

The Impact of Payment Innovation on Narrowing the Urban-rural Gap

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Abstract: With the rapid development of fintech, mobile payments is rapidly being widely used in China. As a financial and economic connection point, vigorously developing the payment system is the inevitable choice to narrow the gap between urban and rural areas. Based on this, this study attempts to establish a random effect model in panel regression to analyse the impact of the development of third-party payment on the urban-rural income gap of 31 provinces and municipalities from 2013 to 2020 in China. The results show that the growth of third-party payment scale has a positive effect on narrowing the urban-rural income gap. Therefore, this paper suggests that increasing the construction of rural mobile payment is of great significance to improve farmers' income. And finally puts forward the specific path of mobile payment construction.

Keywords: Urban-rural income gap, Third-party payment, random effects model, Mobile payment Construction.

1. Introduction

For many years, the urban-rural income gap in China has been in dire need of resolution. Globally, China, as one of the few countries in the world with a Gini coefficient over 0.5, has become one of the countries with a high degree of income disparity inequality. And helping farmers to increase their income, as a key point to narrow the urban-rural gap, directly determines the future development trend of the urban-rural gap.

In recent years, as China's mobile payment project continues to sink into rural areas, the payment environment for farmers has been greatly enhanced, and non-cash payments have become the payment choice for more and more farmers. The third-party Payments innovation aims to serve "agriculture, rural areas and farmers". It refers to an independent institution independent of merchants and banks, which can provide transaction payment platforms for merchants and consumers, such as Alipay, wechat Pay, flash payment, Baidu Wallet, etc. According to Econet Data 2021 statistics, as of December 31, 2021, China's third-party integrated payment scale has exceeded 350 trillion yuan, and the number of people using third-party platforms for online payment has exceeded 900 million. After the continuous upgrading and transformation of third-party payment and the innovation of its own technical force, it has injected new vitality into the rural economic development and made great contributions on narrowing the urban-rural income gap.

2. Literature Review

A large number of studies have been conducted on how to narrow the urban-rural income gap, but there are few literatures that study the method from the perspective of payments innovation. Zhongxia Li(2020) proposed that new payment methods are conducive to improve the payment environment in rural areas and have great practical significance in accelerating the development of diversified rural economies[1]. Haiyuan Gao (2021) uses a theoretical hypothesis approach to study the relationship between the development of third-party payments and the consumption gap between urban and rural residents, and finds that the

development of third-party payments has a catalytic effect on narrowing the income gap between urban and rural areas[2]. Tong Ti(2021) argues that the payment industry plays a fundamental role in the national economy and has a great responsibility and difficult task in the implementation of rural revitalization strategy[3]. Hu Ping (2022) believes that payment clearing, as the most fundamental function of finance, is the pivot point connecting financial services and supply for residents, and the development of payment clearing is an inevitable choice to achieve common prosperity^[4]. Looking at the above literature, most scholars hold a positive attitude towards third-party payment on rural economic development. On this basis, this paper will further study the impact of third-party payment on the urban-rural income gap.

3. Empirical Analysis

3.1. Sample Selection and Variable

In this paper, panel data of 31 provinces, cities and autonomous regions in China are selected for the study, among which the data of third-party payment are obtained from Econet, and the data of the rest of the relevant index system are obtained from the official website of the National Bureau of Statistics. In order to avoid the influence of the dimension, some data are logarithmically processed.

3.1.1. Explained Variable

This paper selects the Thiel index as the explained variable to measure the urban-rural income gap T_{it} which is calculated as follows.

$$TL = \sum_{i=1}^2 \frac{P_{it}}{P_t} \ln\left(\frac{P_{it}}{P_t} \div \frac{Z_{it}}{Z_t}\right) \quad (1)$$

where i represents urban and rural areas, respectively, t represents the period, P denotes income, and Z denotes population.

3.1.2. Explanatory Variable

This paper selects the transaction scale of third-party comprehensive payment as the explanatory variable ($\ln S_{it}$). As a good practice model of financial inclusion recognized by the Chinese industry, third-party payment is rapidly gaining popularity and injecting new strength into the Chinese

economy.

3.1.3. Control Variables

Since there are many factors affecting the urban-rural income gap, these factors cannot be ignored when building the model, otherwise the variance of the random disturbance term will increase, making the accuracy and credibility of the model results lower. Referring to relevant books and literature, this paper selects the urbanization level (Z_{it}), the level of regional economic development (lnG_{it}), years of education per capita (lnD_{it}), regional financial development index (F_{ij}), regional disposable income per capita (R_{ij}) as control variables.

Table 1. Definitions of Variables and Expected Sign

Notation	Empirical definition
T_{it}	Urban-rural income gap
lnS_{it}	Third-party comprehensive payment scale
Z_{it}	Level of urbanization
lnG_{it}	GDP per capita
lnD_{it}	Years of schooling per capita
F_{ij}	Financial Development Index
R_{ij}	Disposable income per capita

3.2. Establishment of Theoretical Model

3.2.1. Correlation Analysis

Using RStudio for correlation analysis of the sample data. We found that there is a high correlation between control variables (lnG_{it}) and control variables (R_{ij}), which may cause the existence of multicollinearity in the subsequent multiple regression model, and it is also found that a high correlation between (R_{ij}) and other variables. Therefore, considering eliminating it in the subsequent modeling.

Table 2. Correlation matrix

	T_{it}	lnS_{it}	Z_{it}	lnG_{it}	lnD_{it}	F_{ij}	R_{ij}
T_{it}	1	-0.24	-0.85	-0.73	-0.75	-0.11	-0.73
lnS_{it}	-0.24	1	0.22	0.45	0.29	0.02	0.21
Z_{it}	-0.85	0.22	1	0.85	0.86	0.09	0.87
lnG_{it}	-0.73	0.45	0.85	1	0.93	0.04	0.71
lnD_{it}	-0.75	0.29	0.86	0.93	1	0.07	0.68
F_{ij}	-0.11	0.02	0.09	0.04	0.07	1	0.13
R_{ij}	-0.73	0.21	0.87	0.71	0.68	0.13	1

3.2.2. Model Selection

For panel data regression, the main three regression models were mixed effects, fixed effects, and random effects models. Mixed effects model means no individual influence and no structural change in the cross section; fixed effect model refers to the individual influence and no structural change in the cross section; random effect model means both individual

influence and structural change in the cross section. The F and Housman tests were used for model screening. The F test is used to select whether to choose a fixed effect model or a mixed effect model; the Housman test is used to test whether the random effect model is a random effect model.

The results of the test using RStudio are as follows. From the test results we can tentatively determine that a random effects model should be chosen for the panel regression.

Table 3. Model Screening Results

Test method	F test	Hausman test
Test type	mixed or fixed	fixed or random
P-value	<2.2e-16	0.3377
Conclusion	fixed effects model	random effect model

3.3. Random Effects Modeling

In this paper, the following econometric model is established with the Thiel index of 31 provinces, cities and autonomous regions as the explanatory variable and the logarithmic third-party integrated payment transaction size as the explanatory variable.

$$T_{it} = \alpha + \beta_1 lnS_{it} + \beta_2 Z_{it} + \beta_3 lnG_{it} + \beta_4 lnD_{it} + \beta_5 F_{ij} + \varepsilon \quad (2)$$

Where α represents the constant term, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ represent the regression numbers of each explanatory variable, respectively. The panel data were imported into RStudio to perform, and the results are shown in Table 4.

Table 4. List of regression results

Variables	Estimate	Std	Z-value	Pr(> Z)	Significance
lnS_{it}	-0.25	0.40	-0.63	0.53	
Z_{it}	-18.20	2.75	-6.62	3.5e-11	***
lnG_{it}	-1.23	1.39	-0.88	0.38	
lnD_{it}	-1.58	0.89	-1.78	0.08	.
F_{ij}	-0.20	0.12	-1.73	0.08	*
α	51.20	7.78	6.58	4.8e-11	***

From the preliminary results of the regression, the explanatory variables were not significant, and the value of R-squared was 0.7331. Considering that it was due to the existence of multicollinearity, so the multicollinearity test was conducted. $lnS_{it}, Z_{it}, lnG_{it}, lnD_{it}, F_{ij}$, these six variables correspond to the VIF values of 5.08, 7.32, 16.47, 8.35, 1.03, 3.16, and the variables with high correlation were removed. The following multiple linear regression model was re-established:

$$T_{it} = \alpha + \beta_1 lnS_{it} + \beta_2 Z_{it} + \beta_5 F_{ij} + \varepsilon \quad (3)$$

The regression results obtained are shown below. The R square of the model was 0.9451, and all variables were significant. Residual testing will be followed up to ensure the accuracy of the model.

Table 5. Regression results of the modified model

Variables	Estimate	Std	Z-value	Pr(> Z)	Significance
lnS_{it}	-0.25	0.40	-0.63	0.53	*
Z_{it}	-18.20	2.75	-6.62	3.5e-11	***
α	51.20	7.78	6.58	4.8e-11	***

Therefore, the modified model is:

$$T_{it} = 27.9545 - 0.2841 lnS_{it} - 25.864 Z_{it} + \varepsilon \quad (4)$$

3.4. Regression Diagnosis

3.4.1. Normality Test

The skewness() function and the kurtosis() function in the RStudio are used to conduct the normality test, where the obtained kurtosis value is 3.08 and the skewness value is 0.58. Due to the small deviation degree, the residue can be roughly considered to obey a normal distribution.

3.4.2. Heteroscedasticity Test

The bptest() function in RStudio and the gqtest() function were tested as follows:

BP=3.90, df=7, p-value=0.26;

GQ=0.63, df1=121, df2=121, p-value=0.99;

The P-value of the test results of both methods is greater than 0.05, so the model is not considered to have heteroscedastic differences at the 95% significance level.

3.4.3. Sequence Correlation Test

The dwtest() function in the R language was used to perform the D.W. test to determine whether the model has a sequence correlation, resulting in D.W.=2.107, and P-value=0.954. Because the test value of D.W. is close to 2 and the P value is much greater than 0.05, the model is considered no sequence correlation at the 95% significance level.

3.4.4. Summary of Model Results

According to the above empirical analysis, it can be seen that the growth of third-party payment scale will narrow the urban-rural income gap to a certain extent. Meantime, this study finds that the higher the urbanization rate, the lower the urban-rural income gap. Based on this research, this study suggests that it is of great practical significance to reasonably promote the promotion of third-party payment in rural areas.

4. Specific Implementation Path of Rural Payment Reform

4.1. The Meaning of Payment to Help Farmers

The so-called payment to help farmers, that is, the use of third-party payments and other innovative financial technology to fill the gap in the field of financial services for rural residents, to promote the expansion of payment and clearing services from serving farmers' lives to serving agricultural production, to provide farmers with "intelligent management + financial services" integrated comprehensive services.

4.2. Practice significance in Payment Reform

As a financial infrastructure, payment carries the function of capital flow, information flow and scene expansion[5]. If finance wants to better serve the rural economy, the key step is to provide payment and settlement convenience, and the emergence of third-party payment just meets this demand. It not only provides a strong support for the flow of rural funds, connects the rural economy and finance effectively, but also expands the traditional financial services, filling the blank area of rural residents in the field of financial services.

The sinking of the third-party payment to the county and rural areas provides better payment and settlement services for the middle and low income groups, which is conducive to improve the digital divide in the rural areas, and provides a solid support for narrowing the income gap between urban and rural areas. From manual bookkeeping, cash payment to the payment platform, trading "zero contact", third-party payment products are expected to apply in major production

and marketing service platforms in rural areas. It is necessary to establish a platform integrating production and marketing, online bookkeeping, payment and settlement, rural credit and payment to benefit farmers, which can reduce the difficulty of farmers to get credit support, and make a great contribution to increase farmers' income. Based on this, this paper argues that mobile payment is the vanguard of narrowing the gap between urban and rural payment services, and is an important part of the financial support for comprehensive rural revitalization in the new era.

4.3. The Path of Rural Payment Revolution

4.3.1. From the Bank's Perspective

Banking institutions should continue to optimize the farmers' bank card withdrawal service, provide , inter-bank transfer, account query, life payment and other services, build a comprehensive rural inclusive financial service station that combines financial services, payment services, convenience services, knowledge publicity and other functions. Helping farmers remain with doors to deal with related payment business and enjoying convenient payment service[6]. Meanwhile, banks should focus on the rural life and production, distribution, circulation, consumption of payment demand, continue to optimize the payment service supply, adhere to promote mobile payment sinking rural, rich online scenarios, develop mobile banking rural revitalization of exclusive functions, gradually build inclusive financial service station, receiving merchants, mobile banking, cloud flash pay product services and other integration of the development of mobile payment system.

4.3.2. From Rural Merchants

In the face of rural retail, rural large acquisition market and small acquisition point payment settlement of different demand of agricultural products, each rural region can join hands with companies to create a series of settlement tool, such as the existing "harvest treasure", "fu agriculture" and other convenient payment tools, so that villagers can enjoy the dividends of convenient payment in their farmland. This paper promote the "third-party payment + inclusive financial services" model to create a third-party payment platform for the public, so that resources can be turned into funds and agricultural subsidies can be implemented to every household^[7]. Specific practical measures may include: taking advantage of rural scenery and tourism, increasing the research and development of "third-party payment + rural tourism" payment and settlement tools, realizing the full coverage of third-party payment in scenic area services such as parking, ticketing and B&B. In addition, the company will guide urban residents to shift their consumption focus to the countryside and boost farmers' income. Meanwhile, this paper suggests the "mobile payment + grain purchase", focus on the capital settlement demand in the grain purchase and selling link, and solve the problem of non-performing loans in the process of grain purchase.

5. Conclusions and Suggestions

Based on the above research, this paper argues that reasonably promoting the promotion of third-party payment in rural areas is of great practical significance to narrow the urban-rural income gap. Based on how to reasonably promote the application of third-party payment in rural areas, this paper proposes the following two suggestions.

Firstly, this paper suggests that government should increase

the coverage rate and promote the convenience of third-party payment services to rural areas in counties. The rural market can be said to be the next blue ocean of third-party payment. At present, due to the influence of traditional rural concepts and the high construction cost of bank rural mobile business, the utilization rate of third-party payment in rural areas is still not very high, so the financial resources can not be reasonably allocated. Most rural residents still use cash as the main payment tool. In order to cope with the above problems, major financial institutions should increase the construction of mobile business infrastructure in rural areas, develop the payment environment construction in rural areas, finally realize the multi-party coverage of third-party payment services in rural areas.

Secondly, regulator should improve the third-party payment supervision system. After the rapid popularity of third-party payment, the risks in the payment environment are also gaining more and more attention. Many users say that there are security loopholes of personal privacy leakage in the specific process of third-party payment applications and some illegal elements' money laundering behavior, making third-party payment become a tool for illegal elements to transfer funds. In this regard, the major bank institutions should increase the risk control of the third-party business. The CBRC and the CSRC should also increase the market management of the third-party payment, and bring the third-

party payment industry into the scope of national supervision.

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