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Can Financial Education Improve Investment Returns?----Evidence from Chinese Securities Investors

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SUMMARY: *Based on the data from the 2020 China Investor Education Status Survey and investor transaction, we systematically discuss the impacts of financial education on investment returns and the channels. It is found that: first, financial education significantly improves investors' investment returns of stocks and financial assets. Second, from the perspective of asset allocation, financial education improves investment returns mainly by reducing investors' stock holding homogenization and increasing portfolio diversification. And from the perspective of investment strategy, financial education improves investment returns by reducing investors' tendency to trend-chasing and selecting passive management-oriented strategies. Third, investors with the sense of long-term financial education have a higher likelihood of achieving positive returns. Our findings provide new empirical evidence for the effectiveness of financial education and may contribute to the integration of financial education into the national education system.*

KEYWORDS: *financial education; investment returns; asset allocation*

1 Introduction

The continuous development of fintech has led to the deep integration of financial services into the social life of individuals, and the continuous enrichment of financial products. However, the ability of residents to make rational decisions has been shown to be insufficient (Carlin et al., 2023). With the scale and diversification of residents' financial consumption, academics and the government have also begun to pay attention to residents' investment returns. According to the China Household Wealth Index Research Report (2023Q1), the average return on household investment is 0.07% (Source: China Household Wealth Index Research Report (https://chfs.swufe.edu.cn/info/1031/1751.htm)), and the contribution of financial investment to wealth growth has increased from last year. Financial investment, However, does not necessarily yield investment returns, and it also carries the risk of loss. The percentage of Chinese households with stock investment losses is 57.93% (Lu et al., 2020), and more than half of the residents do not grasp the investment opportunities and do not effectively utilize the financial products and services to enhance the welfare of their families. The constant emergence of innovative financial instruments and new market rules make the investment environment complex (Lusardi, 2019). Therefore, facing a wide variety of financial products and services, how investors optimize thier asset allocations and choose the appropriate investment strategies is the key to improving investment returns.

In fact, after the international financial crisis in 2008, financial education began to receive

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widespread attention (McCormick, 2009), and policymakers expect to improve the effectiveness of individuals' investment decisions through popularized financial education, which in turn improves residents' investment returns. Reflecting on the financial crisis, Mandell and Klein (2009) point out that the lack of financial literacy is one of the determining factors in the outbreak of the crisis and the spread of risks. Financial literacy is a kind of human capital specific to personal finance, which embodies the ability of investors to master basic economic and financial concepts, and to use financial knowledge and investment skills to effectively allocate financial resources in order to achieve lifelong financial security (Huston, 2010). Survey data around the world have shown that people's financial literacy is very scarce (Cude et al., 2019). For example, in countries that have experienced deflation, such as Japan, the percentage of residents who do not understand the concept of inflation is 28.6% (Sekita, 2011). Residents of China, which experienced the planned economy, correctly answered just 15.64% of questions about inflation (Yin et al., 2014).

Educational activities aimed at improving personal financial literacy can better guide and regulate the investment behavior of residents and correct their wrong financial concepts (Campbell, 2006). Financial education is an important means to promote investors to improve their financial knowledge, financial ability and confidence, enhance their understanding of financial products and increase their awareness of financial risks through market information or objective advice (OECD, 2005). However, the existing literature rarely directly verifies the impact of financial education on residents' investment returns, and the majority discusses the relationship between financial literacy and individual financial decisions (Gaudecker, 2015; Dewi et al., 2020). On the one hand, micro-survey data for households do not cover detailed financial education information to capture residents' participation in financial education activities. On the other hand, for the measurement of investment returns, it is possible that respondents in the survey data alone are reluctant to disclose the precise personal investment return rate due to privacy protection, making it difficult to analyze the issue of financial education and investment returns in a direct perspective.

However, it is important to recognize that the ultimate goal of financial education is to maximize the return on investment by improving individuals' financial human capital, which in turn reduces irrational investment decisions. While part of the literature focuses on the impact of financial literacy on wealth accumulation (Behrman et al., 2012) and investment returns (Arianti, 2018) of the population, this does not imply that financial education plays the equal role. The subject of our study is whether investors ultimately maximize their investment returns to enhance financial well-being after improving their personal financial decisions through financial education. Based on this, we discuss three main issues: (1) whether financial education improves individuals' financial well-being, using investment returns as an example; (2) if so, what are the channels through which financial education affects investment returns? (3) Does individuals' awareness of receiving financial education affect the effect of financial education?

The contribution of our study could be mainly reflected in the following. First, existing studies mostly focus on the analysis of financial education and financial literacy on individual economic decisions, but instead ignore the attention to investment performance. We use individual investors' survey data and accurately matched transaction data to carry out empirical research, construct the Financial Education Index from the subjective level of commitment and objective level of acceptance of financial education, and analyze the impact of financial education on investors' stock and financial assets investment returns, which is a useful addition to the research on the effectiveness of financial education. Secondly, we carry out a detailed analysis of the impact mechanism from the perspective of asset allocation and investment strategy, and explore the change of asset allocation and adjustment of investment

strategy after receiving financial education. Thirdly, we pay attention to the moderating effect of investors' awareness of long-term financial education in the relationship between financial education and investment returns, and provides direct evidence on the effectiveness of long-term financial education.

2 Previous Research and Hypotheses

The germinal idea of financial education can be traced back to Adam Smith's discussion in *The Wealth of Nations* about the division of labor to increase productivity, with laborers receiving specialized education and training to perform delicate, specialized tasks (Smith, 1776). Financial education was first defined by Mason and Wilson (2000) as providing individuals with the necessary, basic financial literacy and investment skills to deal with financial matters rationally and manage their personal finances effectively. The role of financial education is improving individuals' understanding of basic financial literacy and mastery of core financial concepts, which is a solution to alleviate various financial problems in life (Ouachani et al., 2021).

2.1 Discussion on the effectiveness of financial education

Investments that improve the quality of the population can significantly contribute to economic prosperity and improve the well-being of the poor. And financial literacy, as an important human capital, mediates the link between financial education and good personal financial management behaviors (Son and Park, 2019). Borden et al. (2008) incorporate financial literacy into an intertemporal decision-making model, Lusardi et al. (2017) and Lusardi et al. (2020) conducted a series of extended studies and found that investments of financial literacy are cumulative, while financial education inputs have costs. And the benefits of financial education are the increase in the return on investment, and the costs are the expends of knowledge inputs.

Exploring the effectiveness of financial education in terms of its impact on individual economic decision-making, individuals who have received relevant financial education at different life stages are more aware of investment and utilize financial services (Varcoe et al., 2005), and also have a higher likelihood of participation in the stock market (Urban et al., 2020) and holding risky financial assets (Zhu and Xiao, 2022). These people are more likely to have a retirement savings plan (Rothwell and Wu, 2019) and more willing to go for insurance counseling (Xiao and Porto, 2019). They are more likely to use less risky credit products (Baulkaran, 2022), which brings a lower probability of credit default (Urban et al., 2020). They usually have a lower degree of preference for specific industries and types of assets (Lee et al., 2023), and have a moderate frequency of trading and a richer asset allocation category (Talpsepp et al., 2020). And they can also take a more active participation in investments in financial products with a high rate of return, such as financial derivatives (Spulbăr et al., 2021). In a word, these people have higher levels of financial capability in each dimension (Xiao and O'Neill, 2016). The reason for this is that financial education deepens residents' understanding of financial instruments and helps them to better plan for the future (Maldonado et al., 2022).

However, there are also many questions about the effectiveness of financial education. Effective financial education is costly, has to be implemented widely, frequently and intensively, and is coercive (Kozup and Hogarth, 2008), and large-scale public financial education fails to satisfy the heterogeneity of consumers' needs in the context of uncertain decision-making (Willis, 2008). First, because each resident has different financial habits and

differences in wealth management styles, a universal model of financial education may be ineffective (Fünfgeld and Wang, 2009), and we are unable to identify the level of financial literacy that each individual should achieve (Abad-Segura et al., 2019). Second, psychological biases, heuristic decision-making, and external environmental factors contribute to the difficulty of financial education aimed at improving financial literacy to improve individuals' entrenched irrational decision-making behaviours (Willis, 2011). Financial education may have improved the financial literacy of the population, but it is difficult to correct the full range of irrational behaviours (Hastings et al., 2013). A study using meta-analysis by Fernandes et al. (2014) also found that that financial education interventions explain only about 0.1% of the variation in financial behaviour. Finally, the evolving nature of financial markets makes the market environment ever-changing, which results in financial education being a necessary but inefficient policy tool (Singh, 2018). Enhanced regulation of high-risk populations may serve as an alternative to financial education (Betti et al., 2007).

2.2 Financial education and investment returns

Financial education also plays an important role in the process of investment returns and wealth accumulation. Delavande et al. (2008) view investment in financial education as an investment in human capital. By spending time on financial education, an individual forgoes current income and increases the stock of human capital in finance. Financial education is assumed to allow investors to earn a higher expected return on assets at any given level of risk up to a theoretical maximum on the mean-variance frontier. It can be proved that investors who invest more in financial education will earn higher risk-adjusted returns on all financial assets.

We provide a theoretical analysis of the relationship between financial education and investment returns by adding an investor's financial education investment variable to the inter-period choice model, which is used to measure an individual's time investment and capital investment in financial education.

It is assumed that the life cycle of an individual is divided into two periods, the working period and the retirement period. In the working period (period 1), the individual will obtain labour income y and financial asset investment income $r_1 I$, denoted as the financial asset investment rate of return in period 1. And in the retirement period (period 2), the individual will rely on the wealth accumulated in period 1 to be used for consumption. At the beginning of period 1, the individual has an initial stock of financial literacy Φ_0, i.e., the individual's initial understanding. Initial financial literacy changes in a manner similar to an individual's cognitive ability, with a rate δ of depreciation of financial literacy over time as a result of, for example, a decline in ability and forgetting of knowledge. Individuals are assumed to choose the amount of investment in financial assets I, personal savings s, and the amount of investment in financial education φ. The unit cost of investment in financial education is assumed to be p. Then the stock of financial literacy of the individual in period 2 is:

$$\Phi_1 = (1-\delta)\Phi_0 + \varphi \tag{1}$$

Individuals invest in financial education to improve financial literacy, which in turn leads to a greater understanding of market investment opportunities and a rational allocation of the ratio of savings to other financial assets, so the return on savings is assumed to be a function of financial literacy:

$$R(\Phi_1) = \Phi_1^{\alpha} \tag{2}$$

where α denotes the elasticity of savings yields with respect to financial literacy, $\alpha \in (0,1)$.

Based on the significant effect of investment experience on the individual's stock selection ability and time selection ability (Tan and Chen , 2012), the individual, after investing in financial assets in period 1, improves his or her knowledge of the returns and risks of financial products in period 2 by accumulating investment experience. Assuming that r_2, the return on the investment in financial assets in period 2 is positively related to r_1, the return in period 1, and the corresponding ratio is γ. Then r_2 can be written as:

$$r_2 = \gamma r_1 + r \tag{3}$$

where r is rate of return under the influence of other factors in period 2.

Individuals maximise their utility by choosing to invest and save (the utility function is set to be an isoelastic utility function):

$$max \quad U = \frac{1}{1-\frac{1}{\sigma}}({c_0}^{1-\frac{1}{\sigma}} + \beta {c_1}^{1-\frac{1}{\sigma}}) \tag{4}$$

$$s.t. \quad c_0 + s + p\varphi = y + r_1 I \tag{5}$$

$$c_1 = (1 + r_2){\Phi_1}^{\alpha} \cdot s \tag{6}$$

where c_0 is the consumption in period 1, c_1 is the consumption in period 2, σ is the intertemporal elasticity of substitution, and β is the discount factor, $0 < \beta < 1$.

Solving for the relationship between the rate of return on investment in financial assets and the inputs to financial education is obtained from the derivation of the Lagrangian function. It can be showed that:

$$\frac{py}{\alpha I}[(1-\delta)\Phi_0 + \varphi] = 1 + r_2 \tag{7}$$

From equation (7), it can be deduced that when the total amount of individuals' investment in financial assets I remains constant, higher investment in financial education (φ) will increase individuals' investment returns on financial assets (r_2), i.e., higher investment in financial education facilitates individuals to obtain higher financial investment returns. Thus, we propose the research hypothesis of this paper.

*H*1*: Financial education has a significant positive effect on investors' investment returns, i.e., investors with higher level of financial education will have higher returns on stock investment and financial asset investment.*

3 Method

3.1 Dataset

The research data we use comes from China Investor Financial Education Survey (CIFES) (China Investor Financial Education Survey (CIFES) is a nationwide survey conducted annually by China Institute of Financial Studies (CIFES) of Southwestern University of Finance and Economics. It is an ongoing questionnaire survey conducted annually nationwide since 2016, and a total of 91,420 questionnaires have been collected for five consecutive years.). individual investor transaction data provided by a large Chinese brokerage firm, and daily stock price data provided by the RESSET database. CIFES takes individual investors in the Chinese security market as the research object, uses stratified sampling method to identify

the interviewed investors, and designs the investor number, which is used to match the real securities transaction data. The questionnaire includes investor characteristics and risk preferences, financial literacy topics, financial education information, financial decision-making behaviour, etc., involving more than 40 survey questions. The sample collection is strictly controlled through pre-survey collection, tracking and monitoring during collection and post-survey data quality verification to reduce the non-sampling errors. The survey is conducted in the first quarter of 2021, with 9,656 valid questionnaires returned, covering 31 provinces (including autonomous regions and municipalities directly under the central government) in China.

3.2 The Model

Since investors' stock and financial assets investment returns are sorted data, we use the ordered probit model for estimation. For each investor i, the interval to which his investment return belongs to is used as the threshold parameter, which is classified into seven types of return levels, with values from 1 to 7, namely, loss more than 20%, loss 10%-20%, loss 10% or less, no loss, no profit, profit 10% or less, profit 10%-20%, and profit 20% or more, respectively. For the latent variable r_i^*, it satisfies:

$$r_i^* = \varphi_0 + \varphi_1 Financial\_edu_i + \varphi_2 Experience\_medium_i + \varphi_3 Experience\_high_i + \varphi_4 X_i + \tau_i \quad (10)$$

where r_i^* denotes the actual return of investor i and $Financial\_edu_i$ denotes investor i's financial education index. $Experience_medium_i$denotes investor i's moderate investment experience, and $Experience_high_i$denotes investor i's experienced investment. τ_i follows the standard normal distribution. φ_1 denotes the marginal effect of financial education on investment returns, φ_2 and φ_3 denote the effect of moderate and experienced investment experience on investment returns compared to new investors, respectively. Since the actual value of investors' returns (r_i^*) can not be directly observed, we can obtain the interval (r_i) in which each investor i's return level lies, with the following selection rule:

$$r_i = \begin{cases} 1, & r_i^* \le k_1 \\ 2, & k_1 < r_i^* < k_2 \\ 3, & k_2 < r_i^* < k_3 \\ 4, & k_3 < r_i^* < k_4 \\ 5, & k_4 < r_i^* < k_5 \\ 6, & k_5 < r_i^* < k_6 \\ 7, & k_7 < r_i^* \end{cases} \quad (11)$$

where, k_1, k_2, k_3, k_4, k_5, k_6 and k_7, respectively, are the critical values of the intervals in which the returns lie. We use Maximum Likelihood Estimation (MLE) to estimate the coefficients and critical values of the Oprobit model. This allows us to analyse how financial education affects the returns of investors.

3.3 Variables

(1) *Return of Stock investment*. Based on the transaction data of investors' security accounts, we use the total return on investors' stock investments during the sample period to measure their stock investment performance, and we process the variables that are in different return intervals to form a sorting variable for return.

Table 1 shows that the percentage of investors who make a profit on stocks is 57%, with

half of them making a profit of 10% or less. In addition, the percentage of investors who make a profit of 20% or more is 17%, which shows that more than half of the sample of investors make a positive return in the stock market. The proportion of investors who lose money is 41%, with most investors losing 10% or less.

Table 1: Characterisation of investors' returns on equity investments

	Frequency	Frequency ratio	Cumulative Frequency
Loss of more than 20%	482	0.06	0.06
Loss of 10% - 20%	694	0.09	0.15
Loss of 10% or less	1958	0.26	0.41
No loss, no gain (0 return)	131	0.02	0.43
Profit of 10% or less	2165	0.28	0.71
Profit of 10% - 20%	881	0.12	0.83
Profit of more than 20%	1316	0.17	1.00

(2) *Return of financial assets investment*. According to the design of CIFES (2020) questionnaire, there are 7 options of return ranges for the question "the average annualised rate of return on your investment in non-depository financial assets (referring to financial products, equities, funds, bonds, financial derivatives, investment properties, etc.) in the last year is about", which can be assigned the value of 1-7, respectively(Options include "loss of more than 20%", "loss of 10% - 20%", "loss of 10% or less", "no loss and no gain (0 return)", "profit within 10%", "profit 10% - 20%", and "profit more than 20%".). Based on this, we construct the proxy variable of investors' investment returns on financial assets, where the investment returns on financial assets exclude the returns on bank deposits of individual investors.

As can be seen from Table 2, over 60% of the sample investors' participation in the risky financial markets result in positive returns, while the proportion of investors with a breakeven profit or loss is 16%, and the proportion of investors with a loss is 22%.

Table 2: Characterisation of investors' investment returns on financial assets

	Frequency	Frequency ratio	Cumulative Frequency
Loss of more than 20%	258	0.03	0.03
Loss of 10% - 20%	526	0.07	0.10
Loss of 10% or less	912	0.12	0.22
No loss, no gain (0 return)	1191	0.16	0.38
Profit of 10% or less	2000	0.26	0.64
Profit of 10% - 20%	1954	0.26	0.90
Profit of more than 20%	786	0.10	1.00

(3) *Financial Education Index*. The investors' Financial Education Index can be obtained from the subjective input and objective acceptance by using the Factor Analysis. The specific index system is selected as shown in Table 3.

Table 3: Selection and definition of indicators for the Financial Education Index

Dimension	Variable	Measures
input of financial education	money input	annual expense in financial education as a percentage of income
	time input	weekly time spent on learning for financial literacy
acceptance of financial education	content and frequency of education	basic knowledge of securities and futures learning of investment strategies / techniques knowing the risks of various types of investments understanding of new products and policies macroeconomic operations and market trends learning about personal wealth management knowledge of investor rights and ways to protect them identifying and preventing illegal security activities

(4) *Investment experience*. The investors' security account data also covers the opening time of their accounts, we calculate the time interval between the questionnaire distribution date and the account opening date to obtain the investors' years of experience in security investment, and used this to construct three dummy variables of investment experience. To classify the years of security investment of investors with different experience, we identify investors with less than 5 years of investment experience as inexperienced group, investment years of 5-10 and more than 10 correspond to moderate experienced group and experienced group, respectively.

(5) *Control variables*. In our study, investors' demographic characteristics, economic characteristics, psychological characteristics, and macro-environmental properties are selected.

3.4 Descriptive Statistics of the Sample

Table 4 shows the descriptive statistics of the main variables. In terms of investment experience, 36% of investors are inexperienced, while the proportion of investors with moderate and good experience is 31% and 33%, respectively. The proportion of investors who show regret for rising or falling stock prices is about 30%, while that of investments who show happy emotions is close to 40%, indicating that investors generally have positive or negative emotions.

Table 4: Descriptive statistics of main variables

Variable	Mean	Standard Deviation	Min	Median	Max
Explained Variables					
investment return on stocks	4.72	1.55	1	5	7
investment return on financial assets	4.40	1.82	1	5	7
Variables of Interest					
Financial Education Index	0	0.82	-1.99	0.03	1.73
inexperienced dummy	0.36	0.48	0	0	1
moderate experienced dummy	0.31	0.46	0	0	1
experienced dummy	0.33	0.47	0	0	1
Control Variables					
male	0.55	0.50	0	1	1
age	45	12.46	18.43	44.30	91.28
squared-age/100	21.80	12.13	3.40	19.62	83.32
married	0.85	0.36	0	1	1
high school, junior college or vocational high school and below	0.30	0.46	0	0	1
college	0.31	0.46	0	0	1
bachelor's degree and above	0.39	0.49	0	0	1
enterprise	0.36	0.48	0	0	1
non-enterprise	0.64	0.48	0	1	1
monthly income less than 5,000 RMB	0.32	0.47	0	0	1
monthly income of 5,000-10,000 RMB	0.41	0.49	0	0	1
monthly income over 10,000 RMB	0.26	0.44	0	0	1
financial assets less than 100,000 RMB	0.26	0.44	0	0	1
financial assets 100,000-500,000 RMB	0.47	0.50	0	0	1
financial assets over 500,000 RMB	0.27	0.45	0	0	1
risk preferred	0.43	0.49	0	0	1
risk neutral	0.42	0.49	0	0	1
risk averse	0.15	0.36	0	0	1
regret for rising stock prices	0.31	0.46	0	0	1
regret for falling stock prices	0.29	0.45	0	0	1
happy about rising stock prices	0.37	0.48	0	0	1
happy about falling stock prices	0.38	0.49	0	0	1
East	0.81	0.39	0	1	1
Central	0.14	0.35	0	0	1
West	0.05	0.22	0	0	1
GDP per capita	13.54	38.89	3.29	9.35	325.20
financial development	8.97	39.42	2.28	3.94	325.20

4 Results and Discussions

4.1 Benchmark Regression Results

In the basic model, we use the Ordered Probit Model to test whether financial education and investment experience significantly affect investors' returns, and Table 5 reports the regression estimates. The explanatory variables in columns (1) and (2) are returns of stock investment. The financial education index is significantly positive at the 1% level, indicating that financial education has a significant positive impact on investors' stock investment performance, and that investors with higher willingness to participate in financial education activities are more likely to be profitable in stock investments. Columns (3) and (4) show that the effect of financial education on investment returns of financial assets is also significantly positive and that more experienced investors are also more likely to have high financial investment returns. The returns suggest that investors "learn as they go" and that financial education is effective in improving investment returns. In addition, the coefficients of the control variables indicate that investors who are male, have financial asset holdings of 100,000 to 500,000 RMB, and are risk-preferred are less likely to be profitable, and those who have studied in college or taken higher education are more likely to have high investment

returns. Investors who regretted a fall in stock prices after buying are less likely to be profitable, while those who feel happy about a rise in stock prices after buying are more likely to be stock profitable, suggesting that emotionally-driven trading behaviors will significantly affect the returns of investments.

Table 5: Financial education, investment experience and investment returns

	(1)	(2)	(3)	(4)
	O-Probit	O-Probit	O-Probit	O-Probit
	returns of stock investments	returns of stock investments	returns of financial asset investments	returns of financial asset investments
Financial Education Index	0.135***	0.125***	0.271***	0.255***
	(0.0146)	(0.0158)	(0.0148)	(0.0160)
moderate experienced	0.0652**	0.0690**	0.259***	0.265***
	(0.0295)	(0.0296)	(0.0297)	(0.0297)
experienced	0.304***	0.308***	0.488***	0.493***
	(0.0319)	(0.0320)	(0.0321)	(0.0322)
male	-0.169***	-0.170***	-0.151***	-0.151***
	(0.0241)	(0.0242)	(0.0242)	(0.0242)
age	-0.0070	-0.00737	-0.0069	-0.0077
	(0.0062)	(0.0062)	(0.0062)	(0.0062)
squared-age/100	0.0122*	0.0126**	0.0117*	0.0126**
	(0.0063)	(0.0063)	(0.0063)	(0.0063)
married	0.0535	0.0554	0.0620*	0.0624*
	(0.0366)	(0.0367)	(0.0366)	(0.0367)
college	0.0941*	0.0985*	0.0950*	0.101**
	(0.0507)	(0.0507)	(0.0507)	(0.0508)
bachelor's degree and above	0.119**	0.118**	0.118**	0.118**
	(0.0474)	(0.0476)	(0.0474)	(0.0476)
enterprise	-0.0274	-0.0270	-0.0105	-0.0120
	(0.0434)	(0.0434)	(0.0434)	(0.0435)
monthly income of 5,000-10,000 RMB	-0.0195	-0.0195	-0.0106	-0.0119
	(0.0286)	(0.0286)	(0.0286)	(0.0286)
monthly income over 10,000 RMB	-0.0215	-0.0216	0.00118	0.00185
	(0.0363)	(0.0363)	(0.0363)	(0.0364)
financial assets 100,000-500,000 RMB	-0.233***	-0.234***	-0.220***	-0.221***
	(0.0301)	(0.0302)	(0.0302)	(0.0302)
financial assets over 500,000 RMB	-0.0560	-0.0568	-0.0418	-0.0422
	(0.0382)	(0.0382)	(0.0382)	(0.0383)
risk preferred	-0.0449*	-0.0454*	-0.0446*	-0.0458*
	(0.0259)	(0.0260)	(0.0259)	(0.0260)
risk averse	-0.00465	-0.00518	-0.0213	-0.0220
	(0.0399)	(0.0399)	(0.0399)	(0.0399)
regret for rising stock prices		-0.0345		-0.0480
		(0.0336)		(0.0337)
regret for falling stock prices		-0.0690**		-0.0621*
		(0.0332)		(0.0332)
happy about rising stock prices		0.0773**		0.0616*
		(0.0359)		(0.0359)
happy about falling stock prices		-0.0233		-0.0340
		(0.0368)		(0.0369)
Eastern		-0.0353		0.00125
		(0.0577)		(0.0578)
Central		0.0310		0.0765
		(0.0632)		(0.0633)
GDP per capita		0.0212***		0.0105
		(0.0072)		(0.0073)
financial development		-0.0207***		-0.0104
		(0.0072)		(0.0073)
Observations	7627	7627	7627	7627
R^2 (Pseudo R^2)	0.0166	0.0173	0.0212	0.0216

Note: *, **, and *** indicate significant at the 10%, 5%, and 1% levels, respectively.

To further understand the implications of the coefficients on financial education in the O-Probit model, we calculate the marginal effects of financial education conditional on the other variables (taking the mean). From column (1) in Table 6, when the Financial Education Index increases by 1 standard deviation (0.82), the probability of an investor losing more than 20% will decrease by 2.49 percentage points, while the probability of an investor making a profit of more than 20% will increase by 4.98 percentage points. Meanwhile, from the descriptive statistics in Table 4, it is known that 6% of investors have more than 20% loss in stock investment and 17% of investors can make more than 20% profit, so when the Financial Education Index of investors increases by 1 standard deviation, the proportion of investors with more than 20% loss will decrease by 41.57%, i.e., the proportion of investors with more than 20% loss will be changed to 3.51%. And the proportion of investors with 20% profit will increase by 29.28%, i.e. the proportion of investors with a profit of 20% will become 21.98%. The marginal effect of financial education in other cases is analyzed similarly. Column (4) shows the marginal effect of financial education on investors' investment returns on financial assets, and the sign of the coefficient does not change at different levels of returns, all of which indicate that financial education promotes investors' investment profitability and reduces the probability of their losses. The analysis of the marginal effect of financial education and investors' investment returns on financial assets with changes in probability and proportion is similar to this. It can be seen that the marginal effects further verifies that the impact of financial education on improving investment returns and increasing investors' well-being is significant.

Table 6: The marginal effect of financial education on investment returns

	(1)	(2)	(3)	(4)	(5)	(6)
	returns of stock investments			returns of financial asset investments		
	marginal effect	change in probability (%)	change in proportion (%)	marginal effect	change in probability (%)	change in proportion (%)
Loss of more than 20%	-0.0304*** (0.0022)	-2.49	-41.55	-0.0141*** (0.0014)	-1.16	-38.54
Loss of 10% - 20%	-0.0261*** (0.0018)	-2.14	-23.78	-0.0186*** (0.0016)	-1.53	-21.79
Loss of 10% or less	-0.0365*** (0.0023)	-2.99	-11.51	-0.0217*** (0.0019)	-1.78	-14.83
No loss, no gain (0 return)	-0.0009*** (0.0001)	-0.07	-3.69	-0.0153*** (0.0013)	-1.26	-7.84
Profit of 10% or less	0.0124*** (0.0012)	1.02	3.63	0.0013 * (0.0008)	0.11	0.41
Profit of 10% - 20%	0.0209*** (0.0014)	1.71	14.28	0.0358*** (0.0029)	2.87	11.04
Profit of more than 20%	0.0607*** (0.0038)	4.98	29.28	0.0328*** (0.0028)	2.69	26.90

Note: *, **, and *** indicate significant at the 10%, 5%, and 1% levels, respectively.

4.2 Heterogeneity Analysis

For the regression of financial education and investment returns, there may be endogeneity problems, such as omitted variables or reverse causality (higher investment returns may motivate investors to receive more financial education to maintain the continuous growth of returns), and traditional micro-empirical methods cannot accurately identify the causal relationship between financial education and investment returns. To deal with the endogeneity issue in our study, we use the Conditional Mixed Process (CMP) proposed by Roodman (2011), which is able to deal with different types of endogenous explanatory variables as compared to the traditional instrumental variable approach, and is an estimation that fits multiple equations, levels and conditional recursive mixed processes. We similarly need to select reasonable instrumental variables and use investors' knowledge of each financial education subject as an instrumental variable for the Financial Education Index.

Table 7 reports the results of the instrumental variable regression based on CMP. The first-stage regression results in Column (3) show that the DWH test rejects the original hypothesis of no endogeneity at the 1% level, suggesting that there is an endogeneity problem in the basic model. The F-value is greater than the critical value of 16.38 at the 10% level of bias, and the t-value of the instrumental variable is 33.91, rejecting the weak instrumental variable hypothesis and suggesting that the instrumental variables we use are statistically valid. The coefficients on financial education in both columns (1) and (2) are significantly positive, consistent with the findings of the benchmark model.

Table 7: Financial education, investment experience and investment returns (CMP)

	(1)	(2)	(3)
	CMP	CMP	OLS(fisrt stage)
	returns of stock investments	returns of financial asset investments	financial education
Financial Education Index	0.0960***	0.2448***	
	(0.0333)	(0.0428)	
IV (financial education)			0.2928***
			(0.0086)
moderate experienced	0.1124**	0.0790***	0.0794***
	(0.0347)	(0.0294)	(0.0293)
experienced	0.2627***	0.2763***	0.279***
	(0.0374)	(0.0317)	(0.0315)
whether to control for other variables	YES	YES	YES
Observations	7627	7627	7627
F-value for the first-stage			96.50
t-value for the instrumental variable			33.91
DWH Chi^2	6.82	13.96	
P-value	0.0090	0.0002	

Note: *, **, and *** indicate significant at the 10%, 5%, and 1% levels, respectively.

The marginal effects of financial education and investment returns estimated by instrumental variables are shown in Table 8. Columns (1)-(3) show that the coefficients of the marginal effects on stock investment losses are all significantly negative, while the marginal effects on stock investment profits are significantly positive. As an example, the marginal

effect of financial education is -0.0353 for a loss of 10% or less, which indicates that when the investor's Financial Education Index increases by one standard deviation (0.82), the probability of he or she experiencing a loss of 10% or less decreases by 2.90%, and the percentage of investors with a loss of 10% or less decreases by 11.13%. The results of the impact on investment returns on financial assets in columns (4)-(6) are largely consistent with the above. The results of the estimation based on CMP further show that financial education can increase the likelihood of high returns for investors.

Table 8: Marginal effect of financial education on investment returns (CMP and instrumental variables)

	(1)	(2)	(3)	(4)	(5)	(6)
	returns of stock investments			returns of financial asset investments		
	marginal effect	change in probability (%)	change in proportion (%)	marginal effect	change in probability (%)	change in proportion (%)
Loss of more than 20%	-0.0218*** (0.0075)	-1.79	-29.79	-0.0183*** (0.0036)	-1.50	-50.02
Loss of 10% - 20%	-0.0136*** (0.0047)	-1.12	-12.39	-0.0238*** (0.0042)	-1.952	-0.27
Loss of 10% or less	-0.0353*** (0.0125)	-2.90	-11.13	-0.0251*** (0.0043)	-2.058	-17.15
No loss, no gain (0 return)	-0.0001*** (0.0201)	-0.00	-0.41	-0.0193*** (0.0031)	-1.583	-9.89
Profit of 10% or less	0.0374*** (0.0008)	3.07	10.95	0.0010* (0.0006)	0.082	0.32
Profit of 10% - 20%	0.0053*** (0.0019)	0.44	3.62	0.0451*** (0.0074)	3.698	14.22
Profit of more than 20%	0.0324*** (0.0111)	2.66	15.63	0.0422*** (0.0076)	1.076	10.76

Note: *, **, and *** indicate significant at the 10%, 5%, and 1% levels, respectively.

4.3 Mechanisms

4.3.1 Asset allocation

Choosing financial assets that are appropriate for one's risk needs and optimizing the structure of asset allocation are the key to obtaining high investment returns. An important dimension of financial education influencing investors' decision-making behavior is to correct the irrationality of their asset allocation (Dolvin and Templeton, 2006). Accordingly, we analyze the behavioral path through which financial education affects investment returns from the perspective of asset allocation, providing a theoretical basis for a deeper understanding of the effectiveness of financial education.

Table 9 gives the empirical results on the impact of investor' stockholding singleness on investment returns. Column (1) shows that financial education significantly inhibits investors' stockholding singleness and relatively experienced investors tend to hold a diverse range of stocks compared to novice investors. As seen in column (2), the marginal effect of

stockholding singleness is significantly negative, indicating that investors who hold only one or two stocks cannot avoid the extreme risk associated with a single asset, and that singleness reduces the likelihood that investors will earn positive excess returns. The dependent variable in column (3) is stock investment profit of 10% or more, and the marginal effect of the variable of interest is also significantly negative, indicating that in the case of high volatility of single-asset returns, it is more difficult for investors with single holdings to obtain high excess returns. In summary, our empirical results suggest that investors improve their stock selection ability by means of financial education, which reduces the likelihood of single stock holdings and thus increases the probability of profitable stock investments.

Table 9: Financial education, singleness of stockholdings and investment returns

	(1)	(2)	(3)
	Probit	Probit	Probit
	singleness	profit	profit of 10% or more
Financial Education Index	-0.0193***		
	(0.0068)		
moderate experienced	-0.115***		
	(0.0123)		
experienced	-0.176***		
	(0.0134)		
singleness of stockholdings		-0.0312***	-0.0224*
		(0.0118)	(0.0118)
whether to control for other variables	YES	YES	YES
Observations	7627	7627	7627
R^2/Pseudo R^2	0.0507	0.0351	0.0419

Note: *, **, and *** indicate significant at the 10%, 5%, and 1% levels, respectively.

Investors' choice to hold different types of financial assets to diversify risks is also a typical asset allocation problem under uncertainty (Giofré, 2017). We examined whether receiving financial education motivates investors to capture different investment opportunities through diversification of financial assets in order to obtain a reasonable return-risk ratio and ultimately a relatively high rate of return on investment. In CIFES (2020), we asked investors about their allocation of financial assets (Financial assets include: bank deposits, financial products, stocks, funds, bonds, futures and other financial derivatives, insurance, other financial assets, and real estate for investment.). The proportion of funds allocated to a particular type of financial asset is considered to be held by the investor if the proportion is greater than 0. The number of financial asset types held by one investor is summed up to obtain a proxy variable for financial asset diversification.

Column (1) in Table 10 shows that financial education promotes diversification of investors' allocation to financial assets. Columns (2) and (3) show the impact of financial asset diversification on investment returns, and the marginal effects of financial asset diversification are both significantly positive at the 1% level, which implies that the greater the diversity of financial asset portfolios, the higher the likelihood that investors will achieve positive returns. It can be seen that financial education helps to guide investors to optimize the allocation of financial assets, prompting them to more rationally measure the return-risk attributes of different financial asset portfolios, so as to make better use of the correlation between the returns of different assets to reduce the risk of the entire portfolio, enhance the risk return per unit of the asset portfolio, and obtain a higher return on investment.

Table 10: Financial asset diversification, financial education and investment returns

	(1)	(2)	(3)
	OLS	Probit	Probit
	types of financial assets	profit	profit of 10% or more
Financial Education Index	0.2129***		
	(6.1818)		
moderate experienced	0.2749***		
	(3.9976)		
experienced	0.3017***		
	(4.0974)		
diversification of financial assets		0.0063***	0.0089***
		(0.0022)	(0.0021)
whether to control for other variables	YES	YES	YES
Observations	7627	7627	7627
R^2/Pseudo R^2	0.081	0.0352	0.0433

Note: *, **, and *** indicate significant at the 10%, 5%, and 1% levels, respectively.

4.3.2 Investment strategies

Individual investors tend to adopt trend extrapolation for trading due to lack of information or insufficient in-depth mining of information, showing positive feedback trading characteristics (De Bondt, 1993). Studies using Chinese individual investor trading data also found that more than one-third of individual investors tend to extrapolate stock price changes and adopt trend strategies when trading (Pan et al., 2003). The emergence of passive trading strategies is related to the efficient market hypothesis, in which equilibrium market prices fully reflect all available information and investors are unable to beat the market by actively investing in "buying low and selling high". Believing that the market is efficient, passive investors choose to replicate the fund's index in whole or in part, practicing "buy and hold" in order to achieve returns that are closer to the index (Cohen and Cabiri, 2015). Based on the important impact of investment strategies on investors' market performance, we examine whether investors' choice of strategies is a mediating variable for financial education to enhance their investment returns.

(1)Positive feedback trading strategies and stock investment returns

Drawing on De Long et al. (1990) 's description of feedback trading strategies, we design the CIFES (2020) questionnaire to measure the propensity of investors to engage in positive feedback trading strategies, based on the following questions: "Looking back at your stock trading experience, at what stage of the stock's life do you usually buy" and "Looking back at your stock trading experience, at what stage of the stock's life do you usually sell", investors who answered "up" in the buying stage or "down" in the selling stage are identified as positive feedback investors.

Table 11 reports the results of the regression. The marginal effect of financial education in column (1) is negative and significant at the 1% level, suggesting that financial education reduces investors' tendency to trade in pursuit of trends. Columns (2) and (3) examine the impact of positive feedback trading strategies on investment returns, and it can be seen that the marginal effects are both significantly negative, suggesting that feedback trading reduces the likelihood of profitability, and that investors who employ positive feedback trading strategies are less likely to earn high returns. In China, feedback traders pay less attention to

fundamental factors, make decisions mostly from changes in asset prices, and ignore the information of the market, resulting in a lower likelihood of profitability. It can be seen that financial education improves the likelihood of profitability for investors by reducing their tendency to trend-chasing and transforming their trading strategies.

Table 11: Positive feedback trading strategies, financial education and investment returns

	(1)	(2)	(3)
	Probit	Probit	Probit
	positive feedback trading strategies	profit	profit of 10% or more
Financial Education Index	-0.176***		
	(0.0066)		
positive feedback trading strategies		-0.259***	-0.153***
		(0.0096)	(0.0102)
whether to control for other variables	YES	YES	YES
Observations	7627	7627	7627
R^2/Pseudo R^2	0.0834	0.0886	0.0504

Note: *, **, and *** indicate significant at the 10%, 5%, and 1% levels, respectively.

(2)Passive investment strategies and investment returns on financial assets

Based on the characteristics of passive investment strategies, we identify investors with fund allocation ratios higher than stock as passive investors, based on their fund allocation ratios to each financial asset in the CIFES (2020). Table 12 shows the results of passive investment strategies, financial education and investment returns. In Column (1), the marginal effect of financial education is significantly positive, indicating that receiving financial education promotes investors' purchase of fund products and reduces their active investment tendency to hold stocks directly. In column (2), it can be seen that investors who adopt passive management strategies have a higher likelihood of profitably in financial assets. And column (3) shows that passive strategies also significantly and positively affect investors' profitability by more than 10%. The above regression results indicate that financial education plays an important role in guiding investors to establish a long-term investment philosophy, reflecting the positive return effect brought about by individual investors changing their investment strategies after receiving financial education.

Table 12: Passively investment strategies, financial education and investment returns

	(1)	(2)	(3)
	Probit	Probit	Probit
	passive strategies	profit	profit of 10% or more
Financial Education Index	0.137***		
	(0.0067)		
passively strategies		0.160***	0.160***
		(0.0117)	(0.0110)
whether to control for other variables	YES	YES	YES
Observations	7627	7627	7627
R^2/Pseudo R^2	0.0787	0.0520	0.0611

Note: *, **, and *** indicate significant at the 10%, 5%, and 1% levels, respectively.

4.4 Further analysis

As financial education is a long-term process, we analyze the moderating effect of investors' awareness of long-term financial education on the effectiveness of financial education. According to the question "When are you likely to obtain investor education services" in CIFES (2020), investors who choose "Long-term investor education (regularly or irregularly)" are recognized as having the awareness of long-term financial education. In order to verify the existence of the moderating effect, we introduce the cross-multiplier terms of awareness of long-term financial education with financial education, financial education input, and financial education acceptance.

Table 13 shows the moderating effect of awareness of long-term financial education. The coefficients on awareness of long-term financial education are significantly positive at the 1% level in both columns (1) and (2), suggesting that investors who continue to receive financial education have a higher likelihood of profitably. The coefficients of the cross-multiplier terms of financial education and awareness of long-term financial education are 0.1120 and 0.0919, respectively, which are significant at the 1% level, suggesting that investors with awareness of receiving financial education in the long run are more likely to have financial education contribute to obtaining a positive return on investment. The results in columns (3)-(6) show that the coefficient of the interaction term between financial education input and long-term learning awareness is not significant, and the coefficient of the interaction term between financial education acceptance and long-term learning awareness is significantly positive, which shows that the awareness of long-term financial education improves the positive impact of investors' financial education acceptance on investment returns, indicating that the higher the frequency of the investors' actual participation in financial education activities, the higher the likelihood of profits.

Table 13: Financial education, long-term financial education awareness and investment returns

	(1)	(2)	(3)	(4)	(5)	(6)
	Probit	Probit	Probit	Probit	Probit	Probit
	profit (stocks)	profit (financial assets)	profit (stocks)	profit (financial assets)	profit (stocks)	profit (financial assets)
Financial Education Index	0.0694***	0.0192**				
	(0.0089)	(0.0089)				
FEI * long-term financial education awareness	0.1120***	0.0919***				
	(0.0159)	(0.0155)				
financial education input			0.0246***	0.0197**		
			(0.0093)	(0.0089)		
financial education input * long-term financial education awareness			-0.0025	0.0048		
			(0.0191)	(0.0200)		
financial education acceptance					0.0812***	0.0217**
					(0.0098)	(0.0099)
financial education acceptance * long-term financial education awareness					0.118***	0.0977***
					(0.0174)	(0.0170)
long-term financial education awareness	0.124***	0.137***	0.0733***	0.183***	0.125***	0.138***
	(0.0138)	(0.0136)	(0.0140)	(0.0124)	(0.0137)	(0.0136)
whether to control for other variables	YES	YES	YES	YES	YES	YES
Observations	7627	7627	7627	7627	7627	7627
R^2/Pseudo R^2	0.0823	0.0639	0.0370	0.0572	0.0830	0.0636

Note: *, **, and *** indicate significant at the 10%, 5%, and 1% levels, respectively.

4.5 Robustness Checks

To further confirm the reliability of our findings, we conduct robustness tests in terms of both estimation methods and variable construction.

4.5.1 Alternative estimation method

The dependent variable can also be showed as the discrete ordered variable by Ologit model. Columns (1) and (2) in Table 14 estimate the effect of financial education and investment experience on investment returns using Ologit model. The coefficients of financial education are significantly positive, which is consistent with the estimation results of the benchmark model. In addition, we also use multivariable OLS model for estimation, and the sign of the coefficients of the key variables remain unchanged, indicating that our findings are not affected by the choice of model.

Table 14: Robustness tests for replacement of estimation methods

	(1)	(2)	(3)	(4)
	OLogit	OLogit	OLS	OLS
	profit (stocks)	profit (financial assets)	profit (stocks)	profit (financial assets)
Financial Education Index	0.432***	0.334***	0.4692***	0.2988***
	(0.0271)	(0.0270)	(19.1156)	(13.9900)
moderate experienced	0.457***	0.163***	0.4556***	0.1374***
	(0.0503)	(0.0508)	(9.2966)	(3.2214)
experienced	0.876***	0.495***	0.8213***	0.4367***
	(0.0556)	(0.0543)	(15.6284)	(9.5491)
whether to control for other variables	YES	YES	YES	YES
Observations	7627	7627	7627	7627
R^2/Pseudo R^2	0.0344	0.0230	0.114	0.073

Note: *, **, and *** indicate significant at the 10%, 5%, and 1% levels, respectively.

4.5.2 Replace key variables

Replacing key variables is also a commonly used robustness test and we replace the dependent and independent variables separately. For the robustness test, we use dummy dependent variable, where an investor's stock investment profit of 10% or more is 1 and 0 otherwise, and the investment in financial assets profit of 10% or more is 1 and 0 otherwise. The results of Columns (1) and (2) in Table 15 show that financial education significantly contributes to the likelihood of an investor's profit of 10% or more. For the explanatory variables, we apply another Financial Education Index synthesized by the coefficient of variation method as a proxy variable for financial education, and use the average number of times an investor bought and sold stocks before 2020 to measure investment experience. The estimation results of the Oprobit model show that the coefficient of financial education is still significantly positive, and the more practical experience an investor has in the financial market, the higher the probability of obtaining positive returns. In summary, it can be concluded that the regression conclusions of our basic model are not affected by the choice of variables and the regression estimates are robust.

Table 15: Robustness tests with replacement of key variables

	(1)	(2)	(3)	(4)
	Probit	Probit	OProbit	OProbit
	stock investment profit of 10% or more	financial assets investment profit of 10% or more	stock investment profit	financial assets investment profit
Financial Education Index	0.0945***	0.0665***	0.432***	0.151***
	(0.0065)	(0.0070)	(0.0271)	(0.0195)
moderate experienced	0.174***	0.0325**		
	(0.0121)	(0.0133)		
experienced	0.275***	0.0940***		
	(0.0123)	(0.0141)		
average number of transactions			0.0083	0.0272***
			(0.0055)	(0.0055)
whether to control for other variables	YES	YES	YES	YES
Observations	7627	7627	7627	7627
R^2/Pseudo R^2	0.0974	0.0552	0.0169	0.0162

Note: *, **, and *** indicate significant at the 10%, 5%, and 1% levels, respectively.

5 Conclusion

Based on data from CIFES (2020) and investor transaction data, we investigate the impact of financial education on investment performance and analyze the mechanism from the perspectives of asset allocation and investment strategy. The study shows that, first, financial education significantly improves investors' returns on both stock and financial asset investment, and relatively experienced investors have a higher likelihood of profitability. Second, from the perspective of the asset allocation, investors with higher levels of financial education increase stock and financial asset investment returns by reducing the singleness of stock holdings and increasing the diversification of financial assets. From the perspective of the investment strategy, financial education will reduce investors' trend-chasing tendency and increase the likelihood of choosing passive strategies, which promotes high investment returns. Finally, investors with a awareness of long-term financial education also have a higher likelihood of achieving positive returns.

6. Limitations and Directions for Future Research

We provide an exploratory study of the effectiveness of financial education and draws some meaningful conclusions, but there are still limitations that remain to be improved in future research.

First, the construction of Financial Education Index in our study may not be refined enough. For example, this index may also involve the frequency of investors receiving relevant services provided by different financial education institutions. Scholars may include the frequency of investors receiving financial education from different institutions such as financial institutions, national education system, and third-party organizations in the factor analysis. In addition, researchers can consider designing a questionnaire to ask investors how much money they spend on financial education courses, so as to calculate the proportion of financial education investment in personal income in a more detailed way, thus making the index more complete.

Second, it is difficult for micro-empirical evidence from cross-sectional data to truly

overcome the endogeneity problem prevalent in social science research. Although we empirically employ the instrumental variable method to mitigate the impact of endogeneity on the estimation, it is limited by the data obtained from the questionnaire survey, and our study only adopt the cross-sectional data of the year 2020. On the premise of improved data availability, researchers may consider using the panel data.

Furthermore, the heterogeneity analysis in our study does not focus on group differences, and researchers can further categorize and stratify different groups to explore the heterogeneous impact of financial education on different groups and compare the cost-benefit of financial education with potential alternatives, such as financial advice and targeted regulation.

Finally, we carry out mechanism analysis from the perspective of asset allocation and investment strategy, and to a certain extent ignore the impact of financial education on other financial behaviors of investors, such as over-trading behavior, disposal effect, etc. Researchers can consider carrying out mechanism analysis from the perspective of other investment behaviors. In addition, our study also ignores the role of financial education in preventing systemic financial risk to some extent, and future research can be conducted in this direction.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Conflict of Interest Disclosure

There is no potential conflict of interest.

References

[1] Carlin, B., Olafsson, A., & Pagel, M. (2023). Mobile apps and financial decision making. Review of Finance, 27(3), 977-996.

[2] LU Xiaomeng, ZHANG Yong, PAN Li. Shareholding cycles and stock profitability: Evidence from China's A-share market[J]. Statistical Research, 2020, 37(04):32-45.

[3] Lusardi, A. (2019). Financial literacy and the need for financial education: evidence and implications. Swiss Journal of Economics and Statistics, 155(1), 1-8.

[4] McCormick, M. H. (2009). The effectiveness of youth financial education: A review of the literature. Journal of Financial Counseling and Planning, 20(1).

[5] Mandell, L., & Klein, L. S. (2009). The impact of financial literacy education on subsequent financial behavior. Journal of Financial Counseling and Planning, 20(1).

[6] Huston, S. J. (2010). Measuring financial literacy. Journal of consumer affairs, 44(2), 296-316.

[7] Cude, B. J., Chatterjee, S., & Tavosi, J. (2019). Financial knowledge among Iranian investors. International Journal of Consumer Studies, 43(6), 503-513.

[8] Sekita, S. (2011). Financial literacy and retirement planning in Japan. Journal of Pension Economics & Finance, 10(4), 637-656.

[9] YIN Zhichao, SONG Quanyun, WU Yu. Financial knowledge, investment experience and household asset choice[J]. Economic Research,2014,49(04):62-75.

[10] Campbell, J. Y. (2006). Household finance. The journal of finance, 61(4), 1553-1604.

[11] Organisation for Economic Co-operation and Development. (2005). Improving financial literacy: Analysis of issues and policies. OECD Publishing.

[12] Gaudecker, H. M. V. (2015). How does household portfolio diversification vary with financial literacy and financial advice?. The Journal of Finance, 70(2), 489-507.

[13] Dewi, V. I., Febrian, E., Effendi, N., Anwar, M., & Nidar, S. R. (2020). Financial literacy and its variables: The evidence from Indonesia. Economics & Sociology, 13(3), 133-154.

[14] Behrman, J. R., Mitchell, O. S., Soo, C. K., & Bravo, D. (2012). How financial literacy affects household wealth accumulation. American Economic Review, 102(3), 300-304.

[15] Arianti, B. F. (2018). The influence of financial literacy, financial behavior and income on investment decision. Economics and Accounting Journal, 1(1), 1-10.

[16] Smith, A. (1776). An inquiry into the nature and causes of the wealth of nations: Volume One. London: printed for W. Strahan; and T. Cadell, 1776..

[17] Mason, C. L. J., & Wilson, R. M. S. (2000). Conceptualising fi-financial literacy. Occasional paper, 7.

[18] Ouachani, S., Belhassine, O., & Kammoun, A. (2021). Measuring financial literacy: A literature review. Managerial Finance, 47(2), 266-281.

[19] Borden, L. M., Lee, S. A., Serido, J., & Collins, D. (2008). Changing college students' financial knowledge, attitudes, and behavior through seminar participation. Journal of family and economic issues, 29, 23-40.

[20] Son, J., & Park, J. (2019). Effects of financial education on sound personal finance in Korea: Conceptualization of mediation effects of financial literacy across income classes. International journal of consumer studies, 43(1), 77-86.

[21] Lusardi, A., Michaud, P. C., & Mitchell, O. S. (2017). Optimal financial knowledge and wealth inequality. Journal of political Economy, 125(2), 431-477.

[22] Lusardi, A., Michaud, P. C., & Mitchell, O. S. (2020). Assessing the impact of financial education programs: A quantitative model. Economics of Education Review, 78,

101899.

[23] Varcoe, K., Martin, A., Devitto, Z., & Go, C. (2005). Using a financial education curriculum for teens. Journal of Financial Counseling and Planning, 16(1).

[24] Mangrum, D. (2022). Personal finance education mandates and student loan repayment. Journal of Financial Economics, 146(1), 1-26.

[25] Zhu, T., & Xiao, J. J. (2022). Consumer financial education and risky financial asset holding in China. International Journal of Consumer Studies, 46(1), 56-74.

[26] Rothwell, D. W., & Wu, S. (2019). Exploring the relationship between financial education and financial knowledge and efficacy: Evidence from the Canadian Financial Capability Survey. Journal of Consumer Affairs, 53(4), 1725-1747.

[27] Baulkaran, V. (2022). Personal bankruptcy and consumer credit delinquency: The case of personal finance education. International Review of Financial Analysis, 81, 102098.

[28] Urban, C., Schmeiser, M., Collins, J. M., & Brown, A. (2020). The effects of high school personal financial education policies on financial behavior. Economics of Education Review, 78, 101786.

[29] Lee, J., Lee, K., & Oh, F. D. (2023). International portfolio diversification and the home bias puzzle. Research in International Business and Finance, 64, 101807.

[30] Talpsepp, T., Liivamägi, K., & Vaarmets, T. (2020). Academic abilities, education and performance in the stock market. Journal of Banking & Finance, 117, 105848.

[31] Spulbăr, C., GORUN, T. H., BIRĂU, R., CĂLUGĂRU, T., OLUWI, V., ZULFIQAR, I. A., ... & Minea, L. E. (2021). Diversification opportunities in European stock markets and their impact on textile industry development based on a financial education approach. Industria Textila, 72(5), 528-537.

[32] Xiao, J. J., & O'Neill, B. (2016). Consumer financial education and financial capability. International Journal of Consumer Studies, 40(6), 712-721.

[33] Maldonado, J. E., De Witte, K., & Declercq, K. (2022). The effects of parental involvement in homework: two randomised controlled trials in financial education. Empirical Economics, 62(3), 1439-1464.

[34] Kozup, J., & Hogarth, J. M. (2008). Financial literacy, public policy, and consumers' self-protection—More questions, fewer answers. Journal of Consumer Affairs, 42(2), 127-136.

[35] Willis, L. E. (2008). Against financial-literacy education. Iowa L. Rev., 94, 197.

[36] Fünfgeld, B., & Wang, M. (2009). Attitudes and behaviour in everyday finance: evidence from Switzerland. International Journal of Bank Marketing, 27(2), 108-128.

[37] Abad-Segura, E., & González-Zamar, M. D. (2019). Effects of financial education and financial literacy on creative entrepreneurship: A worldwide research. Education

Sciences, 9(3), 238.

[38] Willis, L. E. (2011). The financial education fallacy. American Economic Review, 101(3), 429-434.

[39] Hastings, J. S., Madrian, B. C., & Skimmyhorn, W. L. (2013). Financial literacy, financial education, and economic outcomes. Annu. Rev. Econ., 5(1), 347-373.

[40] Fernandes, D., Lynch Jr, J. G., & Netemeyer, R. G. (2014). Financial literacy, financial education, and downstream financial behaviors. Management science, 60(8), 1861-1883.

[41] Singh, R. (2018). Economic Efficiency. Singh R.(2018) Economic Efficiency. In: Marciano A., Ramello G.(eds) Encyclopedia of Law and Economics. Springer, New York, NY. https://doi.org/10.1007/978-1-4614-7883-6_206-1.

[42] Betti, G., Dourmashkin, N., Rossi, M., & Ping Yin, Y. (2007). Consumer over-indebtedness in the EU: measurement and characteristics. Journal of economic studies, 34(2), 136-156.

[43] Xiao, J. J., & Porto, N. (2019). Financial education and insurance advice seeking. The Geneva Papers on Risk and Insurance-Issues and Practice, 44, 20-35.

[44] Delavande, A., Rohwedder, S., & Willis, R. J. (2008). Preparation for retirement, financial literacy and cognitive resources. Michigan Retirement Research Center Research Paper, (2008-190).

[45] Roodman, D. (2011). Fitting fully observed recursive mixed-process models with cmp. The Stata Journal, 11(2), 159-206.

[46] Dolvin, S. D., & Templeton, W. K. (2006). Financial education and asset allocation. Financial Services Review, 15, 133.

[47] Giofré, M. (2017). Financial education, investor protection and international portfolio diversification. Journal of international money and finance, 71, 111-139.

[48] De Bondt, W. P. (1993). Betting on trends: Intuitive forecasts of financial risk and return. International Journal of forecasting, 9(3), 355-371.

[49] Pandeng, Shi Donghui, Cao Min. An empirical study on the adoption of stock price trend trading strategies by Chinese individual investors[J]. Journal of World Economy, 2003, 026(011):71-77.

[50] De Long, J. B., Shleifer, A., Summers, L. H., & Waldmann, R. J. (1990). Positive feedback investment strategies and destabilizing rational speculation. the Journal of Finance, 45(2), 379-395.

[51] Cohen, G., & Cabiri, E. (2015). Can technical oscillators outperform the buy and hold strategy?. Applied Economics, 47(30), 3189-3197.