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Faculty of Social Sciences
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MASTER'S THESIS

The Impact of Third-Party Payment on The Profitability of Commercial Banks.

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Study program: **Economics and Finance**

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Declaration of Authorship

The author hereby declares that he compiled this thesis independently; using only the listed resources and literature, and the thesis has not been used to obtain a different or the same degree.

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Prague, May 14, 2020

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Acknowledgments

The topic of the thesis is based on my personal interests. First of all, my undergraduate major is e-commerce, and my master major is economics and finance. I try to merge the two types of directions of undergraduate and graduate majors, so I established the research direction of my current thesis. How has the rapid development of third-party payment platforms affected the profitability of commercial banks? And is there any difference in this type of impact among different types of commercial banks? So it was my curiosity that prompted me to complete this thesis. Curiosity brings me energy, and combined professional knowledge brings me confidence.

Secondly, I would like to express my most sincere to my supervisor, professor Dedek. We communicated by email. He provided a lot of guidance and help to me. I am also very grateful to all professors of the thesis courses. I need to specifically point out Professor Michal Mejstrik who has passed away. I thank him for the encouragement he gave me, which gave me confidence to complete this thesis.

Finally, I can not forget to thank my parents for supporting me in completing my postgraduate studies in the Czech Republic.

Abstract

This thesis selects data from the financial annual report of 15 different kinds of commercial banks in China from 2016 to 2019. Meanwhile, the bank's return on total assets (ROA) and non-interest income ratio (NIIR) are considered as dependent variables and other variables are considered as the independent variables. The aim of this thesis is to examine the effect of third-party payment developments on the profitability of commercial banks and whether the effect is different due to different types of banks. At the end of the thesis, suggestions are proposed for banks to withstand risks and improve supervision.

JEL Classification	F12
Keywords	third-party payment , commercial bank profitability, bank supervision , regression
Title	The impact of third-party payment on the profitability of commercial banks.

Contents

Acronyms

TPP Third-Party Payment

CB Commercial Banks

LDR Loan-to-Deposit Ratio

ROA Return on Assets

NPL Non-Performing Loan ratio

NIIR Non-Interest Income Ratio

CIR Cost-to Income Ratio

GDP Gross Domestic Product Growth rate

L_TTPS Third-party payment Scale

L_BSIZE Total Annual Bank Assets

Master's Thesis Proposal

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Defense Planned:	June 2021

Proposed Topic:
The Impact of Third-Party Payment on The Profitability of Commercial Banks

Motivation:
With the rapid update of Internet technology in various countries, as a brand-new shopping method, online-shopping brings new shopping experience to people, and e-commerce greatly facilitates people's lives. E-commerce is a new business ecosystem that tightly interlocks with various business links such as product selection, product transaction, payment settlement, and logistics distribution. The payment and settlement function becomes the hub connecting these important transaction links. Wu Sun (2015) regarded Alipay as the first third-party payment platform that affected half of the Internet payment market, was formally established on December 30th, 2004, and rapidly developed in a short period of time.

Lei Cao (2019) pointed out that as of 2019, the e-commerce transactions of 28 major countries and regions in the world amounted to USD 24,716,626 million, and the total online retail transactions amounted to USD 2,974.46 billion. Among them, e-commerce transactions in 15 European countries totaled 4211.82 billion US dollars, and online retail transactions totaled 698.16 billion US dollars. The transaction volume of China's cross-border e-commerce industry reached 90 billion yuan, an increase of 11.6% year-on-year, and the US e-commerce transaction volume reached 9.776 trillion US dollars, with a growth rate of 10.1%.It can be seen that under the e-commerce background, the transaction volume of third-party payment is growing.

Third-party payment platforms have gradually seized the original customer resources and business of commercial banks. Some scholars analyzed the impact of third-party payment on the profitability of commercial banks from a specific business perspective. Zheng Yan (2014) pointed out that the emergence of third-party payment has a greater impact on bank deposits, thereby reducing bank profits.

Franklin Allen, James Mcandrews and Philip Strahan (2002) started from the theory of financial intermediation, they believed that third-party payment accelerates the process of financial disintermediation, and the intermediary function of commercial banks will inevitably be greatly affected. Therefore, third-party payment will bring huge changes to the profit structure of commercial banks. Because commercial banks' traditional business, intermediate business and customer resources were heavily impacted. Therefore some commercial banks themselves were adjusted to adjust their business segments, then the profit structure of commercial banks changed.

Zhonglu Liu and Yuelin Zhang (2016) pointed out that there are three types of commercial banks in China, namely, joint-stock commercial banks, state-owned

commercial banks and city commercial banks. Because these commercial banks have different characteristics, third-party payment may have different impacts on the profitability of different types of commercial banks.

Based on the above, quantitative research on the impact of third-party payment on the profitability of commercial banks has obvious practical significance. Combining the research results, then I can make suggestions for regulating third-party payment platforms and banks to resist risks.

Hypotheses:

1. Hypothesis #1: The third-party payment will decrease the profitability of commercial banks.
2. Hypothesis #2: The third-party payment will affect the profitable structure of commercial banks.
3. Hypothesis #3: The impact of third-party payment on the profitability of different commercial banks is differentiated.

Methodology:

The first step is collecting data, the macroeconomic data can be collected from the National Bureau of Statistics of China and banking data can be selected from wind database or bank annual report. This article will select data from 15 commercial banks from 2016 to 2019, and then I will conduct quantitative empirical analysis by building panel data regression model. Since quarterly data is difficult to obtain, the data used in this article can only be selected as annual data. Regardless of whether there is auto-correlation in the disturbance term, this thesis will not study the auto-correlation problem for the time being.

The second step is to identify variables. In the thesis, the return on assets and percentage of non-interest income are regarded as the explained variables.The main explanatory variable is the scale of third-party payment. Other indicators that will affect the profitability of commercial banks are control variables, such as national macroeconomic development.

In the following table, I explained the variables in detail.

Variable	Explanation	Calculation
ROA	Return on assets	Net income/Average total assets
NIIR	Percentage of non-interest income	Non-interest income/Operating income
LDR	Loan-deposit Ratio	Total loan/Total deposit
CIR	Cost-to-income Ratio	Bank operating- expenses/Operating income
NPL	Non-Performing Loan	Total non-performing loans/Total loans
L_BSIZE	Bank size	Total bank assets
GDP	GDP growth rate	GDP growth rate
L_TPPS	Third-party payment scale	Non-banking payment scale

The panel data regression model is as follows:

$$Y_{it} = \alpha_{it} + \beta_1 L\_TPPS_{it} + \beta_2 LDR_{it} + \beta_3 CIR_{it} + \beta_4 NPL_{it} + \beta_5 L\_BSIZE_{it} + \beta_6 GDP_{it} + \varepsilon_{it}$$

The third step is to verify the hypothesis separately. In order to verify hypothesis 1 and hypothesis 2, it is necessary to choose the correct regression model based on the data in this article. So first, I will do the F-test, and fixed effect

model is judged by F-test. Then I will choose the Hausman test, which can help me determine whether my panel data is an individual random effect model or an individual fixed effect model. In order to further verify the hypothesis 3,this article will reclassify the commercial banks into three types,state-owned large commercial banks, joint-stock commercial banks and urban commercial banks. The sub-sample regression analysis of panel data is carried out respectively to verify hypothesis 3.

Expected Contribution:

In the thesis, I will focus on the effect of third-party payment scale expansion on the profitability of Chinese commercial banks in the background of e-commerce's development. I will also analyze the differences in this impact among different types of commercial banks. In addition, I will also introduce the characteristics of third-party payment platforms and the sources of profit for commercial banks.

Then I will give examples of representative third-party payment platforms in the the United States and China. Finally, I will propose my own suggestions on how commercial banks can better resist the risks brought by third-party payment platforms and how to better supervise third-party payment platforms.

Outline:

1. Introduction
2. Literature review
3. The characteristic of third-party payment
4. The development of third-party payment
5. Sources of profit for commercial banks
6. Methodology and Data
7. Empirical part
8. Risk and Regulation
9. Conclusion

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1 Introduction

The research background of the thesis is that TPP platforms are expanding rapidly through the growth of e-commerce, and the expansion of the TPP market exert an huge effect on the profitability of commercial banks in various countries. My first part of this article is introduction and the literature review. The second part is a brief introduction to the characteristics of TPP institutions, the development of TPP platforms in different countries and the profit channels of commercial banks. The third part is methodology, data and hypothesis verification. The thesis introduces three hypotheses about profitability. The first one is that third-party payment presents a challenge to commercial banks and the profitability of commercial banks is decreasing. The second hypothesis is that the expansion of the scale of TPP often urges commercial banks to optimize and upgrade internally, and commercial banks to modify their profit structure. The fourth part of the thesis discusses how to better supervise third-party payment platforms, and I put forward specific suggestions for commercial banks to resist the risks brought by such TPP platforms and some other non-financial institutions.

2 Literature Review

In recent years, scholars from many different countries have conducted endless research on the impact of third-party payment on the profitability of CB (commercial banks). The relationship between e-commerce and TPP has been stated by the majority of scholars in these literature. These researchers also focused on the origins and evolution of TPP, as well as the features of TPP in the global financial era. I roughly divide the research directions of these literature into the following three main directions.

The first mainstream research path is the study of the current growth of e-commerce and third-party payment.

Scholars' research on e-commerce and TPP is based on the most basic definition of TPP. ‘Third-party payment’ specifically means that non-financial institutions first rely on communications and information security technologies to sign contracts with major banks, and then TPP platforms act as payment intermediaries between merchants and consumers, and facilitate transactions between the two parties through network connection. In other words, TPP is a modern form of online payment system.

In the United States, e-commerce first arose and gave birth to a multinational TPP firm such as Paypal. Therefore, with the growth of e-commerce, research by scholars on TPP has also arisen.

TPP platforms that have arisen in different countries can be loosely categorized into the following three types. The first is Internet-based payment firms, which generally cooperate with big e-commerce websites

and take online payment as their main business. The second form is financial payment firms, who seek to broaden the financial services industry. The third category is the intermediary of credit. The TPP portal carries out the data sharing and information confirmation process between customers and the bank under the oversight of the bank.

In the first mainstream research direction, most scholars divide the development of TPP into the following three time stages.

The first time for the germination of TPP was from 1999 to 2005.The scale of third-party payments worldwide is at an early point.The overall global demand is small, the homogeneity of different goods is extreme,and competition from industry is fierce. In the first point, value-added space of the TPP platform is limited, and supervision has not yet been established.

The development of TPP was initially developed from 2005 to 2010. The growth of the e-commerce industry at this point has contributed to the initial development of TPP. Driven by the e-commerce platform, the e-commerce market is booming, which has greatly promoted the popularization of TPP. At this stage, payment institutions began to provide customers with various value-added services on the basis of payment services, and orderly competition in the market gradually formed. At this point, however, TPP firms are still in the early stages of investment and their profitability is low.

Since 2010, the user scale of third-party payment has reached at the third stage of rapid development. Over this time of accelerated growth, TPP licenses have been legally released in most countries. At this time, TPP is increasingly becoming mature. The issuing of TPP licenses marked the establishment of its legal status, and increasingly stringent regulation has facilitated the organized and healthy growth of the financial payment

industry. In addition, in this advanced stage, TPP are integrated with financial services such as insurance, credit and securities.

Manuchehr Shahrokhi (2008) has released his thoughts on the potential growth of Internet finance. He claims that the greatest benefit of Internet finance is in the mechanism of exchanging knowledge and gathering information. He also believes that consumers can conduct information exchange activities on the Internet. In the future, this modern financial paradigm of the Internet will eventually lead to new changes. Thanks to the advantages of the Internet, Internet finance is bound to grow in the long term.The author also argues in this article that everybody should pay attention to the protection of information platforms on the Internet.

In 2017, the international investment bank Goldman Sachs released a report entitled ‘The Rise of China FinTech. Payment: The Ecosystem Gateway’. According to the report from Goldman Sachs, cashless transactions in the United States have accounted for 75%, and the scale of TPP transactions in China has increased 74 times from 2010 to 2016, from US$155 billion to US$11.4 trillion, of which 16% are related to personal consumption , 56% are related to personal transfers.

iResearch (2020) statistics show that the size of third-party mobile payment transactions in China in the second quarter of 2020 is approximately US$854 million, a rise of 8.8% compared to the same time in 2019.The website analyzed the reason for TPP rise, as this quarter is the conventional e-commerce promotion season in China, and the impact of COVID-19 has decreased. And the proportion of the consumer sector has significantly rebounded. Among them, Alipay, a TPP platform operated by the famous Chinese e-commerce company Alibaba, and Tenpay, owned by Tencent, accounted for 55.6 per cent and 38.8 per cent of the market. In addition, iResearch also made the following predictions for China's TPP

market: the proportion of the consumer sector will slightly decline in the future, and mobile financial payments will grow to be the most important long-term driving force for China's mobile payments in the future.

Xiongbin Chai and Liyun Fang (2020) focused on three advantages of TPP compared with CB. First of all, TPP helps consumers to get more services at a cheaper price. For example, TPP platforms also provide full reduction benefits in order to attract more consumers. Although CB have launched such activities, the cost of carrying out such activities by CB is relatively high and the operation period is relatively short. The second advantage is that TPP platforms have more investment and wealth management options open to investors and lower thresholds.

TPP platforms are often backed by parent companies, which are often financial institutions such as funds and insurance. The purpose of the parent company is to more conveniently finance its own platform and obtain more profits. These institutions, on the basis of providing a variety of investment and wealth management services for customers of this platform, gradually use their own customer resources to reach cooperation with other financial management institutions, and finally combine offline products with online resources. In addition, TPP can also provide customized wealth management products according to the different needs of users. Therefore, the financial management options of TPP are not only more than CB, but also attract most ordinary qualified investors. In this article, the third important advantage mentioned by the author is that TPP services are more convenient than commercial bank payments. TPP can provide users with online and offline payment services and bill query services. When trading online, both parties to the transaction can transfer the amount as long as they meet the requirements of the platform certification. In offline transactions, customers and merchants can complete the payment through the QR code function. At the same time, TPP also provides users with

invoicing services, which can be invoiced based on user bill records. At the same time, TPP also provides customers with invoicing services that can be invoiced on the basis of user billing information. In addition to the above basic functions, TPP also uses platform information and traffic advantages to provide customers with residential life services. For example, after an outbreak of COVID-19, users can also check confirmed cases of new coronary pneumonia on the app. These services have greatly improved the consumer stickiness of TPP platforms, not only saving consumers time and expense, but also increasing the scale of TPP.

The second key research area by scholars are the study of the main factors influencing the profitability of CB.

Most scholars divide the key factors that influence the profitability of CB into external macroeconomic and internal bank factors. The external factors are mainly GDP, inflation rate, interest rate, monetary policy, etc. Internal factors mainly refer to the bank's asset scale, capital adequacy ratio, deposit scale,loan scale, non-performing loan ratio, income structure, and cost-to-income ratio.

Christos K. Staikouras (2004) claims that the rate of return of financial institutions is affected by many factors.These factors include the internal factors of each financial institution and a variety of meaningful external factors influencing the performance of profits. In this paper, the author constructed the OLS model and the fixed effect model. Experimental findings show that the profitability of European banks is influenced not only by factors relevant to their management decisions, but also by changes in the external macroeconomic environment.

Sinha and Sharma (2016) used Indian CB as sample to perform an empirical study and found that the GDP growth rate is positively associated

with bank profits, and the inflation rate rise has a negative effect on bank profits.

Research by Mohammad Suleiman Aladwan (2015) examined the difference in profitability of listed CB of different sizes in Jordan.The sample time for this article is from 2007 to 2012.The study divided banks into three categories according to the size of their assets. Using a simple regression measurement method, the author found that there are substantial variations in the profitability of banks of different sizes.

In addition to the external macroeconomic factors mentioned from the above literature which will have an effect on the profitability of CB, a large number of other literature have also focused at the internal factors of commercial bank which will also have an impact on their own profitability. Generally speaking, there are two primary income sources of CB in different countries. The first one is the difference between the interest income of the loan and the interest costs of the deposit. The CB in some developed countries, this differential revenue accounts for a greater proportion of overall bank income. In developed countries, the biggest profit of CB comes from non-interest income, i.e. intermediate business income. This form of revenue relates to the commission of intermediary undertakings, such as agency sales and discounting. In general, modern banks mainly rely on intermediate business income to make profits. Businesses such as card business and agency business, such as fund, insurance, third party custody and other bank agency businesses, may also offer benefits to banks. One of the independent variables used in my paper to analyze the impact of TPP development on the profitability of CB is the proportion of non-interest income.

Luh Nyoman Ni (2015) conducted a multiple regression quantitative analysis on private CB in Indonesia from 2009 to 2013, and tested the

hypothesis through normality test and heteroscedasticity test. The results found that the NPL indicator and LDR indicator have a great impact on the profitability of CB.

Hongbin Yang, Qin Wei (2018) conducted a detailed study on the income structure of CB. They found that the influence of the proportion of non-interest income of CB on the return on assets of CB presents different gaps due to differences in bank types.

In addition to this inference, the authors also found that if banks want t o improve profitability, they need to concentrate on the diversification of t heir income structure. Banks should not only concentrate on maximizing interest income business, but should also pay attention to controlling non-interest income business.

Aparna Bhatia, Poonam Mahajan, and Subhash Chander (2012) extracted the financial statement data of 23 Indian private banks from July 2006 to October 2009.They then used the asset return as a dependent variable and used the regression analysis measurement method. Draw the inference that non-interest income, operating expenditure ratio and earning per employee, as well as non-performing assets of the bank, are meaningful variables affecting the profitability of private sector banks in India.

Analysis by Ong Tze San and Teh Boon Heng (2013) examined the effect of specific banking characteristics and macroeconomic conditions on the financial performance of Malaysian CB from 2003 to 2009. This study uses regression models to relate the profitability of banks to different explanatory variables.The results of this study indicate that ROA is the best measure for measuring the profitability of CB.

The third most important conventional research path for scholars is to analyze the influence of third-party payments on the profitability of

CB. Most of these scholars have done extensive studies on intermediary business income and non-interest income in the bank.

Chai Xiongbin and Fang Liyun（2020) hold the view that the TPP mainly exert two main effect on CB. The primary challenge for CB is that customer resources are seized by TPP platforms. Since TPP has the characteristics of easy activity, varied goods and highly focused services, the platform's real and potential customers have steadily increased. The second point is that TPP diverts the amount of deposits initially belonging to CB. Relying on the big data of the Internet , these platforms can directly understand the identity of users, which greatly simplifies the procedures for reviewing loans and deposits. Therefore, TPP platforms can often directly provide users with more convenient loans.

Most scholars, after completing the research on the TPP itself and the profit structure of CB under the background of the rapid development of e-commerce, also put forward suggestions that CB and the financial industry should make corresponding changes.

KincyJason (2010) proposed that the service model of CB should keep pace with the times. He believes that CB should gather and summarize consumer feedback and that CB should distinguish their services, which means that they can provide consumers with unique services that suit their needs.

Carmona and JoseL (2010), based on the previous literature, believe that the position of CB in financial activities is very important, and CB need to learn from TPP platforms.

Literature Summary

Firstly, from the data point of view, most researchers from different countries use bank statements as the basis for study in these literature. Most

of these literature choose cross-section data, and less literature choose panel data.

Secondly, from the perspective of research. Most of the scholars' research on this topic analyzes the threat of TPP to the bank's profitability, but there is a lack of analysis of the specific threat level. In addition, most of the literature treats all types of banks as a whole and lacks analysis of the characteristics of different types of banks.

3 The Characteristic of Third-party Payment

When people from throughout the world have entered the twenty-first century, the development of information technology has greatly aided the growth of network intelligence. TPP platforms and other application software are the products of network intelligence on mobile phones and web pages. In this chapter, I drew these three characteristics from my experience in real life. Through the three distinctive features I described, I will be able to better analyze in depth the dimensions of the TPP platform, which impacts traditional financial institutions.

The first feature that distinguishes the TPP platform from CB is that the former is more user-permeable. User penetration specifically refers to both user needs and user stickiness.

First of all, I will discuss the first factor, user needs. Since the needs of payment users are constantly changing over time. Various research and development technology companies can update the version of the TPP platform after gathering customer reviews online at any time, enabling these payment platforms to continually update their services in response to changing user needs. For example, I've observed that the majority of users' demand changes are limited to withdrawing cash from commercial bank ATMs and transferring it to online payments. This shift in demand, I assume, indicates that online payment has actually started the initial expansion stage. The incremental shift from offline commercial bank remittances to online remittances reflects shifts in consumer needs in the

middle and later stages of the growth of TPP platforms, indicating that users' needs for online payment platforms are no longer limited to pure payment services. TPP systems have lower costs for optimizing services as compared to traditional payment platforms. In other words, compared with CB, TPP platforms prefer provide users with the most types of services at a lower cost. As a result, users' online financial needs can be met on a consistent and timely basis, prompting TPP systems to expand users' penetration.

Next, I'll discuss user stickiness, which is the second aspect that influences user penetration in these platforms. TPP networks, as opposed to CB, take advantage of the network's advantages to gather more attractiveness in less time, obtain customers' feedback, and then provide customers with more services at a lower cost. Subsequently, as the above user needs are steadily fulfilled, users are more likely to establish a reliance on these payment systems, resulting in user stickiness. User stickiness is particularly reflected in the younger generation of e-commerce platform shopping users. Therefore, the enhancement of user stickiness has also greatly improved user penetration.

Compared with the operation of CB, the second characteristic of TPP platforms is that TPP own the linkage effect in diverse service platforms.

Service linkage effect, in my view, is that the TPP platforms can easily achieve multi-faceted and multi-level cooperation with other multi-type service platforms, something which CB find difficult to achieve in their operations. Many TPP systems, as we all know, are no longer limited to providing consumers with a single online payment service. Users with loan needs, for example, would have more loan platforms to choose from if a TPP network collaborates with a credit financial services provider. Users

can apply for loans directly and easily by entering personal details on such platforms. The TPP platform and the credit finance company will only conduct a simple background check on the user, and the user can immediately obtain the loan, and the loan will be directly credited to the applicant's bank account. As a result, when a TPP network collaborates with a credit financing provider, CB' loan business will inevitably be impacted. As I mentioned earlier, the service linkage of the TPP platform is reflected in the multi-faceted and multi-level cooperation between the TPP platform and other service platforms. The cooperation here is multi-dimensional and multi-directional. TPP platforms not only cooperate with financial lending companies alone, but now many TPP platforms can even achieve tripartite cooperation. For example, a TPP platform can introduce a shopping platform for tripartite cooperation while cooperating with a credit company, so that users can purchase in installments on such a TPP platform. Multi-platform cooperation first attracted a large number of young users whose income was insufficient to support shopping costs. Secondly, such linkage cooperation also increased the loan interest income of online lending companies and TPP platforms.

CB have tighter loan regulation than TPP platforms, so loan approval rates are lower, and large loan lines are more inclined to users with secure income. In addition, these traditional offline financial institutions just provide less linkage products than TPP platforms. We rarely see offline CB or CB' own applications can allow a low-income young consumer to buy brand-name clothing in installments, but a TPP platform with multiparty cooperation could meet the demand.

The third distinguishing feature of TPP platforms over CB is their ability to offer more creative and innovative services.

Firstly, from the perspective of operation, CB have higher professional labor costs and rental costs. The specialist labor and rental costs that CB must incur while operating are obviously much higher than those incurred by online platforms. As a result, I've observed that CB don't easily generate new services and goods. Any of their decisions necessitates large outlays. So this is why I claim their update pace is slow. Since the TPP network depends on computer technology and smart phone terminals, product upgrades and iterations aren't as expensive as CB, and labor costs are marginally lower.

I have noticed that after the global outbreak of COVID-19, users can monitor the current number of new infections within user's corresponding country on the TPP platform, and can choose the nearest hospital to get vaccinated after logging in their personal information. And this kind of service is just a simple pop-up reminder in the online applications launched by CB.

Additionally, the TPP platform has added community service with the basis of providing clients with basic services such as payment and transfer. Retirees, for example, could apply for pensions directly on a TPP platform, and the pension is directly transferred to the TPP platform account in the form of digital money, reducing processing time and simplifying the retirement process for many users. Another example is that in the past, many people had to go to the bank to withdraw cash, then hand it over to the landlord while paying utility bills when renting a house, or use a machine in the bank lobby to transfer money. But, as of now, I've seen that some TPP platforms have completed the process of quietly seizing traditional offline platforms' business. Users can directly finish the payment of water, electricity and tuition on the web or via smart phones. For the majority of users, this is incredibly helpful. With the help of social and e-commerce

platforms, online payment platforms can always develop new services. I believe this poses a major challenge to CB.

In summary, as e-commerce and social software have grown in popularity, the general characteristics of TPP platforms are user penetration, service linkage effects, and innovation. In addition, I believe that the TPP platform's aforementioned characteristics have steadily distinguished it from global CB in recent years. And the TPP platform is increasingly expanding internationally thus bringing a vast number of users and partners closer together.

4 The Development of Third-party Payment

In the preceding sections, I detailed how meaningful changes have occurred in the global payment system as a result of the global penetration of technologies such as mobile Internet, cloud computing, and block chain. Online payment has been more unstoppable since the convergence of e-commerce and social networking sites. Scanned payments created by the TPP platform have begun to appear in a variety of countries. Individual users and retailers no longer need to rely on cash as in the past to finish a transaction process.

COVID-19 has had a new effect on the global financial industry since the beginning of 2020. To begin with, this major global health event has contributed to the growth of online shopping activities to some degree, as well as created new e-commerce creation opportunities. Furthermore, online and distance education platforms are rapidly expanding. Various countries' CB are being compelled to upgrade their services. CB, for example, have decreased their business hours in offline operations and strengthened their online banking application software services. In reality, I must confess that when I mention COVID-19, all of my friends experience panic and sadness. But from the research perspective of my thesis, COVID-19 did compel these banks to begin service innovation and, at the same time, encouraged the establishment of new businesses on the TPP platform.

Following that, I'd like to introduce to you several representative TPP platforms in the United States and China based on my own real-life experience and professional knowledge.

Why not select more representative examples from more diverse regions to address? You may ask me. In fact, it out of comprehensive and honest considerations. The criteria is do I really have already used? Am I familiar with these platforms? Personal consideration is one of the criteria. From a rational point of view, firstly TPP sprouted and grew on the land of the United States, and then expanded to other places. Secondly, so far, China is the country with the largest number of people using locally developed TPP. As just an outcome, whether from an emotional or logical standpoint, my decision to study the representative TPP platforms in these two countries is reasonable and persuasive.

Paypal, Apple Pay, and Venmo are the top three TPP platforms in terms of development size in the United States now.First and foremost, I clearly observe the number of users. In terms of use, PayPal is the most used platform in the United U.S. and around the globe. In addition, Paypal is also the earliest established payment platform in the North America. It was established early and accumulated more wealth and users. The main function of PayPal is to provide users with third-party transaction channels. PayPal categorizes all accounts into two categories: merchant accounts and private accounts. Users of these two accounts can use PayPal to make online payments.

I have also observed that PayPal has been very forward-looking a long time ago and started a long-term and stable cooperation with eBay. This kind of cooperation is win-win and full of wisdom. In addition, PayPal also has a very good cooperation with chat software like Facebook.By linking other people's Paypal accounts to their Facebook Messenger accounts,

Facebook Messenger users can directly transfer and receive directly on Facebook. It is clear that TPP network creation and growth are inextricably linked to partnership with social media and e-commerce platforms. Finally, I noticed that PayPal has also developed a bank card that belongs to its own platform. PayPal, in collaboration with its partner financial institutions, has early already begun offering loan and credit card services. Do you feel it is restricted to this? What I admire about PayPal is its wise operations. They have already begun directly collaborate with the bank. PayPal also gradually pursues a position in loans and credit cards.

The second one I use most frequently is apple pay. Apple pay was developed and launched by smart-phone developer Apple in 2014. This is a service software created by Apple that includes mobile payment and electronic cash. Apple Pay has the benefit of being compatible with VISA, MasterCard Contact-less, and American Express Pay. Apple pay has the drawback of being a payment software created by Apple for its own devices, which means that users can only use it by Apple other products, such as the iPad and iPhone. In addition, Apple Pay has a relatively small range of services. At present, the platform only provides one-way consumer payment functions, and lacks the functions of transferring, withdrawing or depositing cash.

The third TPP platform that cannot be ignored in the United States is Venmo. Venmo is a brand new online payment system established lately under PayPal. The biggest feature of Venmo is that it can facilitate people to easily solve the problem of account splitting while socializing. The disadvantage of Venmo is that users can only use it after binding a U.S. bank account and only supports U.S. dollar transfers. As a result, Venmo's market share is currently low. Despite the fact that Venmo already offers users instant transfer services, it is limited to transfer to eligible US debit cards. Venmo has the advantage of being easier to use, and the approach of

integrating social network services means that the majority of Venmo's users are young people.

Next, I will introduce in detail the representative TPP platforms in my birth country. In 2019, the total value of TPP transactions in China is estimated to be about 25 trillion yuan. And the domination of consumer payment accounts was shifted from banks to leading Internet institutions such as Alibaba Group and Tencent Group as early as 2016.

I would like to introduce to you a collection of news articles with detailed data. How many people are actually using TPP when you search on Chinese search websites? The data in the search results will surprise you and me. At the time of the worst outbreak of the COVID-19 last year, the number of people accustomed to using TPP in China is 768 million, which is 85% of the total number of Internet users in this country. What does it mean? In other words, assuming there are ten people who are available on the internet, eight to nine of them can use their mobile phones or computers to pay it online not the cash. What is also directly concerned is that, despite the well-known large population base of this country, there are not a few people who have the conditions to get the Internet at home. Moreover, these people who can access the Internet prefer to use their mobile phones to access the Internet. In fact, my true feelings are the same. During the COVID-19 period last year, because the country restricted anyone from leaving their home at will, everyone's reliance on mobile phones or the Internet became even stronger. Thinking about it, it is actually more convincing to select samples from China for the data part of my thesis.

After introducing the surprising set of data, I want to introduce three Chinese TPP platforms in detail, which are also the platforms I am actually using. Alipay, which was created by Alibaba Group, WeChat Pay, which

was developed by Tencent Technology Group, and JD pay, which was created by JD Group.

The TPP platform I use most frequently is Alipay. The number of Alipay users worldwide has exceeded one billion. Alipay is a software application developed by Alibaba Group on its own, so Alipay can provide consumers with a complete set of coherent services within its application software, such as digital payment and digital financial services. In addition, consumers can also enjoy many other daily life services through Alipay, such as scenic spot and historical site discovery, as well as life convenience services. In contrast to Alipay, a TPP application software with a wide variety of services, the services that CB can offer to customers tend to be more limited.

In the last paragraph, I made a simple summary of the survival condition of Alipay. Next, I want to discuss what service innovations Alipay has in my real experiences. The basic living services provided by Alipay, my real feeling is that the services provided by Alipay are really abundant. For example, if I plan to travel, I can simply purchase transportation tickets or request real-time taxis within the software interface. I can ask for takeout from the platform at any time. If I'm fortunate, I may even get a coupon. In terms of accommodation, I can use the application to find the city where I am in real time, and it will automatically provide me with the best housing plan. If I need to pay my landlord’s utility bills, I can finish it with just one click on the platform. Although Alipay was originally an application developed by Alibaba Group for their special shopping website Taobao, now users like me can also directly shop in Alipay software and browse products online. This website has always advocated for users to live a safe lifestyle. And Alipay has developed two sections on the platform for running check-in and fitness fun, which have welcomed by young people like me.

It is no surprise that Alipay provides users with a full range of abundant basic life services, and now I can still find a variety of financial services on this platform.For example, in the loan field, Alipay has created small loan services for young people like me, such as ‘life reserve’ and ‘Huabei’. Provided a large amount of annual loan projects for some businesses with difficulty in capital turnover. When COVID-19 broke out in the first half of 2020, when merchants were struggling to survive, in addition to the help of the state, Alipay really provided a lot of help to these companies. When COVID-19 broke out in the first half of 2020, some merchants were struggling to survive, in addition to the help of the state, Alipay really provided a large amount of annual loan projects to these companies in time. This platform also provides various wealth management services. For example, a low-yield but low-risk financial product such as ‘Yuebao’ has been developed for the working class. It also developed an interesting deposit service such as ‘Wish Savings’ for students. I am also experiencing this wish deposit service in Alipay. This platform allows me to make my wish first, then enter the desired target amount, and finally Alipay reminds me to deposit a sum of money into their platform every month. As a result, I slowly accumulated my savings, and finally my wish can be realized.

Actively innovating services for users is one aspect. What makes Alipay so popular in a short period of time? What is the reason behind the extremely high user stickiness of this platform? In fact, it is because Alipay believes that social responsibility is the cornerstone of good and bad corporate development. I want to elaborate on how Alipay fulfills its social responsibilities and enhances the reputation of the platform in my eyes. Simply click on this software, and I can see a button called ‘Ant Forest’. ‘Ant Forest’ is a public welfare project to protect the environment developed by this platform for all users. The number of steps an Alipay user walks per day can be proportionally converted into the number of plants

that the platform must plant for the desert areas of China each year. It has been almost five years since this project was first launched. Today, Ant Forest has more than 500 million users, and more than 100 million trees have been planted in desert areas, covering an area of nearly 1.6 million square kilometers. When I look at the official data, I was very shocked. A service innovation on this TPP platform can bring such a big change to the ecological environment.

WeChat Pay is a TPP service developed by Tencent Technology Group that is attached to and embedded in social chat software. Compared with Alipay's standalone application software, WeChat Pay must be attached to social software to provide services to users. In addition, WeChat Pay has replaced some CB to provide users with cross-border transfer services. Users can openly pass funds to their chat friends as long as both parties are social friends. This service of WeChat Pay has severely affected the transfer fee income previously collected by CB. WeChat Pay also provides two-way services. A detailed example is that if I have some money on this platform that I will not use for a long time, then I want to transfer the money to my other accounts or some other friends. WeChat Pay allows me to transfer this extra money to my own social account, and I can transfer the money from the social account to my real bank card later. This two-way linkage service is actually having an impact on traditional offline financial institutions.

In fact, I mostly use WeChat to chat with my friends. So how does such a typical social software make itself has both the ability to chat and pay? The success of WeChat actually sends out a signal in a certain sense. This signal is that the TPP platforms can actually unite users' high social needs and high payment needs. It is not contradictory to satisfy the two needs of users simultaneously.

In the last few years, I've observed that, in addition to connecting financial institutions and banks, WeChat Pay has begun to pay more attention to opening joint offline merchants. This platform has also created Internet tools to assist retailers with online marketing. I think the special thing about this platform is that it has a huge number of users who use social software. Because every moment of payment can bring a channel to users, and then these channels can help merchants carry out secondary marketing. The industries covered by these channels include hospitals, smart phone brands, maternal and infant, retail, highways, life payment, food and beverage processing, and so on. One end of the channel is the user, and the other end is the merchant. I also discovered that, unlike Alipay's self-developed service module, WeChat Pay prefers open operation. Click on WeChat Pay, I can find that there are official accounts, small programs, and social-based services such as Moments, card and coupon marketing. WeChat Pay will also develop new capabilities for its partners every year to help these merchants better attract users. I also noticed that the platform likes to introduce several service- providers and directly cooperate with service providers to attract more users. Compared with WeChat Pay, it is very not easy for CB to have such a powerful social network monetization ability.

So, aside from the previously stated open collaboration with merchants, what other financial services has WeChat Pay developed? I have observed that WeChat Pay has begun to cooperate closely with offline CB and fund institutions. The first is the cooperation with a CB. I can directly follow the corporate official account of the CB in the WeChat . Then I can see that there are three options available under this official account, all-in-one card, credit card and special services. When I click on each menu, there will be different applications.I can find services such as account inquiries, transfers and remittances, wealth management products, and life payment. Even

under the credit card section, I found functions such as bill query, quick repayment, bill installment, and point query. I think the most practical function is inquiry and service reservation. I can directly check the queuing status of offline CB. I can also apply for this CB' credit card in WeChat Pay. Cooperation with fund institutions also facilitates users like my parents. All users can click the 'Query Net Value' button under 'Fund Net Value' in WeChat Pay to check the status of their own funds. If you are a registered user of the platform, you only need to pass identity verification on WeChat to check your balance and income. This kind of open partnership is very practical for users like me.

I introduce JD Pay in the last one because I use it less often than the previous two platforms. JD Pay is a secure and convenient TPP platform that is compatible with wireless terminals, POS machines, QR code payments, and other mobile Internet-related functions introduced by JD Group. JD Group has specially developed JD-Pay for its integrated online shopping mall. In other words, JD Pay is a TPP platform designed specifically for the group's shopping websites. Compared with the scope of Alipay, JD-Pay can only be used in this special shopping website. Compared with WeChat, JD-Pay has no social functions.

Despite the fact that I do not use JD pay frequently, I'd like to go over it in depth. JD Pay is more than just a traditional TPP network; it is also a closed platform with the highest financial value among the shopping websites launched by its parent company. JD Pay not only has a payment function, but also can provide users with loan services. First, the user only needs a bank card with a reserved mobile phone number and a verification SMS to finish the payment process. You are not required to create an online account or register a third-party account, even not required to remember the password. In addition, JD Pay can provide users with fast payment, QR code payment, NFC near-field payment, face recognition payment and other

payment methods, and can open face recognition and other high-tech services to partners. Secondly, the most distinctive feature of JD Pay is the loan function, which called JD Baitiao. JD Baitiao is also the first Internet loan product independently developed by China's TPP platform. Users can consume first and pay later. JD Baitiao also maintains close cooperation with CB, insurance companies, and fund companies.

I would like to mention one more thing that has always been criticized on this platform in the end. Of course, it is also an issue that many emerging TPP platforms are aware of but fail to change. JD Baitiao has successfully attracted many crazy teenagers who have just turned sixteen. They are keen to pursue celebrities who shine on the stage. But their parents don't always sponsor their leisure activities. Therefore, when they don't have enough money to participate in a concert hosted by a star they like, they will apply for a large number of loans on JD Baitiao to chase stars. Such examples are not rare. Are all people able to repay the loan in the end? The answer is obvious. Once teenagers fail to make repayments, they will have stains on their credit records at a very young age. And I will discuss how to better supervise this kind of TPP platform, so as to better protect young users. I think it is very appropriate for me to use the example of JD Pay to illustrate why the TPP platforms that I will mention later needs to be regulated. JD Pay provides star-chasing capital for young fans who are in dire need of money. I think JD pay has forgotten to review the age, purpose, and repayment ability of the young fans and the review mechanism of JD pay actually is very simple. In the following chapters, I will put forward my own suggestions for the specific risks that the TPP platform has now exposed, corresponding to the operation of CB and multi-dimensional supervision.

All in all, different TPP platforms have different characteristics and functions in the United States and China. I introduced the advantages and

disadvantages of these TPP platforms in detail based on my real experience. In fact, this also shows that TPP platforms have not stopped their pace of innovation. I cannot simply say which platform is perfect compared to CB. What I can only do is compare the differences in various services from these platforms based on my real feelings. If you have used these platforms like me, you can understand why so many TPP platforms have survived so well. That's because they're not the same, in terms of concepts and operations. The distinction enables them to take root and sprout in areas where they excel.

5 Sources of Profit for Commercial Banks

After introducing several representative TPP platforms in China and the United States that are operating in good condition, I want to keep it simple to introduce the main sources of profit for CB.

Let me first assume that why some banks can earn more income with less cost? Why are some banks limited in an endless loop and cannot survive? I think that different CB have different original capital and different business strategies. Some banks are struggling to think about whether they can develop more new businesses in the face of risks and shocks in the general environment. And they are thinking about whether they can transform? Such wise banks can survive better.

First of all, from the perspective of the business operated by CB, all CB mentioned in the thesis are only one type of many banks. And CB have a more detailed classification. The business with the largest proportion of CB was initially the operation of deposits and the issuance of loans. I will only address the mode of service. CB, as discussed in my thesis, are only one form of bank. For the time being, most conventional CB benefit mostly from deposits and loans, which is the gap between low-interest deposits and high-interest loans. This is also the most traditional and conventional method of profiting that I am aware of.

However, many CB are now starting to rely on intermediary businesses to make profits in addition to this safe business strategy. For example, the fees for users to open new accounts, business query fees, and fees for user

transfers and remittances all belong to the profits brought by the intermediate business. In addition, credit custody business, futures investment, and insurance agency business can all bring income to such banks I mentioned before. The growth of such TPP platforms has a major effect on such banks' intermediate business profits.

In addition to profit by traditional operation way and CB that actively innovate operating models to increase intermediate business income when facing the pressure of competition from such famous TPP platforms, such platforms are actually directly bringing a certain amount of clearing income to CB. A specific example is that I have learned that most TPP companies are currently losing their independent clearing capabilities after strict national supervision. They have to rely on bank accounts as required by law to clear customers' payments. What does this mean? This means that the TPP platform does not have this ability, and it has to pay for other competing institutions that can provide them with this kind of service. These TPP platforms actually rely heavily on such silent CB behind TPP platforms. Even in order to improve this type of income, CB do not need to pay too much cost. But if I judge from the overall trend, I think such CB do not actually make money as easily as they seem, and they also need to work very hard to keep up with the whole trend. And the TPP platform is still looking at fiercely as a tiger on such banks' market value and the number of users at all times.

6 Methodology and Data

6.1 Methodology

In my thesis, the data is dynamic panel data. The method selected in my thesis to verify the three hypotheses are the regression method, the fixed-effect model, F-test and Hausman test.

Firstly, I will use Stata 14.0 software to perform descriptive statistical analysis on the collected data.

Secondly, I will use F-test to determine the model of my panel data.

I will use the Hausman test. Why do I use this test? It is because this test can help me choose which model my panel data belongs to.

The models we generally know are the fixed-effects model and the random-effects model.

After I determine my panel data type, I will use total sample regression and sub-sample regression to test the three hypotheses.

6.2 Data

Data source: the data in my thesis mainly comes from two ways.

First, macroeconomic data and TPP scale data come from the World Bank database website and the CEIC database website.

Secondly, the specific data of each year of the CB is extracted from the annual financial report issued by the official website of these CB. And on this basis, I sorted out all the collected data.

The sample time chosen for this thesis is from 2016 to 2019. It should be noted that the 15 banks I gathered are all various natures, and I do not collect any central banks' data.

I classify all collected CB into three types according to the following criteria.

State-owned CB own large scale, which are directly operated and supervised by the Ministry of Finance. Five state-owned banks were screened in the thesis.

A joint-stock CB is typically a bank owned by a legal entity, which operates separately, has independent accounting and maximizes income. Joint-stock banks generally have deposits, loans, exchanges and savings services. Seven joint stock banks were screened in this thesis.

The scale of urban CB are smaller than that of joint-stock CB. And meanwhile urban CB are more reliant on the cities in which the banks are based. Who does Urban CB usually serve? They usually serve residents and businesses in their native cities. In my thesis, I screened three urban CB.

Table 6.1: Banks' description

Bank Type	ABBREVIATION	Full Name
State-owned	BOC	China Construction Bank
	ICBC	Industrial and Commercial Bank
	CCB	Bank of China
	ABC	Agricultural Bank of China
	BOCM	Bank of Communication
Joint-stock	EB	Everbright Bank of China
	HX	Huaxia Bank
	PA	Pingan Bank
	SPD	Shanghai Pudong Bank
	IB	Industrial Bank of China
	MB	China merchants bank
	CITIC	CITIC Industrial Bank
Urban commercial	BJ	Beijing Bank
	JS	Jiangsu Bank
	SH	Shanghai Bank

Variable interpretation

In the thesis, I consider the ROA and the NIIR from CB' annual financial report as the dependent variables, and other bank financial indicators, such as LDR, CIR, NPL, Bank Size, TPP scale, and GDP growth rate as independent variable. Next, I will explain each variable in detail.

First of all, the NIIR in the thesis refers to the percentage of other income obtained by CB in total operating income, except for interest, especially the income obtained by CB through intermediary business. The thesis has chosen this variable mainly because the rapid growth of TPP, on the one hand, poses a challenge to CB, and on the other hand, forces CB to pursue reform or innovation. Therefore, the non-interest income ratio indicator of banks plays an important role in studying changes in bank profitability and reforms.

The LDR variable is the ratio that the total amount of loans divided by the total amount of deposits per year. This thesis uses the data percentile system. The reason why my thesis chooses the LDR variable to research the effect of third TPP on banks profitability is mainly because, for CB, LDR can forecast risks. When a CB gets more deposits than loans all year round, this may send a signal. This signal is that the bank's cost is greater than its revenue. So my conclusion is that the bank's profitability may be relatively poor. Generally speaking, CB will try hard to improve this ratio to make a profit. However, from the perspective of banks' resistance to risks, if the LDR is too high, CB will not have enough funds for customers' daily cash withdrawals and daily settlements. Therefore, some wise CB never forget to retain cash in stock.

The CIR variable refers to the ratio of the operating expenses of the CB in current year to the operating income of the current year. And it is calculated by dividing business and management expenses by operating

income. The business and management expenses specifically include fixed asset depreciation, personnel expenses, and asset amortization expenses. Specifically, the CIR indicator will display the specific costs that CB need to pay in order to earn a unit of profits. Generally speaking, if the CIR ratio is small, it is a very good performance, which means that the bank has obtained a higher return on a unit of expenditure. Therefore, I choose the CIR as an important indicator is wise.

NPL refers to the non-performing loan ratio of BC, specifically the proportion of non-performing loans by CB in its overall loan balance.The non-performing loan ratio of CB is one of the critical factors for evaluating the stability of bank assets. The higher the CB's NPL rate, the higher the proportion of loans that the bank cannot recover from total loans, and the higher the CB's credit risk own. The non-performing loans include loans generated by the borrower's inability to repay the principal and interest to the CB. NPL index is of great significance for studying these CB' profitability.

The variable scale of CB in my thesis is the total scale of assets of CB per year. Specifically, the total assets of a commercial bank refer to resources owned or managed by a commercial bank which are intended to bring economic benefits to a commercial bank.

The TPP scale variable specifically refers to the smart-phone payment scale in China. And the amount of China's TPP smart-phone or mobile payments primarily consist of three major sectors: personal applications, mobile finance and mobile consumption. First of all, what does the personal application module specifically refer to? It is the process of credit card transferring and payment activity through a TPP platform. The Mobile Financial Module provides personal and corporate financial management and loan services. The Mobile Consumption Module refers primarily to

online and offline payment activities via QR codes. Among them, Alipay, a TPP platform under the Chinese e-commerce company Alibaba, has a greater market share in the personal consumption module.

Table 6.2: Description statistics of variables

Variable	Definition	Obs	Mean	St.Dev.	Max	Min
GDP	GDP growth rate	4	6.67	0.38	6.95	6.11
L_TTPS	Third-party payment scale	4	22.63	11.05	37.70	8.40
YEAR	2016-2019	4	2017.5	1.29	2019	2016

Table 6.3: Description statistics of state-owned CB

Variable	Explanation	Mean	Median	S.d	Max	Min
L_BSIZE	Total annual bank assets	12.16	12.28	0.39	12.61	11.34
LDR	Loan-to-deposit ratio	77.48	77.97	7.03	90.40	64.63
CIR	Cost-to-income ratio	29.02	28.21	3.32	34.90	23.28
NPL	Non-performing loan ratio	1.54	1.49	0.22	2.37	1.36
NIIR	Non-interest income ratio	28.80	28.83	5.67	38.44	17.71
ROA	Return on assets	1.00	0.98	0.13	1.20	0.80

Table 6.4: Description statistics of joint-stock CB

Variable	Explanation	Mean	Median	S.d	Max	Min
L_BSIZE	total annual bank assets	10.79	10.98	0.362	11.21	10.07
LDR	loan-to-deposit ratio	92.21	91.47	10.15	112.31	75.42
CIR	cost-to-income ratio	28.54	28.78	3.11	34.50	22.58
NPL	non-performing loan ratio	1.69	1.68	0.19	2.14	1.16
NIIR	non-interest income ratio	33.15	34.03	5.21	44.63	23.26
ROA	return on assets	0.89	0.83	0.15	1.32	0.74

Table 6.5: Description statistics of urban-CB

Variable	Explanation	Mean	Median	S.d	Max	Min
L_BSIZE	total annual bank assets	9.84	9.93	0.34	10.22	9.10
LDR	loan-to-deposit ratio	80.14	81.22	8.43	93.97	65.25
CIR	cost-to-income ratio	25.11	25.42	3.06	29.21	19.98
NPL	non-performing loan ratio	1.29	1.32	0.12	1.46	1.14
NIIR	non-interest income ratio	26.51	23.12	10.41	43.20	11.69
ROA	return on assets	0.83	0.84	0.08	0.95	0.71

From the above summary statistics, the scale of the five state-owned CB is obvious bigger than the selected seven joint-stock CB, and the scale of the joint-stock CB is slightly larger than that of urban-CB. The maximum scale of state-owned CB is 12.61, while minimum scale of urban CB is 9.1. The difference in bank scale of the selected sample is 3.51.

From the summary statistics of LDR, the mean of LDR of joint-stock CB is 92.21, the average LDR of urban CB is 80.14, and the average LDR of state-owned CB is 77.48. This shows that in the selected sample, the total number of loans granted by joint-stock CB is close to the same as the total number of deposits accepted. The proportion of loans issued by state-owned CB is slightly lower than that of joint-stock CB. I infer that it also indirectly shows that the profitability of joint-stock CB in my data are higher than those of state-owned CB.

And now I look at summary statistics of CIR, the CIR of all types of banks are within 30%, and the mean of CIR of state-owned CB is 29.02% slightly higher than other types of CB. Urban-CB have the smallest CIR. It can show that most urban-CB have lower operating costs, compared with other banks, these banks can use the lowest cost and the same unit of income.

In terms of NPL indicators, joint-stock CB have the highest average NPL, which shows that joint-stock CB in the sample have the highest credit risk.

In terms of general descriptive statistics on the NIIR, joint-stock CB show the highest mean value. It can be seen that firstly, joint-stock CB may bear greater credit risks. Secondly, this type of CB are carrying out reforms and innovations under the threat of TPP.

Finally, state-owned CB show the highest value of average ROA, and their standard deviation is small. I think this indicator is very important in the subsequent study of the degree of change in the profitability of various types of CB.

7 Empirical Part

7.1 Total sample regression

Firstly, panel data models generally consist of three kinds of models: mixed-effect models, variable-intercept models (including fixed-effect and random-effect), and variable-coefficient models.

My empirical procedure is to first use the F-test to determine whether the model in my thesis is a mixed-model or a variable-intercept model, and then use the Hausman test to specifically determine whether it is a fixed-effect model or a random-effect model.

In the thesis, I use the software Stata14.0 for testing. In the unconstrained regression model, I performed the F-test. I find that the P-value is less than 0.01, so I reject the null hypothesis that the panel data model is a mixed model, indicating that the intercept of the panel data regression model is changing.

Table 7.1: Hausman(1978) specification test

	Coef.
Chi-square test value	59.08
P-value	0

The thesis builds a multiple regression model with the related indicators of ROA and NIIR as explained variables and LDR, CIR, NPL, L_BSIZE, GDP, and L_TPPS as explanatory variables in order to analyze in detail the

effect of the TPP scale on the profitability of CB. The regression model primarily investigates the effect of the TPP scale on CB' profitability and profitable structure under the assumption that all other variables remain constant. In addition, in order to avoid heteroscedasticity errors leading to the failure of t-test, I adopt the standard error method of robust clustering in panel data regression. The specific regression results are shown below one by one in the form of tables.

Table 7.2: Specific regression results

	(1)	(2)
	ROA	NIIR
L_TPPS	−.004***	−.053
	(−3.983)	(−.345)
LDR	.001	.344**
	(.613)	(2.249)
CIR	.009	.197
	(1.238)	(.549)
NPL	−.105	−4.924
	(−1.079)	(−.952)
LB_SIZE	.067**	2.194
	(2.948)	(1.17)
GDP	−.091***	.8

	(−7.722)	(.213)
_cons	.668	−25.045
	(1.59)	(−.752)
Observations	60	60
Pseudo R^2	0.2848	0.1920

t−values are in parentheses

**** p<.01, ** p<.05, * p<.1*

In the table 7.2, model (1) is the specific regression result of L_TPPS to ROA. I clearly see that the adjusted R^2 of the model (1) equals 0.2848. Actually now I think the goodness of fit of this model is good, and the explanatory ability of each explanatory variable of the model is strong. Observing the results of the model, I find that the coefficient of L_TPPS is -0.004, I can reject the null hypothesis at the 1% confidence level, indicating that there is a meaningful negative correlation between L_TPPS and ROA. The coefficient of LDR is 0.001, indicating that there is a optimistic correlation between LDR and ROA. The coefficient of CIR is 0.009, indicating that there is a optimistic correlation between CIR and ROA. The coefficient of NPL is -0.105, indicating that there is a negative correlation between NPL and ROA. The coefficient of L_BSIZE is 0.067, and the null hypothesis is rejected at the 5% confidence level, indicating that there is a meaningful positive correlation between L_BSIZE and ROA. The coefficient of GDP is -0.091, and the null hypothesis is rejected at the

1% confidence level, indicating that there is a meaningful negative correlation between GDP and ROA.

Based on such above analysis, hypothesis 1 of my thesis is established. The development of the scale of TPP indeed exerts a negative impact on the profitability of CB.

Model (2) is the specific regression result of L_TPPS to NIIR. From Table 6.7, we can see that the adjusted R^2 in the regression result of model (2) is 0.1920, it shows that the goodness of fit is good, and the explanatory ability of each explanatory variable of the model is statistically meaningful. Observing the results of the model, it can be seen that the coefficient of L_TPPS is -0.053, indicating that there is a meaningful negative correlation between L_TPPS and NIIR. The coefficient of LDR is 0.344, and the null hypothesis is rejected at the 5% confidence level, indicating that there is a optimistic correlation between LDR and NIIR. The coefficient of CIR is 0.197, indicating that there is a meaningful optimistic correlation between CIR and NIIR. The coefficient of NPL is -4.924, indicating that there is a strong negative correlation between NPL and NIIR. The coefficient of LB_SIZE is 2.194, indicating that there is a strong optimistic correlation between L_BSIZE and NIIR. The coefficient of GDP is 0.8, indicating that there is a strong optimistic correlation between GDP and NIIR.

My second hypothesis is established. NIIR represents the ratio of CB’ intermediary business income to total revenue. This shows that the growth of TPP platforms has indeed had a repercussions on CB' intermediate business income in the data I've collected. CB' profitable structures have been impacted by the growth of TPP scale.

From the results of the total sample regression， hypothesis 1 and hypothesis 2 have been verified.

First, for hypothesis 1 , during 2016-2019, the time of sample selection, the rapid expansion of TPP reduced the profitability of all collected CB. Secondly, for hypothesis 2, during the 2016-2019 period when the sample is selected, with the expansion of TPP platforms, the NIIR of CB will decrease.

I think it can be inferred that the profit structure of CB will indeed be impacted by the expansion of the scale of TPP platforms, but the thesis cannot demonstrate whether it is a positive or negative impact. I speculate that because the sample time selected in the thesis is not enough, I cannot conclude that with the expansion of TPP platforms, CB will increase non-interest income in total income.

7.2 Sub-sample regression

Thereafter, I divide the entire sample into three types of banks and examine the differences in profitability and income structure among them. And table 7.3 and table 7.4 shows the sub-sample results.

Table 7.3: Sub-sample regression results

	(3) Joint-stock ROA	(4) State-owned ROA	(5) Urban commercial ROA
L_TPPS	-.014**	-.009***	-.005**
	(-2.334)	(-4.544)	(-2.937)
LDR	.012**	.004	.005

	(2.085)	(1.077)	(1.829)
CIR	−.003	−.019**	−.02**
	(−.212)	(−3)	(−3.601)
NPL	−.696**	.062	−.313*
	(−2.268)	(.687)	(−2.16)
LB_SIZE	.211**	.241***	−.001
	(2.081)	(3.149)	(−.03)
GDP	−.151	−.1	−.022
	(−1.03)	(−1.536)	(−.465)
_cons	.094	−.96	1.611**
	(.058)	(−.602)	(2.856)
Observations	28	20	12
R−squared	.512	.904	.958

t−values are in parentheses

**** p<.01, ** p<.05, * p<.1*

In the table 7.3, model (3) is the specific regression result of L_TPPS on ROA of Joint-stock CB . We can see that the adjusted R^2 in the regression results of model (3) is 0.512, which indicates that the goodness of fit is good, and the explanatory power of each explanatory variable of the model is statistically meaningful. The coefficient of L_TPPS is -0.014, and the null hypothesis is rejected at the 5% confidence level, indicating that L_TPPS has a negative association with the Joint-stock ROA, according to the model results. The coefficient of LDR is 0.012, and the null hypothesis is rejected at the 5% confidence level, indicating that there is a meaningful optimistic correlation between LDR and Joint-stock ROA. The coefficient of CIR is -0.003, indicating that there is a negative correlation between CIR and Joint-stock ROA. The coefficient of NPL is -0.696, and the null hypothesis is rejected at the 5% confidence level, indicating that there is a meaningful negative correlation between NPL and Joint-stock ROA. The coefficient of L_BSIZE is 0.211, and the null hypothesis is rejected at the 5% confidence level, indicating that there is a meaningful positive correlation between L_BSIZE and Joint-stock ROA.

Model (4) is the specific regression result of L_TPPS to State-owned ROA. The adjusted R^2 in model (4) is 0.904, indicating that the model's goodness of fit is strong and that each explanatory variable's explanatory power is statistically important. Observing the results of the model, it can be seen that the coefficient of L_TPPS is -0.009, and the null hypothesis is rejected at the 1% confidence level, which indicates that there is a strong negative correlation between L_TPPS and State-owned ROA. The coefficient of LDR is 0.004, meaning that LDR and State-owned ROA have a optimistic correlation. The coefficient of CIR is -0.019, and the null hypothesis is rejected at the 5% confidence level, indicating that there is a strong negative correlation between CIR and State-owned ROA. The coefficient of NPL is 0.062, indicating that there is a strong optimistic

correlation between NPL and State-owned ROA. The coefficient of L_BSIZE is 0.241, and the null hypothesis is rejected at the 1% confidence level, indicating that there is a strong optimistic correlation between L_BSIZE and State-owned ROA.

In the table, model (5) is the specific regression result of L_TPPS on Urban commercial ROA. The adjusted R^2 in the regression results of model (5) is 0.958, implying that the goodness of fit is strong and that each explanatory variable of the model has statistically strong explanatory power to the explained variable. The coefficient of L_TPPS is -0.005, and the null hypothesis is rejected at the 5% confidence level, implying that L_TPPS has a negative association with Urban commercial ROA, according to the model's findings. The coefficient of LDR is 0.005, indicating that there is a optimistic correlation between LDR and Urban commercial ROA. The coefficient of CIR is -0.02, and the null hypothesis is rejected at the 5% confidence level, indicating that there is a meaningful negative correlation between CIR and Urban-CB' ROA. The coefficient of NPL is -0.313, and the null hypothesis is rejected at the 10% confidence level, indicating that there is a meaningful negative correlation between NPL and Urban commercial ROA. The coefficient of L_BSIZE is -0.001, indicating that L_BSIZE has a meaningful negative correlation with Urban commercial ROA. The coefficient of GDP is -0.022, indicating that there is a meaningful negative correlation between GDP and Urban commercial ROA.

Table 7.4: Sub-sample regression results

	(6) Joint–stock NIIR	(7) State–owned NIIR	(8) Urban commercial NIIR
L_TPPS	.486**	–.281*	.971*
	(2.346)	(–1.753)	(1.724)
LDR	–.131	.267	–.845
	(–.658)	(.827)	(–.971)
CIR	–.106	–.532	2.409
	(–.202)	(–1.106)	(1.349)
NPL	.861	–5.674	–72.106
	(.083)	(–.814)	(–1.514)
L_BSIZE	7.003**	–7.241	4.584
	(2.035)	(–1.215)	(.285)
GDP	14.708***	–7.643	–2.391
	(2.952)	(–1.512)	(–.155)
_cons	–137.814**	177.627	76.229
	(–2.476)	(1.431)	(.411)
Observations	28	20	12
Pseudo R^2	0.5249	0.6955	0.7022

t-values are in parentheses

**** p<.01, ** p<.05, * p<.1*

In the table 7.4, model (6) is the specific regression result of L_TPPS to Joint-stock CB' NIIR. We can see that the adjusted R^2 in the regression results of the model (6) is 0.5249, indicating the goodness of fit is good, and the explanatory power of each explanatory variable of the model is statistically meaningful. The coefficient of L_TPPS is 0.486, and the null hypothesis is rejected at the 5% confidence level, suggesting that there is a strong positive association between L_TPPS and Joint-stock NIIR, according to the model results. The coefficient of LDR is -0.131, indicating that there is a meaningful negative correlation between LDR and Joint-stock NIIR. The coefficient of CIR is -0.106, indicating that there is a meaningful negative correlation between CIR and Joint-stock NIIR. The coefficient of NPL is 0.861, indicating that there is a meaningful optimistic correlation between NPL and Joint-stock NIIR. The coefficient of L_BSIZE is 7.003, and the null hypothesis is rejected at the 5% confidence level, indicating that there is a meaningful positive correlation between L_BSIZE and Joint-stock NIIR.

Model (7) is the specific regression result of L_TPPS to State-owned NIIR. We can see that the adjusted R^2 in the regression results of the model (7) is 0.5249, indicating that the goodness of fit is good, and the explanatory power of each explanatory variable of the model is statistically meaningful. Observing the model results, it can be seen that the coefficient of L_TPPS is -0.281, and the null hypothesis is rejected at the 10% confidence level, indicating that L_TPPS has a meaningful negative correlation with State-owned NIIR. The coefficient of LDR is 0.267,

indicating that there is a meaningful optimistic correlation between LDR and State-owned NIIR. The coefficient of CIR is -0.532, indicating that there is a meaningful negative correlation between cir and State-owned NIIR. The coefficient of NPL is -5.674, indicating that there is a meaningful negative correlation between NPL and State-owned NIIR. The coefficient of L_BSIZE is -7.241, indicating that L_BSIZE has a meaningful negative correlation with State-owned NIIR.

And model (8) is the specific regression result of L_TPPS to Urban-CB' NIIR. We can see that the adjusted R^2 in the regression results of model (8) is 0.7022, indicating that the goodness of fit is good, and the explanatory power of each explanatory variable of the model to the explained variable is statistically meaningful. Observing the results of the model, it can be seen that the coefficient of L_TPPS is 0.971, and the null hypothesis is rejected at the 10% confidence level, indicating that L_TPPS has a meaningful optimistic correlation with Urban-CB' NIIR. The coefficient of LDR is -0.845, which is telling me that there is a meaningful negative correlation between LDR and Urban-CB' NIIR. The coefficient of CIR is 2.409, indicating that there is a meaningful optimistic correlation between CIR and Urban-CB' NIIR. The coefficient of NPL is -72.106, which shows that there is a meaningful negative correlation between NPL and Urban-CB' NIIR. The coefficient of L_BSIZE is 4.584, indicating that L_BSIZE has a meaningful optimistic correlation with Urban-CB' NIIR.

In summary, I have the following findings.

Firstly I find that whether it is a Urban-CB, a joint-stock CB or a state-owned CB, their profitability and profitable structure have been impacted by the expansion of TPP scale. This finding once again verified the hypothesis 1 and hypothesis 2.

In terms of profitability, joint-stock CB received greater impact than state-owned CB and urban-CB. Urban-CB suffered the least impact. It shows that the impact of TPP platforms on different types of CB is heterogeneous. This difference in impact may be determined by the differences of different types of CB.

TPP platforms' expansion exerts a negative effect on state-owned CB' profit structures, but a positive impact on joint-stock CB and urban-CB' profit structures. This difference in profit structure may also be determined by the differences between different types of CB. For example, state-owned CB are subject to more legal processes in terms of creative services. And state-owned CB are regulated by the government.

Therefore, after being hit by TPP platforms, joint-stock CB and urban-CB will be more efficient in innovative services than state-owned CB. What I understand is, with the expansion of the scale of TPP, the first two CB will actively and efficiently increase the non-interest income. But state-owned CB are subject to more constraints. So the hypothesis 3 of the thesis has been proved that the expansion of the scale of TPP platforms actually indeed exert a heterogeneous impact on the profitability of CB.

8 Risk and Regulation

In the first half of my thesis, I analyze the characteristics of TPP and the main profit ways of CB in detail. I introduce several representative TPP platforms in the middle of the thesis. In the final section of the thesis, I finish an empirical analysis of the impact of TPP platforms on CB' profitability. From my total sample regression, the TPP scale has a tendency to reduce CB' profitability, and in the sub-sample regression, it has a tendency to affect the adjustment of CB' profit structure. What I conclude is that the larger the scale of TPP developed, the lower the profitability of CB, and CB will gradually increase the proportion of non-interest income in total income.

In my view, in this backdrop of Internet-finance, the linkage of online shopping and online social has long been known as an unstoppable trend, and CB also should gradually innovate in services. As the typical financial institution, CB always exert an essential impact in one country's economic status. We cannot ignore this economic role of CB. Furthermore, as non-financial institutions, TPP platforms are growing in the free Internet environment, and there are a variety of risks. In the one hand, these various risks pose secret threats to users' information security, while on the other, they pose risks to the entire financial sector. Therefore, I think it is necessary to improve the supervision of TPP platforms.

Following that, I will go over in depth what I consider to be the threats of TPP platforms so far. And it is on this basis that I will make my own recommendations to regulators about the regulation of TPP platforms.

8.1 Risk

I categorize risks into two categories, risks to consumers and risks to the financial sector.

First of all, I want to analyze the risks that TPP platforms bring to users. The network is the foundation for the survival of non-financial institutions such as TPP platforms, and it contains several uncontrollable threats. For example, after users register on such TPP platforms, most of the users' personal information is uploaded to the Internet by such platforms. If the customer's personal information is stored in such a platform for a longer length of time, the user's personal information may easily be attacked and stolen. As a result, it is difficult to protect the users' data privacy. In addition, I also think that TPP platforms also bring potential transaction risks to users. When we want to shop online, the TPP platform initially establishes a shared period for all parties of online purchases. In general, some merchants does not collect the money paid by the user on the website immediately, and the merchant can only receive the money after the user receives the products. However, in practice, TPP systems may fail to recognize that services do not necessarily exist in the form of tangible items, and that there are often virtual goods of the service kind. When the transaction duration expires, the TPP platform automatically disregards the user's feelings and chooses the end option by default. Therefor, transaction risks are expressed in this default protocol as well. Furthermore, as compared to merchants, consumers face higher transaction risks.

Second, I'd like to discuss the risks that TPP systems pose to the entire financial sector. In the first half of my thesis, I introduced that the TPP platform has indeed no longer only offer simple payment services. The current TPP platforms mostly bypass the commercial bank or directly grab the business of the commercial bank to provide users with a variety of

financial services. The most obvious is that TPP platforms bypass CB to offer loan services to customers indirectly, which not only poses a threat to CB' original loan business, but also poses challenges to the entire financial sector. As we all know, CB will strictly review the user's identity information before each loan application, which is conducive to the monitoring loan and users in the later stage. But at present, most TPP systems are starting to rely on private loan organizations to arbitrarily issue loans to teens or low-income groups with minimal application conditions and extremely high interest rates. This type of TPP platform, which grants loan rates higher than commercial bank interest rates, disrupts the financial market's order and is not easy to be regulated by law.

Some TPP platforms not only issue large amounts of loans provided by private financial organizations, but also unreasonably charge extremely high interest rates. According to surveys conducted by multiple financial websites in China, TPP platforms have put more and more debt pressure on young people born after the 1990s in China. Such young people, who have just graduated from high school, frequently have higher demand. Such high-interest consumer loans offered by TPP platforms have easily attracted a large number of young people with unstable incomes and a lack of self-control. While it is simple for this type of young person to borrow money from such platforms, they have difficulty repaying it due to high-interest rates. And, as the scale grows, an increasing number of young people have a large number of unpaid loans on various TPP platforms. This phenomenon of excessive debt may bring risks to the entire financial industry.

In addition, I also need to point out the system risks brought by TPP platforms. In the free competition market environment, it is very easy for a large TPP platform to merge with a small platform. These large private companies that control these TPP platforms are very easy to cause market

monopoly. The dominant position of these large private companies in payment services is very easy to cause systemic risks. This kind of systemic risk is also one of the reasons why the China's Central Bank recently launched a digital currency pilot project.

In summary, I believe that TPP platforms not only have hidden security risks that will bring risks to individual users, they will also bring risks to the financial industry due to high debt, and they will also bring systemic risks due to monopoly. As a result, I think it is essential and urgent for various regulatory agencies or laws to concentrate on the regulation of TPP platforms.

8.2 Regulation

Despite the fact that numerous regulatory agencies have recognized the importance of supervising non-financial institutions such as TPP platforms, regulatory agencies still face difficulties in supervision. There are three major explanations for the challenge of supervision, in my view.

The relationship between digital currency and real currency is contradictory, which is the first regulatory challenge. Digital currencies originating from TPP networks, without a doubt, already had an effect on real currencies. How to solve this kind of contradictory problem between digital currency and real currency in supervision is particularly important. In my opinion, if we simply allow the derived virtual currency to be swapped with the official currency of each country in a certain proportion. This is indirectly equivalent to sending a signal that non-financial third-party platforms that issue virtual currencies and Internet companies have all become ‘central banks’ that can issue currencies. Such signals can

easily disrupt the order of the currency market. This is one of the reasons why I find it is difficult to be supervised.

My second reason why it is difficult to supervise is that it is difficult to monitor the current criminal activities of TPP sites and to identify perpetrators. Since it is sprouting in a very free Internet operating environment, irregular financial institutions can increasingly collaborate with TPP networks to complete indirect money laundering activities layer by layer. Although we all know that such behavior not only violates the law, but also disrupts the stability of the financial market, it is still difficult to trace the original initiator when the regulatory agency investigates and collects evidence. In addition, compared with CB, TPP platforms use network advantages to obtain users' information at a lower cost. If the TPP platform sells the user's information and cooperates with other illegal financial institutions to conduct illegal activities, there are multiple challenges in terms of vague definition of themes and difficulties in tracking information when the regulators supervise. Therefore, under the premise that the laws in this area are not yet perfect, it is difficult to supervise TPP platforms.

The last reason I think is difficult for regulation is that there are inconsistent standards for payment market access. For example, some platforms lack operating qualifications, but they can still operate normally. However, some TPP platforms with legal payment operating licenses may be blocked from the market by these illegal TPP platforms. In addition, I mentioned earlier that the payment market is prone to monopolization under perfect competition. In my opinion, illegal institutions may be rapidly developing and expanding, while legal institutions may be in an unfair environment. This is also one of the reasons why I think it is difficult to supervise.

Next, I will analyze the rationality of the existing regulatory measures based on the multiple risks and regulatory difficulties analyzed above, and put forward my own suggestions.

The national banks of many countries have established special fund deposit systems for the supervision of TPP institutions. This system not only ensures the safety of user funds, but also it supervises the possible illegal financial behaviors of TPP platforms.

In addition, the regulatory agency has also established a unified liquidation system. For example, in China, the Central Bank established a joint organization of all China's bank cards in 2002. Various banks can conduct inter-bank transaction clearing through the Union-pay. This organization realizes interconnection and resource sharing between similar commercial banking systems. However, with the increasing scale of TPP platforms, the TPP institutions gradually ignored Union-Pay, a key intermediate link, and began to perform the function of inter-bank clearing on their own. Following that, the Union-Pay organization found it difficult to supervise the payment and clearing operations of non-financial institutions. Many instances of illicit arbitrage and money laundering started to appear one after the other. As a result, the regulatory agency's unified liquidation policy will reduce the incidence of such phenomena.

Finally, I put forward my own suggestions. I think that regulators should attach importance to the user privacy and establish a private data protection system. Personal information includes information such as name, identification number,contact information, address, account password, and property status at the time of registration.

8.3 Competition and Cooperation

In addition to what I mentioned earlier on how to better supervise TPP platforms from the perspective of the legal system, I would like to briefly discuss how to better establish a dual relationship of competition and cooperation with TPP platforms from the perspective of CB.

Competition

I believe that CB are still the most irreplaceable financial institutions in one country, though TPP platforms, which have arisen as products of the new era in the Internet environment, cannot completely replace CB.

To begin with, CB, in my view, have a distinct advantage over TPP platforms in that they are closer to consumers offline and easier to receive genuine feedback. Despite the higher cost as compared to TPP systems, CB have their own advantages in retail. CB can first collect objective and all-around consumer payment requirements offline, then associate the collected requirements with online banking to progressively optimize various online banking functions.

Second, CB can provide more than just payment services. CB should absorb TPP platform' good experiences, face the objective needs of consumers, and choose industries appropriate for the growth of payment services, such as aviation, tourism, communications, and insurance. CB should thoroughly understand the characteristics of e-commerce processes in various industries and then provide individualized electronic payment solutions for different industries individually.

Win-Win Cooperation

CB can cooperate with TPP institutions to develop some innovative Internet financial services.

When a customer's bank account is first established in a TPP platform, it should be dual-authenticated, that is, when the customer passes the TPP institution's authentication, it also needs to pass the commercial bank's customer identity authentication. CB can directly verify the identities of customers through electronic channels and clarify the rights and obligations between the commercial bank and the customers. This will not only help ensure the security of customer information, but also help establish a good relationship among TPP platforms, CB, and customers.

In terms of transaction security, CB have also begun to set up payment limits that match the customers' own risk tolerance, including single payment limits and daily cumulative payment limits. In other words, the customer's transaction limit is linked to their own risk tolerance, which can help CB monitor whether the customer's transaction process is safe. CB can promptly notify customers of large and suspicious payments. The notification information should include the name of the TPP institution, transaction amount, transaction time, etc. This approach can greatly reduce illegal TPP platforms that skip the commercial bank link before directly contacting customers to conduct commercial activities independently.

I have carefully noticed some real examples of cooperation between CB and TPP platforms. For example, China Merchants Bank, one CB I have mentioned in my former empirical parts. I have observed that this CB should be the first CB to innovate in smart-bank business. In April last year, this CB official announced that it would start in-depth cooperation with Alipay, which I often use, and the two sides started the cooperation of mutual recognition and scanning of QR codes. In other words, before I

could only use Alipay's QR code for payment, but now I can still use this CB’s QR code. After this kind of technical cooperation is reached, for users like me, I can use the China Merchants Bank mobile-banking Application and Alipay Application simultaneously to scan the QR code of each other’s merchants to finish my payment process. Furthermore, this CB is very clever in collaborating with WeChat Pay, as I stated earlier. Banks attaches great importance to customers' feelings. Now, through the intelligent platform provided by WeChat Pay, this bank can provide me with abundant personalized products. Simultaneously, this CB has also learned to start a direct conversation with customers by establishing its own brand. what does that mean? This means that even traditional offline CB has begun to focus on online-brand marketing.

In summary, I personally think that in the past few years the whole trend is that CB are being hit by TPP platforms in real. The latter's speed of transformation and ability to innovate caught the former by surprise. But I predict that in the next several years, the two will gradually coexist in competition and obtain theirs common-interests in cooperation. What I am most looking forward to is that CB will start thinking about how to operate better in the real challenges and opportunities. TPP platforms will also fill in loopholes in supervision and develop more personalized businesses.

9 Conclusion

In the context of Internet finance, e-commerce and online payment are rapidly occupying the payment market. The increasing scale of third-party payment platforms indeed bring risks and challenges to the operations of commercial banks. The thesis focuses on the impact of the development of third-party payment on the profitability of commercial banks. I put forward three hypotheses, hypothesis one is that the development of third-party payment will reduce the profitability of commercial banks. The second hypothesis is that the development of third-party payment will impact commercial banks' profit structure, i.e., commercial banks will change the proportion of non-interest income in total income. Hypothesis three is that the influence of third-party payment platforms on different types of commercial banks is different. I finish the empirical process of verifying three hypotheses by total sample regression and sub-sample regression.

I draw the following conclusions. Firstly, what I can get from the total sample regression are, the expansion of the scale of third-party payment will reduce the profitability of all types of commercial banks. Secondly, from the perspective of sub-samples regression, the profitability of joint-stock commercial banks is more affected than state-owned commercial banks and urban-commercial banks. Third-party payment has the least impact on the profitability of urban commercial banks. The expansion of the scale of third-party payment will prompt joint-stock commercial banks and urban commercial banks to adjust the proportion of non-interest income in total income. Finally, this impact of third-party payment on different types of commercial banks is different.

I have three points of contributions in total. The first point is that I start

from the characteristics of third-party payment, and introduce the representative third-party payment platforms in detail. The second contribution is that I classify and discuss the influence in various types of commercial banks. My third contribution is that I put forward some suggestion to supervise third-party payment platforms from multiple angles in response to their hidden risks.

In summary, the thesis conducts an in-depth analysis between third-party payment platforms and commercial banks. For mutual benefit, third-party payment platforms and commercial banks should collaborate and compete with each other.

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