Moving towards active retirement planning: Does early financial education matters?

Abstract:

This study examines how early financial education affects individual retirement planning. Using data from the 2021 Financial Capability Survey and analyzing it through STATA, we find that those who received financial education in high school are the most active in making retirement plans. After removing the extreme income groups, the findings still hold. This suggests that financial education at the high school level has a significant positive impact on individual retirement planning. This study highlights the importance of financial education at the high school level, which is an important guide for policymakers, educators, and families to help promote more scientific future planning and astable retirement.

Key words: early financial education,retirement planning,retirement satisfaction

1. Introduction

The global landscape of public finances is encountering a formidable challenge posed by the aging demographic, with credit rating agencies sounding alarms about the exacerbation of pension and healthcare expenditure burdens by recent spikes in interest rates. Prognosticating into the future, Sarbjit Nahal, Director of Thematic Investing at BofA Merrill Lynch Global Research and author of the seminal "The Silver Dollar" report, draws attention to a United Nations forecast, predicting a more than twofold increase in the global population aged 60 and above by 2050, surpassing 2 billion individuals. This trend, compounded by rising life expectancies and dwindling birth rates across both developed and emerging economies, is anticipated to strain the financial safety mechanisms supporting retirees, potentially catalyzing a

heightened demand for financial counseling, as noted by Nahal. The graying of populations is becoming a ubiquitous phenomenon, he observes, posing a formidable challenge to retirement systems over the coming half-century, with global annuity and pension liabilities projected to reach staggering figures of between USD 15 and 25 trillion.

As the Baby Boomer cohort swiftly approaches retirement, the significance of retirement planning has ascended to a paramount level of desirability (Biddle, 2015). This urgency may stem from the revelation that a substantial 56% of this generation have yet to formulate concrete retirement plans or aspirations (Brucker &Leppel, 2013). Moreover, the shift from conventional defined benefit frameworks to defined contribution plans, as highlighted by the Bureau of Labor Statistics (2020), has intensified the scrutiny on intergenerational disparities. Consequently, it is not surprising to observe a notably low percentage of employed Millennials, specifically 8.9%, holding defined benefit plans (Yao and Cheng 2017). This underscores the need for further examination into the evolving landscape of retirement security across generations.Compounding this, a staggering 74% of Millennials harbor doubts about the availability of Social Security benefits upon retirement, thereby intensifying their responsibility for retirement planning. Paradoxically, Millennials prioritize higher salaries over robust retirement benefits, whereas Baby Boomers favor the opposite (Wells Fargo 2016).

As a result, retirement planning is garnering heightened attention, given the demographic trends suggesting a surge in the retirement-age population enduring extended retirement phases (Adams & Rau 2011). The absence of adequate financial preparations for post-retirement life poses a dire threat to the sustainability of personal financial resources (Boisclair et al. 2017).Despite these implications, research consistently underscores the scarcity of financial planning practices globally, even in developed economies (Adams & Rau 2011).The absence of sufficient retirement savings, particularly among individuals approaching retirement, represents a pivotal challenge confronting numerous developing nations, underscoring one of the most pressing issues in these economies (Mohd2023).

Research has revealed that individuals who undergo financial literacy education

are more inclined to participate in retirement savings activities, thereby indicating the significance of such training in fostering savings behavior among the populace (Elin et al. 2019). This indicates a positive correlation between education and enhanced retirement preparedness, prudent financial decision-making, comprehensive understanding of retirement finances, and well-defined retirement goals. Strategizing for retirement entails substantial benefits, encompassing abundant resources upon retirement, income satisfaction, realistic visions for the future, potential for early retirement, and a heightened sense of autonomy over one's life trajectory (Hershey2001). Despite the pivotal role of financial literacy in retirement planning, limited research has underscored the educational dimension's significance in this context (Trivedi 2021). Understanding personal finance, and particularly fostering financial literacy, holds paramount significance among contemporary adolescents and youth, given their heightened exposure to financial decision-making processes compared to previous generations, including their parents (Aprea et al., 2016). To address this research gap, the present study endeavors to empirically delve into the impacts of varying levels of early financial education on an individual's retirement planning strategies, thereby contributing to the existing knowledge base.

To accomplish this objective, we harness data from the 2021 National Financial Capability Study's State-by-State Survey Instrument (NFCS). In our analysis, retirement planning serves as the explanatory variable, while early financial education constitutes the response variable. We meticulously account for domestic factors, including age, gender, marital status, income, as well as other recognized determinants of retirement planning, such as risk appetite, income stability, financial market participation, creditworthiness, and desirable financial management practices. To ensure the robustness of our findings, we assess the influence of parental education on individual financial literacy employing Ordinary Least Squares (OLS), Probit, and Logit regression models. By categorizing early financial education into distinct variable groups, we aim to delve into the nuances of its effects across various educational milestones.

Given the correlation between income and the need for retirement planning (Ricci & Caratelli 2017), an individual's ability and willingness determine the extent

of planning, including financial resources for retirement investments (Larisa 2021). To validate robustly and control for income variability, we employ a probit regression model.These analyses endeavor to unravel the intricate interplay between early financial education and retirement planning strategies. Our overarching objective is to formulate efficacious policy recommendations and devise educational interventions that bolster individual financial stewardship, empowering individuals to devise more comprehensive retirement plans, ultimately contributing to enhanced financial wellbeing.

2. Literacy review

2.1 Previous study on early financial education

Beginning in the 1970s, the era of financial liberalization ushered in a rapid expansion of global financial markets, often surpassing the cognitive capacity of the average individual to navigate rational financial decisions (Klapper 2013). In response, a range of educational endeavors—encompassing foundational courses, lifelong learning programs, and vocational training—have emerged.

Financial education has emerged as a pivotal policy instrument, attracting significant scholarly attention for its potential to enhance citizens' financial literacy and knowledge base.Substantial empirical data underscores the tangible benefits of financial education, spanning diverse domains and yielding concrete outcomes (McCormick 2009). Notably, it has demonstrated remarkable success in bolstering financial literacy, profoundly shaping personal economic behaviors. For example, it fosters higher savings rates and accelerates net wealth accumulation, enabling individuals to embark on a path of sustainable financial growth (Bernheim et al. 2001). Moreover, financial education elevates the likelihood of individuals adopting retirement savings plans, fostering enhanced forward-thinking planning (Joo and Grable 2005). Furthermore, it mitigates the risks associated with employing unsophisticated investment strategies in equities, thereby enhancing the quality of financial market decisions (Clark et al. 2017).

At the foundation of these favorable outcomes lies the heightened understanding of financial instruments fostered by financial education. This education equips individuals with the ability to discern the intricacies and inherent risks of diverse

financial offerings, empowering them to arrive at more enlightened decisions. Concurrently, it fosters personal financial management and future-oriented planning, ultimately enhancing overall economic wellbeing (Laverty 2016). As such, intensifying the dissemination and progression of financial education is paramount in strengthening national financial literacy and nurturing enduring economic advancement.

2.2 previous study on retirement planning

Retirement, the pivotal shift from active professional engagement, can be a gratifying experience when adequately anticipated and prepared for. Nonetheless, global research underscores a prevalent issue: a lack of adequate retirement planning (Maobe 2020). Approximately a third of senior citizens residing in the United States, specifically those individuals surpassing the age of 55, find themselves devoid of both personal retirement savings and accumulated pension entitlements. This phenomenon is particularly noteworthy when directing attention towards lower-income adults who are approaching their retirement years（Nam2021). Contemporary scholarship views retirement planning as a proactive endeavor undertaken by individuals to adapt to the transition to post-employment life (Larisa 2021). This perspective encompasses a financial dimension, emphasizing personal accountability for ensuring financial security amidst the reduction or cessation of income streams (Fan 2022).

The escalating global aging demographic underscores the criticality of retirement planning, a topic that has garnered substantial scholarly interest. A recurring theme across numerous investigations is that individuals who engage in proactive retirement planning often exhibit superior financial stability, higher satisfaction with their retirement income, and more tangible aspirations for the future (Hershey 2000). These proactive planners tend to opt for earlier retirement, empowered by a sense of control over their post-career lives (Rosenkoetter 2001).

A recent survey conducted in Singapore offers an intriguing perspective. Amidst a myriad of financial concerns, those who have mapped out their retirement strategies report an elevated level of overall well-being (BlackRock 2019). This finding echoes research highlighting the myriad benefits of proactive retirement planning, including

financial stability, improved physical health, and bolstered emotional resilience (Muda 2024).

Despite overwhelming evidence from studies conducted across diverse geographical regions, including developed nations, a consistent and concerning trend emerges: the scarcity of financial planning among the general public (Quinn 2007). This underscores the pressing necessity for a paradigm shift, emphasizing the integration of retirement planning as a fundamental life competency. This competency ought to be nurtured from an early stage and sustained throughout life's stages, encompassing childhood, the prime working years, and ultimately, the retirement phase (LeBaron et al. 2020). By fostering a proactive financial planning ethos, societies can empower their citizens with the instrumentalities required to traverse the intricacies of aging with dignity, security, and a sense of purpose.

The heightened focus on retirement planning stems from prevailing demographic shifts, which indicate a rising proportion of the population embarking on extended retirement phases (Adams 2011). Given that individuals who are financially prepared for retirement are more prone to savor their golden years (Elder 1999), it is imperative to highlight the impending financial hurdles, particularly for younger generations who may grapple with the intricacies of retirement planning. Navigating the transition into retirement necessitates a holistic comprehension of this life stage, encompassing not merely financial considerations but also the associated duties, responsibilities, and entitlements.

Regrettably, contemporary trends underscore a pronounced information deficit among millennials concerning retirement planning. This deficiency stems from minimal exposure, scarce hands-on experience, and a pervasive mindset that retirement planning is a remote concern, unworthy of immediate attention (Muda 2024). If left unchecked, such a mindset poses a risk to this generation's financial security and overall wellbeing during their post-career years. Consequently, there arises an exigent need to delve into the intricacies of retirement planning. This endeavor aims not merely to bridge the existing knowledge divide but also to empower future retirees with the requisite tools and perspectives to make prudent choices, thereby securing financial stability and contentment in their golden years.

Achieving this necessitates a concerted action from policymakers, educators, financial counselors, and individuals alike, fostering a proactive approach to retirement planning that transcends generations.

2.3 Previous study on early financial education and retirement planning

In delving into the profound nexus between early financial education and retirement planning, it is imperative to underscore the pivotal significance of financial literacy in shaping an individual's retirement roadmap. Research underscores a favorable relationship between financial preparedness and retiree satisfaction (Elder and1999). This resonates with earlier scholarly endeavors that, a decade prior, underscored the potential congruence between financial literacy and effective retirement strategies, further emphasizing its paramount role in personal financial planning.

Furthermore, financial education emerges as a potent instrument for bolstering public financial literacy. This enhancement can be accomplished via tailored educational avenues, such as workshops and seminars, that address the disparities rooted in gender and race (Andrade 2014). Plus, financial literacy plays a pivotal role in crafting efficient retirement plans and fostering prudent financial decision-making(Van Rooij 2021). However, a notable dearth of comprehensive global data on retirement planning persists, illuminating the limitations of our current understanding and emphasizing the pressing need for more rigorous research to fortify financial literacy worldwide(Maobe 2020).Furthermore, empirical studies have illuminated that individuals who have successfully concluded a financial literacy training program exhibit a heightened tendency to initiate savings for their retirement. This observation underscores the correlation between educational endeavors and enhanced preparedness for retirement, as well as more prudent financial decision-making capabilities(Elinder et al. 2019)

Within this framework, the realm of financial inheritance, particularly parental tutelage, assumes paramount importance in augmenting financial literacy, fortifying individuals' financial decision-making acumen, and nurturing long-term financial resilience. By weaving financial education seamlessly into daily life routines, parents can construct a resilient financial safety net for their offspring. This strategy not

merely equips youth with the wherewithal to make prudent financial decisions at pivotal life junctures but also fosters an overall elevation of financial literacy across society.

Recent scholarly endeavors have underscored the profound and positive influence of financial literacy on retirement planning endeavors. Furthermore, academics have advocated for an anticipatory approach to retirement planning, emphasizing that an individual's financial trajectory ought to be a perpetual aspect of life, originating in childhood, traversing through the working years, and extending into the retirement phase (LeBaron, 2020). Consequently, this paper posits that individuals who are introduced to retirement planning-related financial literacy concepts at an earlier stage may exhibit heightened levels of enthusiasm and preparedness in their retirement planning endeavors. This hypothesis is grounded in the conviction that early financial literacy instruction can motivate individuals to embark on more proactive planning endeavors, nurturing a profound comprehension of the financial prerequisites and considerations vital for securing a comfortable and financially secure retirement.

Hypothesis 1 (H_1): Individuals who receive financial education early in life show higher levels of motivation and preparedness for retirement planning compared to those who do not.

Acknowledging the well-established effectiveness of financial education in augmenting individuals' financial acumen(Walstad et al. 2010), regardless of its mandatory or elective status across diverse educational landscapes, encompassing high school curricula (Bruhn et al. 2016), university programs, and workplace endeavors, this paper delves deeply into the intricate dynamics that underlie the influence of early-stage financial education on individuals' retirement planning strategies. To achieve this, the study is structured into three distinct groups, each defined by the stage(s) of education where financial education was received: those exposed to it solely in high school, those who underwent it in both high school and college, and those whose exposure was confined to college. This categorization aims to elucidate the role of continuity in financial education on shaping retirement planning strategies. It is anticipated that individuals who have had financial education

at multiple junctures of their academic journey will exhibit heightened levels of financial literacy and refined planning capabilities, thereby facilitating the development of more elaborate and well-conceived retirement plans.

Hypothesis 2 (H_2): Individuals who have undergone financial education both during their high school and college years exhibit a more proactive approach towards retirement planning, in contrast to those who have only received such education in either of these educational stages.

The theoretical underpinning of this research is structured around three pivotal components: the explanatory factor, encompassing early financial education, which is further disaggregated into three subgroups: those exposed to it in high school, in college, and across both educational stages. The dependent variable of interest is retirement planning. In addition, a comprehensive set of control variables has been incorporated to account for potential confounding effects, including gender, age, educational attainment, marital status, numerical aptitude, ethnicity, the number of financially reliant children, risk propensity, creditworthiness score, annual income, job stability, engagement in financial markets, favorable financial practices, and household income. This methodology ensures a rigorous examination of the relationship between early financial education and retirement planning, while mitigating the influence of extraneous variables.

3. Method

3.1 Data

The data utilized in this paper stems from the 2021 iteration of the National Financial Capability Study's State-by-State Survey Instrument, a nationwide survey devised to evaluate the comprehension, perspectives, and practices of American adults pertaining to personal finance and the economy. Employing a stratified, multi-stage sampling approach, the survey garnered responses from 13,554 adults across the United States. To align with our study's core objective, which centers on retirement planning behaviors, we narrowed our analytical sample to encompass working individuals aged 25 to 64. This decision was informed by prior research indicating that those outside this age bracket may exhibit distinct retirement planning patterns

and possess varying financial aspirations (Hasler et al. 2018). The sample remained demographically representative, mirroring the nation's diversity in terms of age, gender, ethnicity, educational attainment, and income levels. The NFCS aimed to gather insights into individuals' financial capabilities, along with their demographic profiles, behavioral patterns, attitudinal dispositions, and financial literacy levels. Participants who failed to provide responses to the study's specified variables were excluded from the subsequent analyses.

The survey utilized the following three sampling procedures: first, stratified sampling, which divided the United States into geographic regions and randomly selected counties or districts within each region. Second is multistage sampling, in which household addresses are drawn from census blocks within each county or region by randomization methods. Lastly, there is random sampling, in which a respondent aged 18 years and above is drawn from the household members in each selected address through randomization method. All respondents in the sample were above 18 years of age and the number of respondents reached a representative number of 13,554.

3.2 Model specification and variables

The attainment of a fulfilling retirement is significantly influenced by the thoroughness of pre-retirement planning and the posing of pivotal inquiries, such as identifying the optimal retirement age, assessing financial adequacy, and deliberating on residential arrangements and lifestyle choices (Wann 2023). And an individual's retirement mindset fundamentally shapes their blueprint for post-work life and the actions they undertake to realize this vision(Frank2023). Consequently, this research inquiry sought to examine respondents' endeavors in estimating their retirement savings requirements, operationalized as a binary outcome variable designated as 'retire' to signify retirement planning activities. The focal independent variable under investigation is early financial education, which is stratified into three distinct categories: financial education exposure solely in high school (efinedu1), dual exposure in both high school and college (efinedu2), and exposure solely in college (efinedu3). This stratification aims to facilitate a nuanced understanding of the mechanisms through which early financial education exerts its influence.

This study primarily investigates the impact of early financial behavior (efinedu) on consumer retirement planning (retire). The basic regression model is specified as follows:

$$retire = \alpha_0 + \sum_{j=1}^{N} \beta_j * efinedu_i + \sum_{k=1}^{M} \beta_k * cv_{k,i} + \varepsilon_i \#(1)$$

In Equation (1), the subscript 'i' designates individual consumer samples, while the superscripts 'N' and 'M' respectively signify the count of variables pertaining to early financial education and the number of control variables. Furthermore, ε denotes the stochastic error term. Specifically, 'retire' captures the dimension of consumer retirement planning, and 'efinedu' encompasses variables related to early financial behaviors. The independent variable, namely early financial education, is operationalized using a 3-point Likert scale, inquiring about the timing of its receipt: 1 for high school only, 2 for both high school and college, and 3 for college alone.

More specifically, cv_k denotes the control variable k. In this study, following the practices of previous research on retirement planning,demographic characteristics along with variables related to retirement planning as control variables were included in this study.An analysis revealed that individuals identifying as White and non-Hispanic were more prone to estimating their retirement requirements and possessing retirement accounts, in comparison to other demographic groups. Factors such as educational level, homeownership status, income level, and full-time employment exhibited favorable correlations with the probability of owning a retirement account (Fan et al. 2021).Among these socio-demographic attributes are age, gender, racial/ethnic background (differentiated as White and non-Hispanic, and others), educational attainment (grouped into: high school diploma or below, some college education, bachelor's degree, and postgraduate or advanced degrees), income bracket, marital status (married or unmarried), presence of financially dependent offspring (yes or no), and employment status, encompassing full-time work, part-time employment, and self-employment.Additionally, perceived mathematical proficiency was incorporated as a control variable, measured on a 7-point scale, wherein a higher score indicates a stronger mathematical capability(mathcap). Apart from that, this study also consider a number of variables which have an impact on retirement planning. Individuals who possess a greater capacity for risk acceptance or a

heightened level of financial literacy tend to allocate more funds towards retirement savings, thereby fostering a favorable impact on their overall retirement planning strategy (Parker 2012). Accordingly, a multitude of demographic and socioeconomic factors were incorporated as control variables. The metrics employed for assessing risk tolerance (designated as riskatt), subjective credit evaluations (termed asscrdt), engagement in financial markets (finpart), and desirable financial practices (designated as desfb), among others, adhere to a tailored scoring mechanism, where elevated scores signify superior evaluations. The risk tolerance dimension was quantified through a self-reported query regarding the individual's willingness to accept risks in financial investments, with a scale ranging from 1, signifying complete aversion, to 10, indicating a high degree of willingness. Similarly, the credit rating variable was measured via a self-assessment of the individual's current credit standing, using a scale where 1 corresponds to extremely low creditworthiness, and 5 to exceptionally high creditworthiness.Additionally, the variable whether or not participates in the financial market is binary, with a value of 1 indicating participation in the financial market and 0 indicating no participation. Due to the relevance of several behavioral variables in the study to these financial instruments, it was necessary to include these account status variables. The variable representing desirable financial behavior was formulated through the aggregation of scores derived from six inquiries pertaining to financial conduct, encompassing monthly spending habits, the ease or difficulty in covering expenses and bills, income stability, and savings for contingencies, retirement, or children's education. Each response was coded as 1 for accuracy and 0 for inaccuracy. Consequently, the scale for this desirable financial behavior ranges from 0 to 6, where 0 signifies a negative response to all six questions, while 6 denotes a positive response to all of them. Furthermore, for comprehensive reference, the pertinent details are presented in Table 1.

Table 1 Variable description

Variable	Attribute
retire	Have you considered saving for retirement
efinedu1	received financial education in high school
efinedu3	received financial education in both high school and college

efinedu2	received financial education in college
gender	1=male，0=female
age	1=18-24；2=25-34；3=35-44；4=45-54；5=55-64；6=65+
edu	1= high school graduate; 2= Some college, no degree; Associate's degree; Bachelor's degree; 3= Post graduate degree
married	1=being married, 0 = not married
mathcap	1—not at all good at, 7—extremely good at
ethn	1=white, 0= non-white
child	1-4（4=4+）
riskatt	When thinking of your financial investments, how willing are you to take risks? （ 1= "Not At All Willing"; 10 = "Very Willing）
asscrdt	How would you rate your current credit record? (1= Very bad; 2=Bad; 3=About average; 4=Good; 5=Very good)
income	1=Less than $15,000; 2= $15,000-$25,000; 3=At least $25,000-$35,000； 4= $35,000- $50,000; 5= At least $50,000- $75,000; 6=$75,000-$100,000; 7= $100,000 -$150,000; 8= $150,000-$200,000; 9= $200,000- $300,000; 10= $300,000
worksta	1 = Self-employed； 2 = Work full-time for an employer； 3 = Work part-time for an employer
finpart	does your household have any investments in stocks, bonds, mutual funds, or other securities (1 = yes; 0 = no)
desfb	Six questions

3.3 Estimation method

Based on the survey findings, the retirement planning variable is categorized as an ordered discrete variable rather than a continuous one. Utilizing the conventional OLS approach for regression analysis could potentially lead to issues concerning robustness and precision. Hence, this study adopts a two-step approach: initially performing OLS regression, followed by the application of ordered probit regression to refine and enhance the estimation outcomes, thereby addressing the aforementioned concerns.

$$\Pr(retire) = \phi(\beta_0 + \beta_1 * efedu + \beta_2 * cv_k + \varepsilon) \#(2)$$

By leveraging ordered probit regression as a refinement strategy over OLS regression, we ensure that the probability distribution function of retirement planning aligns more closely with the inherent characteristics of the dependent variable data, thereby bolstering the robustness and precision of our empirical findings. Additionally, the employment of ordered probit regression in resolving the likelihood function further sharpens the accuracy of our empirical results, contributing to a more comprehensive and reliable analysis.

In addition, it is noteworthy that the fundamental assumption of the probit model pertains to random variables adhering to a normal distribution, whereas the logit model presupposes that these variables conform to a logistic probability distribution.Therefore, the difference between these two distributional assumptions makes it possible for the two models to produce different results in a given situation. Additionally, the probability distribution assumed by the Logit model is more common in social sciences, especially when dealing with binary choice problems, the use of the Logit model can explain and predict real-life phenomena more directly. And logit models are widely used in social sciences, economics, medicine and other fields, especially when dealing with binary choice problems. Therefore, considering the field of this study, using Logit model for analysis helps to compare and dialog with other related studies.

$$Logit\big(P(retire = 1 \mid X)\big) = \beta_0 + \beta_1 efinedu_i + i\sum\beta_{i+1} X\, i \#(3)$$

By using both Probit and Logit models, the results can be tested for robustness. If the results of the two models are approximately the same or similar, the reliability of

the findings can be enhanced.The use of Logit model for analysis helps to promote and apply the research results.

3.4 Statistical description

The study's dataset comprises 26,482 observations, encompassing a diverse array of variables, meticulously designed to delve into the intricate relationships between these variables and individuals' retirement planning strategies.Descriptive statistics for the key variables are summarized below.

On average, about 31.46% of individuals reported having a retirement plan which suggests that the majorityof individuals in our sample do not yet have a defined retirement plan. Plus, the three levels of early financial education (efinedu1, efinedu2, efinedu3) represent different stages of education. Overall, the percentage of individuals who received early financial education is relatively low, with only 12.45%, 18.46%, and 11.93% of individuals having received financial education at the corresponding educational level, on average. The sample has a more balanced distribution in terms of gender, with about 46.13% of individuals being female. For education level, most individuals have completed at least secondary education. Marital status shows that about 49.35% of the individuals are married.

In mathcapability, the mean score is 5.3790 out of 7, showing that the sample is moderately proficient in mathcapability. Ethnic background shows that about 74.20% of the individuals belong to a white and Non-Hispanic racial or ethnic group. Family status shows that there is an average of 0.6455 children per family, but the standard deviation is large, indicating that there is a wide variation in the number of children in families.

The average rating of risk attitude is 4.9611 out of 10, indicating that individuals in the sample have a neutral risk attitude. The mean score of credit evaluationis 3.7055 out of 5, showing that most individuals have a moderate evaluation of their credit status. Since it is 4.5058 out of 10 in income level, individuals in the sample have a wide distribution of income levels. Work status shows that the majority of individuals are in some kind of work status with a mean of 2.0285, ranging from 1 to 3. For financial market participation, about 36.20% of the individuals are involved in financial market investments.The aggregate assessment of desired financial conduct

reveals a mean score of 3.2012 on a 6-point scale, suggesting a moderate level of financial behavior among the sampled individuals. These descriptive statistics furnish us with foundational insights into the characteristics of our sample data, laying the groundwork for subsequent analytical endeavors and research pursuits. A comprehensive overview of these details is presented in Table 2.

Table 2 Statistical description

Variable	Obs	Mean	Std. Dev.	Min	Max
retire	26,482	0.3146	0.4644	0	1
efinedu1	26,482	0.1245	0.3302	0	1
efinedu3	26,482	0.1193	0.3242	0	1
efinedu2	26,482	0.1846	0.3880	0	1
gender	26,482	0.4613	0.4985	0	1
age_1	26,482	0.1072	0.3094	0	1
age_2	26,482	0.1726	0.3779	0	1
age_3	26,482	0.1685	0.3743	0	1
age_4	26,482	0.1709	0.3764	0	1
age_5	26,482	0.1759	0.3807	0	1
age_6	26,482	0.2049	0.4037	0	1
edu1	26,482	0.2703	0.4441	0	1
edu2	26,482	0.6187	0.4857	0	1
edu3	26,482	0.1110	0.3141	0	1
married	26,482	0.4935	0.5000	0	1
mathcap	26,482	5.3790	1.7165	0	7
ethn	26,482	0.7420	0.4375	0	1
child	26,482	0.6455	1.0452	0	4
riskatt	26,482	4.9611	2.7725	0	10
asscrdt	26,482	3.7055	1.4624	0	5
income	26,482	4.5058	2.1997	1	10
worksta	26,482	2.0285	0.9593	1	3

finpart	26,482	0.3620	0.4806	0	1
desfb	26,482	3.2012	1.4085	0	6

4. Empirical Results

4.1 Results of correlation analysis

Table 3 offers a comprehensive and nuanced view of the complex interrelationships among various variables, with a particular focus on the intricate dynamics between the receipt of early financial education and the ultimate extent of retirement planning achieved by consumers. This tabular representation constitutes a pivotal analytical instrument for dissecting the interconnected web of these factors, thereby facilitating the discernment of patterns and trends that can inform the formulation of efficacious financial education initiatives.

Observing Table 3, it is evident that there exists a positive and statistically significant correlation between consumer retirement planning and all three indicators of financial education level, suggesting that individuals with higher financial literacy are prone to actively engage in retirement planning. Notably, the correlation is marginally stronger for those who received financial education during high school, potentially hinting at a more pronounced impact of college-level financial education on retirement planning strategies.

The variables pertaining to financial education levels demonstrate a notable positive correlation, notably with a correlation coefficient of 0.415 between high school and college financial education. This observation implies a potential continuity in the progression of financial education, signifying that individuals who acquire financial literacy at the high school level are likely to further their education in this domain during college. In essence, there is a tendency for consumers to maintain their pursuit of financial education across educational stages.

In addition, consumer retirement planning also shows significant positive correlations with several control variables. For example, mathcapability, riskattitude, credit rating, income level, work status, financial market participation, and financial literacy score are all positively correlated with retirement planning with high correlation coefficients. As former study has claimed, the level of financial literacy and cognitive abilities exert a pronounced and favorable influence on an individual's

decision to invest in stocks. Insufficient financial understanding can potentially account for both limited investment allocations and a reduced participation rate within the capital markets(Christelis 2010). The analysis indicates that individuals possessing superior mathematical proficiency, harboring more favorable risk appetites, maintaining higher creditworthiness, enjoying elevated income brackets, occupying stable employment positions, exhibiting greater involvement in financial markets, and scoring higher on financial literacy assessments are inclined to actively pursue retirement planning.

In essence, the correlation analysis underscores the pivotal positive influence of financial education on consumers' proactive retirement planning endeavors, with this effect discernible across several controlling factors. Nevertheless, it is important to note that this analysis merely offers a preliminary glimpse into the interplay between the variables, necessitating subsequent, more exhaustive regression analyses to delve deeper into the specific implications of financial education on retirement planning and its underlying mechanisms.The comprehensive portrayal of these findings is encapsulated in Table 3.

Table 3 Correlations between early financial education and retirement planning

	retire	efinedu1	efinedu3	efinedu2	mathcap	riskatt	asscrdt	income	worksta	finpart	desfb
retire	1.0000										
efinedu1	0.0934***	1.0000									
efinedu3	0.1171***	0.4150***	1.0000								
efinedu2	0.1138***	0.7927***	0.7737***	1.0000							
mathcap	0.1205***	0.0816***	0.1267***	0.1169***	1.0000						
riskatt	0.2748***	0.0645***	0.1079***	0.0929***	0.1549***	1.0000					
asscrdt	0.1507***	0.0236***	0.0995***	0.0605***	0.2237***	0.1457***	1.0000				
income	0.2733***	0.0341***	0.1292***	0.0804***	0.2206***	0.2532***	0.4312***	1.0000			
worksta	0.3826***	0.0425***	0.0634***	0.0564***	0.0421***	0.2505***	0.0752***	0.2818***	1.0000		
finpart	0.2225***	0.0657***	0.1302***	0.1069***	0.1662***	0.3248***	0.2989***	0.3510***	0.0963***	1.0000	
desfb	0.4863***	0.0585***	0.1194***	0.0937***	0.2374***	0.2360***	0.4942***	0.4944***	0.2088***	0.3503***	1.0000

4.2 Early financial education and retirement planning

Table 4 encapsulates the regression outcomes pertaining to the influence of early financial education on retirement planning strategies. Column (1) specifically illustrates the extent of consumers' retirement planning, quantified through an assessment of their objective financial literacy. To further analyze the potential moderating role of parental education in shaping consumers' financial acumen, items related to parental educational backgrounds have been incorporated into Columns (2), (3), and (4), thereby facilitating a comparative evaluation of its impact.

Table 4 Results of regressions of early financial education on retirement planning

	(1)	(2)	(3)	(4)
Variables	Retire	Retire	Retire	Retire
Efinedu1		0.0592***		
		(0.0066)		
Efinedu3			0.0563***	
			(0.0077)	
Efinedu2				0.0528***
				(0.0057)
Male	-0.0151***	-0.0156***	-0.0165***	-0.0163***
	(0.0044)	(0.0043)	(0.0043)	(0.0043)
age_1	0.1734***	0.1644***	0.1710***	0.1650***
	(0.0129)	(0.0126)	(0.0129)	(0.0127)
age_2	0.1715***	0.1684***	0.1710***	0.1689***
	(0.0111)	(0.0109)	(0.0111)	(0.0110)
age_3	0.1882***	0.1865***	0.1884***	0.1872***
	(0.0095)	(0.0094)	(0.0094)	(0.0094)
age_4	0.2158***	0.2127***	0.2154***	0.2136***
	(0.0085)	(0.0084)	(0.0085)	(0.0084)
age_5	0.1845***	0.1818***	0.1842***	0.1825***
	(0.0072)	(0.0072)	(0.0072)	(0.0073)
edu1	0.0308***	0.0296***	0.0230***	0.0261***
	(0.0058)	(0.0057)	(0.0059)	(0.0057)
edu2	0.0495***	0.0491***	0.0399***	0.0439***
	(0.0097)	(0.0097)	(0.0101)	(0.0097)
married	0.0012	0.0009	0.0009	0.0010
	(0.0058)	(0.0058)	(0.0058)	(0.0058)
mathcap	0.0052***	0.0043**	0.0044**	0.0041**
	(0.0017)	(0.0017)	(0.0017)	(0.0017)
ethn	-0.0145**	-0.0145**	-0.0133**	-0.0138**
	(0.0063)	(0.0064)	(0.0063)	(0.0064)

child	0.0069**	0.0068**	0.0067**	0.0067**
	(0.0029)	(0.0030)	(0.0030)	(0.0030)
riskatt	0.0139***	0.0139***	0.0137***	0.0138***
	(0.0012)	(0.0012)	(0.0012)	(0.0012)
asscrdt	-0.0253***	-0.0253***	-0.0254***	-0.0253***
	(0.0019)	(0.0019)	(0.0019)	(0.0019)
income	-0.0056***	-0.0056***	-0.0057***	-0.0056***
	(0.0017)	(0.0016)	(0.0016)	(0.0016)
worksta	0.0985***	0.0986***	0.0984***	0.0986***
	(0.0030)	(0.0029)	(0.0030)	(0.0030)
finpart	0.0556***	0.0539***	0.0538***	0.0533***
	(0.0065)	(0.0065)	(0.0065)	(0.0065)
desfb	0.1508***	0.1502***	0.1505***	0.1502***
	(0.0022)	(0.0022)	(0.0022)	(0.0022)
Constant	-0.4552***	-0.4518***	-0.4479***	-0.4500***
	(0.0127)	(0.0127)	(0.0131)	(0.0129)
State dummies	Yes	Yes	Yes	Yes
Observations	26482	26482	26482	26482
Adjusted R^2	0.3654	0.3671	0.3668	0.3672

Across all four constructed models, a consistent and robust positive correlation emerges between the level of early financial education and the extent of consumers' engagement in retirement planning. This finding underscores the notion that individuals who possess a more comprehensive and well-informed understanding of financial matters, nurtured through early educational interventions, exhibit a heightened propensity towards proactive retirement planning. This observed phenomenon aligns seamlessly with our initial hypothesis (H_1), which posits that early financial education fosters a favorable relationship with consumers' preparedness for retirement, thereby reinforcing the significance of such educational endeavors in shaping financially secure futures. The vital association between early financial education and effective retirement planning underscores the paramount importance of knowledge acquisition in empowering individuals to make well-informed choices that foster their long-term financial security and overall well-being.

In Models (2),(3), and (4), the reception of early financial education emerges as a pivotal factor, exerting a notable and positive influence on consumers' retirement planning endeavors. Notably, individuals who underwent financial education during

their high school years demonstrate superior performance, as evidenced by a coefficient of 0.0592, which stands as the highest among the three models, underscoring the effectiveness of early intervention in fostering retirement preparedness.This proposition implies that the provision of comprehensive financial education at an early juncture may more effectively contribute to the cultivation of retirement planning competencies.While this result does not match with the H_2 that says compared to those who received financial education only in high school or college, individuals who received financial education in both high school and college demonstrate more active planning for retirement planning. A plausible rationale lies in the notion that incorporating financial education into high school curricula presents a formative juncture for students to cultivate financial literacy. At this developmental stage, students are more receptive to establishing robust financial principles, as their cognitive and behavioral frameworks are still in the process of maturation, thereby facilitating the establishment of solid financial foundations.This early educational experience may make them more positive and proactive when faced with future financial decisions, such as retirement plans. And once they have received financial education in high school, students may continue to use this knowledge in their subsequent studies and lives. With the passage of time, the persistent influence of early financial education may bolster individuals' preparedness and self-assurance in tackling long-term financial endeavors, including retirement planning, thereby fostering a more secure financial outlook.

In addition, the control variables in the model also show significant effects. For example, the gender variable shows a negative impact, indicating that men are slightly less competent in retirement planning compared to women. The age variable shows a gradual increase in retirement planning ability with age, especially in the 45+ age group. Increasing levels of education were also associated with better retirement planning ability. These finding are consistent with before studies that the control variables show positive effects on retirement planning (Chatterjee 2023).

Collectively, these findings underscore the significance of early financial education in empowering consumers with enhanced retirement planning capabilities, while also acknowledging the contributory role of diverse personal attributes and

background variables. It is crucial to recognize that these outcomes constitute foundational assessments, leaving room for subsequent studies to delve deeper into the prolonged effects of varied financial educational interventions and their potential applicability within real-world policymaking frameworks.

Table 5 represents the effect of early financial education on consumer retirement planning with the model of Ordered Probit Estimates Examine. Additionally, the set of the variables of this model is same as the regression results. And the results of this examine is generally the same as the regression result.The regression analysis reveals a pronounced and statistically robust positive influence of receiving financial education during high school on consumers' capacity to formulate retirement plans. Specifically, when quantifying this impact, it is evident that each incremental unit in the variable efinedu1 leads to an average elevation of 0.02744 units in the consumers' retirement planning score, underscoring the efficacy of early financial education interventions.

Comprehending the pivotal role of early financial education in fostering financial literacy is paramount. Concurrently, the influence of control variables on consumers' financial literacy is in parallel with the regression outcomes. Nevertheless, when confronted with ordered categorical dependent variables, akin to financial literacy, the Ordered Probit estimates emerge as a more fitting approach compared to OLS estimates. This model accounts for the ordinal nature of the dependent variable, thereby yielding more precise estimations.

Table 5 Results of regression of early financial education on consumer financial planning

	(1)	(2)	(3)	(4)
Variables	retire	retire	retire	retire
Early financial education in high school		0.2294***		
		(0.0274)		
Early financial education in college			0.2008***	
			(0.0305)	
Early financial education in high school and college				0.2043***
				(0.0235)
Male	-0.0643***	-0.0671***	-0.0694***	-0.0700***
	(0.0192)	(0.0191)	(0.0190)	(0.0190)
age_1	0.8085***	0.7732***	0.8028***	0.7779***

	(0.0609)	(0.0600)	(0.0603)	(0.0601)
age_2	0.7607***	0.7493***	0.7626***	0.7533***
	(0.0533)	(0.0529)	(0.0533)	(0.0530)
age_3	0.8031***	0.7978***	0.8072***	0.8022***
	(0.0467)	(0.0463)	(0.0466)	(0.0463)
age_4	0.9192***	0.9079***	0.9221***	0.9142***
	(0.0390)	(0.0390)	(0.0391)	(0.0390)
age_5	0.8157***	0.8060***	0.8181***	0.8107***
	(0.0352)	(0.0350)	(0.0350)	(0.0352)
edu1	0.1378***	0.1336***	0.1067***	0.1186***
	(0.0272)	(0.0269)	(0.0276)	(0.0270)
edu2	0.1990***	0.1983***	0.1623***	0.1768***
	(0.0384)	(0.0384)	(0.0405)	(0.0388)
married	0.0045	0.0035	0.0033	0.0037
	(0.0240)	(0.0242)	(0.0241)	(0.0241)
mathcap	0.0238***	0.0201***	0.0210***	0.0194**
	(0.0076)	(0.0076)	(0.0077)	(0.0077)
ethn	-0.0615**	-0.0619**	-0.0566**	-0.0593**
	(0.0266)	(0.0268)	(0.0267)	(0.0268)
child	0.0096	0.0094	0.0087	0.0088
	(0.0125)	(0.0125)	(0.0126)	(0.0126)
riskatt	0.0612***	0.0610***	0.0604***	0.0608***
	(0.0049)	(0.0048)	(0.0049)	(0.0049)
asscrdt	-0.1075***	-0.1076***	-0.1081***	-0.1079***
	(0.0082)	(0.0082)	(0.0083)	(0.0082)
income	-0.0240***	-0.0238***	-0.0240***	-0.0238***
	(0.0071)	(0.0070)	(0.0069)	(0.0069)
worksta	0.3644***	0.3658***	0.3645***	0.3656***
	(0.0121)	(0.0118)	(0.0120)	(0.0119)
finpart	0.2037***	0.1973***	0.1972***	0.1949***
	(0.0236)	(0.0235)	(0.0236)	(0.0237)
desfb	0.5934***	0.5929***	0.5932***	0.5930***
	(0.0108)	(0.0107)	(0.0108)	(0.0107)
Constant	-3.8016***	-3.8037***	-3.7845***	-3.7972***
	(0.0642)	(0.0639)	(0.0644)	(0.0642)
State dummies	Yes	Yes	Yes	Yes
Observations	26482	26482	26482	26482
Pseudo R^2	0.3480	0.3499	0.3494	0.3501

Analogously, both high school and college financial education exhibit marked positive effects on individual outcomes. Nonetheless, when evaluated jointly, neither level of education significantly surpasses the other in terms of their individual

contributions, despite both maintaining a statistically significant positive influence.

The combined receipt of financial education across both high school and college stages does confer a positive impetus to retirement planning. Nevertheless, the regression analysis fails to uncover a supplementary, statistically significant enhancement in retirement planning specifically attributed to this dual exposure. This observation could indicate that acquiring financial education at either stage imparts sufficient knowledge and competencies to devise effective retirement strategies. It also hints at the advantage of initiating financial education as early as possible to optimize its long-term benefits.

The results of the control variables reveal the complexity of personal financial decisions. Factors such as age, gender, education level, risk attitudes, and financial market participation can affect an individual's retirement plans. As an illustration, the progression of age typically coincides with a heightened emphasis on and preparation for retirement. Meanwhile, the educational attainment of an individual serves as an indicator of their capacity to comprehend and implement financial literacy principles. Additionally, an individual's stance towards risk and their engagement in financial markets underscore their attitudes and preferences in the realm of financial decision-making. Consequently, retirement planning emerges as a multifaceted decision-making endeavor, necessitating the integration and consideration of a diverse array of factors.

4.3 Endogeneity and robustness check

Robustness testing is an integral part of economic research and aims to verify the stability of research results under different model settings or data processing methods. To ensure the robustness and validity of our conclusions, we employ three distinct model configurations within this research endeavor to meticulously examine the impact of early financial education on consumers' endeavors towards retirement planning. This methodological approach endeavors to minimize any potential biases or discrepancies arising from variations in model specifications. By conducting robustness tests, we aspire to enhance the reliability and credibility of our findings, thereby furnishing policymakers and financial institutions with more precise and actionable recommendations. In this study, we leverage a logit regression model to

analyze the probability of consumers engaging in retirement planning, given that the dependent variable, "consumer retirement planning," is dichotomous in nature, signifying whether the consumer is actively planning for retirement (affirmative/negative). For this type of binary dependent variable, Logit regression is a commonly used statistical method to estimate the effect of the independent variable on the dependent variable by maximum likelihood estimation and give the corresponding probability prediction. In addition, Logit regression can handle nonlinear relationships and has relatively low requirements for outliers and data distribution, making it highly applicable in this study.In order to validate the robustness of our estimations, this study initially substituted the OLS method with ordered logit regression. The comprehensive results of this substitution are detailed in Table 6.

In Model 1, our analysis isolates the effect of high school-level financial education on consumers' retirement planning. The findings reveal that individuals who underwent such education exhibit a 0.3896 unit higher likelihood of engaging in retirement planning, vis-à-vis those who did not, thereby underscoring the substantial positive influence of high school financial education on this aspect. Proceeding to Model 2, we shift focus to college-level financial education. The regression outcomes demonstrate that students who received financial education during college are 0.3532 units more prone to planning for retirement, reinforcing the notion that financial education fosters positive retirement planning behaviors, and this impact persists at the collegiate level. In Model 3, we comprehensively examine the combined effects of both high school and college financial education. The results indicate that consumers who have been exposed to financial education at both stages exhibit a 0.3544 unit higher probability of retirement planning. This observation not only reinforces the significance of financial education in shaping consumers' retirement planning strategies but also hints at a potentially more potent cumulative effect of such education on enhancing these endeavors.

Furthermore, the integration of control variables, inclusive of age, gender, marital status, and income level, yields pseudo-R^2 values of 0.3506, 0.3502, and 0.3508 respectively for the model. These outcomes emphasize the robust fit of the

model and its capacity to portray with greater precision the degree of variation within the dependent variable, thereby augmenting its explanatory capability.

Table 6 Robustness check

	(1)	(2)	(3)
Variables	retire	retire	retire
Efinedu1	0.3896***		
	(0.0475)		
Efinedu3		0.3532***	
		(0.0530)	
Efinedu2			0.3544***
			(0.0405)
Male	-0.1281***	-0.1328***	-0.1332***
	(0.0341)	(0.0342)	(0.0342)
age_1	1.2531***	1.3024***	1.2598***
	(0.1059)	(0.1065)	(0.1060)
age_2	1.2044***	1.2266***	1.2109***
	(0.0890)	(0.0900)	(0.0895)
age_3	1.2795***	1.2954***	1.2877***
	(0.0795)	(0.0803)	(0.0798)
age_4	1.4854***	1.5112***	1.4966***
	(0.0680)	(0.0681)	(0.0679)
age_5	1.3088***	1.3302***	1.3169***
	(0.0582)	(0.0580)	(0.0583)
edu1	0.2290***	0.1806***	0.2023***
	(0.0477)	(0.0489)	(0.0479)
edu2	0.3313***	0.2689***	0.2946***
	(0.0691)	(0.0721)	(0.0694)
married	0.0097	0.0099	0.0098
	(0.0417)	(0.0417)	(0.0417)
mathcap	0.0352**	0.0365**	0.0337**
	(0.0141)	(0.0143)	(0.0142)
ethn	-0.1020**	-0.0929*	-0.0973**
	(0.0479)	(0.0478)	(0.0479)
child	0.0097	0.0085	0.0087
	(0.0219)	(0.0219)	(0.0220)
riskatt	0.1078***	0.1069***	0.1074***
	(0.0086)	(0.0087)	(0.0086)
asscrdt	-0.1960***	-0.1972***	-0.1969***
	(0.0141)	(0.0142)	(0.0141)
income	-0.0385***	-0.0391***	-0.0385***
	(0.0123)	(0.0122)	(0.0122)
worksta	0.6430***	0.6412***	0.6430***

	(0.0205)	(0.0208)	(0.0206)
finpart	0.3468***	0.3465***	0.3431***
	(0.0411)	(0.0412)	(0.0414)
desfb	1.0427***	1.0439***	1.0431***
	(0.0195)	(0.0196)	(0.0195)
Constant	-6.5700***	-6.5385***	-6.5595***
	(0.1182)	(0.1198)	(0.1189)
State dummies	Yes	Yes	Yes
Observations	26482	26482	26482
Pseudo R^2	0.3506	0.3502	0.3508

Standard errors in parentheses

*p< 0.10, **p< 0.05, ***p< 0.01

Building upon a solid foundation of previous research that has conclusively linked early financial education to retirement planning, we embark on an exploration of the influence this education exerts on consumers' endeavors in preparing for retirement.Specifically, retirement prospects are favorably correlated with the accumulated wealth of individuals, thereby motivating our investigation into this realm (Lusardi and Mitchell 2007).To ensure the robustness of our findings, we adopted a strategy of excluding extreme income samples, which is, samples with annual incomes less than $15,000 or greater than or equal to $300,000 were excluded. This step is intended to improve the accuracy of the study by reducing the possible anomalous effects of income factors on consumer retirement plans.

Having eliminated outliers related to income, we re-examined the dataset utilizing a Probit regression model, suitable for instances where the dependent variable assumes a binary form. This model enables us to estimate the likelihood that the independent variable will attain a value of 1, conditional on the dependent variable. Thereafter, we present the findings derived from our Probit regression analyses, centering our attention on three distinct and independent variables: exclusive receipt of financial education in high school, joint receipt of financial education in both high school and college, and sole receipt in college. The exhaustive details pertaining to these analyses are systematically organized and presented in Table 7.

Table 7 Robustness check

	(1)	(2)	(3)
Variables	retire	retire	retire
Efinedu1	0.2318***		
	(0.0295)		

Efinedu3		0.2066***	
		(0.0326)	
Efinedu2			0.2119***
			(0.0256)
Male	-0.0876***	-0.0905***	-0.0910***
	(0.0237)	(0.0236)	(0.0237)
age_1	0.7084***	0.7381***	0.7122***
	(0.0664)	(0.0666)	(0.0662)
age_2	0.6923***	0.7060***	0.6961***
	(0.0560)	(0.0566)	(0.0561)
age_3	0.7450***	0.7545***	0.7501***
	(0.0500)	(0.0506)	(0.0500)
age_4	0.8521***	0.8668***	0.8588***
	(0.0397)	(0.0396)	(0.0396)
age_5	0.7792***	0.7918***	0.7839***
	(0.0353)	(0.0352)	(0.0354)
edu1	0.1302***	0.1021***	0.1144***
	(0.0273)	(0.0281)	(0.0275)
edu2	0.1769***	0.1398***	0.1545***
	(0.0413)	(0.0432)	(0.0415)
married	0.0108	0.0115	0.0111
	(0.0251)	(0.0249)	(0.0250)
mathcap	0.0221***	0.0231***	0.0213***
	(0.0080)	(0.0081)	(0.0081)
ethn	-0.0392	-0.0342	-0.0363
	(0.0277)	(0.0276)	(0.0277)
child	0.0035	0.0030	0.0029
	(0.0133)	(0.0134)	(0.0134)
riskatt	0.0618***	0.0612***	0.0615***
	(0.0054)	(0.0054)	(0.0054)
asscrdt	-0.1196***	-0.1204***	-0.1200***
	(0.0090)	(0.0091)	(0.0090)
income	-0.0205***	-0.0210***	-0.0205***
	(0.0076)	(0.0076)	(0.0076)
worksta	0.4151***	0.4134***	0.4147***
	(0.0132)	(0.0135)	(0.0133)
finpart	0.1989***	0.1983***	0.1960***
	(0.0234)	(0.0236)	(0.0238)
desfb	0.5978***	0.5982***	0.5979***
	(0.0125)	(0.0126)	(0.0125)
Constant	-3.9105***	-3.8883***	-3.9031***
	(0.0658)	(0.0667)	(0.0663)
State dummies	Yes	Yes	Yes

Observations	23078	23078	23078
Pseudo R^2	0.3514	0.3509	0.3517

Examining the sole impact of early financial education in high school, we discern a notable and positive influence on consumers' retirement planning endeavors. Specifically, individuals who underwent financial education during their high school years exhibit a 0.2318-unit higher probability of engaging in retirement planning compared to those who did not. This underscores the pivotal role of high school financial education in enhancing consumers' awareness and preparedness for retirement planning.

Shifting our focus to the collegiate level, our findings similarly reveal a significant and beneficial effect of financial education on consumers' retirement planning. Those who have received financial education in college are 0.2066 units more inclined to undertake retirement planning activities than their counterparts who lack such education. This observation further attests to the cruciality of financial education in fostering retirement planning among consumers, emphasizing its significance across different educational stages.

Ultimately, we assessed the combined influence of financial education at both high school and college levels. The outcomes indicate that consumers who have undergone financial education at both stages possess a 0.2119-unit higher likelihood of engaging in retirement planning compared to those unexposed to such education. This discovery underscores not only the significance of financial education in fostering retirement planning among consumers but also hints at the potential for a more pronounced, cumulative impact of financial education on retirement preparedness.

Moreover, our analysis reveals that a range of control variables, inclusive of age, gender, marital status, educational attainment, employment status, risk appetite, participation in financial markets, and creditworthiness ratings, exert notable influences on consumer retirement planning. These insights offer a broader, more nuanced understanding of the dynamics that shape consumer behavior towards retirement planning.

In essence, by excluding outlier income data and reinforcing our findings through Probit regression-based robustness checks, we conclusively affirm the

substantial positive effect of early financial education on consumers' retirement planning endeavors. This validation not only strengthens the credibility of our study but also offers a crucial point of reference for policymakers and financial institutions alike.

5. Conclusions and implications

The present investigation delves into the influence of early financial education on the evolution of consumers' retirement plans, utilizing benchmark regression analysis as the primary tool. Our findings underscore a notably positive association between financial education, whether imparted during high school, college, or both phases, and the formulation of effective retirement plans by individuals. This observation aligns with the initial hypothesis (H_1) posited in this paper, reinforcing the pivotal role of financial education in fostering heightened awareness and capabilities among individuals pertaining to retirement planning.

Contrary to our second hypothesis (H_2), which anticipated an augmentation in retirement planning activities among individuals who received financial education both in high school and college, our empirical examination unveiled an intriguing pattern: those who exclusively received financial education in high school manifested a more pronounced involvement in retirement planning. This observation highlights the pivotal role that the timing of financial education interventions may play in shaping individuals' retirement planning behaviors.Despite the prevalent unawareness of university students towards the functionality and importance of the pension system (Doriana 2019), the significance of fostering retirement planning consciousness during their collegiate years cannot be overstated. The university phase stands as a crucial turning point, laying the groundwork for individuals to embark on proactive and holistic retirement strategies upon entering the workforce. By nurturing this awareness among students, they are equipped to assume control over securing their financial future, thereby paving a smoother path towards a financially stable retirement (Kimiyaghalam et al. 2019). This approach ensures a seamless transition into professional life, where financial preparedness is aligned with personal career goals, fostering a harmonious integration into the workforce. Early financial education within college settings holds immense value, emphasizing the urgent need to prioritize

retirement planning during this formative period.

In addition, the study finds that several factors such as gender, age, education, math ability, risk attitudes, job stability, and participation in financial markets are also strongly associated with retirement planning. These results provide a comprehensive perspective to understand the differences and needs of individuals in retirement planning in different social and economic contexts.

The paramount importance of this research stems not merely from unveiling the direct correlation between financial education and retirement planning, but also from furnishing policymakers and educators with an empirical cornerstone for advocating comprehensive and intensive financial education initiatives. Notably, amidst the current backdrop of a global financial landscape characterized by heightened complexity and volatility, bolstering the public's financial acumen and retirement planning proficiencies is of paramount significance.

For example, given the empirical evidence indicating a substantial influence of financial education imparted during senior high school on fostering motivation towards retirement planning, it is imperative for the education sector and secondary institutions to accord greater emphasis to delivering comprehensive and exhaustive financial literacy programs at this crucial juncture.This can help students develop proper financial concepts and awareness of retirement planning at an earlier age. Moreover, although college-level financial education does not significantly increase retirement planning motivation, this does not mean that college financial education is not important. Rather, it may suggest that we need to revisit and optimize the content and approach to college financial education. For example, course content related to practical applications, such as retirement planning and personal financial management, could be increased to stimulate students' interest in learning and practical application. Apart from that, from high school to university level, financial education should maintain a certain degree of continuity while focusing on practicability. Practical activities and investment simulations can be organized to enable students to learn and master financial knowledge in actual practice, so as to better prepare them for future retirement planning.

By enhancing financial education and fostering a more positive perspective

towards the later stages of life, we can effectively stimulate a heightened sense of retirement preparedness among the youth.Furthermore, the promotion of financial literacy education ought to extend beyond the confines of schools and encompass communities, work environments, and diverse settings, thereby enhancing public consciousness regarding financial acumen and retirement preparedness. Such a comprehensive approach will empower individuals to make financially prudent decisions and be adequately equipped for their impending retirement years.Since family is an important place for personal financial education. Parents should be actively involved in their children's financial education, guiding them to develop a proper outlook on money and a sense of retirement planning. By working together as a family, you can help your children build a solid financial foundation for their future retirement.

In conclusion, the empirical analysis undertaken in this study underscores the salutary effects of early financial education on retirement planning, offering fresh viewpoints and valuable insights that enrich research and practice within pertinent domains. Anticipating the future, we envision a proliferation of more exhaustive investigations delving into the intricate interconnections between financial education, individual financial stewardship, and retirement planning strategies. Such endeavors hold the promise of advancing societal financial literacy and enhancing the quality of life during retirement years.

A notable constraint in this research endeavor stemmed from the confines of the available dataset, necessitating the utilization of state-level regulatory measures in our analyses. Consequently, this approach precluded a nuanced depiction of intrastate disparities in financial planning advice inequality. To address this gap, future endeavors should aspire to harness census tract-level data, empowering the formulation of more precise local and community-tailored policies and initiatives aimed at bolstering financial proficiency, retirement readiness, and financial resilience among citizens.

Moreover, the cross-sectional nature of the data employed herein limited the depth of understanding regarding temporal shifts in retirement savings and preparedness. Longitudinal datasets, if accessible in the future, would offer invaluable

insights into the causal dynamics underlying these variables over time.Moreover, potential avenues for future research could delve into the availability and accessibility of financial counsel and retirement planning methodologies among households, leveraging diverse sources including the Survey of Consumer Finances, thereby offering additional corroboration to the current study's conclusions.Although not the principal focus of this research endeavor, a subsequent investigation delving deeper into the state-specific nuances in the interplay between financial literacy and retirement planning behaviors could offer valuable insights for future studies. Such endeavors would enrich our understanding of this intricate relationship and its ensuing implications, fostering a more sophisticated comprehension.

Reference

[1]. Adams GA, Rau BL. Putting off tomorrow to do what you want today: Planning for retirement. American Psychologist. 2011;66(3):180–192

[2]. Andrade C, Bazelais W, Das N. The effect of financial literacy on retirement planning.2014.

[3]. Aprea C, Wuttke E, Breuer K, Koh NK, Davies P. Greimel-Fuhrmann Band Lopus J.S. Financial literacy in the twenty-first century: an introduction to the international handbook of financial literacy. International Handbook of Financial Literacy Springer Singapore. 2016.

[4]. Bernheim DMGB, DMMC. Education and saving:" Journal of Public Economics. 2001;80(3):435-465.

[5]. Biddle I. The impact of rewards in the workplace. BusiDate. 2015;23(4):2–4.

[6]. Boisclair, David, et al. Individual Financial Returns from Quebec Pension Plan Reform Options: Analyzing Proposals to Renew a Second-Pillar Retirement Income Program. Canadian Public Policy. 2018;44(2):134-158.

[7]. Brucker E, Leppel K. Retirement plans: Planners and nonplanners. Educational Gerontology. 2013;39(1): 1–11.

[8]. Bruhn Miriam, Luciana de Souza Leão, Arianna Legovini, Rogelio Marchetti and Bilal Zia.The Impact of High School Financial Education: Evidence from a Large-Scale Evaluation in Brazil. American Economic Journal: Applied Economics, 2016;8(4):256–95.

[9]. Chatterjee Swarn, Lu Fan. Surviving in Financial Advice Deserts: Limited Access to Financial Advice and Retirement Planning Behavior. International Journal of Bank Marketing. 2023;40(1):70–106.

[10]. Christelis D,Jappelli Tand Padula M. Cognitive abilities and portfolio choice European Economic Review. 2010;54(1):18-38.

[11]. Clark R, Lusardi A, Mitchell OS. Employee financial literacy and retirement plan behavior: A case study. Economic Inquiry. 2017;55(1):248–259.

[12]. Doriana Cucinelli, BPaola. University students and retirement planning: never too

early. International Journal of Bank Marketing. 2019;37(3):775-797.
[13]. Elder, H. W., & Rudolph, P. M. Does retirement planning affect the level of retirement satisfaction? Financial Services Review.1999;8(2):117–127.
[14]. Elinder M, Hagen J, Nordin M, Säve-Söderbergh J. Pension knowledge financial literacy and retirement planning. Semantic Scholar.2019.
[15]. Fan Lu et al. Skint: Retirement? Financial Hardship and Retirement Planning Behaviors. Journal of Family and Economic Issues. 2022;43(2):354–367.
[16]. Fargo Wells2016 Wells Fargo Millennial Study.2016;1-7.
[17]. Frank D, Singh RR, Harrison A, Bai GV, Birau R,Spulbar C, Ninulescu PV. Worker saving attitude towards retirement planning: A study on Indian textile industry. Atitudinea de economisireaangajaților lorfață de planificareapensionării: Un studiu de cazprivindindustriatextilă din India. 2023;74(5):610-617.
[18]. Hasler A, Lusardi A, Oggero N. Financial fragility in the US: Evidence and Implications. GFLEC Research Paper. 2018.
[19]. Hershey DA, Mowen JC. Psychological determinants of financial preparedness for retirement. The Gerontologist. 2000;40(6): 687–697.
[20]. Joo SH, Grable JE.Employee Education and the Likelihood of Having a Retirement Savings Program.Journal of Financial Counseling and Planning. 2005;16(1):37-49.
[21]. Klapper L, Lusardi A , Panos GA .Financial literacy and its consequences: Evidence from Russia during the financial crisis.Journal of Banking & Finance. 2013; 37(10):3904-3923
[22]. Kimiyaghalam, Fatemeh et al. Parents' Influence on Retirement Planning in Malaysia. Family & Consumer Sciences Research Journal. 2017;45(3):315-325.
[23]. Laverty, Darren.How workplace financial education can benefit your employees. Strategic Hr Review.2016;15(6):242-246.
[24]. LeBaron AB, Holmes EK, Jorgensen BL, Bean RA. Parental financial education during childhood and financial behaviors of emerging adults. Journal of Financial Counseling and Planning. 2020;31(1):42–54.
[25]. Lusardi A, Mitchell OS. Baby boomer retirement security: The roles of planning financial literacy and housing wealth. Journal of MonetaryEconomics. 2007;54(1):205–224.
[26]. Larisa Linda Evelina et al. Female Workers' Readiness for Retirement Planning: An Evidence from Indonesia. Review of Behavioral Finance. 2021;13(5):566–83.
[27]. Maobe Asenath. The Overlay between Demographic Characteristics Spirituality and Retirement Planning Kenya Expose. Cogent Social Sciences edited by Alessandro Crociata. 2020;6(1):1831147
[28]. McCormick, M Henn. The Effectiveness of Youth Financial Education: A Review of the Literature. Journal of Financial Counseling & Planning. 2009.
[29]. Mohd Isa Mohd Yaziz, Mellisa Daukin. The Influence of Retirement Goals and Risk Attitudes on Malaysian Women's Retirement Planning. Cogent Economics & Finance. 2023;11(1):2195041.
[30]. Money is top stressor for singaporeans: BlackRock survey: Millennials women could face hurdles in retirement planning due to declining use of financial

advisers.2019.
[31]. Muda S, Musman M, Hussin AH, Idris AR, Kamarulzaman MH, Abidin NFZ, Zaid NAM. Relationship among financial literacy attitude and retirement planning awareness: A PLS-SEM approach. Global Business and Management Research Suppl.Special Issue: South East Asia International Islamic Philanthropy Conference. 2024;16(2):1032-1041.
[32]. Nam Y, Loibl C. Financial capability and financial planning at the verge of retirement age. Journal of Family and Economic Issues. 2021;42(1):133–150.
[33]. Parker AMW, BBruin,JYoong,RWillis. Inappropriate confidence and retirement planning: Four studies with a national sample. Journal of Behavioral Decision Making. 2012;25(4):382–389.
[34]. Quinn, B. Financial planning: Wills and other ways. Newsweek. 2007;149:61.
[35]. Ricci, Ornella, M. Caratelli. Financial literacy, trust and retirement planning.Journal of Pension Economics & Finance. 2015;16(1):43-64.
[36]. Rosenkoetter MM, GarrisJM. Retirement planning, use of time, and psychosocial adjustment. Issues in Mental Health Nursing. 2001;22(7):703–722.
[37]. Trivedi JCPh D, Soni BKPh D. Retirement planning: An Indian study. ASBM Journal of Management. 2021;14(1):76-99
[38]. U.S. Bureau of Labor Statistics. National Compensation Survey Latest Numbers. 2020.
[39]. Van Rooij MCJ, Lusardi A ,Alessie RJM. Financial literacy and retirement planning in the Netherlands. Journal of Economic Psychology.2021.
[40]. van Rooij M, Lusardi A,Alessie R. Financial literacy and stock market. Journal of Financial Economics. 2011;101(2):449-472
[41]. Walstad WB, Rebeck K, MacDonald RA. The effects of financial education on the financial knowledge of high school students. 2010;44(2):336–357.
[42]. Wann, Christi R, Lisa A. Burke-Smalley, Attributes of Households That Engage in Higher Levels of Family Financial Planning, Journal of Family and Economic Issues. 2023;44(1):98–113.
[43]. Yao R, Cheng G. Millennials' retirement saving behavior: Account ownership and balance. Family and Consumer Sciences Research Journal. 2017;46(2):110–128.