



## **Financial Education and Consumer Financial Planning: Evidence from China**

**Fuzhong Chen<sup>1\*</sup>, Tianyi Zhang<sup>1</sup> and Jin'ge Ma<sup>1</sup>**

<sup>1</sup>*School of International Trade and Economics, University of International Business and Economics, Beijing 100029, China.*

### **Authors' contributions**

*This work was carried out in collaboration among all authors. Authors FC and TZ designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors TZ and JM managed the analyses of the study. Author FC managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

The purpose of this study is to examine the impacts of financial education on consumer financial planning. Using data from the 2012 Household Consumer Finance in China's Urban Residents, this study conducts logistic regression to investigate the associations between financial education and consumer financial planning. The results indicate that financial education is positively associated with consumer financial planning. Moreover, the money and time input in financial education has also been proven to have positive effects on consumer financial planning. The findings suggest that the money input in financial education has played a more vital role in improving consumer financial planning than the time input in financial education. The results imply that the improvement of financial education is conducive to improving consumer financial planning. Furthermore, the results also have implications for policymakers to take measures in enhancing financial support for consumer financial education.

**Keywords:** *Financial education; consumer financial planning; consumer financial wellbeing; logistic regression.*

\*Corresponding author: Email: [uibesitechen@126.com](mailto:uibesitechen@126.com);

## 1. INTRODUCTION

In recent years, financial education has been highlighted by the academic communities and policymakers [1]. Financial education may affect consumers' financial behaviors by improving their financial literacy and financial capability [2]. Previous studies have examined contributions of financial education on retirement planning, stock market participation, and investment efficiency [3]. Consumer financial planning is also considered to be one of the most important financial behaviors in daily life. Thus, this study aims to focus on the effects of financial education on consumer financial planning.

Consumer financial planning can be regarded as a manifestation of financial capability. Also, financial capability is defined as people's ability to manage and take control of their financial affairs [4]. Financial capability is utilized to reflect the personal understanding of financial issues and related abilities to manage money and control finances. From a global perspective, a large number of governments have emphasized the importance of consumers' financial planning capabilities. The UK government firstly launched the national survey on financial capability in 2006. In the US, governmental and non-governmental organizations are committed to promoting the improvement of consumer financial capability [5]. For instance, as an important part of consumer financial planning, retirement planning is considered to be an effective way for consumers to accumulate retirement assets, incorporating personal savings, social insurance, and schemes of employer-sponsored pension. The financial planning process requires related knowledge of the social security and pension plans, as well as the ability to execute compound interest and accumulate calculations every month, which has been considered to be complicated processes [6]. Moreover, previous research has also shown that financial planning plays a key role in explaining differences in wealth accumulation [7]. However, due to the large differences in cultural and institutional environments, such as pension systems, in various countries, it is still necessary to explore the assessment of financial knowledge and its impact on household financial status, portfolio choices, or retirement plans.

Consumer financial education refers to education on basic financial knowledge for consumers in high schools, colleges, and workplaces [8]. More specifically, financial education is divided into

professional financial education and public financial education [9]. As early as the financial crisis in 2008, countries around the world had deeply recognized the importance of improving consumer financial literacy and strengthening financial education for maintaining financial stability and regarded them as important measures to supplement prudential regulation and behavioral regulation. In the UK, financial education has been compulsory since 2014. Colleges and universities in the United States generally provide financial education to students through online courses or face-to-face. In recent years, China's government has also begun to focus on the issues of consumer financial education. The People's Bank of China established the Financial Consumer Protection Bureau in July 2012 and launched a series of activities aimed at improving consumer financial knowledge, including *Financial Literacy Month*. An experiment on financial education in an American primary school shows that financial education courses in schools significantly improve students' financial literacy and have a positive impact on their future financial capability [10]. Simultaneously, financial education in the workplace enables employees to improve their financial literacy and thereby to make sound financial decisions [11]. Different from previous research, this study employs the input of time and money to measure the participation level of financial education.

The purpose of this study is to examine the effects of financial education on consumer financial planning. The remainder of this paper is structured as follows. Section 2 reviews the literature on financial education and consumer financial planning as well as proposes the hypotheses. Section 3 presents the data and model specification, and variable measurements. Section 4 discusses the empirical results. Section 5 offers conclusions and implications.

## 2. REVIEW OF LITERATURE AND HYPOTHESES

### 2.1 Previous Research on Financial Education

Previous studies have investigated the impact of financial education on financial literacy that plays a crucial role in the financial decision-making, but no consensus has been reached. To address the importance of financial education on financial literacy, by introducing uncertainty factors such

as income and health risks, longevity, and stock market risks faced by consumers, a stochastic model for maximizing the utility of a consumer life cycle is developed, and optimal analysis of financial education investment levels in different periods is performed in detail [12]. The results show that not all consumers can obtain economic benefits beyond their costs from financial education. Several studies have also indicated that due to the complexity of financial decision-making, there is no direct causal relationship between financial education and financial literacy. For instance, there is a uncertainty about whether financial education can effectively improve financial literacy [13]. Moreover, Mandell and Klein [14] argued that financial education does not effectively improve students' financial literacy and optimize their financial decisions, and even increases the probability of loan default.

On the other hand, some studies have also suggested a positive role of financial education and emphasized that targeted and timely financial education is more effective [15,16]. Hastings et al. [15] revealed that people with higher financial education are more likely to have higher financial literacy. For consumers at the peak of their income (35-49 years old), Bernheim et al. [16] indicated those consumers who have received financial education in school have a higher level of financial management, savings, and wealth accumulation than those who have not. Besides, financial education not only affects wealth accumulation, but also investment behaviors, and therefore, consumers who spend more on financial education will show higher financial literacy and more desirable financial behaviors. Hence, this study aims to measure the impact of financial education on consumers' financial behaviors through investments in financial education.

In recent decades, the impacts of financial education on consumer participation in financial markets, financial behaviors, and asset portfolios have been highly highlighted. Utilizing the Dutch household dataset, Rooij et al. [17] examined the associations between financial education and participation in stock markets, and the results indicate that financial literacy is positive to increase the likelihood of stock market participation and encourage households to benefit from equity premiums. Hilgert et al. [18] claimed that if an individual lacks an understanding of basic financial knowledge and financial calculation capability, it is more likely for

them to make sub-optimal asset allocation decisions. On the contrary, improving personal financial literacy through financial education helps reduce the cost of information collection, thereby promoting their active participation in stock investment [19]. Clark et al. [20] suggested that financial education enables consumers to identify investment opportunities and has a positive impact on their investment returns. Thus, it is evident that the improvement of consumer financial education can affect the participation behaviors of the financial markets by improving financial literacy. Moreover, Guiso and Jappelli [21] proposed for the first time that investors' lack of financial literacy is an important antecedent for portfolio non-diversification. Utilizing the number of assets and the type of issuers as diversification indicators, Abreu and Mendes [22] examined the associations between financial literacy and portfolio diversification, and the results reveal that the higher the financial literacy of investors, the higher the diversification degree of an investment portfolio. Chu et al. [23] investigated the determinants of the decision-making behaviors of families investing in stocks and mutual funds and claimed that households with higher financial literacy are more likely to allocate more mutual funds to diversify risks, while those with lower financial literacy and overconfidence are inclined to focus on holding stocks in their portfolio. Besides, the enhancement of financial education has played a pivotal role in increasing consumers' demand for complicated financial products, which positively contribute to promoting the further improvement of the financial markets [24].

## **2.2 Previous Research on Financial Planning**

Financial planning has featured prominently among the aspects of financial capability available to improve personal financial decision-making. For instance, using the data from the UK, Atkinson et al. [25] measured the levels of British residents' financial capability from five aspects as making ends meet, managing money, planning ahead, choosing products, and staying informed. Therefore, financial planning in advance is designated as one of the vital aspects of measuring financial management capabilities. Especially during a recession, household finances come under such pressure that financial capability becomes even more important. Moreover, as the burden of retirement provision falls increasingly on individuals and the cost of higher education falls increasingly on students,

the consequences of a lack of financial management skills are worse than ever. Also, the results show that most people know little about financial products and are lack of long-term financial plans or budgets. Notwithstanding, the continuous reform and improvement of financial markets, the gradual formation of overseas investment channels, and the accumulation of asset management consulting services, the feasibility of consumers to carry out financial planning are gradually improved. During the process, financial education has played an extremely important role in enhancing consumer financial planning.

Previous research has focused on investigating the determinants of consumer financial planning from the perspective of demographic and socio-economic characteristics. Hanna [26] indicated that people with higher risk tolerance, higher education, higher family income, and higher net worth are more likely to seek professional financial assistance. Finke et al. [27] argued that individuals who are willing to seek assistance from financial advisors are more likely to be women, and individuals who are relatively older and wealthy, as well as those with a college education but low financial awareness. Besides, individuals with poor financial risk tolerance and low satisfaction with their financial status tend to seek financial advice from household members, friends, and colleagues rather than professionals [28]. Taking college students as samples, Britt et al. [29] claimed that students with older age and less net worth tend to seek financial assistance. Also, Collins [30] indicated that individuals with higher incomes and more education are more likely to receive financial advice. Johnston et al. [31] examined the effects of gender on financial planning, and the results suggest that the cognitive ability of men and women are significantly and positively correlated with the probability of taking responsibility for family financial decisions, and the cognitive ability of men has a greater impact [31]. Taylor and David [32] addressed that men obtain investment information differently than women. More specifically, when the cost of information is higher, men seek more information about investment options than women, and more information increases the likelihood of owning risky assets. Previous research suggests that households with a low level of financial knowledge tend to have a low level of financial planning skills [33]. More specifically, households with higher financial knowledge can not only formulate a more complete financial plan but also make more

scientific asset allocation, so that they can better cope with the financial pressure of households and perform more adequate preparation for future consumption and investment needs. Also, taking Japanese households' formulation of retirement plans as an example, Sekita [34] proved that financial knowledge education positively contributes to enhancing the probability of residents making retirement plans. In summary, demographic characteristics (such as gender and age), socioeconomic characteristics (such as income, net worth, and risk tolerance), and financial knowledge education have played pivotal roles in improving consumer financial planning.

### **2.3 Financial Education and Consumer Financial Planning**

Many extant studies have shown that financial education has positive effects on consumers' financial behaviors and financial planning. Utilizing the dataset of the China Family Panel Studies, Niu et al. [35] examined the level of financial knowledge education and its impact on retirement preparation, and the results indicate that financial knowledge has a strongly positive impact on all aspects of Chinese pension preparation, including determining retirement financial needs, formulating long-term financial plans, as well as purchasing private pension insurance. In particular, in rural areas of China, the pension contribution rate of working-age people is related to compound interest knowledge, and the education of compound interest knowledge positively increases rural pension contributions by about 40% [36]. Besides, Fornero and Monticone [37] showed that financial education has a significantly positive impact on the participation of a pension plan, which includes financial planning. Furthermore, Anderson et al. [38] investigated the relationship between financial knowledge education and savings plans, and they argued that financial knowledge education significantly increases the likelihood of consumers making savings plans in advance, and augments the proportion of individual savings for an emergency.

Previous studies directly choosing consumer financial planning as the dependent variable, show that financial knowledge or financial literacy has positive effects on consumer financial planning. Meanwhile, consumers with a higher level of financial literacy are more likely to have better financial planning, which consequently increases wealth accumulation [39]. The results

also imply that educational achievements only show a positive impact on wealth accumulation when interacting with financial literacy, and thereby financial education investment may have a significantly huge wealth return. Thus, the results prove that financial education and financial literacy are closely linked. Several studies suggest that financial education has played crucial roles in improving the financial literacy of adults [40,41]. As the largest developing country, China's financial market is constantly improving, and residents' awareness of financial planning is increasing as well [42]. The impact of financial education on Chinese households' financial decision-making needs to be further examined. This study aims to investigate the associations between financial education and consumer financial planning. In detail, financial education is measured by three sets of variables, namely whether consumers have received financial education, the money, and the time input in financial education. Combined with the discussion above, this study proposes the following hypotheses:

- H1: *Given economic resources and other control variables, financial education is positively associated with consumer financial planning.*
- H2: *Given economic resources and other control variables, the more money is invested in financial education, the more effective it will be to enhance consumer financial planning.*
- H3: *Given economic resources and other control variables, consumers who spend more time on financial education are more likely to perform better in financial planning.*

### 3. METHODOLOGY AND DATA DESCRIPTION

#### 3.1 Data

The dataset in this study comes from the survey of 2012 Household Consumer Finance in China's Urban Residents and is published by the China Financial Research Center of Tsinghua University (CCFR), which provides a large amount of micro-household financial data. The survey involves household assets, liabilities, income, expenditure, financial planning, and financial knowledge. The sample covers 24 provinces in China, incorporating more than 75% of the provinces across the country. Hence, the dataset can be considered to be nationally

representative. The respondents are primarily the household heads because they are the main participants and decision-makers on the households' economic and financial affairs. The sample size is 3122, and the respondents are all over 25 years old. The dataset includes respondents' basic household information, financial education, economic conditions, financial behaviors, and subjective attitudes.

#### 3.2 Model Specification and Variables

This study primarily aims to examine the associations between financial education and consumer financial planning. Based on the hypotheses, the baseline empirical model is specified as follows:

$$finplan_i = \alpha_0 + \sum_{j=1}^N \beta_{j,i} \times finedu_i + \sum_{k=1}^M \delta_{k,i} \times CV_i + \varepsilon_i \quad (1)$$

In equation (1), the subscript  $i$  of the variables denotes interviewed consumers, and  $\varepsilon$  is the random disturbance term. Besides,  $\beta$  and  $\delta$  respectively denote estimated coefficients of financial education-related variables ( $finedu$ ) and control variables ( $CV$ ). Moreover,  $\alpha_0$  is the constant term, as well as  $j$  and  $k$ , are the subscripts specific to the coefficients of financial education-related variables and control variables, respectively. The dependent variable of financial planning ( $finplan$ ) indicates consumer financial planning, which is measured by respondents' answers to whether they have financial planning and is encoded to a binary variable, with 1 as having financial planning and 0 otherwise. In this study, financial education is measured by three sets of variables, namely whether consumers have received financial education, the money, and the time input in financial education. Also, the variable of having received financial education is encoded to a binary variable, 1 means performing the activity and 0 otherwise. More specifically, the money input in financial education is measured by a 5-point scale in terms of the question "How much monthly income does your household input in financial education?" Responses are encoded specific to the answers as follows: 1 = no money input, 2 = less than 5%, 3 = 5%-10%, 4 = 10%-15%, and 5 = more than 15%. Moreover, the time input in financial education is measured by a 6-point scale in light of the question "How much time do you input in learning financial knowledge weekly?" The variable is encoded as follows: 1 = no time input, 2 = less than 1 hour, 3 = 1 to 2 hours, 4 = 2

to 3 hours, 5 = 3 to 5 hours, and 6 = more than 5 hours.

Following the practices of previous studies on consumer financial behaviors, such as financial planning, holding financial assets, and retirement planning [26, 38, 41], several demographic and socioeconomic variables are incorporated as control variables. In detail, the demographic variables incorporate age, gender (1 stands for male and 0 otherwise), educational background (three categories: high school or lower, undergraduate, and master's degree or higher). For the health status of household members, the respondents were asked with the statement "How is the health status of your household members?" A 4-point scale is utilized ranging from 1 (not at all healthy) to 4 (very healthy). The risk attitude is measured by a 3-point scale in terms of the question "How much risk are you willing to take when your family invests?" The answers "Not willing to take on any risk" and "Less risk and less return" are encoded 1. The answer "Average risk and average return" is encoded 2, and the answers "More risk and more return" as well as "High risk and high return" are encoded 3. Regarding household monthly income, the variable is measured by a 13-point scale, ranging from 1 (1001 to 1500 Yuan) to 13 (greater than 50000 Yuan). Furthermore, the other three asset-holding behaviors such as owning a house, owning a car, and owning a private business, are also included and considered as control variables of socioeconomic characteristics. All the three asset holding variables are encoded to binary variables with 1

meaning having performed the behavior and 0 otherwise.

Table 1 provides a summary and descriptive statistics of the variables included in this study. For the dependent variable, more than half of consumers have a financial plan and with the mean value of 0.646, which means that most consumers have realized the importance of financial planning. The mean value of financial education is 0.532, and the mean value of the variables to measure the money and time input in financial education respectively are 2.193 out of 5 and 2.879 out of 6.

Regarding the control variable of risk attitude, the mean value is 1.940, which is measured by 3-point scales. The mean value of household monthly income is 8.172, which implies that the monthly income of most households ranges from 3001 to 4000 Yuan. Moreover, the mean values of the three asset holding variables are 0.905, 0.568, and 0.374, respectively. The results mean that more than 90% of households have their own houses, more than 55% of households hold cars, as well as more than 35% of households, have private businesses. The results of descriptive statistics also show that the age of the interviewed consumers ranges from 25 to 78, and the average value is 34.242. Meanwhile, 71% of consumers are found to be male-headed households. Also, 12.3% of the interviewed consumers attended a high school or lower, while 76.0% had an undergraduate degree, as well as 11.7% earned a master's degree or higher.

**Table 1. Descriptive statistics**

Variable	Obs.	Mean	Std. Dev.	Min	Max
Financial planning	3122	0.646	0.478	0	1
Financial education	3122	0.532	0.499	0	1
Money input in financial education	3122	2.193	0.825	1	5
Time input in financial education	3122	2.879	1.196	1	6
Age	3122	34.242	7.631	25	78
Gender	3122	0.710	0.454	0	1
High school or lower	3122	0.123	0.328	0	1
Undergraduate	3122	0.760	0.427	0	1
Master degree or higher	3122	0.117	0.321	0	1
Health status	3122	3.673	0.513	1	4
Risk attitude	3122	1.940	0.772	1	3
Monthly income	3122	8.172	2.213	1	13
Own a house	3122	0.905	0.293	0	1
Own a car	3122	0.568	0.495	0	1
Own a private business	3122	0.374	0.484	0	1

*Source: The results of descriptive statistics are from the dataset of the survey of 2012 Household Consumer Finance in China's Urban Residents*

**4. EMPIRICAL RESULTS AND DISCUSSION**

**4.1 Results of Multiple OLS Regression and Logistic Regression**

Table 2 presents the estimated regression results of financial education on consumer financial planning. In Column (1), only control variables are entered. In Columns (2) and (3), financial education is added. More specifically, Column (2) presents the results of Ordinary Least Squares (OLS) regression, and Column (3)

shows the results of logistic regression. In Column (4), the interaction terms between education and financial education are incorporated. In Columns (5) and (6), the variables of consumers' money and time input in financial education are included, respectively. To eliminate the disturbance of city heterogeneity on the estimated results, the dummy variables of cities are controlled in all estimations. Simultaneously, robust standard errors are calculated and reported in parentheses, showing more accurate regression results.

**Table 2. Results of regressions of financial education on financial planning**

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Financial education		0.169*** (0.017)	0.798*** (0.080)			
Undergraduate×Financial education				0.784*** (0.084)		
Master degree or higher×Financial education				0.674*** (0.174)		
Money input in financial education					0.600*** (0.056)	
Time input in financial education						0.355*** (0.039)
Constant	-0.003** (0.001)	0.100 (0.104)	-0.769* (0.461)	-0.532 (0.450)	-1.433*** (0.468)	-0.932** (0.461)
Age	-0.022 (0.018)	-0.002 (0.001)	-0.009 (0.005)	-0.009 (0.005)	-0.011 (0.005)	-0.011 (0.005)
Gender	0.075*** (0.027)	-0.016 (0.018)	-0.073 (0.088)	-0.077 (0.088)	-0.112 (0.088)	-0.120 (0.088)
Undergraduate	0.067* (0.036)	0.063* (0.026)	0.286* (0.123)		0.237* (0.123)	0.282* (0.122)
Master's degree or higher	0.034* (0.016)	0.049 (0.035)	0.227 (0.169)		0.168 (0.170)	0.170 (0.170)
Health status	0.047*** (0.011)	0.027* (0.016)	0.130* (0.077)	0.138* (0.076)	0.158* (0.077)	0.139* (0.076)
Risk attitude	0.010* (0.005)	0.044*** (0.011)	0.211*** (0.053)	0.212*** (0.052)	0.162*** (0.053)	0.143*** (0.053)
Monthly income	0.105*** (0.030)	0.009 (0.005)	0.045* (0.023)	0.045* (0.022)	0.029 (0.023)	0.024 (0.023)
Own a house	0.034* (0.020)	0.088*** (0.029)	0.405*** (0.136)	0.420*** (0.135)	0.386*** (0.137)	0.415*** (0.135)
Own a car	0.094*** (0.018)	0.037* (0.020)	0.181* (0.094)	0.179* (0.094)	0.058 (0.094)	0.069 (0.094)
Own a private business	-0.003 (0.001)	0.084 (0.017)	0.419 (0.086)	0.423 (0.085)	0.360 (0.086)	0.360 (0.086)
City fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3122	3122	3122	3122	3122	3122
Adjusted R <sup>2</sup>	0.058	0.088				
Pseudo R <sup>2</sup>			0.079	0.075	0.084	0.075

Notes: The reference category is a high school or lower. Also, \*\*\*, \*\*, and \* represent 1%, 5%, and 10% significance level, respectively. The data in parentheses are robust standard errors. In Columns (1) and (2), the statistics of adjusted R<sup>2</sup> of the OLS regression are reported. For logistic regression, the statistics of Pseudo R<sup>2</sup> is reported.

In Column (1), the OLS regression only incorporates control variables, and the results for most of the control variables are as expected. In detail, although the coefficient of age in Column (1) is statistically insignificant, its coefficient in Columns (2) to (5) are significantly negative, which implies that older consumers are less likely to have financial planning. Together with the coefficients of control variables in Columns (2) to (5), educational background is positively associated with consumer financial planning, which shows that consumers with higher education tend to plan financial affairs. The results also reveal that consumers' health status and risk attitude are statistically positive to their financial planning. Besides, the households' monthly income is positively associated with the formulation of financial planning. Moreover, consumers who have household assets, such as owning a house, owning a car, or owning a private business [except the results of the OLS regression in Column (1)] are more likely to have financial planning.

In Columns (2) and (3), the methods of OLS and logistic regression are employed respectively, and the results indicate that financial education is significantly and positively associated with consumer financial planning, which is as hypothesized in H1. To further address the effects of financial education on consumer financial planning, interaction items between educational background and financial education are introduced in Column (4). Compared with the reference group of consumers educating a high school or lower, the results suggest that consumers with higher education tend to plan financial affairs. Simultaneously, among consumers who have received financial education, consumers who have received an undergraduate education rather than those with a master's degree or higher, are more likely to make financial planning. Consumers with a bachelor's degree are more inclined to conduct financial planning, which may be related to a lower level of financial and investment knowledge. Due to limited expertise, they only have few investment channels. Consumers with a master's degree may have more professional investment knowledge and investment channels. For instance, they prefer to invest in stock markets by themselves instead of buying funds or other financial products provided by professional investment institutions.

In Columns (5) and (6), the variables of the money and the time input in financial education are added, respectively. The results indicate that not only the money but also the time investment in financial education are significantly positive to consumer financial planning. More specifically, the investment of money in financial education has a greater effect on consumer financial planning than that of time, since their coefficients are 0.600 and 0.355, respectively, and both of them are statistically significant at a significance of 1%. Thus, the results are consistent with H2 and H3.

#### 4.2 Robustness Check

To verify the robustness of the estimates, a comprehensive check such as replacing the independent variable with another one, performing estimations with alternative regression methods, as well as removing outliers by age and income, has been conducted in this study. First, the variable of knowing how to seek financial assistance is utilized to replace the independent variable of financial education. Second, this study replaces the estimation method with OLS and probit regression. Third, to eliminate the possible bias introduced from outliers by age, this study only keeps the samples whose age lies between the bottom 10% and the top 10%. Besides, this study drops the sample household heads having no monthly income and those earning a monthly income of greater than 50000, which is conducive to removing the possible bias introduced by income outliers. Table 3 displays the results of the robustness check.

In Column (1), the results indicate that the alternative variable is significantly positive to consumer financial planning. In Columns (2) and (3), the coefficients of financial education remain significantly positive to consumer financial planning. Regression results without outliers of age and income are presented in Columns (4) and (5), and the coefficients are still statistically positive to consumer financial planning at a significance level of 1%. In light of the robustness check, the results remain unchanged, which suggests a robust relationship that financial education is significantly and positively associated with consumer financial planning.

**Table 3 Results of robustness check**

<b>Variable</b>	<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>(5)</b>
Know how to seek financial help	0.257 <sup>***</sup> (0.046)				
Financial education		0.169 <sup>***</sup> (0.017)	0.484 <sup>***</sup> (0.048)	0.703 <sup>***</sup> (0.090)	0.807 <sup>***</sup> (0.081)
Constant	-0.927 <sup>**</sup> (0.460)	0.100 (0.104)	-0.482 (0.277)	-0.611 (0.574)	-0.634 (0.471)
Age	-0.012 <sup>**</sup> (0.005)	-0.002 (0.001)	-0.006 (0.003)	-0.014 (0.010)	-0.008 (0.005)
Gender	-0.100 (0.087)	-0.016 (0.018)	-0.043 (0.053)	0.063 (0.098)	-0.058 (0.089)
Undergraduate	0.332 <sup>***</sup> (0.121)	0.063 <sup>**</sup> (0.026)	0.170 <sup>**</sup> (0.075)	0.288 <sup>**</sup> (0.143)	0.282 <sup>**</sup> (0.124)
Master's degree or higher	0.275 <sup>*</sup> (0.167)	0.049 (0.035)	0.134 (0.103)	0.190 (0.192)	0.243 (0.173)
Health status	0.133 (0.076)	0.027 (0.016)	0.078 (0.047)	0.114 (0.086)	0.119 (0.078)
Risk attitude	0.208 <sup>**</sup> (0.052)	0.044 <sup>**</sup> (0.011)	0.126 <sup>**</sup> (0.032)	0.185 <sup>**</sup> (0.059)	0.217 <sup>**</sup> (0.053)
Monthly income	0.041 (0.022)	0.009 (0.005)	0.029 (0.014)	0.051 (0.025)	0.029 (0.024)
Own a house	0.447 <sup>***</sup> (0.134)	0.088 <sup>**</sup> (0.029)	0.249 <sup>**</sup> (0.083)	0.472 <sup>***</sup> (0.159)	0.382 <sup>**</sup> (0.137)
Own a car	0.104 (0.093)	0.037 (0.020)	0.109 (0.057)	0.185 (0.106)	0.194 (0.094)
Own a private business	0.424 <sup>***</sup> (0.085)	0.084 <sup>**</sup> (0.017)	0.256 <sup>***</sup> (0.052)	0.388 <sup>**</sup> (0.096)	0.394 <sup>**</sup> (0.087)
City fixed effect	Yes	Yes	Yes	Yes	Yes
Observations	3122	3122	3122	2433	3004
Adjusted $R^2$		0.088			
Pseudo $R^2$	0.061		0.079	0.071	0.076

Notes: The reference category is a high school or lower. Besides, <sup>\*\*\*</sup>, <sup>\*\*</sup>, and <sup>\*</sup> represent 1%, 5%, and 10% significance level, respectively. The data in parentheses are robust standard errors. In Columns (1), (4) and (5), since logistic regression is utilized and probit regression in Column (3) is utilized, the statistics of Pseudo  $R^2$  is reported. For OLS regression, this study reports the statistics of adjusted  $R^2$ .

## 5. CONCLUSIONS AND IMPLICATIONS

Previous research on financial education usually focuses on its potential effects on financial behaviors and potential financial outcomes. As one of the most important financial behaviors, financial planning has featured prominently among the aspects of policy options available to improve personal financial wellbeing. However, few studies have explored the potential impacts of financial education on consumer financial planning. Meanwhile, there are even fewer studies that investigate how investment in financial education affects consumer financial planning. The purpose of this study is to respond to the above two challenges. Utilizing data from the 2012 Household Consumer Finance in China's Urban Residents, this study aims to investigate the associations between financial

education and consumer financial planning, as well as explore the effects of investment of financial education on consumer financial planning. To produce more accurate results, robust standard errors are also calculated in all of the estimates. Moreover, a comprehensive robustness check, including replacing the independent variable, performing estimations with alternative regression methods, as well as removing outliers by age and income, has also been performed in this study.

The results of this study document the positive association between financial education and consumer financial planning, which suggests that consumers with a high level of financial education are more likely to conduct financial planning. Besides, the results also indicate that the money and time input in financial education

positively contribute to consumer financial planning. In particular, investing money in financial education has a greater impact on consumer financial planning than the input of time. Thus, all the hypotheses proposed in this study have been verified appropriately. Simultaneously, this study contributes to the literature on the impact of financial education on consumer financial planning.

With the drastic development of financial markets and the increasing importance of financial education, policymakers in developed and emerging economies have begun to emphasize the significance of consumer financial planning. In terms of the conclusions, how to promote consumer financial planning by enhancing financial education can be strategically considered from the following perspectives. First, policymakers are advised to take measures to increase the supply of consumer financial education. The results of this study suggest a positive role of financial education in promoting consumer financial planning, and hence the governments or financial institutions are recommended to provide more consumer education related to financial knowledge, which enables consumers to make financial planning more rationally. For instance, the government can provide financial support for consumers' financial education, such as issuing financial education course vouchers and promoting financial general education, thereby helping consumers improve financial literacy. Second, measures are suggested to be taken to enable consumers to objectively and accurately assess their financial literacy before conducting financial planning. When the financial literacy is at a low level, consumers are encouraged to improve their financial awareness through financial education so that they can better participate in the financial market and more effectively choose appropriate financial products or services. Third, policymakers are encouraged to consider integrating financial education into the national education system and increase investment in financial education. Carrying out formal financial knowledge education in high schools or universities may be one of the ways to effectively improve consumer financial literacy. The improvement of financial education will enable consumers to better resist market risks and have more potential to accumulate personal wealth. Finally, consumers are encouraged to invest more time and money in their financial knowledge education. The results of this study reveal that the money and time input in financial

education is conducive to enhancing consumer financial planning. Thus, increasing consumers' awareness of investing in financial education will help improve their financial literacy and thus better guide them in financial planning.

This study has two limitations. The first limitation is that this study employs cross-sectional data to investigate the associations between financial education and consumer financial planning, longitudinal datasets should be used to present the dynamic change specific to the relationships. Moreover, the use of cross-sectional data may result in estimation errors. Second, there may be some endogeneity problems in this study. The coefficients cannot determine the causality between financial education and consumer financial planning. For some consumers, as they become more concerned about their financial behaviors, they may be inclined to receive more financial education. Therefore, whether consumers have a financial plan may have an impact on their level of financial education. However, there is a lack of testing of endogeneity between variables in this paper. These limitations will provide directions for the continuous improvement of future research.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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