

# New insights into improving financial well-being

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## Abstract

Financial well-being (FWB) is often measured using the CFPB's Financial Well-Being Scale, but there are many alternative ways to assess this concept, including individual perceptions of FWB (e.g., financial satisfaction or stress), objective outcomes that are indicative of FWB (e.g., net wealth and retirement adequacy), and behaviors that influence FWB (e.g., planning, saving, and budgeting). Improving FWB requires a nuanced understanding of factors contributing to these measures. We present results of an analysis designed to investigate the drivers through which individuals attain FWB across its different dimensions. Individual discount rates, risk preferences, and financial self-confidence consistently contribute to different indicators of FWB. In particular, we find significant evidence that both the discount rate and self-confidence in financial decision-making have strong impacts on the dimensions of FWB. Financial literacy has an important moderating role in relation to these two drivers and to income. Personality traits, such as conscientiousness and neuroticism are influential in alternative ways across models.

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## 1. Introduction

In recent years, policy initiatives in the United States and international community aimed at improving consumer finances have started to focus on financial well-being (FWB) as a holistic concept. For example, the Dodd-Frank Wall Street Reform and Consumer Protection Act includes a Consumer Financial Protection Bureau (CFPB) mandate directed at improving financial well-being. An individual's sense of FWB results from a constellation of factors, including financial behaviors and the agency to make decisions, objective financial outcomes such as account balances, and self-perceptions of their current positions and future prospects. Researchers assess these factors through surveying respondents about their behaviors, obtaining quantitative measures of outcomes, such as account balances, and designing surveys to elicit self-perceptions of financial outcomes. Each of these closely related categories contributes in a unique way to FWB. Therefore, researchers as well as policymakers are taking a more holistic approach to investigating FWB through composite measures.

In this paper, we present results of an analysis designed to investigate the drivers through which individuals attain FWB across its different dimensions. We begin by synthesizing terminology and strands of literature over these closely related measures. We analyze data from the Understanding America Study, which includes information on individual time and risk preferences, as well as measures of financial literacy, financial efficacy, household financial information, personality traits and sociodemographic factors.

We contribute to the literature by systematically identifying drivers of FWB and testing their relationship to composite FWB as well as behaviors, perceptions, and quantifiable outcomes indicative of FWB. Through this process, we

identify which drivers are influential across the different measures and test for interaction effects between them. Individual discount rates, risk preferences, and financial self-confidence consistently contribute to FWB across different indicators. Personality traits, such as conscientiousness and neuroticism are influential in alternative ways across models. In particular, we find strong evidence supporting the impact of both the discount rate and self-confidence in financial decision making. Financial literacy has an important moderating role in relation to these two drivers and to income. Analysis of these interactions shows that a one-size-fits-all approach to financial wellness may not be appropriate.

## 2. Measures of FWB—review of literature

The concept of financial well-being is subject to different definitions and interpretations, and there can be significant differences between individuals' perceptions of their financial well-being and objective quantifiable measures (e.g., those based on financial ratios). Concepts closely related to financial well-being and its components have been introduced, defined, and refined throughout a vast body of literature. These terms frequently overlap in meaning and usage, and many have been freely interchanged as this literature developed, but as it continues evolving some delineations between concepts are becoming more widely accepted. Table 1 presents the predominant terms as they're commonly used in the literature and as they're applied in this study.

TABLE 1. DEFINITIONS OF KEY TERMINOLOGY RELATED TO FINANCIAL WELLBEING

Terminology	Definitions/Examples	Sometimes used interchangeably with:
Financial wellbeing	The combined outcome of financial behaviors and decisions related to budgeting, borrowing, spending, saving, and investing, taking into account individual expectations, perceptions, and satisfaction	Financial wellness Financial satisfaction
Financial wellness	Objective standard by which financial health is measured and compared to others, e.g. net wealth, net cash flow, retirement adequacy, indebtedness, financial satisfaction.	Financial wellbeing Financial satisfaction
Financial efficacy	An individual's belief in their ability to achieve their financial goals.	Confidence
Financial behaviors	Actions taken by an individual such as participation in a retirement plan, credit management, investment allocation.	Financial outcomes
Financial circumstances	Outcomes of an individuals decisions, such as income, wealth, investment performance, financial stress.	Financial outcomes
Financial literacy	The ability to use knowledge and skills to manage financial resources effectively.	Financial knowledge
Financial knowledge	The objective mastery of specific financial terms and concepts.	Financial literacy
Numeracy	The ability to understand and work with numbers and to apply simple numerical concepts such as percentages and ratios.	
Cognitive ability	General mental capability involving reasoning, problem solving, planning, abstract thinking, and learning from experience, commonly measured through standardized tests such as the IQ test.	

There is growing awareness that actual or perceived financial well-being cannot be fully captured by individual indicators of a particular condition or outcome, such as financial satisfaction or retirement adequacy. An individual's financial circumstances (credit history, asset accumulation, retirement adequacy, etc.) depend on the quality of their decision-making as well as on chance and other exogenous factors. For instance, access to stock market participation can be enhanced or limited by available employee benefits as well as risk-and-return knowledge, individual risk attitudes, and self-confidence (Merkoulova & Veld, 2022a and 2022b; and Van Rooij et al., 2012). The environment and financial behaviors generate financial outcomes and perceptions that contribute to financial well-being. We define composite measures of FWB to be those that estimate a single metric composed of multiple measures of objective and/or subjective financial behaviors, perceptions, or outcomes. The definition of FWB developed by the CFPB, based on

perceptions about present and future states, is perhaps the best known and most widely applied. Other examples include the Financial Health score (Garon et al., 2021), Fidelity's Financial Wellness Score (Fidelity, 2020), and two separate composite measures—current money management stress and expected future financial security—developed by Netemeyer et al. (2018). Taking a different focus, Brügggen et al. (2017) define financial well-being as a state of existence that depends on expectations regarding lifestyle and spending goals, distinct from “financial wellness,” which refers to having a healthy financial situation.

A common thread between definitions is that to achieve a sense of financial well-being, an individual is making decisions with some level of consideration over intertemporal tradeoffs. For example, the CFPB defines financial well-being as a state in which individuals perceive they have control over short-term finances, would be

capable of absorbing a financial shock, are progressing toward financial goals, and have the financial flexibility to allocate time and money to enjoyable life activities. Based on these components, the CFPB developed a scale that allows researchers to measure this complex concept consistently across surveys and over time. This definition and representative metric, while not fully comprehensive or the sole means of interpreting and measuring FWB, have gained acceptance and now appear to serve as a common reference point for researchers in this arena. Following the definition, some items in the CFPB scale focus on present financial security and choices, whereas others depend on perceptions about the future. Each item asks respondents to assess their subjective feelings about various aspects regarding their financial situation. See Appendix 1 for a list of the CFPB survey questions. In an analysis of the CFPB-FWBS using the National Financial Capability Study, Fan and Henager (2021) find that while short-term positive financial behaviors and perceived financial efficacy improve financial well-being scores, long-term positive financial behavior is unexpectedly associated with lower levels of financial well-being. Since their study was not longitudinal, it is possible that the payoff to long-term positive behaviors would accrue to future FWB.

Prior to the widespread development of composite measures, a large literature focused on exploring separate components related to an overall level of financial well-being. These factors include financial behaviors, quantifiable financial outcomes, and individual survey items focused on financial perceptions. While these measures are clearly connected to each other, for the purposes of this paper, we place them into separate categories. For example, we label consistently spending less than one earns as a financial behavior. We categorize the accumulation of wealth as a separate quantifiable financial outcome of spending behavior and other factors. Finally, a perception of accumulating enough money for future needs is typically part of a composite measure of financial well-being. Underlying all the behaviors, outcomes, perceptions, and composite measurements are personal characteristics, such as risk and time preferences, personality and circumstances, as well as demographic and exogenous factors.

Several drivers have consistently been identified in the literature as having important implications for various dimensions of FWB. In this section, we briefly review the literature related to the FWB effects of financial literacy, financial self-efficacy, discount rates, personality traits, and interactions between some of these characteristics.

**Financial Literacy.** A vast literature has demonstrated consistent linkages between financial literacy and positive financial outcomes and perceptions. Although there is not a universally agreed-upon measure of financial knowledge, many recent papers use sets of survey questions designed to measure financial literacy. Lusardi and Mitchell (2014) review the early literature and explain the rationale for the “Big Three” financial literacy questions measuring understanding of compound interest, inflation, and diversification. These questions have been fielded around the world in many nationally representative samples and are often used as controls in empirical studies related to financial decisions and outcomes. Higher levels of financial knowledge measured at one time extend to positive financial behaviors and better financial outcomes in the future (Angrisani et al., 2020). The effects of financial literacy and financial knowledge may also be intertwined with cognition and numeracy. Using data from the Understanding America Study, Peters et al. (2019) find that when numeracy and numeric confidence are included as controls, financial knowledge is not significantly related to FWB. More recently, Yakoboski et al. (2023) have used the *TIAA Institute-GFLEC Personal Finance Index* to compare across demographic groups and assess improvement over time.

**Financial Self-Efficacy.** Beyond financial literacy, an individual’s financial environment and personal characteristics influence the various indicators of their FWB. The interaction of these factors is of sufficient importance to financial outcomes that researchers have developed the concept of financial self-efficacy (FSE), defined as an individual’s confidence in their ability to make financial decisions and to achieve their financial goals. There is considerable overlap between objective financial literacy, objective financial knowledge and skill, and perceived financial efficacy, but of the three, perceived financial efficacy most heavily relies on the respondent’s beliefs (Hastings et al., 2013). Applying an intertemporal breakdown of composite financial well-being, Netemeyer et al. find that perceived financial self-efficacy is positively and significantly associated with expected future financial security but isn’t a significant variable in explaining current money management stress. Angrisani and Casanova consider the impact of financial self-confidence on asset holdings and find that the best outcomes accrue to those with both knowledge and confidence. The worst case is when individuals believe their skills are higher than they are. They also find that low efficacy can affect important behaviors: these individuals engage in less retirement planning and are less likely to participate in employer-sponsored retirement

plans. Similarly, Van Rooij et al. (2012) find that financial self-confidence regarding financial skills is a significant determinant of the likelihood of retirement planning.

**Time and risk preferences.** In general, high discount rates are theorized to reduce saving, leading to lower lifetime accumulation of wealth, and therefore, time preferences are also important drivers of decisions that influence FWB. Similarly, risk attitudes affect financial decisions and outcomes. Many surveys, including those discussed earlier, do not directly include discount rate elicitation. For example, analyses of composite FWB by Netemeyer et al. and Fan and Henager don't control risk preferences or time preferences. Research shows that time preferences, risk preferences, and cognition—even when measured in adolescence or early adulthood—are predictors of future life outcomes, including those that significantly affect financial well-being (Almlund et al., 2011; Golsteyn, 2014). Chabris et al. (2008) combine experimental data with survey items regarding financial and other intertemporal behaviors, finding that individual time discounting has more predictive power in explaining intertemporal decisions than other traditional individual-level variables. Recent studies that elicit discount rates show that higher discount rates are associated with reduced health and wealth outcomes and greater likelihood of financial fragility (Huffman et al., 2019; Clark et al., 2021). Subjective health and life satisfaction are also higher for respondents who identify as patient and prepared to take risks (Becker et al., 2012).

**Personality Traits.** Personality traits, sometimes referred to as “noncognitive abilities,” are predictive of various aspects of household finances. Personality traits are often represented in a taxonomy known as the “Big Five” that includes openness, conscientiousness, extroversion, agreeableness, and neuroticism. Application of the Big Five traits is well documented in the psychology literature and has recently become more common in economics and finance.<sup>1</sup> For example, Bajtelsmit, Posey, and Tennyson (2022) document significant and independent effects of personality type, risk tolerance and genetic propensities on various financial decisions for participants in the Health and Retirement Study. The personality trait of conscientiousness is negatively related to several measures of financial distress (Parise & Peijenberg, 2019; Xu et al., 2015). Several other papers connect individual personality traits to quantifiable financial outcomes indicative of FWB, such as net worth and household asset allocation. See for example, Brown and Taylor (2014), Bucciol and Zarri (2017), and Nabeshima and Seay (2015). The study by Becker et al. tests a model that includes personality measures along with economic preferences and finds that it better explains outcomes compared to models that factor in just one of these

categories. This body of research indicates that preferences and personality are complementary influences on life outcomes. The standard methodology for measuring the Big Five traits is to have survey participants respond to a series of statements which are then used to score the individual in each of the Big Five domains. These questions are now more commonly being included in large-scale surveys, such as the Health and Retirement Study and the Understanding America Study.

**Interactions.** In much the same way that the concept of financial well-being reflects the interaction between current behavior, observable outcomes, intertemporal states, and an individual's outlook, the antecedents of these indicators also interact with one another. Recent literature focuses on some of these interaction effects. The impact of financial literacy on composite FWB has also been shown to interact with race and ethnicity (Clark et al., 2021). Controlling for risk preferences, but not for time preferences, Angrisani et al. (2020) find outcomes are better for respondents who are white, older or retired, and have higher education and income levels. But the association of financial literacy with the perception, quantifiable outcome, or behavior under consideration varies systematically with other independent variables. For example, their results show that while financial literacy is associated with higher financial satisfaction for men, but not for women, it is associated with increases in positive financial behaviors (more retirement planning, less excessive debt) for women, but not for men.<sup>2</sup>

Experimental research suggests similar patterns. Bajtelsmit and Coats (2023) find that certain behavioral prompts have different levels of impact on subgroups in a laboratory experiment. For example, prompts to focus on goals and future needs increase expected investment returns for women and for participants with lower levels of financial literacy. Similarly, Goda et al. (2015) find that an intervention designed to improve financial decision-making of participants exhibiting exponential growth bias has the desired differential effect on those participants.

Recent research finds financial self-efficacy, in particular, is an interactor that merits further investigation. For example, in the study by Netemeyer et al. (2018), perceived financial

1 See Almlund et al. (2016) for a thorough review.

2 Additional literature suggests that these results may be influenced by systematic differences between men and women in the propensity to answer “I don't know” to financial literacy questions (Bucher-Koenen et al., 2021).

efficacy does not significantly impact current money management stress but it is associated with improvements in expected future financial security. Angrisani and Casanova (2021) investigate determinants of wealth accumulation, finding that individuals who have low financial skill, but misperceive their skills to be high, have the lowest level of net worth in their sample. Asebedo and Payne (2019) show FSE can play a moderating role in that market volatility has no significant effect on financial satisfaction for people with high financial efficacy, whereas those with low financial efficacy experience declines in satisfaction when markets are more volatile. Studies by Allgood and Walstad (2016) and Peters et al. (2019) find that self-perceptions of efficacy and actual competence (numeracy and financial literacy, skill, knowledge, etc.) interact such that the combination of high actual and high perceived financial competence results in the largest positive marginal effect on financial behavior. However, Allgood and Walstad's results suggest that higher perceived financial literacy is associated with healthy personal finance behaviors, regardless of whether actual financial literacy is high, but the study by Peters et al. finds self-efficacy regarding numeracy skills actually counters positive financial behavior when objective numeracy is low.

In the next section we describe our dataset, which provides survey data on composite FWB and various quantifiable outcomes, perceptions, and behaviors found in the literature to be indicative of FWB, in addition to demographic information and risk and time preferences.

### 3. Hypotheses

Based on the previous literature, we develop our hypotheses regarding FWB and the set of drivers influencing it. We analyze the relationships between the drivers and four sets of FWB indicators: (1) composite FWB, (2) perceptions, (3) objective quantifiable outcomes, and (4) financial behaviors indicative of composite FWB. We then use those results, together with the previous literature, to inform our predictions regarding interaction effects of the drivers on composite FWB. Finally, we briefly investigate the relationship between composite FWB and the other variables indicative of FWB.

We expect that alternative indicators of FWB should be affected by the same fundamental set of drivers reflecting individual preferences, characteristics, experiences, and circumstances (after applying standard demographic controls). We expect further that these drivers determine overall FWB by influencing individual behaviors such as planning and saving, quantifiable financial outcomes, such as net wealth, and how individuals perceive their

financial standing, measured by indicators such as financial satisfaction or stress. For example, a person who engages in financial planning, manages their credit wisely, and sticks to a budget will be more likely to have positive financial outcomes and possibly higher composite FWB. Our first hypothesis centers on the drivers of FWB.

#### **Hypothesis 1: Alternative indicators of FWB are determined by the same underlying drivers.**

We expect that while the FWB drivers similarly affect various measures of financial well-being, their impact on composite FWB may be unique to individuals and their characteristics. For example, while income and financial literacy both impact FWB, the composite financial well-being of individuals with lower incomes may depend more heavily on their ability to sacrifice current consumption for future consumption (the discount rate), or on their financial literacy, ability stick to a budget, etc., compared to those with higher incomes. Our second hypothesis focuses on these types of relationships.

#### **Hypothesis 2: The contribution of different drivers to composite FWB depends on their interaction with each other and on individual characteristics.**

As described above, holistic FWB has become the goal of many policy initiatives. Yet improvements in composite measures of FWB are generally brought forward through improvements in more specific areas. For example, an individual who has a low level of accumulated wealth may justifiably have a better outlook regarding their financial prospects if they take positive financial actions in the present than if they are currently engaging in negative financial behaviors. Our third hypothesis is based on these expected relationships between composite FWB and other indicators of FWB.

#### **Hypothesis 3: Positive perceptions, quantifiable financial outcomes, and behaviors are each associated with improvements in composite FWB.**

We expect that the dependent variables representing separate indicators of FWB will contribute to increases in the composite measure. This is because a composite measure is designed to reflect an individual's overall current level of FWB derived from existing resources, intertemporal decision-making, tradeoffs, and anticipated outcomes.

### 4. Data and methodology

To test the hypotheses identified in the previous section, we use data from the Understanding America Study (UAS), a nationally representative Internet panel of households, conducted through the University of Southern

California's Center for Economic and Social Research. The study provides access to multiple surveys conducted by numerous researchers, and it includes approximately 12,000 respondents in 5,000 households. The base survey includes full demographics, wealth, and income data (modeled after questions in the Health and Retirement Study). In addition, the survey data include measures of financial literacy, numeracy, personality type, risk tolerance, time preference, perceptions of FWB, and the CFBP Financial Well-Being Scale. In the next section, we build upon the literature review and previous laboratory results with econometric analysis of the data extracted from UAS surveys to formally examine the differential effects of the determinants of financial well-being.

Our sample consists of 2,887 individuals ages 44 to 76 who answered questions in the UAS 226 survey, fielded in April and May 2020. This survey is unique in that, in addition to all the usual household financial information, financial literacy, personality and other characteristics, it includes a series of questions that elicit respondents' individual discount rates following an established protocol. The respondents answered a series of questions in which they chose between receiving \$100 today versus a larger amount of money in 12 months. Based on the point at which they switch their

preference from receiving the money at the earlier versus later time, a discount rate is calculated, ranging in this sample from 1.5 percent to 115 percent. This can also be seen as a measure of impatience. We also use several variables from a previous survey deployed by Clark and Mitchell (2022) in their study of household financial resilience and response to shocks, as well as from the UAS Comprehensive File, which merges the data from core surveys.

To analyze the drivers of financial well-being, we estimate models of the form given in Equation (1), where the dependent variables are all various indicators of financial well-being.

$$\mathbf{FWB\ Indicator} = \alpha + \beta_1 \text{Rate} + \beta_2 \text{RiskTol} + \beta_3 \text{Finlit} + \beta_3 \text{Efficacy} + \beta_4 \text{Numeracy} + \sum \theta_i (\text{Big Five Personality}) + \sum \gamma_i (\text{Experiences}) + \sum \delta_i (\text{Demographics}) + \varepsilon \quad (1)$$

Table 2 provides variable names and descriptive statistics for the indicators of financial well-being used as dependent variables in the empirical models below. The organization of the table also is consistent with the order of the models identified in this section.

TABLE 2. DESCRIPTIVE STATISTICS – INDICATORS OF FINANCIAL WELLBEING USED AS DEPENDENT VARIABLES IN THE ANALYSIS

Variable Description	Variable Name	Mean	Minimum	Maximum	N
<b>(1) Composite Measure of FWB</b>					
CFPB FWB Scale	<i>CFPBScore</i>	58.29	14	95	2849
<b>(2) Perceptions Indicative of FWB</b>					
Financial Satisfaction =1	<i>FinSatisf</i>	0.294	0	1	2773
No Financial Stress =1	<i>NoFinStress</i>	0.601	0	1	2602
Manageable Debt =1	<i>DebtOK</i>	0.573	0	1	2773
Retirement preparation (1-4)	<i>RetirePrep</i>	2.607	1	4	2690
<b>(3) Observable &amp; Quantifiable Outcomes Indicative of FWB</b>					
Home Owner	<i>OwnHome</i>	0.766	0	1	2715
Total Household Wealth Quintiles	<i>TotalWealth</i>				
	<\$11,000	0.20	0	1	421
	\$11,001 – \$85,000	0.20	0	1	420
	\$85,001 – \$230,000	0.20	0	1	420
	\$230,001 – \$592,300	0.20	0	1	420
	>\$592,300	0.20	0	1	420
Nonhousing Wealth Quintiles	<i>NHWealth</i>				2101
	<-\$2,000	0.20	0	1	422
	-\$2,000 – \$400	0.20	0	1	418
	\$401 – \$10,000	0.20	0	1	418
	\$10,001 – \$70,000	0.20	0	1	421
	>\$70,000	0.20	0	1	416
<b>(4) Behaviors Believed to Influence FWB (Yes = 1)</b>					
<b>Financial Planning</b>					
Tried to calc retirement needs	<i>CalRet</i>	0.45	0	1	2775
Plan Ahead	<i>PlanAhead</i>	0.67	0	1	2886
<b>Saving and Investing</b>					
Emergency Fund	<i>EmergFund</i>	0.52	0	1	2773
Contributing to investment acct	<i>Invest</i>	0.84	0	1	1787
<b>Credit Management</b>					
No Bad Debt	<i>NoBadDebt</i>	0.303	0	1	2305
No Use of Alt Finance	<i>NoAltFinance</i>	0.761	0	1	2885
No Debt Collector	<i>NoDebtCollector</i>	0.843	0	1	2887
<b>Budgeting and Spending</b>					
Follows a budget	<i>Budget</i>	0.561	0	1	2887
Tracks spending	<i>TrackSpend</i>	0.805	0	1	2887
Spend less than earn	<i>PositiveCF</i>	0.571	0	1	2874
No Overdrawn account	<i>NoOverdraft</i>	0.784	0	1	2863
<b>Seeking Help with Finances</b>					
Has used Pers Fin Mgmt tool	<i>PFMTool</i>	0.093	0	1	2864
Seek financial advice	<i>Advice</i>	0.845	0	1	1786



The models include a common set of independent variables and controls. Using data from the UAS surveys described in the previous section, we identify variables understood to drive various economic and financial tradeoffs. In addition, we identify variables known to affect individual competence and perspectives more specifically over financial decision-making and outcomes.

Time and risk preferences are possibly the most fundamental ways in which we understand the intertemporal decisions and tradeoffs that ultimately result in a level of FWB. As discussed previously, in our dataset, a respondent's elicited discount rate (*Rate*) is calculated through responses to a series of hypothetical intertemporal tradeoffs. We expect that higher discount rates discourage saving and investment behavior and would be associated with lower levels of FWB, through poorer financial decisions, lower quantitative outcomes, and reduction of a holistic sense of well-being. *RiskTol* is based on the respondent's self-assessment of tolerance for financial risks on a scale of one to ten, taken from the UAS 226 survey. Based on the risk-return relationship, we expect this variable to be associated with higher levels of FWB, through more investment actions, higher quantitative outcomes, and improvement in a composite well-being in the face of the unavoidable uncertainty regarding one's financial future.

While risk and time preferences are characteristics often considered to be innate and impactful across all intertemporal decisions, several other characteristics apply more directly to consumer finances. Because of the quantitative nature of the decisions and outcomes and their assessment, we include *Numeracy*, which is a score based on an eight-question quiz designed to assess their understanding of basic mathematical concepts, such as percentages and ratios. Financial literacy (*FinLit*) is measured by the score on a fourteen-question financial literacy test. As compared

to the Big 3 or Big 5 financial literacy measures, this variable is a broader measure of financial knowledge. Along with numeracy, we expect financial literacy to positively impact measures of financial well-being. Financial efficacy (*Efficacy*) is a binary variable =1 if the respondent ranked their confidence in making financial decisions at or above the median on a self-assessed scale from 1 to 10. As noted above, an interesting question in the literature is the extent to which self-efficacy extends to actual knowledge or skill in financial decision-making and to improvements in indicators of FWB.

$\theta_i$  is a vector of the scores on the Big Five personality types. Based on the results in previous literature, we expect FWB assessments to be impacted positively by conscientiousness and negatively by neuroticism.  $\gamma_i$  is a vector of experiences that are expected to influence FWB. These include whether the individual lost their job recently (*LostJob*), whether their parent(s) experienced a financial shock while they were growing up (*Shock*), and whether they assess themselves as being in good or better health (*GoodHealth*). We expect that the negative experiences will have a negative effect on FWB and good health will have a positive effect.

We include the usual set of demographic controls for age, marital status, work status, education, race, and income. Table 3 provides variable names and descriptive statistics for the drivers and demographic controls. Following Clark and Mitchell (2022) we group household income into the eight categories as displayed in the table. Marital status is designated by the variable *Couple* which takes a value of 1 if the respondent is married or cohabitating and 0 otherwise. We expect higher levels of FWB for couples. The variable *Education* is given a value of 1 if the respondent has *No College*, 2 for *Some College*, and 3 for a *Bachelor's or Graduate Degree*. Similarly, the survey respondents are categorized by race as *White*, *Black* or *Other*.

TABLE 3. DESCRIPTIVE STATISTICS – FWB DRIVERS AND CONTROLS

Variable Description	Variable Name	Mean	Minimum	Maximum	N
<b>Time and Risk Preferences</b>					
Elicited discount rate	<i>Rate</i>	0.42	0.15	1.15	2887
Self-assessed Risk Tolerance	<i>RiskTol</i>	3.63	0	10	2858
<b>Big Five Personality Types</b>					
Openness Score	<i>Openness</i>	35.97	14	50	2878
Conscientiousness Score	<i>Conscientiousness</i>	36.69	14	45	2876
Extroversion Score	<i>Extroversion</i>	26.04	8	40	2879
Agreeableness Score	<i>Agreeableness</i>	36.2	14	45	2876
Neuroticism Score	<i>Neuroticism</i>	21.04	8	40	2876
<b>Numeracy, Fin Lit, and Efficacy</b>					
FinLit Score (14 question- quiz)	<i>FinLit</i>	10.08	0	14	2885
Numeracy Score	<i>Numeracy</i>	50.99	33.53	70.45	2887
Confident in making financial decisions above median =1	<i>Efficacy</i>	0.51	0	1	2849
<b>Experiences &amp; Opportunities</b>					
Lost job in last year =1	<i>LostJob</i>	0.11	0	1	2887
Parent past financial shock =1	<i>ParentShock</i>	0.45	0	1	2887
Good health or better =1	<i>GoodHealth</i>	0.77	0	1	2887
<b>Demographics</b>					
Age	<i>Age</i>	59.66	44	76	2887
Married or Cohabiting	<i>Couple</i>	0.06	0	1	2887
Retired =1	<i>Retiree</i>	1.27	1	3	2881
Currently Working for Pay =1	<i>Working</i>				2184
<b>Education Categories</b>					
	1 NoCollege	0.22	0	1	640
	2 SomeCollege	0.39	0	1	1118
	3 College+	0.39	0	1	1129
<b>Race Categories</b>					
	1 White	0.82	0	1	2359
	2 Black	0.09	0	1	259
	3 Other	0.09	0	1	263
<b>Hispanic origin =1</b>					
	Hispanic	0.06	0	1	2887
<b>Household Income Categories</b>					
	1 Under \$15,000	0.10	0	1	278
	2 \$15,000 – \$24,999	0.08	0	1	232
	3 \$25,000 – \$34,999	0.09	0	1	271
	4 \$35,000 – \$49,999	0.13	0	1	367
	5 \$50,000 – \$74,999	0.20	0	1	563
	6 \$75,000 – \$99,999	0.14	0	1	396
	7 \$100,000 – \$149,000	0.15	0	1	424
	8 \$150,000 or higher	0.12	0	1	351

## A. Composite measure of FWB

We first estimate Equation (1), using a composite FWB measure (*CFPBscore*) as the dependent variable. We are particularly interested in the relative importance of time preferences, measured by Rate in our model, we run two versions of this model with and without this independent variable.

## B. Perceptions indicative of FWB

In our second set of models, we analyze the extent to which individual characteristics and experiences influence perceptions of several aspects of FWB. This equation is estimated using various measures of perceived FWB as the dependent variable: *FinSatisf* takes a value of 1 if the respondent ranks their satisfaction with their current financial situation as 3 or higher on 5-point scale ranging from not satisfied to extremely satisfied. *NoFinStress* takes a value of 1 if the respondent selects “we experienced no major financial stress” when surveyed about any causes of financial stress in the past 3 years. *DebtOK* takes a value of 1 if the respondent selects the “my debt is manageable” choice from a menu including degrees to which debt is not manageable and “I have no debt.” Our rationale for this categorization is that having productive, manageable debt can be indicative of financial inclusion and capability. *RetirePrep* is an ordinal variable on a scale of 1 to 4 measuring the respondent’s perception of their degree of retirement preparation, ranging from “not prepared at all” to “very well prepared.” The first three models are estimated using logistic regression and the retirement confidence model is estimated using an ordered logit.

## C. Quantifiable outcomes indicative of FWB

Next, to investigate the effects of individual characteristics and experiences on quantifiable financial outcomes, we estimate Equation (1) using several measures of financial outcomes that are often associated with FWB. For many households in the US, the primary residence represents a significant portion of household wealth. The FWB outcomes considered as dependent variables are home ownership (*OwnHome*), Total wealth (*Wealth*), and nonhousing wealth (*NHWealth*). Due to fewer respondents in the sample having completed the survey questions related to assets and debts, these models are estimated with a smaller sample. There is significant within-sample variation and some extreme outliers in the wealth and debt variables. We therefore transform the two wealth variables into categorical variables representing the quintiles of the wealth distribution in our sample.

## D. Behaviors that may influence FWB

Finally, to better understand the drivers of financial behaviors that are associated with FWB, we estimate Equation (1) using various financial behaviors that are expected to influence FWB as the dependent variables. The UAS data provide a wide range of financial behaviors, which is important because we hypothesize that improvements in financial well-being can be attained through a variety of behaviors or actions which are most effective when they align with other personal characteristics. We estimate this model with dependent variables related to the categories of financial planning, saving and investing, credit management, budgeting and spending, and seeking help with finances. Each of these dependent variables is coded as a binary variable in which 1 indicates the respondent reports positive financial behavior or actions.

- **Financial Planning:** Planning variables include whether a respondent has tried to calculate retirement needs (*CalcRet*) and whether they agree or strongly agree with the statement they normally try to plan ahead financially (*PlanAhead*).
- **Saving and Investing:** In the full sample, we include whether the respondent reports having savings for three months of expenses in case of an emergency (*EmergFund*). The variable *Invest* takes a value of 1 if the respondent reports undertaking any investment activities<sup>3</sup>. The data for the investment behaviors are from a smaller sample (N = 1723) drawn from the UAS comprehensive file).
- **Credit Management:** Credit management variables include the variable *NoBadDebt* if the respondent reports no outstanding credit card balances carried over and no debts, loans, or outstanding bills other than those that could be considered “productive”<sup>4</sup> *NoAltFinances*, indicates whether the respondent has used alternative financial services<sup>5</sup> in the past five years. *NoDebtCollector* is equal to 1 if the respondent has not been contacted by a debt collector in the past 12 months.

3 Respondents were surveyed over the following investment activities: employer’s retirement savings program participation, setting aside money for retirement in a savings account, contributing to a 401K, 403B or equivalent, setting up an IRA, purchasing CD’s, investing in mutual funds, stocks, or bonds.

4 In our categorization, bad debt does not include automobile, student, small business, mortgage, home equity, and medical loans. *NoBadDebt* is equal to 1 if they report no debt in the unproductive categories and 0 otherwise.

5 Alternative finances include auto title loans, payday loans, tax refund advance, pawn shops, or rent to own.

- **Budgeting and Spending:** Budgeting and spending variables include frequently setting budget targets for spending (*Budget*), frequently keeping track of spending (*TrackSpend*), spending no more than income (*PositiveCF*), and not overdrawing a checking account (*NoOverdraft*)/
- **Seeking Help with Personal Finances:** *PFMtool* is equal to 1 if the respondent has used a personal financial management tool to categorize and track spending. Using the smaller sample from the comprehensive UAS survey, the variable *Advice* has a value of 1 if the respondent reports having sought advice for any of the listed financial activities.<sup>6</sup>

## 5. Estimation and results

In this section, we first present the results of estimating Equation (1) using a wide range of measures of FWB and evaluate our predictions regarding the drivers and controls. Next, we discuss analysis of variable interactions and the impacts on composite FWB. Finally, we investigate the role of FWB indicators in determining composite FWB. In the following analysis, all continuous variables are median-centered.

In examining the impact of the explanatory variables on composite FWB, perceptions of FWB, quantitative outcomes, and financial behaviors indicative of FWB, we find several consistent effects. First, the discount rate, financial efficacy, household income, and good physical health appear to drive composite FWB and all other indicators of FWB, consistent with our first hypothesis. The other drivers have differential effects across the four categories. For example, extroversion and risk tolerance impact composite financial well-being, but have little impact on the perceptions analyzed. Risk tolerance increases the odds of having positive practices in some behaviors and decreases them in other behaviors. Financial literacy is significant in explaining perceptions and many of the behaviors analyzed but is not a significant determinant of composite FWB. Personality

traits, especially conscientiousness and neuroticism, impact many dimensions of FWB. These results are less consistent with our first hypothesis. We discuss the estimation results for each of our categories of dependent variables in more detail in the following subsections.

### A. Composite FWB

Considering the similarities between the drivers of FWB included as independent variables, we evaluated the variables for potential correlation biases. Our analysis of Spearman coefficients determined that correlations between the explanatory variables are low, and we therefore retain all the variables in our estimation.<sup>7</sup>

Table 4 displays the estimation results for composite FWB. In the first model, we run the estimation without including *Rate* to be more comparable to other studies of FWB. The Adjusted R-squared for the composite FWB model is 46%. The results show strong significance for personality type: openness to experiences and neuroticism have significant negative impacts on composite FWB, whereas conscientiousness and extroversion have significant positive effects. Higher FWB is also associated with higher age, financial literacy, and greater risk tolerance. The ordinal and categorical variables largely have the expected impacts on FWB. Financial efficacy, good physical health, and household income stand out as a strong contributors to FWB. Holding constant personality traits, financial literacy, and the discount rate, having some college is not significant compared to a high school degree (the omitted education category), but having a bachelor's or graduate degree is significant. Compared to the omitted income category of \$50,000 – \$75,000, respondents earning lower incomes on average have lower FWB and those earning higher incomes have higher FWB. Couples and those in good health also have higher FWB. Respondents who experienced a family financial shock when growing up have lower FWB. Respondents who are not working, including retirees, have higher FWB. Gender, race, and ethnicity are not significant determinants of FWB in this model.

6 The survey asked respondents if they had ever visited a social security office, called the social security administration (SSA), visited the social security website, used a retirement calculator such as those on the SSA website, consulted professional sources of advice on retirement planning, or discussed financial planning for retirement with family and friends.

7 Post estimation analysis of the model does not find evidence of multicollinearity—the average variable inflation factor is 1.43 and the highest variable inflation factor is under 2.5.

TABLE 4. CFPB FINANCIAL WELLBEING SCORE OLS REGRESSION RESULTS

	(1)	(2)
Rate	--	-4.261**
	--	(0.574)
Openness	-0.097**	-0.096**
	(0.034)	(0.034)
Conscientiousness	0.174**	0.162**
	(0.043)	(0.043)
Extroversion	0.078*	0.079*
	(0.034)	(0.034)
Agreeableness	-0.058	-0.052
	(0.043)	(0.042)
Neuroticism	-0.245**	-0.237**
	(0.038)	(0.038)
RiskTol	0.375**	0.367**
	(0.085)	(0.085)
Numeracy	0.028	0.006
	(0.031)	(0.031)
Finlit	0.214*	0.130
	(0.092)	(0.092)
Age	0.455**	0.438**
	(0.028)	(0.028)
<b>HOUSEHOLD INCOME (REF.: \$50 – 74K)</b>		
< \$15,000	-8.402**	-7.992**
	(0.891)	(0.884)
\$15 – 24K	-7.988**	-7.613**
	(0.870)	(0.863)
\$25 – 34K	-5.168**	-4.886**
	(0.806)	(0.799)
\$35 – 49K	-2.341**	-2.119**
	(0.720)	(0.713)
\$75 – 99K	2.559**	2.550**
	(0.700)	(0.693)
\$100 – 149K	2.817**	2.789**
	(0.699)	(0.692)
\$150K+	6.829**	6.635**
	(0.765)	(0.758)
<b>EFFICACY (REF.: Efficacy Metric &lt; 9 of 10)</b>		
Efficacy Metric =9 or 10	5.325**	5.247**
	(0.417)	(0.413)
<b>GENDER (Ref.: Female)</b>		
Male	0.233	0.336
	(0.441)	(0.437)

TABLE 4. CFPB FINANCIAL WELLBEING SCORE OLS REGRESSION RESULTS (CONTINUED)

	(1)	(2)
<b>MARITAL STATUS (REF.: Single)</b>		
Married/Cohabiting	1.363** (0.461)	1.363** (0.456)
<b>WORK STATUS (REF.: WORKING FOR PAY)</b>		
Unemployed/Not in labor force/Retired	2.691** (0.484)	2.838** (0.480)
<b>RACE/ETHNICITY (REF.: WHITE)</b>		
Black	0.569 (0.753)	0.934 (0.747)
Other	-0.515 (0.706)	-0.467 (0.700)
Hispanic	-0.177 (0.837)	-0.396 (0.829)
<b>HIGHEST DEGREE OBTAINED (REF.: HIGH SCHOOL OR LESS)</b>		
Some College	0.050 (0.554)	0.043 (0.549)
Bachelor's degree or higher	1.349* (0.635)	1.195 (0.630)
Lost job in past year	-0.655 (0.645)	-0.605 (0.638)
Had financial shock growing up	-0.878* (0.399)	-0.847* (0.395)
Health: good – excellent	5.628** (0.529)	5.497** (0.524)
Constant	49.247** (0.919)	50.004** (0.916)
Total Observations	2773	2773
Adjusted R-squared	0.46	0.47

Source: Authors' calculations using the Comprehensive UAS File, UAS Surveys 183 and 226. Ref. indicates the reference value of categorical variables. Standard errors in parentheses. \*\* p<.01, \* p<.05

Controlling for the discount rate in the second model affects the results. Model fit improves slightly. Financial literacy and having a college or graduate degree are no longer significant. We find that the discount rate has a particularly strong negative association with composite FWB. Closer examination shows that the variables financial literacy and discount rate are only 35 percent negatively correlated, so they are clearly not substitutes.

## B. Perceptions Indicative of FWB

Table 5 displays the results of estimating the model for self-perceptions over various aspects of FWB. The dependent

variables *FinSatisf*, *NoFinStress*, and *DebtOK* are coded as binary outcomes and coefficients reported are log-odd ratios. In each case, Hosmer-Lemeshow (H-L) chi-squared statistic for model fit has a p-value of 0.89 or higher. While we cannot perform the same goodness of fit analysis on the ordered logit regression for *RetirePrep*, on the other variables the likelihood ratio chi-square p-value = 0 implies the model is statistically significant as a whole.

TABLE 5. PERCEPTIONS INDICATIVE OF FWB LOGISTIC AND ORDERED LOGISTIC REGRESSION RESULTS

	(1) Financial Satisfaction	(2) No Financial Stress	(3) Manageable Debt	(4) Retirement Preparation
Rate	0.575** (0.083)	0.652** (0.079)	0.785* (0.092)	0.598** (0.066)
Openness	0.995 (0.008)	0.981** (0.007)	1.007 (0.007)	0.985* (0.006)
Conscientiousness	1.003 (0.010)	0.998 (0.009)	1.005 (0.009)	1.024** (0.008)
Extroversion	0.990 (0.008)	0.997 (0.007)	0.982** (0.007)	1.010 (0.007)
Agreeableness	0.997 (0.010)	0.987 (0.009)	1.004 (0.009)	0.972** (0.008)
Neuroticism	0.961** (0.009)	0.962** (0.008)	0.984* (0.008)	0.966** (0.007)
RiskTol	1.004 (0.020)	0.986 (0.018)	0.969 (0.017)	1.059** (0.017)
Numeracy	0.998 (0.007)	1.004 (0.007)	0.993 (0.006)	0.989 (0.006)
Finlit	0.965 (0.022)	1.043* (0.020)	1.043* (0.020)	1.080** (0.019)
Age	1.024** (0.007)	1.028** (0.006)	0.993 (0.006)	1.051** (0.006)
<b>HOUSEHOLD INCOME (REF.: \$50 – 74K)</b>				
< \$15,000	0.390** (0.101)	0.821 (0.154)	0.461** (0.084)	0.275** (0.047)
\$15 – 24K	0.361** (0.087)	0.812 (0.147)	0.735 (0.127)	0.323** (0.053)
\$25 – 34K	0.521** (0.108)	1.021 (0.171)	0.796 (0.127)	0.397** (0.060)
\$35 – 49K	0.723 (0.122)	0.982 (0.149)	0.813 (0.116)	0.657** (0.087)
\$75 – 99K	1.277 (0.192)	1.403* (0.212)	1.266 (0.180)	1.507** (0.195)
\$100 – 149K	1.453* (0.219)	1.666** (0.256)	1.267 (0.180)	1.757** (0.232)
\$150K+	1.623** (0.265)	2.387** (0.430)	1.631** (0.262)	2.772** (0.403)
<b>EFFICACY (REF.: Efficacy Metric &lt; 9 of 10)</b>				
Efficacy Metric =9 or 10	2.198** (0.215)	1.301** (0.117)	1.373** (0.116)	1.830** (0.145)
<b>GENDER (Ref.: Female)</b>				
Male	0.905 (0.093)	1.084 (0.103)	1.031 (0.093)	1.070 (0.088)

TABLE 5. PERCEPTIONS INDICATIVE OF FWB LOGISTIC AND ORDERED LOGISTIC REGRESSION RESULTS (CONTINUED)

	(1) Financial Satisfaction	(2) No Financial Stress	(3) Manageable Debt	(4) Retirement Preparation
<b>COUPLE (REF.: Single)</b>				
Married/Cohabiting	1.352** (0.147)	1.155 (0.113)	0.920 (0.086)	1.229* (0.106)
<b>WORKING (REF.: WORKING FOR PAY)</b>				
Unemployed/Not in labor force/Retired	1.177 (0.134)	1.225 (0.130)	0.756** (0.074)	1.764** (0.162)
<b>RACE/ETHNICITY (REF.: WHITE)</b>				
Black	0.855 (0.163)	1.144 (0.183)	0.705* (0.107)	0.959 (0.137)
Other	0.866 (0.147)	1.056 (0.164)	1.033 (0.148)	1.189 (0.161)
Hispanic	0.847 (0.173)	0.926 (0.171)	0.690* (0.116)	0.959 (0.156)
<b>HIGHEST DEGREE OBTAINED (REF.: HIGH SCHOOL OR LESS)</b>				
Some College	1.185 (0.164)	0.733** (0.086)	1.009 (0.114)	1.135 (0.117)
Bachelor's degree or higher	1.106 (0.168)	0.793 (0.110)	0.711** (0.092)	1.605** (0.191)
LostJob	0.412** (0.076)	0.878 (0.121)	0.698** (0.090)	0.852 (0.103)
ParentShock	0.981 (0.091)	0.714** (0.062)	0.967 (0.079)	0.838* (0.063)
GoodHealth	2.662** (0.400)	1.572** (0.174)	1.404** (0.148)	2.180** (0.218)
Constant	0.104** (0.025)	1.018 (0.199)	1.419 (0.264)	-1.019 (0.177)
Number of observations	2773	2602	2773	2690

Source: Authors' calculations using the Comprehensive UAS File, UAS Surveys 183 and 226. Ref. indicates the reference value of categorical variables. Estimates are odds ratios. Standard errors in parentheses. \*\* p<.01, \* p<.05

The independent variables that significantly affect three to four of the perceptions indicators include the discount rate, the personality trait of neuroticism, financial efficacy, household income, financial literacy, good health, and age. In particular, the discount rate, financial efficacy, and being in good health, are significant across all four regressions and also have very strong coefficient effects on the odds of a positive outcome. Household income effects are reported relative to the omitted category of \$50,000 – \$75,000 and are generally significant in the expected direction. As compared to the analysis of composite FWB, we find that financial literacy is significant in explaining most of

the perceptions analyzed, and several variables that are significant in explaining composite FWB are not significant in at least half of the perceptions. These include risk tolerance, openness to experience, conscientiousness, experiencing a family financial shock while growing up, education level and marital status. This leads us to believe there are interaction effects between financial literacy and other variables. We analyze and discuss these interactions in a later section.

The first column of Table 5 displays the odds ratios for the financial satisfaction dependent variable. In addition to the results reported above, the odds ratio for this variable is strongly positively impacted by being part of a couple and



negatively impacted by having lost a job in the past year. Unlike the other dependent variables, financial literacy is not a significant determinant of financial satisfaction.

The second column of Table 5 presents the odds ratio of a positive outcome for the *NoFinStress* variable. Openness to experience, *Shock*, and having some college education, are all significant and decrease the odds ratio. Unexpectedly, there is no significant difference in the odds of *NoFinStress* = 1 for income levels below the reference category. But at higher incomes, as expected, the odds of having no financial stress are significantly higher.

The third column of Table 5 displays the results of a logit modeling the odds of a respondent reporting that debt is “somewhat manageable” or better. While the effects of the discount rate, financial efficacy, income, good health, and neuroticism remain consistent with other specifications, the results for this perception stand out against the previous three in several ways. First, it is the only result with a main effect of race or ethnicity. Black and Hispanic respondents are less likely to report a positive perception of debt manageability compared to white respondents and non-Hispanic respondents. Having recently lost a job is also significant. Unexpectedly, respondents who hold bachelor’s or graduate degrees have lower odds of positive outcomes compared to respondents with no college education, which

may be indicative of having student loans. Unlike the other specifications and contrary to the composite FWB results, this variable is significantly decreasing in the personality trait of extroversion.

The fourth column of Table 5 presents the odds ratios for an ordered logit response for *RetirePrep*. Reported coefficients are the proportional odds ratios, i.e., the change in odds of rating retirement preparation higher for a one-unit change in the explanatory variable. In addition to the personality trait of neuroticism, openness to experience and conscientiousness have significant impacts on the odds ratios. Risk tolerance and having a bachelor’s or graduate degree (compared to no college) are both significant and increase the odds of a better preparation rating, as does being part of a couple. The past experience of a family financial shock while growing up decreases the odds of better retirement preparation ratings. These results, which focus on a combination of present and future outcomes for many respondents, most closely resemble the results for the composite FWB regression.

### C. Quantifiable objective outcomes indicative of FWB

In this section we report the results of our models focusing on the determinants of quantifiable outcomes. Table 6 provides the estimation results.

TABLE 6. QUANTITATIVE OUTCOMES INDICATIVE OF FWB LOGISTIC AND ORDERED LOGISTIC REGRESSION RESULTS

Variable	(1) Nonhousing Wealth	(2) Own Home	(3) Total Wealth
Rate	0.649** (0.073)	0.747* (0.109)	0.622** (0.074)
Openness	0.983* (0.007)	0.987 (0.010)	0.988 (0.007)
Conscientiousness	1.023* (0.009)	0.998 (0.012)	1.025** (0.009)
Extroversion	1.000 (0.007)	0.988 (0.010)	1.000 (0.007)
Agreeableness	0.984 (0.009)	0.994 (0.011)	0.986 (0.009)
Neuroticism	1.002 (0.008)	0.978* (0.010)	0.999 (0.008)
RiskTol	1.042* (0.018)	1.000 (0.023)	1.090** (0.020)
Numeracy	0.999 (0.006)	1.011 (0.009)	1.010 (0.006)
Finlit	1.071** (0.020)	1.083** (0.025)	1.114** (0.022)
Age	1.041** (0.006)	1.044** (0.008)	1.062** (0.006)
<b>HOUSEHOLD INCOME (REF.: \$50 – 74K)</b>			
< \$15,000	0.552** (0.097)	0.612* (0.127)	0.247** (0.049)
\$15 – 24K	0.535** (0.089)	0.694 (0.143)	0.321** (0.058)
\$25 – 34K	0.684* (0.109)	1.037 (0.206)	0.594** (0.097)
\$35 – 49K	0.891 (0.127)	0.985 (0.182)	0.925 (0.134)
\$75 – 99K	1.446** (0.207)	1.891** (0.405)	1.649** (0.232)
\$100 – 149K	1.604** (0.235)	2.131** (0.463)	1.931** (0.286)
\$150K+	3.290** (0.569)	2.834** (0.788)	6.011** (1.075)
<b>EFFICACY (REF.: Efficacy Metric &lt; 9 of 10)</b>			
Efficacy Metric =9 or 10	1.334** (0.111)	1.574** (0.179)	1.401** (0.122)
<b>GENDER (Ref.: Female)</b>			
Male	1.098 (0.097)	0.888 (0.108)	0.929 (0.086)

TABLE 6. QUANTITATIVE OUTCOMES INDICATIVE OF FWB LOGISTIC AND ORDERED LOGISTIC REGRESSION RESULTS (CONTINUED)

Variable	(1) Nonhousing Wealth	(2) Own Home	(3) Total Wealth
<b>COUPLE (REF.: Single)</b>			
Married/Cohabiting	1.052 (0.099)	3.531** (0.424)	1.815** (0.178)
<b>WORKING (REF.: WORKING FOR PAY)</b>			
Unemployed/Not in labor force/Retired	1.421** (0.141)	1.098 (0.146)	1.414** (0.147)
<b>RACE/ETHNICITY (REF.: WHITE)</b>			
Black	0.813 (0.120)	0.503** (0.087)	0.424** (0.071)
Other	0.911 (0.140)	0.777 (0.145)	0.841 (0.132)
Hispanic	0.760 (0.146)	0.615* (0.130)	0.892 (0.182)
<b>HIGHEST DEGREE OBTAINED (REF.: HIGH SCHOOL OR LESS)</b>			
Some College	0.930 (0.099)	1.123 (0.157)	1.221 (0.139)
Bachelor's degree or higher	1.474** (0.185)	1.019 (0.176)	1.558** (0.205)
LostJob	1.213 (0.161)	0.763 (0.123)	1.314* (0.178)
ParentShock	0.891 (0.072)	1.008 (0.110)	1.072 (0.090)
Good health	1.490** (0.158)	1.505** (0.195)	1.700** (0.189)
Number of observations	2040	2610	2046

Source: Authors' calculations using the Comprehensive UAS File, UAS Surveys 183 and 226. Ref. indicates the reference value of categorical variables. Estimates are odds ratios. Standard errors in parentheses. \*\* p<.01, \* p<.05

The dependent variable *OwnHome* is a binary variable, which takes a value of 1 if the respondent owns a home. The H-L statistic does not indicate issues with model fit ( $p = .55$ ). The dependent variables *Total Wealth* and *NH Wealth* are ordinal variables taking values of 1 (lowest 20%) to 5 (highest 20%). The reported coefficients are log-odds ratios.

In all three estimations, the discount rate, financial literacy, household income, self-efficacy, age, and good health again all have strong associations with outcomes indicative of FWB. These results are consistent with Hypothesis 1.

However, the other drivers have different effects on wealth and homeownership, which is somewhat inconsistent with the first hypothesis. An interesting result is that the personality trait of conscientiousness is significantly

associated with both wealth variables, while neuroticism is the only personality trait associated with home ownership. Openness to experience is also significant for nonhousing wealth but this trait lowers the relative odds of being in a higher category. Risk tolerance, working status, and having a college degree or higher affect nonhousing and total wealth, but not home ownership. The odds-ratios of homeownership are significantly lower for Black and Hispanic respondents.

It appears that homeownership is a preferred method of saving for couples—the odds of homeownership are much higher than singles, while there is no difference in nonhousing wealth between couples and singles. Given the lower rates of marriage in non-white households, this may also be a negative influence on their FWB.

## D. Behaviors indicative of FWB

Table 7 displays the results of analysis of financial behaviors that are indicative of FWB. Because of the large number of behaviors analyzed, this table appears in three segments.

The dependent binary variables are as defined earlier, where responses indicating positive financial behavior are coded with a 1.

**TABLE 7A. PLANNING AND SAVING BEHAVIORS INDICATIVE OF FWB LOGISTIC REGRESSION RESULTS**

	(1) CalRet	(2) PlanAhead	(3) EmergFund	(4) Invest
Rate	0.573** (0.078)	0.596** (0.075)	0.376** (0.048)	0.635* (0.133)
Openness	1.013 (0.008)	1.021** (0.008)	0.996 (0.008)	0.999 (0.014)
Conscientiousness	1.039** (0.010)	1.052** (0.010)	1.033** (0.010)	1.022 (0.017)
Extroversion	0.993 (0.008)	0.997 (0.008)	0.997 (0.008)	0.996 (0.014)
Agreeableness	0.982 (0.010)	0.988 (0.010)	0.986 (0.009)	0.996 (0.017)
Neuroticism	1.001 (0.009)	0.994 (0.009)	0.990 (0.008)	1.030* (0.015)
RiskTol	1.089** (0.022)	0.986 (0.019)	1.048* (0.020)	1.035 (0.035)
Numeracy	0.999 (0.007)	1.001 (0.007)	0.995 (0.007)	1.009 (0.013)
Finlit	1.232** (0.028)	1.089** (0.022)	1.108** (0.023)	1.166** (0.039)
Age	1.014* (0.007)	1.006 (0.006)	1.044** (0.007)	1.006 (0.011)
<b>HOUSEHOLD INCOME (REF.: \$50 – 74K)</b>				
< \$15,000	0.508** (0.117)	0.708 (0.135)	0.447** (0.093)	0.158** (0.049)
\$15 – 24K	0.459** (0.099)	0.691* (0.128)	0.462** (0.089)	0.350** (0.105)
\$25 – 34K	0.452** (0.086)	0.811 (0.139)	0.624** (0.109)	0.321** (0.093)
\$35 – 49K	0.738 (0.116)	1.056 (0.166)	0.816 (0.125)	0.536* (0.154)
\$75 – 99K	1.049 (0.156)	1.332 (0.216)	1.455* (0.223)	0.980 (0.334)
\$100 – 149K	1.306 (0.197)	1.499* (0.246)	1.285 (0.195)	0.733 (0.246)
\$150K+	1.978** (0.345)	2.185** (0.440)	1.877** (0.326)	5.187* (3.895)
<b>EFFICACY (REF.: Efficacy Metric &lt; 9 of 10)</b>				
Efficacy Metric =9 or 10	1.355** (0.129)	2.018** (0.191)	1.922** (0.177)	1.144 (0.192)

TABLE 7A. PLANNING AND SAVING BEHAVIORS INDICATIVE OF FWB LOGISTIC REGRESSION RESULTS (CONTINUED)

	(1) CalRet	(2) PlanAhead	(3) EmergFund	(4) Invest
<b>GENDER (Ref.: Female)</b>				
Male	1.065 (0.107)	1.024 (0.104)	1.025 (0.100)	1.141 (0.201)
<b>COUPLE (REF.: Single)</b>				
Married/ Cohabiting	0.947 (0.100)	1.118 (0.116)	1.123 (0.114)	0.778 (0.144)
<b>WORKING (REF.: WORKING FOR PAY)</b>				
Unemployed/Not in labor force/Retired	0.933 (0.105)	1.293* (0.144)	1.190 (0.130)	0.579** (0.107)
<b>RACE/ETHNICITY (REF.: WHITE)</b>				
Black	0.843 (0.157)	0.906 (0.148)	0.584** (0.103)	1.739 (0.545)
Other	0.676* (0.110)	0.903 (0.143)	1.291 (0.201)	1.372 (0.406)
Hispanic	1.105 (0.219)	0.977 (0.182)	1.020 (0.189)	0.775 (0.256)
<b>HIGHEST DEGREE OBTAINED (REF.: HIGH SCHOOL OR LESS)</b>				
Some College	1.826** (0.250)	1.057 (0.126)	0.968 (0.119)	1.681** (0.304)
Bachelor's degree or higher	2.073** (0.306)	1.243 (0.177)	1.267 (0.177)	3.160** (0.822)
LostJob	0.859 (0.129)	0.913 (0.127)	1.216 (0.172)	1.271 (0.331)
ParentShock	1.281** (0.118)	1.232* (0.113)	1.153 (0.103)	1.125 (0.179)
GoodHealth	1.732** (0.220)	2.008** (0.225)	1.494** (0.175)	1.452* (0.266)
Constant	0.261** (0.057)	0.659* (0.133)	0.518** (0.105)	6.291** (2.232)
-				
Number of observations	2773	2773	2773	1723

Source: Authors' calculations using the Comprehensive UAS File, UAS Surveys 183 and 226. Ref. indicates the reference value of categorical variables. Estimates are odds ratios. Standard errors in parentheses. \*\* p<.01, \* p<.05

TABLE 7B. ADVICE AND CREDIT MANAGEMENT BEHAVIORS INDICATIVE OF FWB LOGISTIC REGRESSION RESULTS

	(5) Advice	(6) NoBadDebt	(7) NoAltFinances	(8) NoDebtCollector
Rate	1.004 (0.204)	0.605** (0.089)	0.506** (0.066)	0.476** (0.073)
Openness	1.018 (0.012)	0.988 (0.008)	1.011 (0.009)	0.978* (0.010)
Conscientiousness	1.023 (0.015)	1.044** (0.011)	0.992 (0.011)	1.029* (0.013)
Extroversion	1.014 (0.012)	0.986 (0.008)	0.967** (0.008)	0.984 (0.010)
Agreeableness	1.029* (0.015)	0.969** (0.010)	0.985 (0.010)	0.992 (0.012)
Neuroticism	1.030* (0.014)	0.984 (0.009)	0.966** (0.009)	0.966** (0.011)
RiskTol	1.029 (0.031)	0.990 (0.021)	0.947** (0.020)	0.994 (0.024)
Numeracy	1.025* (0.011)	1.006 (0.008)	1.034** (0.008)	1.011 (0.009)
Finlit	1.060 (0.034)	1.028 (0.025)	1.053* (0.023)	1.042 (0.026)
Age	1.045** (0.010)	1.004 (0.007)	1.028** (0.007)	1.047** (0.009)
<b>HOUSEHOLD INCOME (REF.: \$50 – 74K)</b>				
< \$15,000	1.399 (0.447)	1.527 (0.367)	0.621* (0.123)	0.790 (0.178)
\$15 – 24K	0.663 (0.184)	1.020 (0.236)	0.685 (0.134)	0.553** (0.123)
\$25 – 34K	1.264 (0.383)	0.971 (0.209)	1.003 (0.189)	0.720 (0.152)
\$35 – 49K	0.967 (0.244)	1.072 (0.198)	0.747 (0.126)	0.865 (0.175)
\$75 – 99K	0.877 (0.214)	1.397* (0.235)	1.185 (0.214)	1.515 (0.354)
\$100 – 149K	0.917 (0.228)	1.148 (0.193)	1.506* (0.281)	1.719* (0.408)
\$150K+	1.821 (0.565)	2.023** (0.359)	2.079** (0.475)	3.204** (1.075)
<b>EFFICACY (REF.: Efficacy Metric &lt; 9 of 10)</b>				
Efficacy Metric =9 or 10	1.100 (0.165)	1.448** (0.148)	1.360** (0.139)	1.527** (0.188)
<b>GENDER (Ref.: Female)</b>				
Male	0.644** (0.101)	0.999 (0.109)	0.898 (0.098)	0.859 (0.113)

TABLE 7B. ADVICE AND CREDIT MANAGEMENT BEHAVIORS INDICATIVE OF FWB LOGISTIC REGRESSION RESULTS (CONTINUED)

	(5) Advice	(6) NoBadDebt	(7) NoAltFinances	(8) NoDebtCollector
<b>COUPLE (REF.: Single)</b>				
Married/ Cohabiting	1.137 (0.184)	1.519** (0.175)	0.996 (0.112)	1.501** (0.198)
<b>WORK STATUS (REF.: WORKING FOR PAY)</b>				
Unemployed/Not in labor force/Retired	1.308 (0.231)	1.268 (0.156)	1.298* (0.156)	1.213 (0.174)
<b>RACE/ETHNICITY (REF.: WHITE)</b>				
Black	1.030 (0.289)	0.886 (0.176)	0.916 (0.153)	0.598** (0.108)
Other	0.955 (0.236)	1.155 (0.200)	0.911 (0.155)	1.736* (0.407)
Hispanic	0.848 (0.246)	0.625* (0.138)	1.008 (0.192)	0.918 (0.207)
<b>HIGHEST DEGREE OBTAINED (REF.: HIGH SCHOOL OR LESS)</b>				
Some College	1.842** (0.332)	0.956 (0.136)	0.934 (0.116)	0.655** (0.098)
Bachelor's degree or higher	2.103** (0.458)	1.179 (0.185)	1.188 (0.184)	0.991 (0.190)
LostJob	2.020** (0.511)	0.945 (0.152)	0.943 (0.141)	0.778 (0.130)
ParentShock	1.303 (0.186)	0.846 (0.083)	0.947 (0.093)	0.789* (0.093)
GoodHealth	0.978 (0.181)	1.613** (0.226)	1.571** (0.188)	1.742** (0.237)
Constant	2.848** (0.908)	0.152** (0.036)	2.573** (0.558)	4.588** (1.180)
-				
Number of observations	1722	2226	2771	2773

Source: Authors' calculations using the Comprehensive UAS File, UAS Surveys 183 and 226. Ref. indicates the reference value of categorical variables. Standard errors in parentheses. \*\* p<.01, \* p<.05

TABLE 7C. BUDGETING AND SPENDING BEHAVIORS INDICATIVE OF FWB LOGISTIC REGRESSION RESULTS

	(9) Budget	(10) TrackSpend	(11) PositiveCF	(12) NoOverdraft	(13) PFMTool
Rate	0.875 (0.102)	0.573** (0.078)	0.596** (0.075)	0.376** (0.048)	0.506** (0.121)
Openness	1.041** (0.007)	1.013 (0.008)	1.021** (0.008)	0.996 (0.008)	1.013 (0.012)
Conscientiousness	1.055** (0.009)	1.039** (0.010)	1.052** (0.010)	1.033** (0.010)	0.998 (0.015)
Extroversion	1.000 (0.007)	0.993 (0.008)	0.997 (0.008)	0.997 (0.008)	0.993 (0.011)
Agreeableness	1.005 (0.009)	0.982 (0.010)	0.988 (0.010)	0.986 (0.009)	1.003 (0.015)
Neuroticism	1.008 (0.008)	1.001 (0.009)	0.994 (0.009)	0.990 (0.008)	1.001 (0.014)
RiskTol	0.964* (0.017)	1.089** (0.022)	0.986 (0.019)	1.048* (0.020)	1.022 (0.031)
Numeracy	0.984** (0.006)	0.999 (0.007)	1.001 (0.007)	0.995 (0.007)	1.007 (0.011)
Finlit	1.027 (0.019)	1.232** (0.028)	1.089** (0.022)	1.108** (0.023)	1.091* (0.041)
Age	0.994 (0.006)	1.014* (0.007)	1.006 (0.006)	1.044** (0.007)	0.974** (0.010)
<b>HOUSEHOLD INCOME (REF.: \$50 – 74K)</b>					
< \$15,000	1.127 (0.204)	0.508** (0.117)	0.708 (0.135)	0.447** (0.093)	0.413* (0.182)
\$15 – 24K	1.294 (0.230)	0.459** (0.099)	0.691* (0.128)	0.462** (0.089)	0.585 (0.227)
\$25 – 34K	1.232 (0.202)	0.452** (0.086)	0.811 (0.139)	0.624** (0.109)	0.515 (0.182)
\$35 – 49K	1.042 (0.151)	0.738 (0.116)	1.056 (0.166)	0.816 (0.125)	0.620 (0.176)
\$75 – 99K	0.904 (0.127)	1.049 (0.156)	1.332 (0.216)	1.455* (0.223)	1.047 (0.231)
\$100 – 149K	0.896 (0.125)	1.306 (0.197)	1.499* (0.246)	1.285 (0.195)	0.927 (0.206)
\$150K+	0.680* (0.104)	1.978** (0.345)	2.185** (0.440)	1.877** (0.326)	1.300 (0.292)
<b>EFFICACY (REF.: Efficacy Metric &lt; 9 of 10)</b>					
Efficacy Metric =9 or 10	1.163 (0.097)	1.355** (0.129)	2.018** (0.191)	1.922** (0.177)	1.070 (0.155)
<b>GENDER (Ref.: Female)</b>					
Male	0.979 (0.087)	1.065 (0.107)	1.024 (0.104)	1.025 (0.100)	0.981 (0.150)



TABLE 7C. BUDGETING AND SPENDING BEHAVIORS INDICATIVE OF FWB LOGISTIC REGRESSION RESULTS (CONTINUED)

	(9) Budget	(10) TrackSpend	(11) PositiveCF	(12) NoOverdraft	(13) PFMTool
<b>COUPLE (REF.: Single)</b>					
Married/Cohabiting	0.813*	0.947	1.118	1.123	0.988
	(0.075)	(0.100)	(0.116)	(0.114)	(0.159)
<b>WORKING (REF.: WORKING FOR PAY)</b>					
Unemployed/Not in labor force/Retired	1.208	0.933	1.293*	1.190	1.345
	(0.118)	(0.105)	(0.144)	(0.130)	(0.234)
<b>RACE/ETHNICITY (REF.: WHITE)</b>					
Black	1.009	0.843	0.906	0.584**	2.124**
	(0.155)	(0.157)	(0.148)	(0.103)	(0.549)
Other	1.032	0.676*	0.903	1.291	1.107
	(0.147)	(0.110)	(0.143)	(0.201)	(0.263)
Hispanic	1.442*	1.105	0.977	1.020	0.867
	(0.249)	(0.219)	(0.182)	(0.189)	(0.289)
<b>HIGHEST DEGREE OBTAINED (REF.: HIGH SCHOOL OR LESS)</b>					
Some College	1.007	1.826**	1.057	0.968	2.474**
	(0.112)	(0.250)	(0.126)	(0.119)	(0.746)
Bachelor's degree or higher	1.133	2.073**	1.243	1.267	3.339**
	(0.145)	(0.306)	(0.177)	(0.177)	(1.027)
LostJob	0.982	0.859	0.913	1.216	0.860
	(0.127)	(0.129)	(0.127)	(0.172)	(0.210)
ParentShock	1.193*	1.281**	1.232*	1.153	1.114
	(0.096)	(0.118)	(0.113)	(0.103)	(0.153)
GoodHealth	1.407**	1.732**	2.008**	1.494**	1.119
	(0.149)	(0.220)	(0.225)	(0.175)	(0.236)
Constant	0.860	0.261**	0.659*	0.518**	0.031**
-	(0.160)	(0.057)	(0.133)	(0.105)	(0.012)
Number of observations	2773	2773	2773	2773	2752

Source: Authors' calculations using the Comprehensive UAS File, UAS Surveys 183 and 226. Ref. indicates the reference value of categorical variables. Standard errors in parentheses. \*\* p<.01, \* p<.05

The models have good indicators of fit, with H-L statistic p-values ranging from 0.22 to 0.89, except for *CalcRet*, with a p-value of 0.03. As in the estimations of composite well-being and the perceptions and outcomes that are indicative of financial well-being, the discount rate, financial efficacy, financial literacy, good physical health, and income are important determinants in the majority of financial behaviors we analyze. Efficacy and good health consistently have positive impacts on financial behaviors. When significant, a higher discount rate always has a negative impact on the relative odds of positive financial behavior. The discount rate is insignificant in explaining only two dependent variables- *Advice* and *Budget*. It is interesting to note that income,

typically a strong and significant determinant of FWB is also insignificant in these regressions.<sup>8</sup> It is likely that although seeking advice and sticking to a budget are positive actions, they may be an attempt to correct past financial behaviors. Most results for income, even with controlling for financial

8 The one exception is that respondents in the \$150,000 + category have lower odds of setting budget targets than respondents in the reference category of \$50,000 – \$75,0000.

literacy, education, discount rate, etc. are significant and in the expected direction. Thus, it appears as if people in this sample have good financial behavior practices if they can afford it.

In addition, compared to the other FWB indicators previously discussed, various personality traits emerge more clearly as significant contributors to financial behaviors. The personality trait of openness is significantly associated with financial behaviors that involve actively trying things—good and bad. This personality type is more likely to plan ahead, set spending target budgets, and spend no more than they earn, but they also are also more likely to have been contacted by a debt collector. The personality trait of conscientiousness is significantly associated with positive financial behaviors—from taking actions such as trying to calculate retirement needs, planning ahead, setting spending targets, and tracking spending, to covering the bases such as maintaining emergency funds, not holding bad debt, staying out of collections, and not overdrawing their accounts. It is notable that while conscientiousness has a statistically significant negative relationship with the discount rate, the correlation between the two is only  $-0.09$ . With the exception of seeking advice and holding investments, neuroticism is also only associated with negative financial behaviors. Respondents with this personality type are more likely to use alternative financial services and to have been contacted by a debt collector. Like conscientiousness, neuroticism has a statistically significant relationship with the discount rate, but the size of the correlation is low at  $0.13$ . Therefore, these variables are likely making separate contributions toward determining financial behaviors. In spite of being associated with reporting higher composite FWB, the personality trait of extroversion is largely independent of financial behaviors, with the exception of being more likely to have used an alternative financial service.

The variables *RiskTol*, *Shock*, and *Education* are significantly related to several financial behaviors—but, in some cases, they decrease the odds of good practices relative to poor practices. Having a higher tolerance for financial risk increases the likelihood of having used alternative financial services and decreases the odds of setting spending budget targets, but it is associated with trying to calculate retirement needs and maintaining emergency funds, tracking spending and not overdrawing accounts. The variable *Shock* is positively associated with calculating retirement needs, planning ahead financially, earning more than spending, setting spending budget targets, and seeking advice, but also increases the odds of being contacted by debt collectors. Compared to respondents with no college, those with some college or a bachelor's or graduate degree are more likely to have tried to calculate their retirement needs, hold investments, seek advice, and use a personal financial

management tool to track spending. Those with bachelor's or graduate degrees are also more likely to hold emergency funds, but respondents with just some college are more likely to have been contacted by a debt collector.

With a few exceptions, demographic variables have limited effects among the different financial behavior regressions. Age is generally associated with positive financial behavior. Compared to non-Hispanic respondents, Hispanic respondents have higher odds of using alternative financial services and of setting spending budgets, but this variable has an insignificant effect on all other financial behaviors analyzed. Compared to white respondents, Black respondents have lower odds of maintaining emergency funds and higher odds of being contacted by a debt collector or overdrawing an account but have higher odds of using a personal financial management tool to track spending. Compared to single respondents, those who are part of a couple are less likely to have bad debt or have been contacted by a debt collector, or to set spending targets, but *Couple* is not significant in the other regressions. Gender is insignificant in explaining all behaviors except for seeking advice, which has a lower odds ratio among male respondents.

While the discount rate, financial efficacy, household income, and good physical health appear to consistently drive various indicators of FWB in the same way, other drivers are significant to the indicators of FWB under different circumstances. We expect there are interaction effects among these variables in explaining composite FWB.

### E. Composite FWB interaction effects

In this section we investigate the interaction effects of several individual characteristics and experiences on composite FWB. The results presented earlier show that financial literacy is significant for indicators of FWB but not composite FWB. To examine this in more detail, we run the model with interaction effects between financial literacy and the discount rate, financial efficacy, household income, and race. Model fit improves slightly compared to Equation 1, with an adjusted R-squared of 48 percent. As risk tolerance has both significant negative and positive effects on different dependent variables, we compute the same set of interactions for risk tolerance, and model fit is essentially unchanged from Equation 1 (adjusted R-squared = 47%).

The results of these estimations are displayed in Table 8. To avoid repetition, Table 8 displays only marginal effects, standard errors, and p-values (of the marginal effects) and, where informative, we discuss interaction effects and their significance below. We find a set of marginal effects that is consistent with Hypothesis 2—several important drivers of alternative indicators of FWB interact to produce different contributions to FWB under different circumstances.

TABLE 8. MARGINAL EFFECTS (AND STANDARD ERRORS) OF INTERACTED VARIABLES ON COMPOSITE FWB

Variables	Interacted with	
	Financial literacy	Risk tolerance
<b>HOUSEHOLD INCOME MARGINS</b>		
< \$15,000	-0.195 (0.206)	1.133** (0.253)
\$15 – 24K	-0.144 (0.232)	-0.070 (0.277)
\$25 – 34K	0.270 (0.228)	0.427 (0.247)
\$35 – 49K	0.241 (0.208)	0.444* (0.226)
\$50 – 74K	0.514** (0.170)	0.491* (0.194)
\$75 – 99K	0.601** (0.209)	0.358 (0.223)
\$100 – 149K	-0.060 (0.211)	0.229 (0.209)
\$150K+	-0.096 (0.267)	-0.057 (0.244)
	2773	2773
<b>EFFICACY MARGINS</b>		
Efficacy metric <9	0.082 (0.112)	0.378** (0.125)
Efficacy metric = 9 or 10	0.292* (0.115)	0.361** (0.109)
<b>RACE/ETHNICITY MARGINS</b>		
White	0.301** (0.098)	0.426** (0.095)
Black	-0.675** (0.236)	0.172 (0.233)
Other	0.008 (0.222)	0.033 (0.252)
<b>DISCOUNT RATE (r) MARGINS</b>		
At		
r=10.5%	0.316** (0.111)	0.373** (0.110)
r=23.5%	0.264** (0.100)	0.372** (0.095)
r=42%	0.189* (0.094)	0.369** (0.086)
r=71%	0.072 (0.105)	0.365** (0.104)
Number of observations	2773	

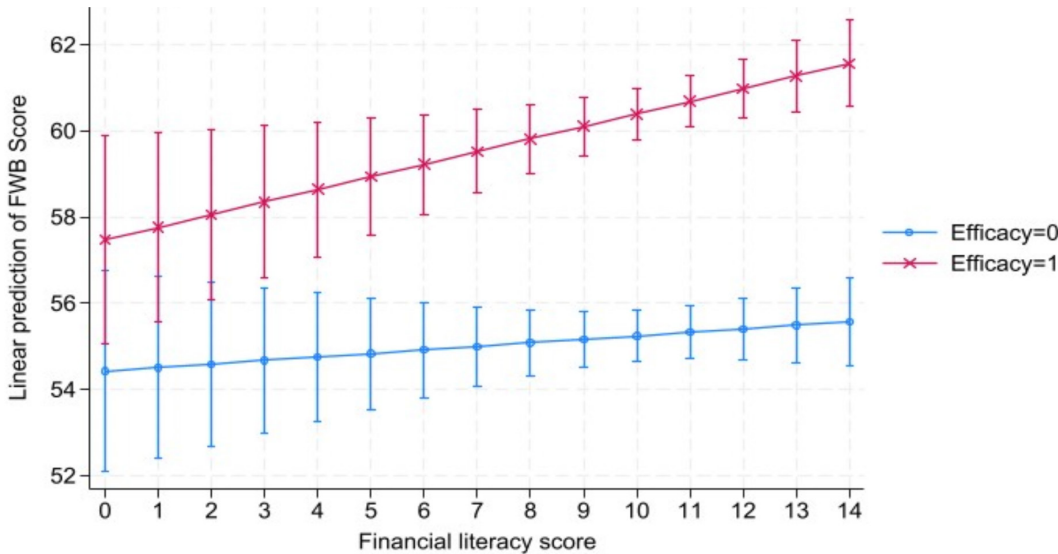
Source: Authors' calculations using the Comprehensive UAS Survey, UAS Survey 226 and UAS Survey 183.  
Marginal effect significance: \*\* p<.01, \* p<.05

At income levels between \$50,000 and \$100,000 the interaction between financial literacy and income is positive and significant. But financial literacy is insignificant in the remaining income categories. This result suggests that improvements in financial literacy are most impactful to FWB at middle income levels.

The interaction term between efficacy and financial literacy is not quite significant (interaction  $p = 0.102$ ) but high efficacy has a significant impact on FWB, compared to *Efficacy = 0*. The marginal effects displayed in Table 8 and illustrated in Figure 1 show the main effect while

also revealing that financial literacy has a positive and significant impact on FWB when efficacy is high, but it does not improve FWB at the reference category. These results are in line with findings by Peters et al., as well as Allgood and Walstad, and have important policy implications. First, it appears necessary that individuals have confidence in their financial decision making for improvements in financial literacy to contribute to FWB. Second, and just as important, a high level of efficacy is necessary but not sufficient without financial literacy, to generate more substantial improvements in FWB.

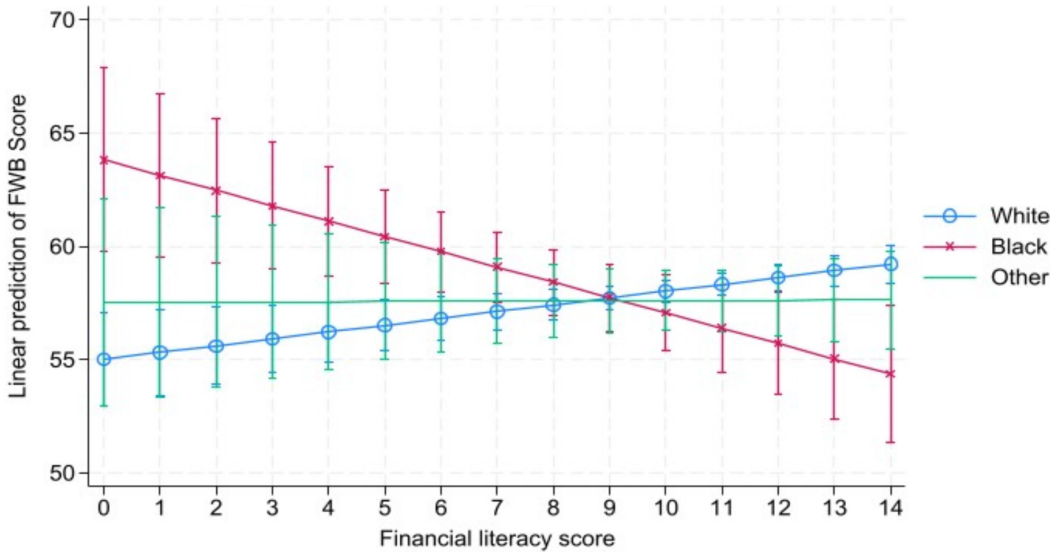
**FIGURE 1. PREDICTIVE MARGINS OF FINANCIAL EFFICACY WITH 95% CIs**



The third panel in Table 8 implies a strong interaction effect between race = *Black* and financial literacy (interaction  $p = 0$ ), but the interaction between race = *Other* and the financial literacy is insignificant (interaction  $p = 0.185$ ). The marginal effects in Table 8 show that White respondents have a positive and significant relationship between composite FWB and financial literacy. For respondents in the “other” category this relationship is insignificant. For Black respondents, there is a negative and significant relationship between financial literacy and FWB. Figure 2 shows that the difference between Black and white respondents’ FWB

occurs primarily at lower levels of financial literacy, where white respondents have lower FWB. At the median and higher levels of financial literacy, the situation is reversed, but less pronounced. Reasons for this difference may lie in larger differences in opportunities among individuals with higher levels of financial literacy, compared to opportunities at lower levels of financial literacy. Alternatively, there may be systematic differences by race in the perceptions elicited by the CFPB-FWBS survey questions. The result is unexpected and is an avenue for further research.

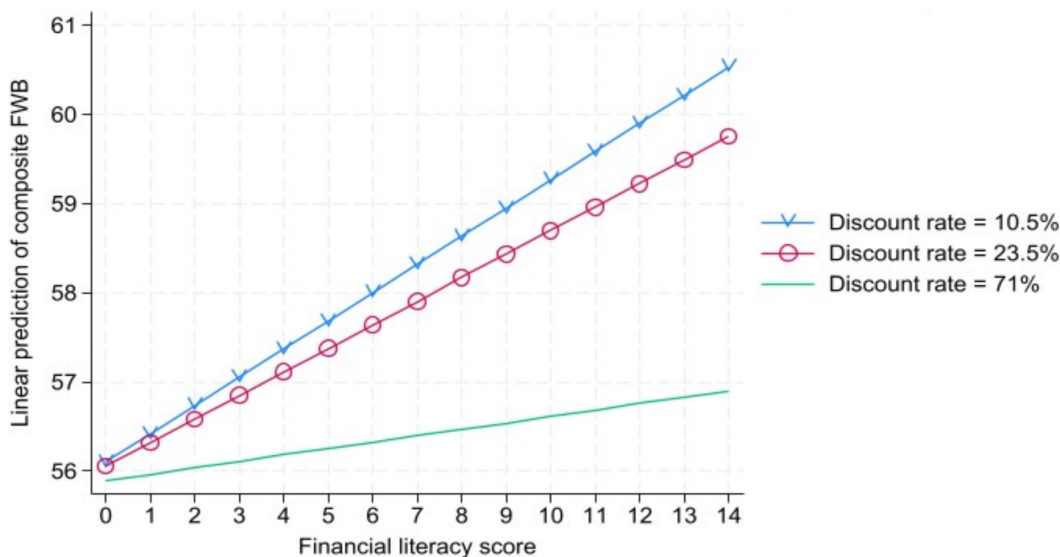
**FIGURE 2. PREDICTIVE MARGINS OF RACE WITH 95% CIs**



The fourth panel of Table 8 reports the marginal effects for the interaction between financial literacy and the discount rate are negative and significant, (interaction  $p = 0.021$ ). At the median financial literacy, an increase in the discount rate decreases composite FWB. Similarly, this relationship implies that the scope of financial literacy to impact FWB also depends on time preferences. At higher discount rates, financial literacy has a smaller impact on FWB than it does at lower discount rates. Evaluating the effects at discount rates of 10.5 percent, 23.5 percent, 42 percent, and 71 percent, respectively, the size and significance of the marginal effect of declines as the discount rate increases. This relationship

is also visually depicted in Figure 3, which displays the marginal effects of the discount rate at the 25th percentile (10.5%), 50th percentile (23.5%) and 75th percentile (71%). This too has important implications- financial literacy is more impactful on the FWB of individuals who have more patience. Having financial knowledge does not necessarily lead to applying it toward improvements in FWB when one's discount rate is very high. Programs aimed at improving FWB via improvements in financial literacy may be more effective if geared toward the time preferences of the individuals being served.

**FIGURE 3. PREDICTIVE MARGINS OF DISCOUNT RATES AT 25TH, 50TH AND 75TH PERCENTILES**



The second column of Table 8 shows the marginal effects of risk tolerance when interacted with income, financial efficacy, race, and the discount rate. While Table 4 shows that risk tolerance improves FWB, the interaction between risk tolerance and income in Table 8 reveals that the benefit accrues to those with incomes between \$35,000 and \$75,000 and below \$15,000. The interaction of efficacy and risk tolerance is insignificant ( $p = 0.913$ ). As shown in Table 8, increased risk tolerance increases FWB at similar rates for  $Efficacy = 0$  and  $Efficacy = 1$ . In addition, while risk tolerance has a significant positive marginal effect on FWB for whites, its interactions with  $Race = Black$ ,  $Race = Other$  and the discount rate are insignificant ( $p = 0.305$ ,  $p = 0.137$ , and  $p = 0.945$ , respectively).

This analysis led us to explore several other interaction effects. Because of the interaction between household income and financial literacy and risk tolerance we checked for interactions between financial literacy and risk tolerance. Because both the discount rate and race interacted with financial literacy, we looked for interaction between race and the discount rate. Controlling for the existing interaction effects, we found no additional significant interactions.

We know from the above analysis that composite FWB and perceptions and quantitative outcomes indicative of FWB are influenced by the same set of drivers. However, analysis of the Spearman correlations and corresponding  $p$ -values between Composite FWB and the other indicators of FWB confirm that although nearly all the dependent variables are correlated with composite FWB, the sizes of the correlations are not very large. Only *Retirement Confidence*, *NH Wealth*, and *EmergFund* are more than 50% correlated with Composite FWB. The statistical significance of the correlations lends support for Hypothesis 3—that the indicators of FWB are associated with composite FWB. However, the size of the correlations suggests that a composite measure conveys different information about an individual's state of being that a single indicator can. Although the correlations between composite FWB and the other indicators of FWB are not as strong as we expected, these variables are endogenously and simultaneously determined.

## 4. Conclusions

Examining multiple indicators of FWB, including the CFPB-FWBs, we find the same drivers and demographic variables consistently contribute to higher FWB. These include individual discount rates, financial efficacy, financial literacy and income. In addition, they interact with other variables and each other in ways that have policy implications.

The most important contribution of this study is the finding that individual discount rates play such an important role in determining composite financial well-being as well as all perceptions of FWB and nearly all behaviors indicative of FWB. Furthermore, the discount rate significantly moderates the role of financial literacy. Time preference measures should be given more attention in the field and should become a regular variable in large datasets as well as small sample experiments. The elicitation of individual discount rates in UAS 226 is a big step forward in large scale collection and we would recommend that these data be collected in all surveys applied to research studying intertemporal decision-making.

It is not surprising that financial literacy contributes to composite FWB. However, the marginal effects with income, the discount rate, financial efficacy, and race contribute to our understanding of this FWB driver. Financial literacy appears to be necessary but not sufficient to enhance FWB. In particular, if individuals lack the confidence and/or patience to make sound financial decisions, the influence of financial literacy on FWB is limited. Similarly, at low levels of financial literacy, financial self-efficacy and patience each make smaller contributions to FWB. Programs focusing on financial literacy improvements should also aim to increase confidence in proportion to financial knowledge. Individuals who know they have high discount rates or are severely lacking in confidence to make financial decisions may benefit more from commitment devices (such as automatic investment contributions) than specific financial knowledge. However, our results suggest that individuals with lower discount rates and higher efficacy may be best served by gaining financial knowledge and applying it in ways that suit their individual personalities and risk attitudes.

Risk tolerance and most of the personality traits have varied impacts on different FWB measures. Risk tolerance has a positive association with composite FWB, non-housing and total wealth, and perceived retirement preparation. But it increases the odds of taking positive actions for some financial behaviors and decreases them for others. Conscientiousness has a positive relationship with at least one indicator in each FWB category, but openness, agreeableness, and neuroticism seem to associate positively with some indicators of FWB and negatively with others. Extroversion appears to be associated with positive responses on the CFPB-FWB survey but is only negatively associated with just two other FWB indicators.

These results suggest that to improve FWB, individuals should focus on developing the positive behaviors that best align with their personalities and risk attitudes.

While we typically conceive of income as a demographic control, it is important to note that when controlling for other characteristics, income is generally a positive predictor of positive financial behaviors as well as perceptions, and outcomes. Furthermore, there are significant marginal effects of financial literacy on composite FWB at middle income levels (\$50,000 – \$99,000), but not at low- and high-income levels. It appears that if income is high enough, FWB does not depend on financial literacy, and similarly at low levels of income, financial literacy cannot compensate for lacking resources necessary to achieve FWB. Similarly, while individuals with lower incomes have lower FWB, higher risk tolerance significantly mitigates this effect at lower-middle income levels (\$35,000 – \$75,000).

Finally, other separate indicators of FWB are significantly correlated with FWB and determined by the same drivers, but the correlations are lower than we initially expected. This suggests that the indicators provide unique insight into specific measures of financial health.

Future research should address some limitations of this study. First, more data including discount rate elicitation would allow us to examine FWB for a larger sample and wider age range. More research should focus on the financial literacy measure and the unexpected relationship between FWB and financial literacy among Black respondents. In addition, the results presented in this paper are unable to isolate causal effects. For example, higher FWB could lead people to feel more self-confident in their financial abilities. Future research should apply a broader range of econometric techniques and identify instrumental variables to model composite FWB as a function of various FWB indicators as well as the fundamental drivers. This would provide a better understanding of the reach and limitations of the CFPB-FWB scale.

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## Appendix A

### Questions used to construct the CFPB-FWB scale

#### How well does this statement describe you or your situation?

1. I could handle a major unexpected expense.
2. I am securing my financial future.
3. Because of my money situation, I feel like I will never have the things I want in life.
4. I can enjoy life because of the way I'm managing my money.
5. I am just getting by financially.
6. I am concerned that the money I have or will save won't last.

#### How often does this statement apply to you?

7. Giving a gift for a wedding, birthday or other occasion would put a strain on my finances for the month
8. I have money left over at the end of the month.
9. I am behind with my finances.
10. My finances control my life.

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