

Impact of Third-Party Payment on Banks' Risk-taking Capacity and Empirical Analysis

Jingwen Zhang^{1,a,*}

¹*Institute of Economics, Guangdong University of Technology, Longdong Street, Guangzhou, China
a. 3221008840@mail2.gdut.edu.cn*

**corresponding author*

Abstract: Third parties have provided people with a lot of convenience through the rapid development of Internet technology. In the meantime, commercial banks will face significant disruption from the characteristics of third-party payments, which include low operating costs and high settlement efficiency, as the Internet financial platform evolves. This article's goal is to conduct an empirical analysis of how third-party payments affect commercial banks' ability to take on risk by using imbalanced panel data from 36 listed banks between the first quarters of 2013 and the first quarter of 2021. The results show that: (1) the third-party payment significantly increases commercial banks' ability to take on risk. (2) third-party payment increases the risk-taking capacity of non-state-owned banks compared to state-owned banks. (3) third-party payment decreases bank profitability and raises bank credit risk, which impacts commercial banks' ability to take on more risk. Based on the above conclusions, this paper puts forward some meaningful suggestions to the relevant regulatory agencies and commercial banks.

Keywords: Third-Party Payment, Profitability of Banks, Credit Risk, Banks' Risk-taking Capacity.

1. Introduction

The third-party payment (TPP) is a financial payment platform that relies on Internet technology and is guaranteed by independent institutions with certain economic strengths [1]. Third-party services are becoming increasingly convenient for people due to the rapid development of Internet technology nowadays. Individuals can purchase or transfer money through the TPP such as Alipay or WeChat at any time. With the upsurge of online shopping, the TPP has reached a mature stage of progress and has become a significant assurance for people to purchase online goods safely. As the Internet financial platform, commercial banks will be greatly impacted by the characteristics of TPP, such as low operating costs and high settlement efficiency. For example, under the impact of the COVID-19 pandemic in 2020, people remained indoors for safety, so the TPP boom has been set off again. Under such circumstances, the offline branches of banks are mostly closed and the banking business is limited. Individuals are more inclined to use TPP for settlement, leading to a decrease in commercial banks' business volume and an impact on bank profitability.

Many scholars have researched whether TPP has an impact on commercial banks. Some scholars believe that the TPP has a positive impact on banks while some insist that the TPP hurts banks. Besides, few scholars consider TPP to have little influence on banks. On the positive side, Chen found

that provision, legal deposit reserve, TPP scale, and liquidity of commercial banks are positively correlated by empirical tests [2]. Based on Keynesian money demand theory, the test shows that the TPP reduces the bank's loan-to-deposit ratio, and thus increases the bank's liquidity [3]. The TPP platform enables a large amount of funds to enter commercial banks by opening accounts in corresponding banks, thus promoting the bank deposit business [4]. On the negative side, the profitability of commercial banks will be affected by the TPP platform's overlap with their business and customers [5]. The TPP's impact on state-owned and rural banks is greater than on intermediate business banks, as demonstrated by the PAC (Primary Component Analysis) and GM (Grey Model) models [6]. Commercial banks will lose their scale advantage due to the negative impact of TPP on their profitability [7]. From the perspective of no significant impact, the scale of TPP has little impact on the performance of banks, so it is proposed that the two should cooperate to achieve common development [8]. Of course, fewer scholars have come to such conclusions. Currently, the majority of studies on TPP's effects on banks concentrate on the commercial banks' profitability, liquidity, and intermediary activity. However, studies on TPP's effects on banks' ability to take on risk also exist.

Through modeling empirical research, this paper analyzes the impact of TPP on banks' risk-taking and the intermediary effect and investigates and tests its impact on banks' risk-taking ability through two-way fixed effect, heterogeneity test, and intermediary effect based on objective data. According to the conclusion, some suggestions are put forward for the relevant regulatory agencies and commercial banks in TPP and bank risk-taking capacity.

2. Method

2.1. Research Hypothesis

There is cooperation between TPP and commercial banks in information and capital, and competition in asset business, liability business, and intermediate business [9]. In Internet finance, the similarity of the third party with commercial banks and its advantages such as low operating costs will inevitably crowd out the user market of commercial banks, resulting in a crowding out effect [4]. At the same time, compared with the unique scale stability of state-owned banks, non-state-owned banks are more susceptible to the influence of TPP, which has a certain degree of substitution effect [5]. In addition, TPP will have a destabilizing effect on commercial bank customers [10]. It is universally acknowledged that commercial banks always focus on serve high net worth customers and lack of attention to the small- and medium-sized clients, which results in small- and medium-sized customer group continually transfer to TPP to pursuit better service. This situation will make an impact on banks' deposit business, the amount of funds available to banks is also decreasing and bank earnings are affected. Banks will turn to high-risk investments to seek higher profits, which is followed by increasing their risk appetite and continually strengthening their risk-taking capacity. Moreover, after the impact on bank deposit and loan business is reduced, banks may relax the credit rating of loan clients to increase loan business, increasing the probability of non-performing loans. The banks' quality is affected, the bank credit risk increases and the banks' ability to bear credit risk is enhanced. The analysis shown above leads to the following hypothesis being put forth:

H1: The TPP has a positive effect on banks' risk-taking ability.

H2: Non-state-owned banks are more affected by the TPP than state-owned banks are.

H3: The TPP raises bank credit risk and decreases bank profitability, which has an impact on commercial banks' ability to take on risk.

2.2. Sample Selection

This paper's data is based on the quarterly reports of major banks and the *Wind* database, which is currently a very comprehensive economic database in China. The research is conducted by selecting the unbalanced panel data of 36 listed banks from 2013 Q1 to 2021 Q1. This paper removes listed banks that don't disclose enough main index data to ensure the accuracy of empirical results, leaving 6 state-owned banks and 30 non-stated-owned banks. Due to the lack of early disclosure of third-party mobile payment data, this variable is also selected from 2013 Q1 to 2021 Q1 in this paper.

2.3. Specification of Variables

In terms of explained variables, this paper selects the mainstream proxy variable of bank risk-taking --distance bankruptcy probability index ($Z - socre$) by combing through the previous literature on risk-taking. In this paper, Z value is used as the interpreted variable, which is the reciprocal of $Z - socre$. The formula is as follows:

$$Z_{it} = \frac{\sigma_i(ROA_{it})}{ROA_{it} + (E/A)_{it}} \quad (1)$$

Among them, ROA refers to the return on assets, $\sigma(ROA)$ that has been adjusted for volatility, and E/A refers to the proportion of total assets to owner equity. In this paper, the Z value is calculated by computing the rolling five-quarter time window's standard deviation of return on assets. The bank's risk-taking capacity becomes stronger as the Z value increases. And vice versa.

To accurately reflect the development of TPP, this paper selects the most representative third-party mobile payment scale ($TPPM$) as the proxy variable for analysis.

In terms of control variables, this paper considers micro and macro levels. On the micro level, we choose capital adequacy ratio (CAR), asset-liability ratio (DA) and bank size ($SIZE$). On the macro level, the selection process involves selecting the cumulative growth rate of GDP and the growth rate of money supply $M2$ ($M2$).

2.4. Model Building

The purpose of this paper is to investigate how TPP affects the risk-bearing capacity of commercial banks. In light of the aforementioned analysis, the following basic measurement model is constructed:

$$Z_{it} = \alpha_0 + \alpha_1 TPPM_{it} + \beta_1 X_{it} + \theta_b + \theta_t + \varepsilon_{it} \quad (2)$$

Where i and t represent the number and year of banks respectively, $TPPM$ represents the market size of TPP, and Z represents bank risk. The control variable X mainly includes capital adequacy ratio (CAR), asset-liability ratio (DA), bank size ($SIZE$), cumulative GDP growth rate (GDP), and money supply $M2$ growth rate ($M2$). θ_b is the bank individual fixed effect, θ_t is the time fixed effect, and ε_{it} represents the random disturbance term.

The mediation effect model is constructed as follows:

$$Nii_{it} = \alpha_0 + \delta_1 TPPM_{it} + \beta_1 X_{it} + \theta_b + \theta_t + \varepsilon_{it} \quad (3)$$

$$NPL_{it} = \alpha_0 + \delta_2 TPPM_{it} + \beta_1 X_{it} + \theta_b + \theta_t + \varepsilon_{it} \quad (4)$$

Where i and t represent the number and year of banks respectively, $TPPM$ represents the market size of TPP. The intermediary variable Nii represents the bank's operating ability, and the net interest income is used as the proxy variable. The intermediary variable NPL represents the

credit risk of the bank, and the non-performing loan ratio is utilized as a substitute variable. The control variable X mainly includes capital adequacy ratio (CAR), asset-liability ratio (DA), bank size ($SIZE$), cumulative GDP growth rate (GDP), and money supply $M2$ growth rate ($M2$). θ_b is the bank individual fixed effect, θ_t is the time fixed effect, and ε_{it} represents the random disturbance term.

3. Result

3.1. Descriptive Statistics

As shown in Table 1, since the TPP market size $TPPM$ and bank size $SIZE$ are too large, the following test is carried out on a logarithmic basis. The maximum amount of Z is 0.4358 and the average value of 0.2104 suggest that the risk-bearing capacity of all banks is good overall.

Table 1: Descriptive statistics about variables

Variables	Sample size	Mean	St.D	Minimum	Maximum
Z	652	0.2104	0.0803	0.0159	0.4358
Z1	882	0.5355	0.2804	0.0605	2.3504
TPPM	927	12.0204	1.7778	6.0540	13.5144
Size	917	9.8151	1.6325	6.7136	12.7475
CAR	882	13.1882	1.5383	8.78	17.91
DA	917	92.9261	1.0621	90.3163	96.4476
GDP	927	6.0621	4.1936	-6.9	18.7
M2	927	10.4388	2.0775	8	15.7
NPL	895	1.3680	0.3742	0.49	2.47
Nii	895	652.9466	1056.926	4.5397	6467.65

3.2. Analysis of Basic Regression Results

This paper makes the bidirectional fixed effect regression of the main variable. As depicted in Table 2, column (1) presents single-variable regression results that incorporate both individual and time effects. At a significance level of 1%, with a coefficient of 0.0893, the results have a positive correlation. Column (2) shows the regression results that consider individual effects, time effects, and control variables. The correlation between the results and the significance level of 1% is positive, and the coefficient is $0.133 > 0.0893$. The TPP's impact on banks' risk-taking capacity is demonstrated by the fact that it takes into account control variables, which indicates that H1 is valid, that is, TPP improves the banks' risk-taking capacity.

Table 2: Fixed effect model regression results

	(1)	(2)
	Z	Z
$TPPM$	0.0893***	0.133***
	(23.33)	(7.41)
cons	-0.301***	-4.820***
	(-6.37)	(-5.13)
Individual effect	YES	YES
Time effect	YES	YES
Control variables	NO	YES
N	882	850

t statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

3.3. Heterogeneity Analysis

In this paper, the samples are divided into state-owned banks and non-state-owned banks. Table 3 displays the results, with a significant correlation between the TPP and both state-owned banks and non-state-owned banks. According to the inter-group difference test of coefficients (Chow test), at a significance level of 10%, the difference between groups is significant. Because of their higher coefficient, TPP has a bigger effect on banks that are not owned by the state, which means H2 is valid.

Table 3: Heterogeneity analysis results

	State-owned banks(Z)	Non-state-owned banks(Z)
TPPM	0.119***	0.143***
	(5.45)	(4.97)
cons	-4.274***	-5.907***
	(-3.91)	(-3.33)
Individual effect	YES	YES
Time effect	YES	YES
Control variables	YES	YES
N	179	671
Adjusted R^2	0.985	0.928
Coefficient group difference test P-value	0.063	

t statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

3.4. Mediating Effect Analysis

The test results are shown in Table 4, in the “profitability” channel, TPPs are negatively correlated with net interest income (Nii) at a significance level of 1%. This indicates that the TPP seizes the bank market and reduces the banking business through the squeezing effect to reduces the bank’s net interest income. The net interest income is affected by cuts, that is, banks are less profitable. Moreover, banks change their risk preference based on the principle of maximum profit and subsequently enhance the banks’ risk-taking capacity. That is to say, the expansion of the TPP scale enhances the risk-taking capacity by weakening the bank’s profitability (reducing net interest income).

TPPs considerably raise banks’ credit risk, as evidenced by the positive connection between them and NPL in the “credit risk” channel, which is present at a significance level of 1%. According to the shaking effect, the emergence of TPP makes the bank deposit and loan users shake and turn to the low-cost and efficient TPP platform. That makes banks begin to relax the condition of loans and deposits. The ascend of high-risk clients increases the credit risk of banks and the banks’ risk-taking capacity will be further challenged. In summary, H3 is valid.

Table 4: Mediating effect analysis results

	Nii	NPL
TPPM	-244.5*	0.176***
	(-1.84)	(3.84)
cons	15769.8***	17.80***
	(2.75)	(9.01)
Individual effect	YES	YES
Time effect	YES	YES
Control variables	YES	YES
N	882	873
Adjusted R^2	0.822	0.810

t statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4. Robustness Test

This paper substitutes the explained variables to assess the validity of the previously mentioned empirical analysis. The Z value adopted in this paper is calculated based on the rolling fifth quarter of ROA. To avoid the impact of the time window span on the proxy variable Z value of risk affordability, ROA rolling third quarter (called $Z1$) is selected for re-basic regression. The results are shown in Table 5, $TPPM$ ($TPPM$) and $Z1$ have a strong correlation at the 1% significance level, and the results are still trustworthy. The regression results above are consistent with this.

Table 5: Robustness test results

	$Z1$
$TPPM$	0.178***
	(9.74)
_cons	-6.232***
	(-6.55)
Individual effect	YES
Time effect	YES
Control variables	YES
N	850

t statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5. Discussion

The Robustness test results indicate that the TPP enhances banks' capacity to take risks. The TPP affects non-state-owned banks' capacity to assume risk more so than it does state-owned banks. The TPP enhances banks' risk-taking capacity through the channel of undermining banks' profitability and increasing banks' credit risk. The above conclusions provide certain research significance for studying the impact of TPP on banks' risk-taking capacity and how regulators and banks view this impact. The following practical suggestions are proposed based on the results.

First of all, related regulators should mention that TPP has a positive influence on banks' risk-taking capacity. At present, there are still some shortcomings in the supervision of TPP. Relevant regulatory agencies should further improve the laws and regulations on TPP, supervise the further disclosure of information by TPP institutions, and give investors a stronger sense of security and protection of funds. Relevant regulatory agencies should also learn from the supervision methods of commercial banks, modify and improve them, and apply them to the supervision of TPP.

Secondly, commercial banks should mention that the TPP enhances banks' risk-taking capacity. The banks' risk-taking capacity is enhanced by undermining banks' profitability and adding credit risk. In other words, banks are forced to increase their risk-taking capacity after their profitability is hit and credit risks increase. Banks should reduce the impact of TPP on bank profitability and credit risk by recruiting high-quality talents and financial technology innovation, and proactively increasing risk-taking rather than being forced to do so.

With further research, we can explore what other variables the TPP will influence the bank's risk-taking capacity through the regulatory effect. Overall, this paper provides some suggestions on how do regulators and banks deal with this impact and lay a foundation on future research and practices.

However, there are some limitations to the study. There are many missing values in the years, and only data from 2013 can be selected. The estimation of the scale of TPP is not comprehensive enough, and there are still shortcomings in empirical analysis. Future research may consider using other proxy variables to explain TPP and conduct empirical analysis based on the new TPP policy.

6. Conclusion

By using unbalanced panel data from 2013 Q1-2021-Q1 for 36 Chinese A-share listed banks, this paper carries out an empirical analysis of the impact of TPP on banks' risk-taking capacity. The findings indicate that: first, the TPP has a positive influence on the banks' risk-taking ability. Heterogeneity analysis shows that the TPP has a stronger impact on non-state-owned banks. Second, the intermediary effect analysis shows that the TPP can improve the banks' risk-taking capacity through the channels of "bank profitability" and "bank credit risk".

In the selection of sample banks, this paper selects banks that are currently listed and have more data disclosure. Future research can extend the scope of sample banks and bring unlisted banks and listed banks with too little data into the sample to reduce errors in sample results. Besides that, the research in this paper can be further diversified. This paper has studied how TPP can improve the banks' risk-taking capacity through the channels of "bank profitability" and "bank credit risk". Future research can try to explore other influence channels through mediating effect and regulating effects.

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