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Family Savings Behavior Change Due to Mobile Payments

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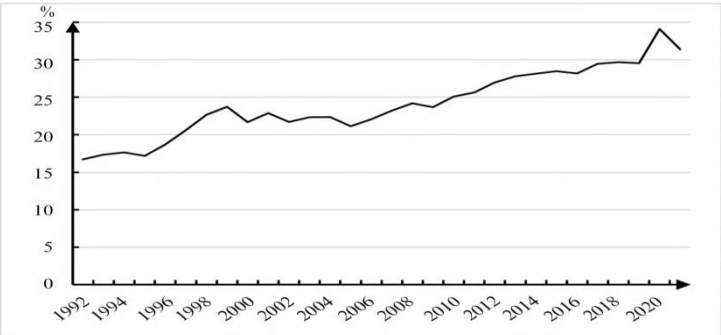
Abstract: The high savings rate of Chinese families is well-known. Based on data from a family survey, this paper's empirical results show that mobile payments significantly reduce the family savings rate. Easing liquidity constraints, credit constraints, and expanding social networks are the main ways that mobile payment reduces the family savings rate. The results of this paper provide a new perspective for understanding the high savings problem in China.

1. Introduction

In recent decades, China's economy has made great progress, and residents' income and wealth have increased effectively. However, China's domestic consumption rate has only risen from the lowest point of 48.91% in 2010 to 54.82% in 2020 (see Fig. 1), which is still far lower than that of most countries in the world. According to World Bank data in 2020, the total domestic consumption rate of the United States and the United Kingdom is 81.73% and 83.34%, respectively; the consumption rate of India and Brazil is 71.08% and 83.20%, respectively. Increasing the consumption rate can directly increase the GDP growth rate. Therefore, studying the saving behavior is of great significance is shown in Figure 1.



Source: China Statistical Yearbook

Figure 1: China's Family Savings Rate from 1992 to 2021

Over the past decade, China's digital economy has been developing rapidly. According to the "49th Statistical Report on the Development of China's Internet", as of December 2021, China's online payment users reached 904 million. As a major manifestation of the digital economy, mobile payment has gained a large number of users by virtue of its convenient payment, low transaction cost, and the provision of financial services. According to the "Overall Situation of Payment System Operation in 2021" released by the People's Bank of China, the mobile payment business reached 151.228 billion pens, and the transaction amount reached 526.98 trillion yuan, with a year-on-year growth of 22.73% and 21.94% respectively. Mobile payments based on platforms such as WeChat and Alipay provide residents with microcredit services such as changing loans, changing flowers, etc., and help financial institutions collect credit information of users, which can effectively alleviate liquidity constraints and credit constraints of families. Therefore, this paper attempts to explore the impact of mobile payment on family savings rate to fully realize the contribution of consumption potential to GDP growth.

2. Literature Review and Research Hypothesis

2.1. Literature Review

The literature has explored the factors affecting the savings rate from three main perspectives.

First, the liquidity constraint perspective. Underdeveloped financial markets, information asymmetry and insufficient supply of consumer credit constrain consumers' liquidity, which leads to high family savings [3]

Second, the precautionary savings perspective. Precautionary savings refer to the additional savings made by families to cope with future uncertainty [8]. Uncertainty about education, income, unemployment, and health care increases the incentives for precautionary savings [8, 9].

Third, the social security perspective. The "retirement effect" caused by pension payments increases the family savings rate [6]. Social security does not have a significant effect on the family savings rate [11]. There is little literature on this issue from the perspective of mobile payments.

This paper focuses on the literature on digital finance from the perspective of liquidity constraints and precautionary savings. The emergence of digital finance enables financially excluded residents to access financial services, reduces liquidity constraints, and thus improves their intertemporal consumption [2]. Mobile payments, as an important component of digital finance, improve families' risk diversification ability and family consumption level [7, 10]. Mobile payment plays its financial function while expanding the family social network, which serves as an informal insurance mechanism to mitigate the impact of uncertainty on the family savings rate [1]

2.2. Research Hypothesis

The liquidity constraint theory is proposed by building a two-period intertemporal choice model to conclude that the liquidity constraint will increase the current savings rate of households. Specifically, when families are subject to liquidity constraints, their own resources can't be allocated efficiently and the current consumption is smaller than the consumption of the future period, which leads to a higher current saving rate of families [4].

Digital finance, as a useful supplement to traditional finance, expands the coverage of finance, reduces the cost of obtaining financial services [3], improves financial accessibility, and effectively alleviates the liquidity constraints faced by families [1]. On the one hand, the small amount of borrowing and lending function of mobile payment alleviates the liquidity constraints faced by families. On the other hand, the use of mobile payment helps banks and other financial institutions collect family credit information, which helps families get out of the dilemma of not being able to

obtain formal credit due to information asymmetry. This effectively alleviates the credit constraints faced by families [10], helping families complete intertemporal resource allocation and thus reducing the family savings rate.

According to the above analysis, this paper proposes hypotheses 1, 2, and 3:

H1: Mobile payments can reduce family savings rates.

H2: Mobile payment can reduce family savings rate by alleviating its liquidity constraints or credit constraints.

H3: Mobile payment can reduce family savings rate by expanding its social network as shown in Figure 2.

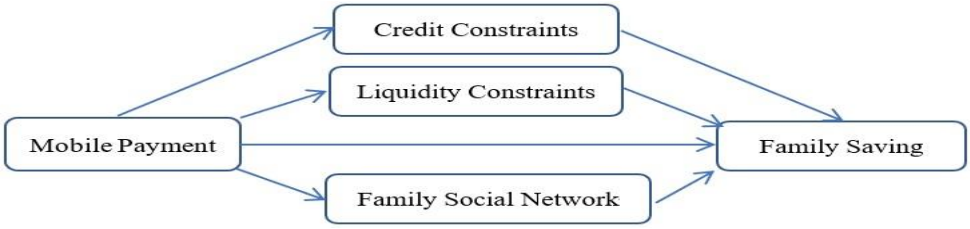


Figure 2: Research Framework

3. Data, Variables and Regression Model

3.1. Data Sources

This project adopts a stratified random sampling method when selecting the researched subjects. Firstly, 5 out of 16 districts in Shanghai were randomly selected; then 4 streets/towns were randomly selected in each district, and a total of 20 streets/towns were selected; then in each street/town, 4 residential neighborhoods were randomly selected, and a total of 80 residential neighborhoods were selected; finally, in each residential neighborhood, 8 families were randomly selected, and a total of 640 families were selected. The sampled families were subjected to a market survey related to residential family real estate investment and stock investment. The survey included detailed data on the family's demographic characteristics, assets and liabilities, insurance and protection expenditures and income, financial literacy, and the family's education.

3.2. Variables

Dependent Variables: This paper uses the following three common ways to define the saving rate:

$$\text{Saving1} = (\text{Total Income} - \text{Consumption Expenditure}) / \text{Total Income} \quad (1)$$

Among them, family consumption expenditures include food expenditures, clothing expenditures, housing expenditures, family equipment and service expenditures, transportation and communication expenditures, education, recreation and entertainment expenditures, healthcare expenditures, and other expenditures.

Since education and health care expenditures are rigid expenditures and have investment attributes. In order to maintain the robustness of the results, the following saving rate 2 is defined.

$$\text{Saving2} = (\text{Total Income} - \text{Consumption Expenditure} + \text{Healthcare Expenditure} + \text{Education Expenditure}) / \text{Total Income} \quad (2)$$

The saving rate 3 is defined as the natural logarithm of family income minus the natural logarithm of family consumption [5].

$$Saving3 = \ln(\text{total income}) - \ln(\text{consumption expenditure}) \quad (3)$$

Independent variables. Mobile payment is assigned a value of 1 to families with third-party payment accounts such as Alipay, WeChat Pay, Jingdong NetBanking Wallet, Baidu Wallet, etc., and 0 otherwise.

Control variables. (1) Family characteristic variables include total family income, family asset liability ratio, proportion of elderly, proportion of children, pension insurance participation, and health insurance participation. (2) Family head characteristic variables include age, age squared/100, married, years of education, health status, agricultural hukou, work status, and smartphone. (3) Community characteristic variables are mainly the economic status of the community.

3.3. Regression Model

Basic measurement model:

$$Savingi = \beta 0 + \beta 1 Paymenti + \beta 2 Xi + \mu i + ei \quad (4)$$

Where subscript i represents the family, Savingi represents the saving rate of the ith family. Paymenti represents the use of mobile payment of the ith family. Paymenti = 1 represents the use of mobile payments of the ith family; Paymenti = 0 represents the non-use of mobile payments of the ith family. Xi is the control variable, including the family head characteristic variable, family characteristic variable, and community characteristic variable. μi represents the family fixed effect. ei represents the disturbance term, where ei ~ N(0, ε2).

In order to investigate the mediating mechanism of mobile payment on family saving rate, the following econometric model is established:

$$Savingi = \alpha 0 + \alpha 1 Paymenti + \alpha 2 PaymentiYi + \alpha 3 Yi + \alpha 4 Xi + \mu i + ei \quad (5)$$

Where Yi represents the liquidity constraint dummy for family i and social network and the associated risks faced by the family. Savingi represents the savings rate of family i. Xi represents the control variables. μi represents the family fixed effect. ei represents the disturbance term, where ei ~ N(0, ε2).

4. Data Analysis and Results

4.1. Analysis of Basic Results

Table 1: Basic Regression of Mobile Payments and Family Savings Rates

DV	(A) Saving1	(B) Saving2	(C) Saving3
Mobile Payment	-0.0731** (0.0125)	-0.0752** (0.0099)	-0.0764** (0.0117)
Control Variables	YES	YES	YES
Fixed Effect of Family	YES	YES	YES
N	640	640	640

Note: In Table 1, 2, and 3, ** and * represent 1% and 5% significance levels, respectively, and heteroskedasticity robust standard errors are in parentheses; for space limitations, goodness-of-fit results are not reported.

Table 1 shows the regression results of mobile payment affecting family savings rate (Model (1)). Columns (A), (B), and (C) are the regression results, respectively, under the definitions of savings rate 1, savings rate 2, and savings rate 3. The results show that the effect of mobile payment is

significantly negative, i.e., mobile payment can reduce the family savings rate. The regression coefficients of mobile payment in columns (A), (B), and (C) are -7.31%, -7.52%, and -7.64%, all significant at the 1% confidence level. These results suggest that the use of mobile payments by the family reduces its savings rate [11]. Moreover, taking three common and different measures of savings rates, this finding is stable and reliable. Therefore, H1 is supported.

4.2. Mobile Payments, Broad Liquidity Constraints and Family Savings Rates

Drawing on [12], families with financial assets worth less than two months of permanent income are defined as broadly liquidity-constrained families and assigned a value of 1; otherwise, 0. The results in columns (A), (B), and (C) of Table 2 show that the coefficients of the interaction terms between mobile payments and liquidity constraints are all significantly negative at the 5% level, indicating that mobile payments can alleviate liquidity constraints and thus reduce family savings. Furthermore, liquidity constraint 2 is defined in terms of whether families use credit cards or not. The results in columns (D), (E), and (F) of Table 2 show that the coefficients of the interaction terms between mobile payment and liquidity constraint 2 are all significantly negative at the 5% level, suggesting that mobile payment reduces the savings rate by mitigating liquidity constraint 2. Therefore, H2 is supported [13].

Table 2: Mobile Payment, Broad Liquidity Constraints and Family Savings Rates

DV	(A) Saving1	(B) Saving2	(C) Saving3	(D) Saving1	(E) Saving2	(F) Saving3
Mobile Payment	-0.0513** (0.0124)	-0.0568** (0.0131)	-0.0547** (0.0119)	-0.0386** (0.0127)	-0.0391** (0.0131)	-0.0395** (0.0134)
Mobile Payment × Liquidity 1onstraints 1	-0.0357* (0.0168)	-0.0346* (0.0157)	-0.0362* (0.0161)	null		
Liquidity 1onstraint 1	0.0539** (0.0141)	0.0485** (0.0127)	0.0513** (0.0134)			
Mobile Payment × Liquidity 1onstraint 2	null			-0.0439* (0.0163)	-0.0407* (0.0171)	-0.0395* (0.0158)
Liquidity 1onstraint 2				0.0814** (0.0174)	0.0695** (0.0158)	0.0734** (0.0161)
Control Variables	YES	YES	YES	YES	YES	YES
Fixed Effect of Family	YES	YES	YES	YES	YES	YES
N	640	640	640	640	640	640

4.3. Mobile Payments, Social Networks and Family Savings Rates

The paper suggests that social networks can reduce the family savings rate, and since formal insurance is not yet sound, low-income groups rely more on social networks. Mobile payment is accompanied by frequent information interaction, and receiving funds from far away is the main mechanism for mobile payment to play the role of risk sharing [7]. In this paper, the natural logarithm of the sum of income and expenditure on holidays (Chinese New Year, Mid-Autumn Festival, etc.) and celebrations (birthday, celebration, etc.) is used as a proxy for social network. Columns (A), (B), and (C) of Table 3 introduce the interaction terms of mobile payment and social network, and the results show that the coefficients of the interaction terms are significantly negative

at the 5% level, indicating that mobile payment further increases the negative impact of the social network on the family's saving rate.

Table 3: Mobile Payment, Social Network and Family Savings Rates

DV	(A) Saving1	(B) Saving2	(C) Saving3
Mobile Payment	-0.0674** (0.0143)	-0.0615** (0.0151)	-0.0652** 0.0138)
Mobile Payment × Social Network	-0.0049* (0.0026)	-0.0055* (0.0023)	-0.0052* (0.0027)
Social Network	-0.0014* (0.0018)	-0.0017* (0.0015)	-0.0013* (0.0016)
Control Variables	YES	YES	YES
Fixed Effect of Family	YES	YES	YES
N	640	640	640

5. Conclusion

In conclusion, this paper uses a fixed-effects model to estimate the impact of mobile payment on the savings rate of Chinese families based on micro family data and explores the mechanism of mobile payment on family savings rate. The results show that mobile payment significantly reduces the savings rate of families. Analyzing of the mechanism reveals that alleviating liquidity constraints, credit constraints, and expanding social networks are the main channels through which mobile payment reduces family savings rate. These conclusions have clear theoretical and applied values.

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