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By *J. Michael Collins and Carly Urban*

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Understanding Financial Well-being Over the Lifecourse: An Exploration of Measures

J. Michael Collins
Associate Professor of Consumer Finance and Public Affairs
and
Carly Urban
Associate Professor of Economics at Montana State University

Abstract

Financial well-being is a relatively new concept in household finance, which measures a distinct characteristics of subjective financial status and perceived trajectory in the future. Compared to measures of financial status, financial inclusion, hardships and other measures, the new Financial Well-Being score changes over the life course in ways that are similar to, but not the same as, other measures. Using a life-cycle model to account for systematic factors that affect consumer financial positions, we find that financial well-being generally tracks income, wealth, and participation in the stock, bond, and mutual fund markets. However, financial well-being is not strongly associated with whether or not an individual is banked or financial literacy. Overall, directly measuring financial well-being using a subjective scale may be a useful strategy for evaluations of interventions and in surveys.

1 Introduction

Especially since the Great Recession of 2008, policymakers and researchers in the United States have become more focused on trends in the financial well-being of families and individuals. While economic conditions have improved, National Financial Capability Study (NFCS) data from 2015 show that less than half of Americans have three months of living expenses saved in case of an emergency FINRA (2015). In addition, only 39% report figuring out how much they need to save for retirement, and half worry about running out of money in retirement. Financial knowledge is also misconstrued during this period: while actual financial knowledge measured through factual questions declined from 2009 to 2015, perceptions of financial knowledge actually increased in the NFCS.

While these data points paint a picture of the level of financial capability of Americans, the actual status of families, beyond standard measures such as employment and income, is not well measured. The field uses a variety of measures ranging from objective financial assets or debt levels, to financial knowledge (or literacy) to the incidence of hardships in order to assess the financial health of households. Each depicts a perspective on household financial conditions, but there are always anecdotes of wealthy people on the brink of financial collapse, as well as thrifty low-income people who are financially independent and secure. Understanding the financial well-being of households requires more holistic measures to captures more than account balances or paystubs. This suggests a need for more subjective measures based on survey data about financial perceptions, but this begs the question if broader measure of financial well-being can offer any insights beyond traditional measures? If so, a subjective financial well-being measure has the potential to deepen our understanding of households' financial health.

Economists consider utility as a prime measure of individual's relative satisfaction from the consumption of goods and services. Seminal work by Angus Deaton points to subjective well-being as the an important measure for individual happiness (Deaton, 2008). People's satisfaction with life in general is a measure of an aspect of human experience. This paper will use a new measure created by the US federal Consumer Financial Protection Bureau (CFPB) called the Financial well-being (FWB) scale. This new scale is a new measure designed to capture the subjective well-being people express related to their financial status. Our analysis summarises how the FWB relates to other types of commonly measured outcomes in household and consumer finances, across the life course.

The scale is based on a definition of financial well-being that has four basic elements: (1) having control of day-to-day and month-to-month finances; (2) having capacity to absorb a financial shock; (3) being on track to meet financial goals; and (4) having the freedom to make choices that allow enjoyment of life.

Drawing on the language used by consumers during a series of over 80 interviews, the items in the FWB scale were written and field-tested using cognitive interviewing. After the initial interview phase, researchers tested the scale using a series of large nationally representative survey samples. Once the final items were selected, scores were generated using factor analysis and Item Response Theory (IRT) modelling separately for working age and older respondents.

To understand how FWB differs from other common measures of financial status, inclusion, hardship, and knowledge, we draw upon a common economic theory: the life-cycle model. In this model, individuals accumulate wealth over the lifecycle and spend down their assets post retirement. This means that income and assets increase as individu-

als age until retirement, when they begin to decrease. Debt holds the opposite pattern. We show how other financial measures, including knowledge and hardship, evolve over the lifecourse. We contrast these measures with the patterns of FWB over the lifecourse. We then use a combination of measures that produce a pseudo-FWB measure for those using datasets that do not include the specific FWB measure to examine how closely approximated the measures are.

We contribute to the literature in three new ways. First, we are one of the first papers to study the new CFPB measure of financial well-being. Second, we use a well-developed life-cycle model to understand how FWB differs from other constructs often used in evaluating financial interventions. Third, we create a measure that mimics financial well-being with variables that closely match the ten-item scale. This allows previous researchers to use measures that are already in existing datasets to construct a variable close to financial well-being.

This paper employs new data from the Consumer Financial Protection Bureau's 2016 national Financial Well-being Survey (FWBS) to better understand financial well-being over the life-cycle. To understand lifecycle effects of financial outcomes, we split our data into age cohorts. We document standard lifecycle behaviour in these data.

After validating known trends in these data, we explore some of the novel measures in the financial well-being data. First, we look at the variation in measured financial well-being scores over the lifecycle. Using a flexible specification with nonlinearities in age that controls for pre-existing factors such as parental education and gender, we show that younger cohorts (those under 30 years of age) have lower financial well-being scores, and scores modestly increase with age until individuals reach approximately 60 years of

age. For all individuals older than 60, there is no further difference in financial well-being–that is, well-being plateaus. Second, we examine how well people answer objective questions about financial knowledge using the same specification. We find there are no statistically distinguishable difference in financial knowledge over the lifecycle after age 20. Finally, we show measured financial well-being score appears to represent a construct that is not directly captured in income and savings metrics. It further suggests that financial knowledge may not be directly embedded in financial well-being, though assets seem to be a direct function of the measure.

2 Overview of Concepts and Measures

Previous work measures financial outcomes in what we classify into four main categories: financial status, financial inclusion, financial hardship, and financial literacy. Financial well-being is distinct from these concepts but closely related to financial capability and satisfaction. We summarise some key aspects of each below.

Financial status is among the most commonly measured financial attribute used in many household surveys, including measures of assets, debt, and income. One data source with these measures is the Federal Reserve Survey of Consumer Finances, which has provided detailed estimates of household finances dating back to the 1980s (and earlier) (Bricker et al., 2017). These data are useful for describing patterns and changes in financial status of households over time. For example, Poterba et al. (1994) examine retirement account balances, and Bergstresser and Poterba (2004) study the types of accounts people hold. There are hundreds of surveys that include related measures of income and wealth,

although there are wide variations in how these items are measured.

Financial inclusion is a newer concept, drawn from development economics where access to basic banking services is viewed as a critical infrastructure for developing economies (Demirguc-Kunt et al., 2018). In the US, inclusion focuses more on access to banking and lending services. For example, Rhine et al. (2006) study the ownership of basic transactional bank accounts (checking accounts). The US Federal Deposit Insurance Corporation (FDIC) 'Unbanked Supplement' to the US Census Current Population survey has provided extensive whereas those measuring inclusion tend to focus on whether or not an individual is banked or has access to financial accounts (Rhine and Greene, 2013). The definitions of 'unbanked' and 'underbanked' are evolving, but they appear to measure an important aspect of the extent to which people have access to financial services that could enhance their financial outcomes. In developed countries like the US, another important measure is participation in stock, bond, and mutal fund markets. Lusardi et al. (2011) find that financial literacy is associated with greater participation in stock markets.

Another domain of measures in household finance are related to material hardship and poverty (Short, 2005; Mayer and Jencks, 1989). Material hardships are measures of consumption and a lack of certain consumption that is considered a necessity is defined as a hardship. A common hardship measure is food insecurity (Bhattacharya et al., 2004). Other measures are related to the cost and quality of housing, or problems being able to afford stable housing (Desmond and Gershenson, 2016). Material deprivation are broader and include access to durable goods or other consumption (Beverly, 2001), including basic health care (Lyons and Yilmazer, 2005). These measures are meant to capture aspects of severe income poverty that income levels alone may mask. For example, Mayer and Jencks

(1989) show that income thresholds mask the fact that some households have higher incomes, but experience material hardships, while other households have incomes below poverty thresholds and face few or no hardships. Heflin and Iceland (2009) further show that measured material hardship is more closely related to poor mental health and distress than income alone. The use of certain material hardship questions, especially food insecurity in the US, based on the United States Department of Agriculture (USDA) survey scale items (Carlson et al., 1999), is common in household surveys. The use and interpretation of these measures, especially for households not in the poverty or near poverty ranges is not as common or standardised.

A broader measure of consumer or household finances is captured in scales related to financial knowledge or 'literacy' (Hung et al., 2009). Financial literacy is measured through either perceived financial knowledge or actual factual knowledge, often using three to five somewhat similar questions about topics like inflation, compound interest or investment types. Financial literacy questions have been included in the Health and Retirement Study, Survey of Consumer Finances, and the National Financial Capability Survey. Lusardi and Mitchell (2014) show that responses to these objective items of knowledge show a consistent association with financial behaviours and outcomes. Higher measured financial literacy appears to have a positive relationship with general financial well-being (Lusardi and Mitchell, 2007; Taft et al., 2013)

An extension of financial literacy is the concept of financial capability, which combines financial knowledge with the ability to take actions by making financial decisions, saving, managing debt or budgeting (Atkinson et al., 2007). Financial capability measures are more diffused, including measures of financial behaviour, confidence and satisfaction

(Taylor, 2011; Xiao et al., 2014). Financial capability blends financial knowledge and inclusion to capture the ability of people to make financial decisions (Johnson and Sherraden, 2007). Financial capability is one of the newer incarnations of measures of consumers in financial contexts, and in part reflects the need for measures that better capture financial well-being, which we discuss more deeply below.

3 Financial well-being

Financial well-being is a relatively new concept in household or consumer finances that buildings on the literature of subjective well being in general and has been researched in psychology and economics over the last few decades. This includes pathbreaking work by Diener (1984) and Kahneman and Krueger (2006). The work of Kobau et al. (2010) includes the development of the five-item Satisfaction With Life Scale.[1] Much of this work discusses the role of income or wealth on subjective well being(Diener and Biswas-Diener, 2002; Dolan et al., 2008). However, subjective well-being encompasses factors like health, family situation and other non-financial factors. A subset of overall well-being is related to finances.

In 2015, based on prior work on subjective well-being, the CFPB developed the FWB scale, a consumer-focused definition of financial well-being, based on qualitative interviews and focus groups to draft survey items. The scale was then tested through multiple waves of surveys to establish reliability and validity of the questions and scoring procedures. While the questions are standardized, the scoring varies by working age or across

[1]The scale has 5 questions with agree or disagree using a 1 - 7 scale, including: 'In most ways my life is close to my ideal, 'The conditions of my life are excellent,' 'I am satisfied with my life', 'So far I have gotten the important things I want in life,' 'If I could live my life over, I would change almost nothing.'

older ages. The scale survey instrument and scoring formula are all publicly available.[2]

This definition of financial well-being is measured at the individual level and is based on reports of feelings of (1) control over day-to-day, month-to-month finances; (2) the capacity to absorb a financial shock; (3) being on track to meet financial goals; and (4) having the financial freedom to make the choices that allow for the enjoyment of life. Being "in control over" includes being able to pay bills on time, not having unmanageable debt, and being able to make ends meet. Absorbing a shock includes resilience by having a financial cushion, having savings, health insurance, access to credit, or friends and family for financial assistance. Financial goals, which can vary based on the individual and his or her needs, are related to planning and being confident financially. Financial freedom includes aspects of autonomy, where a lack of financial resources can limit basic life choices. In interviews consumers suggested freedom includes the ability to have a meal out, spending more time with family, and other basic choices to be an component of financial well-being. The FWB scale uses the question items in Table **??**.

These 10 items are not simply summed from 0 to 50, as might be standard in a classical scale method of adding up raw score points. Instead the FWB scale uses item response theory (IRT) modelling where each response has different meaning. Each question item and item response may does not have equal weighting, and may contribute in different ways to the scale. The use of IRT means some question responses may provide a stronger (or weaker) indication of overall financial well-being. The IRT model estimates parameters for each response item to calculate a combined score (Edelen and Reeve, 2007).[3] The

[2] `https://www.consumerfinance.gov/data-research/research-reports/financial-well-being-scale/`

[3] The FWB score is estimated using software, flexMIRT 2.0 using a bifactor graded response model with one factor related to the latent financial well-being construct and one factor to account for whether each

CFPB provides scoring worksheets, as well as the code to re-estimate the scaled FWB score. The FWB is transformed into a roughly 100 point score, although practically, score range from about 20 to about 80. The scores are then adjusted by people in working ages (18-61) and those who are retired or close to retiring from work (62 and older).

The FWB scale questions are being included in a growing number of studies, including the FINRA Investor Education Foundation's National Financial Capability Study (NFCS) and the Survey of Household Economic Decisionmaking (SHED) completed every year by the Federal Reserve Board.

4 Data

This analysis uses the 2016 CFPB National Financial Well-being Survey (FWBS) data. These data are nationally representative and the first to collect such a sample of financial well-being for Americans. The dataset represents a large public investment, and was carried out in partnership with the nonprofit Prosperity Now, as well as researchers from Abt Associates, Vector Psychometric Group, and the University of Wisconsin-Madison's Center for Financial Security. The survey includes the 10-item FWB score using IRT methods to allow for respondents to skip some questions and still have a complete score. The data contain roughly 6,400 respondents that are at least 18 years old.

In addition to FWB, there are other attributes that make this dataset useful, such as a variety of measures to capture individuals' financial situation, ranging from subjective perceptions (such as whether or not an individual is having difficulty making ends meet) to objective responses on financial status (such as whether or not an individual has been

question was phrased negatively or positively.

rejected on credit applications). At the same time, there are a few downsides to these data. First, there are no administrative credit reports or other financial data linked to individual responses to validate self-reports of financial status in the data. Second, the survey is cross sectional in only year: 2016; it is unlikely that the survey will be replicated in future years. Table **??** shows the distribution of the FWB score in the data by age, where the overall mean is 56, with lower scores for young people, and higher scores among older people. Figure **??** shows the distribution of scores overall.

5 Methods

One way to better understand financial well-being as a construct, and the FWB scale as a particular measure of well-being, is to rely on descriptive approaches used in population science, sociology and demography. Prior studies have examined how measured financial attributes track with gender, age or other fixed factors, as well as preferences and behaviours (for example see Ruel and Hauser (2013) or the work of Halek and Eisenhauer (2001)). Age cohorts are of particular interest since the FWB was in part constructed to account for age-based differences among people of working versus retirement ages. There are also very predictable patterns of financial behaviour as people age, including accumulating savings and earning more income up until retirement.

To understand FWB scores over the lifecycle, we split our data into the following age cohorts: 18-24, 25-34, 35-44, 45-54, 55-61, 62-69, 70-74, and age 75 or more. Since the scores are adjusted for those 62 and older, we are careful to split the data at that point. However, the data also over-sample older people, allowing us to more tightly define the

upper cohorts, especially since those under 70 may be more likely to still be working.

The cross sectional nature of our data does not exactly pick up life-cycle behaviours. Instead, it shows differences across generations. We also re-define our age stratification to instead represent popularly named generational cohorts (e.g., Baby Boomer, Millennial, etc.) to in part attribute differences across cohorts not just to age but also to differences in preferences.[4]

6 Measures of Financial Outcomes

Studies of household financial decisions often focus on a wide array of financial outcomes, including financial status (savings, income, net worth, etc.), financial inclusion (whether or not an individual is banked or has access to products), financial hardship (experience of financial shocks), and financial knowledge (how financially 'literate' measured as individuals answer questions). New to the discussion is a measure of financial well-being, which captures a subjective sense of someone's financial condition and consideration for the future **?**. In this analysis we seek to compare this new measure to existing measures using a common model in economics and related fields, the lifecycle. In this model, individuals accumulate assets as they age and begin to consume these assets in retirement and older age. Individuals also earn more as they age, until they curtail or exit work. We consider a range of measures using the lifecycle model to describe how financial well-being and other measure evolves over the lifecourse in similar or different ways.

We estimate Equation 1 and plot the coefficients along with the 95% confidence interval for the estimates focused on key life stages:

[4]These results are in the appendix.

$$Y_i = \alpha + \sum_{j=2}^{8} \beta_j \text{Age Group}\, j_i + \gamma_1 \text{White}_i + \gamma_2 \text{Male}_i + \theta \text{Parent Educ}_i + \varepsilon_i \qquad (1)$$

Y_i is the financial outcome for individual i . The j age groups allow the excluded group to be 18-24 year olds, keeping bins for the remaining age cohorts. The model further controls for gender, whether or not the individual is a White, non-Hispanic, and parental education (less than high school, high school graduate, some college, bachelors degree, and graduate education). We choose to only control for these variables in our baseline specification, as they are arguably fixed at the individual level by middle age.

6.1 Financial Status

We begin with one of the most common measures, savings. The savings measure in the FWBS is measured as follows: 1 ($0), 2 ($1-$99), 3 ($100-$999), 4 ($1,000-$4,999), 5 ($5,000-$19,999), 6 ($20,000-$74,999), and 7 ($75,000 or more). While the buckets are not evenly distributed, 15% of the sample has fewer than $100 in savings, 16% of the sample has at least $75,000 in savings, and nearly 40% of the sample have between $1,000 and $20,000. Figure **??** shows the evolution of savings over the lifecycle. The left panel clearly follows other data that shows savings follows the lifecycle model. The right panel of Figure **??** shows this same pattern, with the excluded group again being those 18-24. While there are no statistical differences between 18-24 year olds and 25-34 year olds, each older age cohort has increased savings when compared to 18-24 year olds. Further, the size of the coefficient increases across cohorts, where 70-74 year olds have the greatest

amount of savings, and the amount decreases for those over 75.

6.2 Financial Inclusion

Financial inclusion is another way previous papers have measured financial capability. Without access to low-cost accounts, individuals may substitute towards higher cost methods of borrowing, such as payday loans, pawn shops, or other informal markets with high interest rates. We measure financial inclusion in this case by whether or not the individual has a formal checking or saving account, where we refer to this as "banked." While there is less variation in this measure (86% of respondents are banked), the general trends still exhibit a lifecycle model. However, when using a regression framework, the confidence intervals around each estimate are much less precisely estimated. All age cohorts 35-44 and older are more likely to hold an account than those 18-24 and these groups are statistically different than 18-24 year olds at the 95% level. The general pattern appears to show that accounts are more likely as age increases until age 74, when account ownership decreases. However, none of these coefficients are statistically different from each other.

Given the prevalence of bank accounts, it is difficult to use accounts as an outcome for U.S. based interventions when considering a nationally representative sample such as the FWBS. It is likely that imprecise null effects will persist. In cases where a targeted intervention is aimed to improve the likelihood of being banked directly, particularly among samples of individuals who are unlikely to be banked, may allow for more precise estimates.

Table **??** shows a measure of financial inclusion one might consider in developed countries: participation in the stock, bond, or mutual fund market. Both panels of Figure

?? suggest that participation in these formal markets follows a life-cycle pattern similar to assets. While this finding is very clear in the United States, other work by (*Gender role asymmetry and stock market participation ? evidence from four European household surveys*, 2018) shows that this same trend does not materialise in Austria, the Netherlands, or Spain. While this pattern is somewhat consistent with that in Italy, the other three European countries have higher rates of participation for younger ages (under 30) when compared to older ages (over 30) (*Gender role asymmetry and stock market participation ? evidence from four European household surveys*, 2018).

6.3 Financial Hardship

Another important way that researchers have captured the financial capability of Americans is to consider financial challenges some may be facing. In the past, researchers have used measures of emergency savings in the past, but we choose two measures based on specific financial hardships and broad-sweeping self-reported difficulties.

The first measure is called material hardship and captures difficulties that would objectively affect quality of life. These are intended to be extreme financial difficulties. We code an individual as having material hardship if they answer sometimes or often to any of the following questions:

- Worried whether food would run out before got money to buy more,
- Food didn't last and didn't have money to get more,
- Couldn't afford a place to live,
- Any household member couldn't afford to see doctor or go to hospital,

- Any household member stopped taking medication or took less due to costs,
- Utilities shut off due to non-payment.

This question resulted in 28% of individuals reporting material hardship, meaning 72% of the sample reports never having any of these conditions.

The second measure reflects difficulty of covering monthly expenses and bills and is intended to be a bit more broad and less drastic. This measure, called difficulty making ends meet, is coded as a one if individuals report it is somewhat or very difficult to cover monthly expenses and bills and zero if individuals report that it is not at all difficult. Unlike the first measure, roughly 38% of individuals report having at least some difficulty in covering expenses. Again, this difference could reflect that the latter measure is less extreme and individuals may have more (unnecessary) expenses that they cannot afford.

Beginning with the material hardship measure in Figure **??**, younger Americans are more likely to report material hardship, and after age 34, the likelihood decreases steadily until age 75, when there is a subsequent increase. The estimated regression coefficients show a similar pattern. There is no difference between the first two age categories, but the estimated coefficients increase in absolute value by age category. Those 70-74 are 26 percentage points less likely to experience material hardship than 18-24 year olds, and those 45-54 are at least 10 percentage points less likely to experience hardship than 18-24 year olds.

Looking to the more general measure of difficulty in making ends meet in Figure **??**, we see that younger cohorts are more likely to experience difficulty with making ends meet, and after age 34, the likelihood decreases. However, there is no statistical difference across groups until age 62, when the likelihood of experiencing difficulty is 12 percentage

points lower than for those 18-24. That difference persists for those 70 and older.

These findings taken together suggest that sharp and definitive measures of hardship, when compared to more broad difficulty in covering expenses, may provide increased precision when estimating the effects of interventions that aim to improve financial capability.

6.4 Financial Literacy

Another common measure associated with financial interventions is objective financial knowledge. Across survey datasets in the U.S. and other countries, many have relied on the "Big 3" and the "Big 5" questions to capture financial literacy. The Big 3 include simple questions regarding inflation, interest, and diversification. In the FWBS data, roughly 65% of individuals answer all three correctly, 24% answer two correctly, and under 11% answer 1 or fewer correctly.

While Figure **??** shows that younger cohorts have relatively lower financial knowledge as measured by the Big 3, knowledge has little variation for those over 45. Thus, studies exploring financial literacy using the Big 3 for Americans over 45 may have little variation to exploit, as knowledge is already high for this group.

7 Financial Well-being

Figure **??** shows that financial well-being increases with age. In comparison with all of the other outcomes we explore, it most closely matches with liquid savings. While the first two age cohorts are not statistically different, each additional cohort sees an increase in financial well-being until age 75, when the trend decreases. Not surprisingly, there is

a clear break at age 62. We cannot definitively say that this is due to improved financial well-being, as opposed to the slightly different calculation for Americans over 62. This is why it was important to break the grouping at this age group. However, we can still say that financial well-being is slightly higher for those 70-74 when compared to the 62-69 and the over 75 year olds. The pattern for savings is much smoother around the age 62 break. Those using the financial well-being score in assessing outcomes for a variety of ages should take into consideration the (potentially mechanical) break at age 62.

In addition to exploring the differences in means across age cohorts, we show the differences in the distributions in Figure **??**. A few trends become immediately apparent. First, all distributions appear normally distributed, though older age cohorts have higher means than the younger cohorts. Second, the distributions of financial well-being for those 70 and older have the majority of their mass over the full sample mean of 56 points. This suggests that older Americans either have adequate savings or the social safety net is strong enough to protect them from financial struggles. Third, a large amount of the density of well-being for 18-24 year olds is near the mean. However, the spread across values for 25-34 year olds and 35-44 year olds is greater across the entire distributions. Fourth, those in cohorts 25-34 and older see a large density around a top value between 85 and 90, where the size of the density increases with age.

We explore additional financial outcomes over the life course in Table **??**. Column (1) retains financial well-being for the sake of comparison throughout. Again, well-being has a general pattern of increasing over the life courses. Though there are no statistical differences for those 18-44, 45-74 year olds exhibit increased financial well-being, which then decreases a bit in magnitude from 70-74 to those 75 and older. We then explore four

additional variables.

First, we choose a variable that has clear evolution over the lifecycle: homeownership. Not surprisingly, Column (2) reports that the rate of homeownership increases steadily as age increases, decreasing at the highest age cohort. The largest difference suggests that 70-74 year olds are 75 percentage points more likely to be homeowners than 18-24 year olds. This tracks well with the savings and financial well-being measure.

Second, we measure one's ability to absorb a financial shock with a question that asks individuals confidence in their ability to raise $2,000 in 30 days. This captures both their ability to save for emergencies, as well as their ability to draw on a financial safety net from formal or informal networks. Those who state they could probably or certainly come up with the funds are given the value one, and those who certainly or probably could not come up with the funds are given the value zero. The measure of emergency savings closely follows the trends laid out in the previous two variables: FWB and homeownership.

Third, we investigate two variables that we expect to vary differently across the life-cycle, automated retirement savings and automated non-retirement savings. Column (4) reports automated retirement savings. The prevalence of automated retirement savings increases from 25-34 when compared to 18-24, which is indicative of the time period individuals obtain their first jobs with steady income. While the difference between 35-44 and 18-24 year olds and 45-54 and 18-24 year olds is statistically significant, there are no increases in automated retirement savings between the 25-34 and 35-44 or 35-44 and 45-54 age cohorts. Instead, the shift appears one time and is steady over time, which potentially signifies a sustained increase through working years.[5] By age 62-69, likely

[5]This is consistent with the U-shaped relationship between age and voluntary integrative pension schemes participation in Italy in (Alemanni and Lucarelli, 2017).

retirement ages, the size of the difference is half the size. By age 70, there is no difference in automated retirement savings when compared to the 18-24 year old cohort.

Column (5) reports non-retirement automated savings. While the magnitude of these differences increases from 25-54, only the 45-54 and 70-74 year old cohort are more likely to have automated savings than the 18-24 year old cohort. We suspect that setting up automated savings is likely for all age groups, though it could be that younger cohorts prefer automated savings to older cohorts, while we know that older cohorts are more likely to save in general. The life-cycle model also suggests that income falls after retirement, such that there may not be income to automatically transfer to savings accounts.

8 What Affects Financial Well-being?

While financial well-being is intended to be independent of income and separate from other measures of financial outcomes, it is likely correlated with many other measures. As we showed above, the lifecycle patterns of financial well-being closely mimmic liquid savings. To show the relationship between financial well-being and other measures, we show how the distribution of financial well-being shifts by categorizing the variables described above and showing patterns. We then run regressions to predict financial well-being with some of these measures, as well as other measures that reflect financial shocks.

First, Figure **??** recategorizes assets into four categories, $0, $1-$999, $1,000-$19,999, and $20,000 or more. There is a clear shift in the distribution across the four groupings, where individuals with no savings have financial well-being scores shifted to the left of the normal distribution for the full population, and individuals with savings over $20,000

see a financial well-being distribution shifted far to the right of the normal.

Figure **??** explores the distribution of financial well-being by measures of financial inclusion and hardship. The financial well-being distribution appears to have a greater weight towards the lower half of the distribution for those not using formal bank accounts, and it is clearly shifted to the right for those with formal accounts, though the magnitude of the shift more closely matches that of individuals between $1,000-$20,000 in assets than those with over $20,000 in assets and shows the distribution of FWB across these categories. There is a stark difference in those who experience material hardship and those who do not, as well as those who do and do not report having difficulties making ends meet. These markers clearly shift financial well-being, where those without hardship or difficulty score substantially higher than those who do not. Financial challenges are clearly captured in the financial well-being construct.

To what extent is financial knowledge embedded in financial well-being? Figure **??** shows that those who correctly answer all of the Big 3 questions also have higher financial well-being. However, this relationship is not nearly as stark as that of assets or financial hardship. While the density for those who do not answer any of the questions correctly is dispersed, this reflects fewer individuals and does not have a large enough sample to draw direct conclusions.

8.1 Determinants of Financial Well-being

Next we seek to understand the degree to which the other measures commonly used help to predict or explain variation in financial well-being. We begin with the sample regression of each measure on financial well-being scores in Equation 2.

$$Y_i = \alpha + \beta_1 \text{Banked}_i + \beta_2 \text{Hardship}_i + \beta_3 \text{Ends Meet}_i + \gamma \text{Savings}_i + \delta \text{FinLit}_i + \theta \text{X}_i + \varepsilon_i \quad (2)$$

Y_i is financial well being for individual i. Banked equals one if the individual has a formal bank account and zero otherwise; hardship equals one if the individual reported experiencing material hardship and zero otherwise; ends meet equals one if the individual reported having difficulty keeping up with bills and expenses and zero otherwise. γ_{Savings} are savings buckets for the six categories described previously. FinLit is a dummy variable equal to one if the individual answered 1, 2, or 3 questions correctly, where 0 is the excluded group. As before, we include controls for male, white, and parent education; these are noted X_i above. ε_i is the error term.

Figure **??** reports the results with 95 percent confidence intervals around each estimate. Not surprisingly, the measures that were most likely to shift the financial well-being measure have the greatest association with the score: assets and financial hardship. While controlling for all variables simultaneously, financial literacy scores and whether or not the individual is banked are less predictive of differences in scores.

Next, we explore the degree to which other non-financial measures are correlated with financial well-being. Figure **??** focuses specifically on health, where better self-assessed

health is associated with greater financial well-being. Those reporting excellent health score over 15 points higher, on average, than those reporting poor health. Having a health shock in the last year is associated with a lower financial well-being score, though only by roughly two points.

9 Replicating Financial Well-being Measures in Existing Survey Data

The United States Financial Industry Regulatory Authority Investor Education Foundation conducts the triannual NFCS. The survey was conducted online in 2015 among a representative sample of 27,564 adults. Like most household financial surveys, the 2015 NFCS does not include the CFPB FWB scale. However, the NFCS does include question items that approximate the types of topics that the FWB scale measures. We identified five questions that approximate items in the NFCS, capturing the general domains of (1) control over finances; (2) the capacity to absorb a financial shock; (3) being on track ; and (4) having financial freedom. The NFCS 'pseudo' FWB scale is based on the following items:

- I am behind with my finances (Domain 1) $\rightarrow$ NFCS: Credit record is poor (J32)
- I am just getting by financially (Domain 1) $\rightarrow$ NFCS: Low satisfaction with financial situation (J1)
- I could handle a major unexpected expense (Domain 2) $\rightarrow$ NFCS: Can fund emergency of $2,000 (J20)

- I have money left over at the end of month(Domain 3) → NFCS: Expenses less than income (J3)

- My finances control my life (Domain 4) → NFCS: Low confidence in financial future (J30)

We then estimate a FWB score using the same IRT graded response model, where the estimated latent theta parameter is multiplied by 15 and added to 50 to more closely match the FWB distribution in the CFPB data. Although this is not a summation score, if we estimate the classical scale reliability coefficient, the 0.70 value using the Cronbach's alpha measure of internal consistency is reasonable given this an *ex post* scale construction.

The overall distribution and patterns across age cohorts also appear similar to the prior estimates using the FWB score based on the 10-item scale (Figure **??**), though we cannot further drill down our age bins. Even in our estimated regressions across cohorts, our coefficients and patters mimic those of the FWB scale. Unfortunately, we cannot control for parental education so our results are not identical, but if we do not control for parental education in our primary model, our results remain consistent, so we do not think this is driving our result. Our intent is not to suggest a substitute for the CFPB FWB scale items, but rather that the general concept of financial well-being can be replicated even in surveys that do not formally include the CFPB FWB items. This could present a strategy for researchers using other datasets, or even data collected from field studies, in cases where broader measures of financial well-being are useful in addition to traditional measures of financial status, inclusion or hardships.

10 Conclusions

How does financial well-being evolve over the life-cycle? Do other measures previously used in the literature, such as late payments, whether or not an individual is banked, financial knowledge, and the existence of emergency savings, follow similar life-cycle trends? Using the Financial Well-being Survey we show that financial well-being generally tracks age and income. The FWB score is not strongly associated with financial inclusion or literacy, however. Directly measuring financial well-being using a subjective scale may be a useful strategy for evaluations of interventions and in surveys; the FWB score may also be a measure that researchers can proxy in existing surveys and field studies.

The concept of subjective financial well-being, and the FWB score as an applied measure using standardized items and scoring procedures, offers another construct to better understand household and consumer finances. The FWB score is an alternative way to estimate financial status, perhaps as a complement to asset or income measures. It may offer more insights into mechanisms for policy analysis, as well as to understand the longer term, more subjective impacts of policies and programs. The FWB score and subjective financial well-being in general may have potential value for use in field studies, as outcomes or to measure trait-like tendencies.

Being a new concept and new measure, much more work is needed to understand how the FWB score operates. There are potential self-reporting biases, systematic biases by age, race or gender, and maybe problems with non-response in surveys relative to more objective measures. While all measures have issues with reliability and validity, the FWB score has yet to be compared to administrative data, such as credit reports or account balances. The FWB score has also not been tested in a longitudinal panel format, so

changes within respondents have not been documented–the relative temporal effects of subjective financial well-being as a state versus trait measure are unknown.

Overall this is a descriptive exercise to explore this new concept and measure, with the goal of triggering new areas of inquiry and expanding the toolbox of measured used in household financial studies.

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