A Study on the Impact of Digital Payments on Household Consumption Level: Evidence from Microdata in CHFS

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Abstract: Amid the continuous expansion of digital payment systems, this paper analyzes the impact of digital payments on household consumption based on data from the 2019 China Household Finance Survey. The study reveals the following insights: (1) Digital payments play a pivotal role in stimulating household consumption. (2) Particularly, digital payments have a pronounced influence on the hedonic aspects of household expenditure. (3) Viewing digital payments through the prism of consumer behavior theory, their efficacy primarily stems from mechanisms such as mental accounting and present bias. These conclusions contribute to a nuanced comprehension of Chinese household consumption patterns, offering valuable considerations for unleashing consumption potential, facilitating economic dual circulation, and fostering high-quality development.

Keywords: Digital Payments; Household Consumption; Consumption Upgrading; Consumption Patterns; High-quality Economic Development

1. Introduction

In the current landscape where digitization sweeps globally, digital payments, with their distinctive advantages, are emerging as pivotal drivers of economic growth. Riding on the rapid advancements and widespread adoption of information technology, digital payments not only revolutionize traditional payment methods but also play irreplaceable roles in stimulating consumption, enhancing transaction efficiency, and optimizing resource allocation. The emergence of digital payments significantly heightens the convenience and security of transactions, igniting consumer purchasing desires and thereby fostering a thriving consumption market. Simultaneously, digital payments reduce transaction costs, boost transaction efficiency, and create more business opportunities and profit margins for enterprises. Furthermore, leveraging technologies like big data analytics, digital payments offer more precise decision-making foundations for governments and businesses, further optimizing resource allocations, propelling industrial upgrading, and driving economic development. Through in-depth exploration of the correlation between digital payments and economic growth, we can better comprehend the critical stance and impact of digital payments in economic development, providing robust support for governments and enterprises in formulating more scientifically rational policies and development strategies. Additionally, this endeavor aids in propelling the healthy advancement of the digital payments industry, infusing new impetus into economic growth.

2. Literature Review and Research Hypotheses

2.1 Literature Review

Amidst substantial scholarly endeavors in the realm of household consumption, numerous researchers have delved into the subject. With the advent of the global digital era, the digital economy has not only emerged as a crucial engine propelling economic development but also stands as a vital strategic foundation of the new wave of technological revolution. Digital payments, especially mobile payments and internet payment services, have silently emerged as significant transformative forces in global consumer behavior, quietly reshaping household consumption patterns.

Benefiting from technological advancements, digital finance can, to a certain extent, alleviate the shortcomings of traditional finance, showcasing distinct characteristics in its impact on residents' consumption. Studies

by Jiang Hongli, Jiang Pengcheng, among others, have revealed that inclusive digital finance has elevated residents' consumption levels, optimized consumption structures, and facilitated an upgrade in consumption patterns [1]. Through an analysis of CFPS data, Yi and others found that inclusive digital finance, by alleviating liquidity constraints and enhancing resident payment convenience, can elevate residents' consumption levels [2]. He and colleagues, based on CFPS data, discovered that digital finance development promotes consumption growth through facilitating payments and reducing uncertainties [3]. Based on CHFS data from 2013, Xie et al. found that digital finance alleviates household credit constraints, thereby promoting household consumption expenditure, and digital finance has a more significant incentive effect on low-income and rural household consumption [4].

While digital payments quietly transform household consumption behaviors, empirical research on the impact of digital payments on household consumption remains scant. Zhang and Peng researched the influence of mobile payments on household consumption [5]. Pei and Hu argued that mobile payments increase residents' consumption expenditure by saving time costs, lowering search costs, and reducing payment costs [6] Qiu Jiaxian, by intertwining payment outcomes with preference theory, explored their impact on household consumption [7]. Wang et al. pointed out that credit card payments can upgrade household consumption structure by increasing the proportion of enjoyment oriented and development oriented expenditures and reducing the proportion of survival oriented consumption expenditures [8]. The empirical research results of Hou and others indicate that payment digitization has a significant positive impact on household consumption, and its impact on hedonic development consumption is greater than that on survival consumption. [9] Research by Zhan et al. shows that the digital economy has a significant positive effect on the total household consumption, household development, and the proportion of enjoyment consumption [10].

Summarizing the aforementioned, existing research has already confirmed the positive impact of finance, digital finance on household consumption, yet empirical studies specifically focusing on the impact of digital payments on household consumption are evidently lacking. This paper's marginal contribution lies in Hypothesis I, providing theoretical grounds for the influence of digital payments on total household consumption. Hypothesis II categorizes household consumption into hedonic and utilitarian types, striving for a deeper understanding of the long-term performance of digitalization in household consumption. Hypothesis III, based on existing research, constructs the regulatory impact mechanisms of digital payments on household consumption, exploring the mediating role of mental accounting and present bias between digital payments and household consumption, conducting robustness tests to substantiate the research conclusions.

2.2 Research Hypotheses
H1: Digital payments have a stimulating effect on resident consumption.
H2: Digital payments have a more pronounced impact on fostering hedonic consumption within households.
H3: Through the lens of consumer behavior theory, digital payments primarily operate through mental accounting and present bias.
Data Sources, Variable Selection, and Indicator Construction

2.3 Data Sources and Variable Selection
The data for this study is sourced from the China Household Finance Survey (CHFS-2019). The specific meanings and calculation methods of each variable are shown in Table 1.
Based on the hypotheses, the regression models are established as follows:

$$\text{lntotal\_consump} = \alpha_0 + \alpha_1 \text{digital} + \alpha_2 control + \varepsilon \quad (1)$$

$$\text{lnenjoy} = \beta_0 + \beta_1 \text{digital} + \beta_2 control + \varepsilon (2)$$

$$\text{lnalive} = \gamma_0 + \gamma_1 \text{digital} + \gamma_2 control + \varepsilon (3)$$

In the models, the variables riskratio , lnenjoy, lnalive are the dependent variables, digital is the core explanatory variable, $control$ represents a series of control variables including age, marital status, health status, level of education, whether purchasing commercial insurance, and total household income. ε denotes the random disturbance term, and α, β, γ are the parameters to be estimated.

Table 1. Specific Meanings and Calculation Methods of Variables

Variables	Variable Names	Symbols	Meaning of Variables
Dependent Variables	Natural Logarithm of Total Household Consumption	lntotal_consump	Total Household Consumption
	Natural Logarithm of Hedonic Consumption	lnenjoy	Hedonic Consumption
	Natural Logarithm of Utilitarian Consumption	lnalive	Utilitarian Consumption
Independent Variables	Digital Payment	digital	Digital Payment Usage: 1 for used, 0 for not used
Control Variables	Age	age	Age represented as actual numerical value
	Marital Status	marriage	Marital Status of Household Head: 1 for married, 0 for unmarried
	Health Status	health	Health Status assigned values from 1-5, higher values indicating better health
	Level of Education	educ	Level of Education: 1 = No formal education 2 = Primary school 3 = Junior high school 4 = High school 5 = Vocational school 6 = Junior college/technical school 7 = Bachelor's degree 8 = Master's degree 9 = Doctorate degree
	Purchase of Commercial Insurance	fin_insur	Purchase of Commercial Insurance: 1 for purchased, 0 for not purchased
	Natural Logarithm of Total Household Income	lntotal_income	Total Household Income

2.4 Descriptive Statistics

Table 2. Descriptive Statistics of Each Variable

Variable	Obs	Mean	Std.dev.	Min	Max
lntotal_consump	33,355	10.86	0.889	7.212	18.95
lnenjoy	33,355	8.293	1.314	0.693	15.43
lnalive	33,355	10.17	0.830	6.122	14.46
digital	33,355	0.508	0.500	0	1
marriage	33,355	0.847	0.360	0	1
health	33,355	3.264	1.002	1	5
educ	33,355	9.195	4.099	0	22
lntotal_income	33,355	10.61	1.452	-1.894	16.31
age	33,355	56.33	13.72	16	97
fin_insur	33,355	0.0922	0.289	0	1

Table 2 presents the descriptive statistical results of the primary variables. These descriptive statistics offer a fundamental understanding of data distribution and variances between variables, aiding in further analysis and modeling.

3. Empirical Analysis

3.1 Baseline Regression Analysis

Table 3 details the impact of digital payments on total household consumption using a stepwise regression approach. Model (1) involves regressing only independent and dependent variables, while Model (2) includes the introduction of control variables. According to the results of Model (2), the coefficient of digital payments (digital) on total household consumption (lntotal_consump) is 0.401, significant at the 1% level. This indicates a significant positive correlation between digital payments and total household consumption, suggesting that digital payments facilitate household spending. This validates the hypothesis H1: Digital payments have a stimulating effect on resident consumption. This effect may be attributed to the convenience and flexibility digital payments offer, making transactions more convenient and swift. Through digital payments, households can effortlessly engage in online shopping, bill payments, e-commerce transactions, and more, eliminating the need for cash or credit cards. This convenience could potentially lead to increased frequency of spending by households, driving a tendency to purchase more goods and services. Moreover, digital payments may introduce incentives and reward mechanisms like coupons, cashbacks, which could further encourage households to opt for digital payments, subsequently boosting consumption. Therefore, the positive impact of digital payments on total household consumption likely emanates from its convenience,

flexibility, and potential for incentive mechanisms.

Table 3. Basic regression 1

	(1)	(2)
	lntotal_consump	lntotal_consump
digital	0.820***	0.401***
	(0.009)	(0.009)
marriage		0.240***
		(0.011)
health		-0.014***
		(0.004)
educ		0.035***
		(0.001)
lntotal_income		0.202***
		(0.003)
age		-0.006***
		(0.000)
fin_insur		0.136***
		(0.014)
_cons	10.443***	8.354***
	(0.006)	(0.038)
N	33355.000	33355.000
r2	0.213	0.394
F	9007.053	3096.270

Standard errors in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

Table 4 conducts an analysis on the relationships between digital payments and hedonic consumption, as well as digital payments and utilitarian consumption. According to the results, the coefficient of digital payments on hedonic consumption is 0.458, significant at the 1% level, indicating a significant positive correlation between digital payments and hedonic consumption. The coefficient of digital payments on utilitarian consumption is 0.319, also significant at the 1% level, demonstrating a significant positive correlation between digital payments and utilitarian consumption. Comparative analysis of the regression results reveals that digital payments exert a greater influence on hedonic consumption, thus affirming the hypothesis H2: Digital payments have a more pronounced impact on fostering hedonic consumption within households. This could be attributed to the association of hedonic consumption with pleasure, rewards, and gratification. The convenience and immediacy of digital payments may heighten individuals' purchasing desires, particularly when indulging in hedonistic consumption. In contrast, utilitarian consumption is typically linked to basic needs, where purchase

decisions may be more influenced by rational considerations. Furthermore, digital payment platforms may allocate more resources towards marketing and promotional activities related to hedonic consumption, aiming to attract a broader user base. This strategic focus could enhance the impact of digital payments on hedonic consumption.

Table 4. Basic regression 2

	(1)	(2)
	lnenjoy	lnalive
digital	0.458***	0.319***
	(0.015)	(0.009)
marriage	0.148***	0.164***
	(0.017)	(0.011)
health	0.035***	0.036***
	(0.006)	(0.004)
educ	0.049***	0.032***
	(0.002)	(0.001)
lntotal_income	0.219***	0.175***
	(0.005)	(0.003)
age	-0.013***	-0.002***
	(0.001)	(0.000)
fin_insur	0.186***	0.036***
	(0.022)	(0.013)
_cons	5.759***	7.727***
	(0.060)	(0.037)
N	33355.000	33355.000
r2	0.295	0.315
F	1989.644	2186.030

Standard errors in parentheses

* p < 0.1, ** p < 0.05, *** p < 0.01

3.2 Moderating Effect

Table 5. Moderating Effect

	(1)
	lntotal_consump
digital	0.400***
	(0.009)
jiaohu1	-0.006***
	(0.002)
marriage	0.237***
	(0.011)
health	-0.014***
	(0.004)
educ	0.037***
	(0.001)
lntotal_income	0.202***
	(0.003)
age	-0.006***
	(0.000)
fin_insur	0.139***
	(0.014)
_cons	8.342***
	(0.038)

N	33355.000
r2	0.394
F	2710.769

Standard errors in parentheses
* p < 0.1, ** p < 0.05, *** p < 0.01

Mental accounts can serve as personal self-regulation mechanisms to prevent overspending and maintain budgetary balance. However, these accounts are malleable, making it easy for consumers to adjust existing mental accounts or create new ones, potentially increasing spending tendencies. Given the financial services and seamless transaction processes offered by digital payment platforms, the constraints of mental budgeting loosen when utilizing digital payments. Consumers with low self-control are more prone to impulsive spending. When shopping with cash, consumers typically plan ahead or budget by creating shopping lists, estimating total expenses, and ensuring they have enough money, minimizing unforeseen impulsive purchases. Thus, self-control is crucial for users of digital payments[11]. This study utilizes users' education levels as a proxy for their self-control capabilities. By introducing the interaction term between education level and digital payments into the model, as demonstrated in Table 5, the coefficient of the interaction term is -0.006, significant at the 1% level. This suggests that consumers with higher education levels exhibit better expenditure control compared to households with lower education levels. This validates hypothesis H3: Through the lens of consumer behavior theory, digital payments primarily operate through mental accounting and present bias.

3.3 Robustness Test

To confirm whether the empirical conclusions drawn from the baseline regression can be generalized as a universal assertion or are merely incidental phenomena specific to a particular regression, this study conducts a robustness test by introducing a control variable (h_insur indicating the purchase of medical insurance) to examine the regression outcomes. The regression results are presented in Table 6, revealing that the significance of the core explanatory variables remains consistent with the previous regression findings. In summary, based on the results presented in Table 6, it can be concluded that

the model's outcomes exhibit robustness.

Table 6. Robustness Test

	(1)
	lntotal_consump
digital	0.401***
	(0.009)
h_insur	-0.040**
	(0.016)
marriage	0.241***
	(0.011)
health	-0.014***
	(0.004)
educ	0.035***
	(0.001)
lntotal_income	0.202***
	(0.003)
age	-0.006***
	(0.000)
fin_insur	0.137***
	(0.014)
_cons	8.383***
	(0.039)
N	33355.000
r2	0.394
F	2710.435

Standard errors in parentheses
* p < 0.1, ** p < 0.05, *** p < 0.01

4. Conclusion and Insight

4.1 Conclusion

This study primarily delves into an investigation and analysis of the consumption behaviors of the post-90s resident group from a micro-level perspective, based on the 2019 CHFS data. The following conclusions are drawn:

(1) The validation of H1 supports the notion that digital payments play a facilitating role in residents' consumption patterns. The convenience and security aspects of digital payments incline the post-90s group towards utilizing digital payment methods for their transactions, thereby enhancing both their consumption levels and frequencies.

(2) The confirmation of H2 underscores the greater impact of digital payments on hedonic family-oriented consumption patterns. The convenience and diversity of digital payments, alongside the influence of social media, make the post-90s group more inclined towards engaging in hedonic consumption.

(3) The validation of H3, from a consumer behavior theory perspective, suggests that digital payments primarily operate through

mental accounts and present biases in consumer behavior. The utilization patterns of digital payments and consumption habits influence consumers through mental accounts, while present biases also impact the post-90s group's attitudes and behaviors when selecting digital payment methods.

4.2 Policy Implications

Building upon the conclusions drawn above, the following policy implications are proposed:

(1) Government entities and relevant organizations can encourage increased adoption of digital payments among residents through publicity campaigns and incentive policies, thereby leveraging its role in stimulating consumption.

(2) Government bodies and financial regulatory authorities should enhance the security measures of digital payments, creating a conducive payment environment, safeguarding consumers' personal information and funds, and enhancing consumer trust in digital payment systems.

(3) Government entities and relevant organizations can enhance consumer education and awareness while refining the digital payment infrastructure to reduce risks and misconceptions for consumers during digital transactions.

Through these policy implications, there is an opportunity to better harness the positive impact of digital payments on resident consumption, promote the optimization of consumption structures, enhance consumer experiences, and facilitate the healthy development of digital payments.

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