

Three Essays on Retirement Savings Decisions of American Adults

by

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A Dissertation

in

Personal Financial Planning

Submitted to the Graduate Faculty
of Texas Tech University in
Partial Fulfillment of
the Requirements for
the Degree of

DOCTOR OF PHILOSOPHY

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August 2023

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ACKNOWLEDGMENTS

I would like to thank Dr. Christopher M. Browning, my committee chair, for his continuous support, guidance, and encouragement throughout this dissertation process. I am equally grateful to the other esteemed members of my dissertation committee: Dr. Charlene M. Kalenkoski, Dr. Russell James, and Dr. Michael Guillemette, for their valuable assistance in shaping this research.

I would also like to express profound gratitude to the entire faculty and staff in the Personal Financial Planning Department. Their expertise and resources have been instrumental in successfully completing this study. Additionally, I am thankful to the College of Human Sciences, the Graduate School, and the leadership of Texas Tech University for providing me with this incredible opportunity.

I am profoundly indebted to my wife and parents for their unwavering support and sacrifices during this journey. Their love and encouragement have been my constant motivation. I would also like to thank my elder brother Md. Sarwar Jahangir, other siblings, and all my friends for their unwavering support and love throughout this process. Lastly, I am grateful to my teacher and mentor, Dr. Nik Volkov, for motivating me to pursue Ph.D. in Personal Financial Planning. Without his encouragement, I would not make this decision.

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Chapter I

Introduction

Saving for retirement is important because it helps ensure you have enough funds to support yourself throughout retirement. Savings in an employer-sponsored plan has significant tax benefits. Employees can save pre-tax dollars while working with an employer-sponsored plan like a 401(k)s or a 403(b). At retirement, employees are expected to be in a lower tax bracket and pay taxes on those dollars. Even though saving for retirement is vital in many ways, a significant number of U.S. households lack any form of retirement savings account.

The following three essays examine American adults' participation in employer-sponsored retirement plans. Using the 2021 National Financial Capability Study (NFCS), the first essay examines the associations of employer-sponsored retirement plan participation with financial literacy and other explanatory variables and decomposes these associations into their explained and unexplained portions using the Oaxaca decomposition. Using the 2018 National Financial Capability Study (NFCS), the second essay examines the relationship between financial education and participation in employer-sponsored retirement plans, utilizing four different methods of financial education (1) financial education program participation, (2) financial education source, (3) financial education hours, (4) perceived quality of financial education. Using the 2021 National Financial Capability Study (NFCS), the third essay investigates the relationship between the act of figuring out one's retirement savings needs and actual retirement savings decisions in employer-sponsored retirement plans for younger individuals.

The research aims to understand the gender gap in employer-sponsored retirement plan participation decisions. This research also helps understand the role of financial education and retirement need estimation in employer-sponsored retirement plan participation decisions.

Chapter II

Examining the Gender Gap in Participation in Employer-Sponsored Retirement Plans: Oaxaca Decomposition

Introduction

Saving for retirement is important because it helps ensure you have enough funds to support yourself throughout retirement. Knowing whether you will have enough money to fund a retirement that could last 20-30 years is difficult. Even if the money lasts that long, predicting whether one's lifestyle could be maintained in retirement is challenging. Savings in an employer-sponsored plan has significant tax benefits. While working, employees can save pre-tax dollars with an employer-sponsored plan like a 401(k)s or a 403(b). At retirement, employees are expected to be in a lower tax bracket and pay taxes on those dollars. Another top benefit of 401(k) plans is matching employer contributions. Regardless of employee salary, employers usually match a percentage of employee contributions up to a set portion of total salary or contribute up to a specific dollar amount.

According to the U.S. Bureau of Labor Statistics, 68 percent of workers in the private sector had access to retirement benefits through their employer in March 2021, and only 51 percent chose to participate. Among the state and local government workers, ninety-two percent had access to retirement benefits, but only 82 percent participated.

The Employee Retirement Income Security Act (ERISA) ensures that all employees have equal access to employer-sponsored retirement plans regardless of gender, race, or ethnicity as long as they meet the eligibility requirements. Under ERISA, if an employer offers a retirement plan, they must follow specific rules to ensure that the

plan is offered to all eligible employees in a nondiscriminatory manner. Employees are eligible to participate in an employer-sponsored retirement plan once they meet certain age and service requirements. For example, an employer may require that the employees are at least 21 years old and have worked for the company for at least one year before being qualified to participate in the retirement plan. Employers must also follow nondiscrimination rules to ensure that the retirement plan is not unfairly weighted in favor of highly compensated employees. These rules aim to prevent employers from providing greater retirement benefits to executives or other highly-paid employees while excluding lower-paid workers. So, this ensures that everyone has equal access to employer-sponsored retirement plans and is subject to the same eligibility rule. If the employees meet those eligibilities, then there should not be a barrier to plan participation. However, the statistics show a gender gap in employer-sponsored retirement-plan participation. According to the U.S. Bureau of Labor Statistics (BLS 2020), women's participation in employer-sponsored retirement plans such as 401(k)s, or pensions is significantly less than men's participation. In 2019, only 63% of women participated in an employer-sponsored retirement plan compared to 67% of men. The gap is even wider for women of color. For example, compared to 65% of white women, only 54% of Black women participated in employer-sponsored retirement plans in 2019.

Previous literature suggests gender differences in retirement saving decisions and risk attitudes (Bajtelsmit & Bernasek, 1996; Bajtelsmit & Van Derhei, 1997). Men and women face different social and economic conditions, both within and outside the household, which may lead to differing tendencies in retirement savings. According to the World Bank 2018 data, gender gaps in education, discrimination, and social norms

shape the terms of female labor force participation. Women are less likely to join the labor force and work for pay. Women are more inclined to work part-time, in the informal sector, or in lower-income occupations. The gender gap in earnings directly impacts women's ability to save for retirement. Lower earnings result in reduced disposable income available for retirement savings.

Previous research indicates that women tend to be less prepared for retirement than men. This prior research suggests that unpaid caregiving, risk tolerance, investment choices, saving behavior, earnings, information sources, education, and financial knowledge are potential reasons for the gender gap in retirement savings. There also could be an unexplained gap in retirement savings decisions. The unexplained gap can arise because of differences in the return to financial education and other demographic and economic variables between males and females. The Oaxaca decomposition is an appropriate method to measure the explained and unexplained portions of the gap in employer-sponsored retirement-plan participation. This technique has previously been used in many research studies to investigate the gender pay gap and discrimination.

This study examines the associations of employer-sponsored retirement plan participation with financial literacy and other explanatory variables and decomposes these associations into their explained and unexplained portions using the Oaxaca decomposition. The explained portions measure how much of the gender gap in employer-sponsored, retirement-plan participation is due to the differences in financial literacy and other explanatory variables. The unexplained portions measure how much of the gender gap in employer-sponsored, retirement-plan participation is due to the differences *in the return to* financial literacy and other explanatory variables between

males and females. The current study is distinct in that it decomposes the explained and unexplained portions of the employer-sponsored retirement-plan participation gap.

The current study focuses on single, employed individuals. Sundén and Surette (1998) find that single women exhibit a higher likelihood of participating in a defined contribution (DC) plans than single men. Single women may be more financially independent than married women and single men (Kathleen et al., 2010). They are solely responsible for their financial well-being. This independence can motivate single women to prioritize retirement planning and take proactive actions to secure their future. Single women may be more motivated to engage in long-term financial planning, such as retirement planning because they do not have a partner to rely on for financial help. They understand the significance of building a nest egg to provide for themselves in the future. Moreover, women generally have longer lifetimes than men, which may motivate single women to participate in retirement plans to ensure they have sufficient funds to support themselves later.

This study also conducts a sensitivity analysis with single, full-time workers to abstract from the employment hours decision. Previous studies that used Oaxaca decompositions often just looked at full-time workers to examine gender wage differentials and discrimination.

The results show that females' participation in employer-sponsored retirement plans is slightly higher (1.36%) than males' participation. Objective financial knowledge, age, income, education, homeownership, and risk tolerance all are positively associated with employer-sponsored retirement-plan participation. The explained and unexplained gap in participation in employer-sponsored retirement plans is -0.0428 (-

4.28%) and 0.0565 (5.65%), respectively. The negative explained gap means females have a lower average value of explanatory variables than males. The positive unexplained gap means females have a higher return to explanatory variables than males. The results of the sensitivity analysis are consistent with the main models. It shows that females' participation in employer-sponsored retirement plans is 2.07% higher than males.

Literature Review

There could be many reasons for a gender gap in employer-sponsored retirement-plan participation. Limited research has investigated gender differences in the use of retirement plans. Dietz et al. (2003) find that gender is not related to the use of private retirement plans. They also find that women are less likely to utilize an employer-sponsored plan, and this gap is primarily attributed to gender differences in occupational choices.

Analyzing data from the Survey of Consumer Finances (SCF) from 1989 to 2016, Weller and Tolson (2018) investigate the relationship between unpaid caregiving and labor/earnings stability and the link to retirement savings. They find that unpaid caregiving can adversely affect a caregiver's hours at work, earnings, employment, and income stability, negatively impacting the caregivers' savings. Women are more likely to experience the effects of caregiving than men (Pavalko & Artis, 1997). Single women are more likely to provide caregiving to children and others than single men (Feinberg & Choula, 2012). Gender disparities in caregiving and their impacts on jobs can explain the retirement-savings disparity by gender (Weller & Tolson, 2018).

Some researchers have tried to explain the effect of risk tolerance on retirement savings and wealth accumulation. Barsky et al. (1997) utilized data from the Health and

Retirement Study (HRS), and find that, compared to women, men tend to exhibit higher level of risk tolerance. Spivey (2008) finds a similar result using data from the National Longitudinal Survey of Youth 1979. Grable and Lytton (1998) and Sung and Hanna (1996) conclude that women are significantly less risk-tolerant compared to men. By observing wealth accumulation and investment choices, researchers also have made conclusions about women's risk tolerance. Jianakoplos and Bernasek (1998) find that as individual experiences an increase in wealth, the proportion of wealth held in risky assets increases. However, the impact is considerably smaller for single women. Dwyer et al. (2002) find that compared to men, women take less risk in their decision-making regarding mutual-fund-investment. However, the study by Dwyer et al. (2002) finds that the gender gap in risk tolerance can improve substantially when women's financial knowledge improves.

According to the findings of Bernasek and Shwiff (2001), women allocate a significantly lower proportion of their defined contributions-plan in stocks than men. Utilizing data from federal workers enrolled in a government-sponsored Thrift Savings Plan, Hinz et al. (1997) observed that, compared to men, women demonstrate a lower participation rate in equity funds and invest a smaller portion of their assets in that fund. In their study, Sundén and Surette (1998) show that single women exhibit a lower likelihood of investing their defined-contribution plan mainly in stocks than single men. Contrary to the aforementioned studies, Papke (1988) find no impact of gender on investment choices when examining data from the National Longitudinal Survey (NLS) of mature women. Papke (1988) finds that when individuals can choose investments, they allocate 14 percentage points more to stocks than those without such choice. Neelakantan

(2010) estimates the impact of risk tolerance on wealth accumulation and finds that risk tolerance can explain approximately 10% of the gender disparity in accumulated wealth.

Some researchers examine the role of financial knowledge in retirement-savings decisions. In their study, Anderson and Collins (2017) measure the significance of financial knowledge and empowerment in contributing to the gender gap in savings. Utilizing administrative data from a sample of 31,000 public-sector workers in Wisconsin, they assess the effects of financial education, specifically on women in the workplace. They estimate that multi-media education can increase retirement savings by 2.6 percentage points to close the gender gap by more than half. According to Anderson and Collins (2017), disparities between men and women in financial knowledge can play a role in gender gaps observed in retirement savings.

Fisher et al. (2015) investigate the differences in savings behaviors between gender by utilizing data from a nationally representative sample of low- to moderate-income households (NC1172) as well as data from the 2010 Survey of Consumer Finances (SCF). (NC1172) is a multistate research program sponsored by North Central (NC). Results show that men and women exhibit different savings behavior. Using the NC1172 sample, Fisher et al. (2015) identify gender differences in how high risk tolerance and non-White ethnicity effect the possibility of being a saver. In the SCF, having other members in the household affects savings behavior differently for men and women. Additionally, they find that education and counseling positively impact savings behavior among both men and women in low-to-moderate-income households. Ryan and Siebens (2012) find that historically women tend to have fewer years of education and accumulate less experience in the workplace than men, which can affect earnings.

Fisher (2010a) finds that variations in risk tolerance serve as one of the main reasons why there are disparities in saving behavior. He finds that individuals with low risk tolerance are less likely to engage in saving. Given that women typically score lower than men on risk tolerance measures, risk-tolerance may be one of the primary factors contributing to gender differences in savings.

Sierminska et al. (2010) also find a difference in labor force attachment between women and men, which contributes to gender differences in financial behaviors. Females' lower labor force participation is one reason why there is a difference in wealth between men and women (Rowlingson, & Whyley, 2001). Berger and Denton (2004) find that women exhibit a higher tendency than men to work part-time, possess more diversified work histories influenced by childbearing, and experience more frequent job changes. Blau and Kahn (1997, 2000) find that a persistent gender wage gap contributes to the lower wealth holdings observed among women, even when holding saving rates constant. Graham et al. (2002) and Loibl and Hira (2006) highlight that gender disparities in information processing and information sources may also influence the financial strategies men and women adopt. Chen and Volpe (2002) and Loibl and Hira (2006) find that, compared to men, women are less familiar with financial matters and possess less confidence and enthusiasm when it comes to managing money. Using the 2007 wave of the SCF, Fisher (2010b) finds gender differences in personal savings behavior. He also finds that poor health and low risk tolerance have a negative impact on the likelihood of women saving in the short term and saving regularly. He finds that education is not essential in explaining women's savings behavior. In contrast, he finds that higher levels of education encourage men to engage in short-term saving and regular saving practices.

Previous studies have looked at the effects of differences in the level (explained) of the explanatory variables but not at the effects of differences in the returns of the explanatory variables (unexplained). Understanding the factors contributing to the unexplained gap is essential for addressing the gender gap in employer-sponsored retirement plan participation comprehensively. While the explained gap can be attributed to differences in financial literacy, income, employment, or educational attainment, the unexplained gap focuses on other factors contributing to the gender gap in employer-sponsored retirement plan participation. The unexplained gap could come from various reasons, including discrimination and bias, social and cultural factors, work-life balance, and caregiving responsibilities. According to the ERISA Act, in the United States, there should not be any discrimination between men and women in attaining employer-sponsored retirement plans. Gaps in employer-sponsored retirement plan participation can still exist due to other factors, such as social and cultural factors, work-life balance, and caregiving responsibilities. Societal norms and cultural expectations can influence women's financial behaviors and saving patterns, potentially contributing to the unexplained gap. Women's increased caregiving responsibilities and work-life balance challenges can affect their employment patterns, leading to interruptions, part-time work, or career breaks, affecting their retirement savings.

Using the NFCS (2021), the current study examines how differences in the means of the explanatory variables (financial literacy and other demographic & economic variables) and the returns to these explanatory variables between single employed men and single employed women are associated with employer-sponsored retirement plan participation.

Data

The current study uses 2021 National Financial Capability Study (NFCS) data. The NFCS is a project of the FINRA Investor Education Foundation. The online state-by-state survey was administered between June through October 2021 among a nationally representative sample of 27,118 American adults. The survey includes approximately 500 respondents per state, including the District of Columbia.

In 2009, The FINRA Investor Education Foundation commissioned the first nationwide study to assess the financial capability of American adults. The primary goals of the NFCS study are to establish benchmark indicators of financial capability and examine the variations of these indicators based on underlying demographic, behavioral, attitudinal, and financial literacy characteristics. To ensure accurate representation, national figures in the survey are weighted to represent the national population in terms of age, gender, ethnicity, education, and census division.

The current study excludes observations from the sample with the responses "don't know" and "prefer not to say" to the financial literacy, risk tolerance, homeownership, and retirement- savings questions. This study is conducted only on single, employed individuals. It excludes married, separated, divorced, and widowed individuals and analyzes only single individuals. It also excludes self-employed individuals; full-time students; permanently sick, disabled, or unable to work; unemployed; and retired individuals; leaving only employed individuals (full-time and part-time) in the study. Employed individuals who are not self-employed are more likely to have a retirement plan through their employer. In order to abstract from the hours of work decision, this study also performs the analyses on the subsample of full-time employed individuals.

The sample size of the current study is 4,136. Table 2.1 presents the mean comparison of demographic variables across the full and analysis samples to show representativeness. The mean comparison result shows statistical differences between the full and analysis samples for the variables female and white. There are 71% white individuals in the full sample, whereas the analysis sample has 61% white individuals. There are 51% female individuals in the full sample, whereas the analysis sample has 49% female individuals. There are no statistical differences between the full sample and the analysis sample for the age (25-64) and income (\$50k -\$75k) variables.

The percentage of individuals between ages 25 and 64 in the full and analysis samples is 69% and 71%, respectively. In the full and analysis sample, the individuals with annual income between \$50,000 and \$75,000 are 19% and 21%, respectively.

The current study examines how differences between men and women in the explanatory variables (financial literacy, risk tolerance, and other demographic and economic variables) and differences in the returns to each explanatory variable are associated with employer-sponsored retirement plan participation. The study's dependent variable is whether the respondents have any retirement accounts through their current or previous employer. The exact NFCS question that asks this is, "Do you or your spouse or your partner have any retirement plans through a current or previous employer, like a pension plan, a Thrift Savings Plan (TSP), or a 401(k)?" The value for the dependent variable is 1 if the respondents answer "yes," and 0 if the respondents answer "no."

The key explanatory variable is objective financial knowledge measured by responses to six questions assessing the respondent's understanding of inflation, compound interest, bond price, mortgage interest, risk, and return. Respondents received

1 for each correct answer and 0 for an incorrect answer. Thus, this variable is just the sum of correct answers, ranging from 0 to 6.

Other explanatory variables are age, level of education, white race, home ownership, income, risk tolerance, and work status. Five dummy variables represent age: 25-34, 35-44, 45-54, 55-64, and 65+. The reference category is the 18-24 age group. The respondents' education level is represented by four dummy variables for some college, associate degree, bachelor's degree, and postgraduate degree. The reference category is high school or less. White is a dummy variable that equals 1 if the respondents' race is white and 0 if the respondents' race is non-white. Homeownership is also a dummy variable that equals 1 if respondents own a house and 0 otherwise.

Income is represented by six dummy variables for \$50,000 to \$100,000, \$100,000 to \$150,000, \$150,000 to \$200,000, \$200,000 to \$300,000, and \$300,000 or more. The reference category is less than \$50,000. The responses to the risk tolerance variable range from 1 (not at all willing) to 10 (very willing). The current study recodes the responses to the financial risk tolerance question into three categories because of the limited number of observations of some of the original response categories. The first category is low risk tolerance which includes responses ranging from 1 to 3. The second category is medium risk tolerance, which includes responses ranging from 4 to 7. Finally, the third category is high risk tolerance, with responses ranging from 8 to 10.

Table 2.2 presents descriptive statistics for all variables for the full analysis sample and separately for males and females. In the full analysis sample, approximately 56% of individuals have an employer-sponsored retirement plan. The percentage of males in the overall sample is 51%. In the male sample, the percentage of individuals with

employer-sponsored retirement plans is 56%. The percentage of females in the overall sample is 49%. In the female sample, the percentage of individuals with employer-sponsored retirement plans is 57%. The average financial literacy score for the analysis sample is 2.75. This means that, on average, respondents answered 2.75 of the six financial literacy questions correctly. The average financial literacy score is 3.01 among males, but the average financial literacy score is 2.42 among females. Males have scored better than females in financial literacy measures. Overall, 32% of individuals have a bachelor's degree or higher. Of male individuals, 30% have a bachelor's degree or higher, but of female individuals, 35% have a bachelor's degree or higher. Of male individuals, 32% said they are high risk tolerant, but of female individuals, only 19% said they are high risk tolerant. For the annual income level, 56% of males and 62% of females said they have an annual income of less than \$50,000. Table 2.2 also provides the descriptive statistics for the other demographic variables.

Model

A Linear Probability model is estimated to examine the gender gap in participation in employer-sponsored retirement plans. The study estimated two separate models for male and female samples to examine the gap in participation in employer-sponsored retirement plans.

$$\text{Model 1 (Male): } ERS_i = \beta_{0m} + \beta_{1m} \text{finlit}_i + \gamma_m X_i + v_{mi}$$

$$\text{Model 2 (Female): } ERS_i = \beta_{0f} + \beta_{1f} \text{finlit}_i + \gamma_f X_i + v_{fi}$$

where ERS_i is the binary dependent variable that takes a value of 1 if a respondent participates in employer-sponsored retirement plans and 0 otherwise. β_0 is the intercept.

β_1 is the relationship between financial knowledge and employer-sponsored retirement plan participation. finlit_i is the financial literacy score earned by respondent i . The matrix X_i contains all other explanatory variables related to participation in employer-sponsored retirement plans. These explanatory variables include age, level of education, ethnicity, income, risk tolerance, and homeownership. γ_m and γ_f are the vector of the corresponding slope parameter for age, level of education, ethnicity, income, risk tolerance, and homeownership. v_i is the error term that is assumed to follow a normal distribution. The current study uses robust standard error to fix the heteroskedasticity in the linear probability model.

Oaxaca decomposition is used to compute how much of the gender gap in employer-sponsored retirement savings accounts is due to differences in the explanatory variables (financial literacy, risk tolerance, and other demographic and economic variables) and how much is due to *the return* to each explanatory variable.

The current study tests several hypotheses. The association between financial literacy and participating in an employer-sponsored retirement savings account is expected to be positive. According to the human capital theory, financially literate individuals have the ability to make better financial decisions than less financially literate individuals. The association between age and participating in an employer-sponsored retirement savings account is expected to be positive. Young adults usually have more liquidity constraints and a lower likelihood of saving for retirement than older adults.

The respondent's level of education is expected to be related positively to participating in an employer-sponsored retirement savings account. Highly educated individuals can make better financial decisions than less educated individuals. As the

individual's level of education increases, the likelihood of participating in an employer-sponsored retirement savings account may increase.

White is a proxy for preferences and constraints that cannot be given a sign a priori. A household's annual income is expected to be related positively to participating in an employer-sponsored retirement savings account. Higher income increases the financial resources available to the respondents to save for retirement. Ownership of financial assets is influenced by risk tolerance (Coleman, 2003; DeVaney et al., 2007; Xiao, 1996). Financial risk tolerance is expected to have a positive relationship with participating an employer-sponsored retirement savings account.

Results

The coefficients and robust standard errors for the linear probability models are shown in Table 2.3 for both male and female full employed samples. Column "A" of Table 2.3 shows results for the male sample. Column "B" shows results for the female sample.

Consistent with the hypothesis, Table 2.3 results show that the relationship between objective financial literacy score and participation in employer-sponsored retirement savings plans is positive in both male and female samples.

Consistent with the hypothesis, Table 2.3 results show that the relationship between age and employer-sponsored retirement plan participation is positive and statistically significant for both male and female samples, suggesting that age is associated positively with the probability of participating in an employer-sponsored retirement savings account. Consistent with the hypothesis, Table 2.3 shows a positive relationship between respondents' education level and participation in employer-

sponsored retirement plans for both male and female samples. Table 2.3 also shows a positive relationship between income and participation in employer-sponsored retirement plans for male and female samples. Risk tolerance and homeownership show a positive relationship with participation in employer-sponsored retirement plans in Table 2.3 for both male and female samples.

Oaxaca Decomposition

Consistent with Oaxaca and Ransom (1994), the current study uses the Oaxaca decomposition model to investigate questions surrounding the gender gap in employer-sponsored retirement savings accounts. The current study measures how differences in financial literacy and other explanatory variables (explained) and the return to financial literacy and other explanatory variables (unexplained) between males and females are associated with participating in an employer-sponsored retirement savings account. The Oaxaca decomposition model is used to disentangle these effects.

The gender gap in the retirement savings participation is $\bar{y}_F - \bar{y}_M$ where \bar{y}_F is the average retirement savings participation of females and \bar{y}_M is the average retirement savings participation of males. In the current study, employer-sponsored retirement savings participation depends on financial literacy and other demographic and economic variables such as ethnicity, age, education level, income level, risk tolerance, homeownership, and work status. The corresponding regression retirement savings participation equations for men and women are the following.

$$Y_{iM} = \beta_M X_{iM} + \mu_{iM} \quad (1)$$

$$Y_{iF} = \beta_F X_{iF} + \mu_{iF} \quad (2)$$

where Y_{iM} is the retirement savings participation of men i , β_M is the corresponding effect of X_{iM} independent variables on Y_{iM} , X is the matrix of all the explanatory variables and μ_{iM} is the error term for male. Y_{iF} is the retirement savings participation for female i , β_F is the corresponding effect of X_{iF} independent variables on Y_{iF} , μ_{iF} is the error term for females, and i is the unit of observation. $\hat{\beta}_M$ is the estimated effect of X on \bar{Y} . $\hat{\beta}_F$ is the corresponding effect for women. The average values of X_m and X_F are \bar{X}_M and \bar{X}_F .

According to the arithmetic relationship, we can write $\bar{Y} = \hat{\beta}\bar{X}$ and it holds for both men and women. Substituting into the expression for the gender gap in retirement savings participation, we have:

$$\bar{Y}_F - \bar{Y}_M = \hat{\beta}_F \bar{X}_F - \hat{\beta}_M \bar{X}_M \quad (3)$$

This suggests that average retirement savings participation for men and women could differ either because \bar{X} differs or because $\hat{\beta}$ differs - in the current study, either because the average level of financial literacy and other explanatory variables differ by gender or because the return to financial literacy and other explanatory variables differ. For the Oaxaca decomposition, adding and subtracting $\hat{\beta}_M \bar{X}_F$ to the right side of the equation (3) is essential. Since the sum of the two terms is zero, the equality in equation (3) still holds.

Rearranging and combining terms in the below equation yields the famous Oaxaca decomposition of differences in means.

$$\bar{Y}_F - \bar{Y}_M = \sum_{j=1}^k [\hat{\beta}_{jm} \times (\bar{X}_{jF} - \bar{X}_{jM})] + \sum_{j=1}^K [(\hat{\beta}_{jF} - \hat{\beta}_{jM}) \times \bar{X}_{jF}] \quad (4)$$

For each j ,

$$\% \text{ Explained} = \frac{[\hat{\beta}_{jm} \times (\bar{X}_{jF} - \bar{X}_{jM})]}{\bar{Y}_F - \bar{Y}_M} \times 100 \quad (5)$$

$$\% \text{ Unexplained} = \frac{[(\hat{\beta}_{jF} - \hat{\beta}_{jM}) \times \bar{X}_{jF}]}{\bar{Y}_F - \bar{Y}_M} \times 100 \quad (6)$$

In the equation, (j) represents each independent variable. The first term in the brackets on the right side of equation (4) is the difference of average financial literacy and other variables between females and males, multiplied by $\hat{\beta}_m$, the value of a unit of X for males. It represents the gender gap in employer-sponsored retirement plan participation that can be attributed to the differences in financial literacy and other explanatory variables. This portion of the gender gap in employer-sponsored retirement plan participation is the explained portion of the retirement plan participation gap (differences in mean). The second term in brackets on the right side of equation (4) is the difference in the return of financial literacy and other explanatory variables for females and males. This portion of the gender gap in employer-sponsored retirement plan participation is the unexplained portion of the retirement plan participation gap (difference in slope). To get the portion of the gender gap for each explanatory variable, I divide equation (4) by the total gap in employer-sponsored plan participation ($\bar{Y}_F - \bar{Y}_M$) to put the two terms in percentage. The explained portion for each explanatory variable is $\frac{[\hat{\beta}_{jm} \times (\bar{X}_{jF} - \bar{X}_{jM})]}{\bar{Y}_F - \bar{Y}_M} \times 100$ and the unexplained portion for each explanatory variable is $\frac{[(\hat{\beta}_{jF} - \hat{\beta}_{jM}) \times \bar{X}_{jF}]}{\bar{Y}_F - \bar{Y}_M} \times 100$. Adding explained and unexplained percentage for each explanatory variable add up to 100 percent.

Oaxaca Decomposition Results

The current study examines the Oaxaca decomposition of the gender gap in employer-sponsored, retirement-plan participation for single, employed individuals.

Table 2.4 shows the decomposition for single, employed individuals. Column “A” shows the explained portion for each explanatory variable and the total explained gap. Column “B” shows the unexplained portion for each explanatory variable and the total unexplained gap. Table 2.4 also shows the total gender gap (explained & unexplained) in employer-sponsored, retirement-plan participation for single, employed individuals.

Table 2.4 shows that females and males have a 0.0136 (1.36%) gap in participation in employer-sponsored retirement plans. It means that females’ participation in employer-sponsored retirement plans is 1.36% higher than males’. Of the original 0.0136 gaps, -0.0428 is the result of the difference in financial literacy and other explanatory variables between females and males (explained gap). And 0.0565 is the result of the differences in the *return to* financial literacy and other explanatory variables between females and males (unexplained gap). The negative explained gap means females have a lower average value of explanatory variables than males. The positive unexplained gap means females have a higher return to explanatory variables than males.

Table 2.4 also shows which variables are most responsible for the difference in employer-sponsored retirement plan participation. For the explained gap, these are objective financial knowledge (-142.84%), homeownership (-52.44%), and high risk tolerance (-83.02%). For the unexplained gap, variables that contributed significantly are age 25-34 (189.78%), age 35-44 (122.83%), and bachelor’s degree (130.63%). The portion of the gender gap in participation in employer-sponsored plans explained by differences in financial education is -142.85%, and the portion due to differences in return to financial education is -236.01%

Sensitivity Analysis

This study also conducts a sensitivity analysis with single, full-time workers to abstract from the employment hours decision. Table 2.5 shows sensitivity analysis results for the full-time employed subsample. Column “A” of Table 2.5 shows results for the male subsample. Column “B” shows results for the female subsample. The results of the sensitivity models are consistent with the main models. Table 2.5 shows a positive relationship between objective financial literacy scores and participation in employer-sponsored retirement savings plans for both male and female subsamples. The sensitivity analysis results for the control variables are consistent with the main models for both male and female subsamples.

Table 2.6 shows the Oaxaca decomposition for the full-time employed subsample. The results of the sensitivity analysis are consistent with the main models. Table 2.6 shows that females' participation in employer-sponsored retirement plans is 2.07% higher than males. The portion of the gender gap in participation in employer-sponsored plans explained by differences in financial education is -101.81%, and the portion due to differences in return to financial education is -121.46%.

Conclusion

Saving for retirement is one of American adults' most important financial decisions. In the current retirement market of the United States, access to employer-sponsored retirement plans is equal for all individuals as long as they meet the eligibility requirements. The current study is conducted on single, employed individuals to see if there is any gender gap in employer-sponsored plans such as 401(k) or pension plans among single individuals. This study's unique approach involves examining whether a gender gap exists in employer-sponsored plan participation and, if so, determining whether it can be attributed to explained or unexplained factors. The current study examines how differences between men and women in the explanatory variables (financial literacy, risk tolerance, and other demographic and economic variables) and differences in the returns to each explanatory variable are associated with employer-sponsored retirement plan participation. The study uses a nationally representative data set from the 2021 National Financial Capability Study and performs the Oaxaca decomposition. The current study finds that females' participation in employer-sponsored retirement plans is 1.36% higher than males'. The explained and unexplained gap in participation in employer-sponsored retirement plans is -0.0428 and 0.0565, respectively. The negative explained gap means females have a lower average value of explanatory variables than males. The positive unexplained gap means females have a higher return to explanatory variables than males.

Even though previous studies find that women generally participate less than men in employer-sponsored retirement plans, the current study finds that single, employed women have slightly higher participation than single, employed men. Single women may be more financially independent than married women and single men. They are solely

responsible for their financial well-being. This independence can motivate single women to prioritize retirement planning and take positive actions to secure their future. Single women may be more motivated to engage in long-term financial planning, such as retirement planning, because they do not have a spouse or partner to rely on for financial help. They understand the significance of making a nest egg to provide for themselves in the future. Another reason for participation of single women in employer-sponsored retirement plans is their ability to access and use retirement plans offered by their employers. In contrast, some married women may rely on their spouse's retirement plans. Moreover, women generally have longer lifetimes than men, which may motivate single women to participate in retirement plans to ensure they have enough funds to support themselves later.

One of the limitations of this study is that the NFCS does not contain information about the dollar amount of retirement savings in employer-sponsored plans.

TABLE 2.1. MEAN COMPARISON OF VARIABLES BETWEEN THE FULL SAMPLE AND THE ANALYSIS SAMPLE

| Category | Full Sample Mean (Std. Dev.) | Analysis Sample Mean (Std. Dev.) | t | Pr(T > t) |
|---------------------|---------------------------------|-------------------------------------|---------|---------------|
| Female | 0.5107 (0.4965) | 0.4915 (0.4998) | 2.3221 | 0.0101 |
| White | 0.7117 (0.4376) | 0.6140 (0.4869) | 13.1723 | 0.0000 |
| Age (25-64) | 0.6899 (0.0030) | 0.7063 (0.4554) | -5.9568 | 1.0000 |
| Income(\$50K-\$75K) | 0.1940 (0.3955) | 0.2091 (0.4067) | -2.2696 | 0.9884 |

TABLE 2.2. SUMMARY STATISTICS

| | Full Analysis Sample | | Male | | Female | |
|---|----------------------|-----------|--------|-----------|--------|-----------|
| | Mean | Std. Err. | Mean | Std. Err. | Mean | Std. Err. |
| Male | 0.5146 | 0.0081 | | | | |
| Female | 0.4854 | 0.0081 | | | | |
| Participation in Employer-sponsored retirement plan | 0.5618 | 0.0082 | 0.5559 | 0.0116 | 0.5695 | 0.0115 |
| Objective Financial Knowledge | 2.7525 | 0.0267 | 3.0125 | 0.0383 | 2.4160 | 0.0349 |
| White | 0.5765 | 0.0084 | 0.5764 | 0.0118 | 0.5767 | 0.0117 |
| Homeownership | 0.3695 | 0.0079 | 0.3924 | 0.0112 | 0.3399 | 0.0109 |
| Risk Tolerance Level | | | | | | |
| low | 0.2304 | 0.0069 | 0.1729 | 0.0089 | 0.3048 | 0.0106 |
| Medium | 0.5061 | 0.0083 | 0.5052 | 0.0117 | 0.5072 | 0.0116 |
| High | 0.2635 | 0.0076 | 0.3219 | 0.0111 | 0.1880 | 0.0092 |
| Age | | | | | | |
| 18-24 | 0.2641 | 0.0076 | 0.2491 | 0.0108 | 0.2835 | 0.0106 |
| 25-34 | 0.3559 | 0.0080 | 0.3617 | 0.0113 | 0.3484 | 0.0110 |
| 35-44 | 0.1708 | 0.0060 | 0.1686 | 0.0083 | 0.1738 | 0.0086 |
| 45-54 | 0.1233 | 0.0052 | 0.1345 | 0.0074 | 0.1088 | 0.0070 |
| 55-64 | 0.0704 | 0.0040 | 0.0722 | 0.0055 | 0.0681 | 0.0059 |
| 65 + | 0.0155 | 0.0019 | 0.0139 | 0.0025 | 0.0175 | 0.0030 |
| Annual Income Level | | | | | | |

Table 2.2 Continued

| | Full Analysis | | Male | | Female | |
|-------------------------------|---------------|--------|--------|--------|--------|--------|
| | Sample | | | | | |
| Less than \$50,000 | 0.5870 | 0.0081 | 0.5624 | 0.0115 | 0.6188 | 0.0111 |
| \$50,000 to \$75,000 | 0.2033 | 0.0065 | 0.2159 | 0.0092 | 0.1869 | 0.0090 |
| \$75,000 to \$100,000 | 0.1090 | 0.0050 | 0.1161 | 0.0072 | 0.0998 | 0.0067 |
| \$100,000 to \$150,000 | 0.0676 | 0.0040 | 0.0679 | 0.0056 | 0.0673 | 0.0057 |
| \$150,000 to \$200,000 | 0.0197 | 0.0021 | 0.0221 | 0.0030 | 0.0165 | 0.0029 |
| \$200,000 to \$300,000 | 0.0093 | 0.0017 | 0.0108 | 0.0026 | 0.0072 | 0.0018 |
| More than \$300,000 | 0.0042 | 0.0010 | 0.0048 | 0.0014 | 0.0034 | 0.0012 |
| Education Level | | | | | | |
| High School Education or Less | 0.3105 | 0.0080 | 0.3420 | 0.0115 | 0.2696 | 0.0106 |
| Some College | 0.2607 | 0.0073 | 0.2545 | 0.0102 | 0.2688 | 0.0105 |
| Associate Degree | 0.1111 | 0.0053 | 0.1073 | 0.0073 | 0.1160 | 0.0076 |
| Bachelor's Degree | 0.2400 | 0.0066 | 0.2420 | 0.0093 | 0.2373 | 0.0093 |
| Postgraduate Degree | 0.0777 | 0.0039 | 0.0541 | 0.0047 | 0.1083 | 0.0067 |
| Number of Observations | 4136 | | 2128 | | 2008 | |

*Notes: This analysis uses data from the FINRA Foundation 2021 NFCS state by state dataset. Mean values are shown alongside the standard errors. Survey weights are applied. *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.*

TABLE 2.3. EFFECTS OF FINANCIAL LITERACY AND OTHER EXPLANATORY VARIABLES ON EMPLOYER-SPONSORED RETIREMENT PLAN PARTICIPATION: LINEAR PROBABILITY MODEL (MAIN MODEL- FULL EMPLOYED SAMPLE)

| | A. Male | | | B. Female | | |
|------------------------------------|-----------|------------------|---------|-----------|------------------|---------|
| | Coef. | Robust Std. Err. | P Value | Coef. | Robust Std. Err. | P Value |
| Objective Financial Knowledge | 0.0366*** | 0.0065 | 0.0000 | 0.0232*** | 0.0070 | 0.0010 |
| White | -0.0394* | 0.0207 | 0.0570 | -0.0183 | 0.0212 | 0.3880 |
| Homeownership | 0.1352*** | 0.0216 | 0.0000 | 0.1279*** | 0.0231 | 0.0000 |
| Versus (Risk Tolerance – Low) | | | | | | |
| Risk Tolerance – Medium | 0.0653** | 0.0284 | 0.0210 | 0.0579** | 0.0237 | 0.0150 |
| Risk Tolerance – High | 0.1080*** | 0.0310 | 0.0000 | 0.0606* | 0.0316 | 0.0550 |
| Versus (Age 18-24) | | | | | | |
| 25-34 | 0.0691** | 0.0278 | 0.0130 | 0.1248*** | 0.0275 | 0.0000 |
| 35-44 | 0.0749** | 0.0323 | 0.0210 | 0.1354*** | 0.0324 | 0.0000 |
| 45-54 | 0.0978*** | 0.0340 | 0.0040 | 0.1346*** | 0.0370 | 0.0000 |
| 55-64 | 0.0673 | 0.0413 | 0.1030 | 0.1842*** | 0.0416 | 0.0000 |
| 65 + | 0.2151*** | 0.0723 | 0.0030 | -0.0143 | 0.0873 | 0.8700 |
| Versus (Income Less than \$50,000) | | | | | | |
| \$50,000 to \$75,000 | 0.2000*** | 0.0266 | 0.0000 | 0.1691*** | 0.0276 | 0.0000 |
| \$75,000 to \$100,000 | 0.1995*** | 0.0318 | 0.0000 | 0.1956*** | 0.0326 | 0.0000 |
| \$100,000 to \$150,000 | 0.2246*** | 0.0374 | 0.0000 | 0.1691*** | 0.0371 | 0.0000 |

Table 2.3 Continued

| | A. Male | | | B. Female | | |
|--|-----------|------------------|---------|-----------|------------------|---------|
| | Coef. | Robust Std. Err. | P Value | Coef. | Robust Std. Err. | P Value |
| \$150,000 to \$200,000 | 0.3236*** | 0.0478 | 0.0000 | 0.2524*** | 0.0538 | 0.0000 |
| \$200,000 to \$300,000 | 0.1673* | 0.0913 | 0.0670 | 0.2794*** | 0.0652 | 0.0000 |
| More than \$300,000 | 0.2987*** | 0.0683 | 0.0000 | 0.0424 | 0.1383 | 0.7590 |
| Versus (Education Level High School or Less) | | | | | | |
| Some College | 0.0535* | 0.0283 | 0.0590 | 0.0626** | 0.0304 | 0.0400 |
| Associate Degree | 0.0969** | 0.0387 | 0.0120 | 0.0730* | 0.0398 | 0.0670 |
| Bachelor's Degree | 0.1199*** | 0.0291 | 0.0000 | 0.1853*** | 0.0314 | 0.0000 |
| Postgraduate Degree | 0.0995** | 0.0443 | 0.0250 | 0.2182*** | 0.0362 | 0.0000 |
| Constant | 0.1314*** | 0.0353 | 0.0000 | 0.1873*** | 0.0343 | 0.0000 |
| Number of Observations | 2128 | | | 2008 | | |

*Notes: This analysis uses data from the FINRA Foundation 2021 NFCS state by state dataset. Coefficient values are shown alongside the robust standard errors. Survey weights are applied. *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.*

TABLE 2.4. RESULTS FROM OAXACA DECOMPOSITION (MAIN MODEL- FULL EMPLOYED SAMPLE)

| | A | | B | |
|-------------------------------|------------------|--------------------|--------------------|----------------------|
| | Explained | % Explained | Unexplained | % Unexplained |
| Objective Financial Knowledge | -0.0195 | -142.8483 | -0.0321 | -236.0146 |
| White | 0.0000 | -0.0447 | 0.0005 | 3.4146 |
| Homeownership | -0.0071 | -52.4402 | -0.0021 | -15.3123 |
| Risk Tolerance – Medium | 0.0001 | 0.7108 | 0.0040 | 29.1971 |
| Risk Tolerance – High | -0.0113 | -83.0208 | -0.0114 | -83.3842 |
| 25-34 | -0.0011 | -8.1430 | 0.0258 | 189.7832 |
| 35-44 | 0.0004 | 3.1459 | 0.0167 | 122.8348 |
| 45-54 | -0.0025 | -18.3422 | 0.0100 | 73.4972 |
| 55-64 | -0.0004 | -2.7758 | 0.0096 | 70.6010 |
| 65 + | 0.0003 | 2.3411 | -0.0033 | -24.3380 |
| \$50,000 to \$75,000 | -0.0053 | -38.6795 | -0.0050 | -36.8995 |
| \$75,000 to \$100,000 | -0.0032 | -23.3687 | -0.0007 | -5.1477 |
| \$100,000 to \$150,000 | -0.0001 | -0.8254 | -0.0047 | -34.7075 |
| \$150,000 to \$200,000 | -0.0016 | -11.6480 | -0.0016 | -11.9160 |
| \$200,000 to \$300,000 | -0.0005 | -3.7194 | 0.0017 | 12.4403 |
| More than \$300,000 | -0.0003 | -2.3359 | -0.0010 | -7.1113 |
| Some College | 0.0008 | 5.6595 | 0.0031 | 22.7930 |
| Associate Degree | 0.0008 | 5.5398 | 0.0003 | 2.1766 |
| Bachelor’s Degree | -0.0007 | -4.8371 | 0.0178 | 130.6298 |
| Postgraduate Degree | 0.0083 | 61.0642 | 0.0084 | 61.9314 |
| Constant | | | 0.0204 | 150.0984 |

Table 2.4 Continued

| | Explained | % Explained | Unexplained | % Unexplained |
|--|--|--------------------|--------------------|----------------------|
| Total Explained & Unexplained | -0.0428 | -314.5676 | 0.0565 | 414.5662 |
| Total Gap (Explained + Unexplained) | -0.0428 + 0.0565 = 0.0136 | | | |
| % Explained | $(-0.0428/0.0136)*100 = -314.5676$ | | | |
| % Unexplained | $(0.0565/0.0136)*100 = 414.5662$ | | | |
| | -314.5676% + 414.5662 = 100% | | | |

TABLE 2.5. EFFECTS OF FINANCIAL LITERACY AND OTHER EXPLANATORY VARIABLES ON EMPLOYER-SPONSORED RETIREMENT PLAN PARTICIPATION: LINEAR PROBABILITY MODEL (SENSITIVITY MODEL- FULL-TIME EMPLOYED SUBSAMPLE).

| | A. Male | | | B. Female | | |
|-------------------------------|-----------|------------------|---------|---------------|------------------|---------|
| | Coef. | Robust Std. Err. | P Value | Coef. | Robust Std. Err. | P Value |
| Objective Financial Knowledge | 0.0360*** | 0.0073 | 0.0000 | 0.0248** * | 0.0078 | 0.0010 |
| White | -0.0486** | 0.0230 | 0.0350 | -0.0275 | 0.0236 | 0.2440 |
| Homeownership | 0.1059*** | 0.0237 | 0.0000 | 0.1116** * | 0.0247 | 0.0000 |
| Versus (Risk Tolerance – Low) | | | | | | |
| Risk Tolerance – Medium | 0.0417 | 0.0329 | 0.2060 | 0.0387 | 0.0269 | 0.1500 |
| Risk Tolerance – High | 0.0774** | 0.0352 | 0.0280 | 0.0248 | 0.0356 | 0.4860 |
| Versus (Age 18-24) | | | | | | |
| 25-34 | 0.0423 | 0.0329 | 0.1990 | 0.1112** * | 0.0328 | 0.0010 |
| 35-44 | 0.0530 | 0.0371 | 0.1530 | 0.1142** * | 0.0373 | 0.0020 |
| 45-54 | 0.0695* | 0.0390 | 0.0750 | 0.1037** | 0.0420 | 0.0140 |
| 55-64 | 0.0431 | 0.0473 | 0.3620 | 0.1851** * | 0.0458 | 0.0000 |
| 65 + | 0.2115*** | 0.0774 | 0.0060 | -0.2853** | 0.1384 | 0.0390 |

Table 2.5 Continued

| | Coef. | Robust Std. Err. | P Value | Coef. | Robust Std. Err. | P Value |
|--|--------------|-------------------------|----------------|---------------|-------------------------|----------------|
| Versus (Income Less than \$50,000) | | | | | | |
| \$50,000 to \$75,000 | 0.1696*** | 0.0291 | 0.0000 | 0.1419** * | 0.0299 | 0.0000 |
| \$75,000 to \$100,000 | 0.1868*** | 0.0344 | 0.0000 | 0.1610** * | 0.0353 | 0.0000 |
| \$100,000 to \$150,000 | 0.2103*** | 0.0390 | 0.0000 | 0.1386** * | 0.0385 | 0.0000 |
| \$150,000 to \$200,000 | 0.2752*** | 0.0491 | 0.0000 | 0.2888** * | 0.0435 | 0.0000 |
| \$200,000 to \$300,000 | 0.1330 | 0.0949 | 0.1610 | 0.2273** * | 0.0689 | 0.0010 |
| More than \$300,000 | 0.3248*** | 0.0409 | 0.0000 | -0.0014 | 0.1403 | 0.9920 |
| Versus (Education Level High School or Less) | | | | | | |
| Some College | 0.0512 | 0.0331 | 0.1220 | 0.1024** * | 0.0371 | 0.0060 |
| Associate Degree | 0.0657 | 0.0431 | 0.1280 | 0.0838* | 0.0458 | 0.0680 |
| Bachelor's Degree | 0.1156*** | 0.0326 | 0.0000 | 0.1949** * | 0.0356 | 0.0000 |
| Postgraduate Degree | 0.0956** | 0.0465 | 0.0400 | 0.2238** * | 0.0397 | 0.0000 |
| Constant | 0.2553*** | 0.0420 | 0.0000 | 0.2716** * | 0.0408 | 0.0000 |
| Number of Observations | 1694 | | | 1516 | | |

*Notes: This analysis uses data from the FINRA Foundation 2021 NFCS state-by-state dataset. Coefficient values are shown alongside the robust standard errors. Survey weights are applied. *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.*

TABLE 2.6. RESULTS FROM OAXACA DECOMPOSITION (SENSITIVITY MODEL- FULL-TIME EMPLOYED SUBSAMPLE)

| | A | | B | |
|-------------------------------|-----------|-------------|-------------|---------------|
| | Explained | % Explained | Unexplained | % Unexplained |
| Objective Financial Knowledge | -0.0211 | -101.8102 | -0.0252 | -121.4590 |
| White | 0.0000 | 0.2254 | 0.0001 | 0.6493 |
| Homeownership | -0.0050 | -24.2819 | -0.0001 | -0.5460 |
| Risk Tolerance – Medium | 0.0009 | 4.2538 | 0.0073 | 35.0394 |
| Risk Tolerance – High | -0.0080 | -38.6024 | -0.0122 | -58.8469 |
| 25-34 | -0.0001 | -0.5706 | 0.0288 | 139.0441 |
| 35-44 | 0.0009 | 4.1254 | 0.0183 | 88.2032 |
| 45-54 | -0.0015 | -7.1897 | 0.0089 | 43.0729 |
| 55-64 | -0.0004 | -1.8590 | 0.0109 | 52.6468 |
| 65 + | -0.0004 | -1.9854 | -0.0043 | -20.8126 |
| \$50,000 to \$75,000 | -0.0049 | -23.4613 | -0.0021 | -9.8992 |
| \$75,000 to \$100,000 | -0.0022 | -10.7782 | -0.0029 | -14.1192 |
| \$100,000 to \$150,000 | 0.0008 | 3.7146 | -0.0060 | -28.7940 |
| \$150,000 to \$200,000 | -0.0022 | -10.7179 | 0.0004 | 1.8648 |
| \$200,000 to \$300,000 | -0.0002 | -0.9428 | 0.0023 | 11.1890 |
| More than \$300,000 | -0.0002 | -1.0939 | -0.0015 | -7.3186 |
| Some College | -0.0005 | -2.4918 | 0.0130 | 62.9283 |
| Associate Degree | 0.0004 | 2.1143 | 0.0067 | 32.3840 |
| Bachelor's Degree | 0.0007 | 3.5466 | 0.0249 | 120.1817 |

Table 2.6 Continued

| | Explained | % Explained | Unexplained | % Unexplained |
|--|--|--------------------|--------------------|----------------------|
| Postgraduate Degree | 0.0091 | 43.7280 | 0.0118 | 56.8151 |
| Constant | | | -0.0245 | -118.1456 |
| Total Explained & Unexplained | -0.0340 | -164.0772 | 0.0547 | 264.0777 |
| Total Gap | -0.0340 + 0.0547 = 0.0207 | | | |
| % Explained | (-0.0340/ 0.0207)*100 = -164.0772 | | | |
| % Unexplained | (0.0547/0.0207)*100 = 264.0777 | | | |
| | -164.0772 +264.0777 = 100% | | | |

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Chapter III

Relationship Between Financial Education and the Retirement Savings Decision

Introduction

Based on the life cycle hypothesis (Ando & Modigliani, 1963), individuals aim to smooth the marginal utility of consumption over their lifetimes. They borrow during their early years, accumulate savings throughout their working years, and utilize those savings during retirement. Saving for retirement is one of the most critical financial decisions individuals make. Primarily, people save for retirement to maintain the same lifestyle in their retirement as they did during their working lives.

Many individuals can save for retirement at their workplace through 401(k) plans. Even if their employer doesn't offer a retirement plan, individuals can still save for retirement in an Individual Retirement Account (IRA). One may take advantage of the benefits attached to retirement savings accounts such as 401(k)s, 403(b)s, IRAs, Keoghs, and SEPs. Even though saving for retirement is vital in many ways, a significant number of U.S. households lack any form of retirement savings account. According to the 2018 retirement confidence survey (RCS), only 64% of workers report that they or their spouses have a retirement savings account. So, much of the U.S. population faces financial difficulty in late life as they fail to set aside personal savings during their working years.

The retirement-savings decision is a complex financial decision. Even though retirement savings will help individuals have financial solvency during retirement, many fail to save for retirement because of its complexity. A specific set of knowledge and skills are required to plan for a stable and long-lasting stream of retirement income

(Browning, 2018; Hopkins et al., 2016). To determine the appropriate amount to save for retirement, an individual must estimate longevity, investment returns, medical costs, Social Security benefits, planned bequests, and pension benefits (Browning, 2018). Financial knowledge can play an important role in retirement-savings decisions. According to the human capital theory, financially knowledgeable people can make better financial decisions than less financially knowledgeable individuals. An increased level of financial knowledge will help individuals to estimate longevity, investment returns, medical costs, Social Security benefits, planned bequests, and pension benefits (Willis, 2008). Once individuals know about the amount of retirement savings needed, it becomes easier to decide to save for retirement.

The prior literature finds that a lack of financial knowledge is one of the most important reasons individuals fail to save for retirement (Lusardi & Mitchel, 2011). Several studies find that because of a lack of financial literacy, millennials particularly struggle with credit cards and student loans burden (de Bassa Scheresberg & Lusardi, 2014)

To improve financial literacy, educational institutions, government agencies, nonprofit organizations, and private organizations have developed financial education programs and materials (Fox et al., 2005). Individuals can learn the basics of savings and investments from financial education courses offered in educational institutions, workplaces, and military institutions (Xiao & O'Neill, 2016). The success of these courses may vary depending on the timing of the education is received. A nationally recognized program like Red to Black has achieved success by providing financial coaching by students pursuing Personal Financial Planning degrees (Durband et al.,

2019). Acquiring financial education provides individuals with knowledge that can have a positive effect on their long-term financial decision-making (Wagner & Walstad, 2019).

The current study examines the contributing factors to employer-sponsored, retirement-plan participation. Specifically, it examines the importance of financial education on the decision to participate in such plans, utilizing four different methods of financial education (1) financial education program participation, (2) financial education source, (3) financial education hours, (4) perceived quality of financial education. It provides a complete overview of how financial education is related to one's employer-sponsored, retirement-plan-participation decision.

The result shows that individuals who have participated in financial education are more likely to participate in an employer-sponsored retirement plan than those who do not. The findings regarding the sources of financial education show that individuals who received financial education from college only, the employer only, high school and college only, high school and employer only, or from all three sources (high school, college, and employer) are more likely to participate in an employer-sponsored retirement plan in comparison to individuals who did not receive any financial education. Higher perceived quality of financial education is associated positively with participation in employer-provided plans. This study conducts a sensitivity analysis using "employer-sponsored plans where respondents get to choose how money is invested (defined-contribution plan)" as the dependent variable. The results of the sensitivity models are consistent with the main models.

Literature Review

According to household economic theory, households make savings and consumption decisions to maximize their satisfaction. Retirement is one of the most important reasons why people save. Previous research suggests that most Americans are poorly prepared to maintain financial independence during retirement (Warshawsky & Ameriks, 2000). One of the main reasons many individuals face financial difficulty in their later life is the lack of personal savings during their working years (Lusardi et al., 2003). There could be many reasons why people are not prepared for retirement. The prior literature has found that a lack of financial literacy is one of the most significant reasons individuals fail to save for retirement (Lusardi & Mitchel, 2011). Individuals with a lower level of financial literacy participate less in the stock market (van Rooij et al., 2011). These less financially literate people choose to invest in mutual funds even though there are high fees associated with the mutual-fund investment (Hastings & Tejada-Ashton, 2008). Prior research shows that individuals with lower levels of financial literacy choose pension managers with higher costs (Hastings & Mitchell, 2011) and gather less wealth for retirement (Behrman et al., 2010). Existing evidence shows that less financially literate people are more likely to hold costly mortgages and are also more likely to have expensive loans (Lusardi & Tufano, 2009a; Moore, 2003). According to Campbell (2006), people with low financial literacy, low income, and low education are less inclined to refinance their mortgages even when interest rates decrease.

Most previous studies on retirement savings examine the relationships between demographic variables and retirement savings. Prior studies on retirement savings find that retirement savings practices are related positively to age (Grable & Lytton), level of education (Yuh & Olson, 1997), and household income (Bassett et al., 1998). Gender and

marital status are also positively related to retirement savings when women tend to save less than men on average (Glass & Kilpatrick, 1998a). Yuh and Olson (1997) find that married individuals exhibit a higher likelihood of saving compared to single individuals. They also find that the availability of pension funds and easy access to an employer-sponsored 401(k) plan is positively associated with retirement savings (Blau, 1994; Ekerdt et al., 1996).

Prior literature also looks at the association between financial literacy and financial behavior. Hilgerth et al. (2003) find a positive association between financial knowledge and behavior. Because of a lack of financial knowledge, individuals do not understand social security and pensions. Analyzing the sample from the Health and Retirement Study (HRS), Gustman and Steinmeier (2004) find that nearly half of the workers cannot figure out what type of pension plan they have, and a more significant portion is not knowledgeable about future social security benefits.

Most of the prior studies highlighted financial education's importance in increasing retirement savings and improving overall financial decision-making. Many organizations offer retirement seminars to increase participation in voluntary retirement savings programs such as defined-contribution plans. The main objective of these seminars is to increase financial literacy among employees so that they participate in a voluntary retirement savings plan. It is not easy to evaluate the impact of these voluntary seminars on retirement savings. Lusardi and Mitchel (2011) highlighted that these participants might already have retirement savings or may be motivated to save for retirement, yet they participate to know more. The impact of financial education would

be most substantial among the individuals who need it the most, for instance, less educated and less wealthy people (Lusardi 2002, 2004).

The current study comprehensively examines financial education and employer-sponsored, retirement-plan-participation decision. In a similar study, Kyoung, T. K., & Richard, S. (2021) examined the role of financial education in the basic estate planning of U.S. households. They find a positive correlation between financial education and basic estate planning.

Financial education is provided in various places in the U.S., including High schools, colleges, workplaces, and military institutions. Individuals can learn about the basics of savings and investment from any of these institutions. The duration of this financial education could be in different lengths. Sometimes the course lasts only 2-3 hours, or it could be more than 10 hours. The primary focus of this study is to find the relationship between financial education (participation, source, duration, and quality) and participation in employer-sponsored retirement plans.

Data

This study uses data from the 2018 National Financial Capability Study (NFCS). The NFCS is supported by the FINRA Investor Education Foundation, and the survey was directed online from June to October 2018. The survey has a nationally representative sample of 27,091 American adults, with approximately 500 respondents per state, including the District of Columbia.

In 2009, the FINRA Investor Education Foundation started the first comprehensive study to assess the financial capability of adults across the United States. The National Financial Capability Study (NFCS) was planned with two main objectives:

to establish key indicators of financial capability and to analyze the variances in these indicators based on demographic, behavioral, attitudinal, and financial literacy elements. To ensure correct representation, the survey's national data are weighted to represent the demographics of the total U.S. population regarding age, gender, ethnicity, education, and census division.

The current study excludes observations from the sample with the responses "don't know" and "prefer not to say" to the questions about financial education, risk tolerance, number of financially dependent children, level of education, household's annual income, work status, and participation in employer-sponsored retirement plans.

The study's dependent variable is whether the respondents have any employer-sponsored retirement plans. The exact NFCS question that asks this is, "do you or your spouse/partner have any retirement plans through a current or previous employer, like a pension plan or a 401(k)?" The value for the dependent variable is 1 if the respondents answer "yes," and 0 if the respondents answer "no."

The key explanatory variable (financial education) is measured in three ways. First, the key explanatory variable in Model 1 is a dummy variable of whether the respondents participated in financial education offered through any school, college, or employer. Second, in model 2, the key explanatory variable is the source of financial education, which assesses when the individuals took financial education classes (during high school, college, or employment). Eight separate categories are formed to classify sources of financial education, and these are (1) receiving no financial education; (2) financial education from only high school; (3) financial education from only college; (4) financial education from only employer; (5) financial education from high school and

college; (6) financial education from high school and employer; (7) financial education from college and employer; and (8) financial education from high school, college, and employer. Receiving no financial education is the reference category. An indicator variable is created for each category. Third, the 2018 NFCS also asks questions about the duration and quality of financial education. The key explanatory variables in Model 3 are the duration and quality of financial education. The exact NFCS question asks, "In total, how many hours of financial education did you receive?". Financial education hours are represented by two dummy variables comprising 3-10 hours and more than 10 hours of financial education. The reference category is 1-2 hours. Furthermore, the quality of financial education is assessed using the following question, "Overall, how would you rate the quality of the financial education you received?". Respondents were asked to rate the quality of their financial education, ranging from 1 (very low) to 7 (very high). The current study categorizes the responses to the question on the quality of financial education into two groups based on the median value of 5. The first category is low financial education quality, including responses ranging from 1 to 4 (below median). The second category is high financial education quality which includes responses ranging from 5 to 7 (median and above).

Other explanatory variables are age, female, level of education, white race, married, homeownership, number of dependent children, income, risk tolerance, and work status. Four dummy variables represent age: 25-34, 35-44, 45-54, and 55-64. The reference category is the 18-24 age group. Female is a dummy variable that equals 1 if the gender of the respondents is female and 0 if the gender of the respondent is male.

The respondents' level of education is represented by six dummy variables comprising high school graduate (regular), high school graduate (GED), some college, associate degree, bachelor's degree, and postgraduate degree. The reference category for the level of education is less than high school. White is a dummy variable that takes a value of 1 if the respondent's race is white and 0 if the respondent's race is non-white. Married is a dummy variable that takes a value of 1 if the respondent is married and 0 if the respondent is not married. Homeownership is a dummy variable that takes a value of 1 if the respondent owns a home and 0 otherwise.

The number of financially dependent children is represented by four dummy variables for two children, three children, four children, and no financially dependent children. The reference category is one child.

Income is represented by three dummy variables for \$50,000 to \$100,000, \$100,000 to \$150,000, and \$150,000 or more. The reference category is less than \$50,000. The responses to the risk-tolerance question range from 1 (not at all willing) to 10 (very willing). Due to the limited number of observations in certain response categories, the current study recodes the responses to the financial-risk-tolerance question into three categories. The first category is low-risk tolerance which includes responses ranging from 1 to 3. The second category is medium-risk tolerance, which includes 4 to 7. Finally, individuals with responses ranging from 8 to 10 are classified as high-risk tolerant. Medium-risk tolerance and high-risk tolerance are used as dummies for the risk-tolerance variable, with the reference category being low-risk tolerance.

Respondent's work status is measured using six dummies: self-employed, full-time employed, part-time employed, full-time student, disabled or unable to work, and unemployed or temporarily laid off. The reference category is a homemaker.

Table 3.1 displays summary statistics for the variables. Approximately 60 percent of the sampled individuals have retirement accounts in employer-sponsored plans. White individuals make up 72% of the overall sample. The percentage of females in the overall sample is 56%. 53% percent of respondents in the overall sample are married. In the overall sample, the percentage of individuals who are aged between 18 and 64 is 80%. Among all individuals, there are 28% with high school or less education, 29% with some college education, 12% with an associate degree, 19% with a college degree, and 11% with a postgraduate degree.

Table 3.1 further shows that, among all individuals, there are 47% with an annual income below \$50,000, 34% with an annual income between \$50,000 and \$100,000, 13% with an annual income between \$100,000 and \$150,000, and 6% with an annual income more than \$150,000.

Among all individuals, 40% have full-time employment, about 9% work part-time, about 7% are self-employed, about 7% are homemakers, and about 5% are permanently sick or disabled. In the overall sample, the percentage of individuals with one, two, three, and four or more financially dependent children are 15%, 12%, 5%, and 3%, respectively. Among all individuals, 43% exhibit a low risk tolerance, 38% have a medium risk tolerance, and 19% possess a high-risk tolerance.

Table 3.2 shows descriptive statistics for the key explanatory variable (financial education).

It shows that About 21% received financial education. In the analysis sample, about 10% received financial education from a single source. Approximately 3.5% of individuals received financial education exclusively during high school, about 4.7% received financial education exclusively from college, and about 1.7% received financial education exclusively from employers. About 5.70% of individuals in the analysis sample received financial education from two sources. And about 3% of individuals received financial education from all three sources. Among the respondents who reported receiving financial education, approximately 11% reported receiving 1-2 hours, 24% received 3-10 hours, and 55% received more than 10 hours of financial education. About 76% of respondents rated the perceived quality of financial education as 5 or higher, coded as high quality. And about 23% rated their perceived quality of financial education as 4 or lower, coded as low quality.

Model

The study uses three probit models to examine the relationship between financial education and employer-sponsored retirement plan participation. Model 1 examines the relationship between participation in financial education and employer-sponsored retirement plan participation. Model 2 examines the relationship between sources of financial education, such as school, college, and employer, and employer-sponsored retirement plan participation. Furthermore, the study conducted a subsample analysis targeting individuals who had received financial education. This analysis examined the relationship between the total number of hours and perceived quality of financial education and its relationship with participating in employer-sponsored retirement plans, as presented in Model 3. The study uses the same dependent variable for all three models

and the same control variables as well. The probit model is suitable because the dependent variable is dichotomous. The following estimated probit models are used.

Model 1

$$\text{Retirement Saving}_i^* = \beta_0 + \beta_1 \text{fineduparticipation}_i + \gamma X_i + v_i$$

$$\text{Retirement Savings}_i = 1 \text{ if } \text{Retirement Saving}_i^* > 0$$

$$\text{Retirement Savings}_i = 0 \text{ if } \text{Retirement Saving}_i^* \leq 0$$

Model 2

$$\text{Retirement Saving}_i^* = \beta_0 + \beta_1 \text{FEsources}_i + \gamma X_i + v_i$$

$$\text{Retirement Savings}_i = 1 \text{ if } \text{Retirement Saving}_i^* > 0$$

$$\text{Retirement Savings}_i = 0 \text{ if } \text{Retirement Saving}_i^* \leq 0$$

Model 3

$$\text{Retirement Saving}_i^* = \beta_0 + \beta_1 \text{fineduhours}_i + \beta_2 \text{qualityfinedu}_i + \gamma X_i + v_i$$

$$\text{Retirement Savings}_i = 1 \text{ if } \text{Retirement Saving}_i^* > 0$$

$$\text{Retirement Savings}_i = 0 \text{ if } \text{Retirement Saving}_i^* \leq 0$$

where $\text{Retirement Saving}_i^*$ in all three models is the unobserved variable indicating the dollar value of respondent i 's retirement savings. $\text{Retirement Savings}_i$ is the observed variable that takes a value of 1 if a respondent has employer-sponsored retirement plan participation and 0 otherwise. β_0 is the intercept.

In model 1, β_1 is the association between participating in financial education and employer-sponsored retirement plan participation. $finedu_{participation}_i$ is the respondent_i's participation in the financial education program.

In Model 2, β_1 is the association between the sources of financial education and employer-sponsored retirement plan participation. $FEsources_i$ is the financial education respondent_i received from different sources.

In Model 3, β_1 is the association between total hours of financial education and employer-provided retirement plan participation. β_2 is the association between the quality of financial education and employer-provided retirement plan participation. $fineduhours_i$ is the total hours of financial education that respondent_i received from different sources. $qualityfinedu_i$ is the quality of financial education that respondent_i rated themselves.

In all three models, the matrix X_i contains all the other explanatory variables related to participation in the employer-sponsored plans. These explanatory variables include age, ethnicity, marital status, homeownership, education level, income, financially dependent children's presence, work status, and risk tolerance. γ is a vector of the corresponding slope parameters for age, ethnicity, marital status, homeownership, level of education, income, the presence of financially dependent children, work status, and risk tolerance. v_i is the error term that is assumed to follow a standard normal distribution.

The current study tests several hypotheses. The association between participating in financial education and employer-sponsored retirement plan participation is expected to be positive. When individuals participate in financial education programs, it is

assumed that financial education will increase their financial knowledge and will help them in retirement savings decisions. The relationship between receiving financial education from most recent sources, such as employers, and multiple sources, such as schools, colleges, and employers, is expected to relate positively to participation in employer-sponsored retirement plans. The recent timing and the availability of multiple sources of financial education can play a role in persuading these decisions. Individuals who have received financial education from different sources and have been exposed to recent information are more likely to make informed decisions regarding their retirement savings in employer-sponsored plans. Among those who received financial education, the total number of hours of financial education and the overall quality of financial education are expected to relate positively with retirement savings decisions. It is expected that increased hours of financial education should increase an individual's overall financial knowledge. According to human capital theory, financially knowledgeable individuals can make better financial decisions than less financially knowledgeable individuals.

The respondent's age is expected to relate positively to participation in employer-sponsored retirement plans. Young adults usually have more liquidity constraints than older adults (Korankye and Kalenkoski 2021). Thus, age is expected to relate to participation in employer-sponsored retirement plans positively.

White is a proxy for preferences and constraints that cannot be given a sign a priori. Being married is expected to be related positively to having retirement accounts in employer-sponsored plans. According to the economic theory of marriage (Becker's, 1973), individuals marry because they think they will be better off by getting married than being single. Marriage is a long-term commitment that may motivate couples to

envision their old age and retirement life more easily. Married individuals have some benefits in building shared retirement wealth that may motivate them to discuss retirement savings (Smock, Manning, & Porter, 2005; Yilmazer & Lyons, 2010). Such discussion can turn into actual retirement savings decision. Thus, being married is expected to increase the probability that a household will save for retirement.

A respondent's level of education is expected to be related positively to having retirement accounts in employer-sponsored plans. Highly educated individuals can make better financial decisions than less educated individuals. As the individual's level of education increases, the likelihood of saving for retirement also increases.

A household's annual income is expected to be related positively to the retirement savings decision. This is because higher incomes increase the financial resources available to respondents to save for retirement. Full-time employed individuals have a higher possibility of participating in an employer-provided plan than a homemaker, unemployed person, or a self-employed person because they are the ones providing access to these plans. Prior studies find that ownership of financial assets is influenced by risk tolerance (Coleman, 2003; DeVaney et al., 2007; Xiao, 1996). Thus, it is expected that as the individual's risk tolerance increases, the likelihood of saving for retirement may increase. This is because retirement savings accounts include financial assets such as stocks, mutual funds, and ETFs. The number of financially dependent children is expected to relate negatively to retirement accounts in employer-sponsored plans. The household's financial resources available for retirement savings may decrease when the number of financially dependent children increases. This is because the household needs to provide financial support to its dependent children.

Results

The marginal effects and standard errors for the probit models are shown in Table 3.3, Table 3.4, and Table 3.5. Column “A” of these Tables shows the study's main results. Column “B” shows the sensitivity analysis results using “employer-sponsored plans where respondents get to choose how money is invested” as the dependent variable. The following analyses are based on the main results in column “A.” The last paragraph in this section presents the sensitivity analyses.

Consistent with the hypothesis, Table 3.3 results show that the association between participation in financial education and participation in employer-sponsored retirement plans is positive and statistically significant. The result shows that individuals who participated in financial education have a 0.03 higher probability of having an employer-sponsored retirement plan than those who do not. Table 3.4 shows the results for the sources of financial education. It shows that individuals who received financial education from college only, employer only, high school and college only, high school and employer only, and from all three sources (high school, college, and employer) have a higher probability of having an employer-sponsored retirement plan than those without financial education.

For the control variables, age, education level, income level, risk tolerance, female, marital status, and homeownership are positively associated with employer-sponsored retirement plan participation. The result for the respondent's work status shows that, compared to the homemaker, individuals who work full-time have a higher probability of having employer-sponsored retirement plans. And compared to the homemaker, individuals who work part-time, full-time students, permanently sick or

disabled, and unemployed have a lower probability of having employer-sponsored retirement plans.

Table 3.5 shows the sub-analysis results (who received financial education). The result shows that there is no statistically significant association between total hours of financial education received and employer-sponsored plan participation among individuals who received financial education. The respondents perceived quality of financial education is positively associated with employer-provided plan participation.

Column “B” of Table 3.3, Table 3.4, and Table 3.5 shows sensitivity analysis results. The results of the sensitivity models are consistent with the main models. Column “B” of Table 3.3 shows that individuals who participated in financial education have a higher probability of having an employer-sponsored retirement account in a defined contribution plan. The sensitivity analysis results for the sources of financial education are consistent with the main models. Finally, among individuals who received financial education, the total number of hours of financial education has no statistically significant relationship with participating in employer-sponsored retirement accounts. But, the perceived quality of financial education has a positive relationship with participating in defined contribution plan.

Conclusion

Saving for retirement is one of American adults' most essential financial decisions. Many options are available for retirement savings; still, many Americans do not have any savings for retirement. The previous research highlighted a lack of financial knowledge as one of the main reasons individuals fail to save for retirement (Lusardi and Mitchel 2011). The current study examines how financial education (participation, source, duration, quality) is related to the retirement-savings decision. This study shows that individuals who participated in financial education have a higher probability of having an employer-sponsored retirement plan than those who do not. The result also shows that individuals who received financial education from college only, employer only, high school and college only, high school and employer only, and from all three sources (high school, college, and employer) have a higher probability of having an employer-sponsored retirement plan than those without financial education. A positive association exists between the perceived quality of financial education and employer-provided plan participation.

The result shows a positive relationship between being older and participating in employer-sponsored retirement plans. The study finds a positive relationship between retirement savings decision in the employer-sponsored plans and individuals being married. The results also suggest that highly educated individuals are more likely to save for retirement in employer-sponsored plans than less-educated individuals. Individuals with a high income and a full-time job have a higher probability of saving for retirement than individuals with low income and no employment. Individuals with high and medium risk tolerance have a higher probability of saving for retirement than individuals with low risk tolerance.

One of the limitations of this study is that the NFCS does not contain information about the dollar amount of retirement savings. Future research may examine the relationship between financial education and the dollar amount of retirement savings.

TABLE 3.1. SUMMARY STATISTICS

| | Total Analysis sample | | Retirement Savings “Yes” | | Retirement Savings “No” | |
|---------------------------------------|-----------------------|-----------|--------------------------|-----------|-------------------------|-----------|
| | Mean | Std. Err. | Mean | Std. Err. | Mean | Std. Err. |
| Dependent Variable | | | | | | |
| Retirement Plan Participation (1=Yes) | 0.5948 | 0.0033 | | | | |
| Explanatory Variables | | | | | | |
| Hours of Financial Education | | | | | | |
| Less than Two Hours | 0.0245 | 0.0011 | 0.0258 | 0.0013 | 0.0193 | 0.0014 |
| Three to Ten Hours | 0.0507 | 0.0015 | 0.0563 | 0.0019 | 0.0405 | 0.0020 |
| More than Ten Hours | 0.1169 | 0.0021 | 0.1278 | 0.0027 | 0.1015 | 0.0031 |
| Risk Tolerance Level | | | | | | |
| Low | 0.4318 | 0.0033 | 0.3641 | 0.0039 | 0.5537 | 0.0050 |
| Medium | 0.3794 | 0.0032 | 0.4282 | 0.0040 | 0.3102 | 0.0047 |
| High | 0.1889 | 0.0027 | 0.2077 | 0.0033 | 0.1361 | 0.0035 |
| Married | 0.5301 | 0.0033 | 0.6581 | 0.0038 | 0.3611 | 0.0049 |
| White | 0.7227 | 0.0031 | 0.7707 | 0.0034 | 0.7216 | 0.0045 |
| Work Status | | | | | | |
| Self Employed | 0.0744 | 0.0018 | 0.0546 | 0.0018 | 0.1023 | 0.0031 |
| Work Full-Time | 0.4093 | 0.0033 | 0.5279 | 0.0040 | 0.2206 | 0.0042 |
| Work Part-Time | 0.0860 | 0.0019 | 0.0703 | 0.0021 | 0.1103 | 0.0032 |
| Full-Time Student | 0.0337 | 0.0013 | 0.0113 | 0.0009 | 0.0604 | 0.0024 |
| Homemaker | 0.0694 | 0.0016 | 0.0634 | 0.0020 | 0.0908 | 0.0029 |
| Permanently Sick or Disable | 0.0534 | 0.0015 | 0.0166 | 0.0010 | 0.1081 | 0.0031 |
| Education Level | | | | | | |

Table 3.1 Continued

| | Total Analysis sample | | Retirement Savings “Yes” | | Retirement Savings “No” | |
|--------------------------------|-----------------------|-----------|--------------------------|-----------|-------------------------|-----------|
| | Mean | Std. Err. | Mean | Std. Err. | Mean | Std. Err. |
| Less than High School | 0.0248 | 0.0011 | 0.0067 | 0.0007 | 0.0487 | 0.0022 |
| High School (Regular) | 0.1894 | 0.0026 | 0.1445 | 0.0029 | 0.2242 | 0.0042 |
| High School (GED) | 0.0739 | 0.0018 | 0.0470 | 0.0017 | 0.1021 | 0.0031 |
| Some College Education | 0.2932 | 0.0031 | 0.2394 | 0.0035 | 0.3112 | 0.0047 |
| Associate Degree | 0.1174 | 0.0022 | 0.1110 | 0.0025 | 0.0996 | 0.0030 |
| Bachelor’s Degree | 0.1865 | 0.0024 | 0.2684 | 0.0036 | 0.1496 | 0.0036 |
| Post Graduate Degree | 0.1147 | 0.0019 | 0.1830 | 0.0031 | 0.0647 | 0.0025 |
| Age | | | | | | |
| 18-24 | 0.1021 | 0.0021 | 0.0505 | 0.0018 | 0.1595 | 0.0037 |
| 25-34 | 0.1788 | 0.0027 | 0.1665 | 0.0030 | 0.1658 | 0.0038 |
| 35-44 | 0.1610 | 0.0024 | 0.1786 | 0.0031 | 0.1495 | 0.0036 |
| 45-54 | 0.1675 | 0.0024 | 0.1842 | 0.0031 | 0.1594 | 0.0037 |
| 55-64 | 0.1857 | 0.0025 | 0.2045 | 0.0033 | 0.1605 | 0.0037 |
| 65+ | 0.2048 | 0.0026 | 0.2157 | 0.0033 | 0.2053 | 0.0041 |
| Income Level | | | | | | |
| Less than \$50,000 | .4686 | 0.0030 | 0.2770 | 0.0036 | 0.7356 | 0.0044 |
| \$50,000-\$100,000 | 0.3412 | 0.0031 | 0.4328 | 0.0040 | 0.2030 | 0.0041 |
| \$100,000-\$150,000 | 0.1253 | 0.0021 | 0.1882 | 0.0032 | 0.0447 | 0.0021 |
| \$150,000 or More | 0.0642 | 0.0015 | 0.1036 | 0.0025 | 0.0205 | 0.0014 |
| Financially Dependent Children | | | | | | |
| One Child | 0.1534 | 0.0024 | 0.1649 | 0.0030 | 0.1339 | 0.0035 |

Table 3.1 Continued

| | | | | | | |
|-----------------------|--------|--------|--------|--------|--------|--------|
| Two Children | 0.1189 | 0.0021 | 0.1370 | 0.0028 | 0.0946 | 0.0030 |
| Three Children | 0.0509 | 0.0015 | 0.0530 | 0.0018 | 0.0458 | 0.0021 |
| Four or More Children | 0.0295 | 0.0011 | 0.0291 | 0.0014 | 0.0290 | 0.0017 |
| No Dependent Children | 0.3165 | 0.0030 | 0.3357 | 0.0038 | 0.3022 | 0.0047 |
| No Children | 0.3308 | 0.0032 | 0.2803 | 0.0036 | 0.3945 | 0.0050 |
| Number of Observation | 22,685 | | | | | |

*Notes: This analysis uses data from the FINRA Foundation 2018 NFCS state by state dataset. Mean values are shown alongside the standard errors. Survey weights are applied. *** indicates significance at the 1% level; ** indicates significance at the 5% level. N=22,685*

TABLE 3.2. DESCRIPTIVE STATISTICS OF KEY EXPLANATORY VARIABLES

| | Mean | Std. Err. |
|--|--------|-----------|
| Participation in Financial Education | 0.2064 | 0 .0024 |
| Sources of Financial Education | | |
| No Financial Education | 0.8149 | 0.0025 |
| Only High School | 0.0349 | 0.0012 |
| Only College | 0.0469 | 0.0014 |
| Only Employer | 0.0175 | 0.0009 |
| High School and College | 0.0319 | 0.0011 |
| High School and Employer | 0.0075 | 0.0006 |
| College and Employer | 0.0175 | 0.0009 |
| High School, College, and Employer | 0.0289 | 0.0011 |
| Total Hours of Financial Education(who Participated) | | |
| 1-2 hours | 0.1108 | 0.0042 |
| 3-10 hours | 0.2379 | 0.0057 |
| More than 10 hours | 0.5515 | 0.0067 |
| Perceived Quality of Financial Education | | |
| Quality - Low | 0.2343 | 0.0057 |
| Quality – High | 0.7481 | 0.0058 |

TABLE 3.3. RELATIONSHIP BETWEEN PARTICIPATION IN FINANCIAL EDUCATION AND PARTICIPATION IN EMPLOYER-SPONSORED RETIREMENT PLANS: PROBIT MODEL

| | A. Main Model | | B. Sensitivity Model | |
|--|------------------|-----------------|----------------------|-----------------|
| | Marginal Effects | Standard Errors | Marginal Effects | Standard Errors |
| Participation in Financial Education | 0.0274*** | 0.0065 | 0.0450*** | 0.0067 |
| Female | 0.0177*** | 0.0054 | 0.0060 | 0.0057 |
| White | 0.0022 | 0.0061 | 0.0085 | 0.0065 |
| Married | 0.0845*** | 0.0058 | 0.0675*** | 0.0062 |
| Homeownership | 0.1284*** | 0.0057 | 0.1429*** | 0.0061 |
| Risk Tolerance (Versus Low) | | | | |
| Medium | 0.0568*** | 0.0058 | 0.0838*** | 0.0061 |
| High | 0.0578*** | 0.0078 | 0.1041*** | 0.0079 |
| Work Status (Versus Homemaker) | | | | |
| Self-Employed | -0.1199*** | 0.0104 | -0.0871*** | 0.0111 |
| Work Full-Time | 0.1441*** | 0.0072 | 0.1541*** | 0.0075 |
| Work Part-Time | -0.0015 | 0.0097 | 0.0051 | 0.0105 |
| Full-Time Student | -0.1409*** | 0.0162 | -0.1201*** | 0.0176 |
| Permanently Sick or Disable | -0.1834*** | 0.0133 | -0.1802*** | 0.0160 |
| Unemployed | -0.1275*** | 0.0140 | -0.0959*** | 0.0158 |
| Education Level (Versus Less than High School) | | | | |
| High School Regular | 0.1349*** | 0.0197 | 0.1363*** | 0.0238 |
| High School GED | 0.1044*** | 0.0210 | 0.0950*** | 0.0253 |
| Some College | 0.1537*** | 0.0194 | 0.1563*** | 0.0235 |

Table 3.3 Continued

| | Marginal Effects | Standard Errors | | Marginal Effects |
|---|------------------|-----------------|-----------|------------------|
| Associate Degree | 0.1908*** | 0.0204 | 0.1875*** | 0.0244 |
| Bachelor's Degree | 0.2154*** | 0.0197 | 0.2189*** | 0.0237 |
| Post Graduate Degree | 0.2375*** | 0.0205 | 0.2401*** | 0.0244 |
| Age (Versus 18-24) | | | | |
| 25-34 | 0.0289*** | 0.0089 | 0.0119 | 0.0094 |
| 35-44 | 0.0286*** | 0.0092 | 0.0290*** | 0.0097 |
| 45-54 | 0.0303*** | 0.0087 | 0.0469*** | 0.0091 |
| 55-64 | 0.0567*** | 0.0078 | 0.0764*** | 0.0083 |
| Income Level (Less than \$50,000) | | | | |
| \$50,000 - \$100,000 | 0.1669*** | 0.0059 | 0.1753*** | 0.0062 |
| \$100,000 - \$150,000 | 0.2185*** | 0.0094 | 0.2428*** | 0.0092 |
| More than \$150,000 | 0.2288*** | 0.0130 | 0.2672*** | 0.0126 |
| Financially Dependent Children (Versus One Child) | | | | |
| Two Children | -0.0004 | 0.0089 | -0.0009 | 0.0092 |
| Three Children | -0.0105 | 0.0125 | 0.0000 | 0.0132 |
| Four or More Children | -0.0258 | 0.0157 | -0.0177 | 0.0164 |
| No Dependent Children | 0.0181*** | 0.0066 | 0.0177** | 0.0071 |
| Number of Observation | 20823 | | | |

*Notes: This analysis uses data from the FINRA Foundation 2018 NFCS state by state dataset. Marginal effects values are shown alongside the standard errors. Survey weights are applied. *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.*

TABLE 3.4. RELATIONSHIP BETWEEN SOURCES OF FINANCIAL EDUCATION AND PARTICIPATION IN EMPLOYER-SPONSORED RETIREMENT PLANS: PROBIT MODEL

| | A. Main Model | | B. Sensitivity Model | |
|---|------------------|-----------------|----------------------|-----------------|
| | Marginal Effects | Standard Errors | Marginal Effects | Standard Errors |
| Sources of Financial Education (Versus No Fin. Education) | | | | |
| High School Only | 0.0025 | 0.0152 | -0.0059 | 0.0164 |
| College Only | 0.0217* | 0.0132 | 0.0403*** | 0.0139 |
| Employer Only | 0.0407* | 0.0213 | 0.0743*** | 0.0217 |
| High School and College Only | 0.0307** | 0.0156 | 0.0631*** | 0.0165 |
| High School and Employer Only | 0.0622** | 0.0314 | 0.1013*** | 0.0327 |
| College and Employer Only | 0.0191 | 0.0216 | 0.0499** | 0.0216 |
| High School, College, and Employer | 0.1222*** | 0.0170 | 0.1573*** | 0.0180 |
| Female | 0.0247*** | 0.0058 | 0.0139** | 0.0061 |
| White | 0.0075 | 0.0067 | 0.0179** | 0.0071 |
| Married | 0.0880*** | 0.0062 | 0.0680*** | 0.0067 |
| Homeownership | 0.1210*** | 0.0062 | 0.1321*** | 0.0066 |
| Risk Tolerance (Versus Low) | | | | |
| Medium | 0.0554*** | 0.0061 | 0.0831*** | 0.0065 |
| High | 0.0330*** | 0.0085 | 0.0761*** | 0.0086 |
| Work Status (Versus Homemaker) | | | | |

Table 3.4 Continued

| | Marginal Effects | Standard Errors | Marginal Effects | Standard Errors |
|--|------------------|-----------------|------------------|-----------------|
| Self-Employed | - 0.1235*** | 0.0113 | -0.0958*** | 0.0119 |
| Work Full-Time | 0.1458*** | 0.0077 | 0.1534*** | 0.0080 |
| Work Part-Time | -0.0019 | 0.0104 | 0.0079 | 0.0113 |
| Full-Time Student | - 0.1396*** | 0.0186 | -0.1202*** | 0.0206 |
| Permanently Sick or Disable | - 0.1780*** | 0.0139 | -0.1689*** | 0.0166 |
| Unemployed | - 0.1226*** | 0.0151 | -0.0864*** | 0.0170 |
| Education Level (Versus Less than High School) | | | | |
| High School Regular | 0.1604*** | 0.0222 | 0.1714*** | 0.0282 |
| High School GED | 0.1301*** | 0.0236 | 0.1273*** | 0.0298 |
| Some College | 0.1856*** | 0.0219 | 0.1999*** | 0.0278 |
| Associate Degree | 0.2254*** | 0.0228 | 0.2325*** | 0.0286 |
| Bachelor's Degree | 0.2501*** | 0.0222 | 0.2644*** | 0.0280 |
| Post Graduate Degree | 0.2730*** | 0.0229 | 0.2838*** | 0.0286 |
| Age (Versus 18-24) | | | | |
| 25-34 | 0.0280*** | 0.0098 | 0.0068 | 0.0104 |
| 35-44 | 0.0269*** | 0.0100 | 0.0253** | 0.0106 |
| 45-54 | 0.0320*** | 0.0093 | 0.0475*** | 0.0098 |
| 55-64 | 0.0555*** | 0.0083 | 0.0740*** | 0.0087 |

Table 3.4 Continued

| | Marginal Effects | Standard Errors | Marginal Effects | Standard Errors |
|---|------------------|-----------------|------------------|-----------------|
| Income Level (Less than \$50,000) | | | | |
| \$50,000 - \$100,000 | 0.1683*** | 0.0063 | 0.1755*** | 0.0066 |
| \$100,000 - \$150,000 | 0.2250*** | 0.0100 | 0.2506*** | 0.0098 |
| More than \$150,000 | 0.2342*** | 0.0139 | 0.2726*** | 0.0134 |
| Financially Dependent Children (Versus One Child) | | | | |
| Two Children | -0.0012 | 0.0096 | -0.0014 | 0.0099 |
| Three Children | -0.0141 | 0.0134 | -0.0005 | 0.0143 |
| Four or More Children | -0.0463*** | 0.0172 | -0.0459** | 0.0184 |
| No Dependent Children | 0.0191*** | 0.0070 | 0.0184** | 0.0075 |
| Number of Observation | 18,069 | | | |

*Notes: This analysis uses data from the FINRA Foundation 2018 NFCS state by state dataset. Marginal effects values are shown alongside the standard errors. Survey weights are applied. *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.*

TABLE 3.5. RELATIONSHIP BETWEEN TOTAL HOURS AND OVERALL QUALITY OF FINANCIAL EDUCATION AND PARTICIPATION IN EMPLOYER-SPONSORED RETIREMENT PLANS: PROBIT MODEL

| | A. Main Model | | B. Sensitivity Model | |
|---|------------------|-----------------|----------------------|-----------------|
| | Marginal Effects | Standard Errors | Marginal Effects | Standard Errors |
| Hours of Financial Education (Versus 1-2 hours) | | | | |
| 3-10 hours | -0.0222 | 0.0177 | 0.0052 | 0.0223 |
| More than 10 hours | -0.0196 | 0.0152 | -0.0019 | 0.0196 |
| Quality of Financial Education (Versus Low Quality) | | | | |
| High quality | 0.0280** | 0.0139 | 0.0480*** | 0.0184 |
| Risk Tolerance (Versus Low) | | | | |
| Medium | 0.0398*** | 0.0131 | 0.0581*** | 0.0168 |
| High | 0.0737*** | 0.0169 | 0.1222*** | 0.0205 |
| Female | 0.0095 | 0.0121 | -0.0029 | 0.0153 |
| Married | 0.0818*** | 0.0130 | -0.0170 | 0.0172 |
| White | 0.0041 | 0.0133 | -0.0354** | 0.0172 |
| Homeownership | 0.1472*** | 0.0132 | 0.0562*** | 0.0184 |
| Work Status (Versus Homemaker) | | | | |
| Self-employed | -0.0518** | 0.0214 | 0.0447 | 0.0313 |
| Work Full-time | 0.1807*** | 0.0147 | 0.0799*** | 0.0193 |
| Work part-time | 0.0438** | 0.0203 | 0.0026 | 0.0307 |
| Full-time Student | -0.1568*** | 0.0301 | 0.1562** | 0.0666 |
| Permanently Sick, or Disabled | -0.1352*** | 0.0312 | -0.0800 | 0.0513 |

Table 3.5 Continued

| | Marginal Effects | Standard Errors | Marginal Effects | Standard Errors |
|---|-------------------------|------------------------|-------------------------|------------------------|
| Education Level (Versus Less than High School) | | | | |
| High School Regular | 0.0163 | 0.0540 | -0.0365 | 0.1100 |
| High School GED | 0.0015 | 0.0575 | -0.0542 | 0.1138 |
| Some College | 0.0381 | 0.0526 | -0.0570 | 0.1077 |
| Associate Degree | 0.0568 | 0.0541 | -0.0596 | 0.1087 |
| Bachelor's Degree | 0.0702 | 0.0529 | -0.0256 | 0.1081 |
| Post Graduate Degree | 0.0926* | 0.0544 | -0.0414 | 0.1088 |
| Age (Versus 18-24) | | | | |
| 25-34 | 0.0364** | 0.0180 | 0.0413* | 0.0242 |
| 35-44 | 0.0286 | 0.0193 | 0.0190 | 0.0246 |
| 45-54 | 0.0194 | 0.0189 | 0.0397* | 0.0241 |
| 55-64 | 0.0755*** | 0.0188 | 0.0281 | 0.0220 |
| Income Level (Less than \$50,000) | | | | |
| \$50,000 - \$100,000 | 0.1484*** | 0.0136 | 0.0542*** | 0.0184 |
| \$100,000 - \$150,000 | 0.1706*** | 0.0219 | 0.0756*** | 0.0240 |
| More than \$150,000 | 0.2025*** | 0.0288 | 0.1305*** | 0.0299 |
| Financially Dependent Children (Versus One Child) | | | | |
| Two Children | -0.0327* | 0.0198 | -0.0119 | 0.0229 |
| Three Children | 0.0237 | 0.0277 | 0.0247 | 0.0303 |
| Four or More Children | 0.0095 | 0.0326 | 0.0320 | 0.0404 |
| No Dependent Children | 0.0391 | 0.0148 | -8.20e-06 | 0.0185 |

Notes: . *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

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Chapter IV

The Relationship Between the Act of Figuring Out One's Retirement Savings Needs and Actual Retirement Savings Decisions Among Young Individuals.

Introduction

Based on the life cycle hypothesis proposed by Ando & Modigliani (1963), individuals aim to smooth consumption over their lifetimes by utilizing strategies such as borrowing, saving, and dissaving at various points. Individuals usually borrow during their younger years, accumulate savings throughout their working years, and then use those savings to support their expenses during retirement. Consumption and savings decisions made earlier in life can critically impact retirement. Savings are often considered the first step in retirement preparedness. Over the last two decades, savings decisions have significantly impacted Americans. This is mainly due to the transition of retirement funding responsibility from employers to employees (Ibbotson et al., 2007). Because of the change in retirement funding responsibility from employers to employees, individuals, rather than pension professionals, must determine how much they need to save for a comfortable retirement (Poterba et al., 2007). According to the 2018 Employee Benefit Research Institute (EBRI), in the private sector, only 38% of all employees participate in employer-sponsored defined contribution plans. Prior studies also find that a high percentage of individuals are not confident about their comfortable retirement. Helman et al. (2012) find that only 14% of Americans possess the confidence to retire comfortably. Previous studies, including those conducted by Bernheim (1996), Yuh et al. (1998), and Mitchell & Moore (1998), have highlighted that most households in the

United States will not be able to maintain their current standard of living in retirement based on their existing retirement savings.

The current study is conducted on individuals between the ages of 25-44 to see if estimating retirement savings need relates to actual retirement savings decisions for younger individuals. Usually, individuals in their 20s and 30s do not consider saving for retirement. They have other priorities, such as buying houses, cars, emergency savings, etc. It may be more utility-maximizing over the life cycle for younger people to defer their retirement savings. They may think pursuing other things and deferring retirement savings is utility maximizing, but they don't know the cost of the tradeoff. Once individuals calculate their estimated retirement needs, now they can quantify the cost of the tradeoff between pursuing other things versus saving for retirement. Once individuals calculate their retirement needs, they can make more informed decisions about how to allocate their resources with regard to the overall maximization of satisfaction over their lifetime. For this younger group, bringing the calculated retirement need to a more salient place may have a bigger impact on their retirement savings decisions. Calculating the amount of money one needs to save for retirement is often considered an initial and crucial step in retirement planning, as Garman & Fogue (2010) and Goff & Scott (1995) emphasize. Many online retirement calculators exist that are both free and user-friendly. One can easily determine how much one need to save for comfortable retirement life.

According to the life-cycle theory of savings, decisions individuals make regarding consumption and savings during earlier stages of their lives can critically impact their quality of life during retirement. It is essential to start saving early to build a sizable nest egg in retirement. Starting savings early offers the benefit of compound

interest, where the initial savings and subsequent earnings are reinvested, accumulating greater returns in the long run. Starting early allows individuals for a longer time horizon to accumulate savings and benefit from compounding. Saving early provides a financial cushion and gives individuals more flexibility in retirement planning. It reduces the risk of depending only on government or employer-sponsored retirement benefits, which may not be enough to maintain the desired lifestyle in retirement.

Also, employer-sponsored retirement plans, such as 401(k) & 403(b) plans, often include matching contributions. By starting early, individuals can take full advantage of these benefits and maximize their savings with the additional advantage of employer-matching contributions. When individuals start saving early, it allows them to save a smaller percentage of their income each year to achieve their retirement savings goals. If individuals delay to start saving, they need to allocate a higher percentage of their income towards retirement savings to catch up.

The current study investigates the relationship between the act of figuring out one's retirement savings needs and actual retirement savings decisions in employer-sponsored retirement plans for younger individuals. The present paper extends the existing body of literature in two primary ways. First, it uses nationally representative survey data from the 2021 National Financial Capability Study (NFCS) to examine younger individuals' retirement saving decisions. Previous literature on similar topics used smaller datasets and did not focus on younger individuals. Second, the current paper performs sensitivity analysis and uses a defined contribution plan participation where individuals get to choose how money is invested as the dependent variable.

After carrying out the empirical analyses, the results show that among younger individuals, the act of figuring out retirement savings needs and participation in employer-sponsored retirement plans is related positively. The findings in the sensitivity study are also consistent with the main model. It shows that the relationship between figuring out retirement savings needs and participation in defined contribution plans is positive among young individuals.

Literature Review

Helman et al. (2010) find that less than half of U.S. households have tried to calculate the required retirement savings need. Based on findings from the 2018 Retirement Confidence Survey (RCS), about 50% of employees indicate that they and their spouses have tried to determine the necessary savings amount for a comfortable retirement. According to the 2010 Employee Benefits Research Institute (EBRI) survey, 46% of the individuals reported that they and their spouses had estimated the needed savings amount for a comfortable retirement. Using the EBRI data, Helman and Paladino (2004) examine the relationship between estimating one's retirement saving needs and engaging in positive retirement planning actions. While Helman and Paladino (2004) find that certain individuals have changed their retirement planning and increased their savings following retirement savings needs calculations, they also find a substantial portion of individuals who did not find the process helpful. Specifically, 32% of individuals stated that they either did not know or did not remember the outcome of their savings need calculation (Helman & Paladino, 2004, p. 9). According to the 2010 Retirement confidence survey by EBRI, individuals who calculated their retirement needs are more likely to anticipate the need to save at least \$1 million before retirement

compared to those who have not performed any calculations regarding their retirement needs. By analyzing an online survey of benefits-eligible employees, Mayer et al., (2011) find that estimating retirement savings target is associated with higher self-reported levels of retirement savings. Using the 2004 and 2008 waves of the National Longitudinal Survey of Youth (NLSY79), Martin and Finke (2013) find that individuals who have calculated their required retirement savings amount have significantly higher retirement wealth. Previous research studies have consistently shown that a significant portion of U.S. households does not attempt to estimate their needed retirement savings, but those who do estimate their retirement needs tend to engage in positive retirement planning behavior, expect the need for higher savings and have higher levels of retirement wealth.

Previous studies find that retirement planning behavior is influenced by various factors, including financial knowledge, education, income, age, and financial sophistication (Hira et al., 2009; van Rooij et al., 2012; Kim & Hanna, 2015). Estimating retirement savings needs is commonly recognized as an essential phase in retirement planning. According to Sharpe (2021), determining retirement needs can be a complex and intimidating task, mainly due to the anxiety created by market volatility. The 2020 Employee Benefits Research Institute (EBRI) survey finds that fewer than half of U.S. households try to calculate their retirement needs. Interestingly, the survey also finds that a significant majority, about 77% of employees, express confidence in their ability to achieve a comfortable retirement. Lusardi and Mitchell (2017) find a positive relationship between higher levels of financial knowledge and the probability of individuals calculating their retirement needs. Using the 2021 National Financial Capability Survey (NFCS), this study measures the relationship between the act of figuring out one's

retirement savings needs and participation in employer-sponsored retirement plans for younger individuals.

Data

This study uses data from the 2021 National Financial Capability Study (NFCS). The FINRA Investor Education Foundation supports the NFCS, and the survey was directed online from June to October 2021. The survey has a nationally representative sample of 27,118 American adults, with approximately 500 respondents per state, including the District of Columbia.

In 2009, the FINRA Investor Education Foundation started the first comprehensive study to assess the financial capability of adults across the United States. The National Financial Capability Study (NFCS) was planned with two main objectives: to establish key indicators of financial capability and to analyze the variances in these indicators based on demographic, behavioral, attitudinal, and financial literacy elements. To ensure correct representation, the survey's national data are weighted to represent the demographics of the total U.S. population regarding age, gender, ethnicity, education, and census division.

The current study excludes observations from the sample with the responses "don't know" and "prefer not to say" to the questions about retirement inquiry, risk tolerance, financially dependent children, level of education, household's annual income, work status, homeownership, and retirement plan participation. The study specifically focuses on individuals within the 25-34 and 35-44 age groups, excluding observations from the 18-24, 45-54, 55-64, and 65-plus age groups. After excluding all these observations, the analysis sample becomes 7,884.

The study's dependent variable is whether the respondents have any retirement accounts. The exact NFCS question that asks this is, "do you or your spouse/partner have any retirement plans through a current or previous employer, like a pension plan or a 401(k)?" The value for the dependent variable is 1 if the respondents answer "yes," and 0 if the respondents answer "no." The key explanatory variable is whether the respondents estimated their retirement needs. The exact question that asks this is, "have you ever tried to figure out how much you need to save for retirement?". The value for the key independent variable is 1 if the respondents answer "yes," and 0 if the respondents answer "no."

Other explanatory variables are age, male, level of education, white race, marital status, number of dependent children, income, risk tolerance, homeownership, and work status. Male is a dummy variable that equals 1 if the gender of the respondents is male and 0 if the gender of the respondent is female.

The level of education is represented by four dummy variables comprising some college, associate degree, bachelor's degree, and postgraduate degree. The reference category is high school or less. The variable "White" is an indicator variable that takes a value of 1 if the individual's race is white and 0 if the individual's race is non-white. Similarly, the variable "Married" is an indicator variable that equals 1 if the respondent is married and 0 if the respondent is not married. The number of financially dependent children is represented by four dummy variables comprising one, two, three, and four children. The reference category is no financially dependent children. Income is represented by six dummy variables comprising \$50,000 to \$75,000, \$75,000 to \$100,000, \$100,000 to \$150,000, \$150,000 to \$200,000, \$200,000 to \$300,000, and

\$300,000 or more. The reference category is less than \$50,000. The responses to the risk tolerance question range from 1 (not at all willing) to 10 (very willing). The current study recodes the responses to the financial risk tolerance question into three categories because of the limited number of observations of some of the original response categories. The first category is low-risk tolerance which includes responses ranging from 1 to 4. The second category is medium risk tolerance, which includes 5 to 7. Finally, individuals with responses ranging from 8 to 10 are classified as high-risk-tolerant. Medium risk tolerance and high-risk tolerance are used as dummies for the risk tolerance variable, with the reference category being low-risk taking.

Respondent's work status is measured using six dummies: self-employed, full-time employed, part-time employed, full-time student, disabled or unable to work, and unemployed or temporarily laid off. The reference category is a homemaker. Homeownership is also a dummy variable that equals 1 if the respondents own a home and 0 if the respondents do not own a home.

Table 4.1 presents descriptive statistics for the dependent and independent variables. Approximately 56 percent of the sampled individuals have retirement accounts. In the overall sample, approximately 40 percent of individuals have figured out how much they need to save for retirement. Among individuals who participated in employer-sponsored plans, 54% have made calculations concerning the required amount of savings for their retirement. On the other hand, of Individuals who did not participate in employer-sponsored plans, 21% have made calculations regarding the required amount of savings for their retirement.

White individuals make up 66% of the overall sample. The percentage of males in the overall sample is 53%. Forty-six percent of respondents in the overall sample are married.

Among all individuals, there are 29% with high school or less education, and 35% with college degrees and higher education. Among individuals who have employer-sponsored plans, there are 20% with high school or less education, and 45% with college degrees and higher education.

Table 4.1 further shows that, among all individuals, there are 48% with an annual income below \$50,000, 31% with an annual income between \$50,000 and \$100,000, 17% with an annual income between \$100,000 and \$200,000, 2.38% with an annual income \$200,000 or higher. Among individuals who have employer-sponsored plans, there are 33% with an annual income below \$50,000, 39% with an annual income between \$50,000 and \$100,000, 24% with an annual income between \$100,000 and \$200,000, and 3.36% with an annual income \$200,000 or higher

Among all individuals, 57% have full-time employment, about 8% work part-time, about 9% are self-employed, about 9% are homemakers, about 5% are permanently sick or disabled, and 10% are unemployed. Among individuals with employer-sponsored plans, 71% have full-time employment, and 6% work part-time.

In the overall sample, the percentage of individuals with one, two, three, and four or more financially dependent children are about 19%, 20%, 4%, and 5%, respectively.

Among all individuals, 47% have a low risk tolerance, 25% have a medium risk tolerance, and 28% have a high-risk tolerance. Among individuals with employer-

sponsored plans, 41% have a low risk tolerance, 28% have a medium risk tolerance, and 31% have a high-risk tolerance.

Model

The current study uses a probit regression model to examine the relationship between the act of figuring out retirement-savings needs and actual retirement-savings decisions for younger individuals. The probit model is appropriate because the dependent variable is dichotomous. The following estimated probit model is estimated:

$$\text{Retirement Saving}_i^* = \beta_0 + \beta_1 \text{RtrmntNeedCalc}_i + \gamma X_i + v_i$$

$$\text{Retirement Savings}_i = 1 \text{ if } \text{Retirement Saving}_i^* > 0$$

$$\text{Retirement Savings}_i = 0 \text{ if } \text{Retirement Saving}_i^* \leq 0$$

where $\text{Retirement Saving}_i^*$ is a latent variable representing the dollar value of respondent i 's retirement savings. $\text{Retirement Savings}_i$ is an observed variable that takes a value of 1 if a respondent has retirement savings and 0 otherwise. β_0 is the intercept. β_1 is the relationship between the retirement-savings-needs calculation and participation in employer-sponsored plans. RtrmntNeedCalc_i is whether the respondent i has ever tried to calculate how much s/he needs to save for retirement. The matrix X_i contains all the other explanatory variables related to the retirement-savings decision. These explanatory variables include age, ethnicity, marital status, level of education, income, the presence of financially dependent children, work status, and risk tolerance. γ is a vector of the corresponding slope parameters for age, ethnicity, marital status, level of education, income, the presence of financially dependent children, work status, and risk tolerance. v_i is an error term assumed to follow a standard normal distribution.

The current study tests several hypotheses. The association between the act of figuring out one's retirement savings needs and actual retirement savings decision in the employer-sponsored plans is expected to be positive. Previous research suggests that the initial phase of the retirement-planning process includes estimating the needed savings amount for retirement (Garman and Forgue 2010; Goff and Scott 1995). Thus, it can be assumed that individuals who estimate the amount of money they need in retirement consider retirement seriously and expect to start saving for retirement. According to the human-capital theory, financially knowledgeable individuals are more likely to make better financial decisions than those who are less financially knowledgeable. Therefore, individuals possessing higher levels of human capital are more likely to estimate the required savings for a comfortable retirement. Individuals who calculate retirement-savings need are expected to be more motivated towards saving for retirement.

The association between respondents' age and retirement savings decision in the employer-sponsored plans is expected to be positive. Previous research finds that young adults usually have more liquidity constraints compared to older adults (Korankye and Kalenkoski 2021). Thus, age is expected to be related positively to participating in an employer-sponsored retirement plan.

White is a proxy for preferences and constraints that cannot be given a sign a priori. The association between being married and participating in an employer-sponsored retirement plans is expected to be positive. According to the economic theory of marriage (Becker's, 1973), individuals marry because they think they will be better off being married than being single. Marriage is a long-term promise that may inspire couples to visualize their old age and retirement life more easily. Married individuals

have some benefits in building their shared retirement wealth that may motivate them to discuss retirement savings (Smock, Manning, & Porter, 2005; Yilmazer & Lyons, 2010). Such discussion can turn into actual retirement savings decision. Thus, being married is expected to be associated with a higher probability that a household will save for retirement.

The association between a respondent's level of education and participation in an employer-sponsored retirement plan is expected to be positive. According to human-capital theory, more educated individuals can make better financial decisions than less educated individuals. As an individual's level of education increases, the likelihood of saving for retirement also increases.

The association between a household's annual income and the retirement-savings decision is expected to be positive. This is because higher incomes increase the financial resources available to respondents to save for retirement. The probability of saving for retirement in an employer-provided plan is higher among full-time employed individuals compared to homemakers, unemployed individuals, or self-employed individuals because they are the ones who are provided access to these plans.

Prior studies find that ownership of financial assets is influenced by risk tolerance (Coleman, 2003; DeVaney et al., 2007; Xiao, 1996). Thus, it is expected that, as an individual's risk tolerance increases, the probability that an individual saves for retirement increases. This is because retirement-savings accounts include financial assets such as stocks, mutual funds, and ETFs.

The number of financially dependent children is expected to be related negatively to participating in employer-sponsored retirement plans. The household's financial

resources available for retirement savings may decrease when the number of financially dependent children increases. This is because the household needs to provide financial support to its dependent children.

Results

Marginal effects and standard errors for the probit model are shown in Table 4.2. Column “A” of Table 4.2 shows the results for the main model. Column “B” shows the sensitivity analysis results using “employer-sponsored plans where respondents get to choose how money is invested” as the dependent variable. The following analyses are based on the main results in column “A.” The last paragraph in this section presents the sensitivity analyses.

Consistent with the hypothesis, Table 4.2 result shows that among younger individuals, the act of figuring out retirement savings needs and actual retirement savings decisions is related positively. Specifically, the result shows that individuals who estimated how much to save for retirement have a 0.18 higher probability of participating in an employer-sponsored retirement plan.

Consistent with the hypothesis, the result shows that being married and homeownership is positively related to retirement savings decisions. Table 4.2 shows that income is positively related to retirement savings decisions. Compared to less than \$50,000 annual income, individuals who are in the higher income group have a higher probability of having employer-sponsored retirement plans. The results for work status show that compared to full-time employment, self-employed individuals, part-time employment, full-time students, permanently sick or disabled, and unemployed have a lower probability of having employer-sponsored retirement plans.

Consistent with the hypothesis, the respondent's education level results show a positive relationship with participation in employer-sponsored retirement plans. The probability that an individual with a bachelor's degree or higher will save for retirement is 0.23 higher than for an individual with a high school or less education.

Column "B" of Table 4.2 shows sensitivity analysis results. The results of the sensitivity models are consistent with the main models. Column "B" of Table 4.2 shows that among young individuals, the act of figuring out retirement savings needs and actual retirement savings decisions in a defined contribution plan is related positively. Specifically, the result shows that individuals who estimated how much to save for retirement have a 0.14 higher probability of having a defined contribution plan. The sensitivity analysis results also indicate that younger individuals who are male, have a higher risk tolerance, higher income, and a higher education level are more likely to have employer-sponsored retirement plans.

Conclusion

Estimating retirement savings needs are considered the first step in retirement savings decisions. Estimation of retirement savings needs can be a motivating factor for younger individuals to start saving early in their life. Knowing how much they will need to save for retirement to maintain their desired lifestyle can motivate them to act and start saving. Knowing how much to save for retirement helps individuals to set realistic financial goals and creates awareness of the importance of retirement savings. When individuals calculate how much to save for retirement, it helps them to know potential shortfalls, and they can take steps to increase their savings rate.

Using the 2021 National Financial Capability Survey (NFCS), this study measures the relationship between the act of figuring out one's retirement savings needs and participation in employer-sponsored retirement plans for younger individuals. The results show that among younger individuals, the act of figuring out retirement savings needs and participating in employer-sponsored retirement plans is positively related. Specifically, the results show that individuals who estimate the savings needed for retirement have a 0.18 higher probability of participating in employer-sponsored plans. The results in the sensitivity analysis are also consistent with the main model. It shows that among young individuals, the act of figuring out retirement savings needs and participating in defined contribution plans positively related.

Moreover, estimating retirement savings needs can also help financial planning and decision-making. It allows individuals to assess their current spending habits and identify areas where they can reduce expenses or make lifestyle modifications to allocate more money toward retirement savings. Financial planners can inspire clients to estimate their retirement savings needs as it can effectively promote actual retirement savings decisions.

One of the limitations of the current study is that NFCS does not provide a dollar amount of retirement savings variable. Future studies can investigate how estimating retirement savings needs promote the amount of retirement savings for younger individuals.

TABLE 4.1. DESCRIPTIVE STATISTICS

| | Total Analysis Sample | | Retirement Savings “Yes” | | Retirement Savings “No” | |
|---------------------------------------|-----------------------|-----------|--------------------------|-----------|-------------------------|-----------|
| | Mean | Std. Err. | Mean | Std. Err. | Mean | Std. Err. |
| Dependent Variable | | | | | | |
| Retirement Plan Participation (1=Yes) | 0.5589 | 0.0060 | | | | |
| | | | | | | |
| Estimate Retirement Savings Need | 0.4074 | 0.0059 | 0.5363 | 0.0074 | 0.2081 | 0.0074 |
| White | 0.6631 | 0.0060 | 0.6724 | 0.0075 | 0.6335 | 0.0092 |
| Male | 0.5276 | 0.0059 | 0.5366 | 0.0074 | 0.5071 | 0.0091 |
| Married | 0.4583 | 0.0059 | 0.5660 | 0.0074 | 0.2967 | 0.0082 |
| Homeownership | 0.4886 | 0.0060 | 0.6042 | 0.0074 | 0.3102 | 0.0083 |
| Risk Tolerance Level | | | | | | |
| Low | 0.4688 | 0.0060 | 0.4131 | 0.0073 | 0.5520 | 0.0091 |
| Medium | 0.2506 | 0.0053 | 0.2775 | 0.0068 | 0.2122 | 0.0075 |
| High | 0.2805 | 0.0054 | 0.3094 | 0.0069 | 0.2358 | 0.0078 |
| Work Status | | | | | | |
| Self Employed | 0.0942 | 0.0036 | 0.0693 | 0.0039 | 0.1328 | 0.0062 |
| Work Full-Time | 0.5670 | 0.0060 | 0.7080 | 0.0069 | 0.3422 | 0.0086 |
| Work Part-Time | 0.0808 | 0.0033 | 0.0645 | 0.0037 | 0.1092 | 0.0058 |
| Full-Time Student | 0.0196 | 0.0018 | 0.0100 | 0.0015 | 0.0332 | 0.0037 |
| Homemaker | 0.0911 | 0.0035 | 0.0871 | 0.0042 | 0.1018 | 0.0055 |
| Permanently Sick or Disable | 0.0451 | 0.0025 | 0.0126 | 0.0017 | 0.0915 | 0.0053 |
| Unemployed | 0.1022 | 0.0037 | 0.0485 | 0.0034 | 0.1894 | 0.0071 |
| Income Level | | | | | | |

Table 4.1 Continued

| | Mean | Std. Err. | Mean | Std. Err. | Mean | Std. Err. |
|---------------------------------|-------------|----------------------|-------------|----------------------|-------------|----------------------|
| Less than \$50,000 | 0.4841 | 0.0060 | 0.3279 | 0.0071 | 0.7297 | 0.0080 |
| \$50,000 to \$75,000 | 0.1825 | 0.0046 | 0.2101 | 0.0061 | 0.1407 | 0.0064 |
| \$75,000 to \$100,000 | 0.1316 | 0.0040 | 0.1779 | 0.0056 | 0.0599 | 0.0042 |
| \$100,000 to \$150,000 | 0.1366 | 0.0040 | 0.1919 | 0.0058 | 0.0475 | 0.0037 |
| \$150,000 to \$200,000 | 0.0414 | 0.0022 | 0.0586 | 0.0033 | 0.0139 | 0.0020 |
| \$200,000 to \$300,000 | 0.0157 | 0.0014 | 0.0215 | 0.0020 | 0.0061 | 0.0014 |
| \$300,000 or more | 0.0081 | 0.0010 | 0.0121 | 0.0015 | 0.0023 | 0.0008 |
| Education Level | | | | | | |
| High school or less | 0.2877 | 0.0055 | 0.1984 | 0.0062 | 0.4304 | 0.0091 |
| Some College | 0.2547 | 0.0053 | 0.2312 | 0.0065 | 0.2925 | 0.0084 |
| Associate Degree | 0.1112 | 0.0039 | 0.1199 | 0.0050 | 0.0979 | 0.0057 |
| Bachelor's Degree | 0.2408 | 0.0049 | 0.3043 | 0.0066 | 0.1379 | 0.0058 |
| Post Graduate Degree | 0.1055 | 0.0034 | 0.1462 | 0.0049 | 0.0413 | 0.0032 |
| Financial Dependent Children | | | | | | |
| No Dep.Child | 0.0586 | 0.0024 | 0.0456 | 0.0028 | 0.0782 | 0.0044 |
| One child | 0.1986 | 0.0041 | 0.2138 | 0.0055 | 0.1758 | 0.0063 |
| Two children | 0.2039 | 0.0042 | 0.2324 | 0.0057 | 0.1612 | 0.0060 |
| Three children | 0.0911 | 0.0030 | 0.0987 | 0.0040 | 0.0798 | 0.0045 |
| Four or More children | 0.0524 | 0.0023 | 0.0519 | 0.0030 | 0.0531 | 0.0037 |

TABLE 4.2. THE RELATIONSHIP BETWEEN THE ACT OF FIGURING OUT ONE'S RETIREMENT SAVINGS NEEDS AND ACTUAL RETIREMENT SAVINGS DECISIONS: PROBIT MODEL

| | A. Main Model | | B. Sensitivity Model | |
|-------------------------------------|------------------|-----------------|----------------------|-----------------|
| | Marginal Effects | Standard Errors | Marginal Effects | Standard Errors |
| Estimate Retirement Savings Need | 0.1814*** | 0.0099 | 0.1396*** | 0.0148 |
| White | 0.0031 | 0.0107 | -0.0191 | 0.0172 |
| Male | -0.0408*** | 0.0106 | 0.0322** | 0.0156 |
| Married | 0.0609*** | 0.0116 | -0.0253 | 0.0187 |
| Homeownership | 0.0858*** | 0.0104 | 0.0383** | 0.0169 |
| Risk Tolerance Level (Versus Low) | | | | |
| Medium | 0.0070 | 0.0124 | 0.0687*** | 0.0181 |
| High | -0.0172 | 0.0126 | 0.1177*** | 0.0185 |
| Work Status (Versus Work Full-time) | | | | |
| Self-employed | -0.2028*** | 0.0159 | 0.0424 | 0.0366 |
| Work part-time | -0.1442*** | 0.0171 | 0.0439 | 0.0327 |
| Fulltime student | -0.2464*** | 0.0324 | -0.0592 | 0.0760 |
| Homemaker | -0.1092*** | 0.0168 | -0.0589* | 0.0311 |
| Permanently sick or disabled | -0.3514*** | 0.0276 | 0.0897 | 0.0926 |
| Unemployed | -0.2543*** | 0.0170 | 0.0757* | 0.0432 |
| Income Level (Less than \$50,000) | | | | |

Table 4.2 Continued

| | Marginal Effects | Standard Errors | Marginal Effects | Standard Errors |
|--|-------------------------|------------------------|-------------------------|------------------------|
| \$50,000 to \$75,000 | 0.1052*** | 0.0130 | -0.0007 | 0.0214 |
| \$75,000 to \$100,000 | 0.1747*** | 0.0160 | 0.0377 | 0.0238 |
| \$100,000 to \$150,000 | 0.1673*** | 0.0180 | 0.0776*** | 0.0252 |
| \$150,000 to \$200,000 | 0.1500*** | 0.0272 | 0.1809*** | 0.0356 |
| \$200,000 to \$300,000 | 0.1436*** | 0.0420 | 0.2111*** | 0.0574 |
| \$300,000 or more | 0.1844*** | 0.0671 | 0.2303*** | 0.0745 |
| Education Level (Versus High School or Less) | | | | |
| Some College | 0.0546*** | 0.0130 | 0.0294 | 0.0246 |
| Associate Degree | 0.0858*** | 0.0173 | 0.0174 | 0.0292 |
| Bachelor's Degree | 0.1109*** | 0.0138 | 0.0740*** | 0.0231 |
| Post Graduate Degree | 0.1247*** | 0.0190 | 0.0157 | 0.0267 |
| Financial Dependent Children (Versus No Dep.Child) | | | | |
| One child | 0.0133 | 0.0135 | 0.0201 | 0.0208 |
| Two children | -0.0167 | 0.0140 | 0.0291 | 0.0216 |
| Three children | -0.0046 | 0.0185 | 0.0202 | 0.0282 |
| Four children | -0.0237 | 0.0231 | 0.0011 | 0.0355 |

Notes: This analysis uses data from the FINRA Foundation 2021 NFCS state by state dataset. Survey weights are applied. *** indicates significance at the 1% level; ** indicates significance at the 5% level; * indicates significance at the 10% level.

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