Master’s Programme in International Economics with a Focus on China

The Impact of Third-Party Payment on Traditional Banking Industry in China

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Abstract

The payment method is under transition making the world step into a digital and mobile oriented chapter. With the development of integration between internet technology and financial functions, China expects to have a large number of mobile payments from its citizens as a result of the population size. The growth and development of e-commerce and the rise of online shopping have contributed much to the development of third-party payments. Such payment is now widely used in different fields, like retail payment, oversea tax refund, and investment finance. The shift of transaction volume virtually brings a substantial impact to the business as well as the commercial banks operations. Both definition, features, and the growth of the third-party payments are elaborated in the thesis. The research has also analyzed the effects of the third-party fees on the business operations with an emphasis on the Chinese traditional banking system. In addition, third party payment regulations and the entry criteria for the financial activities are in comparison with EU and U.S. policies. The study further gives the trends and recommendations on the improvement of the institutional side to ensure there will be maturity in the third-party payments. Due to the current ease policy, third-party payment platform has a room to grow and play in blurry zone. Combining with the empirical evidences, the negative impact on traditional banking profitability could induce the improvement of regulations.
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Table of Contents

1 Introduction .................................................................................................................. 1
  1.1 Research question, aim and scope .......................................................................... 3
  1.2 Outline of the Thesis .............................................................................................. 4

2 Literature review ........................................................................................................ 5
  2.1 Mobile payment and its relation with traditional bank sector ............................... 5
  2.2 Regulation issue on third-party payment .............................................................. 6
  2.3 Banks’ profitability ................................................................................................. 7

3 Theoretical framework and variables ...................................................................... 9

4 Qualitative research .................................................................................................. 13
  4.1 Third-party payment regulations .......................................................................... 13
  4.2 Entry criteria for Third-party payment ................................................................... 14
  4.3 Decentralized regulation ....................................................................................... 16
  4.4 Privacy and data security ....................................................................................... 17
  4.5 Trends and recommendations ............................................................................... 19

5 Empirical Analysis ................................................................................................... 21
  5.1 Methodology and data ........................................................................................... 21
  5.2 Results and Discussion ......................................................................................... 25

6 Conclusion .................................................................................................................. 31

References ..................................................................................................................... 36

Appendix .......................................................................................................................... 42
List of Tables

Table 1 descriptive statistics. This table illustrates the descriptive statistics of China listed banks from 2014-2017 based on one million RMB ................................................................. 23

Table 2 result of Hausman specification test ........................................................................ 25

Table 3 Model 1 regression results ....................................................................................... 26

Table 4 Model 2 regression results ....................................................................................... 29
List of Figures

Figure 1 2018 the flow chart of third-party payment business ................................................. 27
1 Introduction

With the rapid growth of e-commerce in China, the third-party payment business has massive expansion in recent years. The third-party payment platform operates by non-traditional financial institutions, such as Bank (iResearch Global Group, 2018). Based on the iResearch report, the transaction size of third-party payment on both PC and mobile devices is 58.8 trillion RMB in China in 2016 that is about 70% of Chinese gross domestic product and 16 times of Sweden GDP. In 2013, Alibaba group announced Alipay, its third-party payment branch, has exceeded 300 million registered users and the $150 billion transactions on mobile. This Chinese fintech product has overtaken Paypal and became the world largest third-payment platform in a very short time (Heggestuen, 2014). Tenpay, also known as Wechat pay which is embodied in a widespread messaging app, with over 200 million registered accounts owned by Chinese technology giant Tencent. Tenpay is catching up with Alipay market share and now is the second largest mobile payment platform in China. Chinese retail market has been cash dominated for very long time however recently, more people prefer to pay via mobile phone rather than cash or credit card. It is because of the simple device requirement for retail and easier financial access than a credit card. Different as the traditional banking system, the third-party payment account is apart from the bank system but can transfer money across bank accounts and also integrated with a wide range of financial services. The merchant’s coverage is no longer limited in the online market but covers from high-end restaurant to a traditional bazaar. As the fact that more payments have execute by mobile end via third-party platform, the traditional banking system can no longer manipulate the transactions. The transaction fee that contributes to banks’ non-interest income has squeezed out by the new payment method. As a result, the trend to use third-party payment platform posed a threat to traditional banking. Besides the transaction function, third-party financial product has also gradually transformed from only an online payment device to a mobile wallet with diverse financial service functions. Yu’e Bao, leftover treasure in Mandarin, one of the Alipay financial innovation, provides s little higher interest rate than banks as well as money market funds. It attracts the individuals to withdraw the money from their bank account to the virtual account in Yu’e Bao. Since it launched, Yu’e Bao garnered 49 million users in the first six months and now grew to 81 million. There is over 1.7 trillion Chinese Yuan deposited by individuals in Yu’e Bao that is just
following the four stated-owned commercial banks and followed by Bank of Communications (SOCB) with 0.7 trillion RMB deposits (the companies; Wind Info). The significant asset holding of Yu’e Bao allows a higher interest rate payment. The fast growth of asset and negotiating power make the third-party finance platform become a threat to the banking industry with a higher yield, low threshold and easy access to absorb investment. This function rings the bell to banks’ interest income and which is the core business for most of commercial banks. In long term, it gradually changes the saving behavior and encourage people to move their capital from traditional banks to third-party financial products. The widespread of third-party platform usage threatened the traditional banking system.

At the moment China has no particular regulation for the emerging private finance service. However, the central bank is turning blind eyes for those platforms to grow. Partly as a result, banks lose the clients and the budget deposit flow outwards to the third-party escrow account. The puzzle to have confidence in Alipay and Tenpay is based on its fundamental role to guarantee the transaction between the online buyer and seller. The stable customer relationship builds by serving the customer need for the individual financing service. Before the third-party finance companies emerged, commercial banks in China, in particular the big four stated-owned commercial banks, have a monopoly on capital that controls the financial allocation system. Lin and Zhang (2009) pointed out the big four state-owned commercial banks lend non-profitable loans as so-called financial vehicle that result bad loan and poor performance. The large commercial banks also ignore the small business loan which can be very good performing loan because the state-owned enterprises occupied most of the loan budget and the government supports those projects and companies with soft budget constraints (Andersson, Burzynska, & Opper, 2016). Eventually, Chinese banking industry resulted in a monopolistic system in the past decades. Nevertheless, the emerging of third-party payment platform is breaking the monopoly of the bank with new transaction and saving concept (Yu & Shen, 2015).

Many exciting researches focused on the financial monopoly issue in China. Referring to Chohan’s (2014) perspective that Alipay as the case allow more people to participate in the large investment vehicle which increased the financial inclusion in China. The capability for the capital mobility provides an excellent basis to transform the economy to a higher consumption rate economy. Dollar (2013) has discussed China’s consumption rate is relatively low which is 15-20 percent less than other countries at the same GDP level. The economy needs to rebalance the export-led surplus to a consumer economy that requires the flexibility of money from savings and bonds. The third-party finance companies make the deposit moving out from the saving account to small business loan and the personal loan business is also gradually
changing the purchase behavior. Alipay and Tenpay’s development is stepping in the grey zone due to the miss of regulation for money transaction, money market fund authority and credit scoring system. The rapid expand third-party financial sectors could induce the institutional development for the private financial sector and strategy change of SOCBs.

1.1 Research question, aim and scope

The motivation of this research can be elaborated in two aspects. The first purpose of this study is to analyze to which extent the third-party payment service has impact on the transaction service of traditional banks. The second aim is to compare the regulation framework of the third-party financial activities in big economies such as China, EU and US. It is important to monitor the restrain and liberate policies towards the evolving new financial party. Different as a pure quantitative research, the mixed method research can provide a broader view of both quantitative investigation and macro policy environment study. The quantitative research will carry out by a statistic analysis to explain the correlation between third-party finance platform and banks with a focus on the demographic, transaction size, asset holding and loan profitability. The result will compensate for the lack of empirical evidence to the discussion of the Alipay and the threat to the Chinese banking sector by Yu and Shen (2015). The financial impact of the third-party financial business on the traditional banking industry is directly perceived through a quantitative result and discussion. The qualitative research will refer to the current regulations and its effect on new fintech activities in China, EU and US to study the common policies and differences in order to understand the gap and potential development trend of fintech related regulations.

The innovation of payment method covers a variety of social life that is affecting the traditional banking industry and influencing consumption habits. The potential of Alipay’s and other third-party financial products has impact on the source of banks’ income which is discussed by Yu and Shen that brings up the interest of this study.

The principal object of this thesis is to answer “What are third-party payment platform currently impact on the traditional banking system in China?”. This study will result in the understanding of challenging the position of traditional banking system with the liberation of
payment method and regulation concern by third-party payment platform development. The scope of the study will focus on Chinese market therefore research on Chinese third-party financial products and Chinese commercial banks. Due to the newly development of third-party payment method, the time frame will be recent years when data is available.

The hypothesis of the quantitative research is the third-party payment activity has effect on banks’ non-interest income in term of transaction fee or other payment relative income. As the mobile payment has minimized transaction fee, the interbank transaction is more expensive for private customers. Therefore, the bank customer will shift to the third-party platform to complete the purchasing activity. The institutional comparison will scope out the range of differences between regions and its effect on the development for both new payment method and traditional banking system.

1.2 Outline of the Thesis

The outline of the research is as following. The discussion of relevance pieces of literature will be stated in the literature review section. In the empirical research section, both statistical investigation and institutional research are conducted. The design of empirical model and the hypothesis will be clarified in quantitative part which is followed by regulation study. The findings of both statistical and institutional research will be concluded and further recommendation will be discussed.

* This section builds on parts of the paper “Research Proposal” from the course EKHM73 “research design” (Lai, 2019).
2 Literature review

2.1 Mobile payment and its relation with traditional bank sector

The mobile payment business has taken off after the explosion in the number of smartphone user. The emerging method of transaction through third-party platform bring great attention to its impact on traditional bank sector. In recent years, there has been an increasing amount of literature on monitoring the process of the mobile payment evolution.

U.S. researcher (Tandulwadikar, 2015) points out that Banks react slow in terms of technologies and strategies in the mobile payment market while nonbank players such as Paypal and Square, IT technology giants such as Google, Apple are making inroads. From the German bank side, Dapp (2015) has emphasized the non-bank sector benefits from the digital economy with a better understanding of the language of the internet. The research argued the current digital strategies of many banks unable to remain competitiveness for a long run. Traditional banks should not underestimate the impact from nonbank sector’s financial service and the influence of the customer behavior. To look at the recent tendencies across Europe, Inna & Marina (2016) examined the main risks related to development of the financial innovation. Analysis shows the potential threat to the leading European and U.S. banks is in the area of technology-driven but less knowledge requires services like payment service and simple saving products. The statistics of surveys reveal the financial product and service provided by third-party platform are conquering market share with better level of user experience and functionality. This tendency exposed the requirement of traditional banks to restructure the service distribution channels and investment in emerging technologies. Fung, Molico & Stuber (2014) reviewed the retail payment development in Canada and U.S. the payment behavior is not shift as fast as expected towards e-money payment. In the analysis of impact of wider e-money adoption, the study concluded that bank can stay wait and watch to monitor the development of payment methods. In contrast, many literatures report a relative quick grow of electronic payments in the emerging economies such as India and China. As the fast growth economies with the largest population market, financial service become a rapidly emerging industry and boost electronic payment
development. In the McKinsey&Company payment report, Kamal, Thomas & Tinaikar (2009) describe the e-payment business has large potential in both retail market and government flows in India. While the increasing revenue gained in electronic transactions, Indian banks are catching up with the strategies of convenience and efficiency of payment methods. Non-bank players pursue the field within the regulatory framework that the traditional banks are not well penetrated. The literature (Chiriac et al., 2018) introduced the fact that consumers addicted to mobile payment and its volume has reached the half of GDP in China. Chinese tech companies such as Alibaba and Tencent invest heavily to attract potential users and shaking the position of traditional banks. Tech companies gain mobile payment transaction through broad user basis combines with robust trustful protocols that accelerate the popularity. To conclude, most literatures addressed the traditional banking sector is threatened with the rapid development of third-party payment platform in terms of the change of market share, customer behavior and new modification of rules.

2.2 Regulation issue on third-party payment

Much of the current literature on financial innovation pays particular attention to regulatory framework of the third-party platform. The recent study (Fung, Molico & Stuber, 2014) has shown the central banks as regulators start to have oversight of the evolving payment system. In the context of Canadian mobile payment, the retail payment is likely to involve the third-party financial institutions therefore, it brings up new regulatory implications for the central bank. The research from European Payments Council (EPC) also a relationship exists between third-party payment providers and the impact on the regulatory environment (Santamaría, 2015). Similar conclusion by (Chiriac et al., 2018) stated the earlier adopted legislative agreements in Single Euro Payments Area (SEPA) are dedicated to the protection of consumer and their sensitive personal information. The amendments are disruptors for the mobile payment market though it protects the EU citizens against fraud. The EPC believes that only the combination of convenience and security can enhance the payment innovation. To better understand the effects of regulations on financial innovation, Ali et al. (2014) suggest the prudential regulation provide the necessary requirements to stabilize the financial environment and well constrained the authorities to avoid systemic risks. Dennehy & Sammon (2019) also provide evidence that the many studies carry out the value of mobile payment regulation. A
secure and efficient financial system is attractiveness to the regulators in order to help government enhance the financial services for the unbanked populations. Different from the other cases, on one hand, China is continuously liberating its financial sector such as interest rate to encourage the internet finance development (Guo & Shen, 2016). On the other hand, Chinese regulators have underestimated the acceleration of the financial innovation. The “too small to be regulated” leads to the problem that current legal system lacks of definition and classification for the third-party account (Yu & Shen, 2014). For example, Alipay account will be defined as an escrow account according to U.S. legal system and the application of escrow regulation is very strict. However, As Yu and Shen (2014) mentioned, the terminology of new financial products is missing even in Chinese language. Guo and Shen (2016) outline the pressing task for China is to well regulate and monitor the internet finance at the initial stage to avoid the risk spillover from the cultivate strategy. The authority scope has to be clarity such as the rules of access, risk identification and handling. A sound regulatory policy associates with financial stability in terms of risk management and encourage the traditional banking to adopt nontraditional activities in order to remain competitiveness (Edwards & Mishkin, 1995). To close, it is important to maintain financial market stability by an appropriate legal framework to monitor bank and third-party financial derivatives. Referring to the literatures, few researches focus on comparison study of EU, U.S. and Chinese legal policies for third-party financial service and products.

2.3 Banks’ profitability

Besides the policy impact on financial market, the rapid growth of TPP has also brought great attention particular on the large transaction volume. Various studies have assessed the impact of ownership structure and operational system on Chinese bank performance. Chinese commercial banks have special classification by its ownership and capital size. Most of business loan issued by large or medium size commercial banks flow to unperformed state-owned company that irrelevant to the economic growth (Nee & Opper, 2012). Many facts shown the emerging third-party financial firms have replication of banks functions but dedicated to market demand and efficiency. A number of findings carried out assessment on the correlation between bank’s profitability and market share. Prior to the work of Berger (1995), the empirical result reveals this positive relationship but with a control of market concentration and the efficiency
has weak explanatory power on the variance of profitability. Despite most of literatures provide negative To date, several studies have discussed the Chinese third-party players forestalled the market share of e-commerce payment that have negative effect on bank’s intermediary business (YANG & LIANG, 2018). Online banking service is gradually replaced by third-party service with easy and trustful process for both online and retail purchase, therefore the traditional bank has been crowded out of mobile payment business market. The fierce competition on retail payment and financial products for small and medium companies are squeezing city commercial banks’ profit (Li, Liang & Wang, 2018). Despite the third-party financial service raise the price war in transaction fee and gain attractiveness by user experience, the escrow account cannot bypass the use of the account from commercial banks. To a certain extent, internet finance or third-party platform helps to reduce banks’ managerial cost and able to earn transaction fee by cooperation with third-party companies (Ping, Wenjian & Jiao, 2017).
3 Theoretical framework and variables

Non-interest income

Bank profitability is influenced by many factors and measured by diverse kind of income. In recent years, there has been an increasing amount of literature on the increasing presence of non-interest income such as Feldman and Schmidt (1999). Some studies carry out quantitative approach to examine risk of banks which find out the share of non-interest income can indicate the level of banks’ business stability (Köhler, 2014). The analysis explains the share of non-interest income effect the risk level for different business-oriented bank. By using linear and quantile regression estimators, Köhler (2014) concludes that retail-oriented banks with focus on saving and cooperative activities are benefit and become stable by increasing the non-interest income ratio. In this regard, the declined market share of retail payment business affects the stability of retail-oriented banks. For the aspects that third-party payment is restricting banks’ transaction business, the attention focuses on the challenges on banks’ profitability. As the case study of Alipay mentioned, the third-party platform offers customer-friendly payment service with lower handling fee, quick process and strong qualification on security (Yang & Liang, 2018). In a short-term, third-party remain competitive advantage on mobile payment than traditional banks. In addition, there is linkage between third-party platform and commercial banks which is the dependent protocol for user account. For example, Alipay applies escrow-based e-commerce transactions that are physically connected with the traditional bank account. Banks act as intermediary between retail and customer even though the third-party processes the transaction. A negative effect on banks’ non-interest income can be consequent on a decreasing share of transaction from credit card or online banking, banks still can be benefit from cooperating with third-party platforms with issuing account authority. As a result, banks’ non-interest income is dependent with transaction volumes but not necessarily drag down banks’ overall revenue.

Total asset
Total asset can represent the size of a bank and further related to the business strategy of a bank. DeYoung & Rice (2004) carried out an econometric model to identify relationships between non-interest income and bank characteristics. By testing the financial performance for U.S. commercial banks during 1989 to 2001, the statistical result reveals the importance across bank size that the large commercial banks which record more than 1 billion dollar asset have greater reliance on non-interest income than small commercial banks (DeYoung & Rice, 2004). By looking at banks’ asset scale in China, the state-owned large commercial banks hold more than thousands billion 10 billion dollars. Those banks have a monopoly on Chinese financial sector. Furthermore, the smallest listed city and rural commercial bank such as Zhangjiagang commercial banks has over one-billion-dollar asset. In accordance with the study, a sufficient amount of non-interest income is necessary for Chinese listed commercial banks to be profitable.

**Net interest margins**

Net interest margins represent the status of financial flow that generated by intermediation activities such as interest paid on deposits, interest received from loans and securities (DeYoung & Rice, 2004). The theory suggests the net interest margin would go down when the bank conducts less intermediation business. In U.S. banks’ case, the statistical results show the fact that non-interest income and intermediation business are coexisting. Another regional study for 662 large OECD banks over 15 years reveals the negative correlation between the non-interest income ratio and net interest margins (Hahm, 2017). Both empirical studies carry out panel data regression method display the significant role of net interest margin on explaining the non-interest income for large commercial banks. The data for 2016 and 2017 stated banks with lower deposit rate faced more pressure of net interest margins in China. Chinese commercial banks shifted the business model towards interbank and investment activities to release heavy pressure from net interest margins (Li, Liang & Wang, 2018). Net interest margin affects by deposit competition and have stronger impact on city commercial banks more than SOCE and joint-stock banks.

**Ownership**
Numerous literatures such as Nee & Opper (2012) and Wagner (2014) have explained the function and importance of ownership in China’s banking industry. The commercial banks in China are categorized in mainly 4 types according to the share of ownership which are state-owned, joint-stock, city and rural commercial banks and other capital like post bank. Each type of commercial banks applies specific policy and among them, the state-owned commercial banks (SOCB) are preferable to others by enjoying the government bail out policy. Therefore, the joint-stock and city commercial banks focus more on profit and performance than SOCBs. Much of papers as Sufian & Habibullah (2009) involved ownership as determinants of performance of Chinese commercial banks. Sufian & Habibullah (2009) reckon the ownership has significant correlation with bank’s profitability determinants such as liquidity, risk and capitalization. The different role of banks in the economy shapes the business model and the risk tolerance that results an impact of non-interest income ratio. Guo & Shen (2016) assumed different banks will react to the financial innovation with a distinct strategy and solution due to China’s large and small-and-medium-sized commercial banks varied sharply in terms of property right structure, target customer and policy restriction, etc.

**ROA**

To date, return on assets (ROA) has used in several studies to measure the profitability of a bank and furthermore, reveals the efficiency level of bank’s management in terms of using resources effectively (Hassan, 2003). Hassan (2003) also deems ROA is better than ROE as a dependent variable to indicate banks’ profitability because it covers all portfolio of assets rather than just measure the returns on shareholders equity. Rivard & Thomas (2003) carried out their research by using ROA as the dependent variable to measure the level of profitability for U.S. banks because it is not distorted by high equity multipliers.

**Macroeconomic factors: GDP growth rate and CPI**

Apart from the bank characteristics, the macro economic factors indeed play a significant role on bank performance. In addition of banks’ characteristics, market conditions are external factors to use as control variables for quantitative model avoiding the neglect effect from overall economic condition of the country. Based on many research methods, the GDP growth rate
represents the dynamic changes in the economy particularly the investment opportunities. Findings of the study of OECD banks summarizes the countries with relative high GDP growth result a lower non-interest income ratio because of a profitable investment environment (Hahm, 2017). Retail payment volume reflects the power of consumption that contributed to GDP growth directly therefore, strongly influenced by the change of economic growth (Li, Liang & Wang, 2018). By the experience of OECD banks, the more intense competition provides incentives to broaden income diversification in lower GDP growth rate countries (Hahm, 2017). Another macroeconomic variable is the commonly used inflation rate. Hahm (2017) emphasized a low-inflation market facilitate the intermediation activities of commercial banks as well as banks in a high-inflation country face the pressure to switch the revenue structure form long-term capital to non-interest income activities. Both of cost and revenue will directly effect by inflation rate with the changes of labor cost and indirectly influenced by adjustment of interest rate and asset price (Sufian & Habibullah, 2009). Consequently, the GDP growth rate and inflation rate are considered as important external forces that affects the bank performance.
4 Qualitative research

4.1 Third-party payment regulations

Third-party payment organizations and digital finance are emerging business, and it takes a long time for laws to be formulated and take effect. Currently Chinese laws focus on the requirements for third-party remote account opening. The detailed management of the operation process of third-party payment organizations has been promulgated. Most of the management regulations in the transaction process of these organizations are issued in the form of policy guidance documents and government opinions. For these documents can be formulated and promulgated quickly and can adapt to the rapid changes of third-party payment. For example, the state council of the People's Republic of China (2013) issued The Guiding Opinions on Financial Support for Economic Restructuring, Transformation and Upgrading, and the CPC (Central Committee of the Communist Party of China, 2018) issued the Decisions of the CPC Central Committee on Major Issues Related to Comprehensively Deepening the Reform. The Central Bank of The People's Republic of China and ten other ministries (2015) jointly issued The Guidance on Promoting the Healthy Development of Internet Finance. However, the role of policy guidance is limited. First, the legal penalties for these government documents are limited. The government can only impose administrative penalties on organizations or individuals who violate the provisions of these policies rather than criminal penalties. This reduces the crime cost of illegal third-party payment activities and indirectly encouraged their illegal behaviors. Second, some of the government documents are issued by local governments and are only valid in some areas. When a third-party payment organization conducts illegal activities in multiple areas, punishment to it will becomes difficult and controversial. Third, the legal force level of these government documents is relatively low. Those policy papers cannot execute as laws in the process of trial, and the trial of cases cannot refer to these documents. Fourth, the lack of laws leads to the leading role of administrative power, which makes the governance chaotic. This situation is particularly serious in China. Due to some historical reasons, administrative power playing the role of society governance rather than laws which is very common in China. For instance, the Commercial Banking Law does not restrict the entry
of private capital into the banking sector, while the approval of the establishment of China's private banks is only realized after some policies are lifted. And China's current law does not have any requirements on the number of shareholders of commercial banks, while the China Banking Regulatory Commission (CBRC) adds a requirement of "at least two shareholders" to the establishment of private banks, which will undoubtedly cause some confusion.

In comparison, the United States has a relatively relaxed attitude towards electronic currency and innovative electronic payment services, believing that too much government regulation will burden the emerging payment industry, and premature regulation hindering the innovation of these emerging industries (Chen, 2008). Therefore, the United States adopts moderate supervision on third-party payment. It takes the diversified supervision system at the federal and state levels and focuses on the transaction process rather than the third-party payment organization itself, i.e. the so-called functional supervision. The United States regards third-party payment as a new way of money transfer, which is essentially an extension of traditional monetary services. Therefore, instead of regulating the organization of third-party payment through special legislation, the United States does it from the perspective of monetary service business (Salazar & Ricardo, 2016). Third-party payment organizations are regarded as monetary service organizations stipulated by existing laws, which are non-financial institutions. Unlike mainland China and Europe, the United States legal system belongs to Anglo-American system, thus case law has the same legal effect as statutes. Due to the novelty of third-party payment organizations, there is currently no case law dealing with it in the United States. And different from traditional industries, the development of fintech products are fast and changeable. Regulation of third-party payment organizations relies more on public policies than strict regulatory analysis (Salazar & Ricardo, 2016).

4.2 Entry criteria for Third-party payment

In addition to common industrial and commercial registration, China's third-party payment organizations will be subject to additional regulations if they have business overlap with traditional banks. China’s entry criteria for traditional commercial banks is very strict. Related laws include the PRC Bank Supervision and Administration Law and Commercial Bank Law.
The relevant laws and regulations issued by CBRC (2013) include *The Administrative Licensing Measures for Chinese commercial banks* and *The Procedural Rules on The Administrative Licensing Procedures of China Bank Regulation Commission*. The law on commercial banks only makes relatively general provisions on the entry standards of commercial banks in terms of registered capital, documents, qualification of senior managers and organization structure. As a novelty, China currently has no specific legislation on the market entry of Internet banks. Chapter 2 of the commercial banks Law (1995) stipulates the requirements for the establishment of commercial banks, the required documents, the audit procedures and the administrative departments. And this is one of the legal bases for the market entry system of internet banks as well. But it does not directly regulate internet banks. Policy documents only make general requirements on market entry, but do not have detailed and comprehensive measurement standards, giving administrative institutions great discretion. Due to the particularity of business mode, there must be huge differences between internet banks and traditional banks in terms of entry standards. For instance, there are no clear provisions on the requirements for traditional banks on database resources, security terms and data analysis technology.

The United States adjusts the market entry of third-party payment organizations at the federal and state levels. At the federal level, the regulations on market entry in the United States are mainly reflected in the registration obligations of monetary service providers stipulated in the United States federal code. That is, all money service providers must register with the secretary of the Treasury within 180 days of establishment, regardless of the state requires a license for money transfer or whether a license for money transfer has been granted. The code also stipulates the legal liability of monetary service providers for violating the license system. However, there are still no regulations on the characteristics of third-party payment (Salazar & Ricardo, 2016). In terms of specific conditions for applying for business licenses, European Union has provided regulations (2015). Applicants must be submitted to the competent authorities include business projects, business plan, the initial capital, establish a system to protect the safety of client funds and to prevent money laundering as well as terrorist financing mechanism, organization structure, directly or indirectly holder information, management information, the applicant’s legal certificate and articles of association, the agency's location information, and so on. As a regional integration organization, the EU is committed to
establishing a single EU payment zone (Kokert & Held, 2014). Third-party payments need to obtain a license in any EU member state to operate unimpeded across the regions.

4.3 Decentralized regulation

The current regulation mode in mainland China is to conduct industry supervision according to the business nature formed by third-party payment. But China's third-party payment organization is mixed management mostly. The business has both the deposit and lending business of commercial banks, and there were some of the insurance industry business, which is traditionally provided by investment banks and financial services, including allowing customers on their platform to buy shares, funds, bonds, gold and other financial tools. This regulatory regime reveals two problems. First, some third-party payment organizations do not have adequate supervision of their non-core businesses. Second, some cross-businesses have no clear rules governing them. All these two will increase social financial risks and bring negative impacts on individual's life and economic development. Due to historical reasons, banks play a dominant role in China's financial system, so laws and regulations on banks and their business are relatively mature. For example, the Chinese government promulgated the law of the People's Republic of China on commercial banking, the law of the People's Republic of China on banking supervision and administration and the law of the people's bank of China. Therefore, the Chinese government has stricter supervision over the business of third-party payment, which is similar to that of traditional banks, such as loan examination and transfer limit control. For example, the Chinese government has promulgated the "administrative measures of the People's Republic of China on electronic banking business". But regulation of other marginal and cross-cutting businesses is less meticulous. For example, some third-party payment organizations attract personal funds under the name of investment and financing, with a commitment to pay investors excessively high interest rates. Instead of using the money for legitimate investments, these groups are taking their clients' money for themselves. A part of customer funds is used as interest payment to give investors the illusion that the company is operating normally and making profits. Such firms will inevitably go bust and consequently investors will find out this fraud. Third-party payment groups have technology that enables rapid money transfers, and some of them provide investors with bogus online trading systems that make customers feel confident with the illusion that their capital value keep increasing.
The financial supervision department lacks the experience of supervision and monitor technology, which results difficulties to impose sanction on illegal financial behavior.

The United States is made up of 50 states, each with its own legislative power. The state banking commissioners are responsible for the legislation of financial organizations in each state, but in the federal government the authority to make laws concerning financial organizations is vested in OOC (Office of the Comptroller of Currency). In the federal government, the Electronic Fund Transfer Act (Regulation E) is the most important legal basis for regulating Fintech organizations such as third-party payment companies. But Regulation E has a short history. It was promulgated by the Federal Registry on December 27, 2012. State banking commissioner and OOC manage their respective organizations (Morris & Kent, 2013). However, such decentralized legislation and management make it difficult to form a system of government regulation. Third-party payment organizations can easily exploit the loopholes between state and federal laws, which may damage the interests of consumers. The situation in Europe is even complex. The European Union is made up of many countries with different legal and regulatory regimes. In 2013, the European Commission promulgated the SECOND PAYMENT SERVICES DIRECTIVE, stipulating interchange fees for card-based PAYMENT transactions, but the PAYMENT market in Europe is still very fragmented (Valcke, Vandzande & Nathan, 2015). In turn, the lack of standardization and consistency will affect efficiency. Such inconsistencies in management tend to create a legal vacuum and give lawbreakers an opportunity.

4.4 Privacy and data security

Compared with Europe and the United States, China lacks legal protection of privacy and people's awareness of privacy protection is relatively weak. Third-party payment groups are more likely to exploit the vacuum to profit illegally. With the rapid development of network technology in recent years, a large amount of personal information has been collected. Electronic technology makes the reproduction of these personal information very cheap and internet technology allows personal information to spread very quickly. As a result, buying and selling personal information become a lucrative business. Similarly, laws are not being enacted fast enough to keep up with technological change, so there is not enough law to protect this emerging fields. Third-party payment organizations collect customers' personal information
before or during the provision of services and conduct analysis to obtain commercially valuable information. The strong information collection ability and processing capacity can help them reduce financial risks and expand their business, which is also considered as one of the reasons why they can simplify the review process and quickly provide appropriate services for customers. However, many third-party payment organizations often neglect privacy protection in the process of collecting information. They get personal information without customers' permission, or lure them into signing agreements they don't know about, or even buy personal information from illegal channels or individuals. The bank shall not directly make credit decision based on the data provided by the data partner, thereby transferring the responsibility of loan risk management in a disguised way. Although China has laws to protect the privacy of individual users, there are still flaws on privacy protection due to the late establishment of China's legal system. First, compared with the United States and many developed countries in Europe, China's privacy protection law is still very weak, and many aspects of privacy cannot be protected (Zhao & Dong, 2017). Second, Chinese organizations and individuals have a weak awareness of privacy protection, which not only pay less attention to the protection of individual privacy, but also lack of protection of their own organizational privacy. Third party payment groups in Europe are also at risk of illegally accessing user data which is known as GDPR issue. For example, many third-party payment organizations in Europe act as payment interfaces between consumers, merchants and banks. They are not directly involved in the transfer or deposit business (EBF, 2014) and are therefore not subject to traditional banking laws. However, they have access to the privacy data of consumers and merchants, which poses a great threat to the data security of financial services. Developing credit system is probably a good solution. For the financial sector, the credit investigation system is an important infrastructure. The perfect credit investigation system can provide internet lending institutions with important customer credit information, reduce customer cost, and at the same time, the data of the credit investigation system can further support the development of standardization and securitization of credit assets. At present, compared with western countries, China's credit system has a large room to be enhanced, China should strive to build its own credit system.
4.5 Trends and recommendations

The legislation in China, the United States and Europe lags behind the development of third-party payment, resulting in the lack of legal basis for the current situation. However, with the gradual maturity and standardization of third-party payment, the supporting laws and regulations will also be more perfect. The analysis of the author shows that formal and detailed laws are beneficial to the development of third-party payment. Third party payment business without legal basis and regulation will harm the interests of consumers, bring higher financial risks and hinder economic development (Ozili, 2018). For the Chinese case, administrative regulations and public policies will be replaced by precise formal written laws, and supervision will become more efficient and orderly. Each state in the United States has independent legislative power, which makes the regulation of third-party payment by each state and the federal government go their own way. However, the federal law is higher than the state law. With the development of the industry and the progress of legislation, this situation will be improved. In Europe, it is harder to form uniform laws and regulations because Europe is made up of many independent sovereign states with their own laws and regulators. But the European commission is working on a unified third-party payment legal and regulatory system (Valcke, Vandezande & Nathan, 2015). In the short term, it is difficult to form a unified market and law. In the process of internationalization, third-party payment organizations like Alipay and Apple Pay should first try to be familiar with local laws. Enter the local market only with meeting the legal requirements of the host country.

In general, to start, China lags behind Europe and the United States in privacy protection and data security, a disadvantage that is even more pronounced in this internet decade. Using the powerful information transmission capacity and speed of the internet, data criminals illegally obtain personal information and make profits out of it. The competent authorities in China can learn from the advanced experience of western countries and introduce appropriate measures to gradually improve the information disclosure system and personal information protection system. For example, specific procedures for information disclosure of third-party payment organizations are stipulated, including time limit and mode limit, and other subjects and situations that may infringe personal information except third-party payment organizations, as well as exemption situations applicable to personal information protection system. Secondly, the development of credit system is also a good solution. The credit investigation system is one
of the important infrastructures of the financial sector. The perfect credit investigation system can provide important customer credit information to internet lending institutions, reduce costs, and at the same time, the data of the credit investigation system can further support the development of standardization and securitization of credit assets. Finally, the mature supervision system of third-party payment should be a "four-in-one" supervision mechanism of government supervision departments, provision banks, industry self-regulatory organizations and the public. At present, the industry self-discipline organization and social public regulation's positive attitude is less involved, such as only pay the institutional clients cover depository way "regulation association of China's payment and settlement of the payment institutional clients cover depository self-discipline management of the business activities. In this regard, China's legislation can gradually contribute more and more normative powers to the third-party financial organization. Namely China transaction clearing association guide third-party payment organizations to consciously abide by relevant provisions with the normative guidance of the industry association, so as to maintain the order of the industry. In addition, it is also necessary to encourage the public to play their regulatory role in third-party payment, and monitor third-party payment organizations to abide by laws and regulations with the power of public pressure, and provide payment services for customers within the scope of laws and regulations.
5 Empirical Analysis

5.1 Methodology and data

Data and sampling

Panel data has been used as mechanism for investigation of bank performance in many analytical studies, for example in bank performance in transition countries by Bonin, Hasan & Wachtel (2005) and the determinants of bank performance in China by Heffernan & Fu (2008). Panel data has advantage which is the dataset constitutes both time series and individuals. The statistical result will reveal the effect of two dimensions which is effect across individuals and the dynamics effects by time series. Since the third-party payment platform has fast development from 2013, it is important to collect available data from that time to now. Due to the availability of every variable, the dataset covers the period from 2014 to 2017. In addition to the bank characteristics, the annual transaction volume through third-party payment platform has chosen to reflect the development of TPP. The data is extracted from iResearch report whereas iResearch is a leading internet industry report provider in China offers data, analytic reports and consulting services (iResearch, 2018). The bank information is collected from three resources which are annual report of listed banks, Wind (零壹财经) and EY annual report on China’s listed banks 2016 and 2017. Data that directly obtained are non-interest income, total assets, net income margin, cost to income, net profit and non-performing loan. Based on the data distribution, a self-calculation is needed to transfer dataset to a proper use for the model. In accordance with the selected sample, a natural logarithm of total assets is applied. It optimizes the result from the scale effect and normalize the distribution of the data. Some variables in ratio indicate the bank performance in a certain area, such as non-interest income, net interest margin and non-performing loan. Non-interest income is based on operating income while the other ratio is based on total assets. The data of macro-economy factors obtained from the national bureau of statistics of China (NBS). GDP growth rate reflects the overall economic circumstance in China with a comparison with previous year. The consumer price index (CPI)
denotes the changes of inflation rate to control the statistics with the current market price in a certain year.

This investigation aims to investigate the impact of third-party payment on commercial banks’ non-interest income performance. Due to the data availability, the sample is not random but the listed banks in China that publish their annual financial figures. The bank category covers three types of commercial banks which are the big five large commercial banks (state-owned), national joint-stock commercial banks and city and rural commercial banks.

Descriptive statistics

Table 1 shows the descriptive statistics for all variables. The mean of non-interest income rate is 0.69% with a range from 0.12% to 8.4% and a standard deviation of 0.0084. The Gross merchandise volume (GMV) of third-party mobile payment has grown from 6 to 55 trillion RMB during the four year. With a natural logarithm conversion, an impact by one percentage change of transaction volume will show instead of a unit change. The summary of total assets also displays the bank size is distinct by categories which the standard deviation is 61,945 million. WuJiang rural commercial bank (WJRCB) holds 61,945 million RMB assets which is the smallest bank among the listed banks. Industrial and Commercial Bank of China (ICBC) is the largest listed bank by 26 trillion total assets. The logarithm of total assets normalizes the distribution of data to avoid the outlier effect. Net profit and non-performing loan scale also show a very diverse operational scale and capability among commercial banks. The standard deviation is over 72255 million RMB and therefore, a ratio is necessary to explain banks’ profitability. The return on assets is calculated by dividing the net profit by total assets. Chinese listed commercial banks have on average about 1% return on assets. The non-performing loan rate indicate the loan quality, bank management and bank profitability. Since the financial leasing vehicle issue has been exposed, Chinese large state-owned commercial banks have bad reputation on issuing loan. The mean rate of non-performing loan is 1.47% and the range of the proportion is from 0.42% to 7.07%. Ownership types of large state-owned, joint stock and city and rural commercial banks are converted to 1,2 and 3 as a categorical variable in the dataset.
Table 1 descriptive statistics. This table illustrates the descriptive statistics of China listed banks from 2014-2017 based on one million RMB.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIIR, non-interest income rate</td>
<td>98</td>
<td>0.00690</td>
<td>0.00844</td>
<td>0.00121</td>
<td>0.08430</td>
</tr>
<tr>
<td>logarithm of GMV</td>
<td>160</td>
<td>16.80331</td>
<td>0.88962</td>
<td>15.60727</td>
<td>17.82284</td>
</tr>
<tr>
<td>logarithm of TV</td>
<td>160</td>
<td>16.53834</td>
<td>0.47633</td>
<td>15.90737</td>
<td>17.14771</td>
</tr>
<tr>
<td>logarithm of TA</td>
<td>136</td>
<td>14.02011</td>
<td>1.68274</td>
<td>11.03400</td>
<td>17.07695</td>
</tr>
<tr>
<td>NIM, net interest margin (%)</td>
<td>154</td>
<td>2.42636</td>
<td>0.50986</td>
<td>1.25000</td>
<td>4.05000</td>
</tr>
<tr>
<td>ROA, return on assets (%)</td>
<td>117</td>
<td>0.01006</td>
<td>0.00798</td>
<td>0.00546</td>
<td>0.09323</td>
</tr>
<tr>
<td>CI, cost to income ratios (%)</td>
<td>155</td>
<td>30.66497</td>
<td>7.56324</td>
<td>14.83000</td>
<td>66.44000</td>
</tr>
<tr>
<td>NP, Net Profit</td>
<td>120</td>
<td>44480.55</td>
<td>72255.99701</td>
<td>604.00</td>
<td>286049.00</td>
</tr>
<tr>
<td>NPL, non-performing loan</td>
<td>103</td>
<td>33832.40777</td>
<td>59002.42386</td>
<td>649.00</td>
<td>230834.00</td>
</tr>
<tr>
<td>NPL, ratio (%)</td>
<td>130</td>
<td>1.47169</td>
<td>0.73103</td>
<td>0.42</td>
<td>7.07</td>
</tr>
<tr>
<td>GMV, Gross merchandise volume of TPP</td>
<td>160</td>
<td>27925000.00</td>
<td>19891956.59323</td>
<td>60000000.00</td>
<td>55000000.00</td>
</tr>
<tr>
<td>TA, Total Assets</td>
<td>136</td>
<td>4079037.91176</td>
<td>6236051.04961</td>
<td>61945.00</td>
<td>26087043.00</td>
</tr>
<tr>
<td>GDP growth rate (%)</td>
<td>160</td>
<td>6.92500</td>
<td>0.22848</td>
<td>6.70</td>
<td>7.30</td>
</tr>
<tr>
<td>Ownership</td>
<td>156</td>
<td>2.10256</td>
<td>0.59220</td>
<td>1.00</td>
<td>3.00</td>
</tr>
<tr>
<td>CPI, Consumer Price Index (%)</td>
<td>160</td>
<td>1.75000</td>
<td>0.26062</td>
<td>1.40</td>
<td>2.00</td>
</tr>
</tbody>
</table>

Econometric model specification

The econometric model is designed to test the quantitative impact of third-party payment transaction volume to Chinese commercial banks. For this sake, the model contains variables that denote third-party payment performance, bank characteristics and the macro factors. To examine the aspect of impact on bank, Lee, Yang & Chang (2014) and prior work of Lepetit et
al. (2008) use non-interest income as the indicator for bank’s non-traditional activities. By reference to the empirical model of Xia & Chunsom (2018), the ratio of non-interest income to total asset use as the measure for bank risk and profitability. Since the mobile transaction business affect directly to banks’ non-interest income, the non-interest income rate has chosen to indicate the degree of profitability impact on traditional banking. In accordance to the object of this study, the panel data dynamic models have employed as following:

First:

\[ NIIR_{it} = \beta_0 + \beta_1 \ln_{GMV_t} + \beta_2 \ln_{TA_{it}} + \beta_3 NIM_{it} + \beta_4 ROA_{it} + \beta_5 GDP_{it} + \beta_6 CPI_{it} + \epsilon_{it} \]  

In terms of individuals and time series, i refers to bank id that generated from bank name to a series number from 1, and t refers to year which 2014 is converted to year 1. The independent variable NIIR refers to the non-interest income rate of individual bank during the 4 years. The natural logarithm of GMV (\ln_{GMV}) is the dependent variable that measures the effect on banking system. Bank internal factors and macro factors are included as controlled variables to keep the result under a fair circumstance. The natural logarithm of total assets (\ln_{TA}) denotes the size of banks and following NIM indicates net income margin, ROA means the ratio of return on assets. Two macroeconomic indicators are the GDP growth rate (GDP_{it}) and the CPI index which measures the inflation rate during the period.

Second:

\[ NIIR_{it} = \beta_0 + \beta_1 \ln_{GMV_t} + \beta_2 \ln_{TA_{it}} + \beta_3 NIM_{it} + \beta_4 ROA_{it} + \beta_5 OS_{it} + \beta_6 GDP_{it} + \beta_6 CPI_{it} + \epsilon_{it} \]  

The second model involves the consideration of potential effect from bank ownership. Since the operational strategy is dependent on the share of ownership, a control of ownership influence is necessary for the analysis. People’s Bank of China has classified the commercial banks by the share of ownership and within this study, the foreign joint-stock commercial bank is not included. In the dataset, all five Chinese state-owned large commercial banks are involved and moreover, the 9 of national joint-stock commercial banks and the majority are the city and rural commercial banks which are 26 in the dataset.

Model test

There are three types of panel data model which are pooled, fixed effects and random effects model. For the time being, the pooled regression model is rejected because there are different
banks included in the data. Hausman test is originally a test to detects endogenous regressor in the statistic model and in panel data it also helps to choose between fixed effects model and random effects model (Hassan, 2003). According to the preset of Hausman test, the null hypothesis is to accept random-effect otherwise accept the alternative hypothesis which is fixed-effect. Table 2 shows the result of Hausman specification test which is carried out by Stata 14. It results a very high probability of Chi-square test value which is 0.9977 and it means the null hypothesis cannot be rejected. Therefore, the random effect model is the appropriate model to explain the outcome. The panel data has been tested again in random effect model and the statistic output describe that it is an appropriate model because the corresponding probability value is less than 1% and the coefficient are not equal to zero which means the model is nicely fitted.

<table>
<thead>
<tr>
<th>Table 2 result of Hausman specification test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hausman (1978) specification test</td>
</tr>
<tr>
<td>Coef.</td>
</tr>
<tr>
<td>Chi-square test value</td>
</tr>
<tr>
<td>P-value</td>
</tr>
</tbody>
</table>

5.2 Results and Discussion

In this section, empirical investigation results are first presented to show which factors (variables) are significantly correlated with non-interest income of Banks, so that the effect and influence of third-party payment on non-interest income of traditional Banks can be further analyzed. Moreover, according to the differences of the banks’ ownership, result will further be explored whether the ownership of Banks will have influence on bank's non-interest income from third-party payment.

The statistical analysis was carried out by using Stata SE 14. The result of first model illustrates in table 3. In the first column of the table is the variables related to bank's non-interest income. Through this statistical result, we can determine which factors are significant to the non-interest income business of traditional Banks. The very right column in the table indicated the significant level of each determinants according to ** * p < 0.01, * p < 0.05, p < 0.1 degree,
and the variables with at minimum one * has higher possibility to influence the non-interest income. The coefficient of the influence from each factor on the dependent variable is shown in the second column. The panel data used to test the model covers the data of Banks and third-party payments from 2014 to 2017. After Hausman test, the regression result is obtained by using the appropriate random effects model.

Table 3 Model 1 regression results

<table>
<thead>
<tr>
<th>Model 1 regression results</th>
</tr>
</thead>
<tbody>
<tr>
<td>NIIR</td>
</tr>
<tr>
<td>ln_GMV</td>
</tr>
<tr>
<td>ln_TA</td>
</tr>
<tr>
<td>NIM</td>
</tr>
<tr>
<td>ROA</td>
</tr>
<tr>
<td>NPLr</td>
</tr>
<tr>
<td>GDPPr</td>
</tr>
<tr>
<td>CPI</td>
</tr>
<tr>
<td>Constant</td>
</tr>
</tbody>
</table>

Mean dependent var | 0.0069928  | SD dependent var | 0.0085015 |
Overall r-squared | 0.9330293  | Number of obs | 96.0000000 |
Chi-square | 4937.5065158 | Prob > chi2 | 0.0000000 |
R-squared within | 0.9861717  | R-squared between | 0.8336072 |

*** p<0.01, ** p<0.05, * p<0.1

The results of Model 1 show that five variables have significant impact on the non-interest business of traditional Banks. Among them, the p-value of the impact of Gross merchandise volume on bank NII was 0.032, indicating a significant impact. As a result, a growth of third-
party payment volume will reduce the non-interest income of traditional Banks. Although many literatures as YANG & LIANG (2018) and Li LIANG & Wang (2018) expected by the third-party payment system will has a great impact on the traditional bank non-interest business, but from the regression result to see the coefficient value is very small. This can be explained in two perspectives. First of all, at present, the third-party payment still relies on the customer's bank account, and all transfers are through the bank account. Therefore, if the total consumption through third-party payment increases, the bank's non-interest income will definitely increase as well. For this aspect, rise of third-party payment industry has a positive impact on non-interest income of Banks. On the negative side, once a sum of money is transferred out of bank account to Alipay or Wechat pay account, the further purchase will no longer generate transaction revenue for the bank. Apart of losing profit, banks lose the observation of users' consumption habits at the same time. As a result, it will affect the design and positioning of other financial products.

*Figure 1 2018 the flow chart of third-party payment business*

In addition to the gross merchandise volume paid via third-party payment platform, three characteristics of Banks have a significant impact on non-interest income. First, total asset of the bank has a significant positive impact on NII. The overall business volume of commercial
banks with large assets is enormous. Although interest income and other financial projects will bring in more income, in terms of business proportion, large banks realize economies of scale to obtain large amount of non-interest income. The second banking feature that has a significant impact on NII is net interest margin with a negative coefficient. This is because if a bank has a good performance in its interest income business, the bank will pay more and more attention into interest income and has less motivation to expand the non-interest income business. In profitability wise, non-interest income is less important than interest-based business to the bank. The third significant factor is the banks' ROA. Hassan (2003) mentioned that ROA can be used to see whether a bank has made effective use of resources and can be an indicator of bank's performance. A bank with good performance will not focus on just one income model but diverse income to share the profit and also risk from non-interest income as well as interest income. ROA with 0.936 coefficient on the bank's non-interest income means the return on investment of non-interest income is very high, which is the most influential factor among all factors. Macro-environment factor also has a significant impact on NII. Regression result shows that the overall GDP growth rate of a country can also stimulate the bank's non-interest income. The increase in GDP growth rate indicates that the purchasing power of finish goods has increased. Therefore, whether the final consumption is completed through the third-party payment system or not, the money must be transferred out through the bank account. Therefore, the non-interest income of the bank will eventually increase.

The regression result of the second model is shown in Table 4. The second model has designed to investigate if the ownership of bank cause discrepancy on the correlation to NII. In this panel data, ownership of Banks is divided into three groups: state-owned commercial banks, city commercial banks and small and rural commercial banks. The statistical study results that ownership has a significant impact on banks' non-interest income business. To consider small and rural commercial bank as a basis parameter, NII of 4 large SOCBs and large city banks are negatively affected by its ownership. Compared with large commercial banks, small scope banks have advantages in personal business which is especially in non-interest income business. As the major customers and projects of China's four largest state-owned banks are not targeted at individual businesses, economies of scale cannot be achieved in this field. Moreover, the influence of GMV on bank NII becomes weaker with involving the consideration of ownership types. This shows that compared with the influence affect by the third-party payment business,
the nature of state-owned enterprises still has a decisive influence on the income of banks. In China, ownership also determines the size of banks but not absolutely in all cases of business. The four large state-owned Banks are definitely the largest commercial banks, those SOCBs enjoys the bail out benefit from government but at the mean time the turnover and profits of city commercial banks more reply on the local economic conditions. City commercial Banks cannot compete with state-owned Banks in terms of scale and there is no national project for them as profit guarantee. The rise of third-party payment is indeed squeezing out transaction business from banks and it also has a negative impact on the balancing of banks’ risk management. Most Chinese have accounts in the four major state-owned banks which they feel save to receive salary and city commercial bank account is not prior consideration to keep. If the traditional bank account is gradually replaced by the third-party virtual account, city commercial banks will be shocked initially, and it will directly affect the saving business of banks and consequently reduce interest income.

Table 4 Model 2 regression results

<table>
<thead>
<tr>
<th>NHR</th>
<th>Coef.</th>
<th>St.Err.</th>
<th>t-value</th>
<th>p-value</th>
<th>[95% Conf Interval]</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>ln_GMV</td>
<td>-0.0000068</td>
<td>0.0003195</td>
<td>-0.02</td>
<td>0.083</td>
<td>-0.001</td>
<td>0.001</td>
</tr>
<tr>
<td>ln_TA</td>
<td>0.0004961</td>
<td>0.0004193</td>
<td>1.18</td>
<td>0.237</td>
<td>-0.000</td>
<td>0.001</td>
</tr>
<tr>
<td>NIM</td>
<td>-0.0016787</td>
<td>0.0005756</td>
<td>-2.92</td>
<td>0.004</td>
<td>-0.003</td>
<td>-0.001</td>
</tr>
<tr>
<td>ROA</td>
<td>0.9242953</td>
<td>0.0174388</td>
<td>53.00</td>
<td>0.000</td>
<td>0.890</td>
<td>0.958</td>
</tr>
<tr>
<td>NPLr</td>
<td>0.0001082</td>
<td>0.0001506</td>
<td>0.72</td>
<td>0.473</td>
<td>-0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>1.OS</td>
<td>-0.0032927</td>
<td>0.0010803</td>
<td>-3.05</td>
<td>0.002</td>
<td>-0.005</td>
<td>-0.001</td>
</tr>
<tr>
<td>2.OS</td>
<td>-0.0033255</td>
<td>0.0012807</td>
<td>-2.60</td>
<td>0.009</td>
<td>-0.006</td>
<td>-0.001</td>
</tr>
<tr>
<td>3b.OS</td>
<td>0.0000000</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>GDPr</td>
<td>-0.0034194</td>
<td>0.0010178</td>
<td>-3.36</td>
<td>0.001</td>
<td>-0.005</td>
<td>-0.001</td>
</tr>
<tr>
<td>CPI</td>
<td>-0.0001315</td>
<td>0.0004130</td>
<td>-0.32</td>
<td>0.750</td>
<td>-0.001</td>
<td>0.001</td>
</tr>
</tbody>
</table>
### Inadequate:

This quantitative investigation has only tested the relationship between banks’ non-interest business and third-party payment and also with the characteristics of Banks. However, with the rise and development of the third-party e-wallet business, the higher interest rate offered by the e-wallet compared with the bank’s interest attracts more customers to deposit their capital into the third-party e-wallet. Thus, it directly affects the interest income of the bank. However, as the e-wallet business is a very recently emerged business, the statistical results is less accurate to obtained with a use of the short-term panel data. Moreover, interest income data of the bank will be less accessible than non-interest income. It requires special intelligence to gather data. Another shortcoming of the panel data that used for above two model tests is the data has less perfect in balancing. Some data of small commercial banks are not complete enough through years and it has affected the statistical results.

<table>
<thead>
<tr>
<th></th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.0204394</td>
<td>0.0145015</td>
</tr>
<tr>
<td>Mean dependent var</td>
<td>0.0069928</td>
<td>0.0085015</td>
</tr>
<tr>
<td>Overall r-squared</td>
<td>0.9639446</td>
<td>Number of obs</td>
</tr>
<tr>
<td>Chi-square</td>
<td>4964.6036858</td>
<td>Prob &gt; chi2</td>
</tr>
<tr>
<td>R-squared within</td>
<td>0.9861061</td>
<td>R-squared between</td>
</tr>
</tbody>
</table>

*** p<0.01, ** p<0.05, * p<0.1
6 Conclusion

Chinese economy has experienced a rapid growth and its retail market has been dominant on cash for most of time until a recent rise of e-payment from third-party platform. From that onwards, people started to pay via mobile phones instead of cash and credit cards. The fact is due to this new concept and technology of payment require an easier financial access than the credit card with a simple requirement device for retails. Customers prefer a quicker reaction and comfortable user experience comparing to the traditional payment method that has less integration of variety financial services. Since the payments started to execute by mobile via third-party platforms, the traditional banking system can no longer manipulate the transactions. Hence the new payment method is taking over the business of transaction fee, which contributes mostly to the non-interest income of the traditional commercial banks. Moreover, the idea of using third-party platform of payment is a threat to traditional banking in a broader scope of financial business. Third-party financial products gradually transformed from mobile payment to e-wallet function services which joins the competition in the saving business. For example, the Yu'e Bao treasure from Alibaba, which has a higher interest rate than banks same to the market money funds. Hence people get attracted to withdraw money from their banks to deposit in Yu'e Bao accounts.

However, for some years now, the regulation in China towards the financial sector remain many flaws which is due to the financial sector is more government oriented with lack of private business involvement for very long time so the policy has slow reacted from the market. Nevertheless, the large Chinese State-owned banks monopoly financial system and controls the capital allocations which barely served the needs for private business and individuals’ needs. At the meantime, clients and capital flow to the third-party escrow accounts. Third-party payment platform has got the monopoly broken to the banks with individual oriented service. Therefore, the hypothesis is to test the influence on traditional commercial banks with considering the change of purchasing activities, the bank characteristics and the macro-environment.

This research motivated by notice the third-party payment services have got an impact on transaction services of traditional banks. In order to understand inside out, this study conduct
the quantitative research on non-interest income correlation as well as on qualitative side compared the regulatory frameworks of the financial activities in higher economies like the EU, US, and China. Hence, the importance of monitoring the liberate and restrain policies towards evolving new financial products and different in pure quantitative research that gives a comprehensive view of both quantitative and quality aspects. The quantitative research compensated some prior studies such as Yu and Shen (2015) — hence filled lack of empirical discussion on the threats of third-party payment to traditional banking system.

Throughout the study of institutional comparison, third-party payment related regulations on management of transaction process, government participation and scope of regulations have been analyzed. In the financial sector, China has less experience with control private financial parties due to the bank’s ownership history and hence the current regulations are problematic to the private financial companies. Government issues policy guidance documents and opinions, the papers are promulgated and formulated quickly to adapt to the fast development of third-party payment. Historically, Chinese administrative power has a societal role instead of laws. For example, commercial banking laws started to open the entry of private capital into the banking sectors and after it, China's private banks' approval has established. In contrast, the United States has a relaxed attitude towards electronic currency and innovative electronic payment services, which they believe government regulations will burden the emerging financial parties and the premature regulations hindering the upcoming innovations (Chen, 2008). Hence, the United States had to get third-party moderate payment supervision. By looking at the China's entry criteria for the traditional commercial Bank, it is stringent while the laws on china's internet bank markets have got no legislation on entry criteria. Therefore, in terms of entry standards, the particularity of the business model, a big difference between internet banks and traditional banks must be there. Hence the policy documents only make general requirements of Fintech companies on the entry of the market but not on comprehensive, detailed measurement standards giving great discretion to the administrative institutions (Zhao and Dong, 2017). Moreover, Chinese decentralized regulation in the mainland conduct technical supervision according to how organized the nature of the third-party payment business is. China's third-party payment organizational has mixed composition of business mostly. It consists not only deposit and lending as commercial banks but also added on some insurance products to enhance the attractiveness of their products. At this point, the law is not well prepared to rule the mixed type of financial companies and products which cause a risk in financial sector with a blurry zone for financial activities. For privacy and data security
perspective, China lacks legal protection of privacy when compared to the United States and Europe. Third-party payment groups are likely to exploit vacuum to profit illegally. Hence a large amount of personal information has been spread out due to the rapid development of network technology. Capital chasing and profitability focused financial third-party sneak away from the flaw of privacy protection laws and exchange the personal data among organizations. In the traditional banking sector, the Chinese regulation is well prepared for personal security. Comparing to that, the institutional weakness of privacy security is notable on new Fintech products. Recommendations and trends on legal aspect, to take reference of US and Europe, Chinese government should provide mature supervision in order to react properly to the fast development of variety of financial products (Ozili, 2018). With the support of rules and first moving regulations, Chinese market will be perfect for a gradual standardization maturity of the third-party payment.

Transaction method that emerges through the third-party platform after the explosion of smartphones users brings significant attention to the impact on traditional banking sector. Different as the speed in Chinese market, US researchers believed that their banks react slowly in terms of technologies and strategies in mobile payment market while nonbank players like square PayPal, Google, and Apple are making inroads (Tandulwadikar, 2015). Furthermore, the impact from the nonbank financial service sector and the customer influence behavior should not be underestimated in Europe which is closely related to economic development innovation (Inna and Marina, 2016). The potential threat is seen by the leading banks in Europe, and the US is technologically driven, but less knowledge required services like payment services and simple products saving. Notably, statistics surveys reveal financial products and services provided by third-party platform conquering market share with a high level of functionality of products and experience with private customers. Thus, the exposed tendency forces the traditional banks to restructure the distribution service channels and investment technologies. However, the regulatory framework is lag behind with the need of changes. Notably, for banks' profitability, the rapid grow of TPP has great financial impact, which brought particular great attention on large transactions. Chinese commercial banks have unique classification of ownership which indirectly links to asset size. There are four big state-owned commercial banks that designed to undertake specific national project and issue most of business loans to large size state-owned enterprises. Small business project and private companies are usually not the benefit group from those large banks even though the private sector contributes the most to Chinese economy growth. In another word, due to the soft budget
constrain, large amount of loans is non-performance loan which makes SOCBs irrelevant to economic growth. Most facts show third-party emerging financially firm and have replication of banks functions and are also detected efficiency and market demand.

Since the new fintech products and companies came into daily life, there are many prior studies discussed the potential impact on banks’ profitability. Besides of the forces from third-party and the banks’ own characters, market characteristics are external factors which use to control variables for quantitative model with avoiding neglect effect from the economic situation within the nation. GDP growth rate represent dynamic changes in the economy and the level of investment opportunities (Hahm, 2017). Overall inflation rate is also an important indicator to monitor the level of purchasing power, economic healthy and price level.

Therefore, to quantify the impact of TPP on commercial banks, a group of panel data has been collected and two econometric model has designed to present empirical result for analysis. Since 2013, the third-party payment has launched and developed very fast, hence it is reasonable to collect available data from that time to now. The dataset covers the time from 2014 to 2017 with the coverage of 40 commercial banks and the third-party payment volume in China. Based on the literature review, bank characteristics that has potential impact on non-interest income performance are considered as control variables for the statistical model (Heffernan and Fu, 2008). Moreover, data cleaning and self-calculation is needed to transfer raw dataset to proper use for the model. According to the property of large gross data, logarithm natural is applied to optimize and normalize the data distribution.

Result presents a quantitative answer to the research question that the third-party payment method has a negative effect on banks’ profitability in terms of non-interest income. Gross merchandise volume (GMV) as an explanatory variable shows significant correlation towards banks’ non-interest income. It is noteworthy that GMV has increased from 6 to 55 trillion within four years and the business keeps heating. Key bank characteristics as control variables also show a significant influence on non-interest income. Total assets is represent as bank size has positive effect when large commercial banks realize economies of scale. Net income margin which mostly rely on interest-based business is negatively related to NII. In terms of ROA, the results show non-interest income has very high return on assets which is more than 90%. It means non-interest income has effectively balanced the risk for commercial banks and it becomes crucial if TPP is eating up the market share of transaction and respective business. By looking at the macro-environment, the continuously increased GDP growth rate affect
negatively to Chinese commercial banks. The fast-developing market help to grow purchase power and accelerate TPP to obtain transaction volume. Commercial banks should react to this changing behavior and maintain the competitiveness of card usage and transaction shares. The second model has explained the importance of ownership for particular Chinese financial case. Result states the large size of commercial banks has less advantage on non-interest income than smaller commercial banks. The private business has missed in the past and now third-party platforms took the opportunity to attract customers and generating profit from that.

The research aim is fulfilled by the mixed research and bring a picture of both policy status and empirical understanding. Following the elaboration of this study, the research question can be answered clearly. From quantitative perspective, third-party payment has currently negative impact on banks’ profit in terms of non-interest income business. The institutional aspect reveals the fact that Chinese Fintech regulations react slower but in process to become gradually mature. Nevertheless, a liberation of financial sector in China is undergoing and a mature pack of regulations can be expected for support the development of both emerging private financial sector and traditional banking system.
References


Appendix

Appendix 1

Pairwise correlations

<table>
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<tr>
<th>Variables</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) NIIR</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(2) ln_GMV</td>
<td>0.003</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(3) ln_TA</td>
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<td>0.123</td>
<td>1.000</td>
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<td></td>
<td></td>
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<tr>
<td>(4) NIM</td>
<td>-0.111</td>
<td>-0.479</td>
<td>-0.352</td>
<td>1.000</td>
<td></td>
<td></td>
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<td>(5) ROA</td>
<td>0.929</td>
<td>-0.171</td>
<td>-0.042</td>
<td>0.137</td>
<td>1.000</td>
<td></td>
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<td>(6) CI</td>
<td>-0.135</td>
<td>0.002</td>
<td>-0.066</td>
<td>0.136</td>
<td>-0.077</td>
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<td>(7) NPLr</td>
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<td>0.020</td>
<td>0.171</td>
<td>-0.074</td>
<td>0.011</td>
<td>0.129</td>
<td>1.000</td>
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<td>(8) GDPr</td>
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<td>(9) CPI</td>
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<td>0.020</td>
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<td>(10) OS</td>
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<td>-0.101</td>
<td>0.057</td>
<td>0.075</td>
<td>-0.035</td>
<td>-0.026</td>
<td>0.000</td>
<td>-0.000</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Appendix 2 Flow chart of payment via third-party payment for individual user and Business user