



温州肯恩大学  
WENZHOU-KEAN UNIVERSITY

**The Impact of Electronic Payment on Household Consumption**

In Partial Fulfillment of the Requirements

for the Bachelor of Science in Finance

by

YANG Qijun

1098581

May, 2022

# The Impact of Electronic Payment on Household Consumption

May 1, 2022

Qijun Yang <sup>a,\*</sup>

*<sup>a</sup> School of Accounting and Finance, College of Business and Public Management, Wenzhou-Kean University, Wenzhou 325060, China.*

---

## Abstract

This paper explores the impact of e-payment on consumer behavior at the household level in the context of COVID-19, which studies the influence of electronic payment on household consumption behavior. This paper empirically tests the impact of e-payment on household consumption based on the data of China household Finance survey in 2017-2020. The findings suggest that electronic payment boosts household consumption. The results of robustness checks show the robustness of significance between variables. Overall, the forecast model contain useful information to explain consumption per household member, which is proved by the tests of subsamples and additional control variables methods. The results remained significant either by substituting samples, using the robust check of sub-samples from Shandong and Anhui provinces, or by adding variables and controlling variables of household income and financial assets, which proved the significant impact of electronic payment on household consumption. Under the background of aging population structure, age has positive impact on household consumption. It is of practical significance to discuss the influence of electronic

---

\*Qijun Yang. Email address: 1098581@wku.edu.cn

payment on household consumption. This study both fills in the gaps of previous household consumption research and adapts to the new change of Covid-19. According to the findings of this paper, it is of theoretical significance to provide suggestions for China's consumption and macroeconomic policies.

*JEL Classification:* G23, G11, G12

*Keywords:* electronic payment, household consumption, COVID-19

---

## **1. Introduction**

The COVID-19 pandemic is one of the most destructive global events during recent decades, which caused a huge economic and social impact, and the impact of this unprecedented disruptive event on consumer behavior has attracted widespread attention. The economic losses and social impact of it far exceed that of any other pandemic event in history. The International Monetary Fund (IMF) predicts that the gross domestic product will plummet by about 4.9% in 2020.<sup>1</sup> Meanwhile, the World Health Organization (WHO) has reported over four million global deaths due to COVID-19.<sup>2</sup> The impact of this unprecedented economic recession and social event on consumer behavior has caused widespread concern. Compared to the past, pandemic-era consumer behavior takes place some new changes.

---

<sup>1</sup> International Monetary Fund, 2020. World Economic Outlook. Available at <https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/>

<sup>2</sup> World Health Organization, 2021. Who Coronavirus disease (COVID-19) dashboard. Available at <https://covid19.who.int/>

In China, the impact of COVID-19 has gone beyond public health events such as SARS in 2002. Unlike previous pandemic events, people are in the era of "digital transformation", where electronic payment is becoming the main means of transaction and settlement. To prevent the spread of COVID-19, the Chinese government has adopted isolation policies. During this period, individuals conduct economic activities as a family unit. China is in the era of digital transformation, as a medium in the digital economy, electronic payment has developed rapidly in the past decade. The People's Bank of China (BOC) defines electronic payment as the behavior that a unit or individual directly or authorizes others to issue payment instructions through electronic terminals to realize currency payment and fund transfer.<sup>3</sup> As shown in Figure 1, China's Electronic Payment Business Report (2020), China's electronic payment business grew rapidly in 2014 and 2015, except when the cycle was broken during the epidemic in early 2020.<sup>4</sup> It grew steadily in a weekly form from 2013 to 2020 and performed well in the second and third quarters of 2020 after resuming work step by step, and its quantity and gold amount exceeded the same period of the previous year. It is worth noting the revisions for the second and third quarters' data, the application of electronic payment such as e-commerce has figured prominently in consumer behavior during the COVID-19 pandemic. The confluence of the COVID-19 pandemic and the development of electronic payments is expected to provide a new feature for consumer behavior.

The main findings of this paper points out that electronic payment has a positive impact on household consumption, and the mortgage has a negative impact on household consumption. Under the background of aging population structure, consumption is positively correlated with

---

<sup>3</sup> People's Bank of China, 2005. E-payment Guidelines. Available at [WWW.gov.cn/ztl/2005-10/31/content\\_87377.htm](http://WWW.gov.cn/ztl/2005-10/31/content_87377.htm)

<sup>4</sup> Source: China Payment System Development Report 2020

age. The results of robustness checks show the robustness of significance between variables. Overall, the forecast model contain useful information to explain consumption per household member, which is proved by the tests of subsamples and additional control variables methods. The results remained significant either by substituting samples, using the robust check of subsamples from Shandong and Anhui provinces, or by adding variables and controlling variables of household income and financial assets, which proved the significant impact of electronic payment on household consumption.

With the increasing research on the impact of electronic payment on consumers, the author argues that the previous research was limited to micro-individuals, and there are relatively few studies on household consumption behavior. Household consumption refers to the consumption carried out by the family unit as the foundation of social consumption. The consumption behaviors of family members influence each other and are similar. Moreover, during the period of closure and isolation in China, individuals conducted economic activities as a family unit, it is meaningful to study the influence of electronic payment on household consumption behavior from the household level. On the other hand, the COVID-19 is an unprecedented factor, which has a new impact on household consumption behavior, based on the further use of electronic payment during the period, as well as the new consumption environment has fostered new consumption habits of consumers. Therefore, this paper discusses the impact of e-payment on consumer behavior from the household level under the background of COVID-19, it both fills in the gaps of previous research and adapts to the new background, which has certain timeliness and theoretical significance.

In the sections below, section 2 provides literature review, section 3 provides data analysis and methodology, section 4 provides result and discussion, and section 5 provides conclusions.

## **2. Literature Review and Hypotheses Development**

Though Consumer behavior has always been a major subject of market research, the connection between electronic payment and household consumption behavior has been the debate that lacks attention in consumer behavior literature. The effects of electronic payment on household consumption behavior are complex in theory, which is an extension of the study on the impact of electronic payment on consumer behavior. This paper reviews relevant theories and evidence in the following sections from a micro and macro perspective, which respectively relate to factors influencing household consumption behavior, the relevant influence of electronic payment, and the relationship between electronic payment and consumption.

### **2.1. Factors Influencing Household Consumption Behavior**

The literature starting with Pinki (2014) recognizes that consumer behavior is influenced by four major factors: cultural, social, personal, and psychological. Gefen (2002) further emphasizes the role of cultural trends and the societal environment in guiding consumers. “Cultural trends or Bandwagon effect are defined as trends widely followed by people and which are amplified by their mere popularity and by conformity or compliance with social pressure. The more people follow a trend, the more others will want to follow it.” As a further step, David and Janet (2006) argue that “family” is maybe the most influencing factor for and individuals. It creates a social environment in which consumers evolve, develop personalities, and acquire value. Consumer behavior is strongly influenced by family members. Based on the impact of the home on consumers, Joseph et al. (2010) point out that family can be regarded as a collection of consumers abstractly, the tight-knit Chinese family structure may better reflect the economic impact of the family as a unit than the loose family structure in America. Therefore, studies on

household consumption behavior are more suitable for China or countries with similar social and cultural backgrounds. Kelly (2006) also suggests that the micro individual's personality, individual concept, and lifestyle can be seen as a whole, namely the family. William and Barry (2010) argue that psychological factors that affect consumers' behavior include motivation, perception, learning, and attitudes, other people often influence a consumers' behavior.

The empirical results found in the literature are relatively consistent. Some previous researches on influencing factors of family consumption behavior are based on the extension of individual consumers, that is, the family is regarded as a collection of individuals abstractly, and then rises to the level of a family by studying the members in the family. Joseph et al. (2010) perform a meta-analysis of several previous studies in America and China. They find the difference in family consumption behavior under different cultural and social backgrounds in China and America. Using more than 2000 families of different classes in China as samples, Shuyi (2017) confirms the similarity between family consumption and individual consumption, and the guiding influence of social culture and psychology on a family.

Based on the above discussions, the family has a significant influence on individual consumption behavior, societal environment, cultural background ,and psychological factors that have positive or negative effects on household consumption behavior. Therefore, we propose that societal environment, cultural background ,and psychological factors have positive or negative effects on household consumption behavior.

## **2.2. The Impact of Electronic Payment**

Electronic payment promotes the development of the digital age and changes people's life

greatly. In general, its advantages outweigh the disadvantages. In this paper “Influence and Countermeasures of Electronic Payment Development in Internet Era”, the author Shan (2021) mentions that the impact of electronic payment on macroeconomic and fiscal policies. At the macroeconomic environment level, China has become the most developed country in electronic payment in the world, it reflects the progress of electronic information technology, however, while providing efficiency and convenience, due to the relatively loose supervision in the early stage, a series of financial risks has been triggered, which has promoted stricter supervision and regulations in the e-payment industry, making the whole e-payment industry more secure (Weisheng, 2021). In the application of electronic payment, Wayner (2017) defines the electronic payment system into four categories: (1) online credit card payment, (2) electronic cash, (3) electronic check , and (4) micro-payment. Each of these systems has its advantages and disadvantages. From a social and individual perspective, Bezhovski (2016) points out that cash has become a less common mode of transaction, traditional payment methods have been replaced by a variety of fast and efficient electronic payment methods. White (2017) further suggests that Smartphones have seen a huge growth in the past few years due to the accessibility and usability of the Internet. Electronic wallets such as Paytm, PayPal ,and Alipay have also attracted many consumers to adopt electronic payment models, which has helped them scale of electronic payment grow significantly. Digital wallets further push the economy towards a cashless society.

Based on the above discussions, electronic payments have revolutionized the way people communicate, buy products, pay utility bills, exchange information ,and conduct business. This technology completely changes the way consumers buy and use products or services. Therefore, we propose that electronic payment has become the mainstream way of transaction in a more secure payment environment.

### **2.3. The Relationship Between Electronic Payment and Consumption**

From the macro point of view, Singh (2009) states that the cash economy brings not only direct costs to banking, but also security risks and a lack of transparency, more importantly, large amounts of cash are hoarded outside the formal economy, which limit the effectiveness of monetary policy in managing inflation and stimulating consumption growth. From the micro point of view, Alireza (2014) suggests that electronic payments can influence individual purchasing decisions and ultimately increase household consumption; Consumers' trust and awareness react to electronic payments. Tella and Adeyinka (2012) perform a regression and correlation analysis with a sample size of 384 were conducted to study the adoption of electronic payment and the effect of electronic payment on consumer purchasing decisions, as well as its impact on household spending growth.

Prelec and Loewenstein (1998) put forward the theory of "two-channel mental account", arguing that there are two channels when people consume, one of which records the positive utility obtained from consumption, namely "happiness experienced from consumption". Another channel records the disutility of paying for a gain, the "pain of paying". If the positive utility obtained by consumers is greater than the negative utility, the sense of "gain" will be stronger, if the negative utility is greater than the positive utility, the sense of "loss" will be intense. On this basis, the coupling theory proves that consumption is associated with pay. Cash makes the connection even closer. Using cash for payment makes the pain of payment more obvious and the pleasure of consumption greatly weakened, credit card payment is characterized by low transparency of payment (Soman, 2003), which makes the connection more loose, so that consumers' payment pain is more passivated, consumption satisfaction is more obvious, and

consumption can be promoted.

Tella and Adeyinka (2012) perform a regression and correlation analysis with a sample size of 384 were conducted to study the adoption of electronic payment and the effect of electronic payment on consumer purchasing decisions, as well as its impact on household spending growth. For the relationship between electronic payment and consumption, the results showed a positive statistical significance relationship. Fang et al. (2014) confirm that the factors driving consumers to use electronic payment by building an econometric model, which concludes that education level, social inclusion, income level, Internet service availability, awareness, trust, social influence, safety, security, and convenience are the main determinants of consumers' adoption of electronic payment. The findings of this study are consistent with those of Adeoti and Oshotimehin (2011). What's more, it is inferred from the research that electronic payments can influence the purchase decisions of individuals and ultimately increase household consumption. For a long time, the research on consumer behavior usually emphasizes the research on individuals. However, due to the different cultural backgrounds of China and foreign countries, which leads to the difference in consumption habits, and the consumption behavior of Chinese families cannot be explained only by the western micro individual theory.

Based on the above discussions, therefore, we propose the hypothesis.

**Hypothesis** : The adoption of electronic payment has an important impact on consumer purchase, as well as its positive correlation to the growth of household expenditure.

Whether all the above conclusions about household consumption behavior and electronic payment are still suitable for the new era is debatable. There are few existing studies on the impact of electronic payment on household consumption behavior in the context of COVID-19.

My research aims to fill this gap by studying the impact of electronic payment on household consumption in the new context.

### **3. Data and Methodology**

#### **3.1 Data**

This study employs the data from the Family Survey and Research Center of Southwestern University of Finance and Economics (CHFS), there is free of survivorship bias. Founded in 2010, CHFS is a non-profit academic research institution integrating data collection and research. It contains three databases of Chinese households, small enterprises, and urban and rural community governance. From this database, we obtain the household consumption data. Based on the results of the questionnaires, CHFS database provides information on electronic payment, annual consumption, age, sex ratio, proportion of unhealthy members, and home ownership among members of the sample households. The sample period is 2017-2020, and the sample size is 40,000. The sample families cover 355 counties and 1,428 villages in 29 provinces of China, reflecting the economic and financial conditions of Chinese families in a more comprehensive and detailed way. The preliminary statistics of the data show that the penetration rate of electronic payment in China has increased significantly, and most families take electronic payment as the main payment method. In addition, because of the income gap, Chinese families generally have a large gap in consumption, and the regional gap is the main problem.

#### **3.2 Methodology**

In this study, Stata is used for data analysis, per capita household consumption is processed

by natural logarithm. In particular, due to the special background of COVID-19, the new variable of  $Health_{i,t}$  is added to the measurement model, which measures the proportion of unhealthy households in China. The household consumption data in 2017-2020 is used to build an econometric model:

$$Consum_i = \beta_0 + \beta_1 Pay_i + \beta_2 Age_i + \beta_3 Sex_i + \beta_4 Hea_i + \beta_5 Hou_i + \varepsilon_i \quad (1)$$

(*Consum* refers to the natural logarithm of consumption per household member; *Pay* refers whether to use electronic payment, 1 indicates that electronic payment is used, 0 indicates that electronic payment is not used; *Age* is the average age of a family; *Sex* refers to the proportion of male members of a family; *Hea* refers to the proportion of family members who are unhealthy; *Hou* means whether or not have housing;  $\varepsilon$  is the random perturbation term)

According to the International Monetary Fund's statistics (2020), China's inflation rates from 2018 to 2020 are 2.075%, 2.889%, and 2.419%, respectively.<sup>5</sup> It is worth noting that China's inflation rate as measured by the Consumer Price Index was lower in 2020 than in 2019 due to the impact of COVID-19. China's monetary policy does not carry out strong quantitative easing, the economy maintains moderate inflation, and the overall price level remains stable in general, which kept household consumption data stable. Electronic payment is the explanatory variable, the others are control variables. Based on preliminary statistics, this study found the gap between the per capita consumption of sample households is very large, the maximum is 1717322.50, while the minimum is 368.40, and the gap reaches 1716954.10. Due to the relatively large income gap of Chinese families, this study adopts the method of removing extreme values. In addition, the average age of the sample families has reached 47.23, and the

---

<sup>5</sup> Source: International Monetary Fund International Financial Statistics 2020

skewness is 0.38, indicating the aging trend in China .

Finally, this econometric model is used to analyze whether the electronic payment could promote household consumption behavior, and explore the ways in which it affects. Other control variables are also discussed in this econometric model, and some practical conclusions are drawn.

## **4. Result and Discussions**

In the section below, Stata is used for regression analysis, and the results explain whether the results are statistically and economically significant.

### **4.1 Main Results**

Based on equation (1), as shown in Table 3, electronic payment promotes household consumption. Compared with households that do not use electronic payment, the per capita consumption of households with family members using electronic payment is higher. From the control variables, the average age of family members is positively correlated with the per capita consumption of the family. The proportion of male members is negatively correlated with the per capita consumption of the family. The more male members there are, the less the per capita consumption of the family will be. Compared with women, men have a weaker tendency to consume. The proportion of unhealthy family members is negatively correlated with the per capita consumption of the family. Home ownership has a negative impact on household per capita consumption at the significance level of 1%, which is contrary to the traditional theory of housing asset effect, because the mortgage loans have reduced real income.

This model uses 95% confidence level for interval estimation, and the results show that the upper and lower confidence intervals are both positive and negative, the confidence interval of electronic payment is [0.801, 0.838], the confidence interval of *Age* is [0.010, 0.011], the confidence interval of *Sex* is [-0.091, -0.015], the confidence interval of *Hea* is [-0.162, -0.080], and the confidence interval of *Hou* is [-0.303, -0.230], which suggests that there is a possibility of significant difference. In the T-test, P-value is less than 0.05, indicating that explanatory and control variables have a strong interpretation of the dependent variable, *Consum*. In the F-test, given significance level  $\alpha$  is 0.05, F-value is 1817.16. The result shows that  $F\alpha$  is greater than the critical value,  $F\alpha(k, n-k-1)$ , indicating the linear relationship of the model sets up significantly at 95% level. Based on the above analysis, it is concluded that the regression model is statistically significant at 95% level.

This study finds that the results are not statistically significant, but also economically significant. Without considering the control variables, the correlation coefficient of electronic payment is 0.62, after the addition of control variables, the correlation coefficient is 0.82, and is more significant, which proves the economic significance of electronic payment. For example, for the sample of consumption per household member of Table 3, the coefficient on electronic payment is 0.82 when the control variables are included. Thus a 100% use of electronic payment, which is less than one standard deviation, predicts a increase of 0.82 in consumption per household member in the one-year. Comparing this result to other variables in the same regression, this study finds that electronic payment is about as important economically than the housing (coefficient of -0.28) or the average age (coefficient of 0.01). A one percentage point increase in the housing (average age) predicts a 28 basis point (1 basis point) decrease (increase) in the annual consumption per household member. Because the coefficient between housing and

consumption per household member is -0.28, it points to the negative correlation between house and consumption.

## **4.2 Additional Results**

To investigate whether electronic payment is a contributing factor in our results, additional linear regression is used for re-regression in this study. In table 4, nonlinear quadratic relation is studied by square processing of explanatory variables and regression analysis of explanatory and dependent variable. Which is shown in Table 4, the correlation coefficient of electronic payment is 0.69, in the *t*-test, *p*-value is less than 0.05, indicating that explanatory and control variables have a strong interpretation of the dependent variable, consumption per household member. This proves that electronic payment is a contributing factor in our results. Similarly, this study further analyzes whether electronic payment is an effective explanatory variable by creating dummy variables and regression analysis in table 5. Which is shown in Table 4, the correlation coefficient of dummy variable is 0.69. In the *t*-test, the results of regression results are more significant overall, *p*-value is less than 0.05, indicating that explanatory and control variables have a strong interpretation of the dependent variable, consumption per household member. This proves that electronic payment is a contributing factor in our results, and also reduces the impact of endogenous problems.

## **4.3 Robustness Checks**

In the discussion below, robustness checks are carried out in this study using subsamples and additional control variables methods.

### **4.3.1 Sub-sample result**

In Table 5, this study analyzed the model by using different regions, the results show that the coefficient on the different regions remain statistically significant in the presence of all of the control variables. Therefore, the results of the model do not appear to be affected by different regions. This study divides the whole sample into two different sub-samples according to the regional gap in China, namely Shandong province and Anhui Province. The economic level of Anhui province is relatively poor compared with that of Shandong Province, which makes the result of sub-sample more prove the result. Although this selection is not fully representative of all regions, we try to keep the diversity of the two sub-samples. Which is shown in Table 6, the model fit is slightly worse for the sub-sample, and the robustness of the model is proved by parameter estimation of two subsamples.

#### **4.3.2 Income and financial assets as additional control variables**

In Table 6, Income (*Inc*) and financial asset (*Fin*) are added as additional control variables. In the forecast model above, the reasons for not adding these two additional variables are that the financial asset holding rate of Chinese households is not high and the gap is large. Real estate is the main asset of Chinese households. In addition, according to economic theory, income and consumption are positively correlated, so these two control variables are not considered. In this section, this study examine the ability of electronic payment to explain the consumption per household member in the presence of these two additional control variable, Inc and Fin. Which is shown in Table 6, income and financial asset are statistically significant. Compared with the previous results, the correlation coefficient of electronic payment decreases from 0.82 to 0.45, and income and financial asset slightly reduce the economic significance of electronic payment, but do not reduce its significance. Housing significantly change from 1% to

5% in the presence of income and financial asset. The presence of income and financial asset reduce its statistical significance, but do not exclude it. Overall, the previous forecast model contain useful information to explain consumption per household member even in the absence of income and financial asset. Electronic payment as a convenient way of payment, on the one hand, it reduces the pain for people to pay cash, on the other hand, it is not only efficient and convenient, but also provides unsecured loan, therefore, it promotes household consumption.

## **5. Conclusion**

Based on the results of regression analysis and empirical analysis, electronic payment has a positive impact on household consumption, electronic payment boosts the household consumption. Mortgage has a negative impact on household consumption, housing loan depresses the growth of consumption. The age of consumer groups shows a positive trend under the background of aging population structure.

The results of robustness checks show the robustness of significance between variables. Overall, the forecast model contain useful information to explain consumption per household member, which is proved by the tests of subsamples and additional control variables methods. The results remained significant either by substituting samples, using the robust check of subsamples from Shandong and Anhui provinces, or by adding variables and controlling variables of household income and financial assets, which proved the significant impact of electronic payment on household consumption.

At present, there are few existing studies on the impact of electronic payment on household consumption behavior in the context of COVID-19. This research fills this gap by studying the

impact of electronic payment on household consumption in the new background. However, the micro analysis of household consumption is ultimately complex, and many factors are not considered in this study. The research results obtained in this paper are obtained under ideal conditions, and more variables are still needed to be analyzed.

Based on the above findings, combined with the rapid growth of China's current electronic payment market, this study believes that the Chinese government should continue to promote the development of electronic payment, increase its coverage, and further unify the current mixed electronic payment methods in the market, such as the development of central bank digital currency. For the contradiction between housing and consumption, in the short term, this study believes that the government should keep housing prices stable and further increase workers' income, so as to reduce the actual gap between housing prices and wages. In the long run, the study argues that the Chinese government should further guide housing prices down to a reasonable range and change local fiscal revenue patterns. For consumption of the growth of the age, which showed that young Chinese consumers and western young consumption group consumption idea is different, also illustrates the change of consumption idea and Chinese young group income and debt problems, this study thinks that the Chinese government should give subsidies young labor force, low incomes and lower pensions, the current China's social security fund income showed a trend of decrease, moreover, expenditure shows an increasing trend, and the two are inverted, which indicates that the employment and income of the labor force are declining, and the aging trend is aggravated. The employment of young labor force will be a serious problem faced by China, and the shortage of social security fund caused by it can not be underestimated. Therefore, the Chinese government should give subsidies to young labor force to further expand consumption domestic demand and promote employment.

## References

- Alireza, Wilson, D., Jordan, B., 2014. A survey of the effect of social media marketing on Online Shopping of Customers by Mediating Variables. *Journal of Service Science and Management* 132, 368–376.
- David, W., Janet, G., 2000. The bowing of exploratory factor analysis as a precursor to structural equation modeling. *Journal of Financial Economics* 59, 81–232.
- Gardner, T., Gilligan, J., Stern, C., 2009. Household actions can provide a behavioral wedge to rapidly reduce US carbon emissions. *Proc Natl Acad Sci* 106, 18452–6.
- Gefen, K., 2002. Customer loyalty in e-commerce. *Journal of the Association for Information Systems* 60, 27–51.
- He, Fang., Peter, P., 2007. Decision factors for the adoption of an online payment system by customers. *Journal of International E-Business Research* 34, 1–32.
- Rolph, E., Ronald, L., William, C., 1997. Multivariate data analysis. *The Quarterly Journal of Economics* 112, 696–756.
- Joseph, F., Rolph, E., 2010. Dynamic pricing and consumer fairness perceptions. *Journal of Consumer Research* 33, 304–305.
- Kelly, L., 2006. Pricing on the Internet. *Journal of Product and Brand Management* 19, 274–87.
- Olivia, F., 2003. Dynamic pricing in Internet retail: effects on consumer trust. *Psychology Marketing* 20, 495–513.
- Osterhus, T., 1997. Pro-social consumer influence strategies: when and how do they work? *Journal of Financial Economics* 61, 16–29.
- Ouyang, J., Hokao, K., 2009. Energy-saving potential by improving occupants' behavior in urban residential sector in Hangzhou city. *Journal of Financial Economics* 41, 711–20.
- Pinki, R.J., 2014. Factors influencing household consumption behavior. *Journal of Economics* 11, 42–64.
- Shan, Li., 2021. Influence and countermeasures of electronic payment development in internet era. *China New Communications* 15, 64–65.
- Soman, D. 2003. The Effect of Payment Transparency on Consumption: Quasi Experiment from the Field. *Marketing Letters* 14, 173-183.
- Tella, W., Adeyinka, L., 2012. Determinants of e-payment system success : a user's satisfaction perspective. *International Journal of Electronic Adoption* 43, 15–38.
- Vining, J., Bechtel, R., 2003. Emerging theoretical and methodological perspectives on conservation behaviour. *New Handbook of Environmental Psychology* 64, 541–58.

Wayner, C.P., 2017. Electronic payment and implications. *Journal of Financial Economics* 53, 335–384.

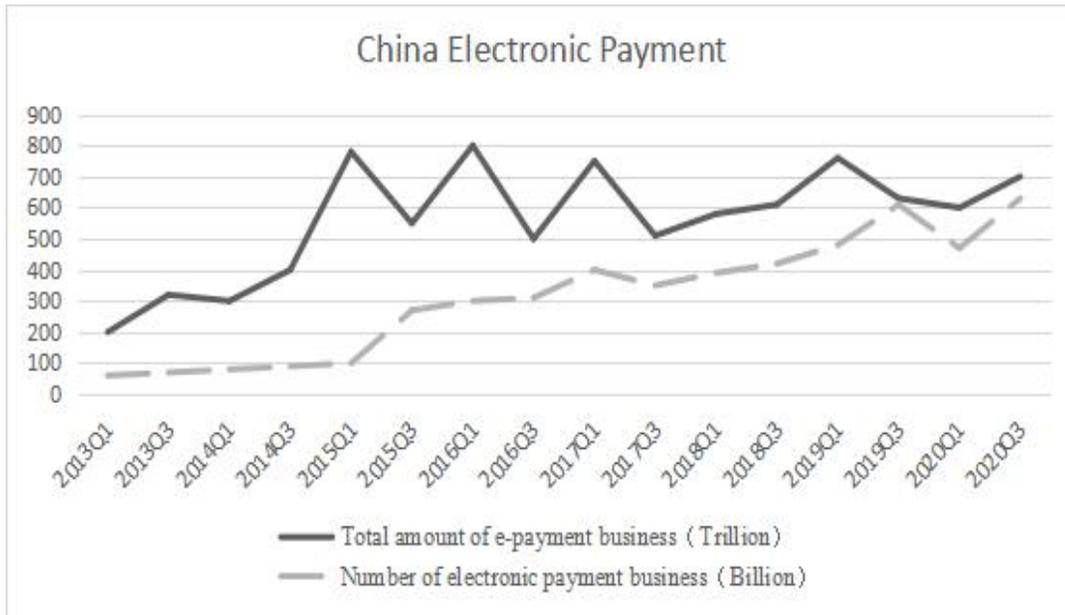
Weisheng, Lu., 2021. Block chain technology for governmental supervision of construction work: learning from digital currency electronic payment systems. *Journal of Construction Engineering and Management* 10, 1595–1638.

White, M.J., 2017. User acceptance of information technology : toward a unified view. *Journal of Financial Economics* 25, 371–395.

Williamson, Barry E., 2010. Transaction-cost economics: the governance of contractual relations. *Journal of Law and Economics* 22, 233–61.

**Figure 1: China's Electronic Payment Business Report (2020)**

This figure shows the quarterly overview of electronic payments in China from 2017 to 2020. The solid line represents the number of electronic payment transactions, while the dotted line represents the transaction volume of electronic payment. The vertical axis represents quantity and the horizontal axis represents time.



**Table 1: Sample Statistics of variables**

This table reports descriptive statistics for the sample of variables covering from 2017-2020. The sample size includes 40,000 random families. The *Consum* is calculated by taking the natural logarithm of consumption per household member. *Pay* is represented by 1 or 0. *Age* is calculated by adding the ages of all family members divided by the number of members. The *Sex* is calculated as the proportion of male family members. *Hea* refers to the proportion of members who are not physically fit. *Hou* is indicated by 1 or 0.

Variables	Observations	Mean	StdDev	Min	Max	Skew	Kurt
<i>Consum</i>	40,000	9.66	0.89	6.34	13.67	0.10	0.38
<i>Pay</i>	40,000	0.35	0.48	0	1.00	0.62	-1.61
<i>Age</i>	40,000	47.23	16.60	10	117.00	0.38	-0.80
<i>Sex</i>	40,000	0.50	0.21	0	1.00	-0.18	1.28
<i>Hea</i>	40,000	0.08	0.20	0	1.00	2.84	8.39
<i>Hou</i>	40,000	0.84	0.36	0	1.00	-1.89	1.57

## Table 2 Correlations

This table shows the correlations among *Pay*, *Age*, *Sex*, *Hea*, *Hou*, and *Consum*. The sample of variables cover from 2017-2020. The sample size includes 40,000 random families. The *Consum* is calculated by taking the natural logarithm of consumption per household member. *Pay* is represented by 1 or 0. *Age* is calculated by adding the ages of all family members divided by the number of members. The *Sex* is calculated as the proportion of male family members. *Hea* refers to the proportion of members who are not physically fit. *Hou* is indicated by 1 or 0. \*-stat.sign. at 10% level, \*\*-stat.sign. at 5% level, \*\*\*-stat.sign. at 1% level.

	<i>Consum</i>	<i>Pay</i>	<i>Age</i>	<i>Sex</i>	<i>Hea</i>	<i>Hou</i>
<i>Consum</i>	1.00					
<i>Pay</i>	0.37***	1.00				
<i>Age</i>	0.02***	-0.41***	1.00			
<i>Sex</i>	-0.03***	0.01***	-0.08	1.00		
<i>Hea</i>	-0.07***	-0.22***	0.27***	-0.06	1.00	
<i>Hou</i>	-0.14***	-0.08***	0.04***	0.01	-0.02***	1.00

### Table 3 Main Regression Results

Based on the following equation, the table shows results for the in-sample regression:

$$Consum_i = \beta_0 + \beta_1 Pay_i + \beta_2 Age_i + \beta_3 Sex_i + \beta_4 Hea_i + \beta_5 Hou_i + \varepsilon_i$$

This table shows the results of the in-sample regression. The sample of variables cover from 2017-2020. The sample size includes 40,000 random families. The *Consum* is calculated by taking the natural logarithm of consumption per household member. *Pay* is represented by 1 or 0. *Age* is calculated by adding the ages of all family members divided by the number of members. The *Sex* is calculated as the proportion of male family members. *Hea* refers to the proportion of members who are not physically fit. *Hou* is indicated by 1 or 0. The t-statistics adjusted standard errors are reported in parentheses blow the estimated. \*-stat.sign. at 10% level, \*\*-stat.sign. at 5% level, \*\*\*-stat.sign. at 1% level.

VARIABLES		Consum
<i>Pay</i>	0.69*** (0.01)	0.82*** (0.01)
<i>Age</i>		0.01*** (0.00)
<i>Sex</i>		-0.06*** (0.02)
<i>Hea</i>		-0.12*** (0.02)
<i>Hou</i>		-0.28*** (0.01)
<i>Cons</i>	9.41***	9.13*** (0.02)
Observations	40,000	40,000
Adjusted R-squared	0.14	0.19

**Table 4 Nonlinear Quadratic Relation**

Based on the following equation, this table shows the nonlinear quadratic relation among *Pay* and *Consum*:

$$Consum_i = \beta_0 + \beta_1 Pay_i + \beta_2 Age_i + \beta_3 Sex_i + \beta_4 Hea_i + \beta_5 Hou_i + \varepsilon_i$$

The sample of variables cover from 2017-2020. The sample size includes 40,000 random families. The *Consum* is calculated by taking the natural logarithm of consumption per household member. *Pay* is represented by 1 or 0. \*-stat.sign. at 10% level, \*\*-stat.sign. at 5% level, \*\*\*-stat.sign. at 1% level.

VARIABLES		Consum		Consum
<i>Pay</i>	0.69*** (0.01)	0.82*** (0.01)	0.69*** (0.01)	0.82*** (0.01)
<i>Age</i>		0.01*** (0.00)		0.01*** (0.00)
<i>Sex</i>		-0.06*** (0.02)		-0.06*** (0.02)
<i>Hea</i>		-0.12*** (0.02)		-0.12*** (0.02)
<i>Hou</i>		-0.28*** (0.01)		-0.28*** (0.01)
<i>Cons</i>	9.41*** (0.01)	9.13*** (0.02)	9.66*** (0.00)	9.13*** (0.02)
Observations	40,000	40,000	40,000	40,000
Adjusted R-squared	0.14	0.19	0.14	0.19

### Table 5 Subsamples

Based on the following equation, this table shows the result of subsamples between different regions, Shandong and Anhui province:

$$Consum_i = \beta_0 + \beta_1 Pay_i + \beta_2 Age_i + \beta_3 Sex_i + \beta_4 Hea_i + \beta_5 Hou_i + \varepsilon_i$$

The additional sample of variables excerpt from Shandong and Anhui provinces.  $Consum_{Shandong}$  refers to the data from Shandong province,  $Consum_{Anhui}$  refers to the data from Anhui province. The sample size includes 40,000 random families. The  $Consum$  is calculated by taking the natural logarithm of consumption per household member.  $Pay$  is represented by 1 or 0. \*-stat.sign. at 10% level, \*\*-stat.sign. at 5% level, \*\*\*-stat.sign. at 1% level.

VARIABLES	Consum <sub>Shandong</sub>	Consum <sub>Anhui</sub>	Consum
<i>Pay</i>	0.72*** (0.04)	0.79*** (0.05)	0.82*** (0.01)
<i>Age</i>	0.01*** (0.00)	0.01*** (0.00)	0.01*** (0.00)
<i>Sex</i>	-0.11*** (0.11)	-0.18*** (0.13)	-0.06*** (0.02)
<i>Hea</i>	-0.04*** (0.11)	-0.21*** (0.11)	-0.12*** (0.02)
<i>Hou</i>	-0.34*** (0.07)	-0.18* (0.07)	-0.28*** (0.01)
<i>Cons</i>	9.25*** (0.10)	8.75*** (0.13)	9.13*** (0.02)
Observations	2,147	1,009	40,000
Adjusted R-squared	0.14	0.18	0.19

### Table 6 Additional Control Variable

Based on the following equation, this table shows the result of adding control variables, *Inc* and *Fin*:

$$Consum_i = \beta_0 + \beta_1 Pay_i + \beta_2 Age_i + \beta_3 Sex_i + \beta_4 Hea_i + \beta_5 Hou_i + \varepsilon_i$$

The sample size includes 40,000 random families. The *Consum* is calculated by taking the natural logarithm of consumption per household member. *Pay* is represented by 1 or 0. *Inc* is the total income per household, yearly frequency. *Fin* is the amount of financial assets, including equity assets such as stocks and futures. at 10% level, \*\*-stat.sign. at 5% level, \*\*\*-stat.sign. at 1% level.

VARIABLES	Consum	Consum
Pay	0.82*** (0.01)	0.45*** (0.01)
Age	0.01*** (0.00)	0.01*** (0.00)
Sex	-0.06*** (0.02)	-0.08*** (0.02)
Hea	-0.12*** (0.02)	-0.30*** (0.02)
Hou	-0.28*** (0.01)	-0.35** (0.01)
Inc		0.16*** (0.00)
Fin		0.10*** (0.00)
Constant	9.13*** (0.02)	6.68*** (0.05)
Observations	40,000	40,000
Adjusted R-squared	0.19	0.33