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How Gender Shapes Financial Literacy and Retirement Savings: Evidence from U.S. Survey Data

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Abstract

Financial literacy provides individuals with the knowledge to improve their economic decision-making, contributes to greater financial stability, and is a strong predictor of retirement planning, as those who have higher financial literacy tend to plan more effectively for retirement. However, financial literacy is low worldwide and is unevenly distributed, with lower-income, less-educated women exhibiting lower financial literacy levels compared to their male counterparts. There are similar disparities within retirement planning, where more highly educated men are more likely to demonstrate retirement planning behaviors. This study utilizes the data from the 2022 wave of the United States based Survey of Household Economics and Decisionmaking (SHED) to examine the impact of gender on financial literacy. Additionally, the analysis explores the combined impact of financial literacy and gender on retirement planning. Using a probit regression model and controlling for socioeconomic variables, this research finds that women have lower levels of financial literacy and also contribute less to retirement planning; low financial literacy is also associated with poor retirement planning. The findings are robust in terms of both sign and significance and underscore the need for intervention. This study, unlike previous

research, examines all three variables in conjunction. Policies supporting financial literacy across all demographics could help close the gap in both financial literacy and retirement. Mandatory financial education as early as high school can also improve financial literacy and help close the educational gap between various populations.

Introduction

Globally, financial literacy rates are low; as of 2017, the rate was only 33% (Hasler & Lusardi, 2017). Financial literacy is defined as an individual's proficiency in general financial terms and concepts; the definition is rather broad because there are many different methods for measuring financial literacy, the most common being “The Big Three”, which was developed by Lusardi and Mitchell and first mentioned in their paper from 2007. Financial literacy has traditionally catered to higher-educated white males, because of the patriarchal system in which households have typically been run (Kaur & Hassan, 2018). While some households still follow historical precedent, many now have greater diversity in their makeup and in how they handle finances. Although it can be more of a shared responsibility, women still generally have lower financial literacy scores (Iwatsubo et al., 2025). Retirement is also greatly affected by gender and financial literacy; with women having longer life spans and lower financial literacy, they tend to fare worse in retirement (Hasler & Lusardi, 2017). Considering this background, this study aims to explore the following research questions. (1) What exactly is the relationship between gender, financial literacy, and retirement? (2) How does gender impact financial literacy? (3) How do gender and financial literacy together impact retirement?

Worldwide, there is a general lack of financial literacy; however, it is particularly prevalent among individuals with lower incomes and lower education (Lusardi et al., 2011). Overall, if individuals do have lower education levels, the education they do have will most likely not be financial literacy related, especially since it is not actively taught in primary or secondary schools. Specifically, in the United States, those who identify as Hispanic and African American also tend to have lower financial literacy scores (Lusardi & Mitchell, 2011), which could be due to education inequities or socioeconomic inequities. When looking globally at 148 countries, about 33% of adults are financially literate; even still, men have a 5% higher financial literacy rate than women (Hasler & Lusardi, 2017). Another study looked at 12 countries specifically, and the same trend holds: women score lower (Cupák *et al.,* 2018). Unfortunately, there is no current, accessible solution to raising global financial literacy rates, which causes an issue for the state of the world’s financial systems.

The study of gender and financial literacy is still a relatively recent topic, given that for so long, men were the sole providers in households, and there was no reason to consider

women's financial literacy. Although this research lacks longevity, it is imperative nonetheless; financial dependence cannot be placed solely on one gender, nor can the gap between men and women be ignored. When considering the current research, it has primarily produced results supporting the claim that women have lower financial literacy scores. The nature of these scores could be attributed to numerous factors, the predominant ones being accessibility, education gaps, and societal expectations. Although these reasonings may seem outdated, they are still prevalent in today's society, as well as the trickle-down effects of these reasons still affecting women today. Education gaps could be defined in two ways in this research: not only the educational opportunities, but also the actual interest in said education. Finance is a male-dominated field; therefore, women are less likely to break through societal barriers and remain a minority. It is a well-known psychological idea that those more alike are more likely to group; if there is an initial baseline of being male, women are less likely to want to join in. However, in one study, examining college students' majors and experience, women still scored lower on financial literacy (Chen & Volpe, 2002).

With the current research available, the financial literacy gap cannot be purely based on a singular factor; even still, with the factors proven to have an effect, there is no causality, and many factors build on each other, for example, the wage gap (Kaur & Hassan, 2018). According to the U.S. Department of Labor, women tend to work in less analytical fields and more in caregiving fields, meaning they will not require the same level of education that men need in their stereotypical fields of study (Chen & Volpe, 2002). Women are expected to take on natural caretaker roles, whether it's for their job, their family, or even their community. By taking on these extra responsibilities, women often have to seek more flexible jobs, which typically pay less (Enda & Gale, 2020). With their lives preoccupied by the aforementioned obligations, finding time to learn financial literacy is difficult. Not only do women typically seek more flexible, lower-paying jobs, but they are also less likely to be promoted and hired over male candidates, thereby giving them fewer opportunities to build their wealth and retirement funds. The world, particularly Western culture, has been built and established with men in mind. Roads and the layout of cities were built for those who work predictable nine-to-five jobs, not those who predominantly work in sectors that are more care-based, particularly those that don't have as consistent schedules (Perez, 2019).

Although there are no direct barriers stopping women from pursuing financial careers, stereotypes and societal assumptions can heavily push women away. Although women have longer life expectancies, because of the career gap, they are much worse off in retirement (Enda & Gale, 2020). With longer lifespans, they spend more years being retired, and they will most likely have to cover their husbands' medical costs. Social Security is based on an individual's lifetime earnings, using one's 35 highest-earning years. It can vary

based on the age at which one accesses it, regardless of when they access it. Women's social security benefits are, on average, 80% of what men receive (Edna & Gale, 2020). Once in retirement, women have to limit their spending, considering it's a lesser amount of money for a longer period of time. Over the course of retirement, women can consume 7% less than men each year to preserve their retirement savings (Edna & Gale, 2020). Because of the lack of support for retired women, poverty rates for women tend to increase with age, and are even worse for women with children, regardless of how old the woman and child are (Enda & Gale, 2020).

To fully understand financial literacy, gender, and retirement, it is important to get a global perspective. In Australia, for example, there is a program aimed at boosting citizens' financial literacy and retirement planning (Wagland & Taylor, 2009). The purpose is to give individuals the opportunity to maintain a comfortable standard of living in retirement and to better prepare them for retirement in the first place. Australia is among the top 10 countries for financial literacy, suggesting this program could be effective (Hasler & Lusardi, 2017). Globally, financial literacy remains low, and the retirement age continues to rise. To properly plan for retirement, one should be financially literate, at least in terms of the necessary information for retirement, but many are not. Those who are not properly set up for retirement will likely not achieve their full financial potential in retirement (Clark *et al.,* 2012). It is important to be aware of when and how to retire to achieve the best outcome.

Financial literacy has a direct impact on retirement. Previous studies have shown that higher financial literacy leads to better retirement outcomes. However, financial literacy is extremely low, meaning many are generally not properly educated or prepared for retirement. People also tend to overestimate their knowledge of retirement, regardless of gender (Lusardi & Mitchell, 2011). Even among individuals with higher education, their financial literacy remains relatively low (Boisclair *et al.,* 2014). Generally, those who are more disadvantaged have worse retirement planning and subsequent outcomes. It is also relevant to note that the average retirement age has been increasing over the years, perhaps due to low financial literacy and complicated retirement options. If individuals do have lower financial literacy, it is understandable that they would have worse retirement outcomes. With lower financial literacy, individuals are less likely to have proper retirement knowledge.

The relationship between gender and retirement shares a similar gap as that between gender and financial literacy, possibly because of financial literacy disparities. Because of the impact of financial literacy on retirement, those same reasons may cause worse outcomes for women in retirement. If a woman has lower financial literacy, it is likely she won't be knowledgeable about retirement or retirement preparation. This research focuses on gender and financial literacy, with a specific emphasis on retirement, which makes it

unique. Not many papers focus on gender and retirement, so bringing in financial literacy within that focus is new. I aim to offer a post-COVID perspective on this issue. It could be interesting to test whether societal standards, the general hypothesis, or something distinct accounts for differences in men's and women's abilities in financial literacy; however, there is currently no available data to explore this. Based on previous research, the former is most commonly assumed; however, it could still be an interesting topic to study. This research contributes in the literature by analyzing the interaction between financial literacy and gender, particularly female, and how gender and financial literacy together affect retirement and retirement savings plan.

This study comprises 4 sections, in which Section 2 explains the literature, focusing on gender in each literary source. Section 3 consists of the data, variables, and methodology. Section 4 explains the results and findings of this research.

Literature Review

Although there is already literature on gender and financial literacy, I could not find any that specifically examines how retirement affects this topic. Previous literature on gender and financial literacy supports the idea that, on average, men have higher financial literacy than women. Literature also supports the idea that higher financial literacy is associated with better retirement savings.

Many factors contribute to retirement planning behavior; the main factor is financial literacy. As one might expect, better financial literacy can aid in one's retirement planning. There have been several studies conducted on this before, all showing a positive relationship between financial literacy and retirement planning. Park and Martin (2022) found a positive relationship among financial literacy, income, and savings with retirement planning. The overall conclusion of this study is that many factors support retirement planning, and no single factor can achieve adequate retirement savings. Chen and Volpe's 2002 research is a highly cited paper that is among the earliest studies on gender differences in financial literacy. This research had a significant impact on subsequent research in gender economics and finance. It examined college students while controlling for major and claims that there is still a difference between men and women, but attributes it more to societal pressure on women to be interested. Although one of the most prominent findings is that women generally have lower financial literacy than men, there are factors, including differences in confidence, income, education, and financial experience. This research also proves that financial programs need to address the complexity of individuals' differences in financial literacy. Arianti's 2018 research among Indonesian students concluded that financial literacy had no significant effect, while

financial behavior, income, and the three combined had effects on investment decision-making.

When discussing retirement preparation, one might want to consider age. One study by Clark *et al.* in 2012 examined employees of retirement-eligible age across three large companies to assess whether age played a role in retirement knowledge. However, they found that, rather than age being the leading factor, knowledge about retirement in general, Social Security, Medicare, and one's specific employee pension plays a much larger role in determining one's retirement preparedness. Most respondents had little knowledge of their general retirement benefits, which ultimately was the biggest tell of how well-off an individual would be in retirement. Other papers have also concluded that age cannot predict retirement; other factors can, and age simply happens to correlate with them. Kaur and Hassan conducted a study in 2018 about age, gender, income, education, and financial literacy in relation to retirement planning, specifically in Malaysia. Their findings supported Clark et al.'s paper, stating that age was insignificant in retirement planning, whereas this paper highlighted that income, education, and financial literacy had positive impacts on retirement. A study conducted in Japan on age, gender, and financial literacy by Okamoto and Komamura found that financial literacy increases with age but declines around age 60, the retirement age. This result does make sense, considering the population age range was from 18 to 79 years old; someone who is just starting their personal financial journey, compared to someone who has at least 60 years on their journey, should have differing levels of financial literacy. In 2011, Hurd and Rohwedder published a paper examining older individuals in the United States to determine whether those closer to retirement were better prepared than those further from it. Their findings were that those closer to retirement were generally more prepared; however, those who are single and less educated were at greater risk of not being prepared for retirement. A study conducted in Ireland by Nolan *et al.* (2019) explored the gender pension gap, income poverty, and financial decision-making, specifically among older adults. On average, women received less pension income than men, although the difference was not due to the state pension but to supplementary pensions.

The other focus of this paper is gender and its relationship to both retirement and financial literacy. Many research studies have examined gender and financial literacy, and almost all conclude that women have lower financial literacy than men. Additionally, according to Cupák (2018), women in more developed countries have lower financial literacy rates, according to one study. In ten of the twelve countries, three-quarters of the overall literacy gap is attributed to unexplained factors. Women in non-developed countries have little difference in financial literacy in comparison to men. Hasler and Lusardi examined data from 140+ countries to provide a global perspective on the gender gap in financial literacy. Overall, most adults are not financially literate, but even so,

women are less financially literate, regardless of income level. In 2018, a paper by Potrich, Vieira, and Kirch again showed that general financial literacy is low. Still, women continued to score lower, with lower income, lower education, and those who are single contributing to the lower scores. Unfortunately, most papers have simply stated how gender is an issue when it comes to financial literacy but not much has been enacted to change that issue. One study conducted in Japan in 2025 by Iwatsubo *et al.* found that women had better financial literacy than men in household management and prudent financial practices; however, men generally performed better in general financial literacy.

A study conducted in Australia by Wagland and Taylor (2009) found little to no difference between male and female undergraduate business students, which helps support the idea that, when given equal opportunity, men and women should generally fare the same in financial literacy. There is a program in Australia that requires employers to make contributions to a special retirement fund, called a superannuation fund, which both employers and employees can contribute to. The current rate is 12% of an employee's ordinary time earnings (OTE), and it changes frequently, but is always based on the employee's OTE. This typically includes employees under 18 who work at least a 30-hour workweek, as well as most employees over 18. This study specifically builds on the research by Chen and Volpe (2002) and applies it to the Australian context. The significance of recognizing this system is how it could be implemented in other countries. Australia is one of the top ten countries for financial literacy; maybe this program has something to do with that. Research completed in the US on 12th graders and then adults in general showed that everyone has low financial literacy. Even among adults in the US, many have few assets and high levels of debt. It's predicted that people will lean very heavily on social welfare because they haven't saved up enough for retirement. In research analyzed by Smith (2025), many people believe that providing government benefits will cause people as work less hard and rely primarily on those benefits.

Education, whether finance-specific or general, affects both retirement and financial literacy. Lusardi has contributed to multiple papers on financial literacy and education. There have also been studies examining how race might contribute to one's financial literacy. A study conducted by Lusardi and Mitchell (2011) on the National Financial Capability Study suggests that this is not only true among young, less-educated women but also among Hispanics and African Americans. Lusardi et al., (2011) find that those with higher financial literacy are generally wealthier.

Previous literature states that women have lower financial literacy because of a lack of educational resources, societal structures, and stereotypes. Women's financial literacy has historically been low, partially because for a very long time, they were not allowed or expected to have any kind of part in financial dealings. Previous literature has also supported that financial literacy and retirement outcomes are positively correlated, and

women typically have worse outcomes in retirement. Retirement setup is not made for women, at least, the lead-up to it is not. Social Security benefits men more than women; women have longer life expectancies and typically have less money to spend in retirement. Because higher financial literacy leads to better outcomes in retirement, and women have low financial literacy, it is only logical that women have worse retirement outcomes.

In this research, there are two main hypotheses:

Hypothesis 01: Women have lower financial literacy in the United States.

Gender differences are prevalent in many historically male roles, like handling finances. Although women do have the freedoms today to increase their financial literacy, that does not mean things are now equal. Women consistently have lower financial literacy than men (Hasler & Lusardi, 2017). There is not equal access to financial education, nor have the stereotypes of the field of finance.

Hypothesis 02: Women have lower financial literacy, and they also have worse outcomes in retirement.

Gender differences in financial literacy continue into retirement and retirement planning. Financial literacy has a positive effect on retirement (Kaur & Hassan, 2018), therefore it is predicted that if women already have lower financial literacy, it would be likely that they would also have worse retirement planning and subsequent outcomes. Retirement was also created with men in mind, considering they were the only ones who could participate in it for a very long time (Edna & Gale, 2020).

Data, Variables, and Methodology

Data and Variables

This paper uses data from the 2022 wave of the Survey of Household Economics and Decisionmaking (SHED). This data source is the most comprehensive data available for the United States. Although the United States is one of the most researched countries in these topics, this data is the most reliable and accessible. The Survey of Household Economics and Decisionmaking is an annual online survey conducted via address-based sampling that asks about households' financial well-being, including credit access and behavior, savings, retirement, economic fragility, and education and student loans, among other topics. The Federal Reserve Board conducts the survey, and it has been conducted since 2013. The data being used was collected individually from late October 2021 to early November 2021 and included around 11,000 American adults. The limitations of this data include the method of collection (voluntary and by mail address) and its nonlongitudinal nature; however, the latter should cause no concern regarding what is being studied.

The primary variables include gender, financial literacy, and retirement planning, with the assumption that gender affects financial literacy and that gender and financial literacy

affect retirement. Of the three, the simplest variable to measure is gender; this data uses male as the base, with 51.63% of individuals being male. Retirement Planning has been condensed to a single variable from an initial question asking if one has any kind of retirement savings plan, specifically outlined in the data as one of the following: 401(k), 403(b), Keogh, other defined contribution plans through an employer, pension plan, IRA, Roth IRA, savings outside of a retirement account, owning a business or real estate that will provide income, or other retirement savings, with 68.47% of respondents saying yes to at least one type. Although a savings account does not necessarily define one's preparedness for retirement, it can be a good indicator that individuals are at least considering saving for retirement. Financial literacy and retirement are measured using results from several survey questions that fully cover these topics. Financial literacy will be measured using The Big Three financial literacy questions developed by Lusardi and Mitchell (2007), which include questions about interest, "Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, how much would you be able to buy with the money in this account?", 74.30% of respondents answered the interest question correctly. The next question is about inflation, "Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow?", 75.74% of respondents answered the inflation question correctly. Finally, there is a question about stock diversification in relation to risk, "Do you think the following statement is true or false? "Buying a single company's stock usually provides a safer return than a stock mutual fund", 68.60% of respondents answered the risk question correctly. There is also a variable measuring the percentage of those who got all three questions correct, which was 50.72%, and was simply named financial literacy.

The retirement planning variable has already been defined, but other variables are included in the retirement section. There is how risky an individual is willing to be, their credit score range, whether they have emergency funds set aside to cover at least three months' worth of expenses, and whether they have applied for a mortgage in the past 12 months. Risk willingness is defined using the measure employed by Nawaz and Noel (2025). The 3-category scale provides a clear, concise range of an individual's risk willingness: low, with 40.87% of respondents, medium, with 49.11% of respondents, and high, with 10.01% of respondents. Although credit score, which 86.57% of respondents have at least a good credit score, is not specifically a measure of retirement planning, it can be a predictor of one's financial knowledge and subsequent retirement outcome. Credit scores are categorized into two: those with good credit scores and those with poor credit scores; the specifics of each category are not relevant to this research, but rather whether one has good credit scores to predict some financial knowledge and a general understanding of credit. The emergency funds category, with 53.31% of respondents

having emergency funds, is again not specifically a measure of retirement planning; it can be an indicator that an individual is planning for the future, suggesting they might also be considering retirement planning. Mortgages can be a lifelong debt that an individual pays; therefore, including them in this data set is important when considering an individual's overall debt, with 18.65% of respondents claiming to have taken out a mortgage in the past 12 months.

Included in the demographics are the standard: race, age, marital status, and education level, and I have added household size, employment status, and region. Race is typically defined in four categories: with 65.66% of respondents being White, 11.37% being Black, 14.15% being Hispanic, and some combination of Asian and other being 8.82%. Age is separated into three categories: with 23.17% of respondents being between 25 and 34, 46.65 being between 34 and 54, and 30.19% being between 55 and 64.

Table 1. Description of Variables

Variable	Definition	Mean (%)
Financial Literacy[1]		
Financial Literacy	= if answered three financial literacy questions correctly	50.72
Interest Knowledge	= 1 if respondent correctly answered	74.30
Inflation Knowledge	= 1 if respondent correctly answered	75.74
Risk Knowledge	= 1 if respondent correctly answered	68.60
Retirement Planning:		
Retirement Planning[2]	= 1 if respondent has some type of retirement savings	68.47
Risk Willingness		
Low Risk Willingness	= if their risk willingness between 0 and 3	40.87
Medium Risk Willingness	= if their risk willingness between 4 and 7	49.11
High Risk Willingness	= if their risk willingness between 8 and 10	10.01
Credit Score (Omitted: Poor, Very Poor, Don't Know)	= if their credit score is fair, good, or excellent	86.57
Emergency Funds	= 1 if set aside funds that would cover 3 months' expenses	53.31
Mortgage	= 1 if applied for mortgage in the past 12 months	18.65
Demographics:		
Gender	= 1 if respondent is female	48.37
Race (Omitted: White)		
Black	= if respondent is Black	11.37
Hispanic	= if respondent is Hispanic	14.15
Asian	= if respondent is Asian or other	8.82
Age[3] (Omitted: 25-34)		
35-54	= if respondent's age is between 35 and 54	46.65
55-64	= if respondent's age is between 55 and 64	30.19
Household Size	= mean (number of people)	2.82
Marital Status (Omitted: Single)		
Married	= 1 if respondent is married	58.94
Divorced	= 1 if respondent is divorced or separated	11.77
Widowed	= 1 if respondent is widowed	1.68

Self-Employed	= 1 if respondent's primary job is self-employed	9.67
Education Status (Omitted: Less than High School)		
High school	= if has high school diploma or equivalent	48.05
Bachelor's	= if respondent's highest degree is a bachelor's degree	27.21
Master's or Higher	= if respondent has some post-graduate education	18.98
Region		
Northeast	= if respondent lives in the Northeastern United States	17.25
Midwest	= if respondent lives in the Midwestern United States	22.29
South	= if respondent lives in the Southern United States	37.68
West	= if respondent lives in the Western United States	22.79
Income[3]:		
Under $20,000	= if respondent's household income is under $20,000	22.06
$20,000-$39,999	= if household income is between $20,000 and $39,999	10.82
$40,000-$59,999	= if household income is between $40,000 and $59,999	10.32
$60,000-$79,999	= if household income is between $60,000 and $79,999	10.70
$80,000-$124,999	= if household income is between $80,000 and $124,999	18.68
$125,000-$149,999	= if household income is between $125,000 and $149,999	5.49
$150,000 and over	= if household income is $150,000 or more	21.95
Total Income (In Thousands)	= mean (natural log of thousands of dollars)	13.48

1. Lusardi & Mitchell, 2007
2. This includes 401(k), 403(b), Keogh, other defined contribution plans through an employer, pension plan, IRA, Roth IRA, savings outside of a retirement account, owning a business or real estate that will provide income, or other retirement savings.
3. Boisclair *et al.,* 2014

In this data, those under 25 and those 65 and older were excluded because those under 25 are considered too young to be included in retirement data, and those over 65 are likely retired, making them not applicable to include when considering retirement data. Household size is simply the mean number of individuals per household, with 2.82 being the average number, suggesting that households predominantly have at least one dependent. Marital status is separated into four categories: with 27.60% of respondents being single, 58.94% being married, 11.77% being divorced or separated, and 1.68% being widowed. Employment status was not easily defined in the data examined; therefore, I simply examine those who are self-employed, which was 9.67% of respondents, versus those who are not self-employed, which was 90.33% of respondents. Education is defined by four categories: with 5.76% of respondents having less than a high school diploma, 48.05% having a high school diploma or equivalent, 27.21% having at most a Bachelor's degree, and 18.98% having a Master's or higher degree. Finally, the variable region is defined simply as Northeast, with 17.25% of respondents, Midwest, with 22.29% of respondents, South, with 37.68% of respondents, and West, with 22.79% of respondents. Income is the last category of variables and is based on the paper by Biosclair et al. (2014). There is also a total income variable that has the log taken to make it more comprehensible.

Previous research has supported the idea that higher financial literacy will provide a more successful and wealthy retirement (Clark et al., 2012). Previous research has also supported the idea that women are worse off for retirement, because of their gender identity (Enda & Gale, 2020). It can be concluded that the majority of the reasons behind the gender financial literacy gap are similar to those in the retirement gender gap, including the wage gap, access to educational tools, and gender stereotypes. This research will consider those factors when analyzing and interpreting the data.

Econometric Method

This paper uses cross-sectional data to understand of how financial indicators have changed in the United States post-COVID. The dependent variable is financial literacy and take value equal to “o” and “1”. Hence, this research uses probit regressions of the data to understand the relation between gender and financial literacy.

$$FinancialLiteracy^*_i = \alpha + \beta Female_i + \theta^M MediumRiskTolerance_i + \theta^H HighRiskTolerance_i + \sum_{j=1}^{N} n_j X_j + \varepsilon_i \qquad (1)$$

$FinancialLiteracy^*_i$ is a binary variable that measures if respondents answered all three financial literacy questions correctly. $Female_i$ is defined as a binary variable of either male or female, 0 or 1. $MediumRiskTolerance_i$ represents respondents that answered under medium risk willingness while $HighRiskTolerance_i$ represents respondents that answered under high risk willingness, with low risk tolerance being the omitted reference variable. The remaining variables represent all other control variables and ε_i is the normally distributed error term.

$$RetirementPlanning^*_i = \alpha + \beta FinancialLiteracy_i + \beta Female_i + \theta^M MediumRiskTolerance_i + \theta^H HighRiskTolerance_i + \sum_{j=1}^{N} n_j X_j + v_i \qquad (2)$$

$RetirementPlanning^*_i$ is a binary variable that measures if respondents had any sort of retirement savings plan set up. Other variables shave already defined above.

Results and Discussion

Summary Statistics

To start, the data is examined and initial concepts of relations start to form before examining correlations. It is found that at least half of the respondents answered at least one financial literacy question correctly, with the highest percentage of correct answers associated with the inflation question. Unsurprisingly, risk knowledge is the lowest category; individuals have a more basic understanding of inflation and interest rates, since these are the most necessary topics. Retirement planning has slightly more than the majority of respondents claiming to possess some sort of retirement savings, allowing for representative data for both those who possess and do not possess retirement savings.

Table 2. Financial Literacy and Retirement Planning

	Financial Literacy	Interest Knowledge	Inflation Knowledge	Risk Knowledge	Retirement planning
Gender:					
Female	41.22	67.79	70.04	62.82	64.72
Male	59.61	80.40	81.09	74.02	71.99
Age:					
25-34	47.93	68.95	75.30	65.67	71.67
35-54	49.55	72.06	75.80	68.43	73.86
55-64	54.65	81.87	76.00	71.13	57.70

Table 2 analyzes the primary variables, gender, financial literacy, and retirement planning, as well as age. Across the table for financial literacy, interest knowledge, inflation knowledge, risk knowledge, and retirement planning, females have a lower mean than males do. Although not all differences are large differences, there is still an apparent differentiation between females and males. The largest gap is in financial literacy (41.22% versus 59.61%); this is interesting, yet predictable. The variable is defined as individuals who responded correctly to all three questions, meaning even if there are smaller gaps within each question between men and women, overall, men perform better when considering all three questions. Again, across the table, there is a consistent pattern with age and financial literacy, interest knowledge, inflation knowledge, risk knowledge, but not retirement planning. In almost every category, the correlations increase in percentage as individuals increase with age, except for retirement planning. Retirement planning could be skewed unusually because of possible early retirement, or because of individual life costs (i.e., children's college, parents' healthcare). Although there are many possible reasons for the deviation in trend, the data used does not allow for the specificities of why certain correlations result in unusual results.

Table 3 extends the analysis further about financial knowledge and financial risk. Financial risk also has the majority in the average answer; respondents answered somewhere in the middle of the risk-willingness scale, with slightly less answering on the low side and very few answering at a high-risk response. It could be interesting to analyze whether there is a relationship between age and willingness to take financial risks: are younger individuals, who have less to lose, more likely to take more risks? Emergency funds are evenly distributed between those who do and those who do not have enough money set aside to cover three months' worth of expenses. Credit score has the majority of respondents claiming to have a fair, good, or excellent credit score, assuming the majority of the sample has at least some basic financial knowledge. Mortgage has a relatively small percentage of respondents who have applied for a mortgage in the past twelve months. The only issue with this variable is does not measure any individual who currently has a mortgage that was applied for more than twelve months ago, meaning this population should represent newer homeowners.

Table 3. Financial Literacy and Risk Correlation

	Financial Literacy	Interest Knowledge	Inflation Knowledge	Risk Knowledge	Low Risk Willingness	Medium Risk Willingness	High Risk Willingness
Retirement Planning	58.64	80.14	82.86	73.64	33.60	54.82	11.58
Emergency Funds	63.10	82.37	84.52	76.74	29.54	57.63	12.83
Credit Score	54.96	78.06	78.93	71.38	36.85	52.46	10.70
Mortgage	62.82	85.20	85.92	74.55	32.13	53.25	14.62

Retirement planning's correlation with all variables seems logical. If an individual has a higher financial risk willingness score, it is logical that they will also have a lower likelihood of having substantial, if any, retirement planning. It is also worth noting how all financial literacy variables have at least 50% of respondents possessing both financial literacy and the various retirement variables: retirement planning, emergency funds, credit score, and mortgage. The relationship between retirement planning and risk willingness is interesting to examine, given that younger individuals are less likely to have retirement plans. It is also assumed that those who report a high willingness to take on risk are also less likely to have emergency funds to cover three months of expenses. Generally, risk knowledge is lower for both retirement planning and emergency funds, consistent with the data's overall percentages. It is fascinating to consider credit scores' correlation to financial literacy and then the subsequent financial literacy questions.

Table 4 extends it using the financial literacy and financial risk against education categories, marital status, and regions. There is generally a very low percentage of respondents who do not at least have their high school diploma or equivalent. Most

respondents have less than a Bachelor's degree but more than a high school degree, with the second highest category being those with at most a Bachelor's degree. These percentages mean that our population possess an average to higher level of education, considering the lowest level is rather small and the highest level isn't significantly larger. Marital status has the highest percentage of married individuals, with the next highest being single individuals. There are rather low percentages of respondents that are not married or single, which provides a straightforward perspective; there is a very small percentage of individuals who at one point may have relied on a spouse for financial handlings but no longer has that. Regions are mostly evenly represented, with all regions having around 20% of individuals.

Table 4. Financial Literacy Correlation and Retirement Planning

	Financial Literacy	Interest Knowledge	Inflation Knowledge	Risk Knowledge	Retirement Planning
Education Status:					
Less than H.School	14.81	47.61	44.87	43.51	22.10
High School	36.90	66.10	66.89	59.60	57.42
Bachelor's	65.99	84.18	87.07	78.29	84.95
Master's	74.69	89.00	91.29	85.13	86.93
Marital Status:					
Single	42.61	65.29	69.47	62.58	62.15
Married	57.00	79.31	80.27	73.21	74.75
Divorced	40.13	70.35	69.90	60.09	55.18
Widowed	37.50	74.22	60.94	65.62	45.31
Region:					
Northeast	52.89	75.11	79.07	69.25	71.99
Midwest	53.42	75.09	77.03	70.67	73.44
South	46.95	72.17	73.08	65.83	63.36
West	52.65	76.44	76.38	70.68	69.41

The correlations between education status and financial literacy, interest knowledge, inflation knowledge, risk knowledge, and retirement planning are predictable and consistent with a trend of an increase in percentages as education increases. Although there isn't a large difference between retirement planning with Bachelor's and Master's (84.95% versus 86.93%), it is still consistent with higher education levels having higher, positive outcomes. These results are consistent with the assumption that higher education would provide an individual with more knowledge, and in this case, financial knowledge. Marital status follows less of a trend; married individuals have the overall highest percentages across all categories, but there is no consistent close second category. Individuals who identify as single have higher financial literacy, risk knowledge, and retirement planning than those who have been married but are no longer. This is particularly fascinating considering risk knowledge has the lowest overall percentage of

individuals who answered that question correctly. Between divorced and widowed individuals, they switch with slightly higher percentages within each category; divorced individuals score higher with financial literacy, inflation knowledge, and retirement planning; widowed individuals score higher with interest and risk knowledge. Although there are those differences represented in this correlation, it is most likely that the sample and the individuals within the study simply happen to have higher knowledge in certain categories rather than a defined trend.

The only consistent trend among regions is that the South has the lowest percentages across all categories. The other regions are not consistently in a specific order, but across the board, all regions have at least 50% of individuals in each category. Although the number for southern respondents is not remarkably lower, it is still consistently lower. While it is primarily based on stereotypes, there is evidence that individuals in the South possess lower education levels, which means there is a likely chance that those individuals will have lower financial knowledge. It is also primarily built on stereotypes, but it's common that typical individuals living in the South possess more blue-collar jobs as well as have lower income. Blue collar jobs do not require substantial financial knowledge and individuals with lower income typically have lower financial literacy.

Table 5. Financial Literacy and Income Correlation

	Financial Literacy	Interest Knowledge	Inflation Knowledge	Risk Knowledge
Income:				
Under $20,000	26.23	52.41	55.44	52.41
$20,000-$40,000	34.,83	65.29	64.08	58.74
$40,000-$60,000	41.35	71.25	71.63	61.20
$60,000-$80,000	45.52	74.85	76.56	65.64
$80,000-$125,000	60.51	83.70	86.03	74.98
$125,000-$150,000	68.42	89.47	87.08	82.54
Over $150,000	77.33	90.13	92.70	85.77

Table 5 shows the relationship between the financial literacy concepts and income, as this is a previously studied relationship, but it is still worth specifically noting. Previous literature is additionally supported by the results of this table, where individuals that possess higher household income have higher percentages of getting these differing financial literacy questions correct. Logically, this result can be reasoned; individuals with higher incomes may have a career that required a more than average amount of schooling, and with a higher level of education, comes more financial literacy. As well as, individuals

with more money, will most likely have better concepts of money in general, including how to spend or save it.

Regression Results

To truly understand the relationship between gender, financial literacy, and retirement, this study uses probit models in two ways, (i) analyzing the impact of gender on financial literacy and (ii) the impact of financial literacy on retirement.

Table 6 focuses on gender and financial literacy, with the four models being each category of financial literacy: (a) overall financial literacy, (b) interest knowledge, (c)inflation knowledge, and (d) risk knowledge. The results of the regression show that the coefficient values of females are negative and are statistically significant in all the models. This result, which states that as being female decreases the probability of being financial literacy by 14.3 percentage points, also decreases their probability of getting (i) interest knowledge by 10.1 percentage points, (ii) inflation knowledge by 6.50 percentage point, and (iii) risk knowledge by 9.16 percentage points. This is supported by previous literature stating that women possess lower financial literacy (Hasler & Lusardi, 2017).

Financial risk is also almost all positively and statistically significant with financial literacy, the only exception being medium financial risk and interest knowledge. Although there is no evidence to directly support this specific finding, it could possibly just be the sample size possessing lower interest knowledge for individuals with medium financial risk tolerance. Age has an interesting relationship with the four categories; nothing in the 34-54 age group was statistically significant, and in the 55-64 age group, inflation was not significant. It is also odd to note that both age groups had a negative association with inflation; possibly, this specific population lacks inflation knowledge. Household size lacks statistical significance except for inflation, but all categories are still negative. One could potentially argue that with more individuals to care for in a household, the main providers of the household will have less time to become more financially literate.

All three race categories are negatively associated with each financial literacy category, with both Black and Hispanic categories being statistically significant. The most likely reason Asian and Other is not statistically significant is a lack of data; this data set has rather low numbers for representation for those two groups. As for race having a negative relationship, this is consistent with current data in that people of color tend to have lower financial literacy levels as compared to white individuals. Marital status does not have a consistent pattern across any group; divorced individuals have a negative relationship with every category except interest, which could be worth noting, but also, only risk is statistically significant, so it could also just be an odd coincidence. Employment status is also not necessarily an obvious result, although no category is significant, all are negative.

Table 6. Regression Results of Gender and Financial Literacy

	Financial Literacy	Interest Knowledge	Inflation Knowledge	Risk Knowledge
Sex (ref. Male)				
Female	-0.143***	-0.101***	-0.0650***	-0.0916***
	(0.0120)	(0.0102)	(0.0100)	(0.0116)
Financial Risk (ref. Low)				
Medium Financial Risk	0.0883***	0.0181	0.0411***	0.0640***
	(0.0140)	(0.0113)	(0.0112)	(0.0132)
High Financial Risk	0.165***	0.0604***	0.0876***	0.128***
	(0.0222)	(0.0180)	(0.0170)	(0.0200)
Total Income	0.0393***	0.0269***	0.0304***	0.0199***
	(0.00485)	(0.00357)	(0.00339)	(0.00427)
Employment Status (ref. Not Employed)				
Self-Employed	-0.00414	-0.0140	-0.00324	-0.0194
	(0.0206)	(0.0169)	(0.0163)	(0.0192)
Age (ref. 25-34)				
35-54	-0.00419	0.0116	-0.0108	0.0190
	(0.0163)	(0.0144)	(0.0130)	(0.0157)
55-64	0.0594***	0.111***	-0.0126	0.0564***
	(0.0188)	(0.0153)	(0.0153)	(0.0178)
Household Size	-0.000369	-0.000719	-0.00616*	-0.00112
	(0.00478)	(0.00386)	(0.00373)	(0.00445)
Race (ref. white)				
Black	-0.164***	-0.167***	-0.0806***	-0.120***
	(0.0223)	(0.0209)	(0.0188)	(0.0217)
Hispanic	-0.0906***	-0.0600***	-0.0372**	-0.0554***
	(0.0194)	(0.0165)	(0.0157)	(0.0184)
Asian or Other	-0.00437	-0.0204	-0.00829	-0.0119
	(0.0227)	(0.0194)	(0.0188)	(0.0217)
Marital Status (ref. Single)				
Married	0.0125	0.00914	0.0229*	0.0108
	(0.0166)	(0.0136)	(0.0135)	(0.0155)
Divorced	-0.0291	0.00897	-0.00247	-0.0390*
	(0.0233)	(0.0186)	(0.0186)	(0.0221)
Widowed	0.0394	0.00262	0.0184	0.0841*
	(0.0593)	(0.0477)	(0.0442)	(0.0481)
Education Status (ref. No High School)				
High school	0.191***	0.0792**	0.100***	0.177***
	(0.0377)	(0.0367)	(0.0373)	(0.0407)
Bachelor's	0.394***	0.203***	0.220***	0.308***
	(0.0388)	(0.0375)	(0.0380)	(0.0416)
Master's	0.467***	0.227***	0.252***	0.370***
	(0.0395)	(0.0379)	(0.0382)	(0.0420)
Region (ref. Northeast)				
Midwest	0.00853	-0.00701	-0.0331**	0.0110
	(0.0191)	(0.0164)	(0.0156)	(0.0182)
South	-0.00819	0.000598	-0.0223	-0.0108
	(0.0178)	(0.0151)	(0.0143)	(0.0170)
West	0.0128	0.0130	-0.0162	0.0167
	(0.0194)	(0.0164)	(0.0157)	(0.0184)
Observations	5,366	5,366	5,366	5,366

Note: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

One could speculate that because an individual is focused on whatever their self-employment work is, they may not have time to focus on financial literacy and gaining that knowledge. Education status groups are all positive and statistically significant, supporting

previous studies stating that higher education leads to higher financial literacy. Region is another odd variable where there is really no consistent pattern. The only significant relationship is the Midwest and Inflation, which doesn't seem to be something particularly worth noting. The South is almost all negatively associated with financial literacy; however, interest is not negative, perhaps individuals in the South are more familiar with interest, more so than inflation or risk. Total income is positive and statistically significant, which is supported by previous studies (Arianti, 2018) stating that the higher the income the individual possesses, typically the higher financial literacy they also possess. This table is consistent with previous studies and supports the hypothesis stated by this paper.

Table 7 had a focus on retirement planning using different measures of financial literacy. In all models, we also consider different categories of income to analyze the retirement planning decisions among poor and rich households. These results state that, as retirement planning increases, meaning if a respondent has planned for retirement by setting up a savings account of sorts. Overall financial literacy increases the probability to plan for retirement by 6.24 percentage point, while interest knowledge increases it by 7.61 percentage point, inflation knowledge increases it by 6.52 percentage point, and risk knowledge increases it by 3.75 percentage point. One unexpected result of this table is the relationship between gender and financial literacy in relation to retirement. Although there is a significant relationship between females with interest, inflation, and risk, it is a small significance level. Even though the significance strength is disappointing in support of the research, it is still worth noting that all categories are negative, which does support the research that states women have lower financial literacy overall. This lack of significance could also be attributed to the lower observation numbers for this table, with almost half the size of Table 6. Mortgage is positive and statistically significant across all categories, meaning those who have applied for a mortgage in the past 12 months have higher financial literacy. This could be due to having the financial knowledge to be familiar with mortgages. Age is an odd category with this data, with all groups having a negative association, and only the 55-64 individuals are statistically significant. This could possibly be due to the smaller number of observations, otherwise there is no plausible cause behind this odd behavior. Household size is consistent with the previous table in that, while it is not statistically significant, they are all negative.

Table 7. Regression Results of Financial Literacy and Retirement Planning

	All FL	Big Three	Interest	Inflation	Risk
Financial Literacy					
Interest		0.0611***	0.0761***		
		(0.0170)	(0.0162)		
Inflation		0.0493***		0.0652***	
		(0.0169)		(0.0165)	
Risk		0.0181			0.0375**
		(0.0156)			(0.0151)

All FL	0.0624***				
	(0.0149)				
Sex (ref. Male)					
Female	-0.0221	-0.0200	-0.0245*	-0.0276*	-0.0286**
	(0.0144)	(0.0143)	(0.0142)	(0.0142)	(0.0143)
Mortgage	0.0482**	0.0463**	0.0467**	0.0480**	0.0497**
	(0.0198)	(0.0197)	(0.0198)	(0.0197)	(0.0198)
Age (ref. 25-34)					
35-54	-0.0215	-0.0235	-0.0252	-0.0203	-0.0217
	(0.0173)	(0.0172)	(0.0172)	(0.0174)	(0.0174)
55-64	-0.174***	-0.178***	-0.181***	-0.167***	-0.172***
	(0.0224)	(0.0225)	(0.0225)	(0.0225)	(0.0225)
Household Size	-0.00221	-0.00136	-0.00216	-0.00167	-0.00258
	(0.00509)	(0.00509)	(0.00508)	(0.00511)	(0.00511)
Race (ref. White)					
Black	0.0211	0.0256	0.0227	0.0166	0.0158
	(0.0210)	(0.0208)	(0.0210)	(0.0211)	(0.0212)
Hispanic	-0.0620***	-0.0598***	-0.0633***	-0.0642***	-0.0656***
	(0.0212)	(0.0211)	(0.0212)	(0.0213)	(0.0214)
Asian or Other	-0.0127	-0.00911	-0.00858	-0.0125	-0.00925
	(0.0274)	(0.0272)	(0.0272)	(0.0273)	(0.0273)
Marital Status (ref. Single)					
Married	-0.00465	-0.00726	-0.00720	-0.00602	-0.00633
	(0.0191)	(0.0190)	(0.0191)	(0.0191)	(0.0191)
Divorced	-0.00258	-0.00411	-0.00582	-0.00204	-0.00401
	(0.0244)	(0.0243)	(0.0244)	(0.0243)	(0.0245)
Widowed	-0.0909	-0.0923	-0.100*	-0.0882	-0.0964*
	(0.0577)	(0.0574)	(0.0579)	(0.0578)	(0.0580)
Education Status (ref. No High School)					
High School	0.208***	0.199***	0.211***	0.206***	0.214***
	(0.0449)	(0.0449)	(0.0449)	(0.0452)	(0.0451)
Bachelor's	0.327***	0.315***	0.334***	0.330***	0.338***
	(0.0474)	(0.0474)	(0.0472)	(0.0476)	(0.0474)
Master's	0.341***	0.328***	0.347***	0.344***	0.354***
	(0.0488)	(0.0489)	(0.0485)	(0.0489)	(0.0487)
Region (ref. Northeast)					
Midwest	0.0124	0.0157	0.0139	0.0154	0.0123
	(0.0229)	(0.0228)	(0.0229)	(0.0229)	(0.0230)
South	-0.0464**	-0.0458**	-0.0474**	-0.0457**	-0.0471**
	(0.0210)	(0.0210)	(0.0210)	(0.0211)	(0.0211)
West	0.00122	0.000801	-0.000752	0.00245	0.00102
	(0.0229)	(0.0229)	(0.0229)	(0.0229)	(0.0230)
Income (ref. Over 150)					
Under $20,000	-0.337***	-0.328***	-0.339***	-0.338***	-0.346***
	(0.0247)	(0.0248)	(0.0246)	(0.0246)	(0.0246)
$20,000-$40,000	-0.266***	-0.259***	-0.268***	-0.267***	-0.276***
	(0.0276)	(0.0276)	(0.0275)	(0.0275)	(0.0274)
$40,000-$60,000	-0.152***	-0.150***	-0.160***	-0.155***	-0.159***
	(0.0280)	(0.0280)	(0.0278)	(0.0279)	(0.0280)
$60,000-$80,000	-0.107***	-0.107***	-0.112***	-0.110***	-0.112***
	(0.0272)	(0.0271)	(0.0271)	(0.0271)	(0.0272)
$80,000-$125,000	-0.0548**	-0.0571**	-0.0587**	-0.0559**	-0.0566**
	(0.0256)	(0.0255)	(0.0256)	(0.0255)	(0.0256)
$125,000-$150,000	-0.0777**	-0.0793**	-0.0826**	-0.0752**	-0.0788**
	(0.0359)	(0.0358)	(0.0359)	(0.0360)	(0.0361)
Observations	2,971	2,971	2,971	2,971	2,971

Note: Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Education status is consistent with other studies, in which they are all positive and statistically significant, meaning that higher education is associated with higher financial literacy and retirement planning outcomes. Region does have interesting results in this table. The South is negative and statistically significant across all categories, which is supported by previous studies that individuals in the South are typically lower in general education and, therefore, financial literacy and retirement planning as well. Race is an abnormally behaving category; Hispanic individuals are the only group to have statistical significance, and both Hispanic and Asian and Other are all negative. It is not consistent with other data that Black individuals have a positive association with financial literacy and retirement planning, but it could be this specific population. Marital status also behaves unexpectedly, with all categories across all groups being negatively associated. This could be due to the specific population examined in this table, and they could all have low financial literacy and retirement planning. Income is another odd variable where all are negative and statistically significant; however, studies have shown that, typically, income is positively associated with financial literacy and retirement planning. Although this table does have some interesting results, most tend towards less typical and more out-of-the-ordinary results.

Conclusion and Policy Implications

Conclusion

This research concludes that women do, in fact, have lower financial literacy and worse retirement outcomes than men. Supported by the correlations and regressions results, women consistently had lower overall percentages than men. By using comprehensive data from the Survey of Household Economics and Decisionmaking from the 2022 wave, this data was able to produce many significant conclusions. Previous studies have examined financial literacy and retirement separately to gender but have yet to focus on the three variables in totality, which is exactly what this study did.

The data supports not only the gender gap in both financial literacy and retirement but also other inequities in both topics. Overall, those with less education and lower income tended to have lower financial literacy. Respondents that were employed by others, not self-employed, tended to have higher financial literacy, possibly due to having more time to learn financial literacy. In the probit models, various specifications of financial literacy variables are used to check the robustness, but the overall results did not change, there was a significant relationship between retirement planning and financial literacy. With the second probit model, gender had less significant values but still had a negative

relationship with both financial literacy and retirement. To look at every variable together, the worst-off individuals for both financial literacy and retirement would be people of color, women with low education, living in the southern United States. Although this research did not set out to find these additional patterns, it is still significant to consider when discussing financial literacy, retirement, and gender.

General financial wellbeing and preparedness also played a role in financial literacy and retirement outcome rates, credit scores, emergency funds, and mortgages were all predictors of financial literacy and retirement outcomes. Those who had at least "good" credit scores and those with emergency funds tended to have better financial literacy and retirement outcomes. Those with mortgages tended to have higher financial literacy as well, possibly respondents that have a mortgage are more familiar with different financial literacy topics. Respondents that were also people of color tended to have lower financial literacy, with things such as stereotypes and lack of opportunities being possible root causes.

Policy Implications

These overall findings show that changes need to be made in the world of financial literacy and retirement planning. Financial literacy, globally, remains very low, which contributes to poor retirement outcomes. Formal, required education on financial literacy starting at the secondary school level could help raise financial literacy while also beginning to close the gender gap. If everyone is given equal access to financial knowledge, the gender disparity would reduce, and women would have better opportunities for improved retirement outcomes as well as pursuing careers in finance. Although this is a more significant ask, having equal pay laws could also help promote financial literacy and well-being. While equal pay is not directly correlated with financial literacy, by giving all individuals the same opportunities could help more women be into the idea of financial literacy.

In addition to formal education, workplace financial wellness programs can play a crucial role in improving financial literacy by providing adults with ongoing guidance and resources tailored to their life stages and goals. Furthermore, policy reforms that encourage transparent and simplified retirement planning tools would empower individuals to make informed decisions with greater confidence. Implementing comprehensive financial education in schools would ensure individuals develop the maturity and skills needed to understand complex financial concepts, while workplace programs and clearer policy frameworks would reinforce those skills throughout adulthood. Together, these measures can greatly improve global financial literacy, reduce gender inequality, and lead to better retirement planning and outcomes.

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