The Impact Study of Mobile Payment on Household Asset Allocation: Evidence from CHFS Data

Yuneng Xu

Tongji University (School of Economics and Management), Shanghai Jiading District Tongji University Jiading Campus, 201804, China

xuyuneng001110@126.com

Abstract. Low household risk market participation has been a problem for a long time in China, this study explores the issue of Chinese household asset allocation from the perspective of mobile payment. Based on China Household Finance Survey data in 2017, this research studies the impact of mobile payment on Chinese household stock market participation and risk participation by using Probit model. Tobit and OLS model are used to analyze the impact of mobile payment on Chinese household risky asset allocation and the types of risky asset Chinese families hold. To reduce endogeneity caused by omitted variables and measurement errors, this study uses Instrumental Variable to make the estimation. The empirical results indicate that mobile payment can promote household stock market and risk participation by improving social interaction, social trust and financial literacy. Area heterogeneity analysis shows that mobile payment has a greater impact on eastern, first, second and third tier, and urban areas. Additionally, heterogeneity of family characteristics shows that mobile payment is more effective for highly educated households. This study provides a new perspective to conduct research on investment problems in China, and has extremely strong practical significance.

Keywords: mobile payment, stock market participation, risk participation

1. Introduction

Since reform and opening-up, China's economy has experienced rapid growth, with thriving capital markets and stock markets. Innovative financial products have emerged in an endless stream, thoroughly transforming China's underdeveloped financial structure since the 1970s and providing investors whose income levels have increased accordingly with more options to allocate assets. Although the volume of financial market transaction has been growing continuously and the scale of funds has expanded rapidly in recent years, issues such as an excessively large proportion of savings and a too-low investment ratio in risky assets still exist in terms of household asset allocation structures [1]. According to China Household Finance Survey (2017), the proportion of Chinese households participating in the stock market is only 8.59%, while the figure for American households is 50.3% (2007), 26.2% for British households (1999), and 25.2% for Japanese households (1999) [2]. In view of this, there is still a significant gap in the proportion of Chinese households participating in the stock market compared to developed countries.

The low participation rate of Chinese households in the stock market has exerted negative impacts on both household financial asset allocation and corporate financing. On the one hand, according to Markowitz Portfolio Selection Model, rational investors must allocate a portion of their assets to risky assets to achieve an optimal portfolio. Given the limited participation of Chinese households in the stock market, investors are unable to achieve an optimal balance between risk and return. On the other hand, due to the lack of the attendance of investors, corporations face difficulties in obtaining the expected amount of financing through financial instruments such as stocks, leading to issues such as financing difficulties, low liquidity, and inefficient resource allocation, which hinder the further development of China's real economy [3]. Therefore, for individual households, the financial system, and society at large, increasing the participation rate of Chinese households in the stock market holds significant theoretical and practical importance. In recent years, optimizing household asset allocation has also become a hot topic within the field of household finance.

With the development of technologies such as the internet and big data, the application scope of mobile payments has been continuously expanding and its user base has been broadening in recent years. According to the "Report on the Development of China's Payment System 2021" [4], mobile payment transactions has reached 151.23 billion, with a transaction value of 526.98

trillion yuan, rising by 22.73% and 21.94% year-over-year. This demonstrates that mobile payment has permeated all aspects of residents' lives and brought tremendous changes. Existing literature on the impact of mobile payment on the Chinese economy has conducted detailed discussions from perspectives such as entrepreneurship, household monetary demand, and resident employment, concluding that mobile payment can increase the likelihood of household entrepreneurship and improve business performance [5], reduce household monetary demand at different levels [6], and enhance household employment rates [7]. Due to the further development and popularization of mobile payment, investors can now directly participate in risky asset investments through platforms such as Alipay and various apps of brokers. This new transaction form breaks the constraints of consumption space and time [8], significantly reducing transaction costs of investors and the entire financial market, providing favorable conditions for household participation in the stock market and risky assets. As household asset allocation is one of the most important components of the Chinese economic system, the focus of this paper is on the impact and transmission mechanism of mobile payment on household asset allocation.

The marginal contributions of this paper are as follows: Firstly, it innovates in the perspective of problem analysis. Currently, there is scant literature exploring the impact of mobile payment on household asset allocation. This paper creatively elucidates the causal relationship between the two, which holds profound theoretical and practical significance. Secondly, it innovates in data selection. This paper employs the China Household Finance Survey Data (2017), which is relatively recent and features a large sample size. Thirdly, it innovates in the exploration of influence mechanisms. This paper meticulously discusses how mobile payments positively influence household participation in the stock market and risky assets by enhancing social interaction, fostering social trust, and improving financial literacy, thereby improving the structure of household assets.

2. Literature Review

Existing literatures have conducted in-depth analyses of the impact of mobile payment on transaction costs, consumption, economic growth, and other aspects. However, there is a lack of literature examining the influence of mobile payment on household asset allocation. In terms of transaction costs, Humphrey et al. argue that replacing traditional payment with mobile payment can reduce payment costs to half or even one-third of the original amount [9]. Zhang and Yang point out that electronic payment can enhance capital turnover efficiency and reduce transaction costs [10]. Xie and Liu suggest that mobile payment can give full play to its advantage of low cost due to network scale effects [11]. In terms of consumption, Wang and Hu believe that mobile payment can stimulate consumption [12]. Riley found that in face of natural disasters, households within the same village that use mobile payment are less likely to experience a decline in consumption compared to those that do not [13]. Pei and Hu suggest that there is a long-term equilibrium relationship between mobile payment and consumption [14]. In terms of economic growth, Hamdi, H. argues that electronic payment can drive economic growth in less developed countries [15]. Chen and Liu point out that mobile payment have a significant short-term promotional effect on economic growth, with the two achieving an equilibrium relationship in the long term [16].

Based on existing literature, the factors influencing household asset allocation primarily include two categories: social capital and human capital. Specifically, social capital encompasses social interaction and social trust, while human capital mainly refers to financial literacy [17].

In terms of social interaction, H. Harrison et al. point out that a higher level of social interaction can increase investors' participation in the stock market [18]. By studying micro-survey data from Guangdong Province (2004), Li found that individuals who engage in more social interaction activities during Spring Festival are more likely to participate in the stock market [19]. Markku, K., and S. Knüpfer concluded that the gains from stock market participation by residents in a Finnish community in the previous period have a positive impact on the number of new residents in that community entering the stock market in the next period, suggesting that social interaction leads to a "bandwagon effect" in asset allocation among residents [20]. Guo and Liang conducted empirical research on the China Household Finance Survey and pointed out that social interaction and network informatization promote stock market participation by transmitting stock market information [21].

In terms of social trust, Li believes that social trust increases residents' participation in the stock market by raising their expected probabilities and amounts of stock returns [22]. Guiso et al. point out that investors with low levels of social trust are less likely to participate in the stock market, which explains the " stock market limited participation puzzle [23]." Dong et al. studied and found that trust has a positive impact on household stock market participation after controlling variables such as gender, age, education level, and income [24]. Zang and Wang believe that an increase in the level of social trust significantly raises the possibility of urban households investing in risky financial assets and increases the proportion of risky financial assets in household portfolios [25].

In terms of financial literacy, Yin et al. point out that an increase in financial literacy promotes households' participation in financial markets and increases their allocation of assets to risky assets, especially stock assets [26]. Zeng et al. used CHFS to show that the level of financial literacy has a significant positive impact on the diversity of household risky asset allocation [27]. Wu et al. [28], based on CHFS (2013), point out that an improvement in financial literacy leads investors to allocating more assets to financial assets, especially risky financial assets, while reducing their allocation to non-financial assets. Zhu used CHFS (2015) to show that whether investors have studied economic and financial literacy has a significant positive effect on households' participation in financial markets and stock markets [29]. Qin et al. believe that an increase in financial literacy helps increase the probability of allocating assets to stocks and funds [30].

In summary, existing literatures have elucidated the impact of social interaction, social trust, and financial literacy on household asset allocation. However, to date, no literature has analyzed the influence of mobile payment on household financial asset allocation, nor has any delved into the mechanism through which mobile payment affects household financial asset allocation. Therefore, this paper will conduct a detailed study on the impact of mobile payment on household financial asset allocation and its mechanisms.

3. Research Design

3.1. Theoretical Basis and Research Hypothesis

Considering the essence of mobile payment, we argue that mobile payment affects household financial asset allocation through two pathways: social capital and human capital.

Firstly, the widespread adoption of mobile payment has reduced the cost for economic agents to engage in social interaction. Mobile payment, based on internet and smartphones, fulfills financial functions as well as facilitates closer online information interaction [31]. Taking WeChat Pay as an example, it relies on the widely used social platform WeChat to not only facilitate payments but also maintain social networks. Before the prevalence of mobile payment, residents had to attend social events in person to give red envelopes of cash, with factors such as time and distance often impeding their social interactions. However, the popularization of mobile payment has enabled residents to conveniently transfer cash gifts through red packets or transfers, thereby enhancing communication and fostering stronger relationships, making social interaction more frequent. According to the "Cashless Mobile Payment" survey report published by Ipsos in 2016, 78% of respondents use mobile payment to send red packets among relatives, and 75% use it for transfers among friends to maintain friendships. Li and Guo and Liang pointed out that social interaction positively influences household participation in the stock market [21,22]. Therefore, we propose:

Hypothesis 1: Mobile payment increases household participation in the stock market and allocation of risky assets by enhancing the level of social interaction.

Secondly, mobile payment integrates technologies such as cloud computing, blockchain, and artificial intelligence to establish a transparent, secure, and efficient trust mechanism in terms of payment security and personal privacy protection. Mobile payment allows both parties to retain transaction records, resolving unnecessary misunderstandings and troubles caused by social trust crises. Additionally, mobile payment integrates fragmented information, effectively mitigating issues such as information asymmetry and low transaction efficiency. Third-party payment platforms represented by Alipay have built intermediary platforms for merchants and buyers, establishing a transit mechanism for credit. It is evident that mobile payment tends to rationalize and transpose the mechanisms of the entire financial market, contributing to the establishment of a social trust system. Zang et al. believe that enhancing social credit levels helps increase the proportion of risky financial assets in urban household investment portfolios [25]. Therefore, we propose:

Hypothesis 2: Mobile payment increases household participation in the stock market and allocation of risky assets by enhancing the level of social trust.

Finally, mobile payment relies on various mobile terminals to enable the flow of vast amounts of information from platforms to economic agents [31], providing investors with channels to systematically learn relevant knowledge and thereby enhancing their literacy levels. For instance, Alipay has created a financial education IP and launched a mini-program for financial literacy quizzes, allowing users to comprehensively understand financial literacy when using Alipay for transfers, settlements, purchasing funds, gold, and other products, thus enhancing users' financial literacy. In addition, with the rise of mobile payment, to protect the rights and interests of financial consumers when using mobile payment, the People's Bank of China has designated September as the annual "Financial Literacy Popularization Month" since 2013. Through activities such as bringing financial literacy to villages, schools, government agencies, and communities, relevant knowledge is communicated to residents in an easy-to-understand manner, thereby improving the financial literacy levels of various social groups. Existing research has found that an increase in financial literacy can diversify household asset allocation [27]. Therefore, we propose:

Hypothesis 3: Mobile payment enhances household participation in the stock market and allocation of risky assets by improving investors' financial literacy levels.

3.2. Data

We employ data from the fourth round of the China Household Finance Survey (CHFS) conducted nationwide in 2017. The sample covers major regions in 29 provinces, encompassing 40,011 households and 127,012 individuals. CHFS aligns with the National Bureau of Statistics in terms of sample population age structure, urban-rural population structure, gender structure, and other aspects. Furthermore, the survey inquiries in detail about the specific status of households' investments in financial and non-financial assets, providing robust data support.

3.3. Introduction of Variables

(1) **Household Asset Structure.** According to existing literature, household assets include financial assets and non-financial assets. Specifically, financial assets are further categorized into risky financial assets and non-risky financial assets. Risky financial assets primarily include stocks, funds, corporate bonds, financial wealth management products, derivatives, foreign exchange, gold [28]. It is worth mentioning that in CHFS (2017) questionnaire, internet financial products such as Yu'ebao and Lingqiantong were newly added to the category of financial assets.

(2) **Mobile Payment.** Xu defines mobile payment as the transfer of funds between the payer and the payee through mobile terminals such as mobile phones [32]. CHFS inquired about payment methods used by households when shopping. Based on the definition of mobile payment, we select "payment through mobile terminals such as mobile phones and iPads" from the questionnaire as the proxy variable for mobile payment [5,6].

(3) **Social Interaction.** China is a society of human relationship where the primary channel for maintaining relationships among relatives and friends is participating in weddings, funerals, and other significant events and exchanging cash gifts. According to existing literature, expenditures of cash gifts can serve as an indicator of the degree of social interaction between Chinese households and their relatives, friends, and other social networks [33]. Therefore, we select cash gifts expenditures as the proxy variable for social interaction.

(4) **Social Trust.** There are mainly two methods for measuring social trust: qualitative and experimental methods [24]. We use qualitative method to construct a dummy variable for social trust. CHFS questionnaire inquires about the level of trust in strangers, with options including: very trusting, relatively trusting, neutral, not very trusting and very untrusting. When respondents answer very trusting, relatively trusting, or neutral, social trust is coded as 1; when respondents answer not very trusting or very untrusting, social trust is coded as 0.

(5) **Financial Literacy.** Currently, there is no clear definition of financial literacy. CHFS questionnaire assesses respondents' level of financial literacy through questions related to interest rate calculations, inflation, and investment risks. Based on existing literature, we adopt a method of summing scores to construct a financial literacy indicator [26].

3.4. Descriptive Statistics

Table 1. Descriptive Statistics

Variable	Observation	Mean	Std. Dev.	Min	Max
Dependent Variable					
Stock market participation	39992	0.0859	0.2802	0	1
Risk participation	39962	0.1720	0.3774	0	1
Proportion of stock assets	39992	0.0002	0.0073	0	0.6109
Proportion of risky assets	39962	0.0083	0.0045	0	0.9897
Independent Variable					
Mobile payment	39992	0.2762	0.4471	0	1
Family Characteristics					
Income (10,000 yuan)	39992	10.2769	2.8878	-13.8155	15.42495
Net worth (10,000 yuan)	39992	11.7179	4.8009	-15.404	17.21671
Debt (10,000 yuan)	39992	4.9732	23.3134	0	15.42495
Number of children	39992	0.4974	0.7766	0	7
Number of elderly people	39992	0.8401	0.8857	0	5
Social insurance participation	39992	0.9322	0..2513	0	1
Medical insurance participation	39992	0.9646	0.1845	0	1
Household Head Characteristics					
Age	39992	55.2122	14.2336	16	117
Square of age/100	39992	32.50327	15.89141	2.56	136.89
Sex	39992	0.7932	0.4049	0	1
Marriage	39992	0.8499	0.3571	0	1
Education	39992	9.3112	4.2113	0	22
Health	39992	0.4758	0.4994	0	1
Rural hukou	39992	0.5245	0.4994	0	1
Employment	39992	0.6161	0.4863	0	1

As shown in Table 1, the average stock market participation rate among Chinese households is 8.59%, and the risk participation rate is 17.2%, indicating low participation rates in both the stock market and risky markets for Chinese households. The proportions of stock assets and risky assets in Chinese households are 0.2% and 0.83%, respectively, suggesting that Chinese households allocate very little capital to risky assets. The average mobile payment usage among Chinese households is 27.62%, indicating a moderate level of mobile payment adoption in China. The average household income, net assets, and liabilities are 102,769 yuan, 117,179 yuan, and 48,732 yuan, suggesting high income levels and low debt burdens for households. The average number of children and elderly individuals in households is 0.4974 and 0.8401, respectively, indicating a less optimistic demographic structure in China. The participation rates for pension insurance and social insurance are 93.22% and 96.46%, indicating a well-established social security system in China that achieves near-universal coverage. The average age of respondents is approximately 55 years, with 79.32% being male and 84.99% married. The average number of years of education among respondents is 9.3112 years, indicating a generally low level of education. The average health level of respondents is 0.4758, indicating good overall health. Additionally, 52.45% of respondents have rural household registrations, and 61.61% are employed.

4. Method

4.1. Model

The baseline model to estimate the impact of mobile payment on household asset allocation is as follows:

$$y_{1i}^{*} = \alpha Payment + \beta X + \varepsilon$$
$$y_{1i} = 1(y_{1i}^{*} > 0), \quad i = 1,2 \tag{1}$$

In Equation (1), y_{1i}^{*}denotes dummy variables, y_{1i} represents household participation in the stock market and risky asset market. The value is 1 if the household participates, and 0 otherwise. $Payment$ denotes mobile payment, with a value of 1 if the household uses mobile payment and 0 otherwise. α is the coefficient. X represents control variables. ε denotes the random disturbance term following a standard normal distribution.

Furthermore, due to the fact that some households have a zero proportion of risky assets, we employ Tobit model to investigate the impact of mobile payment on the proportion of household asset allocation. The model specification is as follows:

$$y_{2i}{}^{*} = \alpha Payment + \beta X + \varepsilon, \quad i = 1,2 \tag{2}$$

In Equation (2), y_{2i}denotes the proportion of household investment in the stock market and risky asset markets. The settings for the other variables are the same as in Equation (1).

Finally, we select the types of risky assets invested by households as the dependent variable and employs OLS model to investigate the impact of mobile payment on the variety of risky assets invested by households. The model specification is as follows:

$$y_3 = \beta_0 + \alpha Payment + \beta_1 X + \varepsilon \tag{3}$$

In Equation (3), y_3 denotes the number of types of risky assets invested by the household, and β_0 is the intercept term. The settings for other variables are the same as in Equation (1).

4.2. Endogeneity Analysis

Mobile payment may be endogenous. On one hand, there exists omitted variables. Unobservable variables such as cultural background, customs, family traditions, and preferences may simultaneously influence both a household's use of mobile payment and its savings rate, leading to endogeneity. On the other, micro survey data often contain certain measurement errors, which can affect the measurement of risky assets and subsequently result in endogeneity.

To overcome endogeneity, we select the average usage of mobile payment among other households residing in the same community as an instrumental variable. Due to the bandwagon effect, the use of mobile payment by other households has a certain influence on the use of mobile payment by the focal household. However, it does not affect the asset allocation of the focal household, which satisfies the requirements of relevance and exogeneity. In view of this, it is appropriate to choose it as an instrumental variable for mobile payment.

5. Results

5.1. Mean Analysis

Table 2. Mean Analysis

	Households using mobile payment	Households not using mobile payment
Stock market participation	0.2027	0.0413
Risk participation	0.4196	0.0777

As shown in Table 2, the average stock market participation and risky asset participation for households using mobile payment are 0.2027 and 0.4196, respectively, while the corresponding averages for households not using mobile payment are only 0.0413 and 0.0777. This indicates that mobile payment has a positive impact on household stock market participation and risky asset participation.

5.2. Probit Model

Table 3. Mobile Payment and Household Stock Market Participation, Risk Participation

	(1) Stock market participation	(2) Stock market participation	(3) Risk participation	(4) Risk participation
Independent Variable				
Mobile payment	0.0738*** (0.0032)	0.2817*** (0.0159)	0.1465*** (0.0035)	0.4901*** (0.0206)
Other control variables	YES	YES	YES	YES
Fixed effect of provinces	YES	YES	YES	YES
N	39992	39992	39699	39699
R^2	0.2806	0.2667	0.3020	0.2608
First stage estimation of F value		553.85***		553.85***

We conduct a Probit regression, and Columns (1) and (3) of Table 3 report the impact of mobile payment on household stock market participation and household risky asset participation, respectively. The marginal effects of mobile payment are 0.0738 and 0.1465, both significant at 1% level. This indicates that mobile payment significantly promotes household stock market participation and risky asset participation.

Given the endogeneity between mobile payment and household asset allocation, this paper selects the average usage of mobile payment among other households in the same community as an instrumental variable. Since the F-value of the first-stage estimation is 553.85, which is greater than the critical value of 16.38 at the 10% bias level, the weak instrumental variable hypothesis is rejected. Columns (2) and (4) report the results after incorporating the instrumental variable, with the marginal effects of mobile payment being 0.2817 and 0.4901, respectively, further demonstrating that mobile payment significantly promotes household stock market participation and risky asset participation.

5.3. Tobit Model

Table 4. Mobile Payment and Household Proportion of Stock Assets, Risky Assets

	(1) Proportion of stock assets	(2) Proportion of stock assets	(3) Proportion of risky assets	(4) Proportion of risky assets
Independent Variable				
Mobile payment	0.1166*** (0.0229)	0.3472*** (0.1121)	0.1141*** (0.0034)	0.2748*** (0.0171)
Other control variables	YES	YES	YES	YES
Fixed effect of provinces	YES	YES	YES	YES
N	39992	39992	39962	39962
R^2	0.1916	0.1738	0.4780	0.4064
First stage estimation of F value		539..63***		539..63***

According to CHFS, the proportion of risky assets for some households is 0. In light of this, we conduct a Tobit regression, and Columns (1) and (3) of Table 4 report the impact of mobile payment on the household stock market share and household risky asset share, respectively. At 1% significance level, the marginal effects of mobile payment are 0.1166 and 0.1141, respectively, indicating that mobile payment has a significant positive impact on both the household stock market share and the risky asset share.

We again choose the average usage of mobile payment among other households in the same community as an instrumental variable to address the endogeneity issue. Since the F-value of the first-stage estimation is 539.63, which is greater than the critical value of 16.38, the weak instrumental variable hypothesis is rejected. Columns (2) and (4) report the results after incorporating the instrumental variable, with the marginal effects of mobile payment being 0.3472 and 0.2748, respectively. This further demonstrates that mobile payment has a significant positive impact on both the household stock market share and the risky asset share.

5.4. OLS Model

Table 5. Mobile Payment and Types of Household Risky Assets

	(1) Types of household risky assets	(2) Types of household risky assets
Independent Variable		
Mobile payment	0.3706*** (0.0089)	0.8966*** (0.0437)
Other control variables	YES	YES
Fixed effect of provinces	YES	YES
N	39699	39699
R^2	0.2455	0.1476
First stage estimation of F value		150.43***

Furthermore, to explore the impact of mobile payment on the types of household risky assets, this section conducts an OLS regression, and Column (1) of Table 5 reports the effect of mobile payment on the types of household risky assets. At 1% significance level, the marginal effect of mobile payment is 0.3706, indicating that mobile payment promotes diversification in the types of risky assets. The F-value of the first-stage estimation is 150.43, which is greater than the critical value of 16.38, thus rejecting the weak instrumental variable hypothesis. After using the instrumental variable for estimation, the marginal effect of mobile payment on the types of household risky assets is 0.8966, with a significance level of 1%. This reflects that mobile payment can increase the variety of risky assets held by households.

6. Further Analysis

6.1. Mechanism Analysis

In 2020, the outbreak of the COVID-19 pandemic forced residents across the country to stay home and avoid going out, leading to the temporary disruption of on-site transactions. Residents could only participate in the stock market and risky asset markets through various online trading platforms using their mobile phones and computers. The widespread adoption of mobile payment mitigated the impact of the pandemic on household participation in the stock market and risky asset markets to a certain extent. However, due to the pandemic, households' willingness to save increased [34]. In view of this, how to leverage mobile payment, which breaks the restrictions of time and space, to diversify Chinese households' asset allocation in the post-pandemic era has become an urgent issue to address [8].

Previously, it was hypothesized that mobile payment enhances household participation in the stock market and risky asset markets by increasing the level of social interaction, strengthening social trust, and improving financial literacy, thereby optimizing the structure of household asset allocation.

6.1.1. Mobile Payment and Social Capital

Social capital encompasses social interaction and trust.

From Columns (1) and (3) of Table 6, it can be seen that at 1% significance level, the marginal effect of mobile payment on social interaction is 3.3023, and the marginal effect of social interaction on risk participation is 0.2904. This indicates that mobile payment increases household participation in risky assets by enhancing the level of social interaction. Since we use cash gift expenditures as a proxy variable for social interaction [33], a possible explanation is that in Chinese social traditions characterized by the exchange of gifts, mobile payment enables relatives and friends to maintain their social networks through transfers via

Alipay, WeChat, online banking, and other methods. Given its convenience, speed, low cost, and the elimination of the need for offline meetings between both parties, mobile payment has increased the degree of social interaction to some extent, thereby increasing household participation in risky assets.

From Columns (2) and (4) of Table 6, it can be observed that at 1% significance level, the marginal effect of mobile payment on social trust is 0.3378, and the marginal effect of social trust on risk participation is 0.6481. This indicates that mobile payment increases household participation in risky assets by enhancing the level of social trust. A possible explanation is that, with the advancement of information technology and the heightened security awareness of various payment platforms, investors' personal information and account security are well-protected, allowing investors to securely use mobile payment for asset transfers. Mobile payment provides electronic receipts for both parties involved in a transaction, resolving suspicions and doubts between economic entities in a cash-based society. Furthermore, mobile payment fully integrates fragmented information, alleviating issues such as information asymmetry. Therefore, mobile payment increases household participation in risky assets by enhancing the level of social trust.

6.1.2. Mobile Payment and Financial Literacy

From Columns (1) and (2) of Table 7, it can be seen that at 1% significance level, the marginal effect of mobile payment on social trust is 0.2909, and the marginal effect of financial literacy on risk participation is 0.7987. This indicates that mobile payment increases household participation in risky assets by enhancing the level of financial literacy.

According to existing literature, mobile payment enables users to share and transmit information conveniently, which is then imitated and learned among users [31]. Furthermore, when users purchase financial products on mobile terminals, relevant software mandates investors to undergo tests that systematically assess their risk tolerance and understanding of financial literacy. Additionally, guided by national policies, some mobile payment platforms consciously educate users on financial literacy in an easy-to-understand manner, enabling residents to gain a comprehensive understanding of financial literacy and alleviating the long-standing issue of financial illiteracy among Chinese. Therefore, mobile payment increases household participation in risky assets by enhancing residents' financial literacy.

Table 6. Mobile Payment and Social Capital

	(1) Social interaction	(2) Social Trust	(3) Risk participation	(4) Risk participation
Independent Variable				
Mobile payment	3.3023*** (0.2415)	0.3378*** (0.0321)		
Social interaction			0.2904*** (0.0172)	
Social trust				0.6481*** (0.0514)
Other control variables	YES	YES	YES	YES
Fixed effect of provinces	YES	YES	YES	YES
N	39992	39992	39457	YES
R^2	0.0357	0.0374	0.1453	
First stage estimation of F value	539..63***	539..63***	115.90***	63.33

Table 7. Mobile Payment and Financial Literacy

	(1) Financial literacy	(2) Risk participation
Independent Variable		
Mobile payment	0.2909*** (0.0211)	
Financial Literacy		0.7987*** (0.0445)
Other control variables	YES	YES
Fixed effect of provinces	YES	YES
N	38587	38323

Table 7. (continued).

R^2	0.1581	0.0316
First stage estimation of F value		

6.2. Heterogeneity Analysis

We analyze the heterogeneity of the impact of mobile payment on household asset allocation across different regions, cities with varying economic development levels, urban versus rural areas, and groups with different educational level, considering both regional and household characteristics. According to the results in Column (1) of Table 8, at 1% significance level, the interaction term between mobile payment and rural areas has a coefficient of -0.4445, which is significantly negative. This suggests that mobile payment has a smaller impact on the asset allocation of households residing in rural areas. Column (2) indicates that the interaction term between mobile payment and the central and western regions has a coefficient of -0.2374, significant at 1% level, implying that compared to households in eastern regions, mobile payment has a lesser impact on asset allocation for those in the central and western regions. Column (3) categorizes cities into two groups based on the city rankings released by the New First-Tier City List: Tier 1, New Tier 1, Tier 2, Tier 3 versus Tier 4, Tier 5 cities. The interaction term between mobile payment and Tier 4 and Tier 5 cities suggests that mobile payment has a smaller impact on the asset allocation of households residing in these less developed cities. Column (4) examines the impact of mobile payment on residents with different educational backgrounds. Existing literatures point out that educational level has a significant influence on financial literacy levels, and the use of mobile payment requires a certain level of financial literacy. Combining literature and empirical results, it can be concluded that mobile payment has a smaller impact on the asset allocation of residents at the junior college level or below.

Table 8. Heterogeneity Analysis

Dependent Variable	Risk participation			
	(1)	(2)	(3)	(4)
Independent Variable				
Mobile payment	0.6796*** (0.0327)	0.6594*** (0.0279)	0.6283*** (0.0291)	0.9115*** (0.0041)
Rural areas	0.0895*** (0.0062)			
Mobile payment * Rural areas	-0.4445*** (0.0394)			
Central and western regions		-0.0395*** (0.0193)		
Mobile payment * Central and western regions		-0.2374*** (0.0230)		
Tier 4 and Tier 5 cities			0.0557*** (0.0061)	
Mobile payment * Tier 4 and Tier 5 cities			-0.3082*** (0.0261)	
Junior college level or below				0.0862*** (0.0249)
Mobile payment * Junior college level or below				-0.4133*** (0.0468)
Other control variables	YES	YES	YES	YES
Fixed effect of provinces	YES	YES	YES	YES
N	39699	39699	39699	39699
R^2	0.1266	0.1266	0.1689	0.1071
First stage estimation of F value	539..63***	539..63***	539..63***	539..63***

6.3. Robustness Analysis

To verify the robustness of the previous results, we use an alternative variable whether a household uses a smartphone as an instrumental variable. Since most mobile payment in China is conducted through smartphones, there is a close relationship between

smartphone use and mobile payment adoption among households. Moreover, smartphone use does not directly affect household asset allocation, making it relevant and exogeneous. Given this, selecting whether a household uses smartphones as instrumental variable is appropriate. After changing the instrumental variable, Column (1) of Table 9 reports that the marginal effect of mobile payment is 0.6023 at 1% significance level, further indicating that mobile payment significantly promotes household risk participation. To address the issue of potential non-strict exogeneity of instrumental variables, Conley et al. proposed Local to Zero (LTZ) approach, which relaxes the exclusivity constraint of instrumental variables by assuming they are nearly exogenous [31]. Column (2) of Table 9 reports the results based on the LTZ approach: under the condition of near exogeneity, mobile payment significantly promotes household participation in risky assets. In light of this, the results are robust.

Table 9. Robustness Analysis

	(1) Risk participation	(2) Risk participation
Independent Variable		
Mobile payment	0.6023*** (0.0262)	0.6475*** (0.0320)
Other control variables	YES	YES
Fixed effect of provinces	YES	YES
N	39962	39962
R^2	0.1381	
First stage estimation of F value		

7. Conclusion

Although the scale of China's financial market has been expanding in recent years, there are still many shortcomings compared to mature financial market. One of the biggest issues is the relatively homogeneous financial structure, which does not match the stable operation of economic entities, resulting in insufficient effective demand and severely constraining further development of the financial market. The optimization of the financial structure requires adjustments in asset allocation by every household. In recent years, the rapid proliferation of mobile payment has created a stable and reliable trading platform, reduced transaction costs, alleviated information asymmetry, and improved financial efficiency, bringing profound impacts on China's financial system. Therefore, studying the impact of mobile payment on household asset allocation has significant theoretical and practical implications.

Using CHFS (2017), we examine the impact of mobile payment on household asset allocation and draws the following conclusions: Firstly, mobile payment significantly promotes Chinese households' participation in the stock market and risky assets by enhancing social interaction, strengthening social trust, and improving financial literacy, thereby optimizing the asset allocation structure of Chinese households. To address endogeneity issues, we select the average use of mobile payment by others within the same community as an instrumental variable, and the results further validate the aforementioned conclusions. Secondly, mobile payment has a relatively minor impact on the asset allocation of households residing in rural areas, the central and western regions, fourth- and fifth-tier cities, and those with education levels at or below junior college.

We not only investigate the extent of the impact of mobile payment on household asset allocation but analyze its specific impact mechanisms in detail. Based on the results, the following recommendations are proposed:

Improve the regulatory system for mobile payment. In recent years, with the booming development of mobile payment, an increasing number of vendors aim to enter the market. New entrants often attract users through marketing tactics such as payment discounts. These vendors, compared to well-known mobile payment platforms, are smaller in scale and lower in technological proficiency, unable to effectively safeguard users' fund and personal information security, which has adverse effects on the social trust system. Government should improve the market access mechanism, strengthen supervision of mobile payment platforms, and establish a safe and efficient mobile payment system for users.

Increase the popularization of financial literacy among investors. Given investors with higher levels of financial literacy possess more well-rounded asset allocation portfolios, government should collaborate with mobile payment platforms to launch financial literacy classrooms. This can improve the current situation where the majority of residents lack adequate financial literacy, correctly guide residents in making rational asset allocations, and enable mobile payment to bring more significant positive impacts to residents living in rural areas, the central and western regions, fourth- and fifth-tier cities, and those with lower education levels.

References

[1] Guo, S. (2012). There will be no way out for China's economy without improving its financial structure. *International Economic Review*, (04), 9-16+4.

[2] Yin, Z., & Huang, Q. (2013). A review of research on the mystery of limited participation in the stock market. *Economic Review*, (06), 144-150.
[3] Jiang, J., Wang, Z., & Liao, L. (2018). Rural growth experience and stock market participation. *Economic Research*, 53(08), 84-99.
[4] Department of Payment and Settlement, People's Bank of China. (2017). *China Payment System Development Report*. Beijing: China Finance Press.
[5] Yin, Z., Gong, X., & Guo, P. (2019). The impact of mobile payment on entrepreneurship - Micro evidence from the Chinese household finance survey. *China Industrial Economy*, (03), 119-137.
[6] Yin, Z., Gong, X., & Pan, B. (2019). The impact of mobile payment on household money demand - Micro evidence from the Chinese household finance survey. *Financial Research*, (10), 40-58.
[7] Yin, Z., Liu, T., & Zhang, Y. (2021). Does digital finance promote residential employment?. *Fujian Forum (Humanities and Social Sciences Edition)*, (02), 98-112.
[8] Chen, M., & Cheng, Z. (2021). The impact of mobile payment popularization on residents' consumption inequality - micro evidence from CHFS. *Consumer Economics*, 37(06), 50-59.
[9] Humphrey, D. B., & Kim, M. (2001). Vale realizing the gains from electronic payments: Costs, pricing, and payment choice. *Journal of Money, Credit and Banking*, 33(2), 216-234.
[10] Zhang, Y., & Yang, K. (2010). Study on the influence of electronic payment methods on regional trade development. *Gansu Social Sciences*, (03), 192-195.
[11] Xie, P., & Liu, H. (2013). ICT, Mobile Payment and Electronic Money. *Financial Research*, (10), 1-14.
[12] Wang, X., & Hu, D. (2017). Research on the impact of mobile payment on consumer behavior: a comparison based on different payment methods. *Consumer Economy*, 33(05), 77-82+97.
[13] Riley, E. (2018). Mobile money and risk sharing against village shocks. *Journal of Development Economics*, 135.
[14] Pei, H., & Hu, Y. (2020). An empirical study on the impact of mobile payment on China's residents' consumption. *Journal of Xi'an Finance and Economics College*, 33(01), 37-44.
[15] Hamdi, H. (2011). Can E-Payment Systems Revolutionize Finance of the Less Developed Countries? The Case of Mobile Payment Technology. *International Journal of Economics and Financial Issues*, 1(2), 46-53.
[16] Chen, M., & Liu, Y. (2020). Research on the impact of mobile payment on China's economic growth. *Journal of Bohai University (Philosophy and Social Science Edition)*, 42(05), 71-77.
[17] Zhao, P., Wang, H., & Zhao, X. (2015). Research on the differential impact of human capital on urban and rural household entrepreneurship: An empirical analysis based on CHFS survey data. *Population and Economy*, (03), 89-97.
[18] Hong, H., Kubik, J. D., & Stein, J. C. (2004). Social interaction and stock-market participation. *The Journal of Finance*, 59(1), 137-163.
[19] Li, T. (2006a). Social interaction and investment choice. *Economic Research*, (08), 45-57.
[20] Markku, K., & Knüpferand, S. (2012). Peer performance and stock market entry. *Financ. Econ.*, 104, 321–338.
[21] Li, T. (2006b). Social interaction, trust and stock market participation. *Economic Research*, (01), 34-45.
[22] Guiso, L., Sapienza, P., & Zingales, L. (2008). Trusting the Stock Market. *The Journal of Finance*, 63(6), 2557-2600.
[23] Dong, J., Xi, B., & Wu, S. (2013). Trust and Household Stock Asset Allocation: An Empirical Analysis Based on Resident Household Micro Survey Data. *Jiangxi Social Science*, 33(07), 60-65.
[24] Zang, R., & Wu, Y. (2017). Social trust and urban household investment in risky financial assets: An empirical study based on CFPS data. *Journal of Nanjing Audit University*, 4(04), 55-65.
[25] Yin, Z., Song, Q., & Wu, Y. (2014). Financial knowledge, investment experience and household asset choice. *Economic Research*, 49(04), 62-75.
[26] Zeng, Z., He, Q., Wu, Y., & Yin, Z. (2015). Financial literacy and household portfolio diversity. *Economist*, (06), 86-94.
[27] Wu, Y., Peng, C., & Yin, Z. (2016). Financial Literacy, Wealth Accumulation and Household Asset Structure. *Contemporary Economic Science*, 38(04), 19-29+124-125.
[28] Zhu, X. (2018). Human Capital and Household Asset allocation. *Capital University of Economics and Business*.
[29] Qin, H., Li, C., & Wan, J. (2018). Financial literacy, financial asset allocation and portfolio effectiveness. *Journal of Nanjing Audit University*, 15(06), 99-110.
[30] Conley, T. G., Hansen, C. B., & Rossi, P. E. (2012). Plausibly Exogenous. *Review of Economics and Statistics*, 94(1), 260-272.
[31] Xu, H. (2006). A preliminary study of China's mobile payment market research and development. *Southwest University of Finance and Economics*.
[32] Ma, G., & Yang, E. (2011). Social Networks, Informal Finance and Entrepreneurship. *Economic Research*, 46(03), 83-4.
[33] Gan, L., Lu, X., Wang, X., Zhou, R., Li, Z., Wang, F., Lin, C., Cheng, Z., Wu, Y., Zhang, Y., & Feng, C. (2020). Trends of household wealth change in China under the epidemic. *China Economic Report*, (04), 110-123.
[34] Guo, S., & Liang, P. (2014). Social Interaction, Information Channels and Household Stock Market Participation - An Empirical Study Based on the 2011 Chinese Household Finance Survey. *Economic Research*, 49(S1), 116-131.