partner, and being partnered but only holding individual accounts.

For the correlates that are not significantly different from zero in the R-10 scale, we are interested in whether the same correlates are also not significantly different from zero for R-5. Thus, the association of being a business owner on reported financial wellbeing is not significantly different from zero for the R-10 and R-5 scale.

6.3.3 Joint Test of All Coefficients

The last three rows of Table 6.3.2 present the results for the joint testing of equality of regression coefficients over all correlates when comparing R10 to R-5 (χ^2 of 502.3, 78 degrees of freedom, with a highly significant p-value of 0.000), and so on. In all cases, the joint χ^2 tests indicate that the regression coefficients are statistically distinct. This is in no way surprising, as the R-5 scale changes from the R-10 by dropping half of the scale components.

Also clear is the overall similarity between the two self-reported scales themselves as compared to the observed scale. When testing for equality of coefficients, the larger the χ^2, the larger the overall statistical difference is: all comparisons with the observed scale exhibit the largest χ^2 test scores, compared to the lower reported χ^2 test scores when comparing *between* the reported scales.

6.3.4 Summary

The overwhelming qualitative stability of the coefficients between the two reported scales indicates that the most important information when switching from R-10 to R-5 has been retained in the scales. Whilst the χ^2 tests indicate that the association of several correlates changes in magnitude, depending on which self-reported measure is used, the strong message is that those coefficients that were positive and significant remain so over the reported measures. Similarly, those correlates that were negative and significant remained so. There were only relatively few correlates that lost or gained significance, but no significant correlates changed their sign and remained significant, when moving between the R-10 and R-5 measures.

Table 6.3.2 Chi Squared (χ^2) Tests of Coefficient Equality

Variable	R-10 vs. R-5 χ^2	p-value	R-10 vs. OBS χ^2	p-value	R-5 vs. OBS χ^2	p-value
Personal and household characteristics						
Logarithm of total household income	16.967	(0.000)	0.425	(0.515)	0.246	(0.620)
Home owner	0.163	(0.686)	4.971	(0.026)	4.189	(0.041)
Mortgage holder	1.040	(0.308)	2.702	(0.100)	3.495	(0.062)
Rent/mortgage per month	3.404	(0.065)	4.423	(0.035)	2.341	(0.126)
Difficulty with mortgage/rent	19.154	(0.000)	14.681	(0.000)	6.299	(0.012)
Part-time worker	0.085	(0.771)	0.233	(0.629)	0.150	(0.699)
Unemployed	0.107	(0.744)	1.439	(0.230)	1.148	(0.284)
Not working, home duties	0.022	(0.881)	5.097	(0.024)	4.594	(0.032)
Other work status	0.414	(0.520)	0.040	(0.841)	0.000	(0.986)
Not working, student	0.022	(0.883)	2.914	(0.088)	2.863	(0.091)
Semi-retired	2.081	(0.149)	0.490	(0.484)	1.149	(0.284)
Retired	4.148	(0.042)	0.924	(0.336)	0.139	(0.709)
Highest education	0.667	(0.414)	28.510	(0.000)	24.431	(0.000)
General health	5.954	(0.015)	6.413	(0.011)	9.721	(0.002)
Disability	0.058	(0.810)	1.819	(0.178)	1.535	(0.215)
Disability impacts work	1.151	(0.283)	1.284	(0.257)	0.644	(0.422)
Mental distress	2.373	(0.124)	17.453	(0.000)	13.109	(0.000)
Find finances confusing	0.011	(0.916)	11.888	(0.001)	11.322	(0.001)
Understand financial products	0.326	(0.568)	17.893	(0.000)	15.496	(0.000)
Control in life	0.790	(0.374)	66.221	(0.000)	65.882	(0.000)
Clear savings goal	1.068	(0.301)	5.374	(0.020)	6.379	(0.012)
Prefer not living on credit	7.636	(0.006)	11.428	(0.001)	6.324	(0.012)
Financial situation will look after itself	6.030	(0.014)	56.542	(0.000)	63.159	(0.000)
People in household	0.332	(0.564)	3.642	(0.056)	4.017	(0.045)
Dependent children at home	12.011	(0.001)	16.527	(0.000)	23.831	(0.000)
Single	0.023	(0.881)	1.393	(0.238)	1.212	(0.271)
Not living with partner	0.544	(0.461)	0.007	(0.935)	0.079	(0.779)
In de facto or cohabiting relationship	2.645	(0.104)	0.069	(0.793)	0.488	(0.485)
Widowed	0.308	(0.579)	0.309	(0.578)	0.476	(0.490)
Provide unpaid care	2.422	(0.120)	0.253	(0.615)	0.832	(0.362)
Unpaid work impacts earning income	2.323	(0.128)	0.098	(0.755)	0.013	(0.909)
Male	0.025	(0.875)	9.020	(0.003)	8.695	(0.003)
Age	0.055	(0.815)	0.324	(0.569)	0.237	(0.627)
Age squared	0.237	(0.626)	0.113	(0.737)	0.037	(0.848)
Immigrant	10.940	(0.001)	1.395	(0.238)	4.193	(0.041)
Metropolitan resident	0.011	(0.917)	6.645	(0.010)	6.365	(0.012)

	R-10 vs. R-5		R-10 vs. OBS		R-5 vs. OBS	
External conditions and events						
Financial improvement	1.342	(0.247)	22.394	(0.000)	23.968	(0.000)
Financial worsening	0.248	(0.619)	6.382	(0.012)	5.327	(0.021)
Fired	3.289	(0.070)	1.430	(0.232)	2.733	(0.098)
Promoted	2.801	(0.094)	1.095	(0.295)	0.307	(0.579)
Retired	0.006	(0.939)	0.096	(0.757)	0.078	(0.780)
Separated from partner	6.049	(0.014)	5.007	(0.025)	8.054	(0.005)
Illness/injury of self	0.013	(0.909)	1.180	(0.277)	1.171	(0.279)
Social contact	0.027	(0.869)	0.003	(0.959)	0.009	(0.925)
Social support in crisis	0.395	(0.530)	2.909	(0.088)	3.320	(0.068)
Needed support but had no access	7.857	(0.005)	1.698	(0.193)	0.244	(0.621)
Used comm./gov. support but not reliant	17.465	(0.000)	2.991	(0.084)	7.935	(0.005)
Used specialised comm./gov. support	15.813	(0.000)	0.017	(0.898)	1.470	(0.225)
Used emergency comm./gov. support	0.127	(0.721)	13.105	(0.000)	12.962	(0.000)
Financial behaviours						
Term deposit	0.662	(0.416)	16.018	(0.000)	16.769	(0.000)
Credit card	0.726	(0.394)	4.025	(0.045)	2.918	(0.088)
Personal/car loan	7.280	(0.007)	37.235	(0.000)	44.120	(0.000)
Mortgage for own home	1.618	(0.203)	0.001	(0.973)	0.100	(0.752)
Mortgage offset account	0.262	(0.609)	11.447	(0.001)	9.819	(0.002)
Mortgage for investment property	0.401	(0.526)	0.015	(0.902)	0.003	(0.957)
Share investment portfolio	0.231	(0.631)	4.232	(0.040)	3.455	(0.063)
Car insurance	0.009	(0.923)	2.458	(0.117)	2.221	(0.136)
Home and contents insurance	0.899	(0.343)	0.091	(0.763)	0.304	(0.581)
Life or health insurance	6.645	(0.010)	2.690	(0.101)	5.254	(0.022)
Number of banks	0.227	(0.634)	27.168	(0.000)	26.764	(0.000)
Make sure to have money for bad times	3.851	(0.050)	0.899	(0.343)	2.115	(0.146)
Try to save money to fall back on in future	1.917	(0.166)	6.977	(0.008)	8.611	(0.003)
Try to save money regularly	0.720	(0.396)	7.700	(0.006)	8.508	(0.004)
Good job balancing spending and savings	11.890	(0.001)	1.118	(0.290)	3.868	(0.049)
Run short on money because overspent	16.485	(0.000)	0.059	(0.808)	0.768	(0.381)
Buy things but cannot afford them	0.014	(0.907)	4.040	(0.044)	3.658	(0.056)
Organised managing money day-to-day	38.966	(0.000)	0.752	(0.386)	6.489	(0.011)
Plan for financial future	3.290	(0.070)	15.415	(0.000)	10.907	(0.001)
Regularly sit down and review finances	7.265	(0.007)	5.877	(0.015)	9.505	(0.002)
Credit card management	0.015	(0.904)	23.809	(0.000)	21.977	(0.000)
Willing to sacrifice now to secure future	6.279	(0.012)	0.383	(0.536)	1.650	(0.199)
Put off making financial decisions	1.936	(0.164)	10.623	(0.001)	7.689	(0.006)
Approach to budgeting	7.964	(0.005)	0.270	(0.603)	0.073	(0.788)
χ^2 test of joint equality of all coefficients	502.3		1149.7		1156.9	

	R-10 vs. R-5	R-10 vs. OBS	R-5 vs. OBS
p-value	0.000	0.000	0.000
Degrees of freedom	78	78	78

Notes: Results from Seemingly Unrelated (Multivariate) Linear Regression. N = 3,836.

■   Statistically significant at 95% level, Degrees of Freedom = 1 if not stated otherwise.

7. Conclusion

The purpose of this report was to construct a short-form version of the *CBA-MI Reported Financial Wellbeing Scale* (termed R-10 in this report) first developed by Comerton-Forde et al. (2018) for Australians. Using the R-10 scale as benchmark, we develop a self-reported scale that contains fewer items. Results from rigorous quantitative testing provided the basis for a self-reported scale with 5 items, termed the *CBA-MI Reported Financial Wellbeing Scale 5* (R-5).

The R-5 scale still measures all conceptual temporal domains of financial wellbeing, as it contains three 'every day' outcomes, one 'rainy day' outcome, and one 'one day' outcome, in the *same proportion* as R-10. Going from four question blocks in R-10 to two question blocks in R-5 and removing the reverse coded items 5 and 7 reduces the respondent's cognitive load substantially. By avoiding items 1 and 6, we focus on more *subjective* measures as opposed to potentially more confronting factual/objective measures. These advantages make the R-5 measure easier to collect from the standpoint of the surveyor *and* respondent.

The retained components of R-5 nonetheless still exhibit high discriminatory properties. Overall the R-5 scale displays excellent statistical characteristics and closely overlaps with the original R-10 scale. The relationship between the R-5 scale and the observed scale is very similar to the relationship between the R-10 scale and the observed scale. Furthermore, there is very little difference in how the various customer socio-demographic characteristics and financial behaviours are associated with both the R-10 and R-5 scales.

As we would expect, given that fewer items have been included, the R-5 scale provides less total information and granularity about the underlying financial wellbeing construct than the R-10 scale. Nevertheless, the R-5 gains the above-mentioned advantages and still performs very well by providing strikingly similar insights about customers' self-reported financial wellbeing as compared to the R-10 scale.

After thorough statistical testing, our analyses find that the R-5 scale is a viable short-form alternative to the original 10-item CBA-MI Reported Financial Wellbeing Scale for the purpose of measuring customers' reported financial wellbeing, yet improves substantially the ease of implementation and response.

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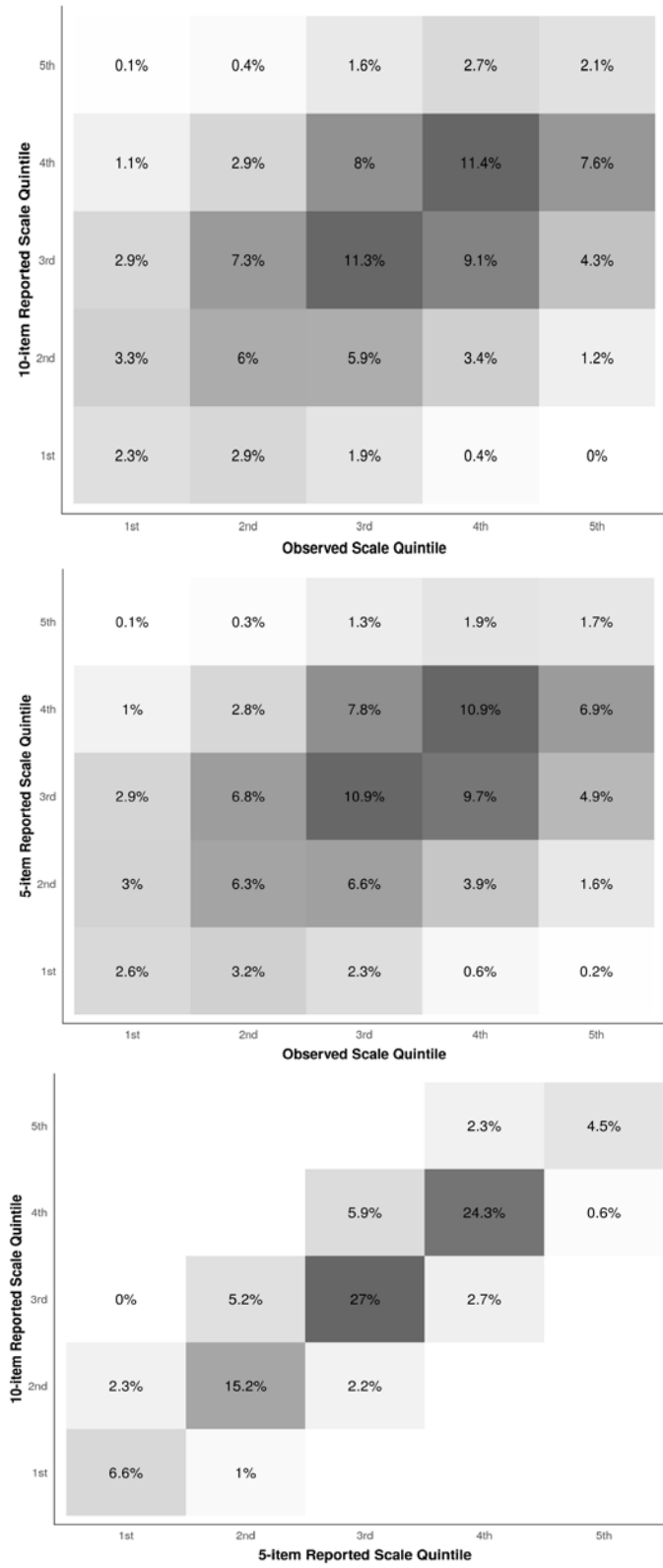# Appendix A. Detailed Descriptive Statistics and Regression Results

Table A.1 Distribution of Characteristics in the On-line Survey

Measure	Responses	Mean	Min	Max
Components of Reported FWB				
Difficulty meeting expenses	4,470	2.19	0	4
I can enjoy life	4,470	2.03	0	4
I could handle an unexpected expense	4,470	1.73	0	4
I am securing my financial future	4,470	1.83	0	4
Finances control my life	4,470	2.07	0	4
Have money left over at end of month	4,470	2.17	0	4
Giving a gift... would strain finances	4,470	2.52	0	4
Feel on top of everyday finances	4,470	2.44	0	4
Comfortable with current levels of spending	4,470	2.30	0	4
On track to have enough for financial future	4,470	2.02	0	4
Components of Observed FWB				
Payment problems	4,470	2.04	0	3
Low balances	4,470	2.31	0	4
Net spend	4,470	1.78	0	4
Cover unexpected expenses	4,470	2.21	0	4
Median savings	4,470	1.93	0	4
Personal and household characteristics				
Logarithm of total household income	4,039	9.74	0	12.43
Home owner	4,470	1.14	1	2
Mortgage holder	4,455	1.36	1	2
Other home ownership status	4,470	1.50	1	2
Rent/mortgage per month	4,148	10.41	0	30
Difficulty with mortgage/rent	4,470	2.11	1	5
Full Time worker	4,470	0.52	0	1
Part-time worker	4,470	0.17	0	1
Unemployed	4,470	0.04	0	1
Not working, home duties	4,470	0.03	0	1
Other work status	4,470	0.05	0	1
Not working, student	4,470	0.07	0	1
Semi-retired	4,470	0.03	0	1
Retired	4,470	0.09	0	1
Highest education	4,021	13.78	0	16
General health	4,001	3.57	1	5
Disability	4,001	1.15	1	2

Measure	Responses	Mean	Min	Max
Disability impacts work	4,001	1.46	1	5
Mental distress	4,019	5.89	0	24
Find finances confusing	4,089	2.47	1	5
Understand financial products	4,237	2.65	1	4
Control in life	3,994	4.36	1	7
Clear savings goal	4,089	3.46	1	5
Prefer not living on credit	4,470	3.99	1	5
Financial situation will look after itself	4,089	2.27	1	5
People in household	4,470	2.69	1	4
Dependent children at home	4,470	1.47	1	3
Married/Divorced/Separated	4,470	1.43	1	2
Single	4,470	1.30	1	2
Not living with partner	4,470	1.06	1	2
In de facto or cohabiting relationship	4,470	1.19	1	2
Widowed	4,470	1.02	1	2
Provide unpaid care	4,002	1.19	1	2
Unpaid work impacts earning income	4,001	1.37	1	5
Male	4,470	0.47	0	1
Age	4,470	40.63	18	94
Immigrant	4,470	0.32	0	1
Metropolitan resident	4,467	0.70	0	1
External conditions and events				
Financial improvement	4,470	0.06	0	1
Financial worsening	4,470	0.03	0	1
Fired	4,470	0.04	0	1
Retired	4,470	0.03	0	1
Promoted	4,470	0.11	0	1
Separated from partner	4,470	0.04	0	1
Illness/injury of self	4,470	0.06	0	1
Social contact	4,013	4.27	1	5
Social support in crisis	4,008	3.07	1	5
Needed support but had no access	4,470	1.09	1	2
Used comm./gov. support but not reliant	4,470	1.06	1	2
Used specialised comm./gov. support	4,470	1.02	1	2
Used emergency comm./gov. support	4,470	1.01	1	2
Financial behaviours				
Term deposit	4,451	0.07	0	1
Credit card	4,451	0.60	0	1
Personal/car loan	4,451	0.21	0	1
Mortgage for own home	4,451	0.29	0	1

Measure	Responses	Mean	Min	Max
Mortgage offset account	4,451	0.14	0	1
Mortgage for investment property	4,451	0.11	0	1
Share investment portfolio	4,451	0.08	0	1
Car insurance	4,451	0.37	0	1
Home and contents insurance	4,451	0.33	0	1
Life or health insurance	4,451	1.14	1	2
Number of banks	4,470	1.54	1	5
Make sure to have money for bad times	4,140	3.21	1	5
Try to save money to fall back on in future	4,140	3.33	1	5
Try to save money regularly	4,140	3.48	1	5
Good job balancing spending and savings	4,140	3.26	1	5
Run short on money because overspent	4,140	2.00	1	5
Buy things but cannot afford them	4,140	2.05	1	5
Organised managing money day-to-day	4,140	3.32	1	5
Plan for financial future	4,207	2.14	1	3
Regularly sit down and review finances	4,089	3.42	1	5
Credit card management	4,311	2.26	0	5
Willing to sacrifice now to secure future	4,089	3.66	1	5
Put off making financial decisions	4,089	2.71	1	5
Approach to budgeting	4,184	2.89	1	4

Figure A.1 Heat Maps of Financial Wellbeing Scale Quintiles

10-Item Reported Scale Quintile	1st	2nd	3rd	4th	5th
5th	0.1%	0.4%	1.6%	2.7%	2.1%
4th	1.1%	2.9%	8%	11.4%	7.6%
3rd	2.9%	7.3%	11.3%	9.1%	4.3%
2nd	3.3%	6%	5.9%	3.4%	1.2%
1st	2.3%	2.9%	1.9%	0.4%	0%

Observed Scale Quintile

5-Item Reported Scale Quintile	1st	2nd	3rd	4th	5th
5th	0.1%	0.3%	1.3%	1.9%	1.7%
4th	1%	2.8%	7.8%	10.9%	6.9%
3rd	2.9%	6.8%	10.9%	9.7%	4.9%
2nd	3%	6.3%	6.6%	3.9%	1.6%
1st	2.6%	3.2%	2.3%	0.6%	0.2%

Observed Scale Quintile

10-Item Reported Scale Quintile	1st	2nd	3rd	4th	5th
5th				2.3%	4.5%
4th			5.9%	24.3%	0.6%
3rd	0%	5.2%	27%	2.7%	
2nd	2.3%	15.2%	2.2%		
1st	6.6%	1%			

5-Item Reported Scale Quintile

Appendix B. Quantitative Analysis

B.1 Exploratory factor analysis of linked self-reported and financial-record data

We conducted two sets of exploratory factor analyses on the self-reported and financial-record measures, one for each self-reported scale with the bank-record measures. The results are reported in Tables B.1 and B.2. All original ten self-reported items load on the first factor and all the financial-record measures load on the second factor. The same pattern is found when considering the 5-item reported scale. The factor loadings for most items are very high, with generally low uniqueness values.

Table B.1 Exploratory Factor Analysis for 10-item Reported and Financial-Record Measures

Item	Loading: 1st factor	Loading: 2nd factor	Uniqueness
Self-reported measures:			
1. How difficult was it for you to meet your necessary cost of living expenses?	**0.74**	0.07	0.40
2. I can enjoy life because of the way I'm managing my money	**0.74**	0.02	0.43
3. I could handle a major unexpected expense	**0.71**	0.10	0.42
4. I am securing my financial future	**0.72**	0.00	0.48
5. My finances control my life *	**0.62**	-0.05	0.64
6. I have money left over at the end of the month	**0.68**	0.14	0.44
7. Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the month *	**0.73**	-0.02	0.47
8. I feel on top of my day to day finances	**0.78**	-0.02	0.41
9. I am comfortable with my current levels of spending relative to the funds I have coming in	**0.67**	-0.04	0.58
10. I am on track to have enough money to provide for my financial needs in the future	**0.80**	-0.10	0.42
Bank-record measures:			
11. Experienced payment problems in last year	0.17	**0.44**	0.72
12. Days in last year with low liquid balances	-0.06	**0.95**	0.14
13. Months in last year when spending exceeded 80% of inflows	0.05	**0.51**	0.67
14. Days in last year during which customer had the ability to raise one or six month's expenses from available savings or available credit	0.03	**0.78**	0.36

15. Savings relative to people their own age (age-normed residual of customer's median daily savings balance during last year)	0.03	**0.80**	0.33

Note: Table reports factor loadings and uniqueness values from an oblique promax rotation for two factors. Factor loadings with an absolute value of 0.2 or greater are displayed in bold font.
* Measure is reverse coded.

Table B.2 Exploratory Factor Analysis for 5-item Reported and Financial-Record Measures

Item	Loading: 1st factor	Loading: 2nd factor	Uniqueness
Self-reported measures:			
1. I can enjoy life because of the way I'm managing my money	**0.73**	0.05	0.44
2. I could handle a major unexpected expense	**0.67**	0.14	0.45
3. I feel on top of my day to day finances	**0.79**	-0.01	0.38
4. I am comfortable with my current levels of spending relative to the funds I have coming in	**0.69**	-0.03	0.54
5. I am on track to have enough money to provide for my financial needs in the future	**0.78**	-0.07	0.43
Bank-record measures:			
6. Experienced payment problems in last year	0.17	**0.44**	0.72
7. Days in last year with low liquid balances	-0.06	**0.95**	0.14
8. Months in last year when spending exceeded 80% of inflows	0.11	**0.51**	0.68
9. Days in last year during which customer had the ability to raise one or six month's expenses from available savings or available credit	0.05	**0.78**	0.35
10. Savings relative to people their own age (age-normed residual of customer's median daily savings balance during last year)	0.01	**0.81**	0.33

Note: Table reports factor loadings and uniqueness values from an oblique promax rotation for two factors. Factor loadings with an absolute value of 0.2 or greater are displayed in bold font.

B.2 Item Response Theory Analyses and the Reported Financial Wellbeing Scales

To test whether the reported items fit together well in a scale, we conducted formal item response theory (IRT) analyses of these items. A two-parameter IRT graded response model was estimated for the latent variable corresponding to reported financial wellbeing. Consider θ as an individual's latent reported financial wellbeing, and Y_i the ordered categorical measure of each response on item i, (with Y_i taking values 1, …, J). The probability of providing a response of j or higher to item i is:

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

where exp[.] is the exponential function, α_i is the discrimination parameter for item i, and δ_{ij} is the differentiation parameter (or severity level) of response category j from item i.

The IRT results are reported in Tables B.3 and B.4.

Table B.3 IRT Severity and Discrimination Parameter Estimates—Latent Variable for the 10-item Reported Financial Wellbeing Scale

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	0.899	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	-1.640	-0.695	0.313	1.212	2.236
7. Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the month *	-1.973	-1.157	-0.141	0.979	2.101
8. I feel on top of my day to day finances	-2.226	-1.117	-0.171	1.588	2.464
9. I am comfortable with my current levels of spending relative to the funds I have coming in	-2.569	-0.979	-0.030	2.126	1.758
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	2.274

Notes: Estimates of severity (δ_{ij}) and discrimination (α_i) parameters from IRT graded-response models.
* Responses reverse coded.

For all self-reported scales, the severity parameters show that higher responses are related to higher levels of latent reported financial wellbeing. The discrimination parameters also indicate that each item can adequately distinguish between higher and lower levels of reported financial wellbeing. In the R-10 scale, the item about enjoying life because of the way money is managed has the highest discrimination, and the question on finances controlling a person's life has the lowest discrimination.

Table B.4 IRT Severity and Discrimination Parameter Estimates—Latent Variable for the 5-item Reported Financial Wellbeing Scale

Item	δ_{i1}	δ_{i2}	δ_{i3}	δ_{i4}	α_i
2. I can enjoy life because of the way I'm managing my money	-1.765	-0.854	0.615	2.115	2.408
3. I could handle a major unexpected expense	-1.110	-0.398	0.900	2.074	2.151
8. I feel on top of my day to day finances	-2.106	-1.063	-0.167	1.532	2.740
9. I am comfortable with my current levels of spending relative to the funds I have coming in	-2.397	-0.919	-0.030	2.014	1.975
10. I am on track to have enough money to provide for my financial needs in the future	-1.617	-0.567	0.350	2.023	2.350

Notes: Estimates of severity (δ_{ij}) and discrimination (α_i) parameters from IRT graded-response models.
* Responses reverse coded.

The R-10 scale was calculated by summing the responses of all items and multiplying this sum by 2.5, resulting in a scale from 0 (low reported financial wellbeing) to 100 (high reported financial wellbeing). The R-10 scale constructed via summation has a correlation of 98.2% with an R-10 scale generated from the IRT analysis as well as a reliability coefficient of 0.92.

To generate the R-5 scale, a straightforward strategy is to identify the questions with the lowest discrimination parameters as candidates for exclusion, ensuring we keep at least one question from each of the three dimensions (i.e. 'every day', 'rainy day', and 'one day') of financial wellbeing. Ideally, the R-5 scale will capture all conceptual time dimensions of financial wellbeing, 'every day' outcomes, 'rainy day' outcomes, and 'one day' outcomes, in the *same proportion* as R-10.

Dropping those items with the lowest discrimination parameters ensures the minimal information loss to the scale in dropping the items. Additionally, in the interests of maximising survey response rates, we focus on more "perception"-based measures as opposed to potentially more confronting "factual"-based measures.

Thus we categorise the six 'every day' items into two more "factual"-based measures (items 1 and 6) and four more "perception"-based measures (item 2, 5, 8, 9). We prefer only to retain a subset of the more "perception"-based measures in R-5, as there is the possibility of the more "factual"-based measures being more confronting to the respondent. Questions 5 and 7 have reverse coding which also makes them candidates for dropping to ease the cognitive burden on the respondent and potentially reduce unintended measurement error.

We subsequently dropped items 1, 4, 5, 6 and 7 leaving only two question blocks, namely II. and IV., thereby further reducing the cognitive load on the respondent.

Finally, the R-5 scale was calculated by multiplying all summed item responses by the factor 5, resulting in a scale from 0 (low reported financial wellbeing) to 100 (high reported financial wellbeing). The correlation between the summation R-5 scale and an R-5 scale generated from the IRT analysis is 99.2%, and the R-5 scale's reliability coefficient is 0.86.

Following the IRT analyses, Category Characteristic Curves (CCC) were estimated for each item within each financial wellbeing scale. The IRT diagnostics for the self-reported items are summarised in Figures B.1 to B.3. All CCC figures indicate that for each item in each of the three reported financial wellbeing scales, each response category contributes significant information in explaining the underlying latent trait. As expected, the corresponding CCC patterns for each relevant item remain very consistent when moving from the R-10 scale to the R-5 scale.

The Item Information Functions (IIF) and Test Information Functions (TIF) further demonstrate the good general performance of the R-5 scale. Similar to the R-10 scale, the IIF for the R-5 scale shows that *all items contribute information about the latent trait across all reported financial wellbeing values*.

The TIF's show that the overall R-5 scale performs well across all reported financial wellbeing values. However, plotting the TIF's of the reported financial wellbeing scales on the same graph in Figure B.3 clearly highlights the *loss of total information* about the latent trait; the R-5 scale contributes less information than the R-10 scale. This is not surprising, given that the R-5 scale contains fewer items than the R-10 scale. The R-5 scale contributes information about the latent construct *across all reported financial wellbeing values* and are thus adequate shorter-form measures of reported financial wellbeing. In using the R-5 scale, however, there is less *total* information about the underlying latent trait (by construction).

Figure B.1 Diagnostic Graphs for Items in the 10-item Reported Financial Wellbeing Scale
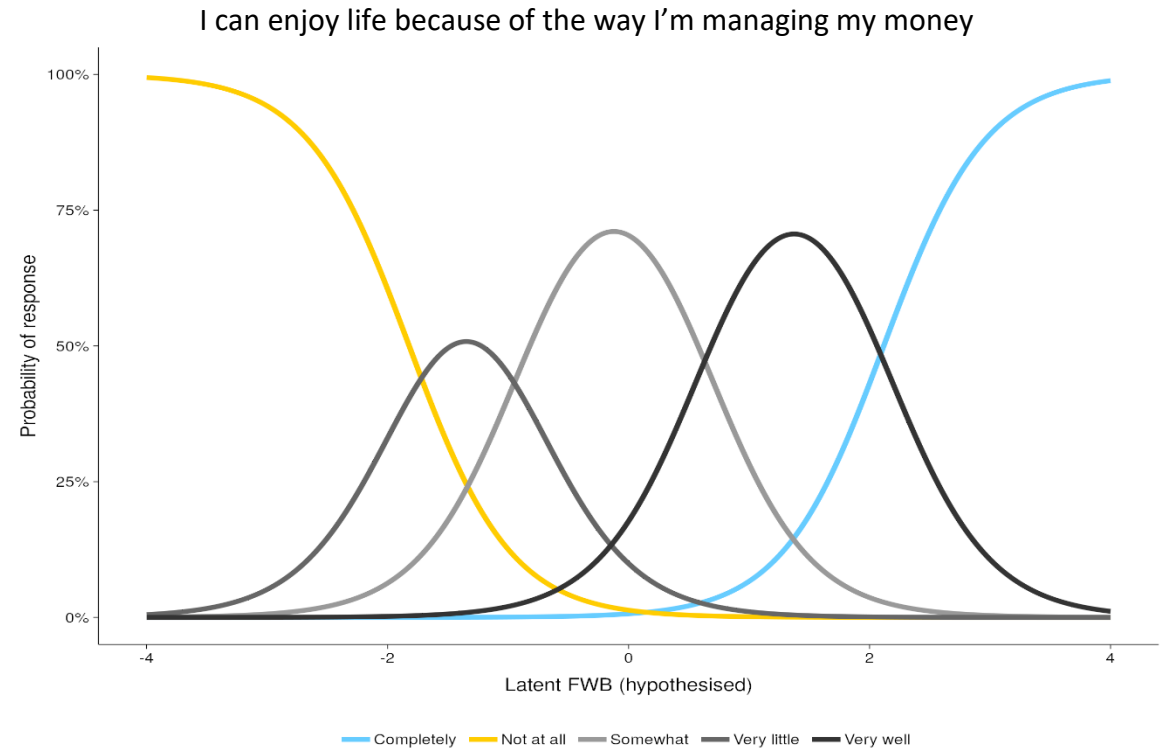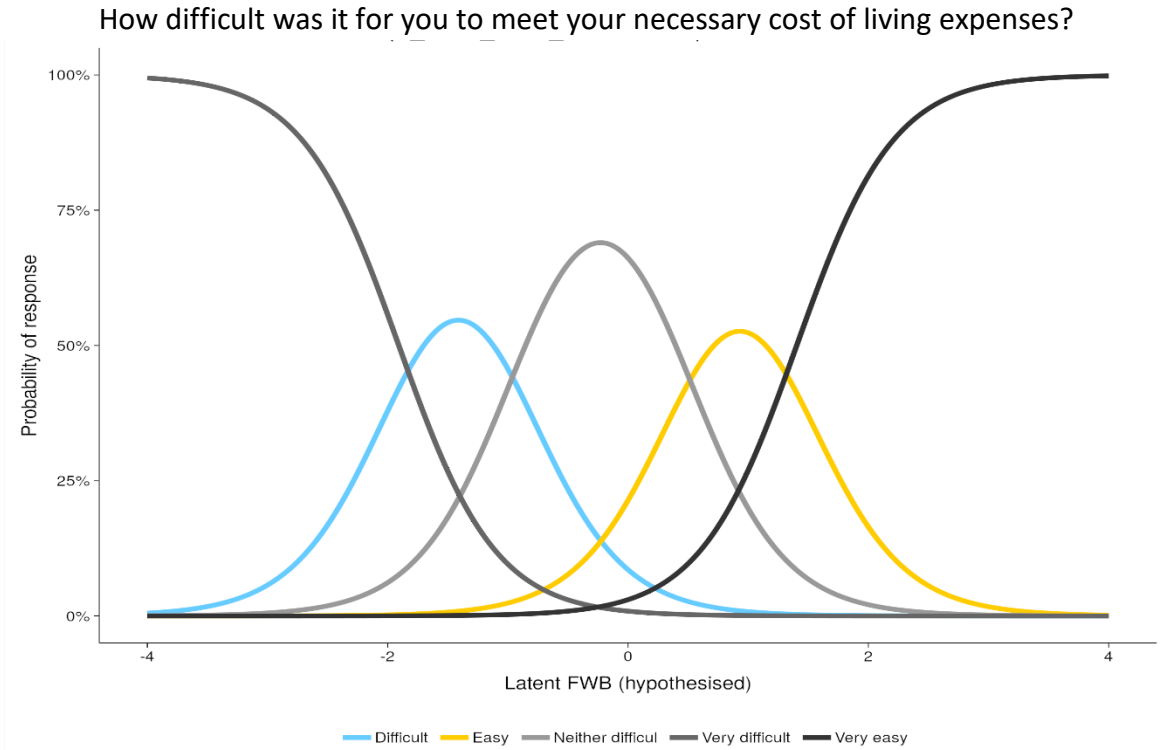
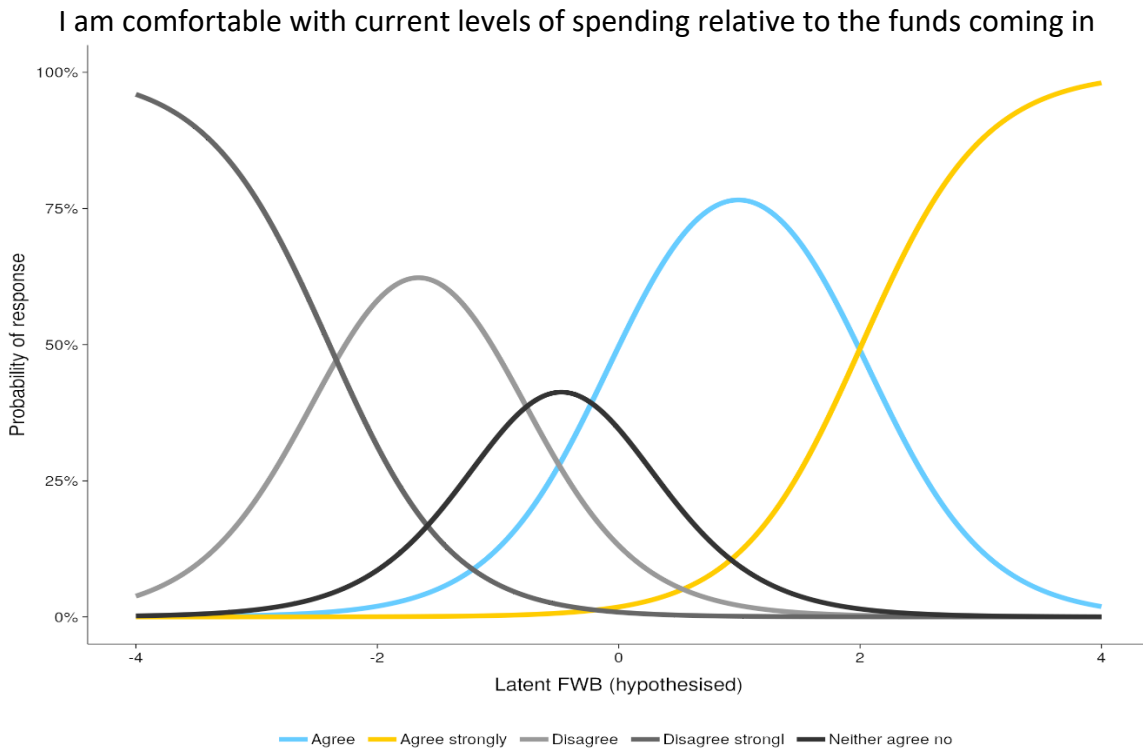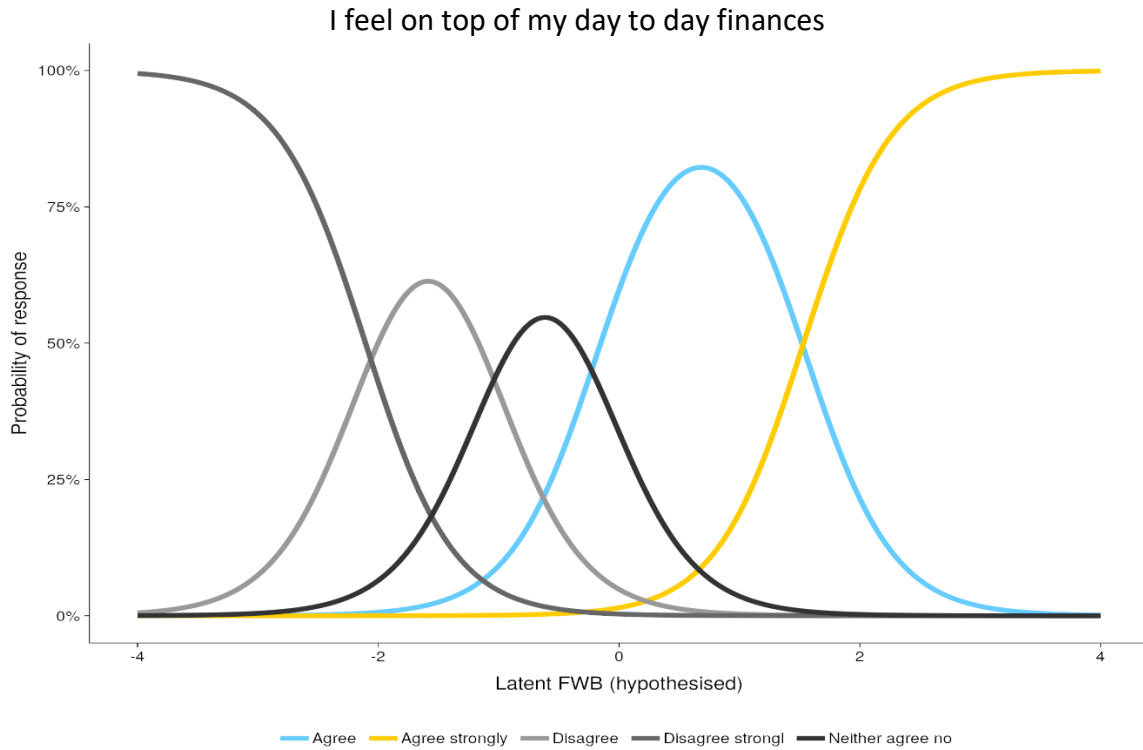**Categorical Characteristic Curves**

How difficult was it for you to meet your necessary cost of living expenses?

I can enjoy life because of the way I'm managing my money

I could handle a major unexpected expense

Legend: Completely — Not at all — Somewhat — Very little — Very well

I am securing my financial future

Legend: Completely — Not at all — Somewhat — Very little — Very well
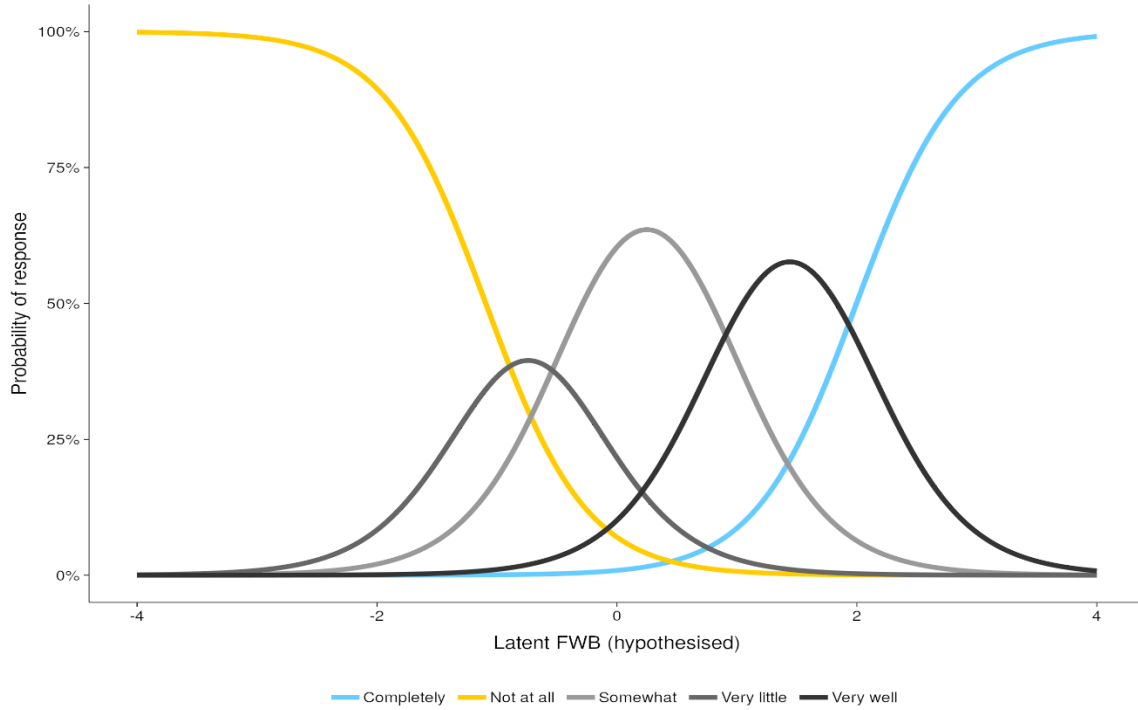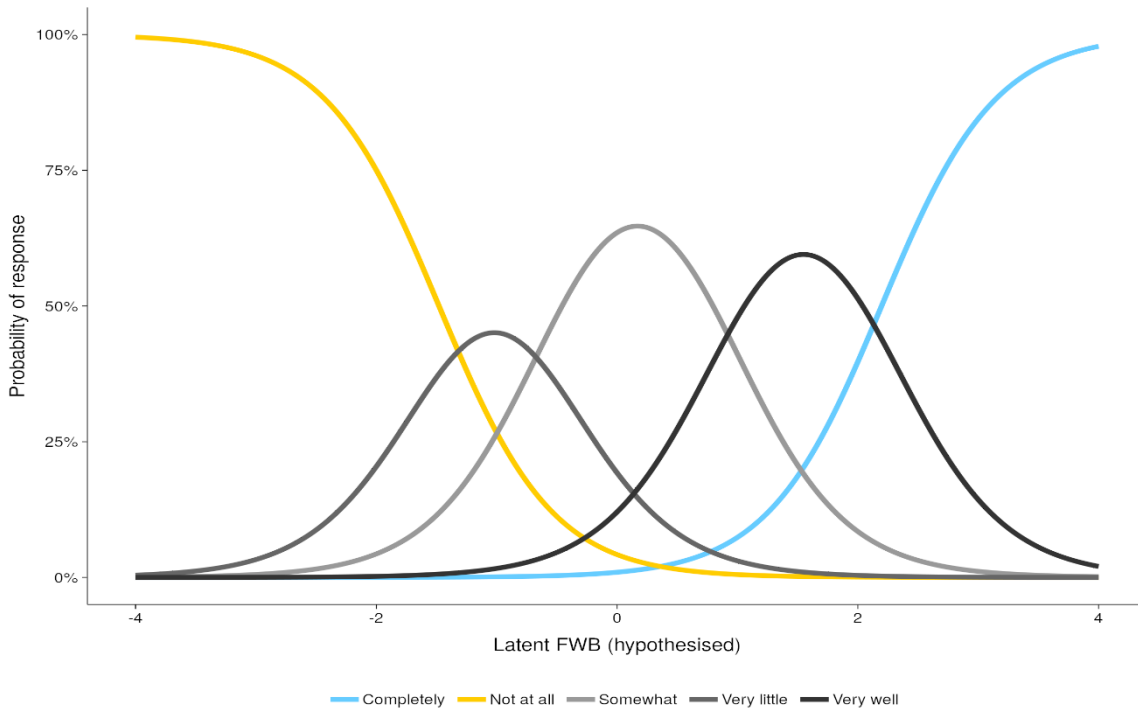
My finances control my life
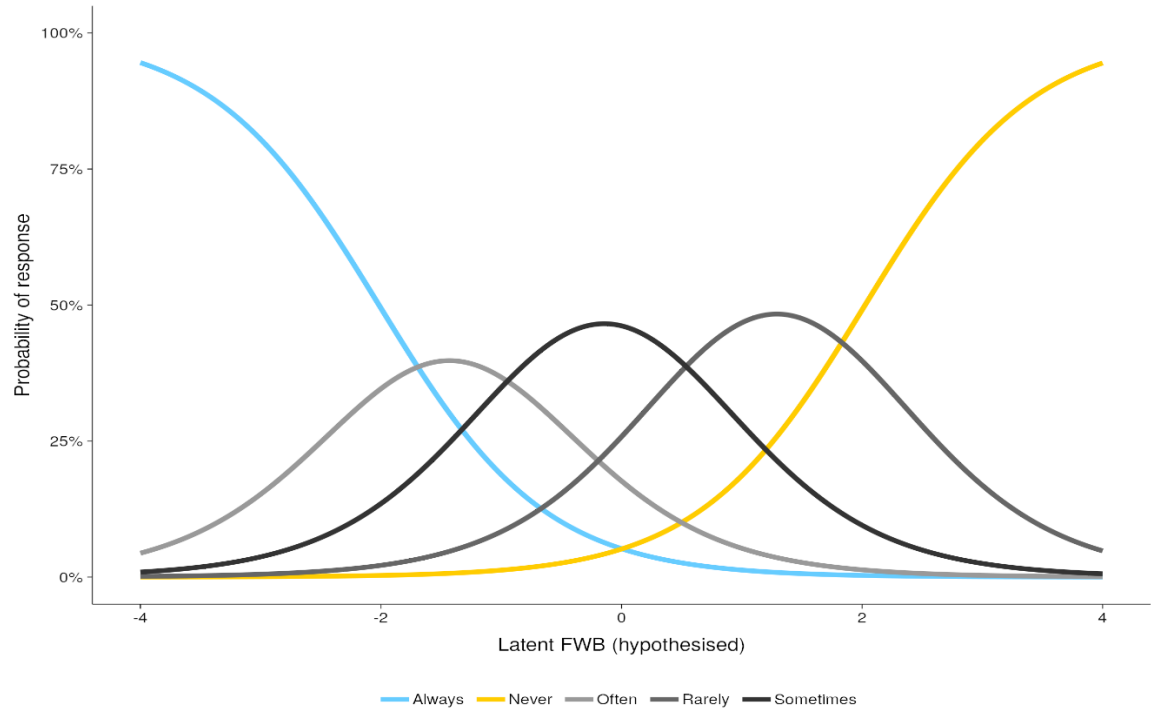
I have money left over at end of the month
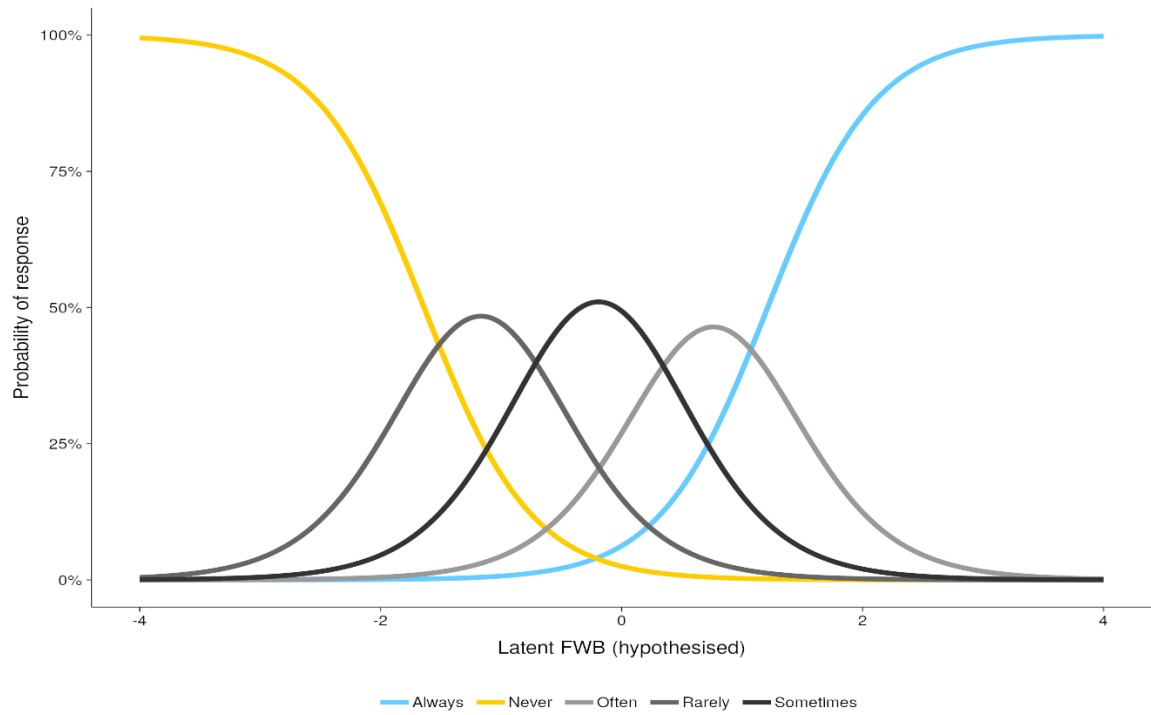
Giving a gift for a wedding, birthday or other occasion would put a strain on my finances
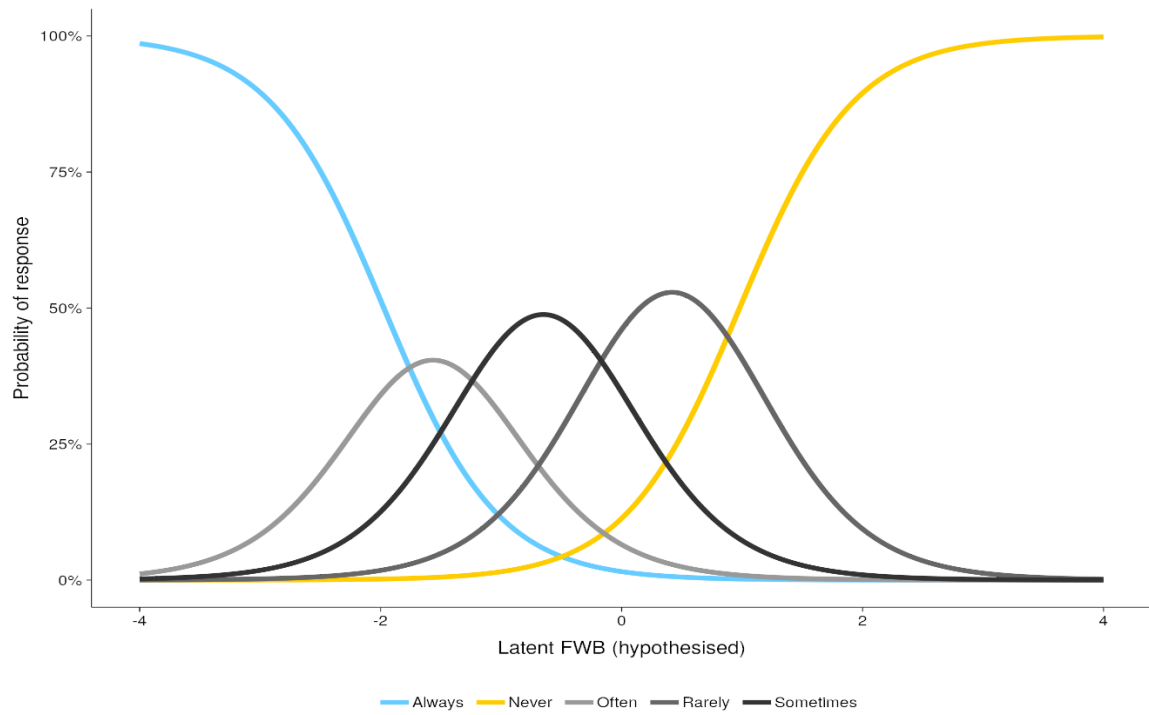
I feel on top of my day to day finances
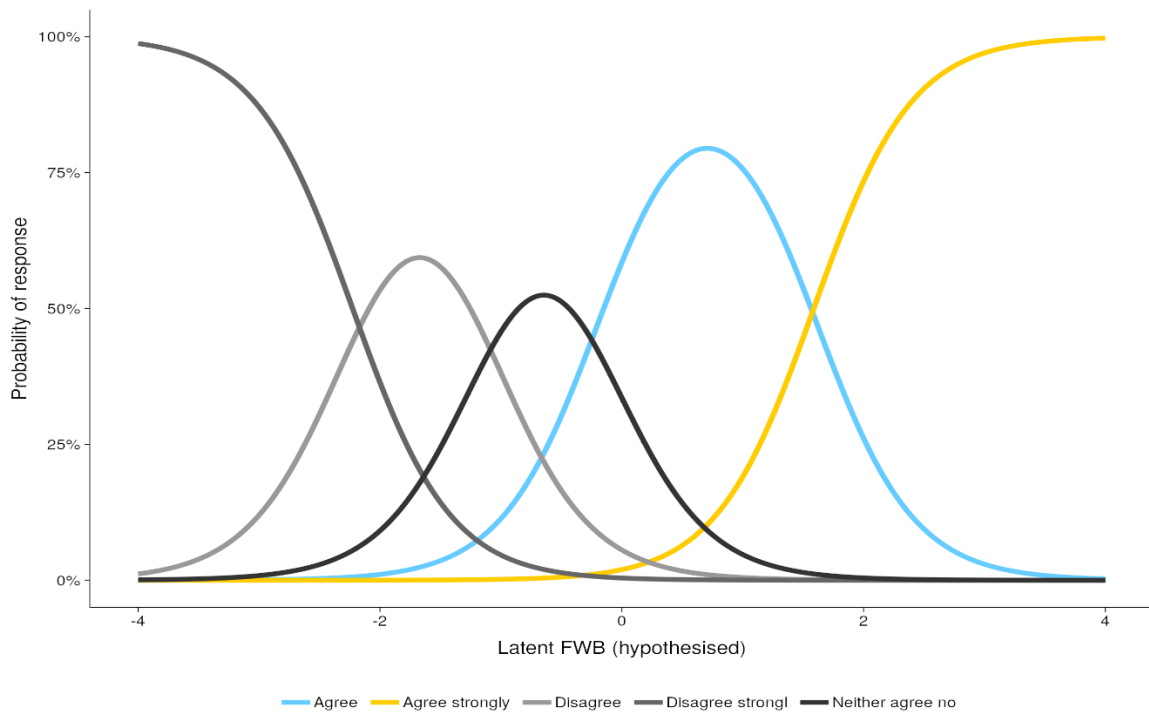
I am comfortable with current levels of spending relative to the funds coming in
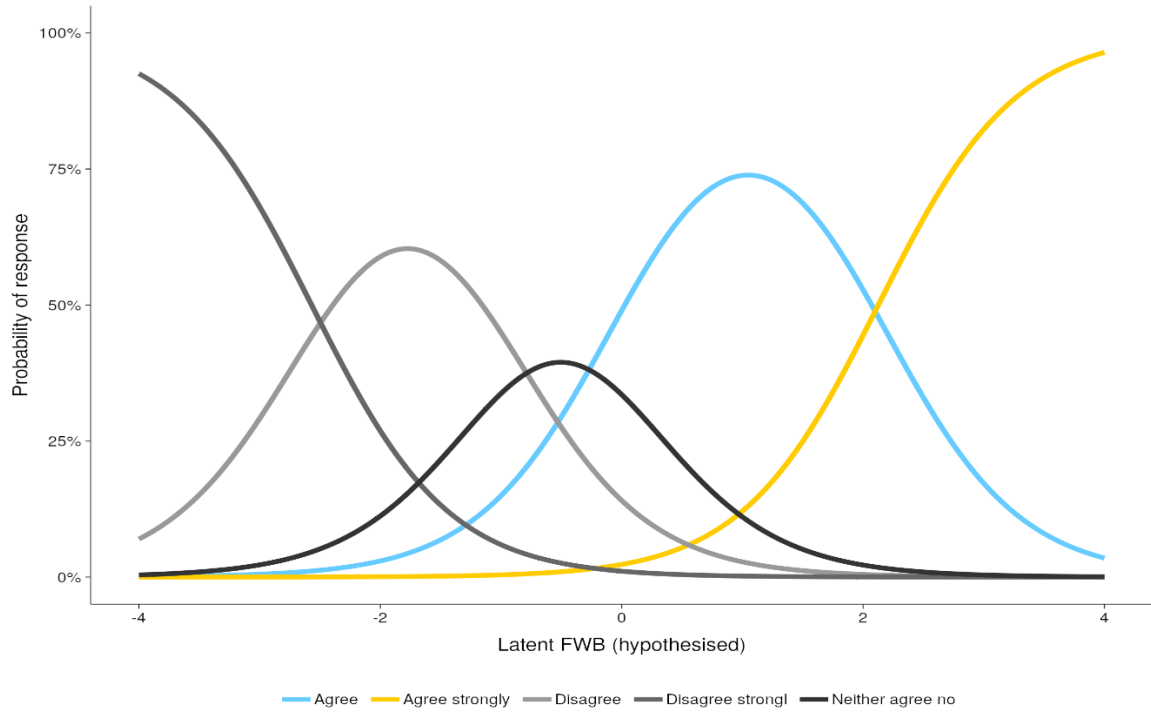
I am on track to have enough money to provide for my financial needs in the future
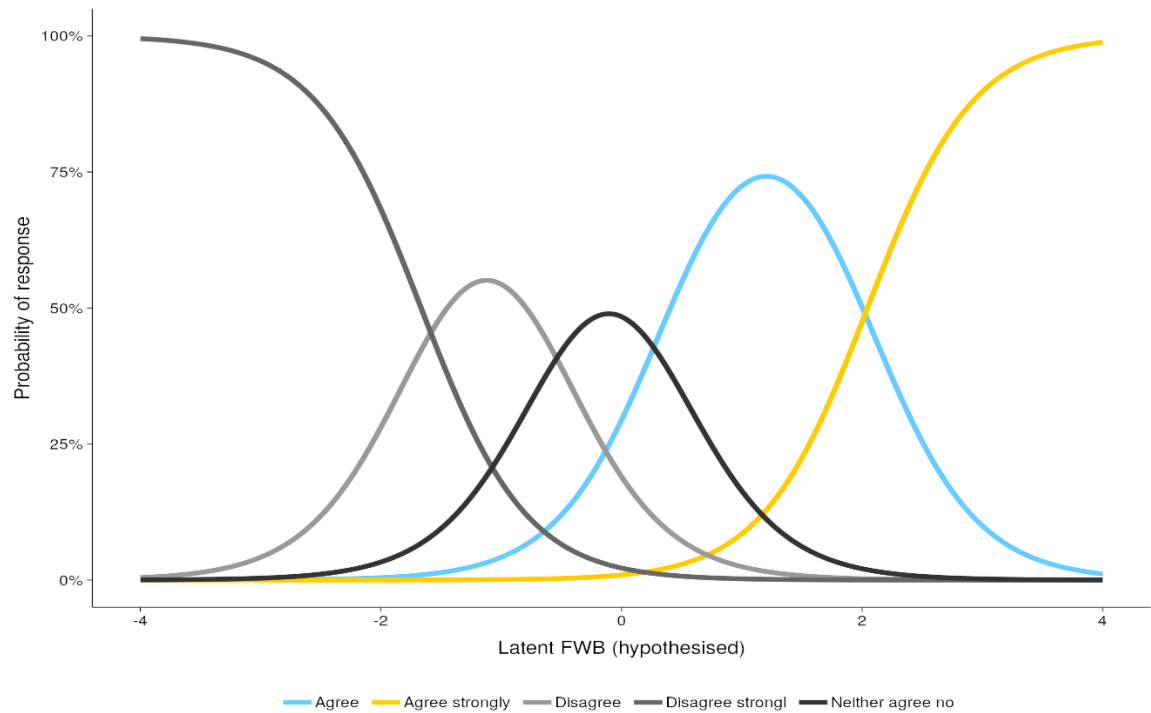
Information curves

Item information curves
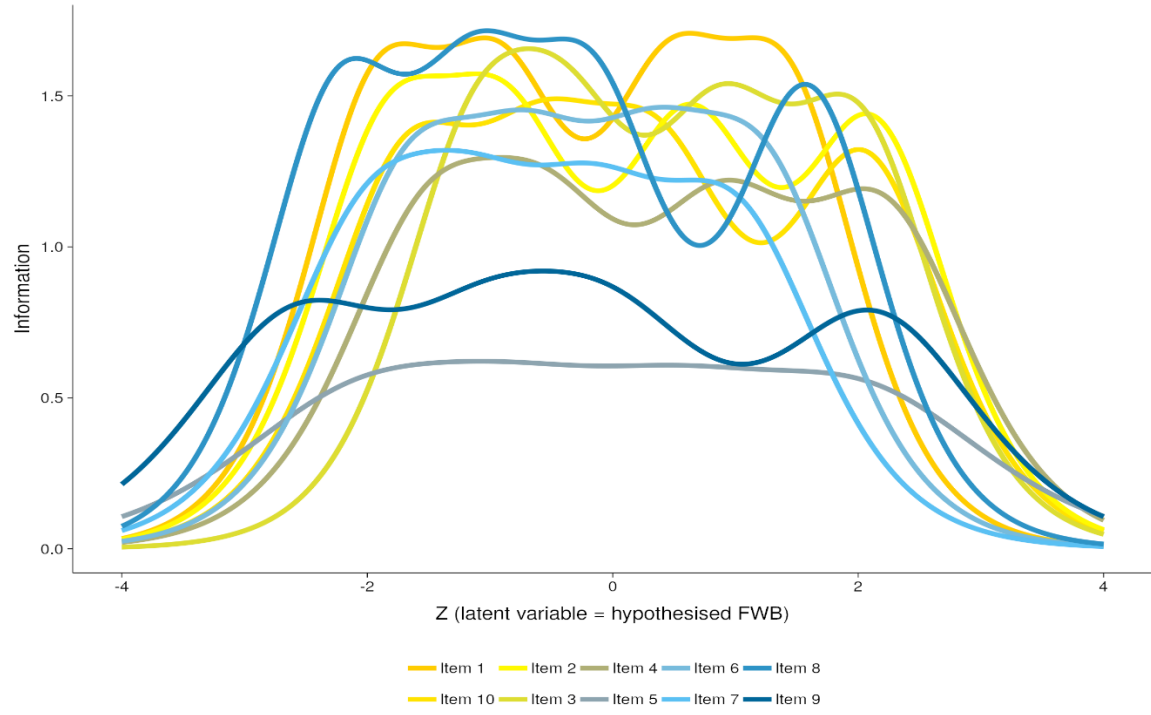
Test information curve
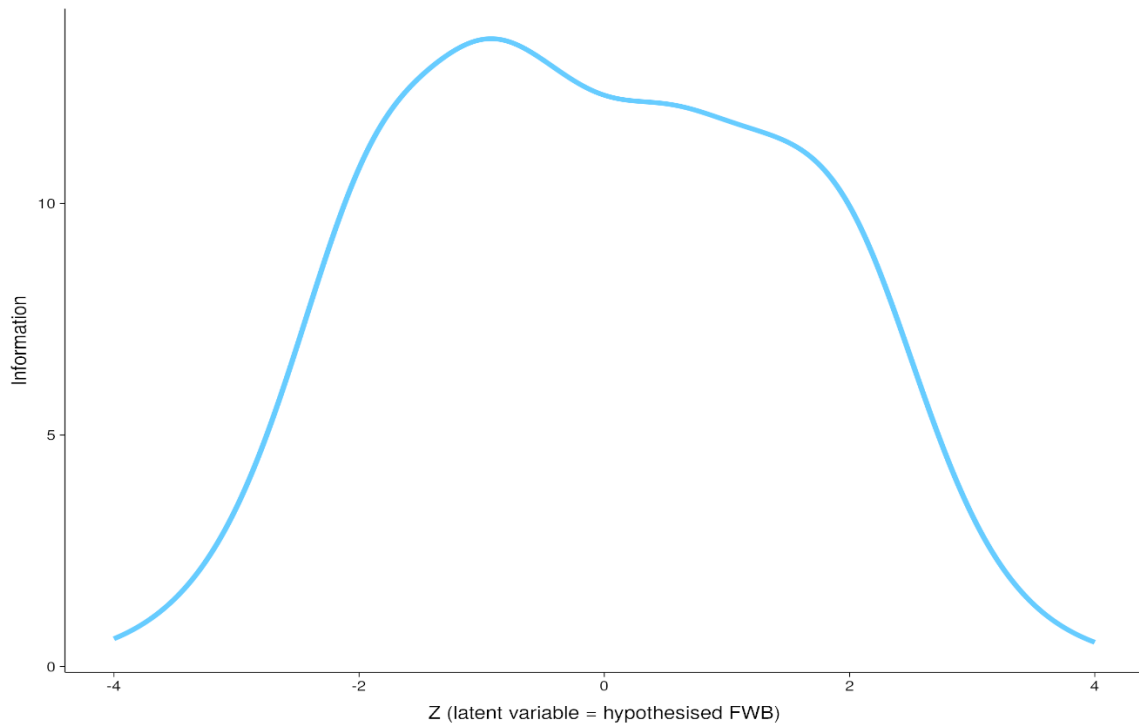
Figure B.2 Diagnostic Graphs for Items in the 5-item Reported Financial Wellbeing Scale
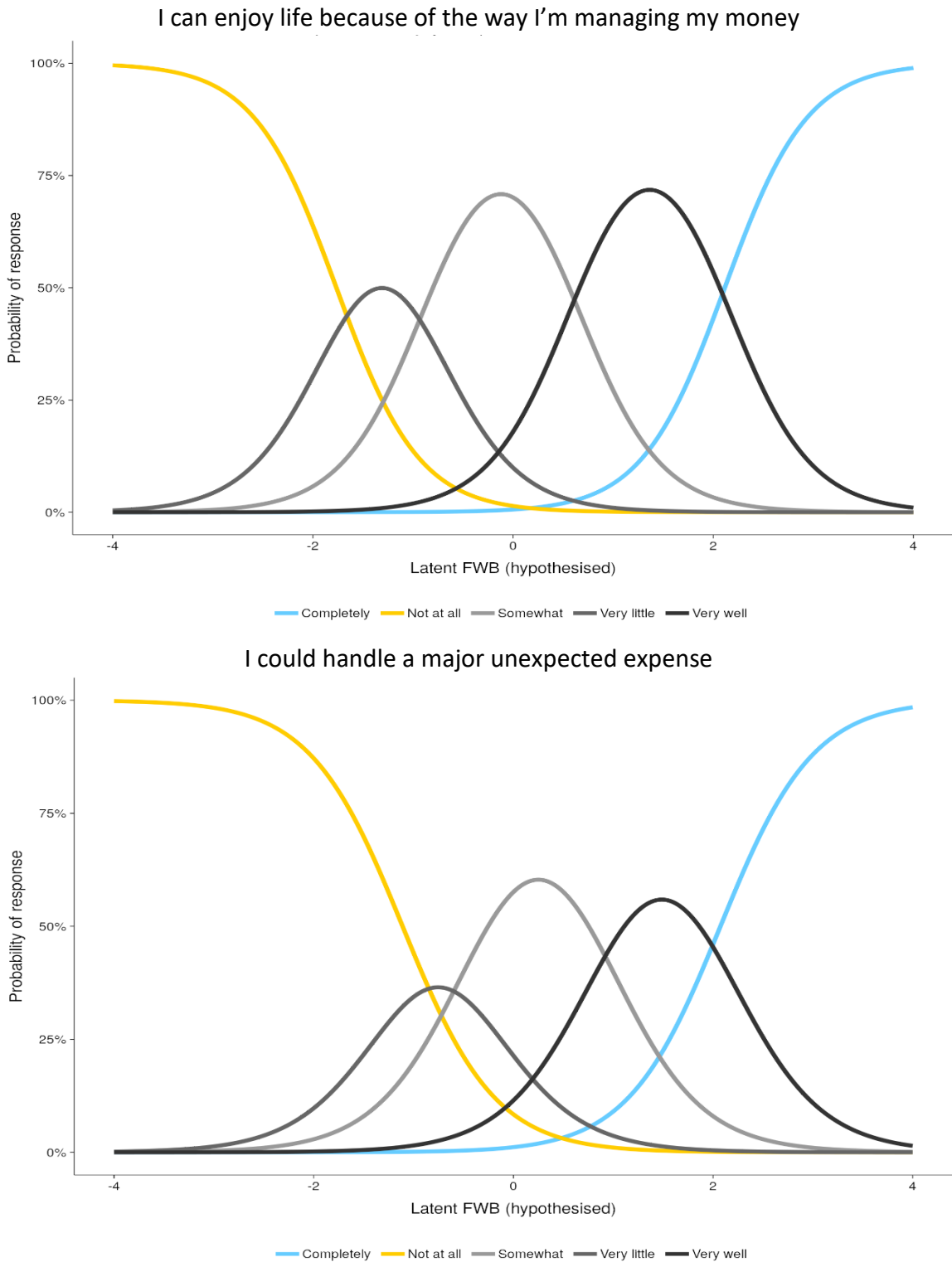
Categorical Characteristic Curves

I can enjoy life because of the way I'm managing my money

I could handle a major unexpected expense

I feel on top of my day to day finances

I am comfortable with current levels of spending relative to the funds coming in

I am on track to have enough money to provide for my financial needs in the future

Information curves
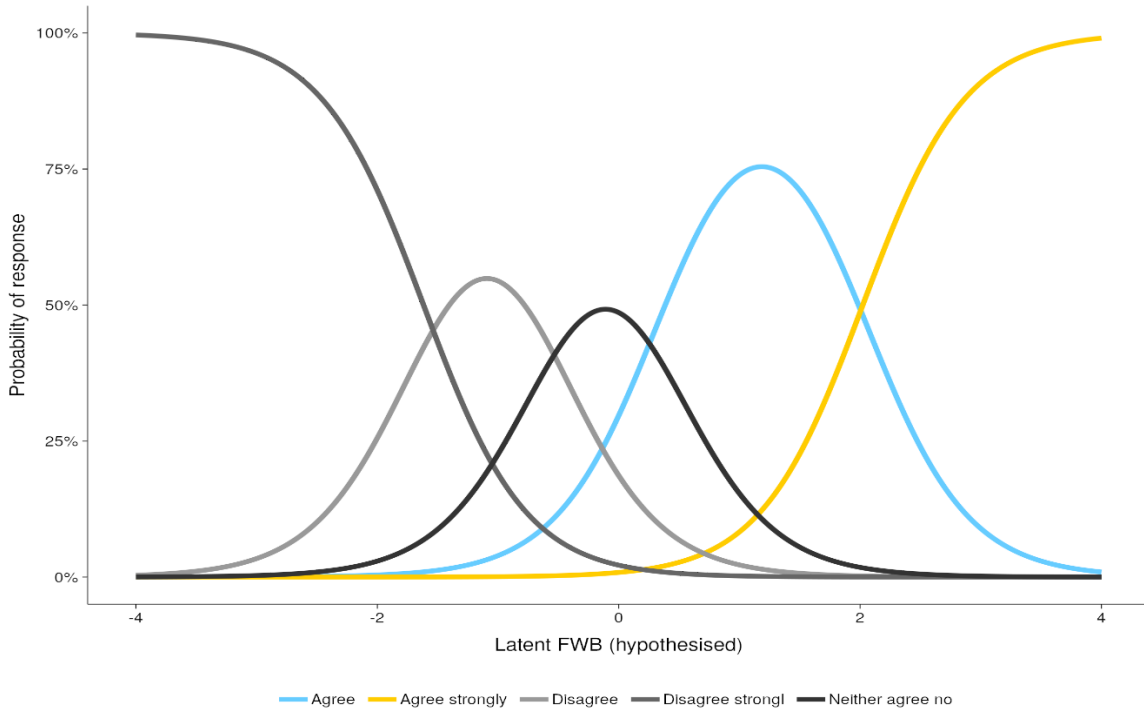
Item information curves

Test information curve
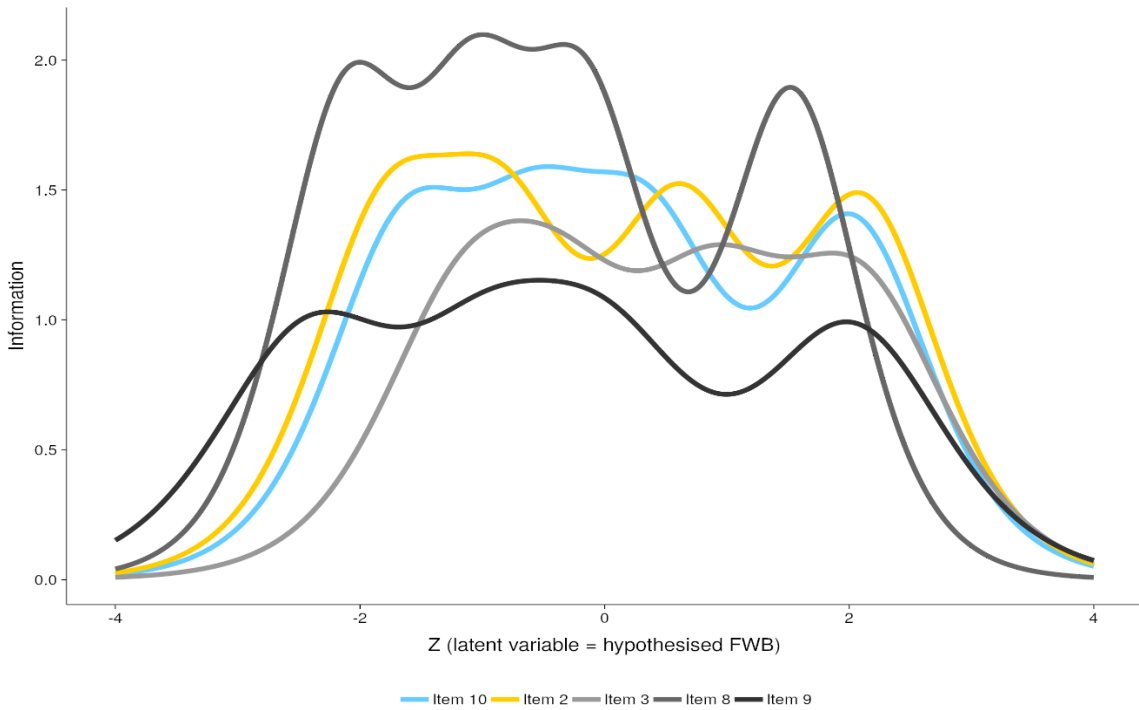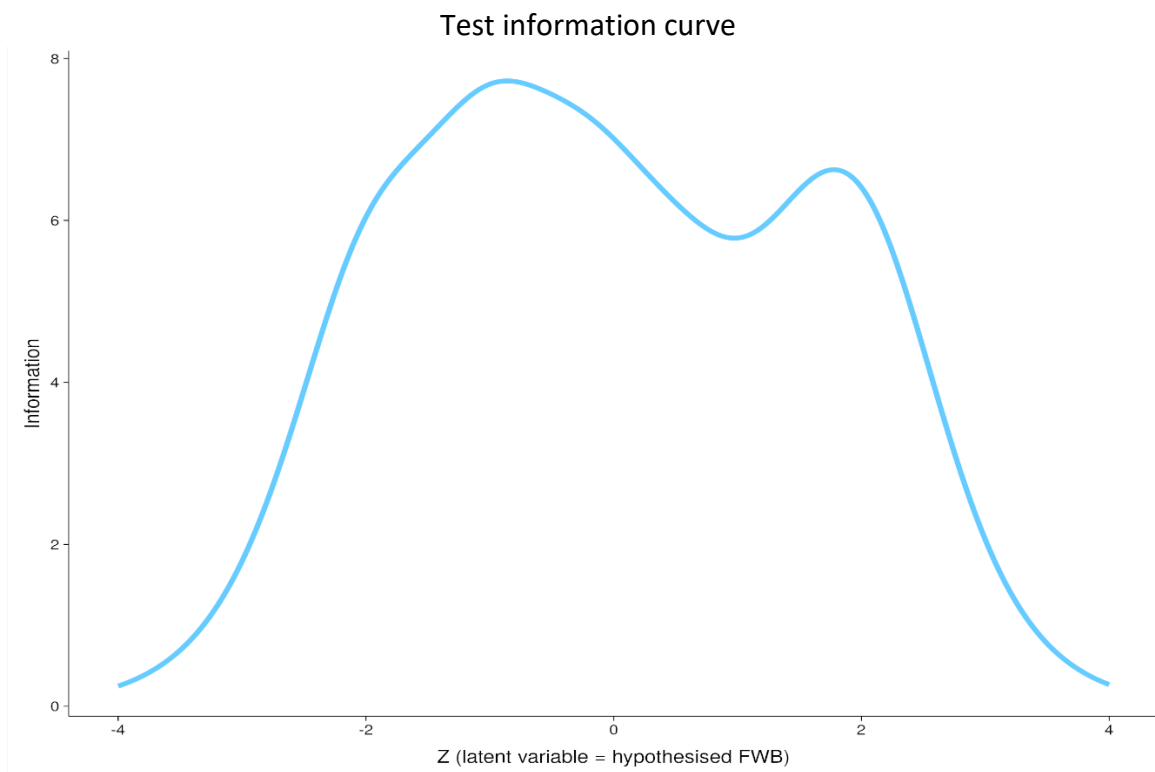
Figure B.3 Combined Test Information Curves of Reported Financial Wellbeing Scales
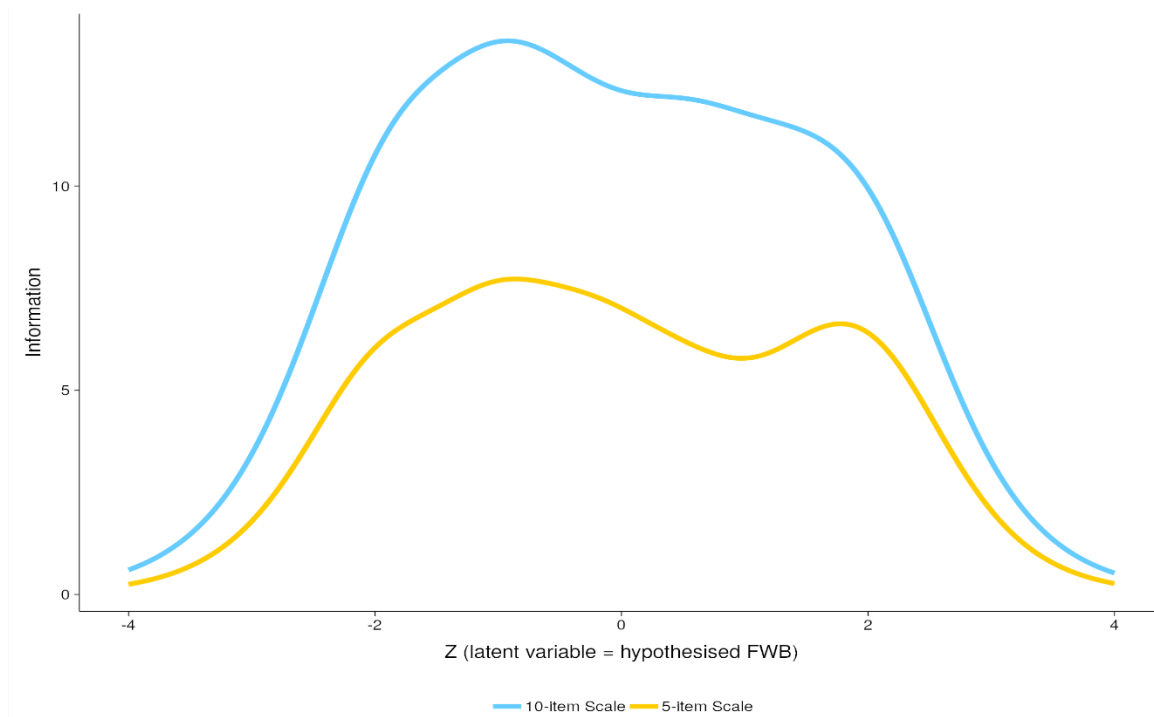
B.3 Item Response Theory Analyses and the Observed Financial Wellbeing Scale

As with the self-reported measures, a two-parameter IRT graded response model was also applied to the five bank-record measures. The findings in Table B.4 indicate that higher levels of each item are related to higher levels of observed financial wellbeing, as suggested by the severity parameters. The discrimination parameters indicate that each item distinguishes well between higher and lower levels of observed financial wellbeing. Although the discrimination parameters for the payment problems and ability to raise funds items are lower than items in the reported scale, the low liquid balances item has very high discrimination, following by the age-normed savings measure.

Category Characteristic Curves, summarised in Figure B.5, suggest that for each item, each response category contributes significant information in explaining the underlying latent trait. The Item Information Function and Test Information Function curves further demonstrate the good overall performance of the bank-record scale. The IIF's show that the low liquid balance measure contributes the most information to the underlying latent trait, followed by the items on net spending and age-normed savings. The TIF indicates that the overall scale performs well across all observed financial wellbeing values.

The observed financial wellbeing scale was calculated by summing the responses of all items and multiplying this sum by 100/19. This produces a scale from 0 to 100. The observed financial wellbeing scale constructed via summation has a correlation of 98.0% with an observed financial wellbeing scale generated from the IRT analysis and has a reliability coefficient of 0.85.

Table B.4 IRT severity and discrimination parameter estimates — latent variable for bank-record measures

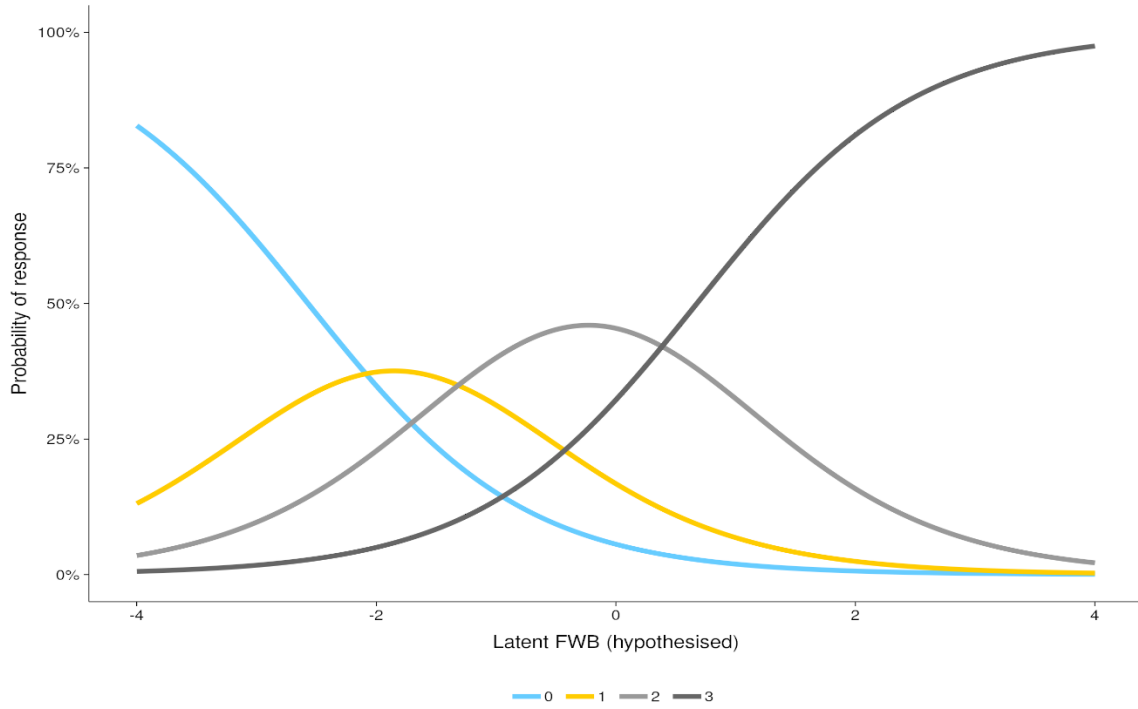| Item	δ_{i1}	δ_{i2}	δ_{i3}	δ_{i4}	α_i
1. Experienced payment problems in last year	-2.570	-1.132	0.677	-	1.099
2. Days in last year with low liquid balances	-1.197	-0.541	0.120	0.842	4.227
3. Months in last year when spending exceeded 80% of inflows	-1.778	0.098	0.950	2.282	1.572
4. Days in last year during which customer had the ability to raise one or six month's expenses from available savings or available credit	-1.184	0.455	0.345	1.214	2.581
5. Savings relative to people their own age (age-normed residual of customer's median daily savings balance during last year)	-1.068	-0.403	0.622	1.428	2.874

Notes: Estimates of severity (δ_{ij}) and discrimination (α_i) parameters from IRT graded-response models.
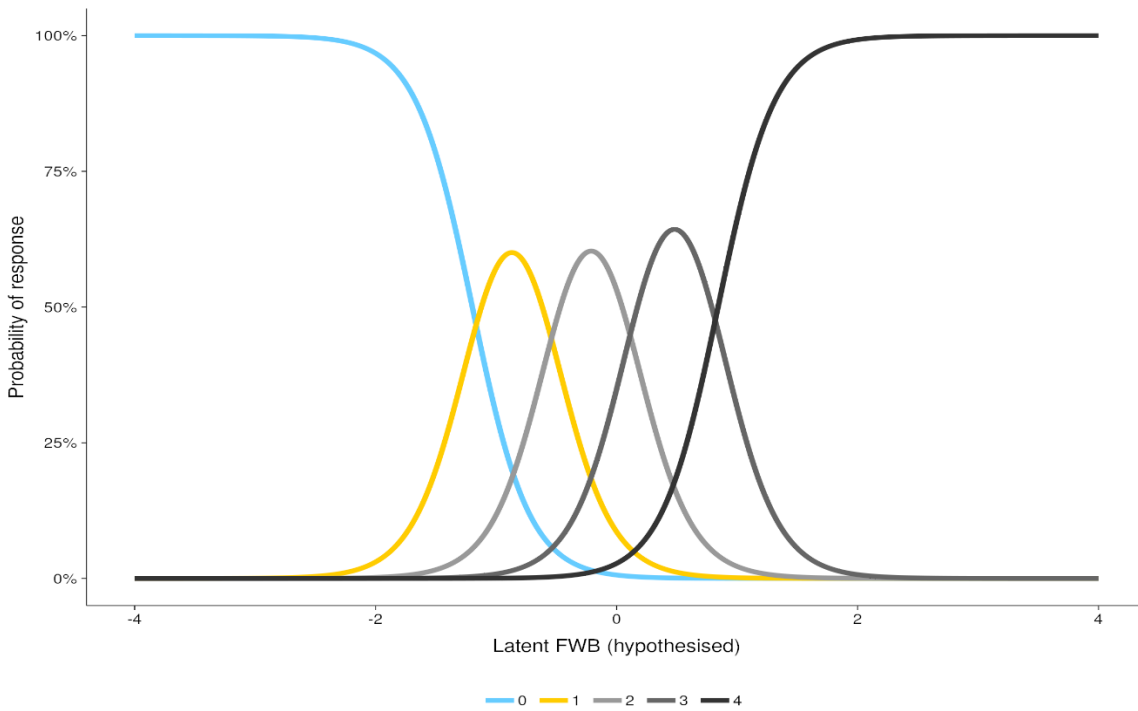* Responses reverse coded.

Figure B.5 Diagnostic Graphs for Items in the Observed Financial Wellbeing Scale
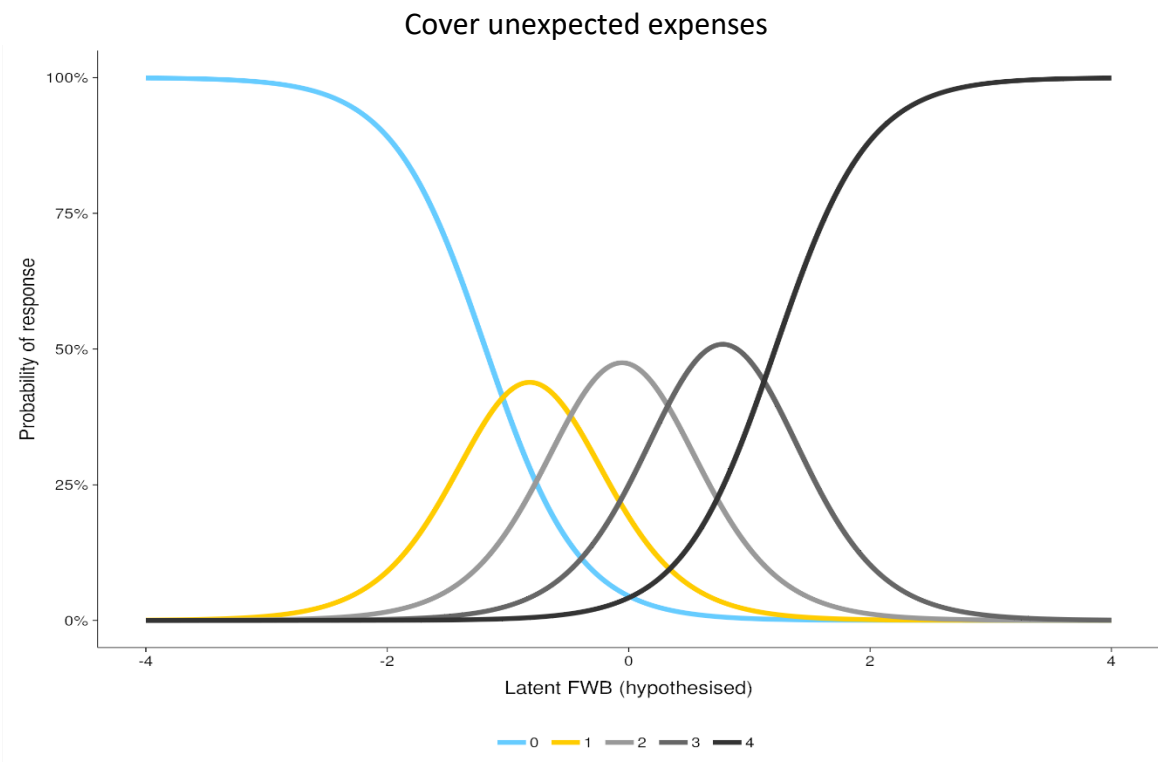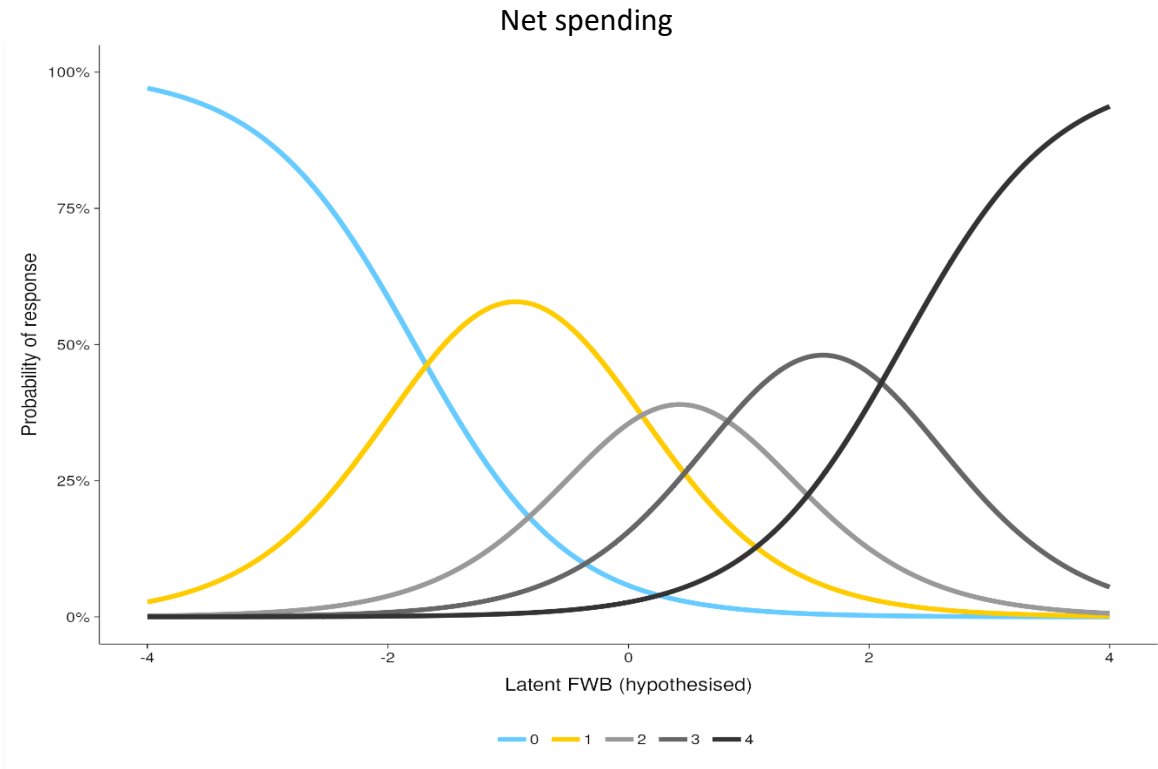
Categorical Characteristic Curves

Payment problems

Low balances

Net spending

Cover unexpected expenses

Median savings
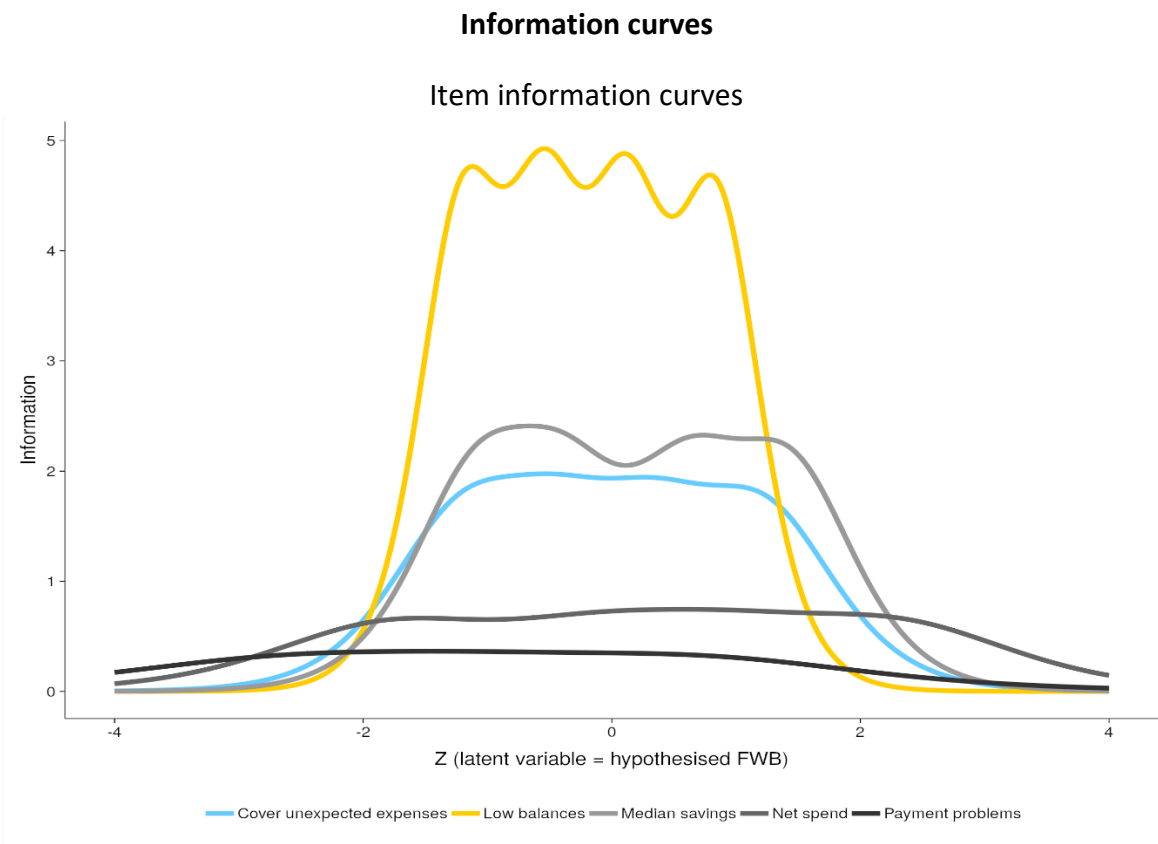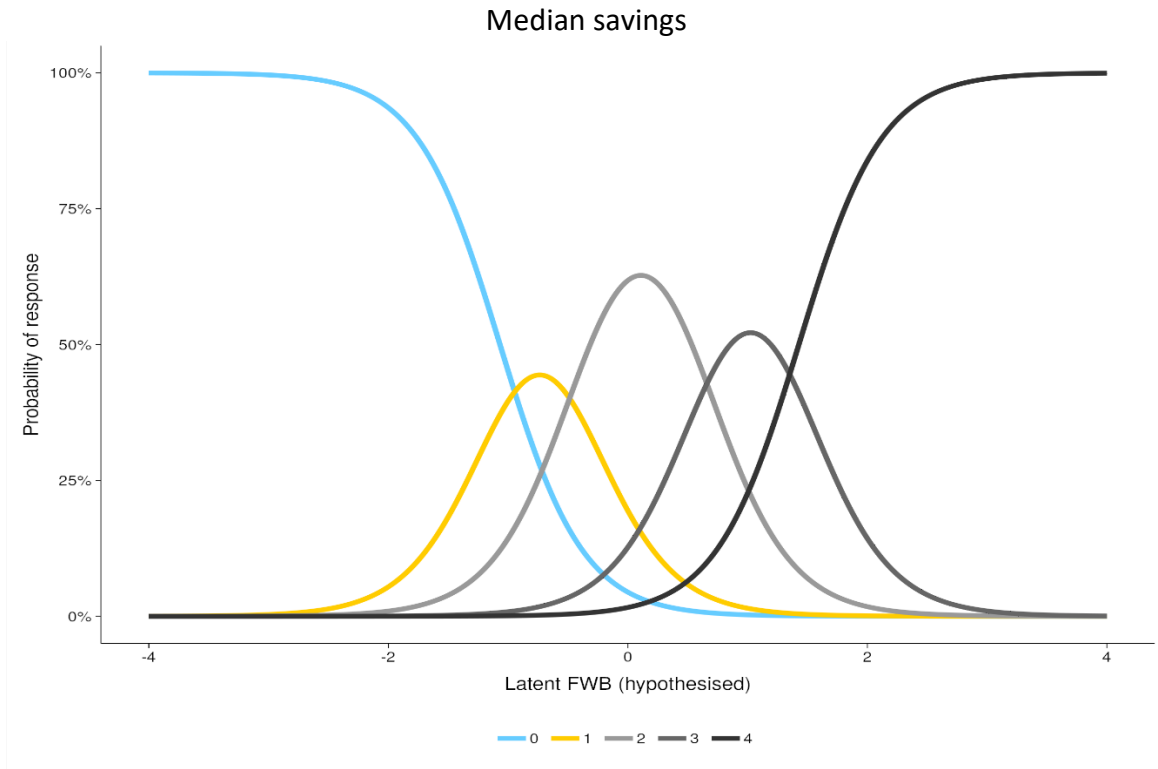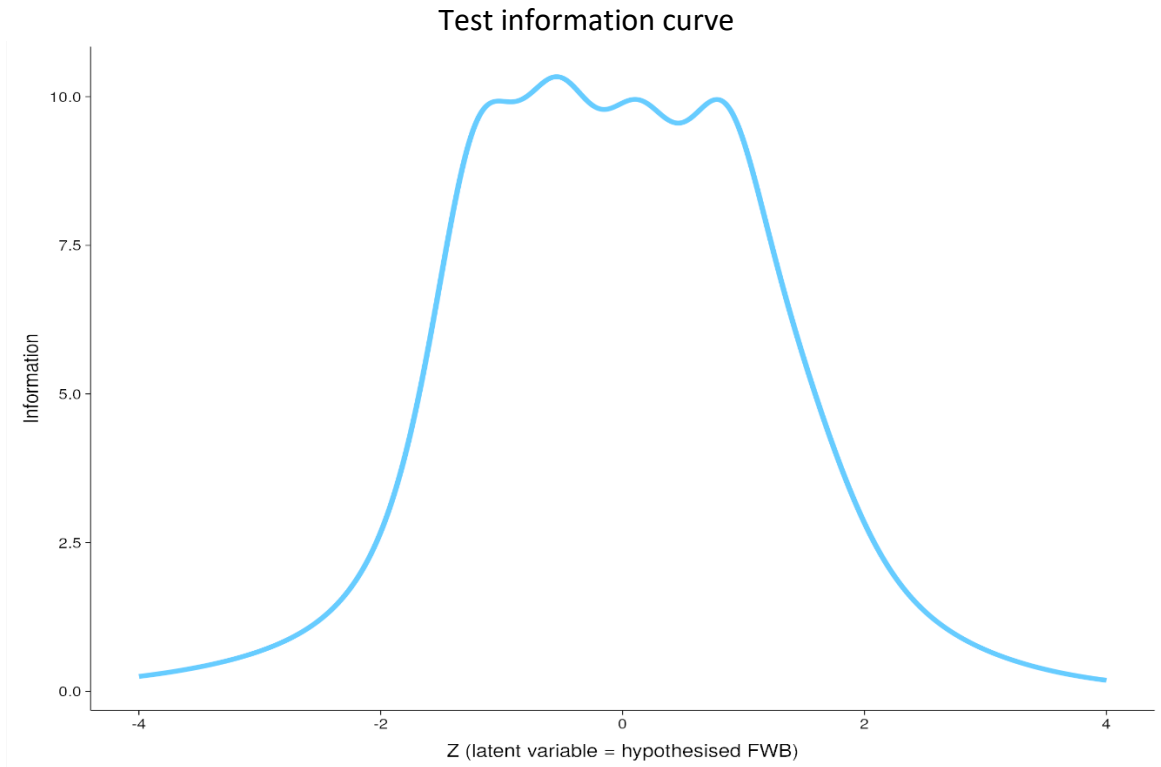

Information curves

Item information curves

Test information curve

B.4 Specification and Sensitivity Tests

Confirmatory analyses

The main analysis was restricted to respondents who were identified as CBA main bank customers. However, we also re-estimated the IRT models for the three reported financial wellbeing scales and the observed financial wellbeing scale for those customers who were not included in the primary analyses.

For the reported scales, these included 820 non-main bank customers. With respect to both reported financial wellbeing scales, the IRT results for these 820 respondents indicated that the scale measurement relationships are similar to those in the main analysis sample. For the observed scale, Haisken-DeNew et al. (2019) reported used a random sample of identical size to the original analysis to re-estimate the IRT model. They reported that the measurement relationships of the non-survey sample were also very similar to that of the main analysis sample.

Differential item functioning

To be universal, the measurement relationships for the two scales—that is, the ways in which the survey questions and bank-record measures function in each scale—should be the same for anyone with the same underlying values of reported or observed financial wellbeing, regardless

of the person's other characteristics. Following the method of Crane et al. (2006), we conducted tests for three sets of comparisons:

- Housing tenure (owned home outright, owned home but with a mortgage, did not own home),
- Work status (working or looking for work, student, retired, carer), and
- Household composition (lived alone, lived with a partner, lived in someone else's home, lived with roommates).

Overall, we found very little evidence of differential item functioning. Apart from a few differences among housing tenure groups, the handful of differences do not have a substantial effect on the scales.

External validity

We explored how each of the financial wellbeing scales was associated with various measures that are related to, yet distinct from, financial wellbeing. The analyses in Section 6 of this report suggested that the associations of the reported and observed financial wellbeing scales with the other measures were mostly in ways we would expect.