

Can the Development of Digital Finance Improve the Financial Asset Allocation Efficiency of Middle Class Households?

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Abstract. With the development of economy, the middle class families have become the backbone of the society, and efficient family financial asset allocation is undoubtedly of great significance for their realization of wealth creation, preservation and transmission. Based on the CHFS database, this paper empirically examines the impact of digital finance development on the efficiency of financial asset allocation of middle class households and the transmission path. It is found that the development of digital finance can significantly improve the financial asset allocation efficiency of middle class families mainly through promoting social interaction, improving financial literacy and increasing risk appetite.

1. Introduction

With the rapid development of China's economy, household wealth has accumulated rapidly. According to 2021 statistics from the National Bureau of Statistics, 140 million Chinese households have reached the middle class level. This not only means that middle-class families have become the backbone of China's social and economic development, but also means that the overall level of household demand is shifting from basic consumption to higher level of investment demand, so as to realize the preservation and appreciation of household financial assets, which has become the main demand of households for financial asset allocation. However, the Household Wealth Index Survey Report for the first quarter of 2022 shows that most households in China do not participate enough in the financial market and have a relatively undiversified financial asset allocation structure. How to realize the diversification and diversification of household financial assets and improve the allocation efficiency are urgent problems to be solved at present.

As a means of financial development and innovation, digital finance is favored by people for its service availability and convenience, and to a certain extent, improves household financial market participation and financial asset allocation diversity. Considering the core role of middle class families in economic and social development, and compared with wealthy class who are more inclined to high-end wealth management and low-income families who lack investment demand, middle class families may respond more actively to the development of digital finance. Taking middle class families as research objects, it is representative to explore the impact of digital finance development on the efficiency of family financial asset allocation. Relevant

research is of great significance to better stimulate the investment intention of middle class families, release investment potential, improve family property income, and play the role of "social stabilizer" and "economic accelerator" of middle class families. At the same time, it can also provide new ideas for the allocation of household financial assets of the rich class and the low asset class, and accelerate the process of China towards an "olive" shaped society and achieve common prosperity.

2. Review of Relevant Literature

With the rapid accumulation of residents' wealth, the rational allocation of household financial assets has attracted increasing attention. A large number of studies have shown that the number of years of schooling, marital status and risk attitude of household heads [8][10], gender difference of children, and home ownership are the key factors affecting family financial market participation and asset allocation portfolio diversity. However, other scholars focus their research on the efficiency of household financial asset allocation, believing that maximizing investment returns by optimizing household financial asset allocation is the key to maintaining and increasing the value of household financial assets. Weixing Wu et al. (2015) [6] found that higher financial literacy of household heads is conducive to improving the effectiveness of their household investment portfolios. Mingzhu Qi et al. (2019) [5] pointed out that the influence of the age of the household head on the efficiency of the household financial allocator presents a "bimodal" relationship. Li Zhou (2021) [2] explored the relationship between population aging and household asset allocation efficiency from the perspective of population aging and debt leverage

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structure, while Pelizzon (2009) [11] explored the impact of housing ownership on household financial asset allocation efficiency from the perspective of resident characteristics of their sample countries, and proposed completely opposite views.

With the development of digital finance, especially the continuous emergence of digital financial products, some scholars have shifted their research focus to the constraints of digital finance on household credit [9], household consumption [7], entrepreneurship and the effect of household poverty reduction. However, there are few researches on the influence of digital finance on household financial asset allocation, and most of them focus on the influence of digital finance on participation in household financial asset allocation [1] and portfolio diversity. The results show that digital finance has an impact on household financial allocation behavior by reducing information search costs [12], broadening financial service boundaries [4], and improving the level of risk taking [3]. The impact of the development of digital finance on the efficiency of household financial asset allocation is rarely considered, and there is a lack of relevant research on the effect of the development of digital finance on the efficiency of middle-class family financial asset allocation.

Based on the above analysis, this paper focuses on the increasingly large middle class families in China, and uses the national survey data of the Family Finance Survey and Research Center (CHFS) of Southwestern University of Finance and Economics to study the impact of the development of digital finance on the financial asset allocation efficiency of Chinese middle class families. The innovation points are as follows: first, existing studies on the middle class mainly study the formation, composition and social function of China's middle class from the perspectives of sociology, politics and geography. Few scholars pay attention to the performance of middle class families in improving the efficiency of financial asset allocation. Therefore, this study can make up for the deficiencies in this aspect. Secondly, in existing studies on the correlation between digital finance and family finance, most scholars use digital financial inclusion index instead of digital financial index, which leads to the problem of data mixing. However, this study constructs digital financial development index from a micro perspective, namely the perspective of family use, and analyzes the impact of digital financial development on the financial asset allocation efficiency of middle-class families. It is a beneficial exploration to improve the measurement effectiveness of digital financial development index.

3.Theoretical Analysis

The development of digital finance integrates finance with big data, cloud computing, blockchain and other new technologies. Compared with traditional finance, digital finance has advantages such as low cost, high efficiency and wide range of services, which increases the availability and convenience of financial services for households. However, most adult members of middle

class families have good educational background, better ability to accept new things, and positive response to the development of digital finance. For example, in terms of mobile payment, according to the 2019 China Mobile Payment Industry Development Report released by the Internet Finance Association of China, the usage rate of middle-income people reached 70.8%. In terms of digital finance, according to the 2019 Financial Market Development Report of China Banking Industry released by China Banking Association, the average amount of financial investment of middle-income people is 148,000 yuan, and the scale and frequency of financial investment have increased significantly. In terms of online lending, according to the Research Report on China's Online Lending Industry (2020) released by Tencent Research Institute, middle-income groups are one of the main participants in online lending, accounting for 29.9%, while low-income groups and high-income groups have relatively low participation in online lending. It can be seen that compared with high-income groups and low-income groups, middle-income groups have more outstanding performance in mobile payment, digital finance and online lending, which also reflects the increasing demand and recognition of middle-income groups for digital financial products. The development of digital finance can affect the financial asset allocation behavior of middle class families.

3.1.Digital Finance Reduces the Cost of Investment Information for Households by Promoting Social Interaction

The development of digital finance reduces the cost of obtaining investment information by promoting social interaction and thus improves the efficiency of financial asset allocation of middle class families. In the traditional financial business, residents have to spend a lot of time to collect information related to the asset allocation of financial families and to deal with relevant business in entity institutions, which undoubtedly consumes a lot of time cost for ordinary wage earners, especially for middle class families who place great emphasis on time efficiency. From the perspective of information economics, the high cost of obtaining information will inhibit investors' willingness to participate in risky financial markets. The development of digital finance and the integration of big data technology can break through the "time-space limitation" of financial services, generate accurate investment portraits for residents' families and provide personalized and accurate push services, and reduce the cost of information search for residents' families. At the same time, households can also take the initiative to obtain rich investment information through various investment service platforms. This enhances the online social interaction between the supply side and the demand side of digital financial services, realizes convenient financial information interaction for households, reduces the cost of information search, stimulates investment demand, and improves the effectiveness of financial decision-making.

Middle class households, the main demanders of digital financial services, are more motivated to actively interact and obtain low-cost investment information than wealthy households, and are better able to understand relevant investment information than low asset households. Therefore, the development of digital finance can reduce the cost of obtaining investment information by promoting social interaction, thus improving the efficiency of financial asset allocation of middle class families.

3.2. The Development of Digital Finance Contributes to the Further Improvement of Household Financial Literacy

A large number of studies show that there is a positive correlation between financial literacy and the efficiency of household financial asset allocation. And the development of digital finance is helpful to further improve residents' financial literacy. With the emergence of a large number of financial planning apps and third-party payment apps, the development of digital finance not only provides residents with more diversified forms of financial services, but also provides residents with more channels to acquire financial knowledge. People can not only acquire relevant financial knowledge through traditional media channels, but also through the financial literacy zone in these mini programs. Multi-channel access to financial knowledge can help residents further improve financial literacy, cross the "digital divide", and improve the efficiency of household financial asset allocation.

The middle class mainly comes from the "middle and second generation" or multiple generations. Most of them have received good education, have stronger learning ability, and have better absorption and application ability of financial knowledge popularization brought by the development of digital finance. Compared with the rich class, middle class families are more motivated to learn financial knowledge to improve their own financial literacy, so as to better allocate family financial assets and realize the demand of "creating, keeping and passing on wealth". Therefore, the role of the development of digital finance in promoting family financial literacy is more obvious in middle-class families.

3.3. The Development of Digital Finance can Help Increase Household Risk Taking

The basic risk preference of household investment decision makers will change with the change of environment. The development of digital finance puts residents' families in various financial scenarios, enhances their trust in digital finance, weakens "risk concerns", enhances their awareness of risks, improves their level of risk taking, and subtly changes their risk preference. To a certain extent, it can enhance the confidence and willingness of residents to allocate financial assets reasonably. Compared with low-asset families, middle-class families generally have stable

occupations and sources of income, strong ability to bear risks, and most of them have received good education and have a broader vision, strong ability to accept digital finance, and their working and living environments are more exposed to various financial scenes. Therefore, digital finance has a more prominent impact on the risk preference of middle-class families. The development of digital finance is likely to improve the financial asset allocation efficiency of middle class households by changing their risk preference.

4. Data, Variables and Model Building

4.1. Data Description and Variable Definition

The data were selected from the Household Finance Survey and Research Center (CHFS) of Southwestern University of Finance and Economics in 2015, 2017 and 2019. According to China's National Bureau of Statistics, a family with an annual household income of 100,000 to 500,000 yuan is defined as middle class. The data of 15,426 households were obtained after processing.

4.1.1. Financial Asset Allocation Efficiency of Middle Class Households

Referring to the method of Mingzhu Qi and Chenggong Zhang(2019), the expected rate of return of household financial asset allocation portfolio is used to replace the efficiency of household financial asset allocation. The calculation is as follows:

$$expect_{j,t} = \sum_{i=1}^4 p_i R_i, i = 1, 2, \dots, 4 \quad (1)$$

Where $expect_{j,t}$ denotes the financial asset allocation efficiency of the j -th household, P_i denotes the proportion of each asset in the total financial asset, R_i denotes the investment return rate of each financial asset, i denotes the Class i asset, $i=1, \dots, 4$.

The financial asset allocation portfolio of middle class households investigated in this paper includes the following four types: stocks, funds, bank financing and bonds. Using the research method of Pelizzon and Weber (2008) [13] for reference, the index substitution method is used to represent the return on various assets of household to calculate the expected return on financial asset allocation of household.

4.1.2. Digital Finance Development

The development of digital finance can be investigated from its breadth and depth of use. Considering that the core of this study is to study the impact of the development of digital finance on the financial asset allocation efficiency of middle class families from the micro level of family, and pay more attention to the impact of digital finance on the family in the daily life of middle class families, dummy variables are adopted to measure the breadth of use of digital finance according to the questions in the CHFS questionnaire. That is, if a middle class family uses digital payment, digital

financial management or digital lending, it indicates that the family uses digital finance and $digfin1=1$, otherwise $digfin1=0$. $digfin2$ was used as the key explanatory variable to measure the depth of use of digital finance.

4.1.3. Digital Finance Development

The characteristics of household head and family characteristics are selected as two level control variables. Characteristic variables of household head include gender (male =1, female =0), age, years of education (no schooling =0, primary school =6, middle school =9, high school =12, higher vocational college =13, bachelor =16, master =19, doctor =23), marital status (married =1, unmarried =0), health status (1-5 points, The higher the score, the healthier), political background (Party member =1, masses =0), pension insurance (yes =1, no =0), medical insurance (yes=1, no =0). Household characteristic variables include household registration status (rural =1, urban =0), household population size, logarithm of per capita income, logarithm of total household assets, and number of houses. In addition, both the year fixed effect and province fixed effect were controlled in the empirical analysis. See Table 1 for the definitions and descriptive statistical results of the above variables.

4.2. Model construction

Multiple regression model is adopted to estimate the possible impact of digital financial development on the efficiency of financial asset allocation of middle-class households. The model is set as follows:

$$expect_{j,t} = \alpha_0 + \alpha_1 X_{j,t} + \beta Control_{j,t} + \gamma_t + \delta_p + \varepsilon \quad (2)$$

$expect_{j,t}$ indicates the financial asset allocation efficiency of the j -year household; α_0 is a constant term; α_1 is the core explanatory variable coefficient; $X_{j,t}$ are explanatory variables, including $digfin1$ and $digfin2$; $Control_{j,t}$ is other control variables that may affect the efficiency of household financial asset allocation, β is the coefficient of control variable, γ_t is the time fixed effect. δ_p is the provincial fixed effect; ε is a random perturbation term.

5. Empirical Analysis

5.1. Baseline Regression Analysis

The empirical results show that the coefficients of $digfin1$ and $digfin2$ are 0.236 and 1.018 respectively, both of which are significantly positive at the 1% level, indicating that $digfin1$ and $digfin2$ have a positive effect on the efficiency of household financial asset allocation.

In terms of control variables, in terms of the characteristics of the household head, the gender variable coefficient is significantly negative, that is, the financial asset allocation efficiency of the household headed by male is lower. The possible reason is that the investment style of the household headed by female is more cautious, and they can fully acquire various information and make decisions to improve the asset allocation efficiency. Of course, there may also be a "survivor bias". Under the tradition of "The man takes care of the outside and the woman takes care of the inside", the female head of the household must have outstanding ability. In particular, the middle class couples are more matched in educational background and family status, and the female head of the household is more likely to have a good educational background, which makes the risk control more accurate and their asset allocation decisions more reasonable and effective. There is an inverted U-shaped relationship between the age of the householder and the efficiency of financial asset allocation of the middle class families. With the increase of the age of the householder, his experience, investment experience and wealth are further accumulated, which is more conducive to the effective allocation of family financial assets. However, the marginal effect of this enhancement effect decreases, and when it reaches a certain critical point, the householder's cognitive ability and risk taking level gradually decrease. It has a reverse effect on the efficiency of household financial asset allocation. From the perspective of family characteristic variables, the financial asset allocation efficiency of middle-class families with rural hukou is lower. The possible reason is that some rural households with hukou are at the stage of purchasing improved housing. If they want to buy a home in first-tier cities, even if their income level reaches the level of middle-class families, it will still take a certain period of time to accumulate funds, which will have a "crowding out effect" on families' participation in the financial market. The family population size coefficient is significantly negative, which may be due to the fact that middle-class families pay attention to human resources investment and have a large educational burden, which restricts the effectiveness of financial asset allocation of middle-class families. The above results passed the endogeneity test and the robustness test.

Table 1. Baseline Regression Result

	(1)	(2)	(3)	(4)	(5)	(6)
	expect	expect	expect	expect	expect	expect
$digfin1$	0.916*** (24.961)	0.433*** (9.707)	0.236*** (5.159)			
$digfin2$				1.453*** (32.435)	1.178*** (23.996)	1.018*** (20.391)
gender		-0.334*** (-4.346)	-0.304*** (-3.991)		-0.310*** (-4.100)	-0.287*** (-3.810)
age		0.096***	0.081***		0.085***	0.073***

		(3.512)	(2.967)		(3.168)	(2.742)
age2		-0.001***	-0.001***		-0.001**	-0.001**
		(-3.115)	(-2.652)		(-2.389)	(-2.051)
edu		0.149***	0.102***		0.122***	0.086***
		(14.897)	(10.277)		(12.382)	(8.751)
married		0.008	0.009		0.033	0.048
		(0.060)	(0.073)		(0.272)	(0.392)
health		-0.064**	-0.118***		-0.077**	-0.120***
		(-2.031)	(-3.749)		(-2.466)	(-3.857)
party		0.163*	0.135		0.163**	0.138*
		(1.951)	(1.628)		(1.983)	(1.696)
pension		0.150**	0.094		0.089	0.048
		(2.300)	(1.436)		(1.379)	(0.742)
medical		0.117	0.126		0.111	0.117
		(1.105)	(1.207)		(1.064)	(1.130)
hukou		-0.838***	-0.576***		-0.705***	-0.501***
		(-14.015)	(-9.553)		(-11.921)	(-8.379)
hhszise			-0.137***			-0.126***
			(-7.154)			(-6.625)
income			0.616***			0.513***
			(7.956)			(6.677)
asset			0.385***			0.302***
			(15.350)			(12.245)
house			-0.055			-0.040
			(-1.205)			(-0.881)
_cons	3.271***	-0.089	-11.332***	0.634***	-2.187***	-11.095***
	(18.093)	(-0.139)	(-10.494)	(3.021)	(-3.446)	(-10.412)
Year	Yes	Yes	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes	Yes	Yes
N	15426	15424	15424	15426	15424	15424
r2	0.078	0.128	0.149	0.122	0.156	0.170

t statistics in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

5.2.Mechanism Analysis

In order to further study the mechanism of the development of digital finance to improve the financial asset allocation efficiency of middle class families, combined with the theoretical analysis results in Part 3, the following three approaches are discussed from social interaction, financial literacy and risk preference, and the model is set as follows:

$$expect_{j,t} = \alpha_0 + \alpha_1 X_{j,t} + \beta Control_{j,t} + \gamma_t + \delta_p + \varepsilon \quad (3)$$

$$Med_{j,t}^* = \alpha'_0 + \alpha'_1 X_{j,t} + \beta' Control_{j,t} + \gamma'_t + \delta'_p + \varepsilon' \quad (4)$$

$$expect_{j,t} = \alpha''_0 + \alpha''_1 X_{j,t} + \alpha_2 Med_{j,t}^* + \beta'' Control_{j,t} + \gamma''_t + \delta''_p + \varepsilon'' \quad (5)$$

Med*_{j,t} were mediating variables, which were social interaction, financial literacy finknow and risk preference.

5.2.1.Social Interaction

In order to reflect the level of social interaction more objectively, this paper uses logarithm to measure the variables of social interaction of middle class families by adding up the annual communication network expenses of families and transferring expenditures such as red envelopes and gifts during festivals. Column (2) and (5) of Table 2 show that the influence coefficients of the use of digital finance and the depth of use of digital finance on social interaction are 0.33 and 0.274 respectively, both of which are significant at the 1% level, that is, digital finance can significantly promote social interaction. Column (3) and (6) show that the influence coefficients of social interaction on the financial asset allocation efficiency of middle-class families are 0.13 and 0.087, respectively, both at the level of 1%. The empirical results show that the development of digital finance improves the financial asset allocation efficiency of middle-class families by promoting social interaction and reducing the cost of investment information acquisition.

Table 2 Social Interaction

	(1)	(2)	(3)	(4)	(5)	(6)
	expect	social	expect	expect	social	expect
digf	0.236***	0.330***	0.193***			
	(5.159)	(9.779)	(4.143)			
digf				1.018***	0.274***	0.994***
				(20.391)	(12.641)	(19.733)
soci			0.130***			0.087***
			(5.990)			(4.067)
Con	Yes	Yes	Yes	Yes	Yes	Yes
Yea	Yes	Yes	Yes	Yes	Yes	Yes
Pro	Yes	Yes	Yes	Yes	Yes	Yes
N	15424	15424	15424	15424	15424	15424
r2	0.149	0.087	0.151	0.170	0.092	0.170

t statistics in parentheses * p < 0.1, ** p <

5.2.2. Financial Literacy

According to the CHFS questionnaire, the score of the household head in answering questions related to financial investment in the questionnaire is taken as an indicator to measure the financial literacy of the household head. The more correct the number of questions, the higher the score, the higher the financial literacy. The regression results in Table 3 (5) and (6) show that the influence coefficient between the depth of

use of digital finance and financial literacy is 0.072, and the influence coefficient of financial literacy on the efficiency of financial asset allocation of middle-class families is 0.303, both of which are significant at the 1% level. This indicates that with the continuous improvement of the depth of the use of digital finance, residents' financial literacy has been improved, which effectively improves the efficiency of financial asset allocation of middle-class families.

Table 3. Financial Literacy

	(1)	(2)	(3)	(4)	(5)	(6)
	expect	finknow	expect	expect	finknow	expect
digfin1	0.236***	0.001	0.236***			
	(5.159)	(0.138)	(5.173)			
digfin2				1.018***	0.072***	0.996***
				(20.391)	(8.482)	(19.897)
finknow			0.363***			0.303***
			(6.490)			(5.468)
Control	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes	Yes	Yes
N	15424	15424	15424	15424	15424	15424
r2	0.149	0.387	0.152	0.170	0.390	0.172

t statistics in parentheses * p < 0.1, ** p < 0.05, *** n < 0.01

4.2.3. Risk Appetite

In order to better measure the investment preference of middle class households, this paper takes the answers to the questions about the investment preference of household heads in CHFS as the measurement index. The answers were divided into five categories, with the higher the score, the greater the preference for venture

capital. The results are shown in Table 4. The use and depth of digital finance can significantly increase householders' risk preference. In columns (3) and (6), risk preference has a significantly positive impact on the financial asset allocation efficiency of middle-class families, that is, digital financial development improves the financial asset allocation efficiency of middle-class families by changing risk preference.

Table 4. Risk Appetite

	(1)	(2)	(3)	(4)	(5)	(6)
	expect	risk	expect	expect	risk	expect
digfin1	0.259*** (3.714)	0.127*** (2.766)	0.200*** (2.875)			
digfin2				1.142*** (16.615)	0.263*** (11.596)	1.032*** (15.009)
risk			0.465*** (15.188)			0.418*** (13.702)
Control	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes	Yes	Yes
N	11247	11247	11247	11247	11247	11247
r2	0.144	0.126	0.163	0.164	0.136	0.179

t statistics in parentheses * p < 0.1, ** p <

6. Conclusion

This paper studies the influence of the development of digital finance on the efficiency of financial asset allocation of middle class households and the mechanism path by using the data of CHFS micro-survey in the third phase. The following conclusions are drawn: (1) The development of digital finance significantly improves the efficiency of financial asset allocation of middle-class families, which shows that the development of digital finance significantly improves the expected return rate of financial asset allocation portfolio of middle-class families; (2) The development of digital finance mainly improves the efficiency of financial asset allocation of middle class households through promoting social interaction, improving financial literacy and increasing risk appetite.

The research results are of great significance. The research results show that the development of digital finance can significantly improve the efficiency of financial asset allocation of middle-class families. In order to give full play to the role of the middle class family as a social stabilizer and economic development accelerator, we must vigorously develop digital finance, especially to provide personalized digital financial services for the characteristics of the middle class family, and fully stimulate the investment potential of the middle class family. And according to the mechanism of the development of digital finance on the efficiency of financial asset allocation of middle-class families, in order to maximize the positive role of digital finance, the government should strengthen the guidance of digital financial infrastructure construction, encourage financial institutions to provide higher quality and more convenient platforms for financial information interaction and learning, and popularize financial knowledge and education. Subtly change the risk preference of residents to improve the level of risk sharing; Resident families should make full use of the convenience platform brought by the development of digital finance, actively learn financial knowledge, improve financial literacy, make better decisions about family financial asset allocation, and realize the needs of family wealth creation, wealth preservation and wealth transmission.

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