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

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Abstract

Using the 2021 National Financial Capability Study (NFCS), this study examines the association between gender-based participation in employer-sponsored retirement plans and financial literacy. It also decomposes the association between gender-based participation in employer-sponsored retirement plans into its explained and unexplained portions using the Oaxaca decomposition. The explained portion measures how much of the gender gap in employer-sponsored, retirement-plan participation is due to the differences in the level of financial literacy. The unexplained portion measures how much of the gender gap in employer-sponsored, retirement-plan participation is due to the difference in the return to financial literacy between men and women. The results show that the explained portion of the gap due to financial literacy is -0.02, and the unexplained portion of the gap due to return to financial literacy is -0.03. The negative explained and unexplained gap due to financial literacy suggests that women have a lower average value of financial literacy and a lower return to financial literacy than men.

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Introduction

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 (U.S. Bureau of Labor Statistics, 2021).

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

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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 be at least 21 years old and have worked for the company for at least one year before becoming eligible 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. This ensures that everyone has equal access to employer-sponsored retirement plans and is subject to the same eligibility rules. If the employees meet those eligibility requirements, then there should not be a barrier to plan participation. However, participation is voluntary, and 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 (BLS 2020). The gap is even wider for women of color. Compared to 65% of White women, only 54% of Black women participated in employer-sponsored retirement plans in 2019 (BLS 2020).

A possible reason for this gender gap is that men and women face different social and economic conditions, both within and outside the household, which may lead to differing participation in retirement-savings plans (Clark & Strauss, 2012). One of these is labor force participation. According to 2018 World Bank data, gender gaps in education, discrimination, and social norms shape women's labor force participation decisions. They are less likely to join the labor force and work for pay than men and thus less likely able to access employer-sponsored plans. They are more likely to work part-time, in the informal sector, or lower-income occupations. The gender gap in earnings directly impacts women's ability to save for retirement as lower earnings result in reduced income available to save.

Beyond labor market factors, financial knowledge is one of the most important factors that influence how individuals make their financial decisions, especially when it comes to saving for retirement. Prior studies find that individuals with a higher level of financial knowledge are more likely to plan for retirement (Lusardi & Mitchell, 2011). However, research also shows that women tend to have lower levels of financial literacy than men, which may contribute to the gender gap in retirement preparedness (Anderson & Collins, 2017). Therefore, this study places a special emphasis on financial literacy as a key factor when examining gender gaps in retirement plan participation. Other reasons women are less prepared for retirement that are suggested by prior research point to their unpaid caregiving, risk tolerance, investment choices, saving behavior, earnings, information sources, and education (Bajtelsmit & Bernasek, 1996; Feng et al., 2019; Weller & Tolson, 2017; Zhao & Zhao, 2018). Beyond these observable factors, there may also be an unexplained gap in retirement savings decisions that may be due to unmeasured characteristics that are correlated with measured ones. To investigate this, the current study uses the Oaxaca decomposition method, a widely accepted approach for identifying separately the explained and unexplained sources of differences in outcomes. This technique has previously been used in many research studies to investigate the gender pay gap and discrimination (Anspal, 2015).

This study uses this method to examine how measured characteristics such as financial literacy are related to plan participation, that is, how differences in the level of financial literacy between men and women (the explained portion) lead to differences in participation, all else equal, and how differences in the return to financial literacy (the unexplained portion—due to differences in regression coefficients) lead to differences in participation. Other demographic

characteristics that are examined include age, level of education, race, home ownership, income, and risk tolerance. Thus, the following research questions are addressed:

(1) What factors explain the gender gap in retirement plan participation among single, employed individuals?

(2) How do financial literacy and other variables contribute to the explained and unexplained portions of this gap?

The analysis sample is made up of single, employed individuals, a group that hasn't been studied much previously. However, it is important to study this group because they alone are responsible for their own retirement savings. Studying the behavior of single individuals to learn more about what influences their retirement plan participation will help financial planners understand how to better support single individuals with their retirement planning.

The results show that single women's participation in employer-sponsored retirement plans is slightly higher (1.36 percentage points) than male worker's participation a surprising result as it is different from what is found with an all-female-worker sample (BLS 2020). Objective financial knowledge, age, income, education, homeownership, and risk tolerance are all associated positively with employer-sponsored, retirement-plan participation.

Literature Review

Previous research finds that women are less prepared for retirement than men and finds that financial knowledge, unpaid caregiving, risk tolerance, investment choices, saving behavior, labor force participation, and information sources are potential reasons for women's lack of retirement preparedness (Bajtelsmit & Bernasek, 1996; Bajtelsmit & Van Derhei, 1997; Dietz et al., 2003; Huang & Curtin, 2019). However, this research has not focused on single individuals who, unlike married individuals, bear sole responsibility for their financial future, and may behave differently from the population as a whole.

Financial Knowledge

The terms financial literacy and financial knowledge have often been used interchangeably in the literature (Huston, 2010). Some researchers examine the role of financial knowledge in retirement-savings decisions. Anderson and Collins (2017) find that men possess greater financial knowledge than women, which contributes to the observed gender gaps in retirement savings. This increased financial knowledge allows men to better understand the features and benefits of employer-sponsored retirement plans, leading to greater confidence and participation in these plans. Similarly, Bucher-Koenen et al. (2017) find that women are less likely than men to provide correct answers to questions about basic financial concepts and are more likely to say that they do not know the answer. This gender gap in financial literacy is concerning, especially since women tend to live longer and are more likely to experience widowhood in retirement (Hsu, 2016). Recent studies such as those by Harahap et al. (2022), Preston and Wright (2023), and Tomar et al. (2021), confirm that financial literacy is a strong predictor of retirement-planning behavior and highlight the importance of financial education.

Unpaid Caregiving

Analyzing data from the Survey of Consumer Finances (SCF) from 1989 through 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 (Lee & Tang, 2015; Reinhard et al., 2012). These disparities are particularly significant for single women who lack the support of a partner. While caregiving is not directly analyzed in this study due to data limitations, it remains a relevant context for understanding the gender gap.

Risk Tolerance

Some researchers have examined the relationships between risk tolerance and retirement savings and wealth accumulation.

Previous studies find that, compared to women, men exhibit a higher level of risk tolerance (Bollen & Posavac, 2018; Gibson et al., 2013). Spivey (2010) finds a similar result using data from the National Longitudinal Survey of Youth 1979. This increased risk tolerance of men could translate into a more proactive approach to retirement planning, including participation in employer-sponsored retirement plans. Dwyer et al. (2002) and Kappal and Rastogi (2020) confirm that risk aversion leads women to invest less in risky assets. However, Dwyer et al. (2002) and Kappal and Rastogi (2020) also note that improved financial knowledge can help reduce this gap, highlighting that targeted financial education may be an effective solution.

Savings Behavior

Differences in saving behavior between men and women can contribute to the gender gap in employer-sponsored, retirement-plan participation. Various societal, cultural, and individual factors often influence these differences. Fisher et al. (2015) investigate the differences in savings behaviors between genders with 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 behaviors. 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.

Labor Force Participation

Differences in labor force participation between men and women can contribute to the gender gap in employer-sponsored, retirement plan participation. Various employment and workforce factors shape this gap. Men and women often work in different industries or roles, and some sectors are more likely to offer retirement benefits than others. As a result, access to employer-sponsored plans can vary significantly by gender. Cordova et al. (2022) and Sierminska et al. (2010) find that women's lower labor force participation leads to lower retirement wealth accumulation. Women more frequently work part-time, possess more diversified work histories influenced by childbearing, and experience more frequent job changes (Berger & Denton, 2004; Niessen-Ruenzi & Schneider, 2019). This study's focus on employed individuals ensures that differences in employer-sponsored, retirement-plan participation are not influenced by variations in employment status, thereby enhancing the reliability of the findings.

Information Sources

Access to financial information also differs by gender. Studies have found that women report lower levels of confidence and familiarity with financial concepts than men (Chen & Volpe, 2002; Loibl & Hira, 2006). Graham et al. (2002) also suggest that information-processing styles may lead to differences in financial strategies. While this factor is not directly included in the model, its indirect effects may be captured through variables such as education or financial literacy.

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 factors that are unobserved or not included in the model, such as discrimination and bias, social and cultural factors, work-life balance, and caregiving responsibilities. According to the U.S. ERISA Act, there should not be any discrimination between men and women in attaining employer-sponsored retirement plans. However, 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 and 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.

Theoretical Framework

This study's theoretical framework draws from the Life Cycle Hypothesis (Ando & Modigliani, 1963) and Human Capital Theory (Becker, 1994). The Life Cycle Hypothesis suggests that individuals plan their consumption and savings across different stages of life to maintain a consistent living standard. Human Capital Theory suggests that investments in education and training enhance a person's skills and knowledge, which in turn increases their economic productivity and value. Financial literacy, a form of human capital, has been associated with increased retirement preparedness and a more proactive approach to long-term financial planning (Mitchell & Lusardi, 2022).

Building on this theoretical foundation, this study hypothesizes that individuals with higher levels of human capital, measured by objective financial literacy, are more likely to participate in employer-sponsored retirement plans, all else equal. However, the returns to financial literacy may differ between men and women due to discrimination or to unmeasured factors correlated with measured ones. The use of Oaxaca decomposition allows separation of these differences into two parts: one based on levels of financial literacy (explained), and the other based on the return to financial literacy (unexplained).

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. Owning a home often indicates greater financial stability and long-term planning, which can encourage individuals to be more proactive about retirement planning. Therefore, homeownership is expected to have a positive relationship with participation in employer-sponsored retirement-savings accounts.

Higher-income increases the financial resources available to the respondents to save for retirement. Therefore, a household's annual income is expected to be related positively to participating in an employer-sponsored, retirement-savings account. Ownership of financial assets is influenced by risk tolerance, as financial assets are often risky (Nguyen, 2015). Therefore, financial risk tolerance is expected to have a positive relationship with participating in an employer-sponsored retirement savings account.

Data

This paper uses data from the 2021 National Financial Capability Study (NFCS). The NFCS is a project of the FINRA Investor Education Foundation. The online state-by-state survey was administered from June through October 2021 to a sample of 27,118 American adults. The survey includes approximately 500 respondents per state, including the District of Columbia. Weights are provided to make estimates from the data nationally representative.

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 with underlying demographic, behavioral, attitudinal, and financial literacy characteristics.

The analysis in this paper focuses on single, employed individuals and 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. Observations with missing or non-informative responses, such as “don’t know” or “prefer not to say” were excluded from the analysis. These responses do not contribute to measuring financial literacy scores or estimating risk tolerance and other categorical variables. This approach is consistent with previous studies using NFCS data (Olajide et al., 2024; Pandey & Guillemette, 2024). Missing data were not imputed, as most variables are categorical and imputing them would introduce additional, potentially untenable, assumptions. This study also excludes self-employed individuals as they are less likely to have a retirement plan through their employer. To abstract from the hours of work decision, a sensitivity analysis is performed on the subsample of full-time employed individuals.

The analysis sample size is 4,136. Table 1 presents comparisons of the means of demographic variables across the full and analysis samples to show the representativeness of the analysis sample. There are some statistically different means between the full and analysis samples. These are for the female and White variable. Seventy one percent of the full sample consists of White individuals, whereas 61% of the analysis sample is White. Fifty one percent of full sample is female, whereas 49% of the analysis sample is female.

Because this paper 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 dependent variable in the analysis 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 survey data unfortunately does not include information on whether retirement plans were offered in the first place. This omission could lead to omitted variable bias if the availability of retirement plans is not randomly distributed across demographic groups. For example, if women are offered retirement plans less often than men due to employment in sectors or jobs with lower benefits, then the observed gap in participation may not fully reflect the actual difference in access. To address this, we performed a sensitivity analysis using a sample of full-time employees, who are generally more likely to have retirement plan offers from the employers. This helps somewhat mitigate the issue by focusing on a group where plan availability is more consistent.

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 and ranges from 0 to 6. This six-question index has been widely used in financial capability research and reflects core concepts essential to effective retirement planning (Lusardi & Mitchell, 2011). However, it has limitations, as it measures only objective knowledge and does not account for other aspects of financial capability, such as behavioral application, confidence, or self-efficacy. Therefore, while valuable, this index may not fully capture the broader financial decision-making abilities that influence retirement plan participation.

Other explanatory variables are age, level of education, White race, home ownership, income, and risk tolerance. 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 $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). Due to the limited number of observations in certain response categories, the responses are recoded 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. The third category is high risk tolerance, which includes responses ranging from 8 to 10. Medium-risk tolerance and high-risk tolerance are included in the regression, with the reference category being low-risk tolerance.

Table 2 presents descriptive statistics for all variables for the analysis sample and separately for males and females. In the 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 55.59%. The percentage of females in the overall sample is 49%. In the female sample, the percentage of individuals with employer-sponsored retirement plans is 56.95%. 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. Thirty percent of males have a bachelor's degree or higher, and 35% of females have a bachelor's degree or higher. Thirty-two percent of males said they are high risk tolerant, but only 19% of females 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 also provides the descriptive statistics for the other demographic variables.

Table 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	0.7063	-5.9568	1.0000
	(0.0030)	(0.4554)		
Income($50K-$75K)	0.1940	0.2091	-2.2696	0.9884
	(0.3955)	(0.4067)		

Table 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						
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.*

Model

A linear probability model is estimated separately for men and women in order to decompose the gap in participation into its explained and unexplained portions.

$$\text{Model 1 (Male):}\quad ERS_i = \beta_{0m} + \beta_{1m}\,finlit_i + \gamma_m\ X_i + V_{mi}$$

$$\text{Model 2 (Female):}\quad ERS_i = \beta_{0f} + \beta_{1f}\,finlit_i + \gamma_f\ X_i + V_{fi}$$

where ERS_i is a binary dependent variable that takes a value of 1 if a respondent participates in an employer-sponsored, retirement-plan and 0 otherwise. β_0 is the intercept. β_1 is the association 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, race, home ownership, income, and risk tolerance. γ_m and γ_f are vectors of the slope parameters for age, level of education, race, home ownership, income, and risk tolerance. v_i is the error term that is assumed to follow a normal distribution. Robust standard errors are used to adjust for heteroskedasticity.

This study uses Oaxaca decomposition to compute how much of the gender gap in employer-sponsored retirement-plan participation is due to differences in levels of 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 regression coefficients). The Oaxaca decomposition is a statistical technique commonly used to break down differences in outcomes, such as earnings or participation rates between groups. It separates the total difference into two parts: one that is explained by differences in observable factors (e.g., financial literacy, income, education) and the other unexplained, often attributed to discrimination or unmeasured factors that are correlated with measured ones. This method is appropriate for analyzing gender gaps in

employer-sponsored retirement-plan participation, as it shows not only whether men and women differ in characteristics that influence retirement plan participation, but also whether they receive different returns to those characteristics.

Results

The coefficients and robust standard errors for the linear probability models are shown in Table 3 for both the male and female employed samples. Column "A" of Table 3 shows results for the male sample. Column "B" shows results for the female sample.

Consistent with the hypothesis, Table 3 results show that the relationship between objective financial literacy and participation in employer-sponsored retirement-savings plans is positive in both the male and female samples.

Table 3 also shows that the association between age and employer-sponsored, retirement-plan participation is positive for both male and female samples, suggesting that older individuals are more likely to participate. There is also a positive relationship between a respondent's education level and participation in employer-sponsored retirement plans for both the male and female samples. Similarly, income is positively associated with participation in employer-sponsored retirement plans for both groups. Finally, both risk tolerance and homeownership are positively associated with participation in employer-sponsored retirement plans for the male and female samples.

Table 3. Effects of Financial Literacy and Other Explanatory Variables on Employer-sponsored Retirement Plan Participation: Linear Probability Model (Main Model- 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
$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.*

Oaxaca Decomposition

Consistent with Oaxaca and Ransom (1994), the Oaxaca decomposition technique is used with the previous regression results to examine the gender gap in employer-sponsored, retirement -savings accounts. In particular this technique examines how differences in level of financial literacy and other explanatory variables can explain a portion of the gap and how differences in the return to financial literacy and other explanatory variables form the unexplained portion of the gap.

The gender gap in retirement-savings participation is $\overline{y}_m$ - $\overline{y}_F$, where $\overline{y}_m$ is the average retirement savings participation of males and $\overline{y}_F$ is the average retirement savings participation of females. Employer-sponsored retirement savings participation depends on financial literacy and other demographic and economic variables such as age, level of education, race, home ownership, income, and risk tolerance. 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 man i, β_M is the vector of effects of X_{iM} matrix of independent variables on Y_{iM}, μ_{iM} is the error term. Y_{iF} is the retirement savings participation for woman i, β_F is the vector of effects of X_{iF} matrix of independent variables on Y_{iF}, μ_{iF} is the error term. $\hat{\beta}_M$ is the vector of effects of matrix X on $\overline{Y}$. $\hat{\beta}_F$ is the corresponding vector of effects for women. The average values of X_m and X_F are $\overline{X}_M$ and $\overline{X}_F$.

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

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

This suggests that average retirement savings participation for men and women could differ either because $\overline{X}$ differs or because $\hat{\beta}$ differs - in the current study, either because the average level of financial literacy and/or other explanatory variables differ by gender or because the return to financial literacy and other explanatory variables differ.

Adding and subtracting $\hat{\beta}_m \overline{X}_F$ to the right side of the equation and rearranging and combining terms yields the famous Oaxaca decomposition of differences in means.

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

For each j,

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

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

In the equations 4, 5, and 6, 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, we divide equation (4) by the total gap in employer-sponsored plan participation ($\overline{Y}_F - \overline{Y}_M$) to put the two terms in percentage. The explained portion for each explanatory variable is $\frac{[\hat{\beta}_{jm} \times (\overline{X}_{jF} - \overline{X}_{jM})]}{\overline{Y}_F - \overline{Y}_M} \times 100$ and the unexplained portion for each explanatory variable is $= \frac{[(\hat{\beta}_{jF} - \hat{\beta}_{jM}) \times \overline{X}_{jF}]}{\overline{Y}_F - \overline{Y}_M} \times 100$. Adding explained and unexplained percentage for each explanatory variable add up to 100 percent.

Oaxaca Decomposition Results

This study examines the Oaxaca decomposition of the gender gap in employer-sponsored, retirement-plan participation for single, employed individuals. Table 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 4 also shows the total gender gap (explained and unexplained) in employer-sponsored, retirement-plan participation for single, employed individuals.

Table 4 shows that females and males have a 0.0136 (1.36 percentage point) gap in participation in employer-sponsored retirement plans. It means that females' participation in employer-sponsored retirement plans is 1.36 percentage points 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 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 literacy (-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 positive unexplained gap for age and education suggests that women in

these groups benefit more than men with similar characteristics. Women with higher education may make better use of employer-sponsored retirement plans, and younger women may be more engaged in planning for their financial future. The portion of the gender gap in participation in employer-sponsored plans explained by differences in financial literacy is -142.85%, and the portion due to differences in return to financial literacy is -236.01%. The negative explained and unexplained gap due to financial literacy suggests that women have a lower average value of financial literacy and a lower return to financial literacy than men. Figure 1 illustrates the explained and unexplained contributions of key variables to the gender gap.

Figure 1. Explained vs. Unexplained Contribution to Gender Gap (Key Variables)

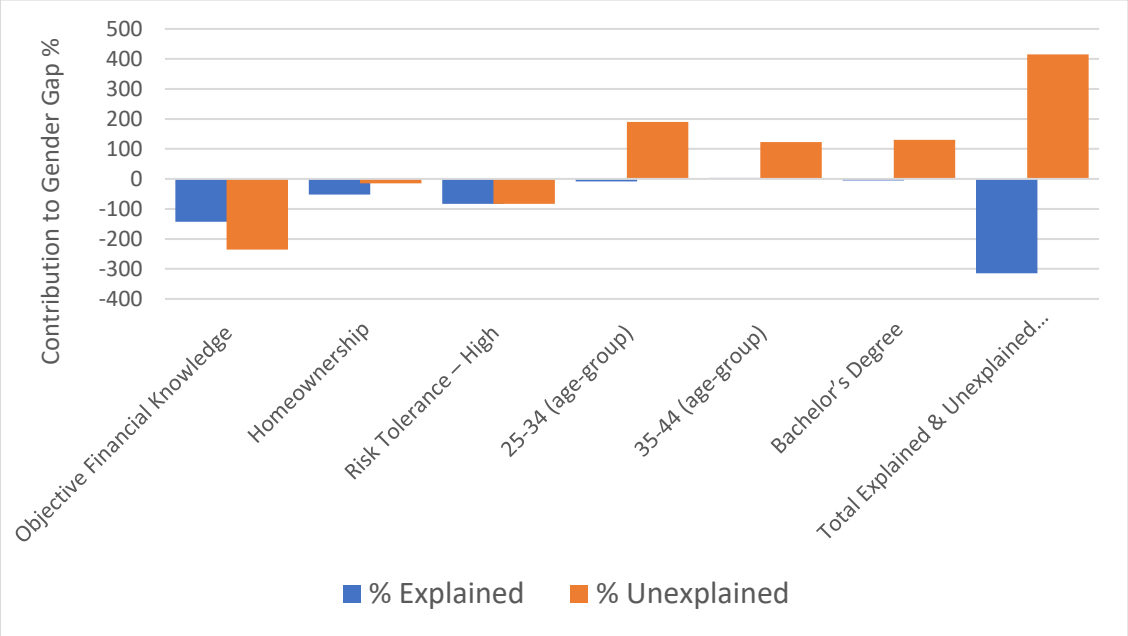

Table 4. Results from Oaxaca Decomposition (Main Model-Employed Sample)

	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
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%			

Sensitivity Analysis

This study also conducts a sensitivity analysis with single, full-time workers to abstract from the decision regarding the number of hours worked. Table 5 shows the results for this subsample. Column "A" of Table 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 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 6 shows the Oaxaca decomposition for the full-time employed subsample. The results of the sensitivity analysis are consistent with the main models. Table 6 shows that females' participation in employer-sponsored retirement plans is 2.07 percentage points higher than males. The portion of the gender gap in participation in employer-sponsored plans explained by differences in financial literacy is -101.81% and the portion due to differences in return to financial literacy is -121.46%.

Table 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
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 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
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%			

Discussion and Implications

This study finds that single women have a lower level of financial literacy and lower returns to financial literacy than single men. This indicates that single women are less knowledgeable about financial matters and benefit less from the financial literacy they possess in terms of participation in employer-sponsored retirement plans. While ERISA guarantees equal access to employer-sponsored retirement plans, these findings suggest that equal availability does not necessarily result in similar participation rates. Differences in financial literacy, along with demographic and economic factors, continue to create gaps in actual participation.

To address this, financial planners can collaborate with employers to develop and implement financial literacy programs specifically targeted at single women. These programs should cover important topics such as retirement planning, investment strategies, budgeting, and risk management. The format of these programs should be tailored to suit different audiences. For example, online modules or gamified learning tools may be more effective for younger workers, whereas in-person workshops or seminars may be more suitable for older individuals.

Developing tailored educational programs, such as workshops, online courses, and seminars specifically designed for women, focusing on fundamental financial concepts, might help increase financial literacy among single women. Additionally, financial planners can work with companies to incorporate financial literacy programs into their employee-benefits packages, encouraging participation among employees. Employers can incorporate financial literacy into employee wellness programs and provide incentives for participating in educational sessions or increasing retirement contributions.

The study also finds that single females have lower risk tolerance than single males. Financial planners can educate single females on risk management to improve their participation in retirement plans by offering one-on-one consultations to assess individual risk tolerance and provide tailored advice on suitable investment strategies. Arranging workshops that cover the basics of risk management, different types of risks, and how to balance risk and reward in investment portfolios might also be helpful. To help individuals overcome challenges like low income or risk aversion, employers and financial planners can recommend low-cost, diversified investments such as target-date or index funds. They can also break long-term goals into small, actionable steps to build confidence and encourage participation.

Furthermore, single women aged 25-34 and 35-44 have a much higher return on their retirement plan participation compared to single men. This suggests that, within this age group, women benefit more from their participation in employer-sponsored retirement plans, possibly due to better utilization of employer benefits, more favorable employment conditions, or other sociocultural factors influencing their participation. Financial planners can offer customized financial planning services based on age groups, addressing the unique financial needs and goals of single males and females. They can work with employers to create programs and workshops specifically designed for young professional women to maximize their retirement savings potential, encouraging early and consistent participation in employer-sponsored retirement plans to build a strong foundation for future financial security.

These findings also have important policy implications. Policymakers can improve access to retirement savings by supporting community-based financial literacy programs and mandating automatic enrollment in employer-sponsored retirement plans.

Finally, the results find that single males have significantly lower returns to bachelor's degrees than single females. Given the significant unexplained impact of having a bachelor's degree, financial planners should leverage the educational background of their clients to tailor more effective retirement planning advice.

Overall, the findings of this study contribute to both public policy and financial-planning practices by offering actionable recommendations to support retirement preparedness among single individuals.

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. This 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 likely to have worries about retirement and their financial future (Malone et al., 2010). They are solely responsible for their financial well-being. Single women may be more financially independent than married women and single men. 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 lifespans than men (Maklakov and Lummaa, 2013). This longer life expectancy may motivate single women to participate in retirement plans to ensure they have sufficient funds to support themselves later.

Limitations

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. This limits the ability to draw comprehensive inferences about the financial readiness of single individuals for retirement. Another limitation is the use of cross-sectional data which does not allow causal inference. The data provides a snapshot of the participation in employer-sponsored retirement plans at a single point in time, which means that any observed relationships between explanatory variables and retirement plan participation may not necessarily suggest causation. Longitudinal data would be

more appropriate for examining causal relationships but is not available for all relevant variables. The decision to use the 2021 NFCS data was driven by its comprehensive coverage of financial literacy, risk tolerance, and demographic and economic variables pertinent to the study. Future research could address this by utilizing longitudinal data to track individuals over time, allowing for the identification of causal relationships between financial literacy, other variables, and retirement plan participation.

The study focuses on financial literacy and other demographic and economic variables. However, another limitation of this study is that other important factors are omitted that may influence retirement plan participation, such as future time perspective, peer effects, workplace characteristics, employer matching contributions, and job stability. The exclusion of these variables may lead to omitted variable bias. They are not available in the data. In addition, the measure of financial literacy used in the NFCS may not capture all dimensions of financial knowledge and skills relevant to retirement planning. The financial literacy questions are limited in scope and may not fully reflect an individual's comprehensive understanding of financial concepts.

Finally, the Oaxaca Decomposition method assumes that the differences in retirement plan participation can be decomposed into explained and unexplained components based on observable variables. This method relies on the assumption that the model is correctly specified and that all relevant variables are included. One important limitation of this method is its assumption that the estimated coefficients accurately reflect true returns to the explanatory variables without bias. However, if the model is mis-specified or omits important variables, the resulting decomposition may produce biased or misleading estimates. While the method is useful for identifying gaps and their sources, its results should be interpreted with caution.

While the study advocates financial literacy programs and tailored retirement planning strategies, the implementation and effectiveness of these recommendations are not measured. Future research should assess the impact of specific interventions intended to increase retirement plan participation and reduce the gender gap.

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