

Unemployment, Financial Literacy, and Retirement: Evidence From National Data Before and During COVID-19 Pandemic

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Unemployment rates changed dramatically and peaked at 14.7% in April 2020 in the United States. The labor market force might affect households' retirement differently before and during the COVID-19 pandemic. By utilizing 2018 and 2021 datasets, the study mainly contributes to the following insights related to retirement decisions. First, the current study finds a positive correlation between state-level unemployment rates and retirement. Second, this study finds that both objective and subjective financial literacy, financial confidence, age, and households without a child or a financially dependent child are positively associated with retirement in both pre-pandemic and during the pandemic. Financial market participation, financial risk, and income drop are negatively associated with retirement in pre-pandemic and during the pandemic. We find different significant results regarding the annual income, savings, and the number of children in a household before and during the pandemic. The findings extend the literature on unemployment and retirement. Financial professionals and the government will apply the empirical findings to the practice.

Keywords: retirement, state-level unemployment rate, financial literacy

INTRODUCTION

Retirement decisions have become complex as they relate to households' retirement well-being. In December 2021, about 65.2 million people received Social Security benefits (Social Security Administration, 2022), an increase of 2.3 million (3.66%) since December 2018 in the United States. One of the explanations for the increasing number of retired people was that the large population of baby boomers reached retirement age (De Preter et al., 2013). The decision to retire varies by demographic and economic factors (Fisher et al., 2016). Households' retirement decisions were affected by the COVID-19 pandemic because COVID-19 has affected the economy, the financial planning industry, financial planners and their clients, and consumers in various domains, from physical health to financial health (Fox & Bartholomae, 2020). From a household perspective, financial literacy is a robust indicator of retirement

readiness and financial behaviors or decisions (Hasler et al., 2023; Lee & Hanna, 2020; Lusardi & Mitchell, 2017; Xiao & Kumar, 2023). Objective financial literacy was positively associated with financial decisions, from short-term to long-term (Hasler et al., 2023). In the face of financial hardship during the COVID-19 pandemic, households with high subjective financial literacy might withdraw from their retirement savings accounts without fully understanding the consequences (Lee & Hanna, 2020). Marmora and Ritter (2015) found that the monthly retirement rate for unemployed people (age 62 or more) was 7.0%, compared to that of employed people (age 62 or more), where it was only 1.2%. From a macroeconomic perspective, the unemployment rate has been one of the leading indicators of business cycles and impacted labor force markets (Gorodnichenko et al., 2013). Higher local-level unemployment rates were associated with a higher probability of retirement (Galarneau et al., 2015). For example, 10% of baby boomers retired after being laid off and not finding a new job (Goyer, 2013). Theoretically, households aim to maximize utility by smoothing out their lifetime savings and spending and making retirement decisions after considering economic factors and individual factors (Ando & Modigliani, 1963). When observing the increased unemployment rate during the COVID-19 pandemic, we raised the question of whether the unemployment rate affects households' retirement using the updated datasets.

The average national unemployment rate in the United States was 3.6% in 2022 (Bureau of Labor Statistics [BLS], 2022). Among the 50 states and the District of Columbia, Nevada had the highest unemployment rate of 5.4%, and North Dakota and South Dakota had the lowest of 2.1% (BLS, 2022). The unemployment rate reached its peak rate of 14.7% in April 2020 (BLS, 2022). In comparison, the average unemployment rates were 3.67%, 8.05%, and 5.35% in 2019, 2020, and 2021 (BLS, 2019; 2020; 2021), respectively. However, the impact of the labor force market on retirement has been overlooked for years (Hairault et al., 2015). While there was an increase in the unemployment rate from 2018 to 2020, understanding the association between the state-level unemployment rate and households' retirement decisions helps to explain the increasing number of retired people in the United States.

Furthermore, understanding the individual factors of households' retirement decisions will help financial planners provide their clients with appropriate financial plans and strategies to prepare for retirement and make rational retirement decisions. Utilizing the 2018 and 2021 National Financial Capability Study (NFCS) and the 2018 and 2021 state-level unemployment rate from the U.S. Bureau of Labor Statistics (BLS, 2018; 2021), the current study utilized datasets before COVID-19 pandemic and during pandemic to explore the relationship between state-level unemployment rate and household retirement decision, the importance of financial literacy on the relationship between unemployment rate and retirement decision, and comparison the results before the COVID-19 pandemic and during the pandemic. We conducted probit regression models to examine the associations between the unemployment rate, households' sociodemographic and socioeconomic factors, and retirement. Furthermore, we compared the differences in the models' results between pre-pandemic and during the pandemic.

The remainder of the paper includes the following sections: 2. Literature Review; 3. Theoretical framework; 4. Methods; 5. Results; 6. Implications and Conclusions.

LITERATURE REVIEW

Retirement and Related Factors

From a household's perspective, retirement represented a household withdrawing from a job to enjoy leisure and freedom or to deal with health issues (Atchley, 1982). Classifying a household as retired could be ambiguous because households could claim pensions and still be employed (Bosworth & Burtless, 2010). For example, Coile and Levine (2011) classified a household as retired when they were out of the workforce for more than 13 weeks in the preceding year. Dorn and Sousa-Poza (2010) defined early retirement as when an individual was not working and reports their employment status as early retirement. Generally, there were three broad classifications of retirement: receiving a pension, being out of the labor force, or self-reported Retirement status (OECD, 1995). In this paper, we defined a household as retired while he or she self-reported their retirement status.

Research has found that socioeconomic factors (e.g., income, income drop, financial literacy, financial market participation, financial risk, savings, financial confidence) and a set of sociodemographic (e.g., age, gender, race, educational attainment, marital status, number of children) associated with households' retirement (Boado-Penas et al., 2023; El Alaoui et al., 2020; Harahap et al., 2022; Hasler et al., 2023; Lee & Hanna, 2020; Lusardi & Mitchell, 2011; Lusardi & Mitchell, 2017). For example, financial literacy is a significant factor in households' financial decision-making (El Alaoui et al., 2020; Hasler et al., 2023; Lee & Hanna, 2020; Lusardi & Mitchell, 2011; Lusardi & Mitchell, 2017). Financial literacy was defined as people's ability to apply financial knowledge and financial skills to make sound decisions (Hung et al., 2009; Huston, 2010). Theoretically, human capital theory posited that investment in human capital was a form of intangible resources investment (Becker, 1993; 1994; 2009; Lusardi & Mitchell, 2014). There were many ways to invest in human capital, such as going to school, on-the-job training, and learning about economic systems (Becker, 1962).

Previous empirical results showed that the higher the level of financial literacy, the better decision-making from households (Harahap et al., 2022; Lotto, 2020; Lusardi & Mitchell, 2011; Lusardi & Mitchell, 2014). For example, a higher level of financial literacy impacted people's optimal retirement planning because they would have more alternatives to support their retirement (Harahap et al., 2022; Lusardi & Mitchell, 2011). Furthermore, the research found that financial literacy caused households' retirement readiness using the American Life Panel (Lusardi & Mitchell, 2017). Financial literacy has been measured from objective and subjective perspectives. Objective financial literacy measures a person's comprehensive financial knowledge in a variety of personal financial planning topics, such as compounding interest, inflation, bonds, mortgages, and stocks, while subjective financial literacy is measured as a self-assessment of their financial knowledge (Huston, 2010; Lusardi & Mitchell, 2014; Lusardi et al., 2017; Xiao & Kim, 2022; Xiao & Meng, 2023).

Unemployment Rate and Its Impacts on Retirement

Economic conditions have been measured using the unemployment rate, stock market values (Boado-Penas et al., 2023), and housing equity (Goda et al., 2011). Boado-Penas et al. (2023) found that the economic cycle was significantly associated with retirement. An economic downturn causes an increase in the unemployment rate and, thus, an increase in the probability of retirement (Bosworth & Burtless, 2010; Bould, 1980; Coile & Levine, 2010; Galarneau et al., 2015; Goda et al., 2011; Hallberg, 2011; Munnell et al., 2008).

According to the Bureau of Labor Statistics, the unemployment rate is an indicator of the labor market and is calculated by the number of unemployed workers as a percentage of the labor force. The unemployment rate has been found to be related positively to retirement (Bosworth & Burtless, 2010; Bould, 1980; Coile & Levine, 2010; Lee & Hanna, 2020; Galarneau et al., 2015; Goda et al., 2011; Hallberg, 2011; Munnell et al., 2008). Goda et al. (2011) utilized the 2006 and 2008 waves of the Health and Retirement Study (HRS) to examine an individual's self-reported probability to work. When viewed with different time horizons, the effect of the unemployment rate produced different results in terms of the probability of working at age 62 or 65 for the group of respondents who were at least age 58 and still working. For example, the effect of the unemployment rate on the probability of working after age 65 was significantly positive. Specifically, a one-percent increase in the unemployment rate increased the probability of working after age 65 by 10.89 percentage points (Goda et al., 2011). These different results for the two age groups were explained by the time horizons: individuals who self-reported to work after 65 expect economic conditions to recover, and the unemployment rate will decrease after longer time horizons (Goda et al., 2011).

Similarly, Bosworth and Burtless found that a high unemployment rate was related positively to the decision to retire since employers reduced new hires and accelerated early retirement. Research has also indicated that an increasing unemployment rate was consistent with an increase in involuntary retirement since companies usually reorganized during the recession (Dorn & Sousa-Poza, 2004; Lee & Hanna, 2020). Furthermore, Marmora and Ritter (2015) utilized 1996, 2001, 2004, and 2008 panels of the Survey of Income and Program Participation (SIPP) and the state-level unemployment rate by the Bureau of Labor

Statistics (BLS) and concluded that the unemployment rate had a positive relationship with the retirement decision for individuals age 55-69.

By contrast, several researchers have found that highly educated individuals have more flexibility to choose to delay retirement during the high unemployment rate. However, those with less education might be forced to retire because they cannot find a job in the job market after reaching retirement age (Chan & Huff Stevens, 2001; Choi et al., 2014; Coile & Levine, 2011; Hairault et al., 2015). It might be explained by highly educated individuals investing more in job-related continuing training and being competitive in the labor market (Ehrenberg & Smith, 2017). Bould (1980) found that if an individual was out of the labor market for several weeks when close to the retirement age, unemployment often caused early retirement. In addition, Bould (1980) indicated that changes in the unemployment rate had a negative relationship with early Retirement for American men aged 52-64.

In summary, existing research has examined macroeconomic and individual factors on households' retirement decisions. Specifically, previous literature and theoretical framework found that economic condition measured by the unemployment rate significantly predicts households' retirement. This study revisited the impact on households' retirement by considering the state-level unemployment rate and demographic factors together by using the updated data from the 2018 and 2021 National Financial Capability Study (NFCS) survey and the 2018 and 2021 Bureau of Labor Statistics (BLS). Then, it was compared to see any differences between pre-pandemic and during the pandemic in this relationship. In implication, we proposed techniques that financial professionals might use to assist households in making sound retirement decisions while facing unemployment rate change.

Theoretical Framework and Hypotheses

Life Cycle Theory, Life Cycle Aspects of Labor Supply, and Retirement

Life cycle theory (LCT; Ando & Modigliani, 1963) states that people will smooth out their consumption and savings over their lifetime. To maximize utility, people prefer delaying their consumption from their income, saving their income for retirement over the long term, and consuming their retirement savings during retirement. LCT posits that people tend to maintain their quality of life and save in a saving ratio that increases with their earnings. The LCT further implies that as household income goes up and down exponentially, the saving ratio will tend to fluctuate constantly. When people reach retirement age, they will choose between work and retirement, involving comparing market productivity and home productivity (Ehrenberg et al., 2021). Meanwhile, the life cycle of aspects of labor supply incorporates labor supply theory, and life cycle theory indicates that unexpected wage changes will affect people's retirement choices. While the unexpected wage decreases, people will compare their home productivity with market productivity and choose the one with higher productivity (Ehrenberg et al., 2021).

Human Capital Theory

Ehrenberg et al. (2021) stated that working conditions, macroeconomics, and individual backgrounds affect people's labor market decisions. Human capital theory indicates that people investing in education and training will make better decisions (Becker, 1962; Becker, 1994; Lusardi & Mitchell, 2014). Financial literacy is essential in personal finance in various domains, from short-term to long-term financial decisions, such as retirement.

Hypotheses

The models used in this study are grounded primarily in the life cycle theory (Ando & Modigliani, 1963), life cycle aspects of labor supply (Ehrenberg et al., 2021), and human capital theory (Becker, 1962). Based on the assumption that households attempt to maximize the expected value of earnings over the lifetime and maintain a stable quality of life. People delay their consumption and save before retirement age and consume their retirement savings while retired. Incorporating the life cycle theory with the labor supply theory implies that people will choose between work and retirement by comparing the financial benefits of working and retirement. During unemployment, people expect to get no or low wage rates, and thus, they might be more likely to retire if their utility from home is higher than their utility from work.

Meanwhile, human capital theory emphasizes the benefits of education and training. Thus, we hypothesize that:

H1: The unemployment rate is positively associated with retirement in a household.

H2: Objective financial literacy is positively associated with retirement in a household.

H3: Subjective financial literacy is positively associated with retirement in a household.

METHODS

Data

The analysis in this study uses two data sources: the 2018 and 2021 National Financial Capability Study (NFCS) survey and the 2018 and 2021 Bureau of Labor Statistics (BLS). The NFCS state-by-state survey is funded by the Financial Industry Regulatory Authority's (FINRA) Investor Education Foundation. The BLS releases the state's monthly and annual unemployment rates, estimated by the Local Area Unemployment Statistics (LAUS) program. The main objective of the NFCS survey is to measure key indicators of financial capability. The NFCS survey was conducted online by Applied Research and Consulting in 2018 and 2021, respectively. It covered a nationally representative sample of over 25,000 American adults from 51 states, including approximately 500 respondents per state. This study utilizes 20,663 and 23,405 respondents in 2018 and 2021, respectively. We excluded respondents who answered "do not know" and "prefer not to say." Therefore, survey weights were applied to the analysis to represent it nationally. The LAUS program of the BLS utilizes data from the Current Population Survey (CPS) to estimate national, state, and local unemployment rates. The federal-state cooperative program covers approximately 7,000 areas to estimate total employment and unemployment.

Dependent Variable, Key Independent Variables, and Control Variables

The dependent variable in this study, a household's retirement, was taken from a household's current retirement status. The questions asked: "Which of the following best describes your (or your spouse's/partner's) current employment or work status?" The variable took a value of 1 if the respondent reported them or their spouse as "retired" and 0 if no one in a household reported as "retired."

The key independent variable, the unemployment rate, was constructed from the 2018 and 2021 state-level annual unemployment rates from the BLS. In order to match the unemployment rate in the state where each respondent lives, we used the Federal Information Processing Standard (FIPS) state codes. We merged the 2018 state-level unemployment rates into the 2018 NFCS data and the 2021 state-level unemployment rates into the 2021 NFCS dataset.

Control variables were a set of socioeconomic factors, including objective financial literacy, subjective financial literacy, financial participation, annual income, financial risk, savings, income drop, and financial confidence, and a set of sociodemographic, including age, gender, race, education, marital status, and the number of children. Objective financial literacy was derived from 5-item questions, including compounding interest, inflation, bond price, mortgage, and investment. Objective financial literacy was measured by the total scores of these five questions answered correctly by respondents (Lusardi & Mitchell, 2014). Subjective financial literacy was derived from a self-reported question that asked respondents to self-assess their "overall financial knowledge" using the 7-point Likert scale, where 1 indicated low subjective financial literacy, and 7 indicated high financial literacy (Despard et al., 2020). An employer-sponsor retirement plan was a proxy of financial participation (Boado-Penas et al., 2023). In the United States, individuals with an employer-sponsored retirement plan usually participate in the financial markets voluntarily or involuntarily. Due to the nature of the NFCS datasets, annual income was categorized into ten groups in 2021 and eight groups in 2018. Financial risk was derived from a 10-point Likert-type scale question regarding "How willing are you to take risks?", in which 1 indicated not at all willing and 10 indicated very willing (Despard et al., 2020). We also proxied savings when respondents reported spending

was less than their income. The income drop was derived from a question regarding whether or not respondents had an income drop in the past 12 months. Financial confidence was derived from a self-assessed 7-point Likert scale question of how confident the respondent was “good at dealing with day-to-day financial matters, such as checking, credit and debit cards, and tracking expenses”, in which 1 indicated low financial confidence, and 7 indicated high financial confidence. Age was categorized into six groups: 18-24, 25- 34, 35- 44, 45- 54, 55-64, and 65 or more. Gender and race are dichotomous variables. Education level, marital status, and number of children were categorized into seven, three, and six groups.

Empirical Probit Models

Two models have been performed to answer the research questions. First, in order to examine the impacts of the unemployment rate on a household’s retirement status, we assumed that a probit model takes the form as follows:

$$Y_{it}^* = \alpha_0 + \alpha_1 * UR_{it} + \alpha_j * X_{FLit} + \alpha_{j+1} * X_{it} + \varepsilon_{it} \quad (1)$$

$$Y_{it} = \begin{cases} 1 & \text{if } Y_{it}^* > 0 \\ 0 & \text{if } Y_{it}^* \leq 0 \end{cases}$$

where Y_{it}^* is the latent variable representing the unobserved net benefit of retirement status for a household i at time t . The variable, Y_{it} , represents a household’s retirement and is equal to 1 if a household reported as retired and 0 otherwise. UR_{it} represents the state-level unemployment rate at time t . X_{FLit} represents objective and subjective financial literacy, respectively. X_{it} represents a set of control variables, including age, gender, marital status, race, educational achievement, annual income, and risk tolerance. α_0 is an intercept. α_j and α_{j+1} are slope coefficients indicating associations between the latent variable Y_{it}^* and the independent variables. ε is an error term that is assumed to follow a normal distribution. The STATA Special Edition 16.1 was used for all analyses in the current study.

Reliability Test and Robustness Test

To test the reliability of the current study, we performed Pearson’s correlation coefficient test among independent variables (Mukaka, 2012). Tables 1 and 2 show the correlation coefficient results of the independent variables in 2018 and 2021, respectively. As shown in the two tables, there are negligible correlations ($-0.3 \leq r \leq 0.3$) and low correlations ($-0.5 \leq r \leq -0.3$ or $0.3 \leq r \leq 0.5$) among variables (Mukaka, 2012). Furthermore, we further performed the Mann-Whitney U test to investigate if the two sets of cross-sectional data from NFCS are comparable (Mann & Whitney, 1947). We first defined the 2018 and 2021 observations as two groups: 2018 data and 2021 data. Then, we compared each variable in two groups using the Mann-Whitney U Test. The U test results showed that the dependent variable and some sociodemographic variables are insignificantly different ($p > 0.1$), including retirement decisions, age, race, and annual income. Other variables are significantly different ($p < 0.05$), including unemployment rate, objective financial literacy, subjective financial literacy, marital status, number of children, financial risk, savings, income drop, financial participation, and financial confidence. Therefore, the median differences between the two groups might exist (McKnight & Najab, 2010). The results offered robustness in testing the differences between COVID-19 pre-pandemic and during the pandemic.

**TABLE 1
CORRELATIONS OF VARIABLES (2018)**

	rate	oblit	sublit	par	income	risk	save	drop	conf	age	gen	race	edu	mar	child
rate	1.00														
oblit	-0.04	1.00													
sublit	0.01	0.25	1.00												
par	-0.03	0.23	0.21	1.00											
inc	-0.02	0.33	0.28	0.50	1.00										
risk	0.01	0.14	0.30	0.21	0.28	1.00									
save	0.00	0.14	0.14	0.15	0.22	0.07	1.00								
drop	0.03	-0.19	-0.09	-0.11	-0.17	0.05	-0.12	1.00							
conf	-0.01	0.26	0.48	0.17	0.22	0.11	0.18	-0.14	1.00						
age	-0.01	0.31	0.20	0.10	0.15	-0.15	0.07	-0.21	0.25	1.00					
gender	0.02	0.22	0.16	0.08	0.16	0.27	0.04	-0.03	0.05	0.04	1.00				
race	-0.10	0.17	0.04	0.05	0.09	-0.08	0.04	-0.11	0.09	0.23	0.02	1.00			
edu	0.01	0.32	0.16	0.26	0.38	0.17	0.09	-0.10	0.14	0.05	0.10	0.00	1.00		
mar	0.06	-0.16	-0.15	-0.29	-0.45	-0.08	-0.06	0.06	-0.11	-0.16	-0.06	-0.13	-0.08	1.00	
child	0.02	0.08	-0.01	-0.10	-0.13	-0.10	0.06	-0.12	0.04	0.17	0.03	0.08	0.00	0.25	1.00

Number of Observations: 23,663

Sources: 2018 National Financial Capability Study (NFCS); 2018 U.S. Bureau of Labor Statistics

Notes:

Unemployment rate (rate); objective financial literacy (oblit); subjective financial literacy (sublit); par (financial participation), annual income (inc); financial risk (risk); savings (save); income drop (drop), financial confidence (conf); age (age), gender (gender); race (race); educational attainment (edu); marital status (mar); number of children (child)

**TABLE 2
CORRELATIONS OF VARIABLES (2021)**

	rate	oblit	sublit	par	incomerisk	save	drop	conf	age	gen	race	edu	mar	child	
rate	1.00														
oblit	-0.03	1.00													
sublit	0.01	0.24	1.00												
par	-0.01	0.25	0.20	1.00											
inc	0.04	0.33	0.28	0.49	1.00										
risk	0.02	0.10	0.28	0.18	0.26	1.00									
save	0.01	0.20	0.14	0.16	0.23	0.03	1.00								
drop	0.02	-0.17	-0.08	-0.12	-0.18	0.06	-0.15	1.00							
conf	0.01	0.27	0.49	0.18	0.24	0.08	0.20	-0.16	1.00						
age	-0.02	0.33	0.17	0.11	0.14	-0.22	0.15	-0.23	0.27	1.00					
gender	0.00	0.21	0.15	0.06	0.16	0.26	0.04	-0.04	0.04	-0.01	1.00				
race	-0.26	0.14	0.03	0.05	0.07	-0.09	0.03	-0.08	0.08	0.18	0.01	1.00			
edu	0.02	0.33	0.20	0.31	0.44	0.16	0.14	-0.11	0.19	0.14	0.08	0.02	1.00		
mar	0.06	-0.17	-0.17	-0.31	-0.46	-0.08	-0.09	0.06	-0.15	-0.18	-0.05	-0.13	-0.16	1.00	
child	0.02	0.06	-0.06	-0.12	-0.16	-0.13	0.07	-0.10	0.02	0.13	0.01	0.03	-0.05	0.27	1.00

Number of Observations: 23,405

Sources: 2021 National Financial Capability Study (NFCS); 2021 U.S. Bureau of Labor Statistics

Notes:

Unemployment rate (rate); objective financial literacy (oblit); subjective financial literacy (sublit); par (financial participation), annual income (inc); financial risk (risk); savings (save); income drop (drop), financial confidence (conf); age (age), gender (gender); race (race); educational attainment (edu); marital status (mar); number of children (child)

RESULTS**Descriptive Statistics Results**

The summary descriptive statistics of the dependent and independent variables are provided in Table 3. Approximately 24.6% of respondents reported retirement, and 23.8% reported retirement in 2021. The key independent variable, the state-level annual unemployment rate, on average, is 3.73% and 4.90% in 2018 and 2021, respectively. The average objective financial literacy was 2.98 out of 5 and 2.84 out of 5, respectively. The average subjective financial literacy was 5.19 out of 7 and 5.13 out of 7, respectively. The average financial risk score is 4.96 out of 10 and 5.08 out of 10 in 2018 and 2021, respectively. On average, financial confidence was 5.86 out of 7 and 5.72 out of 7, respectively. Approximately 19.5% and 25.1% reported an income drop in 2018 and 2021, respectively. The majority are having an employer-sponsored retirement plan (62.2%; 58.2%), annual income between \$50,000 and \$75,000 (19.9%; 19.0%), spending more than their income (55.9%; 53.0%), no income drop in the past 12 months (80.5%; 74.9%), aged 65 and above – 64 (21.5%, 21.9%), being female (55%, 52.7%), White (75.6%, 75.4%), Some college (26.8%; 26.1%), married (54.9%; 51.0%), and no child/no financial dependent child (32.7%; 35.2%) in 2018 and 2021, respectively.

**TABLE 3
DESCRIPTIVE STATISTICS**

	2018		2021	
	Weighted Mean	Standard Error	Weighted Mean	Standard Error
Dependent Variable				
Household's Retirement				
Retired	0.246	0.430	0.238	0.426
Not retired	0.754	0.430	0.762	0.426
Key Independent Variable				
Unemployment rate	3.729	0.747	4.902	1.277
Control Variables				
Objective Financial Literacy (0-5)	2.978	1.428	2.844	1.474
Subjective Financial Literacy (1-7)	5.194	1.301	5.132	1.303
Financial participation				
Having retirement plan	0.622	0.485	0.582	0.493
No retirement plan	0.378	0.485	0.418	0.493
Annual Income				
Less than \$15,000	0.094	0.292	0.104	0.305
At least \$15,000 but less than \$25,000	0.097	0.296	0.101	0.302
At least \$25,000 but less than \$35,000	0.106	0.308	0.105	0.307
At least \$35,000 but less than \$50,000	0.145	0.352	0.142	0.349

	2018		2021	
	Weighted Mean	Standard Error	Weighted Mean	Standard Error
At least \$50,000 but less than \$75,000	0.199	0.400	0.190	0.393
At least \$75,000 but less than \$100,000	0.150	0.357	0.137	0.344
At least \$100,000 but less than \$150,000	0.136	0.343	0.138	0.345
At least \$150,000 but less than \$200,000			0.049	0.215
At least \$200,000 but less than \$300,000	0.073	0.260	0.023	0.149
\$300,000 or more			0.011	0.103
Financial Risk (1-10)	4.956	2.657	5.081	2.690
Savings				
Savings from income	0.441	0.497	0.470	0.499
No savings from income	0.559	0.497	0.530	0.499
Income Drop			0.257	0.003
Had income drop	0.195	0.396	0.251	0.434
No income drop	0.805	0.396	0.749	0.434
Financial confidence (1-7)	5.859	1.468	5.721	1.474
Age (Years)				
18-24	0.089	0.285	0.093	0.290
25-34	0.165	0.371	0.166	0.372
35-44	0.166	0.372	0.167	0.373
45-54	0.175	0.380	0.175	0.380
55-64	0.190	0.392	0.181	0.385
65+	0.215	0.411	0.219	0.413
Gender				
Male	0.450	0.498	0.473	0.499
Female	0.550	0.498	0.527	0.003
Race				
White	0.756	0.430	0.754	0.430
Non-white	0.244	0.430	0.246	0.430
Education attainment				
Did not complete high school	0.020	0.142	0.021	0.144
High school graduate	0.170	0.376	0.164	0.371
High school graduate – GED	0.066	0.249	0.064	0.246
Some colleges, no degree	0.268	0.443	0.260	0.439
Associate’s degree	0.108	0.310	0.111	0.314
Bachelor’s degree	0.227	0.419	0.261	0.439
Postgraduate degree	0.141	0.348	0.118	0.322
Marital Status				
Married	0.549	0.498	0.510	0.500
Living with a partner	0.078	0.267	0.086	0.280
Single	0.373	0.484	0.404	0.491
Number of children				
One child	0.154	0.361	0.148	0.355

	2018		2021	
	Weighted Mean	Standard Error	Weighted Mean	Standard Error
Two children	0.120	0.325	0.121	0.326
Three children	0.050	0.219	0.048	0.213
Four children or more	0.029	0.167	0.027	0.161
No children	0.327	0.469	0.305	0.460
No financially dependent children	0.321	0.467	0.352	0.478
Number of observations	23,663		23,405	

Sources:

2018 and 2021 National Financial Capability Study (NFCS)

2018 and 2021 U.S. Bureau of Labor Statistics

Probit Regression Results

Table 4 shows statistical results from the probit models (Model 1 and Model 2). Both models include the dependent variable of a household's retirement. As shown in Model 1 of Table 4, controlling for all other variables, the result showed that the state-level unemployment rate was positively associated with a household's retirement in 2018 ($\beta = 0.037, p < 0.01$) and 2021 ($\beta = 0.030, p < 0.001$), respectively. For example, in 2021, an increase of one percent point in the state-level unemployment rate was related to a 0.03 higher probability of retirement. Financial literacy was measured objectively and subjectively. Objective ($\beta = 0.042, p < 0.001$; $\beta = 0.026, p < 0.01$) and subjective financial literacy ($\beta = 0.069, p < 0.001$; $\beta = 0.061, p < 0.001$) were positively associated with the probability of retirement in 2018 and 2021, respectively. Financial market participation was negatively associated in both years ($\beta = -0.056, p < 0.05$; $\beta = -0.069, p < 0.05$). In other words, people with an employer-sponsored retirement plan had a lower probability of retirement. Income showed different results. In 2018, annual income (greater than \$50,000) was negatively associated with retirement. However, in 2021, annual income (less than \$35,000) was positively associated with retirement. Financial risk was negatively associated with retirement in both years. In 2018, households who reported spending less than their income had a lower probability of retirement compared to the group without savings from their income. The income drop was associated negatively with retirement. Financial confidence was positively associated with retirement. Other control variables in demographics, including age, marital status, and number of children, have been found to be associated significantly with retirement.

TABLE 4
PROBIT REGRESSION MODELS

Retirement	2018	2021
	Coefficient (S.D.)	Coefficient (S.D.)
Unemployment rate	0.037** (0.017)	0.030*** (0.011)
Objective Financial Literacy (0-5)	0.042*** (0.011)	0.026** (0.011)
Subjective Financial Literacy (1-7)	0.069*** (0.013)	0.061*** (0.013)
Financial participation (Ref: No participation)	-0.056* (0.031)	-0.069* (0.031)

Income (Ref: Less than \$15,000)		
At least \$15,000 but less than \$25,000	-0.004 (0.063)	0.149** (0.062)
At least \$25,000 but less than \$35,000	-0.003 (0.063)	0.131** (0.063)
At least \$35,000 but less than \$50,000	-0.070 (0.062)	0.008 (0.061)
At least \$50,000 but less than \$75,000	-0.222*** (0.063)	-0.007 (0.061)
At least \$75,000 but less than \$100,000	-0.213*** (0.068)	-0.223*** (0.067)
At least \$100,000 but less than \$150,000	-0.373*** (0.070)	-0.345*** (0.070)
At least \$150,000 but less than \$200,000		-0.447*** (0.086)
At least \$200,000 but less than \$300,000	-0.559*** (0.079)	-0.713*** (0.110)
\$300,000 or more		-0.850*** (0.146)
Financial Risk (1-10)	-0.030*** (0.006)	-0.032*** (0.006)
Savings (Ref: No Savings)	-0.081*** (0.027)	0.011 (0.028)
Income Drop (Ref: No drop)	-0.270*** (0.040)	-0.436*** (0.037)
Financial confidence (1-7)	0.019* (0.011)	0.049*** (0.012)
Age (Ref: 18-24)		
25-34	0.247 (0.199)	0.415** (0.194)
35-44	0.777*** (0.180)	0.736*** (0.186)
45-54	1.327*** (0.174)	1.318*** (0.179)
55-64	2.321*** (0.172)	2.264*** (0.177)
65+	3.616*** (0.173)	3.603*** (0.178)
Male(Ref: Female)	-0.008 (0.027)	-0.020 (0.021)
White (Ref: non-white)	0.048 (0.035)	0.021 (0.035)
Education attainment (Ref: not complete high school)		
High school graduate	0.095 (0.109)	-0.151 (0.112)

High school graduate – GED	0.035 (0.115)	-0.070 (0.119)
Some colleges, no degree	0.036 (0.108)	-0.023 (0.111)
Associate’s degree	-0.088 (0.112)	-0.130 (0.115)
Bachelor’s degree	-0.020 (0.110)	-0.113 (0.113)
Postgraduate degree	-0.003 (0.112)	-0.103 (0.116)
Marital status (Ref: Married)		
Living with a partner	-0.107* (0.063)	-0.107* (0.063)
Single	-0.302*** (0.032)	-0.252*** (0.032)
Number of children (Ref: One child)		
Two children	-0.015** (0.069)	-0.057 (0.068)
Three children	-0.242** (0.109)	-0.131 (0.108)
Four children or more	-0.049 (0.122)	-0.037 (0.131)
No child	0.297*** (0.045)	0.299*** (0.046)
No financially dependent children	0.214*** (0.048)	0.239*** (0.048)
Number of observations	23,663	23,406
Pseudo R-squared	0.530	0.540

Sources: 2018 and 2021 National Financial Capability Study (NFCS) survey;
2018 and 2021 U.S. Bureau of Labor Statistics.

*** p < 0.001; ** p<0.01; * p<0.05

DISCUSSION, IMPLICATIONS, AND CONCLUSIONS

This paper utilizes the 2018 and 2021 National Financial Capability Study (NFCS) and the 2018 and 2021 state-level unemployment rate from the U.S. Bureau of Labor Statistics (BLS) to examine 1) the relationship between the state-level unemployment rate and households’ retirement, 2) the relationships between financial literacy and retirement, and 3) comparison of the differences between COVID-19 pre-pandemic and during pandemic. Note that the data in 2018 represents the timeframe of COVID-19 pre-pandemic, and data from 2021 represents the timeframe during the COVID-19 pandemic.

Consistent with the theoretical hypothesis and prior findings, the results show that the state-level unemployment rates are associated positively with the probability of retiring (Bosworth & Burtless, 2010; Bould, 1980; Coile & Levine, 2010; Goda et al., 2011; Hallberg, 2011; Munnell et al., 2008). The LCT and life cycle of labor supply theory imply that during a high unemployment rate, households will make retirement decisions that produce a higher utility (Ando & Modigliani, 1963; Ehrenberg et al., 2021). Human capital theory indicates that an individual with more training is more competitive in a labor market (Becker, 1993; Becker, 2009). In addition, previous studies have found that individuals with less education are forced to retire because those individuals cannot find a job (Chan & Huff Stevens, 2001; Choi et al.,

2014; Coile & Levine, 2011; Hairault et al., 2015). In this case, a high unemployment rate might decrease their wage rate, and thus, households would have a higher probability of retiring. Theoretically, financial literacy is a proxy of human capital investment. As predicted, people who invest in human capital have more knowledge to make better decisions (Becker, 1993; Becker, 2009). In addition, our study provides empirical evidence that objective financial literacy and subjective financial literacy are positively associated with retirement, respectively. These findings are consistent with theoretical expectations and add robust empirical evidence that high financial literacy (objective and subjective) positively affects people's financial decision-making, such as retirement (Hussain et al., 2018; Lusardi & Mitchell, 2007; Lusardi & Mitchell, 2014).

Furthermore, these findings imply that households might not be able to control unemployment rates to go up and down. However, households can apply their financial literacy, objectively and subjectively, to make sound retirement decisions that might best fit their family and their life. Financial professionals (e.g., financial planners and financial advisors), communities, and governments might need to be aware of the importance of financial literacy, both subjective and objective, and help their clients and residents improve their financial literacy. For example, financial institutions, schools, and local governments offer clients and residents free access to personal finance classes or workshops (Hastings et al., 2013; Hussain et al., 2018; Lusardi & Mitchell, 2007; Lusardi & Mitchell, 2014).

Employer-sponsored retirement plans are proxied to financial market participation. Surprisingly, financial market participation is negatively associated with households' retirement. Employer-sponsored retirement plans might serve as economic incentives for households to stay in the labor market and delay retirement (Fisher et al., 2016). Also, a high unemployment rate is one of the phenomena of an economic downturn. In turn, an economic downturn causes a decline in the stock market and, thus, increases the probability of delaying retirement as households' retirement accounts are devaluing (Coile & Levine, 2006; Goda et al., 2011; Munnell et al., 2008). In addition, financial risk is negatively associated with retirement. In other words, risk-averse households are more likely to retire than risk lovers. The result is consistent with the prospect theory that risk-averse people tend to feel more pain from the loss of retirement activity than risk lovers do under uncertainty (Kahneman & Tversky, 2013). As expected, households have a higher probability of retiring as age increases.

Moreover, having no children and having no financially dependent children are related positively to the probability of retiring. Labor supply theory indicates that an individual will increase working hours if the monetary costs of childcare increase (Ehrenberg et al., 2021). These results are consistent with findings in that the more children in a family, the lower the probability of retiring (Bonsang & van Soest, 2015; Hairault et al., 2015; Lumsdaine & Vermeer, 2015).

One of the limitations of this study is that it uses cross-sectional data in empirical analysis. Future research might consider utilizing longitudinal data to test the causal effects. Moreover, other economic indicators such as the inflation rate, stock market index, and housing value might be considered as other explanatory variables to investigate the effects of economic conditions on retirement. Furthermore, limitations of the nature of continuous variables, such as income and age, were categorized into groups in the dataset. Using the categorical variables of continuous variables in nature might reduce the accuracy of empirical results.

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