

# Study on the Impact of Digital Finance on Risky Financial Asset Allocation of Chinese Households

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**Abstract:** In recent years, the wealth of Chinese households has increased rapidly, and the demand for preserving and appreciating household assets has grown. However, the asset allocation structure of Chinese households remains relatively singular, with the majority of assets concentrated in real estate, which increases systemic risk and is unfavorable for financial support to the development of the real economy. Therefore, this paper constructs indicators for household risky financial asset allocation and household digital finance. Then, using Probit model, Tobit model, and ordered Probit model respectively, starting from a micro perspective, it investigates the impact of digital finance on household risky financial asset allocation. This comprehensive examination is conducted by incorporating instrumental variables for endogeneity testing, utilizing the mechanism of intermediary effects, and finally drawing corresponding conclusions.

**Keywords:** Digital Finance; Household Risky Financial Asset Allocation; Empirical Study; Mechanism Analysis

## 1. Background and Literature Review

The "China Wealth Report 2023" shows that at the overall level, the total wealth of Chinese residents reached 79 trillion yuan in 2023, ranking second globally. Nowadays, more and more families are engaging in investment and financial management. However, according to data from the "China Household Wealth Health Index White Paper 2022," about 31% of Chinese households have a wealth management health score of less than 60 points. Overall, Chinese household assets are not sufficiently balanced,

with the majority of families considering home purchases as investments. At the same time, most households' financial assets consist mainly of low-interest, highly liquid risk-free assets, with a low proportion of risky financial assets.

With the addition of information technology, the world's financial system has evolved from the electronization of ATM cash machines in the 1960s, to the Internet-enabled stage of online banking at the beginning of the 21st century, and then to the current digitization and intelligence stage of smart investment, big data regulation, and blockchain collaboration. Although China's financial industry started late, the rapid economic takeoff since the reform and opening up, the industry has also developed rapidly, followed by the emergence of new Internet companies such as Alipay and traditional financial institutions have a competitive relationship, the pressure of competition to the traditional financial institutions of the business brought about an impact, but also forced them to accelerate the speed of digital transformation, thus significantly improving the quality of service at the overall level of financial institutions. The use of artificial intelligence, big data, cloud computing, blockchain, the Internet of Things and other modern emerging technologies has greatly improved the efficiency of data collection, analysis and sharing, and the "credit" framework of the traditional financial system has been gradually replaced by "data"-driven digital credit. The digital era has changed the operation of traditional financial institutions. The digital era has changed the operation mode of traditional financial institutions, and digital finance has profoundly influenced the asset allocation behavior of families with

innovative services as the entry point, and has become a new channel for family wealth growth.

A number of scholars have studied related issues in China. Wu Wensheng and Li Shuo [1] studied the key influencing factors of household asset allocation under rational neglect and found that information uncertainty is a critical factor. The study found that information processing ability and information acquisition ability can reduce information uncertainty, and these two abilities have a positive promoting effect on risk allocation. Wang Zhimao [2] found that internet information channels reduce information asymmetry through information sharing, thereby affecting the structure of household asset allocation and promoting the proportion of household financial assets. Zhou Guangsu [3] found that market frictions are important factors affecting household risky financial assets. Digital finance can mitigate the inhibitory investment effect caused by market frictions by reducing transaction costs, lowering participation restrictions, and enhancing social interaction, thereby increasing the likelihood of household participation in risky financial markets. Li Xiao [4] pointed out that digital finance can promote household purchase of commercial insurance by increasing the availability of commercial insurance, reducing transaction costs, improving household financial literacy, and enhancing social interaction.

## 2. Theoretical Analysis

### 2.1 Enhancing Financial Accessibility

Financial accessibility refers to the ease with which residents in a region can access financial services. In the past, all transactions had to be conducted at physical branches, but the distribution of Chinese financial institutions' branches is uneven. By utilizing internet technology, financial institutions can provide services through online platforms, reducing operational costs and improving service quality, thereby enhancing financial accessibility. Digital financial institutions can also collect and store customer information while serving customers, forming user big data to reduce information asymmetry. By analyzing user data, the objectives of risk

control and cost reduction can be achieved. Today, even in remote areas, people can use mobile phones and computers to access financial services.

### 2.2 Improving Residents' Financial Literacy

Household asset allocation requires decision-makers to expend effort in collecting and analyzing information, and financial literacy plays a crucial role in this process. First, financial literacy helps investors understand financial markets and products, reducing information search and processing costs, and enabling them to assess potential risks, thereby facilitating rational decision-making. Second, it may lead investors to make irrational decisions or overestimate risks, resulting in a decision to abstain from investing altogether.

Internet financial institutions, in order to attract investor participation, provide news related to economic finance, as well as various financial knowledge and current market information. This provides residents with a convenient and efficient channel to enhance their financial literacy, and various software platforms also enhance communication, allowing investors to share investment experiences and expertise. These efforts help residents learn financial basics, understand the risks and returns of various financial products, identify investment opportunities, and optimize household asset structures.

### 2.3 Easing Household Liquidity Constraints

Liquidity constraints are difficulties or obstacles faced by households in accessing credit, which can affect households' access to credit and make them more cautious in their investment decisions in order to prevent cash-flow disruptions caused by a shortage of funds, which can affect household creditworthiness, and therefore require households to minimize their current investment expenditures in order to ensure adequate cash flow. Liquidity constraints can limit the level of household consumption and investment, and a household's credit profile is also affected by the external financial environment, which can determine a household's effective access to credit and

participation in financial markets. A good financing environment can provide households with more convenient services and broaden their credit channels, thereby reducing their liquidity pressure and increasing their willingness to invest in risky financial assets. The rapid development of information technology has given rise to digital finance as a new form of finance, which can not only realize the deep integration of science and technology and the financial industry, but also create a more relaxed financial environment for residents, thus easing the pressure on family liquidity and enabling families to access funds more safely and quickly. The emergence of digital finance will create a more inclusive financial environment for households and ease their liquidity constraints. It will enable households to use more funds for current consumption and investment, and promote household financial participation in risky financial markets.

### 3. Research Design

#### 3.1 Sample Data

The data used in this study mainly come from the China Household Finance Survey (CHFS) from 2013 to 2019 [5]. This data was surveyed on a household basis, totaling 140,084 households from 2013-2019, with missing data samples and anomalous data samples removed, resulting in a final sample of 139,331 households.

#### 3.2 Variable Setting

This study measures household risky financial asset allocation behavior from three aspects. First, whether the household allocates risky financial assets: risky financial assets include stocks, bonds, funds, wealth management products, financial derivatives, gold, and non-RMB assets. If a household holds one or more of these assets, it is considered as having allocated risky financial assets, with a value of 1; otherwise, it is 0. Second, the depth of household participation in risky financial asset allocation: "the proportion of risky financial assets in total household assets" is selected as the proxy variable for participation depth. Third, the breadth of household allocation of risky financial assets: the number of types of

risky financial assets held by the household is used as the proxy variable for the breadth of allocation.

The core explanatory variable is digital finance. According to the "Guiding Opinions on Promoting the Healthy Development of Internet Finance" jointly issued by the People's Bank of China and ten other ministries, three types of digital financial formats are listed: internet finance, online lending, and third-party payment. Therefore, this study constructs household digital financial usage based on these three digital financial formats. First, if digital payment is used, it is recorded as 1; otherwise, 0. Second, if the household engages in internet wealth management, it is recorded as 1; otherwise, 0. Third, if the source of all household loans is "online lending platforms," it is recorded as 1; otherwise, 0. The sum of these three types of digital financial participation behaviors is used as the proxy variable for the degree of household digital finance usage, with values of 0, 1, 2, or 3.

Control variables include: total household assets, annual household income, annual household expenditure, monthly food expenses per household, number and value of properties owned, monthly mortgage payments, number of household members, number of elderly, number of children, number of unhealthy individuals, number of working individuals, whether there are financial professionals in the household, educational attainment of the household head, age of the household head, gender of the household head, marital status of the household head, risk aversion, risk preference, whether paying attention to economic and financial issues, accuracy rate of answering whether a rural resident, and per capita GDP of rural residents.

#### 3.3 Model Specification

Since household participation in the risky financial market has only two outcomes, 0 and 1, it is a binary variable. The Probit model can be used to solve probability model problems with dummy variables. Therefore, this study uses the Probit model to test the effect of digital finance on the likelihood of household participation in the risky financial market. The specific econometric model is as follows:

$$Ifrisk = \begin{cases} 0, & Ifrisk_i^* \leq 0 \\ 1, & Ifrisk_i^* > 0 \end{cases} \quad (1)$$

$$Ifrisk_i^* = \alpha_0 + \alpha_1 x_i + \alpha_2 Control_i + \lambda_t + \varepsilon_i \quad (2)$$

The dependent variable *Ifrisk* indicates whether households participate in the risky financial market, with 1 for participation and 0 for non-participation. *Ifrisk<sub>i</sub><sup>\*</sup>* is the unobservable latent variable; the subscript *i* represents households, and *t* represents years. *x<sub>i</sub>* is the main explanatory variable, digital finance; *Control<sub>i</sub>* is the control variable, including household and head of household characteristics;  $\alpha$  is the parameters to be estimated;  $\lambda_t$  is the time fixed effect;  $\varepsilon_i$  is the random disturbance term.

The value of the dependent variable *Ifrisk* is determined by the latent variable *Ifrisk<sub>i</sub><sup>\*</sup>*, where *Ifrisk* = 0 when the latent variable is less than or equal to 0, and *Ifrisk* = 1 when the latent variable is greater than 0. The size of the latent variable *Ifrisk<sub>i</sub><sup>\*</sup>* is determined by the core explanatory variable *x<sub>i</sub>*, the control variable *Control<sub>i</sub>*, and the unobservable household trait random variable  $\varepsilon_i$ .

Since the proportion of risky financial assets in total assets held by households is a truncated data with a roughly continuous distribution from 0 to 1, ordinary linear regression models cannot provide accurate estimates for such restricted dependent variables. Therefore, this study adopts the Tobit model for estimation. The specific econometric model is as follows:

$$Riskratio = \beta_0 + \beta_1 x_i + \beta_2 Control_i + \lambda_t + \varepsilon_i \quad (3)$$

Since the number of types of risky financial assets held by households ranges from 0 to 8, constituting an ordered discrete variable, this study uses the ordered Probit model to test the relationship between digital finance and the breadth of household participation in the risky financial market:

$$Diversify = \gamma_0 + \gamma_1 x_i + \gamma_2 Control_i + \lambda_t + \varepsilon_i \quad (4)$$

## 4. Empirical Analysis

### 4.1 Baseline Regression

Table 1 presents the results of the baseline

regression, showing that digital finance has a significant positive impact on all three levels. The significance indicates that households with higher levels of digital finance are more likely to participate in the risky financial market and have higher levels of participation depth and breadth.

**Table 1. Baseline Regression Results**

	(1)	(2)	(3)
Model	Probit	Tobit	Oprobit
Variable	ifrisk	ratio	varity
df	0.140*** (0.001)	0.006*** (0.000)	0.951*** (0.009)
<i>N</i>	137887	137887	137887
adj. <i>R</i> <sup>2</sup>	0.4425	0.6964	0.3618

Note: \*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively; robust standard errors are reported in parentheses. Since the coefficients of nonlinear regression cannot directly reflect the effects of explanatory variables, reporting the coefficients directly is not reliable. Therefore, the Probit model and Tobit model report average marginal effects.

In Table 1, it can be observed that digital finance has a significant positive impact on the likelihood, depth, and breadth of household risky financial asset allocation at the 1% significance level. For each unit increase in digital finance, the likelihood of households participating in the risky financial market increases by 14%, and the proportion of household participation in risky financial assets to total assets increases by 11%.

### 4.2 Endogeneity Analysis

To address potential endogeneity issues, this study employs the Instrumental Variables (IV) approach for estimation. "Distance from the respondent's city to Hangzhou city" is selected as the instrumental variable for digital finance. From a correlation perspective, this variable is highly correlated with the level of digital finance development in the region. From an exogeneity perspective, it does not directly affect the risky financial asset allocation of the surveyed households, meeting the relevance criteria required for instrumental variables and reducing model endogeneity.

Table 2 reports the regression results of IV-Probit and IV-Tobit in columns (1) and (2), respectively, and ensures the reliability of the

instrumental variable through the Wald test and the weak instrumental variable test. Since the number of types of risky financial assets held by households and household digital finance are both discrete variables, the estimation results based on two-stage least squares are no longer effective. Therefore, this study employs the Conditional Mixed Process (CMP) estimation method proposed by Roodman[6]. The results are presented in column (3) of Table 2.

**Table 2. Endogeneity Analysis Results**

	(1)	(2)	(3)
Model	IV-Probit	IV-Tobit	CMP
Variable	ifrisk	ratio	varity
df	2.838***	0.408***	1.604***
	(0.250)	(0.035)	(0.066)
	(0.003)	(0.000)	(0.002)
Endogeneity Wald Test	$\chi^2=55.89$ P=0.000	$\chi^2=92.49$ P=0.000	
atanhrho_12			-0.509 (0.000)
First Stage F-value	2479.18	2479.18	2486.67
N	137,102	137,102	139,331
adj. R <sup>2</sup>	0.3591	0.3591	0.3599

Note: Standard errors are robust standard errors.

The first stage F-values are all greater than 10, and the instrumental variables are significant at the 1% level for digital finance, indicating a high correlation between the instrumental variables and digital finance.

In the IV-Probit and IV-Tobit regressions, the endogeneity Wald test is significant at the 1% level. In the CMP regression, the auxiliary estimation parameter *atanhrho\_12* is significantly different from zero, indicating significant correlation between the two equations in the simultaneous equation model. Conducting simultaneous estimation using the conditional mixed process is more effective than separately estimating, thus the results obtained from the endogeneity test are reliable. Table 2 results indicate that after correcting for endogeneity issues, the impact of digital finance remains significant, and the coefficients remain unchanged in sign, proving the reliability of the conclusions.

### 4.3 Mechanism Analysis

#### 4.3.1 Mediating Effect of Financial Accessibility

Lack of participation opportunities is one of the reasons affecting residents' allocation of risky financial assets, and residents in areas with higher financial availability are more likely to receive financial services, a necessary condition for a household to allocate risky financial assets. This study adopts the method used by Yin Zhichao [7], using the number of bank accounts opened as a proxy variable for financial accessibility to investigate whether digital finance provides a path to influence financial accessibility to affect residents' allocation of risky financial assets.

**Table 3. Presents The Results of the Stepwise Regression Method for Financial Accessibility**

	(1)	(2)	(3)
Variable	ifrisk	fa	ifrisk
df	1.1153***	20.3871***	1.1138***
	(0.011)	(1.964)	(0.011)
fa			0.0001*** (0.000)
SN	137102	137102	137102
adj. R <sup>2</sup>	0.4425	0.6793	0.4427

In Table 3 (other tables not reported due to space limitations) indicate that, according to the mediation effect determination method of the stepwise regression, the partial mediation effect mechanism of financial accessibility in the household's allocation of risky financial assets is significant. The results of the Sobel test and Goodman test further validate the significant mediating effect of financial accessibility in the pathway of digital finance affecting the household's allocation of risky financial assets.

#### 4.3.2 Financial Knowledge Level

The rapid development of digital finance for the family information exchange and capital circulation provides technical support and a convenient investment trading platform, digital financial services platform in the marketing of financial products at the same time will publicize and popularize the financial knowledge, some families through the digital financial services platform can learn all kinds of financial knowledge, broaden the family's previous limited access to financial knowledge, and then stimulate the family's investment and financial needs, and ultimately This in turn stimulates families' investment and financial needs, and

ultimately affects the allocation of family risky financial assets. Therefore, the level of financial knowledge of households plays a key role in the investment decision of household risky financial assets. Based on this, this paper tries to study whether digital finance affects the allocation of household risky financial assets by influencing the level of residents' financial knowledge from the perspective of mediation effect. This study uses the accuracy rate of financial questions in the questionnaire to construct the variable of financial knowledge level.

**Table 4. Presents the Results of the Stepwise Regression Method for the Financial Knowledge level.**

	(1)	(2)	(3)
Variable	ifrisk	accuracy	ifrisk
Digital Finance	0.2810*** (0.002)	0.1038*** (0.002)	0.2724*** (0.002)
accuracy			0.083*** (0.003)
<i>N</i>	139331	139331	139331
adj. <i>R</i> <sup>2</sup>	0.3637	0.3276	0.3684

Table 4 indicate that, according to the mediation effect determination method of the stepwise regression, the partial mediation effect mechanism of financial knowledge level in the household's allocation of risky financial assets is significant. The results of the Sobel test and Goodman test further validate the significant mediating effect of financial knowledge level in the pathway of digital finance affecting the household's allocation of risky financial assets.

## 5. Conclusion

This study examines the relationship between digital finance and household allocation of risky financial assets from three aspects: the likelihood, depth, and breadth of household participation in the risk financial market. The results show a significant positive correlation between digital finance and household allocation of risky financial assets. Specifically, households with digital finance are more likely to allocate risky financial assets, allocate a higher proportion of risky

financial assets to their total assets, and hold a greater variety of risky financial assets. In the mechanism analysis, the mediating effects are examined using stepwise regression and Sobel tests. The findings suggest that digital finance can influence household allocation of risky financial assets by enhancing financial accessibility and financial knowledge level among residents.

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