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Financial Literacy, Fintech, and Risky Financial Investment in Urban Households—An Analysis Based on CHFS Data

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Abstract: In recent years, China's financial markets have come under increasing scrutiny. In order to explore the impact of financial literacy on urban household investment in the risk financial market, this paper used the micro-data of the 2019 China Household Finance Survey (CHFS) to start from two perspectives: household risk financial investment and the number of investment financial products, namely the breadth of investment. By constructing a probit model and ordered probit model for empirical analysis, the main conclusions are as follows. Benchmark regression results show that the improvement of financial literacy can significantly promote urban households to make risky financial investments and can significantly broaden the types of risky financial investments. Based on the IV-probit model and two-stage least square method, the endogeneity test using the economic and financial information attention degree as the instrumental variable showed that the model results were credible. The robustness test showed that the model results were basically correct. Furthermore, the mechanism analysis found that the use of fintech played an intermediary effect in the process of financial literacy affecting urban household risky financial investment and the amount of investment. This indicates that the improvement of financial literacy can improve the probability of using fintech, thus promoting the household risky financial investment behavior. Heterogeneity analysis based on risk attitude showed that financial literacy had a greater effect on the improvement in the risky financial investment behavior of risk-inclined families, followed by risk-neutral families, and had the least effect on risk-averse families. The research conclusions of this paper are of practical significance to solve the problems related to urban household financial market investment. Therefore, this paper puts forward some suggestions for reference, especially in terms of financial education and the digital economy.

Keywords: financial literacy; urban families; risky financial investment; financial technology

MSC: 91G15

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1. Introduction

In recent years, China's economy has developed rapidly, and more and more attention has been paid to high-quality economic development [1]. During the ongoing economic development, the financial market has garnered increasing attention, particularly following the 2008 financial crisis. A significant number of residents have begun to focus more on the financial market, leading to a rising trend in investments. Engaging in the financial market is crucial for fostering economic growth and enhancing income equality [2,3]. Participation in the financial market improves the level of household wealth [4] and improves people's well-being. At present, the financial markets widely participated in by residents mainly include stocks, funds, bonds, financial markets, etc. Taking stocks as an example, according to the report data of the 2023 China Statistical Yearbook released by the National Bureau

of Statistics, there are 5079 listed companies in the Shanghai and Shenzhen stock markets and the Beijing Stock Exchange in 2022, an increase of 382 compared with 2021, and their trading volume has continuously improved in the five years from 2018 to 2022. However, at present, the participation of residents in financial market investment also has problems such as single investment types [5] and unbalanced regional development. According to the 2019 CHFS survey data, among the households with financial market investment behavior, 67% of households invest in only one financial product.

Financial literacy measures the residents' mastery and understanding of financial knowledge. Certain scholars have described financial literacy as the financial competencies that individuals should have, emphasizing the necessity of acquiring pertinent financial information and knowledge as well as the ability to apply this understanding to financial management and related activities. [6]. The U.S. Financial Literacy and Education Commission, along with the OECD, has indicated that financial literacy encompasses both the capability and the awareness to utilize financial knowledge for managing financial resources and optimizing financial well-being. The popularization of financial literacy has become a global trend, and governments around the world have expressed their commitment to continuously improve their citizens' financial literacy in order to improve the country's overall financial situation [7]. With the continuous improvement of China's financial system, the financial literacy of Chinese residents has also been further improved, according to the 2019 Consumer Financial Literacy Survey and Analysis Report released by the People's Bank of China, where 39.13% of consumers think their level of financial knowledge is "very good" or "relatively good", which is an increase of 3.73 percentage points compared with 35.27% in 2017, indicating that Chinese residents' self-perception and confidence in financial literacy are gradually improving.

The household sector is the basic unit of social and economic activities [8], and it is also an important individual to make financial decisions. Its financial behavior affects the asset allocation of households and investment decisions on financial products. In addition, improving the financial knowledge of household heads can significantly alleviate the financial vulnerability of households [9]. The significance of studying urban household risky financial investment lies in that, on the one hand, urban households may be more willing to invest in financial products than rural areas due to their location advantages, resource access advantages, and other reasons, and new-type urbanization is a trend of China's development [10]. From the CHFS data, 17% of urban households invest in the financial market and less than 2% of rural households. This means that compared with rural households, urban households are more willing to invest in financial products. Urban households are the main force of financial market participation. On the other hand, holding risky financial assets can be said to be an ideal financial behavior, which contributes to the financial status of consumers [11]. An improved financial situation also affects the residents' happiness. In addition, it can be seen from the above data that the residents' financial literacy has gradually improved in recent years, and their willingness to engage in risky financial investment has increased. With the development of the digital economy, the emergence of financial technology has a more complex impact on family financial behavior. Therefore, there may be a certain relationship between financial literacy and urban household venture financial investment, and fintech may play an important role in its development, which needs to be further verified.

Most of the previous studies have focused on rural areas, and few studies have combined the three concepts of financial literacy, fintech, and urban household venture financial investment. Thus, the innovations and contributions of this paper are as follows. First, the behavior of urban households participating in risky financial investment is measured from the two perspectives of risky financial investment and investment breadth. Second, this paper takes urban residents as the research object. Previous studies have mainly focused on the participation of all residents and rural households in the financial market, and there have been few studies on urban households, which are more convenient to participate in risky financial investment. The third is to consider fintech as an intermediary

variable to study the new impact of finance on the residents' financial participation under the empowerment of a digital economy.

2. Literature Review and Research Framework

2.1. Literature Review

For a long time, information access, credit constraints, and other reasons have been considered to be important factors affecting households financially [12,13]. Scholars have conducted many studies on the factors affecting family financial market participation, and the existing studies mainly include the following factors affecting family financial market investment. From the perspective of the investors themselves, trust is a key factor in financial market participation. Investors with a higher level of trust are more likely to invest in the financial market [14]. There is a nonlinear relationship between happiness and the probability of financial market participation. With the increase in self-reported happiness indicators, the likelihood of participation in a risky financial market increases [15], and the intention to buy a house also has a significant positive impact on household participation in the financial market [16]. Social networking constitutes a pivotal element influencing familial engagement in risky financial investments, with evidence demonstrating a positive correlation between social interaction and the extent of family participation in volatile financial markets [17]. An elevated social network index value markedly enhances the likelihood of household engagement within the market, along with the percentage of risky assets maintained within both formal and informal financial sectors [18]. Financial liberalization, propelled by the wealth effect, markedly enhances the likelihood of household engagement in the financial market. Subsequently, the entities augment their investments in riskier assets [19].

The above research results are all from factors other than financial literacy, and at this stage, the research on financial literacy and family financial market participation has also achieved many results. At this stage, some scholars around the world have studied the impact of financial literacy on household financial market investment from different perspectives, mainly including the level of financial knowledge, which can significantly affect the financial decisions of households [20]. After participating in a financial knowledge program, the financial planning scores of participants will be significantly improved [21]. Although the net wealth of households is the main driver for investing in risky assets, financial literacy plays a significant role [22], especially with respect to the stock market. Financial knowledge plays an important role in participation in the stock market [23]. Using the data of nine European countries, scholars have found that financial knowledge has a positive and significant impact on participation in the stock market [24]. Data studies from Japan show that high financial knowledge tends to improve stock market participation, but households with high financial knowledge do not necessarily hold a high proportion of financial assets [25]. Moreover, researchers discovered from data in Vietnam that individuals with a high degree of financial knowledge, particularly those with advanced understanding, are more likely to engage in the financial market. Conversely, those with only basic financial knowledge are inclined to withdraw from it. A statistically significant negative correlation was observed between basic financial knowledge and participation in the financial market. [26]. Some scholars have divided financial literacy into subjective and objective aspects. Subjective and objective financial knowledge have a significant impact on risky investment intention, while only objective financial knowledge seems to affect behavior [27,28]. Using data from Italy, scholars found that objective financial knowledge has a positive and significant impact on financial market participation and preference for ethical financial companies [29]. In addition, Mudzingiri C found that financial literacy confidence has a significant impact on financial risk appetite confidence [30].

This paper puts the research perspective on China, so pays more attention to the research results of China-related issues. Through the research of the existing literature, the relationship between financial literacy, financial technology, and household venture financial investment was identified, and a research hypothesis was made.

Many scholars have carried out a lot of research based on the situation in China. As for the relationship between financial literacy and household risky financial investment, studies have shown that there is an inconsistency between risk appetite and risky behavior; however, financial knowledge will affect this inconsistency [31]. By combing through the existing research literature, we found that there may be a close relationship between financial literacy and household risky financial investment. Existing studies have found that households with stronger financial planning ability are more likely to invest in the financial market and hold a larger proportion of risky financial assets [32]. Financial knowledge significantly increases household investment in risky assets (Li J et al., 2020) [33]. Consumers with higher financial knowledge are more likely to hold risky financial assets than those with lower financial knowledge [34]. For common types of financial assets, for example, stock and financial products, etc., financial literacy overconfidence is positively correlated with stock market participation [35], and financial literacy also has a significant positive impact on the selection of financial products and the total retirement financial assets [36]. For both urban and rural families, the influence of financial literacy on family risky financial investment is established. For rural families, financial literacy has a positive impact on the market participation of Chinese rural families [37]. Financial literacy also significantly improves the probability of Chinese urban households participating in the financial market [38]. In addition, Huichun H et al. found that the underestimation of financial knowledge had a negative impact on the respondents' financial market participation. However, overestimation had no significant impact on the respondents' participation in the financial market [39]. Fei S et al. found that financial literacy is an important factor to improve family health investment participation [40]. Based on this, we believe that there is a strong relationship between financial literacy and household risky financial investment. Thus, this paper puts forward the following hypothesis:

Hypothesis 1. *Financial literacy can promote urban households to make risky financial investments*.

Hypothesis 2. *Financial literacy can broaden the scope of urban households' risky financial investment*.

In the existing studies, scholars have found some mediating factors that financial literacy affects family risk financial investment including the following. The improvement of financial literacy significantly increases the family's demand for risky assets; enhancing financial literacy can reduce household liquidity constraints and mitigate the influence of liquidity constraints on household risk assets [41], in which the Internet also plays an intermediary role [42]. In recent years, digital financial services have developed rapidly [43]. Digital finance is an emerging industrial form that integrates advanced technology with financial services [44]. Marszk A and Lechman E (2021) plan to adopt the new technology to shape the financial market, called a "digital financial market" [45]. Here, fintech, represented by Internet payments, online banking, and other technologies, plays an important role in financial stability and other economic aspects [46,47]. In particular, the development of digital financial inclusion is driving economic development [48] and has a great influence on household participation in financial market investment [49]. As for the intermediary role played by fintech in the process of financial literacy affecting household risky financial investment, domestic research at this stage has mainly focused on two aspects. First, the enhancement of financial literacy can notably boost the residents' utilization of digital financial products such as mobile payments, online lending, and online financial products [50,51]. This suggests that improving financial literacy can drive the use of fintech. Second, the digital economy has significantly improved the participation rate of urban households in the financial market [52]. In particular, the use of digital finance has promoted residents to invest in risky financial markets such as stocks [53,54]. This shows that the use of fintech can promote urban households to make risky financial investments. It can be seen from the review of the existing literature that financial literacy has a significant impact on the use of financial technology, and the use of financial technology will have an

impact on household venture financial investment. Based on this, this paper puts forward the following hypothesis:

Hypothesis 3. *Financial literacy promotes risky financial investments by urban households by promoting the use of fintech.*

To sum up, there are many studies on the impact of financial literacy on family financial market investment in the existing literature. However, there is still a lack of literature on the impact of financial literacy on family risk financial investment, especially for urban households, which is exactly what this paper contributes.

2.2. Research Framework

Based on the weaknesses of the existing studies, this paper used 2019 CHFS data to empirically analyze the impact of financial literacy on urban household risky financial investment by constructing relevant econometric models.

The overall framework of the paper is as follows. Section 2 presents the research framework by sorting through the relevant literature. Section 3 describes the research design, which encompasses variable selection and model construction. Section 4 analyzes the empirical results, while Section 5 summarizes the conclusions of the entire paper and offers relevant suggestions. The core research framework of this paper can be represented by Figure 1, which shows the relationship between the core explanatory variables, mediating variables, and explained variables, which is the research content of this paper.

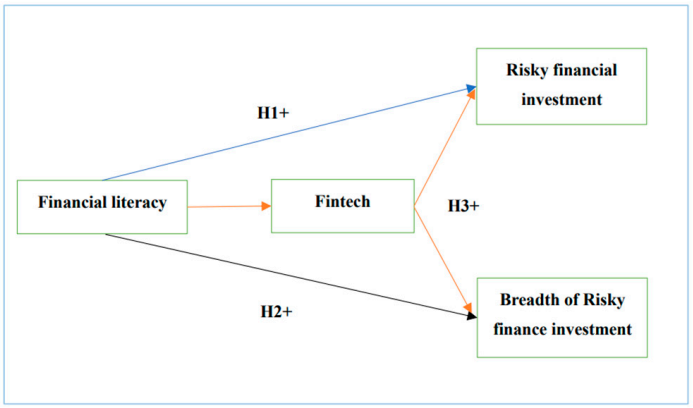


Figure 1. Core research framework.

3. Research Design

3.1. Data Source and Sample Selection

The data utilized in this paper came from the 2019 China Household Finance Survey (CHFS). The survey intends to apply modern survey techniques and management approaches via scientific sampling and gathers information on household assets, liabilities, income and expenditure, social security, and insurance across the country, providing high-quality micro-data for researchers both at home and abroad who are engaged in studying issues related to China. Since 2019 is the latest survey, it provides data support for this paper.

For the sample selection, we first removed samples with missing values of relevant variables. Then, this paper selected the sample of urban households with the head of household between 16 and 80 years old, and finally obtained a valid sample size of 15,309.

3.2. Variable Selection and Descriptive Statistics

3.2.1. Explained Variables

This paper defines urban household risky financial investment from two perspectives, one is whether to participate in risky financial investment, and the other is the amount

of risky financial investment, that is, the breadth of risky financial investment (BRFI) (refer to the existing studies [55,56]). Based on the characteristics of the CHFS data and combined with the relevant situation of the residents' participation in risky financial market investment in real life, this paper defined the behavior of participating in four kinds of financial products, namely stocks, funds, financial products, and financial derivatives as risky financial investment. In addition, for risky financial investment, households that invested in any of the above financial products were defined as participating in risky financial investment and assigned a value of 1; households that did not participate in risky financial investment were assigned a value of 0. For the BRFI, the number of financial product investments that households participated in was defined as the breadth of risky financial investment, whose value ranged from 0 to 4. The larger the number, the greater the number of risky financial product investments that households participated in.

3.2.2. Core Explanatory Variables

The core explanatory variable of this paper was financial literacy, and the financial literacy of the head of the household was selected as the representative of the household. The CHFS questionnaire included an overall understanding of stocks, funds, and bonds, a survey of the respondents' financial knowledge about bank interest rate, inflation rate and interest rate, and their understanding of financial products. If the answer was "very well understood" and "relatively well understood", it was marked as 1; otherwise, it was marked as 0. For relevant knowledge, if the answer was correct, it was marked as 1; otherwise, it was 0. The scores of these questions were added together to define the financial literacy of residents, and the value was 0–3. The larger the value, the higher the financial literacy. This was similar to the definitions used in most of the previous studies.

As shown in Figure 2, the average financial literacy of urban households at the county level had a certain linear relationship with the average participation rate and investment breadth of risky financial investment, indicating that there is a certain correlation between the two, but further verification is still needed.

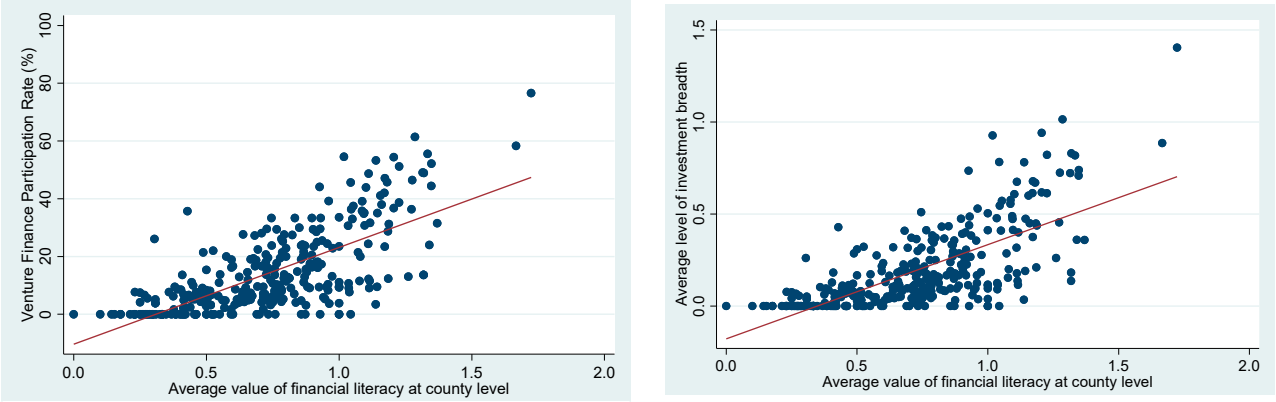


Figure 2. Relationship between financial literacy and risky financial investment in urban households at the county level.

3.2.3. Control Variables

The control variables in this paper were selected from the three levels of household head, household, and region. At the level of household head, seven variables including age, marital status, and health status were selected, and at the level of household, eight variables including family assets, consumption, and housing were selected. For regional variables, they were divided into the eastern, central, and western regions according to the provinces where the families were located. According to the administrative division of China, the eastern region includes Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, and Hainan; the central region includes Shanxi, Anhui, Jiangxi, Henan, Hubei, and Hunan; the western region includes Inner Mongolia, Guangxi,

Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang; Northeast China includes Liaoning, Jilin and Heilongjiang. In this paper, the northeast region was integrated into the eastern region for analysis. The names and assignments of the relevant control variables are shown in Table 1.

Table 1. Definition and description of the control variables.

	Variable Name	Variable Meaning
Household variable	Entrepreneurship	Household entrepreneurship = 1, others = 0
	Total household assets	Total household assets
	Total household income	Total household income of the previous year
	Total household consumption	Total household consumption
	Number of houses	The number of houses owned by households
	New housing	New homes purchased or newly built in the last two years = 1, others = 0
	Social network	Households have social networks = 1, others = 0
Household head variable	Age	Age of head of household
	Age squared	Age square Age of head of household squared/100
	Educational level	The lowest level of education is never attended school, the highest is a doctoral student, the greater the value of the higher the level of education
	Be married	Married = 1, others = 0
	Party member	Party members = 1, others = 0
	Health status	Good health = 1, others = 0
	Commercial insurance	Commercial insurance = 1, other = 0
Regional variable	Eastern region	Eastern region = 1, others = 0
	Central region	Central region = 1, others = 0
	Western region	Western region = 1, others = 0

3.2.4. Mediating Variables

The intermediary variable in this paper was the use of financial technology. The CHFS questionnaire included questions related to household online shopping and Internet financial management. In addition, it also included "Does your family open third-party payment accounts such as Alipay, Wechat Pay, Jingdong Online banking wallet, and Baidu Wallet?" That is, regarding whether to use a third-party payment account, if the family had any behavior of online shopping, Internet banking, and opening a third-party payment account, it was considered as using financial technology and the value was 1; otherwise, the value was 0.

3.2.5. Descriptive Statistics of Variables

The descriptive statistics of the relevant variables used in this paper are shown in Table 2. In terms of the explanatory variables and explained variables, 18.2% of urban households had risky financial investment behaviors, and the amount of risky financial products invested by each household was different. There were households with no investment and those with all four kinds of products invested, and the average value of family financial knowledge in the sample used was low. In terms of intermediary variables, 69.2% of households had fintech behavior. In terms of the control variables, at the family level, 14.1% of families have entrepreneurial behavior, and there were large differences among families in terms of total household assets, total income, and total consumption. On average, each family owned more than one house, 35.2% of families had a car, 68.1% of families had a social network, and there were differences in the household head level and household head education level. A total of 87.3% of all households had a married head and 21.7% had a Party member as their head. The average health status was low. A total of 53.9% of all households lived in the eastern region, 19.2% in the central region, and 26.9% in the western region.

Table 2. Descriptive statistics of variables.

Variables	Mean Value	Standard Deviation	Minimum Value	Maximum Value
Risky financial investment	0.182	0.386	0	1
BRFI	0.256	0.602	0	4
Financial literacy	0.798	0.846	0	3
Financial technology	0.692	0.462	0	1
Entrepreneurship	0.141	0.349	0	1
Total household assets	1,748,143	6,493,045	760	734,000,000
Total household income	99,635.91	506,033	1	60,000,000
Total household consumption	96,462.06	106,772.1	2264	2,663,462
Number of houses	1.276	0.563	1	10
New housing	0.020	0.138	0	1
Own car	0.352	0.478	0	1
Social network	0.681	0.466	0	1
Age	53.947	13.059	16	80
Age squared	30.808	13.961	2.56	64
Educational level	3.962	1.715	1	9
Be married	0.873	0.333	0	1
Party member	0.217	0.412	0	1
Health status	0.455	0.498	0	1
Commercial insurance	0.136	0.343	0	1
Eastern region	0.539	0.498	0	1
Central region	0.192	0.394	0	1
Western region	0.269	0.443	0	1

3.2.6. Matrix of Correlation Coefficients of Major Variables

Table 3 shows the correlation coefficients among the core explanatory variables, explained variables, and intermediary variables obtained by the Pearson test. The Pearson test can be used to test the correlation between variables. In the test results of this paper, "***" represents significant at the significance level of 1%. From the results, several core variables were positively correlated at the significance level of 1%, indicating that there was a strong correlation among several variables. Therefore, it can be preliminarily concluded that it is feasible to use the econometric model to study the relationship between them. In addition, in order to prevent the multicollinearity problem, this paper conducted a multicollinearity test, where the VIF of the main variables was less than 10, indicating that there was no multicollinearity problem.

Table 3. Pearson correlation tests among several major variables.

	Risky Financial Investment	BRFI	Financial Literacy	Financial Technology
Risky financial investment	1	—	—	—
BRFI	0.9009 ***	1	—	—
Financial literacy	0.3253 ***	0.3350 ***	1	
Financial technology	0.1907 ***	0.1834 ***	0.2490 ***	1

Note: *** represents significant at the significance level of 1%.

3.3. Model Settings

3.3.1. Probit Model

Since participation in risky financial investment is a binary dummy variable, traditional OLS estimates are biased. Thus, according to most studies, probit regression is adopted for the empirical analysis of this explained variable, and its model is set as follows:

$$Y_i = 1(\alpha + \beta S_i + \gamma X_i + \mu_i > 0) \quad (1)$$

$$y_i^* = \alpha + \beta S_i + \gamma X_i + \mu_i \tag{2}$$

$$\mu_i \sim N(0, \sigma^2) \tag{3}$$

$$y_i = \begin{cases} 1 \; if \; y_i^* > 0 \\ 0 \; if \; y_i^* \leq 0 \end{cases} \tag{4}$$

where Y_i is the explained variable including the risk financial investment and risk financial investment breadth. y_i^* represents the latent variable, when y_i^* greater than 0, the explained variable y_i value is 1, and when y_i^* is less than or equal to 0, the explained variable y_i value is 0. S_i is the core explanatory variable, that is, financial literacy. X_i is the control variable, and μ_i is the random error term and follows the normal distribution.

3.3.2. Ordered Probit Model

The explained variable risk financial investment breadth is an ordered variable with a value ranging from 0 to 4. Therefore, for the demonstration of this explained variable, referring to the study of Zhang C et al. [57], the ordered probit model was adopted, that is, the ordered probit model, which was set as follows. Although the model has some limitations, it is suitable for the study in this paper.

$$Y_i = F(\alpha_1 S_i + \alpha_2 + X_i + \varepsilon_i) \tag{5}$$

where Y_i represents the explained variable, S_i represents the core explanatory variable, X_i represents the control variable, α_1 and α_2 are the coefficients to be estimated, ε_i is the random disturbance term, and $F(\cdot)$ is a nonlinear function, and its specific expression is:

$$F(Y_i) = \begin{cases} 0, & Y_i^* \leq r_0 \\ 1, & r_0 < Y_i^* \leq r_1 \\ 2, & r_1 < Y_i^* \leq r_2 \\ 3, & r_2 < Y_i^* \leq r_3 \\ 4, & Y_i^* > r_3 \end{cases} \tag{6}$$

where $r_0 < r_1 < r_2 < r_3$ denotes the tangent point, and all represent parameters to be estimated. When Y_i^* is below the threshold r_0, it means that households are not investing in risky finance. Therefore, when Y_i^* is higher than r_3, it means that households are investing in four risky financial products. Y_i^* is the unobserved continuous variable behind Y_i, which is called the latent variable of the investment breadth of urban household risk finance, satisfying the following formula:

$$Y_i^* = \alpha_1 S_i + \alpha_2 X_i + \varepsilon_i \tag{7}$$

where Y_i^* is the latent variable of the risky financial investment breadth of the i urban household, which is used to derive the maximum likelihood estimator, and there is a certain quantitative relationship with Y_i. The definition of other variables is consistent with Formula (5).

4. Empirical Results and Analysis

4.1. The Impact of Financial Literacy on Urban Household Risk Financial Investment

Table 4 reports the empirical results of the impact of financial literacy on urban household risky financial investment. The results in column (1) of the table show that the improvement of financial literacy can positively promote urban household risky financial investment at the significance level of 1%; the results in column (2) show that financial literacy can promote the breadth of urban household risky financial investment at the significance level of 1%. The higher the financial literacy, the greater the number of risky financial products that households invest in. The result shows that it is necessary to take

measures to improve the residents' financial literacy for the development of a risk financial market. Therefore, hypothesis 1 and hypothesis 2 were tested.

Table 4. Influence of financial literacy on urban household risky financial investment.

Variables	Risky Financial Investment (1) Probit Model	BRFI (2) Ordered Probit Model
Financial literacy	0.340 ***	0.349 ***
	(0.017)	(0.016)
Entrepreneurship	−0.209 ***	−0.219 ***
	(0.042)	(0.040)
ln (total household assets)	0.427 ***	0.425 ***
	(0.018)	(0.017)
ln (total household income)	0.108 ***	0.110 ***
	(0.018)	(0.017)
ln (total household consumption)	0.070 ***	0.066 ***
	(0.025)	(0.023)
Number of houses	−0.039	−0.032
	(0.024)	(0.022)
New housing	0.046	0.013
	(0.087)	(0.080)
Own car	−0.038	−0.050
	(0.034)	(0.032)
Social network	0.239 ***	0.223 ***
	(0.033)	(0.031)
Age	0.057 ***	0.055 ***
	(0.008)	(0.008)
Age squared	−0.043 ***	−0.042 ***
	(0.008)	(0.007)
Educational level	0.111 ***	0.102 ***
	(0.010)	(0.010)
Be married	−0.142 ***	−0.152 ***
	(0.045)	(0.042)
Party member	−0.011	−0.008
	(0.034)	(0.031)
Health status	−0.050 *	−0.048 *
	(0.029)	(0.027)
Commercial insurance	0.414 ***	0.384 ***
	(0.036)	(0.033)
Regional control variables	Controlled	Controlled
LR chi2	3983.16 ***	4257.86 ***
Pseudo R^2	0.2748	0.2239
Observed value	15,265	15,265

Note: *** and * are significant at the significance level of 1% and 10%, respectively, and figures are the standard errors reported in brackets.

In addition, the relevant control variables also had an impact on urban household risky financial investment. Families who start businesses will significantly inhibit their risky financial investment behavior. The reason may be that families who start businesses need a large amount of capital, so they will be less willing to invest their capital in risky financial products. The total household assets, total household income, and total household consumption will all promote households to make risky financial investments at the significance level of 1%, that is to say, the richer the family, the more likely it is to make risky financial investments. Social networks will significantly promote urban households to make risky financial investments. Social networks enable families to have wider channels to obtain relevant investment information and financial support, so the greater the possibility of risky financial investment, and the higher the education level of the household head, the greater the possibility of risky financial investment of the family. The age squared variable

was significantly negative at the significance level of 1%, indicating there is a nonlinear relationship between age and risky financial investment. As the age of the household head increases, the possibility of participating in risky financial investment increases first. When the age exceeds a certain value, the increase in age will inhibit risky financial investment, the married head of the household will significantly inhibit the family's participation in risky financial market investments, and the probability of the family participating in commercial insurance is higher than that of the family without participation.

4.2. Endogeneity Test

In order to solve the endogeneity problem that may be caused by missing variables and other reasons, this paper used the method of instrumental variables for testing. In the past, scholars used the IV-probit model and two-stage least square method to conduct an endogeneity test. The IV-probit model was used for testing risky financial investment, and the two-stage least square method (2SLS) was used for testing the breadth of risky financial investment. This paper selected the degree of attention to economic and financial information. If residents chose "very concerned" and "very concerned" regarding economic information, they were considered to be concerned about economic and financial information, and the value was 1; otherwise, the value was 0. The basis for the selection of instrumental variables was as follows. On the one hand, attention to economic and financial information will enhance the residents' financial awareness and thus cultivate their financial literacy; on the other hand, attention to economic and financial information is difficult to directly affect risky financial investment, and it may affect investment decisions by affecting the residents' attitude toward risks, investment confidence, and other factors.

Table 5 reports the results of the endogeneity test. According to the results of the IV-probit model, both the F-value and T-value of economic/financial information in the first stage were significant at the significance level of 1%, indicating that there were no weak instrumental variables. In the regression results of the second stage, after adding the instrumental variables, financial literacy could still promote urban household risky financial investment at the significance level of 1%, and the Wald test was significant at the significance level of 1%. Therefore, it is necessary to introduce instrumental variables to solve the endogenous problem. From the results of 2SLS, the results of the first stage showed that there were no weak instrumental variables, and after adding the instrumental variables, the regression results of the second stage showed that the improvement of financial literacy could improve the breadth of urban household risky financial investment at the significance level of 1%. The result of the endogeneity test shows that the model is basically correct.

Table 5. Results of the endogeneity test.

Variables	IV-Probit		2SLS	
	(1)	(2)	(3)	(4)
	The First Stage	The Second Stage	The First Stage	The Second Stage
Financial literacy	—	1.645 *** (0.084)	—	0.657 *** (0.029)
Economic/financial information	0.196 *** (0.006)	—	0.196 *** (0.006)	—
Control variables	Controlled	Controlled	Controlled	Controlled
Stage one F number	251.48 ***		251.48 ***	
Wald test	355.68 ***		—	
Observed value	15,265		15,265	

Note: *** represents significant at the significance level of 1%, and figures are the standard errors reported in brackets.

4.3. Robustness Test

After introducing instrumental variables to solve the possible endogeneity problem, the results of benchmark regression still need to be further tested. The robustness test in this paper was conducted from two aspects. First, the study of replacing the model. The probit model and ordered probit model were replaced by the logit model and ordered logit model, respectively. Second, changing the sample size, by referring to the practice of Chunkai Z et al. to test whether the regression result was robust by reducing the sample size [58]. Generally speaking, participation in risky financial market investment requires certain funds and investment willingness, so young and middle-aged people are more likely to make risky financial investments. Moreover, the estimated coefficient of the control variable age squared in the baseline regression was negative, indicating that with the increase in age, the probability of risky financial investment first increased and then decreased. Therefore, samples below 30 years old and over 60 years old were excluded, and the age of the household head was kept between 30 and 60 years old (this paper believes that most residents in this stage are working). Therefore, the sample of funds involved in financial investment was tested for robustness.

The results of the robustness test are shown in Table 6. Columns (1) and (2) in the table are the estimated results after changing the model. According to the results, after changing the econometric model, financial literacy still significantly promoted the risky financial investment behavior of urban households at the significance level of 1%, and columns (3) and (4) in the table are the results after the reduction in sample size. After removing the sample size, financial literacy still promoted household risky financial investment behavior at a significant level of 1%. The results of the robustness test once again verify that the baseline regression construction was correct.

Table 6. Results of the robustness test.

Variables	Risky Financial Investment	BRFI	Risky Financial Investment	BRFI
	(1)	(2)	(3)	(4)
	Logit Model	Ordered Logit Model	Probit Model	Ordered Probit Model
Financial literacy	0.605 *** (0.030)	0.630 *** (0.029)	0.314 *** (0.021)	0.325 *** (0.020)
Control variables	Controlled	Controlled	Controlled	Controlled
LR chi2	3991.37 ***	4239.01 ***	2543.27 ***	2736.64 ***
Pseudo R^2	0.2754	0.2229	0.2760	0.2250
Observed value	15,265	15,265	9499	9499

Note: *** represents significant at the significance level of 1%, and figures are the standard errors reported in brackets.

4.4. Mechanism Analysis

In order to further explore the mechanism of financial literacy affecting urban household risky financial investment, this paper introduced the intermediary effect identification mechanism and tested fintech as an intermediary variable. According to Baron and Kenny (1986), the identification steps of an intermediary effect are as follows. Step 1: Test whether core explanatory variables significantly affect dependent variables. Step 2: Test whether the core explanatory variable has a significant effect on the mediating variable. Step 3: If the core explanatory variable has significant influence on both the explained variable and the intermediary variable, the intermediary variable is added as the explanatory variable in the regression of the first step. The basis for judging whether there is a mediator effect is as follows: if the regression coefficients of the core explanatory variables and the intermediary variables in the third step are both significantly positive, and the regression coefficients of the core explanatory variables are decreased compared with the

first step, it indicates that the core explanatory variables can influence the explained variables through the intermediary variables, and the intermediary variables play a part of the intermediary effect [59].

In Table 7, columns (1) and (2) are the results of baseline regression, and (3) lists the results of the regression of financial literacy on fintech, that is, the impact of core explanatory variables on intermediary variables in the second step. The results show that financial literacy can promote the use of fintech at the significance level of 1%. Columns (4) and (5) are the regression results after the addition of intermediary variables. According to the results, the use of fintech can positively affect urban household risky financial investment and investment breadth at the significance level of 1%. After the addition of intermediary variables, both household risky financial investment and investment breadth of risky financial investment were affected. Financial literacy still promoted urban household risky financial investment at the significance level of 1%, and its influence coefficient decreased compared with the baseline regression, indicating that fintech plays an intermediary effect in the process of financial literacy affecting urban household risky financial investment. Therefore, hypothesis 3 is confirmed. This shows that thanks to the development of the digital economy, the emergence of financial technology plays an important role in the residents' investment in the venture financial market. This can provide new ideas for the development of financial markets and the participation of residents in the financial market.

Table 7. Results of the mechanism test.

Variables	Risky Financial Investment	BRFI	Financial Technology	Risky Financial Investment	BRFI
	(1)	(2)	(3)	(4)	(5)
	Probit Model	Ordered Probit Model	Probit Model	Probit Model	Ordered Probit Model
Financial literacy	0.340 *** (0.017)	0.349 *** (0.016)	0.232 *** (0.018)	0.327 *** (0.017)	0.336 *** (0.016)
Financial technology	—	—	—	0.387 *** (0.043)	0.386 *** (0.041)
Control variables	Controlled	Controlled	Controlled	Controlled	Controlled
LR chi2	3983.16 ***	4257.86 ***	7455.87 ***	4067.98 ***	4350.54 ***
Pseudo R^2	0.2748	0.2239	0.3954	0.2806	0.2288
Observed value	15,265	15,265	15,265	15,265	15,265

Note: *** represents significant at the significance level of 1%, and figures are the standard errors reported in brackets.

4.5. Heterogeneity Analysis

Based on the residents' risk attitude, this paper analyzed the impact of financial literacy on urban households with different risk attitudes to participate in risky financial investment. According to the questions about the residents' subjective risk attitude in the CHFS questionnaire, households with "high risk" and "high risk" were considered as risk preference, and households with "average risk" were considered as risk neutral. Households that chose "lower risk" as well as "low risk" were considered risk averse.

Table 8 reports the regression results of the heterogeneity analysis. Sections (1) to (3) in the table list the impact of financial literacy on household risk financial investment participation with different risk attitudes, and sections (4) to (6) list the impact of financial literacy on the breadth of household risk financial investment with different risk attitudes. From the results, whether it is for the participation of risky financial investment or the breadth of risky financial investment, financial literacy had the greatest promotion effect on the risky financial investment behavior of risk-inclined households, followed by risk-neutral households, and had the least promotion effect on the risk-averse households. This result

indicates that financial literacy showed risk attitude heterogeneity on the risky financial investment behavior of urban households. This result is close to the actual situation.

Table 8. Results of the heterogeneity test.

Variables	Risky Financial Investment	Risky Financial Investment	Risky Financial Investment	BRFI	BRFI	BRFI
	(1)	(2)	(3)	(4)	(5)	(6)
	Risk Aversion	Risk Neutral	Risk Appetite	Risk Aversion	Risk Neutral	Risk Appetite
Financial literacy	0.289 *** (0.021)	0.305 *** (0.037)	0.415 *** (0.053)	0.299 *** (0.020)	0.327 *** (0.033)	0.356 *** (0.045)
Control variables	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
LR chi2	2139.96 ***	880.63 ***	484.65 ***	2255.28 ***	938.47 ***	539.18 ***
Pseudo R^2	0.2390	0.2627	0.3206	0.2030	0.1970	0.2266
Observed value	11,368	2772	1125	11,368	2772	1125

Note: *** represents significant at the significance level of 1%, and figures are the standard errors reported in brackets.

5. Conclusions and Recommendation

5.1. Conclusions

Using the data of the China Household Finance Survey in 2019, this paper empirically tested the impact of financial literacy on urban household risky financial investment by constructing a probit model and oprobit model, and further analyzed its impact mechanism and risk heterogeneity. The main conclusions were as follows:

First of all, the results of benchmark regression showed that financial literacy can promote urban household risky financial investment at the significance level of 1% and can broaden the breadth of investment. Households with higher financial literacy are more likely to make risky financial investments, and their investment breadth is also higher. This is basically consistent with the conclusions of previous studies on rural families, and the research in this paper can fill the gap in the research on urban families. Most of the control variables also had a significant impact on urban household venture financial investment. The results of the endogeneity test and robustness test with the degree of attention to economic information as an instrumental variable showed that the model construction was correct.

Second, the mechanism analysis results showed that fintech played an intermediary role in both the investment in the risk financial market and the breadth of investment. In other words, an improvement in the residents' financial literacy can promote the use of fintech to influence household risk financial investment behavior.

Finally, based on the subjective risk attitude of residents, the residents were divided into risk preference, risk neutral, and risk aversion, and then a heterogeneity analysis was conducted. The results showed that financial literacy has a greater effect on the improvement in the risk financial investment behavior of risk-prone families, followed by risk-neutral families, and had the least effect on the promotion of risk-averse families.

A limitation of this paper is that it did not analyze the influence mechanism from multiple perspectives, and the data used were relatively early, which is what this paper can continue to improve in the future. In addition, the definition of risk appetite in the heterogeneity analysis was slightly inadequate, which is also something that this paper can continue to improve.

5.2. Recommendation

Based on the research conclusions of this paper, this paper proposed countermeasures and suggestions to solve the problems related to urban household investment in the

financial market. Compared with previous studies, this paper emphasizes the role of financial education and the digital economy in countermeasures and suggestions, which is also an innovation of this paper. The countermeasures and suggestions made in this paper include the following.

First, relevant policies need to be formulated to improve the residents' financial literacy. Activities such as lectures and seminars can be organized to further publicize relevant financial knowledge and give play to the role of financial education. On the one hand, individuals can enhance their financial acumen and increase their economic literacy, which aids in making informed investment choices. On the other hand, this can stimulate public interest in financial markets. By encouraging more households to engage in financial activities, it can ultimately contribute to the growth and expansion of the financial sector.

Second, advancing the combination of the digital economy and the financial sector, so that digital finance can offer superior services to the financial market. When concentrating on the inclusiveness of digital finance and the usability of financial technology, utilizing digital technology will infuse new vigor into the financial field and prompt more families to take active part in the financial market. The usability of fintech can be improved by means of bringing digital technology to vast areas and providing policy subsidies. Moreover, while enhancing the residents' financial literacy, attention can be paid to raising their digital literacy to bring into full play the positive elements brought by digital finance and better serve the vast majority of residents.

Third, to enhance participation in the financial market and improve the overall financial system, it is essential to streamline relevant processes. By doing so, residents will find it easier and more efficient to engage in the financial market and invest in various financial products. Additionally, increasing the availability of professional financial knowledge will make the market more accessible to the general public, helping to reduce financial exclusion and encouraging greater participation.

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