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Impact of Third-Party Payment on Commercial Banks' Intermediary Business and Empirical Analysis

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Abstract: *This paper describes the impact of third-party payments on commercial banks' intermediary business, and collates the relevant data of third-party payments and commercial banks' intermediary business, and makes an empirical analysis for the impact of third-party payments on commercial banks' intermediary business during 2016-2020, and conducts a panel data regression on the top ten domestic commercial banks by analyzing the type of data, and arrives at the result that third-party payments have an inverse relationship with commercial banks' intermediary business.*

Keywords: *Third-party payment; Commercial banks; Intermediate business; Fixed-effects model*

1. Introduction

1.1 Research Background

In 2000, the rise of domestic e-commerce created the demand for merchants to receive payments online, which brought the opportunity for the birth of third-party payment. Later, with the rapid development of Internet technology, third-party payments continued to innovate and improve their business models, and became popular with customers because of their efficiency and convenience. At the same time, third-party payments are competing with commercial banks in business areas, bringing challenges to the traditional banking industry.

In 2004, Alibaba Group launched the Alipay platform, which initially served as a financial credit intermediary between Taobao merchants and consumers. In 2005, Tencent launched "CaiPay", which initially did not have a large transaction scale and coverage. It was not until 2014 that Tencent combined CaiPay Tong with WeChat to produce WeChat Pay, which met customers' daily payment and transfer needs and soon became the second largest payment platform in China. In recent years, third-party payment platforms have continued to improve their business functions and technological innovation, providing customers with a full range of multifunctional products and services, and becoming an important means of payment for China's residents. By December 2020, the scale of users using online payment and cell phone payment in China will both exceed 800 million, accounting for more than 80% of the total number of Internet users and cell phone users respectively. It can be seen that non-cash payment methods have become the norm in China, and the impact of third-party payments on the banking industry cannot be underestimated.

1.2 Literature Review

In recent years, with the development of Internet technology, financial electronic payment system is growing [1]. Not only the online payment can solve the physical path of time and labor problems, but also can provide an environment of safe, fast and a lot of convenient advantages [2]. At present, financial electronic payment can be largely divided into internet banking, mobile payment and third-party online payment.

In addition, with the network services provided by the function more and more complex, internet service is open to the global environment. In fact, the security issues are also worthy of attention [3]. So choose the appropriate network service evaluation criteria, taking into account the subjective and objective safety factors, should be based on the user's security level requirements.

Owing to past researches in online e-payment were only for the choice of single-normative style, but in today's online trading environment, the decision-making problem faced by the user is complex and changeable[4]. That is to say, users often faced with the choice is not a single criterion can be used to

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solve. But rather to consider the various assessment criteria to which the same program belongs, and make the most appropriate choice. In this way, multi-criteria decision-making (MCDM) become a method often used by decision makers. Therefore, this study will apply multi-criteria decision-making method to assist financial electronic e-payment users in a number of possible options. According to the characteristics of each attribute of each program, make each program a sort of merit, then evaluate and select the deal solution for the user.

Overall, this study will use the ideal solution similarity to prepare the order assessment adjustment method as a network service recommendation method [5]. To obtain reliable network service content satisfaction with trust range, and then use the hierarchical analysis method to obtain the user's feedback weight. That is to say, the establishment of a trusted electronic payment network service recommendation mechanism.

2. Empirical Analysis

2.1 Variable Selection

Explanatory variables: Since the main component of commercial banks' intermediate business is NI (non-interest income), i.e. off-balance sheet business, non-interest income is a more appropriate choice. This paper collects monthly data on non-interest income of the top ten commercial banks from 2016 to 2020, including Construction Bank, Agricultural Bank, ICBC, Bank of China, China Merchants Bank, Industrial Bank, Bank of Communications, Pudong Development Bank, Post and Reserve Bank, and Minsheng Bank.

Explanatory variables: In this paper, two variables, mobile payment and online payment, are selected as explanatory variables, which are the most intuitive manifestation of the impact of third-party payment on commercial banks' intermediary business.

Control variables: GDP and CPI are the most intuitive variables representing the living and consumption levels of the population, while M2 is the variable reflecting the regulation of monetary policy, so these three variables are most appropriately chosen as control variables. In order to reflect the strength of commercial banks, the asset size (ASSET) and capital adequacy ratio (CE) of commercial banks are selected as control variables for commercial banks.

NII (non-interest income) is the explanatory variable, mobile payments (MP) and internet payments (IP) are the explanatory variables, GDP, CPI, M2, ASSET, and CE are the control variables, and ε_i is the random error.

2.2 Multicollinearity test and unit root test and co-integration test

In order to ensure that there is no multicollinearity in the selected variables, the multicollinearity VIF test is used to check whether there is multicollinearity in all variables, and the results are as follows (Table 1).

Table 1: Multicollinearity test performed for all variables of the model

Variable	VIF	1/VIF
CPI	2.070	0.483
CE	1.970	0.506
M2	1.820	0.549
GDP	1.530	0.654
MP	1.390	0.719
IP	1.350	0.740
ASSET	1.010	0.985
Mean VIF	1.590	0.629

After initial processing of the data, unit root tests are performed using STATA and the monthly data of GDP and CPI for 2016-2020 are found to be non-stationary time series, which achieve stationarity after first-order difference is applied to them. The results of the unit root test are as follows (Table 2).

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Table 2: Stationarity test of the series for all variables in the model

Variable	NII				MP			
Test	LLC	IPS	ADF	PP	LLC	IPS	ADF	PP
outcome	-32.7652	-4.2734	-7.2842	-3.2947	-28.8252	-3.6734	-5.6842	-1.9947
P	0	0	0	0.0003	0	0	0	0.0023
Variable	D1-CPI				M2			
Test	LLC	IPS	ADF	PP	LLC	IPS	ADF	PP
outcome	-34.4752	-8.6634	-5.2552	-3.2247	-56.2481	-17.3134	-9.2143	-5.1735
P	0	0	0	0.0002	0	0	0	0
Variable	IP				D1-GDP			
Test	LLC	IPS	ADF	PP	LLC	IPS	ADF	PP
outcome	-26.7652	-5.2734	-8.2842	-5.2947	-29.3752	-9.5734	-6.2842	-3.9947
P	0	0	0	0	0	0	0	0.0001
Variable	AESST				CE			
Test	LLC	IPS	ADF	PP	LLC	IPS	ADF	PP
outcome	-46.1752	-14.6134	-8.2552	-5.5247	-66.6352	-18.8654	-13.5962	-9.3647
P	0	0	0	0	0	0	0	0

This paper then conducted a cointegration test on the data to examine whether the data have long-term effects and whether they have research value and analytical significance. The results of the cointegration test are as follows. It can be found that the p-value of all the results in the figure below is significantly 0, so the original hypothesis is strongly rejected and the model data has research value.

2.3 Model Selection

After the above data processing, the paper will use the Hausman test to determine whether the panel data should be used in a fixed effects model or a random effects model. The results of the Hausman test are shown as Table 3.

Table 3: Hausman test

Hausman (1978) specification test	
	Coef.
Chi-square test value	83.64
P-value	0

It can be found that the P value is much less than 0.05, so the original hypothesis is rejected. Therefore, the fixed effect model was used.

2.4 Regression analysis and improvement of fixed effects model

Table 4: Basic fixed effects model regression

Regression results							
NII	Coef.	St.Err.	t-value	p-value	[95%Conf Interval]		
IP	-0.03	. 184	3.64	0.002	-0.665	0.096	***
MP	0.08	. 112	5.89	0	0.439	0.088	***
GDP	0.02	0.011	-2.45	0.066	-0.041	0.001	***
CPI	0.087	0.025	3.47	0.001	0.038	0.014	***
M2	0.001	0	3.55	0	0	0.001	***
ASSET	0.688	0.343	-2.87	0.006	-1.365	-0.112	**
CE	0.062	0.027	-2.69	0.003	-0.114	-0.109	**
Constant	0.885	0.682	3.3	0.006	-0.46	0.03	***
Mean dependent var		2.079		SD dependent var		0.583	
R-squared		0.434		Number of obs		1200	
F-test		13.568		Prob > F		0	
Akaike crit. (AIC)		-246.299		Bayesian crit. (BIC)		-218.454	
*** p<.01, ** p<.05, * p<.1							

The regression of the panel data revealed that the model did not take into account the time

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characteristics, the heteroskedasticity between groups, and serial correlation, and therefore the model fit was not accurate. Therefore, the following revisions were made to the model (Table 4).

Therefore, this paper adopts a two-way fixed effects model (two-way FE) for the data, which takes into account not only the individual characteristics u_i that do not change with time, but also the time characteristics λ_t that do not change with the individual. u_i can represent the bank's own factors, while λ_t can represent macroeconomic factors such as GDP, M2, etc. The two-way fixed effects model is more complete than the one-way fixed effects model.

$$y_{it} = \alpha + u_i + \lambda_t + \beta X_{it} + \varepsilon_{it} \quad (1)$$

From the results in the following figure, we can see that R-Square -0.4420, the goodness of fit is good and the model can be used.The figure below shows the two-way fixed effects model with the robust term added to improve the coarse data of the original one-way fixed effects model (Table 5).

Table 5: Two-way fixed effects model regression

Regression results							
NII	Coef.	St.Err.	t-value	p-value	[95% Conf Interval]		Sig
IP	-0.05	0.214	-4.43	0.009	-0.738	0.025	***
MP	0.12	0.141	5.01	0	0.421	0.987	***
GDP	0.049	0.013	-4.86	0	-0.075	-0.024	***
CPI	0.082	0.029	3.8	0.007	0.023	. 141	***
M2	0	0	4.52	0.005	0	0.001	***
ASSET	0.644	0.291	-3.21	0.002	-1.23	-0.058	***
CE	0.061	0.026	-3.39	0.005	-0.114	-0.008	***
2016b	0	.	.	.	.	.	.
2017	-0.054	0.031	-2.53	0.041	-0.118	0.009	**
2018	-0.151	0.049	-3.09	0.003	-0.248	-0.053	***
2019	-0.181	0.055	-3.29	0.002	-0.292	-0.07	***
2020	-0.052	0.069	-1.75	0.048	-. 191	0.087	**
Constant	1.25	0.575	3.67	0.005	0.092	2.408	***
Mean dependent var		2.079		SD dependent var		0.583	
R-squared		0.634		Number of obs		1200	
F-test		9. 188		Prob > F		0	
Akaike crit. (AIC)		-280.892		Bayesian crit. (BIC)		-242.605	

At the data analysis level, the two-way fixed effects model is used because this model considers both individual characteristics u_i, which do not change over time, and temporal characteristics λ_t, which do not change over time, and the inclusion of the robust term overcomes the effects caused by heteroskedasticity and serial correlation of arbitrary order. The conclusions drawn from the two tests are basically the same, but the latter regression results have a significantly better fit than the former, demonstrating the validity of the model improvement.

3. Conclusion

The above data analysis shows that both mobile payment and Internet payment have a significant impact on the intermediary business of banks.The relationship between mobile payments and commercial banks' intermediary business is positive, thanks to the development of the Internet and the progress of consumer attitudes. On the contrary, Internet payments have an inverse relationship with the non-interest income of commercial banks, as Internet companies, through their own products, have changed the traditional payment methods of banks, which could only be done through cumbersome transfers, into new Internet transaction methods that can be transferred in a second with a single swipe, and because of their resource integration property of being able to bind multiple bank cards, single banks cannot compete with such payment methods in terms of convenience and speed. As a result, more and more users choose to use such platforms for Internet payments, and the situation gradually shows a "snowball effect". Of course, the strength of commercial banks is also very important for their intermediate business, and the stronger the banks are, the stronger their ability to resist the impact of new payment methods.

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