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Internet Finance in China:

An Event Study of Yu'e Bao

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Abstract

The advent of Yu'e Bao posed a stark challenge to competitors in Chinese banking industry. To learn the market reaction and influences of Internet finance in China, we started with background that the Internet finance was generated. Following this we introduced the main forms of Internet finance to give a picture as a whole. We realized that the launch of Yu'e Bao has led to the booming of this industry; therefore we conducted an event study to know the impact of Yu'e Bao on banks. We found out that it had positive effect on the banking industry's reconstruction. Given that the Internet finance may erode the banks' profit margin, it also would shake up the sclerotic Chinese banking sector, and would push the banks to find ways for sustainable growth. At the end of the paper, we analyzed the risks we should take into consideration when it came to Internet finance.

Keywords: Internet finance, Yu'e Bao, Bank, Third-party payment

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1. Introduction

The development of Internet has shifted people's lives fundamentally in all respects. Recent years, Internet has shocked financial industry in China as well. Internet finance, a newborn industry, or a new direction of traditional finance has received increasingly attention from all over the world. P2P lending, Corwdfunding and online money market funds, etc., these financial terms can be heard from Chinese's daily discussions. McKinsey estimates that wider adoption of Internet applications in financial services alone could contribute 1,200 billion CNY ($192 billion) to China's annual GDP by 2025. And all these began from the launch of Yu'e Bao in June 2013. In essence, Yu'e Bao is just a money market fund with no remarkable innovative functions. It was Internet that makes it the second largest money market fund in the world in less than two years.

What is Internet finance? Is it just a simple combination of finance and Internet? How will the rising of Internet finance influence traditional financial industry, especially commercial banks? In this paper, we would answer these questions by studying the development of Internet finance in China. And hopefully we can provide some suggestions for future directions of financial industry all over the world.

Our study started by analyzing the environment that Internet finance grows from. Then we introduced the definition and characteristic of Internet finance. Following that, four major forms of Internet finance active in China would be discussed. After that, an event study was conducted to illustrate the impact of the rise of the Internet finance industry on Chinese banking industry. We used the launch of Yu'e Bao as a milestone of Internet finance's popularization in China. Due to this event, a large portion of Chinese people, who neither had sense of investment, nor had the chance to invest before, get involve into the financial system. After that, other forms of Internet finance, such as P2P lending and crowdfunding had experienced substantial growth in China. By studying the stock market's reaction on the launch of Yu'e bao, we would have a clue about how Internet finance has influenced Chinese banking industry. We analyzed the comprehensive effects of Internet finance on commercial banks after case study, as well as the potential risks caused by this financial innovation.

2. Literature Review

When Internet first came into people lives, E-finance, also called online finance, had raised heated discussion in financial industry. In the period of Dot-com Bubble from late 1990s to early 2000s, the booming in stock market due to investment in internet-related firms, several studies had analyzed the impact of Internet on financial industry, in terms of trading system, payment system, monetary policy and risk management, etc. The studies during that period were mostly from the view of traditional financial industries.

Claessens et al. (2002) provided an overview of electronic finance, and discussed the opportunities and challenges due to the transformation of financial sectors. They argued that online banking and brokerage services, as well as new trading systems had influenced the structure of and competition in financial services. They suggested that, on the one hand, e-finance could stimulate financial industry development by reducing the costs, increasing breadth and quality, and widening access to financial services. On the other hand, electronic finance had challenged public policy, requiring policies changed in areas regarding safety and soundness, competition policy, consumer and investor protection, and global policies.

Clemons et al. (2002) suggested that improving price transparency, differentiating prices, and transforming of distribution channel were three important trends in financial services industry due to the emergence of the Internet.

Cronin (1998) stated that technological developments and electronic strategies had driven full-scale online commerce into the financial services sector. The electronic commerce would develop in a direction of customized and integrated financial services, as well as standard solutions for digital trust. As a result, financial institutions may lose their traditional advantages. Besides, banks themselves experimented new approaches to customer service, and produced extension based on the one-to-one, interactive capabilities of Web.

While, in recent years, with the advent of Internet finance companies, which competed directly with traditional financial sectors, the focus of studies on Internet related finance has shifted to Internet finance, a new term different from financial

institutions on Internet. However, most related studies in China stayed at theoretical level.

Guo Na (2014) studied the coexistence of traditional finance and Internet finance based on logistic growth model. The model included CPI, GDP growth and interest. In the end she found that the best coexistence is built on the competition between two sectors.

Due to the strict rules, banks could not fulfill the capital demand for some companies. Liu Yun and Zhu Ruibo (2014) found that the information asymmetry was the bottleneck for small-sized company funding. To get the loan, the money loader, small-sized company could conceal the true information, which may jeopardize the loan application system. With the expectation of information concealing, banks would hardly lend to small companies, which deteriorated the sustainable growth of micro companies.

In addition, the products of Internet are complementary for banks. Xie Qinghe (2013) analyzed the necessity for third-party payment based on game theory model. He found that the third-party payment was the corner stone for online honest trade.

Furthmore, there were other studies about Internet finance in China. Guo Siyao(2015) studied innovation of Internet finance by comparing Yu'e Bao and 8. Baidu; Yu Songtao (2015) talked about how should bank react to the challenge of Internet finance; Li Shaokun (2015) discussed about risk control and supervision about Internet finance; Xie Ping (2014) provided several measures for Internet supervision and regulation.

These previous papers have provided directions and guidelines for our study. As Internet finance industry had grown at exponential rate, we provided current status of Internet finance industry and analyzed the far-reaching changes in China.

3. Background Information

3.1 International & National Background

3.1.1 International Background

Internet has already tremendously influenced many industries in the past decades, especially which do not depend on physical delivery, such as telecom, books, music, and retail industries. Likewise, born with numbers and data, finance could be digitalized.

As 70% of total information being digitalized nowadays, digitalization is the trend of the society. The widely use of sensors and popularization of 3D printing would shift some offline business to online base, making Internet generate more sophisticated ways of communication and cooperation. As a result, 90% of whole information might be digitalized, which catalyze the widespread application of big data in finance. Given that most of people and companies kept information online, we could assess the credibility and project future payoff accurately based on that information. Thus, the accumulated massive financial data together with global emerge of sharing economy[1] would provide data and customer base for Internet finance. Meanwhile, risk control measures in bricks-and-mortar have furnished Internet finance with application scenarios.

3.1.2 National Background

The long-standing inefficiency and distorted factors in Chinese financial system have contributed to the development of Internet finance in China.

- Tedious paper work and time-consuming services in traditional financial institutions were big disadvantages when compared to Internet finance.
- Strict screening process and conservative risk control rules could not provide enough financial support to small-scale enterprises and economy restructure.
- Equity financing was difficult for most companies under the current

[1] Sharing economy is a form of consumption where people share goods and services online. (Hamari, et al., 2015)

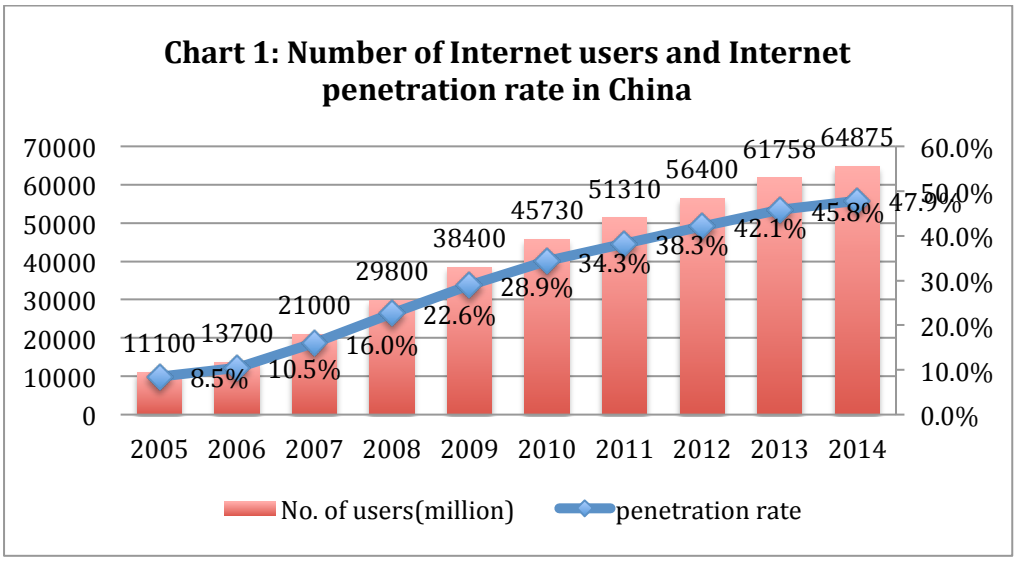
circumstances in China.

- The lucrative spread between deposits and loans has attracted the private capital to step into the banking industry.

Moreover, Chinese government supported inclusive finance[2], aiming to provide financial service to all groups and classes in the whole society, which accelerated the development of Internet finance. However, lacking of enough capital, promotion channel and customer base made inclusive finance still at a disadvantage in relation to traditional finance. In the contrast, Internet could mitigate information asymmetry and decrease transaction cost. Thereby, Internet finance would be a drive-force of inclusive finance by taking advantage of abundant data and data process method online.

3.2 Population and Behavior Characteristics on Internet

Up to December 2014, there were 649 million Internet users in China, 13.17 million more than the number in 2013. Internet penetration rate reached 47.9%, which was 2.1% more than that of last year. There were 361 million Internet shoppers, represented 55.7% of total Internet users in China. The Chart 1 showed the number of Internet users and Internet penetration rate in China from 2005 to 2014. [3]

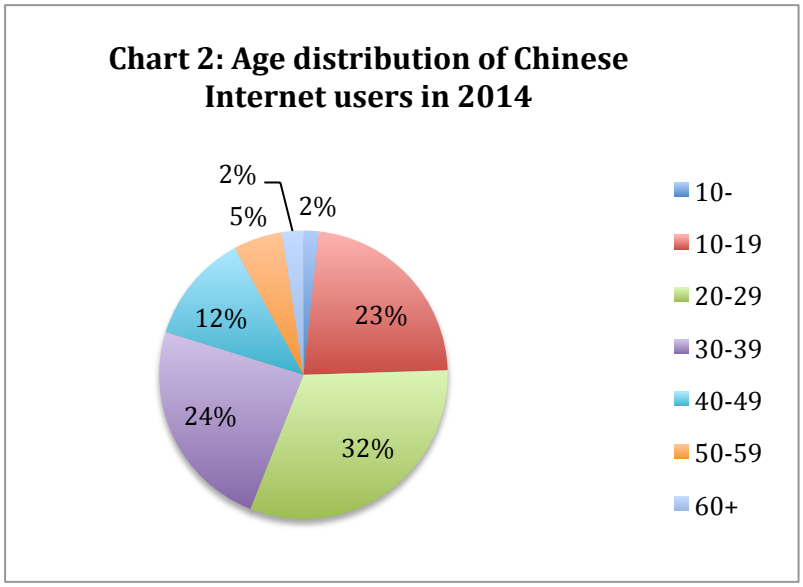


[2] Inclusive financing is the delivery of financial services at affordable costs to sections of disadvantaged and low-income segments of society (poor people and small-sized enterprises), in contrast to financial exclusion where those services are not available or affordable.

[3] Data from China Internet Network Information Center (CNNIC), 2015, 35th Statistical report on Internet development in China.

3.2.1 Age Distribution of Chinese Internet Users

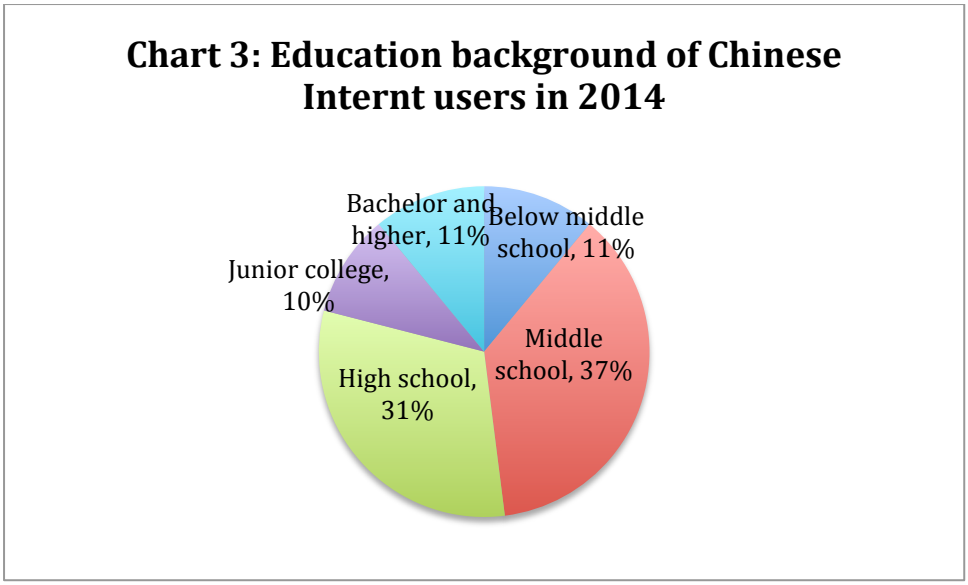
As showed in Chart 2, people between the ages of 10-39 were the main force of Chinese Internet, taking 78.1% in the whole Chinese Internet users in 2014. Among them, 31.5% were 20-29 years old. Young people are more open-minded to new things and more likely to try Internet finance for theirs wealth management. [4]



3.2.2 Educational background of Internet users in China

From Chart 3, we recognized that users with middle school and high school education level were the largest groups in all Internet users, which was 36.8% and 30.6% respectively in 2014. The users with bachelor or higher degree represented 11% of Chinese Internet users. While 89% of Internet users did not have advanced education in university or college. Less-educated people were more likely to be motivated by advertisements and promotions. Moreover, their education level was far behind the requirement of sophisticated personal wealth plan. Therefore, the convenient and accessible Internet finance could provide them new opportunities for personal investing, yet may also bring them huge risk to their personal wealth at the same time.

[4] Data from China Internet Network Information Center (CNNIC), 2015, 35th Statistical report on Internet development in China.



3.2.3 Income Structure of Internet Users in China

In 2014, 46.5% and 40% Internet users in China had income less than 2000CNY and between 3000-5000CNY per month respectively. Only 16.4% of Chinese Internet users had monthly income more than 5000CNY. The people of low-income group need to have financial plans that can meet their strict liquidity requirements. In that case, they were more easily to be attracted by Internet finance that declared providing higher accessibility and flexibility. [5]

3.3 Technology Background

Without big data, there is no way to develop Internet finance. And the development of big data was built on cloud computing, SNS and search engine.

- **Cloud Computing**

  Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction (National Institute of Standards and Technology, 2011). As a computation method based on Internet, cloud computing provides the capacity for data storage and calculation, which spreads the financial information

[5] Data from China Internet Network Information Center (CNNIC), 2015, 35th Statistical report on Internet development in China.

through search engine and social network. By taking advantage of this information, financial institutions could assess risk premium and default rate at lower cost. Thereby, the operation cost can be reduced.

- **Social Network Sites (SNS)**

  As a platform for personal information publishing and sharing, SNS is the digitalization of social network in real life. The shared information includes personal contact, relation, social group, parties, etc. SNS accumulated social capital and increased moral cost of personal default.

- **Search Engine**

  Search engine could match the users' need from massive information. Combined search engine with SNS, social search provides liable information by screening and filtering the information.

3.3.1 Big Data

"Big data" is the ability of society to harness information in novel ways to produce useful insights or goods and services of significant value (National Institute of Standards and Technology, 2011). Now mainstream definition of big data as the three Vs of big data: volume, velocity and variety (META Group, 2011). Volume refers to the huge amount of data; Velocity reflects to the data streaming at unprecedented speed; and Variety indicates the different types and formats of data. Big data could be used in seven ways: 1) classification 2) regression 3) association analysis 4) cluster analysis 5) recommender system 6) link analysis 7) anomaly detection.

3.3.2 Credit Reference Based on Big Data

The essence of credit reference is customer classification. Based on the customers' financial status, behaviors and credit records, credit reference is an assessment on lending capacity and solvency.

3.3.2.1 Data Sources of Credit Reference

Internet corporations generate data gradually from the customers' behaviors. With the analysis of customers' social network and economic behavior, the data on the Internet may reflect their lending need and credit status. Big data on Internet and official

database are complementary, which are supported by the comparison below.

Existing credit reference data was obtained from official credit data of loan customers. For example, credit reference center in People's Bank of China (PBOC) collects data mainly from: 1) the bank credit information kept in the authorized financial institutions by China Banking Regulation Commission 2) related data from utilities 3) credit information during the governmental supervision and administration 4) information produced during the course of hearing, concerning registration, litigation, judgment and enforcement.

Financial data on Internet was mainly extract from the corporates' core business. While for some companies they gained the information from authorized related account as well. For example, Alibaba got public social information through the investment of Weibo and Gaode. Table 1 compares data sources of Alibaba and PBOC.

Table 1: Data sources for credit reference of Alibaba and PBOC

System		**Alibaba**	**PBOC**
Number of merchants	**Enterprises**	6 million(Taobao only)	10 million
	Individuals	145million(Taobao only)	600 million
Credit reference content	**Enterprises**	Merchant information, transaction volume and frequency, stock, customer reviews, cash flow, etc.	Enterprises registered information, credit record, environment information, payment for social welfare and security, quality inspection report, etc.
	Individuals	Customer information, online expenditure, social network, daily payment, etc.	Personal credit record, status information, social welfare payment, housing provident fund, etc.
Data resources		Automatic record in online system	Merchant banks and public sectors

Data was obtained from official websites of Alibaba and PBOC.

3.3.3 The Application of Big Data in Finance

Data is the core asset in financial institutions. To earn profit from information

asymmetry and economies of scale, financial institutions are required to analysis data accurately and quickly. Big data had revolutionary impact on financial industry by changing the traditional ways of data analysis to approach potential customers, to open new market, as well as to improve self-management and operation. The data in traditional financial institutions was focused on historical record including clients' basic information, financial status and transactions, etc. In the contrast, with big data, the range of available data for financial institutions was broadened.

In addition, big data creates new models of financial service. Take JD model as an example: JD and the Bank of China launched supply-chain finance service in 2012. With this service, JD suppliers could apply loans from JD by providing the purchase order and stock invoices, etc. Their applications will be transferred to bank after the analysis and confirmation of JD big data. It is said that, this service could help JD shorten capital turnover period and increase the capital return from 60% to 226%. Moreover, big data was also widely used for public opinion analysis, operation blog analysis, fraud detection and risk control for financial institutions.

The Internet credit reference system was improving gradually. However, most of Internet companies did not have massive and long-time accumulated data as Alibaba. Even Alibaba could not success if isolated from credit reference center in People's Bank of China.

4. What is Internet Finance?

4.1 Definition

Increasing numbers of financial institutions have provided their services online, such as, online banking, mobile banking and online trading. In a board sense, all financial activities conducted online, or using Internet based technology could be included in Internet finance. But in this paper, we discuss Internet finance in a narrower sense. We would only study on typical Internet finance activities, such as third-party payment, online investment and financing activities that cannot perform offline.

4.2 Characteristics

Internet Finance, as a new form of finance, has similar basic functions as traditional

finance, such as money transfer, information processing, product pricing, risk management, and resources allocations, etc. It generates value by building a bridge between entities that need fund and that have excess capital, and by allocating resource over time under uncertainty. (Bodie, Zvi, and Robert Merton, 2000)

To better understand Internet Finance in China, we would analyze it in four aspects: payment system, information gathering and processing, resource allocation, and business models.

1) Payment system

Payment system is the foundation of finance. The major forms of payment for Internet finance were third-party payment and mobile payment. Since mobile payment tends to be the extension of third-party payment, in the rest of our paper we would include it into third-party payment, and analyze them together. Comparing to traditional payment methods operate by banks, third-party payment is more convenient, cheaper and less time consuming. It significantly increased the efficiency of transactions. Besides, third-party payment platforms normally do not charge any service fee for individual users, leading to large user base and high costumer loyalty. We would discuss third-party payment in more detail in the later part of this paper.

2) Information Gathering and Processing

The new methods for data process distinguish Internet finance from traditional finance, by using the SNS, search engine, cloud computing and big data. Search engines, online shopping platforms, third-party payments, browsers, hotel or ticket booking websites and social networks, etc. generate massive information about individuals' social relations, cash flows, hobbies, as well as behavior on consuming and income distribution. The application of cloud computing and big data enables Internet finance companies to obtain and analyze valuable information automatically within short period of time. The information processing not only includes wider range of information into analysis, but also covers much larger portion of population, which traditional financial institutions would not cover in their investigation due to cost issue. It mitigates the information asymmetric problems, providing better risk management and product pricing for small clients. Due to automatic and efficient information processing, Internet finance companies have further reduced cost of

financial services, and have increased efficiency of transactions.

3) Resources Allocation

Resources allocation means how capital is transferred from supplier to money demander. Internet finance was tightly linked to real business. It boosted the trend of financial disintermediation by matching buyer and seller automatically through complex information processing. Risk preference, maturity, price, credit rating and project contents, etc., could all be considered into the matching process. Peer-to-Peer (P2P) lending and crowdfunding have provided good examples of resources allocation in Internet finance. On those online financing platforms, fund demanders' information would be released; thereby investors could choose the most suitable investment option, in terms of amount of money, risk level and maturity, etc. With Internet finance, individuals or small companies that were refused by banks due to high cost in credit investigation and difficult risk management could receive financing. Similarly, people who only have little capital now have chance to invest as well. Through Internet finance companies, they could make transactions with each other directly. In brief, Internet finance extended the range of participants in financial activities, and helped financial disintermediation go further.

4) Business Model

Unlike traditional financial institutions majorly serve high-end clients, Internet finance focus on the Long Tail market[6], and earning micro service fee from huge amount of small business and individuals, and finally generate sustainably enormous revenue.

Chinese Internet finance companies were majorly developed from three ways:

1) One type of Internet finance firms was found by Internet companies, which have large customer base, sufficient information pool and technology advantages. In order to compete in the staggering-growth Internet industry, they need to consider every aspects of users' need, including financial demand. The best representatives are Alibaba Group and Tencent. The former is the

[6] The theory of the Long Tail is that our culture and economy is increasingly shifting away from a focus on a relatively small number of "hits" (mainstream products and markets) at the head of the demand curve and toward a huge number of niches in the tail. (Chris Anderson, 2006)

parent company of the largest Chinese online shopping website – Taobao, while the latter operates the dominant chatting application in China – Wechat. For Alibaba Group, it controls massive financial data about users, such as bank account information, income and consumption level, and revenue of sellers; as well as behavioral information, e.g. consumer behavior online. Alibaba can easily find out financial needs of buyers and sellers, and provide fund to them. By contrast, with information advantage in social networks of users, Tencent provides payment service to let users transfer money between friends and families.

2) Another kind of Internet finance companies is third-party financing platform, including P2P lending and crowdfunding platforms. They neither have support from real business, nor offer financial products by themselves. This type of Internet finance companies plays a role as online financial intermediation, using Internet based technology to help direct transactions.
3) The third kind of Internet finance company came from the cooperation between traditional financial institutions and third party financing. For example, Lufax, as a member of PINGAN Insurance (Group), is an online investing and financing platform that guaranteed by Guarantee Company under PINGAN GROUP. Those companies have enjoyed the benefit of Internet; at the same time, they have received support from traditional financial institutions. Based on that, they won a place in Internet finance industry.

5. Major forms of Internet Finance in China

There were four major forms of Internet Finance in China, including third-party payment, P2P lending, crowdfunding, and E-commerce microfinance. We do not include virtual currency[7] into Internet finance in our analysis, because "virtual currencies do not fit the economic or legal definition of money or currency" according to European Central Bank's report in February 2015. Besides, People's Bank of China, which is the central bank, has required banks and payment institutions to close all

[7] In 2012, the European Central Bank defined virtual currency as "a type of unregulated, digital money, which is issued and usually controlled by its developers, and used and accepted among the members of a specific virtual community".

accounts opened by the operators of Bitcoin trading websites by April 15th 2014, making it no longer possible to be a form of finance. In the following parts we would introduce these four forms of Internet finance in China briefly. Third-party payment would be our focus, because it was highly linked to our event study.

5.1 Third-party Payment

5.1.1 Introduction

"Nonbank or third-party payment processors (processors) are bank customers that provide payment-processing services to merchants and other business entities. Traditionally, processors contracted primarily with retailers that had physical locations in order to process the retailers' transactions. These merchant transactions primarily included credit card payments but also covered automated clearing house (ACH) transactions, remotely created checks (RCC), and debit and prepaid cards transactions. With the expansion of the Internet, retail borders have been eliminated. Processors now provide services to a variety of merchant accounts, including conventional retail and Internet-based establishments, prepaid travel, telemarketers, and Internet gaming enterprises." (Federal Financial Institutions Examination Council, 2014)

5.1.2 Development in the World

Third-party payment is an online payment system originated from customer-to-customer (C2C) model. To solve the weakest link in eBay's bulletproof - payment, eBay created their own online payment system and planned to buy a small company named Billpoint in 1999. Almost at the same time, another similar company called PayPal was founded in 1998, changing the online payment history in the world.

In a simple transaction, customers can open PayPal accounts by giving their credit card or bank information in 5 minutes. But these accounts would not be activated until the customers have validated bank account or have used the credit card. This is usually performed by a small charge made by PayPal to that account (the amount varies). Then the customers need to check the amount and to verify it back to PayPal.

PayPal's services allow users to send or to receive money on websites like eBay, to

buy or to sell goods and services. A PayPal account is not required to use the company's services. Because of its adaptable model and the ease of user registration, PayPal has become the most successful online payment system for C2C transactions. As of 2014, PayPal operated in 203 markets and had 152 million active, registered accounts. PayPal allows customers to send, receive, and hold funds in 26 currencies worldwide.

5.1.3 Third-party Payment in China

5.1.3.1 Development History

The third-party payment in China started at March 1999. Beijing Municipal Government, the People's Bank of China, the Ministry of Information and the National Domestic Commercial Bureau founded the first third-party payment firm in China, Capital E-commerce. Following this, another third-party company, the IPS was founded in Shanghai in 2000. In the march of 2002, approved by State Council and PBOC, Union Pay was established. The third party payment boomed from 2005 with an annual growth rate over 100%. The third-party titan, Alipay was launched by in 2005. In the same year, PayPal entered Chinese market. According to iRearch, the total transaction volume for third party payment is 900 million, 7.5 billion, 163 billion, 580.8 billion, and 2.2 trillion CNY, in 2001, 2004, 2005, 2009 and 2011 respectively. In order to regulate the order of third-party payment market, People's Bank of China issued a document requiring non-financial institutions, including third-party payment, to obtain a "payment business license" before September 1st, 2011. With the legal recognition of Chinese government, the third-party payment started a new chapter.

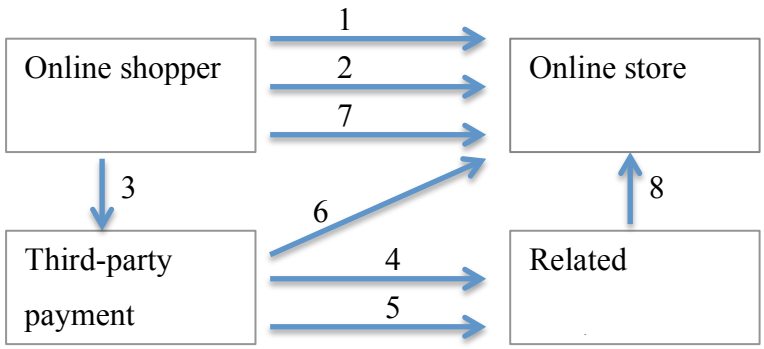
5.1.3.2 Third-party Payment Process

The most widely used third-party payment process in China follows the steps below.

1) Shopper searches the goods they want online.
2) Shopper makes an order on the website.
3) Shopper chooses the platform of third-party payment he/she wants to use and he/she will be transferred to the payment page.
4) Third-party payment platform delivers the payment information to the related bank.

5) The related bank checks the buyer's payment capacity and then freezes or transfers the required amount of money to the third-party payment platform. After that, the bank needs to deliver the transaction result to the third-party payment platform and to the buyer.
6) Third-party payment platform informs the buyer with the transaction result.
7) If payment is accomplished, the seller will provide the service or start to deliver the goods to buyer.
8) The bank processes clearing automatically with merchant through the third-party payment.

Chart 4: Third-party payment process

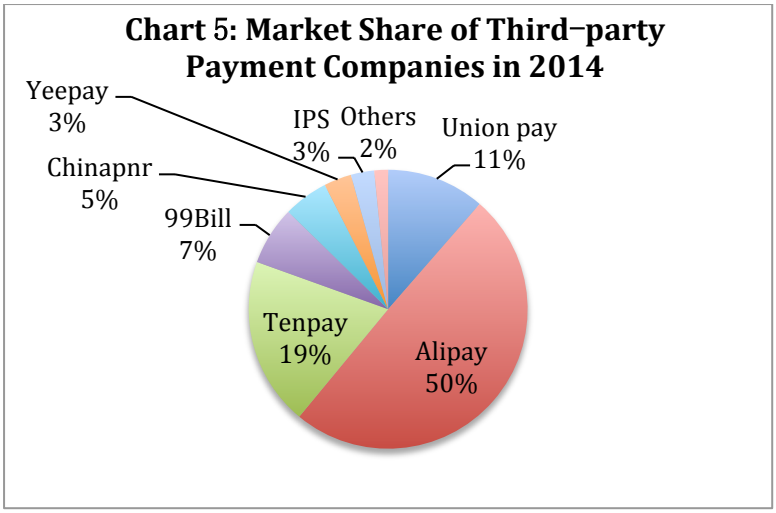


The importance of Internet third-party payment platform:

1) Internet third-party payment platform decreases the commutation and transaction cost.
2) Internet third-payment platform provides series of application interfaces, which integrate all available banks in one page. The platform is responsible for clearing with each bank, which makes online shopping more convenient.
3) Internet third-party payment platform provides credit-guarantee in online shopping, which prevents the online sellers receiving money without goods delivery and decrease online transaction risk. This feature also stimulates the growth of E-commerce.

5.1.3.3 Current Status

Chart 5 illustrates the market share of third-party payment companies in China. According to iResearch report, the total transactions through third-party payment platforms in China has reached 8 trillion CNY, increased 50.3% year on year. Alipay occupied half of the entire market, outperformed all the other competitors.



5.1.3.4 Representative Platforms

- **Alipay** is the lifeblood of Chinese largest E-commerce network – Alibaba and the dominant payment processor in China. Launched in 2004, the service of Alipay pioneered online payments in China, and settled 4.825 trillion CNY ($788 billion) in transactions. It had more than 300 million users (17 million oversea) in the year ended June 30, 2014. Alipay provides an escrow service, in which consumers could verify the goods they have received before releasing money to the seller. This service has mitigated the problems of consumer confidence in online shopping due to China's weak consumer protection laws. Most importantly, it even could be all done via mobile device. Transfer money into your Alipay account, and then you can buy things online and in brick and mortar stores, send money to friends, make cross-border transactions, and invest in stocks, etc. Alipay has operated with more than 65 financial institutions including Visa, Mastercard and Global Blue to provide payment service for Taobao and Tmall, as well as more than 460,000 Chinese businesses. Internationally, more than 300 worldwide merchants have used Alipay to sell directly to consumers in China. It currently supports transactions in 14 major foreign currencies. Furthmore, based on Alipay, Alibaba launched Yu'e Bao, which reshape the banking industry. We would illustrate it in the part of event study. [8]

[8] Data from website: www.alipay.com

- **Tenpay,** an integrated third-party payment platform, launched by Tencent[9] to meet the needs of its online chat tool (QQ) users. Now with the development of Tencent's 1.1 billion QQ users and 400 million Wechat users, Tencent has huge amount of potential user pool and has grown into one of China's leading online payment platform. Tenpay provide airlines, logistics, insurance, games, B2C business and other industries with professional and secure online payment solutions. At the end of 2014, the registered Tenpay users accounts amounted to 400 million.

5.2 P2P Lending

5.2.1 Introduction

P2P lending platforms, as a supplement of traditional financial institutions, match borrowers and lenders directly to satisfy the financing and investing needs of micro business and individuals. It can be regarded as a form of direct financing. Borrowers can divide their financing amount into small portions, and receive funding from a large group of lenders. At the same time, lenders can hold a diversified portfolio of loans to reduce individual risks. Internet based technologies helped P2P lending mitigate information asymmetric problems, and lowered transaction cost. It benefited borrowers by providing reliable and convenient financing with lower cost, as well as lenders by giving them higher return than bank deposit.

P2P lending platforms provide information, evaluation, and other necessary services to facilitate transactions. To be more specific, P2P lending platforms provide services that include, but are not limit to borrowing information releasing, credit checking, investment consulting, recovery of overdue loans, and other value-added services. It profits from service fee, instead of the spread between borrowing and lending rate. Therefore P2P lending platforms should bear neither credit risk, nor liquidity risk.

There are four characteristics of P2P lending:

[9] Tencent Holdings Limited, a Chinese investment holding company, whose subsidiaries provide media, entertainment, Internet and mobile phone value-added services, and operate online advertising services in China. Its offerings include the well-known (in China) instant messenger Tencent QQ and one of the largest web portals in China, QQ.com. Mobile chat service WeChat has helped bolster Tencent's continued expansion into smartphone services.

1) P2P has extremely wide range of users. A large group of people can participate in P2P lending due to the low threshold and flexible methods of borrowing and lending. Borrowers with no collateral or guarantee can get finance if they have good personal credit. While investors who only have a little money, or have strictly maturity requirement, gain investment opportunities through P2P lending.

2) Transactions are flexible and efficient. Loan amounts, interest rate, maturity, and repayment methods etc. can all be customized. Debtors and creditors can be matched according to their unique needs. In addition, the examination process of P2P lending is simplified, shortening the transaction time.

3) P2P lending has high return and high risk. Because the borrowers on P2P lending platforms tend to be the people who cannot get financing from traditional financial institutions, or even be denied by the banks due to poor credit. They do not have collateral or guarantee, and may have special requirements for the loans. Therefore they are willing to pay high interest. Another reason of high risk may be lacking of, or careless offline due diligence process. The credit checking only relies on collecting and analyzing online information may be insufficient.

4) P2P Lending highly relies on the application of Internet based technology. Due to the huge amount of participants in P2P lending, and the complicated lending relationships between individuals, the capacity of data mining, storing, and analyzing is crucial for P2P lending industry's development.

5.2.2 The Development of P2P Lending Industry

P2P lending industry has experienced rapid growth since it was born in 2005. The first P2P lending platform is Zopa, which was found in March 2005 in London. Borrowers submit their borrowing requests on Zopa, then this platform will evaluate and release the borrowers' credit ratings information. When investors see the public information of borrowing requests, such as borrowers' credit information, maturity, and the size of the loans, etc., they can bid for the loans using interest rate. The one who provide fund with lowest interest rate can win the auction. Transactions are made directly between debtors and creditors. Zopa does not participate in the process, but

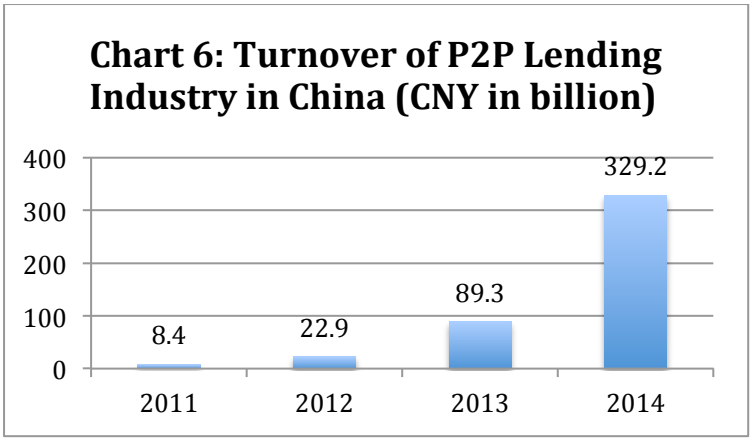
just plays a role as intermediary, charging service fee, which is transparent.

In February 2006, Propser, the first P2P lending website in the US began to operate. And in May 2007, Lending Club was found. Nowadays, they have become the largest two P2P lending platforms in the US. In early stage of the development of P2P lending in the US, there was barely limitation for borrowers, leading to high probability of adverse selection problems and of default. Besides, the liquidity was low at that time due to the long maturity of loans, normally at least 3 years. In 2008, P2P lending companies was required to register their offering as security according to the Security Act of 1993 by U.S. Securities and Exchange Commission (SEC). After registering, Prosper and Lending Club were allowed to sell notes that can be traded on the secondary market to investors.

There has been more and more P2P lending companies and business models appeared in past nine years all over the world, such as Trustbuddy from Sweden, Zidisha from US, RateSetter from UK, and Auxmoney from Germany, etc.

5.2.3 P2P Lending in China

The development of Chinese P2P lending began with the found of CreditEase in 2006, which brought the concept of P2P lending into China. After that, this industry grew at an amazing rate. Chart 6 illustrates the number of active P2P lending platforms in China. According to Report on Internet Finance (Boao Forum for Asia, 2014), at least 238 P2P lending platforms were actively operating at the end of 2013, out of total numbers around 800. Till the end of 2014, the total amount of P2P lending platforms had doubled to reach 1500. According to Chart 6, the turnover of this industry was only around 89.3 billion CNY in 2013, and then jumped to 329.2 billion CNY in 2014, suggesting more than three times growth.



P2P lending companies in China can be divided into majorly four groups based on the investment they received from: venture capitals, government, banks or public companies. In 2014, around 30 companies, such as Renrendai, Hongling Capital, Yooli, and Rong 360, have received financing from Venture Capitals. There were 13 government-backed P2P lending companies existing in 2014, with registered capital ranging from 9.7 million CNY to 100 million CNY. This group of P2P Lending companies had higher average registered capital than other groups of competitors. For bank-supported P2P lending companies, they have advantages in credit checking, and risk management due to the high degree of cooperation with traditional financial institutions. There were 12 bank-supported P2P lending companies in China, among them, Lufax was one of the largest P2P lending platform in China. P2P Lending companies invested by Public listing companies represented a large portion of this industry. At least 40 platforms got funding from public listing companies.[10]

5.3 Crowdfunding

5.3.1 Introduction

"With crowdfunding, an entrepreneur raises external financing from a large audience (the "crowd"), in which each individual provides a very small amount, instead of soliciting a small group of sophisticated investors." (Belleflamme et al., 2014)

There are three parties in crowdfunding: Project initiators, who have ideas but no fund to realize it; supporters, who are interested in the idea or the return of project, and can provide fund to the initiator; and the crowdfunding platforms that connect

[10] Data was obtained from 2014 Annual Report of P2P Lending Industry by Zongls.cn

project initiators and supporters. crowdfunding has many similar characteristics as P2P lending, such as low threshold and high flexibility. But it also focus on creativity of the project, and has a tighter connection between the project initiators and supporters from the beginning of the financing process till the end of the project, even after the completion of project. Unlike P2P lending, or many other forms of financing, in which the main purpose of lenders is to generate return, and the purpose of borrowers is financing, crowdfunding has much more complicated goals for both parties. We will discuss more about this in the characteristic part of crowdfunding.

Currently there are four modes of crowdfunding, which distinct from the returns funder required.

1) Donation-based Crowdfunding: In donation-based crowdfunding, funders do not ask for money return. Activities using this mode of crowdfunding can be non-profit projects for charity, or dreams realizing activities. According to Financial Times's definition, donation-based crowdfunding "enables individuals to directly share their money with causes and projects that they feel strongly about and thereby empower others to create impact."

2) Loan-based Crowdfunding: Loan-based crowdfunding also called P2P lending, in which investors expect financial returns with interest.

3) Reward-based Crowdfunding: The reward-based crowdfunding is the earliest and the most popular form of crowdfunding. Funders provide money to project initiators. If the crowdfunding success, funders can receive products or services in return. The rewards can be products specified at the beginning of the money raising process, or the participation rights of events. Pre-sale of products or service, which makes the funders also be the customers, is one of the most successful ways of reward-based crowdfunding.

4) Equity-based Crowdfunding: The equity-based crowdfunding tends to face strict regulation. Because funders provide money to project initiator in return of certain portion of equity of the project or the business, seeking for future profit of the business. We can regard equity-based crowdfunding as private equity online.

Crowdfunding platforms could be divided into two types, full-service and

vertical. Vertical crowdfunding platform focused on limited areas, for example music, movie, or technology products, etc. By contrast, full-service crowdfunding platforms focused on consummate the transactions. They covered a variety of projects, and attracted a wider rage of both founders and funders.

Unlike other financing methods, to receive fund or return is not the only purpose of users on crowdfunding platforms. When project initiators posed the idea of their projects online, and asked for financing, they could get feedback from the funder. If a project could not receive certain level of funding, this provided some information about the feasibility of the project. Besides, in pre-sale way of crowdfunding, producers could decide the production magnitude according to the amount they sold in financing process. It also made the revenue earlier than the production costs, which lowered the threshold for starting a business. In addition, donation-based and reward-based crowdfunding, help some endangered industries, e.g. craft, came to lives again.

5.3.2 Development of Crowdfunding Industry

According to Crowdfunding Industry Report 2014 by Massolution, global crowdfunding had experienced accelerated growth in 2014, from $6.1 billion USD fund raised in 2013 to $16.2 billion USD in 2014, realizing 167% increased. “In 2015, the industry is set to more than double, on its way to raising $34.4 billion USD.”

The first crowdfunding website in the world, ArtistShare, was founded by Brian Camelio in 2001. ArtistShare introduces itself as “a platform that connects creative artists with fans in order to share the creative process and fund the creation of new artistic works.” ArtistShare provided a demonstration for crowdfunding industry, and influenced most subsequent crowdfunding platforms deeply.

Since 2005, many crowdfunding platforms have sprung up, such as Sellaband, SliceThePie, IndieGoGo, and Kickstarter, etc., found in 2006, 2007, 2008, 2009, respectively. Kickstarter, found in April 2009 in the US, is the largest crowdfunding platform in the world. A project that is raised on Kickstarter should have a deadline and lowest financing goals. If the project does not get enough finance to reach the goal before deadline, money that already rose will be refund. Kickstarter does not own the projects that facilitated on the platform, but just charges service fee. Projects on Kickstarter are classified into 15 categories, including Arts, Comics, Crafts, Dance,

Design, Fashion, Film & Video, Food, Games, Journalism, Music, Photography, Publishing, Technology and Theater.

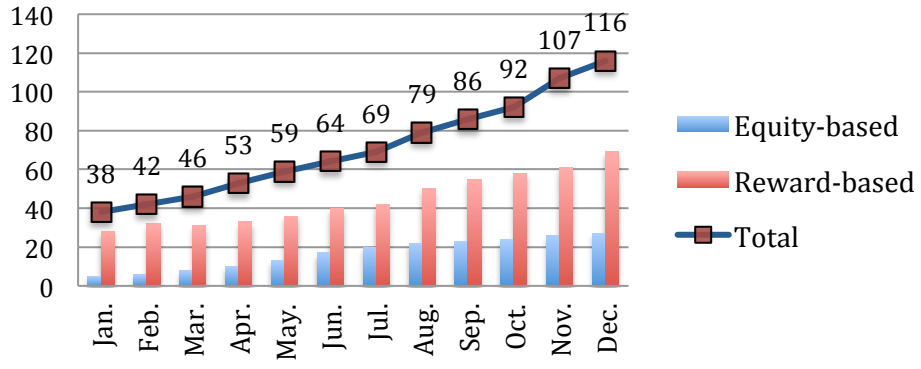
UK has sounder regulations for crowdfunding industry, and provides a good development environment. The largest crowdfunding platform in the UK is Crowdcube, which was found in January 2011. It was "selected as the largest partner for the London Co-Investment Fund (LCIF), a Government backed initiative designed to address the funding gap in London." This suggested that crowdfunding industry was supported by the UK government, and grew in a healthy way.

5.3.3 Crowdfunding in China

The first crowdfunding platform Demohour was found in June 2011, it was a reward-based crowdfunding platform. Following Demohour, more and more companies have joined this industry. Till the end of 2013, there had been around 16 crowdfunding companies in China.

The boom of Chinese crowdfunding industry was in 2014. According to statistics provided by Rong360, reward-based and equity-based crowdfunding platforms had dominated this industry excluding the loan-based crowdfunding (P2P Lending). Chart 7 shows the development of crowdfunding platforms in 2014.

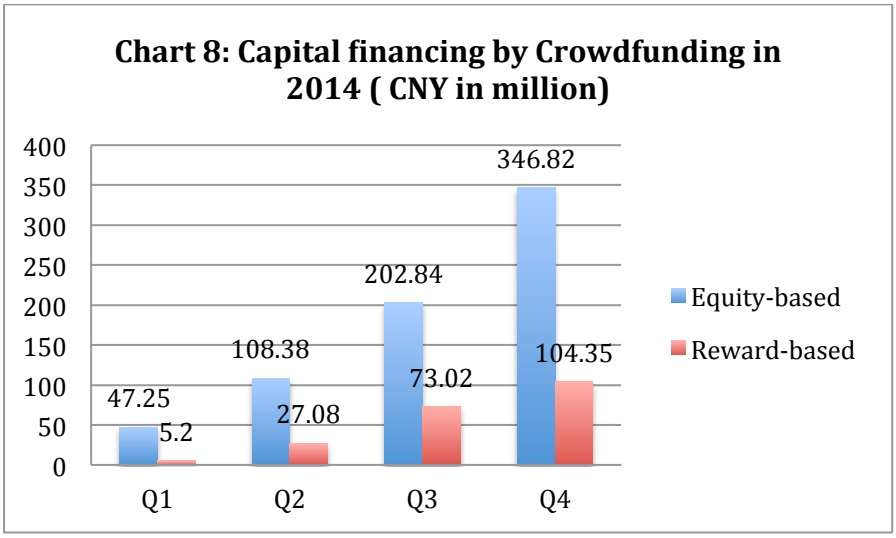
Chart 7: Chinese Crowdfunding Platforms Existing in 2014 (Exclude Loan-based Crowdfunding)



The number of reward-based crowdfunding platforms was around 1.5 times more than that of equity-based crowdfunding platforms in 2014. The amount of equity-based crowdfunding platforms had increased significantly, from 5 in January to 27 in December. The amount of reward-based crowdfunding platforms also grew to reach

69 at the end of the year, whereas it was only 28 at the beginning.

The size of crowdfunding market in China also jumped substantially in 2014. We could see from Chart 8 that the capital financing by equity-based crowdfunding platforms had rocketed from 47.25 million CNY in Q1 to 346.82 million CNY in Q4 of 2014, realizing more than 600% growth in the year. In terms of financing amount, equity-based crowdfunding surpassed reward-based crowdfunding.[11]



The outstanding crowdfunding platforms in China included Taobao Crowdfunding, JD Crowdfunding, Dreamore and Zhongchou.cn etc., when Taobao Crowdfunding and JD Crowdfunding are controled by Chinese E-commerce giants.

5.4 E-commerce Microfinance

5.4.1 Introduction

Microfinance often refers to the financial services that provided to low-income individuals or groups, who cannot get financing elsewhere, to help them become self-sufficient. E-commerce microfinance is microloans provided by E-commerce companies to their platform users, taking the advantages in online credit checking.

E-commerce Microfinance provided microloans to both sellers and buyers on the platforms. The one provided to sellers also could be regarded as the supply chains

[11] Data was obtained from The Report of Chinese Crowdfunding Industry in 2014 provided by Rong360.

microfinance based on Internet. Based on information that collected from their own E-commerce ecosystem, for example, the Alibaba alliance including Alibaba, Taobao, Tmall and Alipay, etc., E-commerce microfinance companies could build models and perform quantitative and qualitative analysis to rate users' credit, and provided loans based on the credit. Those E-commerce companies could easily access to users information that included, but was not limit to business register information, historical transactions, users' interactions, import and export information, payment of utility fee and consumption behaviors, etc. Besides, for relatively large size micro loans, E-commerce companies could also ask other institutions to help perform offline credit checking. After the money was lent, E-commerce Microfinance companies would monitor the usage of the fund through third-party payment platforms. They could immediately terminate the lending and block the funds in borrowers' third-party payment accounts if misusage of fund was detected.

Due to the application of Internet based technology, most E-commerce microfinance could be entirely performed online, from application of the loan to money granting. Therefore the financing became extremely efficient. For instant, Ant Credit, the online microloans service that offered by Ant Financial - Alibaba's financial arm, could provide a microloan within 3 minutes in shortest, and 7 days in longest.

5.4.2 Development of E-commerce Microfinance

Few pioneers have been found in E-commerce Microfinance industry, as it was newly born in recent years. Kabbage, found in 2009, it is not a E-commerce company itself, but provides micro loans to small business that sell online, majorly via eBay, Amazon, Yahoo, Shopify or Etsy. Since Kabbage has found, it has served over 100,000 small business owners, and provided fund over 550 million USD.[12]

In 2012, Sebastian Diemer and Alexander Graubner-Müller found the Kreditech Group. Kreditech is an online micro finance company using "big data, complex algorithms and automated workflows" to do credit checking automatically, and to fund small business and individuals worldwide. In 2014, it lent out 70.5 million USD,

[12] Data was obtained from Kabbage's company website.

grew significantly from 11.3 million USD in 2013.[13]

5.4.3 E-commerce Microfinance in China

The highly developed E-commerce industry in China has laid a solid foundation for E-commerce Microfinance. Alibaba was the first E-commerce company to be granted the license of micro lending in 2010. Ant Credit, originally called Alifinance, had already provided over 200 billion CNY loans to more than 800,000 small businesses until June 2014. Following Alibaba, Suning and JD, competitors of Alibaba in online shopping platform industry, also joined the microfinance market in December 2012 and September 2013 respectively. Besides, Baidu, the largest search engine in China, also founded a microfinance company in 2013.

A large portion of E-commerce Microfinance service was supply chain microfinance based on Internet. Take Ant Credit as an example, the micro loans offered by Ant Credit could be divided into two groups, loans provided to users on Business-to-Customers (B2C) platforms and Business-to-Business (B2B) platforms. For B2C users, sellers could borrow money based on the revenue of products, which were already in the delivering process to buyers, but not yet be confirmed received. At that stage, the revenue was neither owned by the buyer, nor received by seller, but kept by third-party payment platforms. This is a kind of loans based on account receivables. The maximum amount of this kind of loans is 1 million CNY, with 30 days maturity and 0.05% daily interest rate. Another kind of loans is based on credit, which does not have collateral or guarantee requirement. For B2C users, the maximum amount is 1 million CNY, with 6 months maturity and 0.06% daily interest rate; while for B2B users, the size of credit-based loans ranges from 50,000 CNY to 1 million CNY, with 12 months maturity and daily interest rate between 0.05% and 0.06%. Ant Credit claimed that, till March 2014, it had already provided more than 190 billion CNY to over 700,000 small businesses.

5.5 Summary

Table 2 summaries major forms of Internet Finance in China, and provides information about representative products and service of each form.

[13] Data was obtained from Kresitech's company website.

Table 2: Forms of Internet Finance active in China		
Forms	**Characteristics**	**Representative Products and Services**
Third-party payment	Independent from shops and banks, provide payment services to customers	Alipay, Tenpay, Unionpay
P2P Lending	Investors meet and lend directly to borrowers through online platform	Lufax, Hongling Capital, Renrendai
Crowdfunding	Individual founders request small amount of money each from a large group of people to finance projects	Taobao Crowdfunding, JD Crowdfunding, Dreamore, Zhongchou.cn
E-commerce Microfinance	E-commerce companies provide micro loans to their users based on credit information gather through online activities, such as transactions, cash flows, and logistics, etc.	Ant Credit, JD Micro Credit

After we analyzed the four major forms of Internet finance in China, we can easily realize that E-commerce companies had already become major players in Internet finance industry. Alibaba group has already occupied a large portion of third-party payment, crowdfunding, and microfinance markets, so does JD. An online ecosystem, which covers every aspect of people's lives, tends to be the trend of future development in China. Although traditional financial institutions were one-step behind those E-commerce giants, they still maintained accumulative advantages in financial industry.

6. Event study

We found that E-commerce giants played crucial part in Internet finance. To study the effect of Internet finance on Chinese banks, we would like to conduct an event study about Yu'e Bao. The reason for taking the Yu'e Bao as the representative of the Internet finance in China is that there was no any other similar Internet financial product that has such influential ability as Yu'e Bao, or the comparable customer base. We also found that after Yu'e Bao launch, other forms of Internet finance (e.g. P2P lending and crowdfunding) had experienced substantial growth in China. We expected that stock investors could realize the influence of Yu'e Bao on Chinese banking industry, and react correspondingly.

6.1 Yu'e Bao

Yu'e Bao, also means "leftover treasure", is a money market fund that offers through Chinese E-commerce giant Alibaba. Transfering money into Yu'e Bao means invest in Zeng Li Bao, a money market fund managed by Tianhong Asset Management Co. Investors can easily transfer any amount of money into, or out from Yu'e Bao at anytime, without transaction fee, through simple operation online or on mobile phone. When Chinese banks offer around 0.35% annual interest rate to current deposit, and around 3.3% for 1-year time deposit, Yu'e Bao have average 4.78% 7-day annualized rate to the investors since it launched till end of April 2015, with highest rate 6.763%. This makes Yu'e Bao an attractive option for individuals who have no idea about investment, and only deposit money in banks. At the end of 2014, approximately 185 million people, 13.5% of Chinese population, invested in Yu'e Bao, with average holding 3133.47 CNY. Around 711.7 billion CNY was invested in Yu'e Bao at the end of March 2015, making it the second largest money market fund in the world. [14]

Several factors have contributed to Yu'e Bao's success. The connection with Alipay is a crucial reason of Yu'e Bao's popularity. Without Alibaba, hardly a money market fund could achieve this huge success. By less than five clicks, individuals can transfer the residual of their online shopping money into an interest generator, which provides higher return than 1-year time deposit in banks. There is no minimum investment requirement for Yu'e Bao, indicating that low-income population can also benefit from it. Besides, the first return of Yu'e Bao is realized within four business days, then compounds daily. This means that investors can watch their wealth grows day by day, leading to high consumer loyalty. In addition, the freedom of transfer money in and out, using money in Yu'e Bao to shop directly, makes Yu'e Bao extremely attractive for Alipay user. Neither other money market funds, nor commercial banks have these advantages.

6.2 The Event

After several days' secretly appeared on the webpage of Alipay, at 7:00pm GMT+8 June 17th 2013, the launch of Yu'e Bao was reported by CCTV News, the most influential Chinese national news. Within one month, the user of Yu'e Bao had

[14] Data was obtained from Tianhong Asset Management Co.'s website.

jumped to 4 million, and money invested in it had exceeded 10 billion CNY, shocking not only Chinese financial industry, but also the rest of the world. Since that, Internet Finance has become familiar to most Chinese people, and has raised hot debates in the society. We defined the first business day after CCTV News reported the launch of Yu'e Bao as the event day, which was June 18th 2013.

6.3 Data

Considering the Chinese stock market performed irrationally in the past years[15], adjusted closed stock price in Hong Kong Stock Exchange (HKSE) was used in our analysis. We took eight national banks, out of nine Chinese banks that were listing during our analyzed period, from December 31st 2012 to July 19th 2013, to calculate the stock return. Table 3 summarized the banks that we included in our study. Besides, prices of Hang Seng Indexes (^HSI) were obtained to calculate the market returns. In addition, we use the rate of 10-year Hong Kong Government Bond as risk free rate. Stock prices were obtained from Yahoo Finance (HK), when risk free rate was from Hong Kong Monetary Authority.

Table 3: Chinese National Banks in HKSE	
China Min Sheng Bank (CMBC)	Industrial and Commercial Bank of China (ICBC)
China CITIC bank (CITIC)	Bank of China (BOC)
China Construction Bank (CCB)	Agricultural Bank of China (ABC)
China Merchants Bank (CMB)	Bank of Communications (BOCOM)

6.4 Methodology

We calculated Abnormal Returns (ARs) and Cumulative Abnormal Returns (CARs) of the banks' stocks after the event, and tested the significance of these values to see whether the launch of Yu'e Bao influenced Chinese Banking Industry.

6.4.1 Estimation Window and Event Window

Estimation window included returns from Jan 2nd 2013 to June 17th 2013; when five different lengths of event windows were tested in our study, with the longest event window included data from June 18th to July 19th 2013. During the event period,

[15] Gabriel Wildau, Josh Noble, 2015, China investors: Stock market fever, Financial Times, April 10.

Chinese banking industry had faced money shortage problems and there was no other event would influence the whole industry. Therefore we believed that the abnormal returns the industry would be mainly driven by the launched of Yu'e Bao. Table 4 illustrates the length and data that included in the estimation window and event window. To simplify the problem, all the lengths or time used in the formulas in the following sections were calculated by the available data.

Table 4: Estimation Window and Event Windows (EWs)						
	Estimation Window [-111, -1]	**EW1** [0, 3]	**EW2** [0, 8]	**EW3** [0, 12]	**EW4** [0, 17]	**EW5** [0, 22]
Calendar Date	1/2 - 6/17	6/18-6/21	6/18-6/28	6/18-7/5	6/18-7/12	6/18-7/19
Number of Available Data	111	4	9	13	18	23

6.4.2 Formulas

Let $L_1 = T_1 - T_0 + 1$ be the estimation window length with T_0 as the 'earliest' day of the estimation window (which is Jan 2nd, 2013 in our case), and T_1 as the 'latest day' of the estimation window relative to the event day (which is June 17th 2013 in our case). Let $L_2 = T_2 - T_1$ be the event window length with T_2 as the 'latest day' of the event window relative to the event day. Define N as the sample size.

We used Capital Asset Pricing Model (CAPM) in our regression for abnormal return.

$$R_{\mathrm{i,t}} - r_{f_t} = \beta_i (R_{M_t} - r_{f_t})$$

The abnormal return (ARs) is the residual of the model in event window.

$$AR_{i,t} = R_{\mathrm{i,t}} - r_{f_t} - \beta_i (R_{M_t} - r_{f_t})$$

Cumulative abnormal returns (CARs)

$$CAR_i = \sum_{t=T_1+1}^{T_2} AR_{i,t}$$

S_{AR_i} represents the standard deviation as produced by the regression analysis over the estimation window according to the following formula.

$$S_{AR_i}^2 = \frac{1}{M_i - 2} \sum_{t=T_0}^{T_1} (AR_{i,t})^2$$

M_i refers to the number of non-missing returns. The standard deviation corresponds to the CAPM model.

Standardized cross-sectional method is robust to the variance induced by the event. Test statistics on day t.

Second, we provide t statistics of the cumulative abnormal returns for each firm. The t statistic und the Null $H_0: CAR_i = 0$

$$t_{CAR_i} = \frac{CAR_{i,t}}{S_{CAR}}$$

where

$$S_{CAR}^2 = L_2 S_{AR_i}^2$$

$$CAAR = \frac{1}{N} \sum_{i=1}^{N} CAR_i$$

Generalized Rank T Test (GRANK T)

In following steps we assume for sake of simplicity that there are no missing values is estimation and event window for each firm. In order to robust event-induced volatility, to auto correlate abnormal returns and to against a certain degree of cross-correlation due to event day clustering we would like to do the nonparametric generalized rank (GRANK) T test (Kolari and Pynnönen, 2011). In order to account for possible event-induced volatility, the GRANK test squeezes the whole event window into one observation, the so-called 'cumulative event day'. First, define the standardized cumulative abnormal returns of firm i in the event window

$$SCAR_i = \frac{CAR_i}{S_{CAR_i}}$$

where S_{CAR_i} is the standard deviation of the prediction errors in the cumulative abnormal returns of firm i, namely

$$S^2_{CAR_i} = S^2_{AR_i}\left(L + \frac{L_2}{L_1} + \frac{\sum_{t=T_1+1}^{T_2}(R_{a,t} - \overline{R}_a)^2}{\sum_{t=T_0}^{T_1}(R_{a,t} - \overline{R}_a)^2}\right)$$

$R_{a,t}$ is the normal return based on our regression model

The standardized CAR value $SCAR_i$ has an expectation of zero and approximately unit variance. To account for event-induced volatility S_{CAR_i} is re-standardized by the cross-sectional standard deviation

$$SCAR^*_i = \frac{SCAR_i}{S_{SCAR}}$$

where

$S^2_{SCAR} = \frac{1}{N-1}\sum_{i=1}^{N}(SCAR_i - \overline{SCAR})$ and $\overline{SCAR} = \frac{1}{N}\sum_{i=1}^{N}(SCAR_i)$

By construction $SCAR^*_i$ has again an expectation of zero with unit variance. Now, let's define the generalized standardized abnormal returns (GSAR):

$$GSCAR_{i,t} = \begin{cases} SCAR^*_i & \text{for t in event window} \\ SCAR_i & \text{for t in estimation window} \end{cases}$$

The CAR window is also considered as one time point, the other time points are considered GSAR is equal to the standardized abnormal returns. Define on this $L_1 + 1$ points the standardized ranks:

$$K_{i,t} = \frac{\text{rank}(GSCAR_{i,t})}{L_1 + 2} - 0.5$$

Then the generalized rank t-statistic for testing $H_0: CAAR = 0$ is defined as:

$$t_{grank} = Z\left(\frac{L_1 - 1}{L_1 - Z^2}\right)^{1/2}$$

with

$$Z = \frac{\overline{K_0}}{S_{\overline{K}}}$$

When t=0 indicates the cumulative event day, and

$$S_{\overline{K}}^2 = \frac{1}{L_1}\sum_{t \in CW}\frac{N_t}{N}\overline{K}^2$$

with CW representing the combined window consisting of estimation window and the cumulative event day, and

$$\overline{K_t} = \frac{1}{N_t}\sum_{i=1}^{N_t} K_{i,t}$$

t_{grank} is $t-$ distrubution with L_1-1 degree of freedom

6.5 Results

Table 5 shows the regression results of CAPM Model, the extremely high R^2 indicated that CAPM was a perfect model to estimate Chinese Banks' normal returns in HKSE. The correlation coefficients were very close to 1, which meant investors in HK believed that Chinese Banks' stock prices moved closely in line with the market, bearing almost no individual risks but only systematic risk.

Table 5: Regression Results of CAPM Model

	CMBC	**CITIC**	**ICBC**	**CCB**	**BOCOM**	**ABC**	**CMB**	**BOC**
$\boldsymbol{\beta_i}$	1.00029 ***	1.00098 ***	1.0002 ***	1.0001 ***	1.00004**	1.0005 ***	1.0010 ***	0.9998 ***
S.E. of $\boldsymbol{\beta_i}$	0.0018	0.0011	0.001	0.001	0.0007	0.001	0.0008	0.0006
$\boldsymbol{R^2}$	99.965 %	99.986 %	99.997 %	99.997 %	99.995%	99.994 %	99.992 %	99.996 %
Notes: *** means the number is statistically significant at 0.01 level								

Table 6 summaries the CARs value when we using different lengths of event window. The t_{grank} of 1-week event window is 1.855, which means the CAAR is statistically significant when α=0.1. A significant CAAR demonstrates that the launch of Yu'e Bao had positive effect on Chinese banking industry, increasing banks' stock return of 2.83% in the first week. For individual banks, only ICBC, BOCOM, ABC and CMB had significant effects in some lengths of event window. To be more specific, ICBC, BOCOM and CMB had significant CARs using 2-weeks event window, when ICBC and BOCOM showed significant CARs if the event length increase to 3 weeks. Besides, ICBC had significantly negative CARs, when other banks had most likely positive CARs.

Table 6: Cumulative Abnormal Returns (CARs)

Date	CMBC	CITIC	ICBC	CCB	BOCOM	ABC	CMB	BOC	CAAR
EW1	3.90%	4.14%	1.26%	0.85%	1.29%	5.61%***	3.17%	2.44%	2.83%*
EW2	9.59%	1.71%	-5.29%**	1.08%	6.50%**	1.78%	7.93%**	-1.62%	2.71%
EW3	9.97%	3.54%	-6.03%**	2.17%	6.16%**	3.21%	3.58%	1.05%	2.96%
EW4	6.47%	5.04%	-3.96%	2.52%	5.67%	2.46%	3.92%	2.80%	3.12%
EW5	8.05%	1.63%	-2.42%	2.19%	7.84%*	3.02%	1.48%	4.69%	3.31%

Notes: *** means the number is statistically significant at 0.01 level
** means the number is statistically significant at 0.05 level
*means the number is statistically significant at 0.1 level

Development on seizing the money from bank deposits to their account, Yu'e Bao and other similar money market fund increased the banks' cost of funding, which certainly cut into the banks' interest income in short term. However, the positive average CAR for eight banks suggested that the stock investors have confidence in banks after Yu'e Bao launched.

Alibaba's Yuebao gave Chinese banks a rude awakening. Traditional banks now are facing the real competition from sophisticated investment platforms that are operated by some of China's most competitive private companies. It is clear that Yu'e Bao is fighting an asymmetric war with Chinese banking giants, by undermining Chinese banks' biggest comparative advantage - their low cost of funding. Facing this big challenge and the trend of interest-rate liberalization, banks should adjust strategy

for more efficient way to grow.

In addition, as we introduced before, more people were brought into the financial market, especially the poor people with lower education and income level. They took largest part in the whole Internet users as well. Having the 649 million of potential users(total Chinese Internet users in China), 47.9% of whole population in China, Yu'e Bao roused the consciousness of finance for half Chinese people. With the broadened range of customer base, the financial market would step into a new era.

Furthermore, the trend of Internet finance, by creating a platform for banks compete with each other equally, is restructuring the banking system. As a result, small sized banks may outperform the large central state-owned banking giant. This healthy competition would benefit the banking industry in the long run.

7. Impacts of Internet finance on banks in China

The advent of Internet finance brought new channel for private capital investment and broadened the range of customers in financial industry. Meanwhile, this type of more convenient, more accessible, and cheaper financial innovation has far-reaching impact on traditional finance section.

The Internet finance accelerated the process of disintermediation in China. According to the 2014 financial reports disclosed by six Chinese national banks[16], the growth rate of net income declined in different degrees. Meanwhile, assets qualities in banks were general under pressure. As a result profitability of banks can hardly be optimistic. On the basis of statistics from China Banking Regulatory Commission, the net profit of Chinese merchants banks in 2014 was 1.55 trillion CNY, increased 9.65% year by year. However, in the previous 2008-2013, growth rate of net profit was in double-digit, which meant that China's banking sector declined. [17]

We would analyze the influences of Internet finance on traditional finance sector from three aspects: assets, liabilities and payment.

[16] Six banks were: Minsheng Bank, Shanghai Pudong Development bank, Xingye Bank, Citic Bank, Ningbo Bank, Chian Merchants Bank.
[17] Data from Shanghai Stock Exchange official website.

7.1 Liabilities

According to data from People's Bank of China, deposit increased in 4.14 trillion CNY, which was 3.08 less compared the increased amount in 2013. Among the total increased amount, residents' deposits increased 4.14 trillion CNY, 1.35 trillion CNY less than the growth in 2013. For some months in 2014, residents' deposits were even in negative growth. Public deposits and financial products are the main types of liabilities in traditional financial sectors. Their main competitors are Yu'e Bao and other Internet financial products, which we introduced before. While, most of the Internet financial product invested on the money market fund, which has grown rapidly since 2013, from less than 300 billion CNY in 2011 to 750 billion 2013 in total size. According to the latest report, the size of money market fund in China was over 2 trillion CNY by the end of 2014.

China is still in the process of financial reform. The misallocation of financial resources pushed financial customers to seek out more ways for personal wealth management. Born with the nature of flexibility, Yu'e Bao outperformed banks in terms of much higher yield. The average 7-day annualized rate is 4.78% to the investors since it launched till May 4th 2015, while the Chinese banks offer around 0.35% annual interest rate to current deposit, and around 3.3% for 1-year time deposit. Moreover, Yu'E Bao offers depositors the convenience of instant withdrawals. As to the risk, according to the 2014 financial report, Yu'e Bao's investment portfolio was consist of 7.97% fix-income investment, 7.11% buying back the financial asset, 84.69% bank deposit reservation for balance, 0.23% others, which maintained low risk. These convenient-lite Internet financial products evoked the people's sense of finance and satisfied the tremendous need for personal finance. [18]

Deposit and lending rates are heavily regulated in China and banks are able to earn a fixed and lucrative return from the country's vast pool of money. Though the central bank is liberalizing interest rate policy, banks are still expected to enjoy this favorable policy for the foreseeable future. The advent of Yu'e Bao and other similar products accelerated the process of interest rate market-base reform, decreased the interest spread, changed the saving structure and essentially undermined Chinese banks' biggest comparative advantage - their low cost of funding. UBS found that if

[18] Data was obtained from 2014 Annual Report of Yu'e Bao.

10% of deposit was replace by money market fund, the interest spread in banks would decrease 10 basis points. To deal with this challenge, banks launched several similar financial products and increased the yield for the existing products. Under this fierce competition, the change of liability structure in banks led to the rise of funding cost, even through the liability amount did not change in and off the book.

7.2 Assets

The loan services in Ant Credit and other P2P financial institutions restructured the credit market. Since the target customer for Internet loan customers were small sized enterprises and start-ups in retail industry, which were treated as customers with high risk and cost by banks, the effects of Internet loan services were quite limited on banks. However, in the long run, the Internet finance might cover the clients for bank loan service.

7.3 Payment

The third party payment platforms and online shops for financial product, mainly affected the non-interest income for banks. Third-party payment influenced the current commission charges allocation. The payment fee for offline payment was 1%-2% of transaction amount. The acquirer, changeover mechanism and card issuer would charge 10%, 20% and 70% of the total commission. When it came to the online payment, there was no changeover mechanism and the commission fee was only from 0.3% to 0.5% of transaction amount, which was much less than online payment. As a result, the growth of online payment reduced the income for card issuer. Meanwhile, the commissions for banks of selling fund product, securities and trust would be decreased. Moreover, during the online payment process, the information of transaction and consumption would be isolated from banks, which would have long-term effect on banks.

Internet finance played as a catfish[19], increasing competition and stimulating the reform in Chinese financial industry. Besides, it brought opportunities to the banking industries by bringing more customers into the financial market. There were 649 million Internet users in China, among which 361 million of them had online

[19] The catfish effect is the effect that a strong competitor has in causing the weak to better themselves.

shopping experience. Furthermore, the main customers of Internet loan were small and medium size businesses, which accounted for 60% of China's economy and about 75% of jobs. China could not have sustainably economic growth without empowering small businesses. To catch up the trend of Internet finance, banks could develop their strategy to attract more customers and to enhance the customer relationship.

Besides, the model of Internet finance would reflect the price preference for the demand and the supply, which is the efficient way for interest rate liberalization. With the development of interest marketization, financial institutions should set benchmark interest from the market instead of relying on the guidance of benchmark interest rate set by PBOC. By taking advantage of the Internet, banks could estimate the interest rate for specific groups by referring to the interest provided by Internet financial companies.

Last but not the least, Internet finance would accelerate the process of disintermediation. In the model of Internet finance, the Internet corporates played as intermediary by providing the transaction platform, in particular providing search engine to find trading object and third-party platform for raising capital, which might replace the similar service in banks.

8. Risk and Potential Problems Faced by Internet Finance Industry in China

Although the rise of Internet Finance has stimulated the development of Chinese financial system and has benefited small business and individuals, this industry also faces many risks and potential problems. We would analyze some major risks that have to be managed, including legal risk, credit risk, technology risk, as well as platform and business model risk.

1) Legal Risk

A major legal risk faced by most Internet finance companies in China is the problem of providing services that exceed the legal business scope. Due to the imperfect regulation about Internet finance, many online financing platforms, such as P2P lending and crowdfunding, have unclear business scope. For example, if an online

financing platform not only plays a role as intermediary, but also collects fund from investors, it will be on suspicion of absorbing public saving. As a large portion of P2P Lending platforms were registered as normal business, they are not under supervision of Chinese financial regulators, and do not have the rights to collect money from individuals, or to issue securities to investors. Besides, when those companies claimed that they would provide guarantee to investors' money, they seemed to violate the financial laws. The legal problems could be more serious if Internet finance industry grows too fast that regulation development failed to follow.

2) Credit Risk

Credit checking is crucial for financing. In Internet finance, the evaluation of credit risk for fund demanders is major through processing online information using Internet based technology. The complicated, non-transparent data process and pricing models, simplified financing procedures, as well as much shorter evaluation and processing time, suggest unexpected credit risk. As an emerging industry, Internet finance needs longer time to prove the reliability of its credit reference system. By cooperating with traditional financial institutions, online platforms can better manage the credit risk of capital demanders, and protect investors on their platforms.

3) Technology Risk

Internet finance reduced the processing time of finance and served larger population at the same time by decreasing the usage of human source in credit checking and financing procedures. The high dependence on Internet and computer technology requires this industry to have serious management of technology risk. Collapse of the computer system, loss of data or being attacked by hackers would cause severe problems to the financial system. In addition, personal-information leakage, computer virus, and identity theft are also the technology risks faced by this industry.

4) Platform and Business Model Risk

As an industry rising rapidly, Internet finance neither has accomplished laws or regulation system to monitor participants, nor has mature business models. The failures, or defaults of P2P lending and crowdfunding platforms happened frequently. Use P2P lending as an example, there were 287 problematic P2P lending platforms in

2014, compare to 75 in 2013.[20] The problems happened could be classified into four groups: failure due to poor management, liquidity problems, companies intended to defraud, and the platforms' responsible persons absconded with money. Thus it is urgent to regulate Internet finance industry and to cover it under supervision of financial regulators.

China has already set a series of regulations about third-party payment, such as Anti-Money Laundering Law of the People's Republic of China, Electronic Signature Law of the People's Republic of China, Administrative Measures for the Payment Services Provided by Non-financial Institutions, and Measures for the Custody of Clients' Reserves of Payment Institutions, etc. For financial products selling online, Interim Administrative Provisions on the Settlement Funds for Securities Investment Fund Sales was set to protect investors. Administrative Measures for P2P Lending Industry was also on its way. Chinese government has attached great importance to Internet finance industry. Therefore we expect that this industry would receive better supervision and would grow healthier in the future.

9. Conclusion and the Future

In this paper, we have studied the development of Internet finance industry in China, and introduced four major forms of Internet finance active in China, including third-party payment, P2P lending, crowdfunding and E-commerce microfinance. We found that E-commerce companies played crucial roles in pushing the development of this industry in China by widening access to financial services. The result of our event study on the launch of Yu'e Bao suggested that the rising of Internet finance has significant positive impact on Chinese banking industry. We think that Internet finance has showed a direction for traditional financial industries to grow in a digital world. Internet finance in China is energetic but immature. How to regulate this industry and to make it grow sustainably is still an unsolved issue, which deserves our attention.

[20] Data was obtained from Tianhong Asset Management Co.'s website.

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11. Appendix

Appendix 1: Daily Abnormal Returns (ARs) in EWs								
DATE	**CMBC**	**CITIC**	**ICBC**	**CCB**	**BOCOM**	**ABC**	**CMB**	**BOC**
13/6/18	0.64%	-0.43%	0.17%	0.52%	-0.01%	-0.08%	-0.46%	0.34%
13/6/19	-1.77%	0.01%	0.29%	1.40%	0.67%	0.25%	-0.15%	0.77%
13/6/20	3.54%	0.10%	0.90%	2.36%	0.03%	-0.02%	0.43%	0.00%
13/6/21	1.50%	0.31%	-1.72%	-1.38%	1.30%	-0.37%	0.11%	-0.23%
13/6/24	6.06%	1.46%	0.78%	-0.12%	0.86%	0.64%	2.19%	0.44%
13/6/25	-2.72%	2.02%	1.96%	0.19%	0.00%	-0.56%	1.11%	-1.08%
13/6/26	-3.79%	-1.81%	-4.24%	-3.91%	-0.71%	-1.92%	-2.23%	-0.81%
13/6/27	2.87%	2.27%	-0.82%	0.85%	1.84%	-0.24%	0.90%	0.54%
13/6/28	3.27%	-0.70%	-0.98%	-0.09%	0.14%	0.39%	1.08%	-0.10%
13/7/2	0.03%	2.51%	2.16%	3.18%	1.52%	0.78%	0.17%	1.88%
13/7/3	1.77%	-0.68%	1.52%	-0.03%	0.60%	1.96%	1.08%	0.47%
13/7/4	0.27%	-0.11%	-0.86%	-0.17%	0.52%	0.80%	-1.22%	0.64%
13/7/5	-1.70%	0.49%	-1.35%	-0.42%	-0.41%	0.12%	-0.72%	-1.00%
13/7/8	-0.33%	0.18%	0.30%	0.74%	0.53%	0.20%	0.29%	0.99%
13/7/9	-0.12%	1.12%	0.43%	0.47%	0.89%	0.37%	0.54%	0.86%
13/7/10	-0.33%	-1.79%	-0.25%	-0.84%	-1.22%	-0.69%	-0.90%	-0.83%
13/7/11	-4.28%	-2.20%	-0.62%	-0.45%	-1.10%	-1.09%	-0.93%	-0.60%
13/7/12	1.54%	0.69%	0.21%	0.51%	0.83%	0.38%	0.52%	0.86%
13/7/15	-0.70%	-1.77%	-0.14%	-0.81%	0.31%	0.35%	0.19%	0.16%
13/7/16	-0.40%	0.37%	0.40%	0.39%	-0.17%	-0.07%	0.11%	0.72%
13/7/17	-2.24%	0.61%	-0.59%	-0.11%	0.87%	0.82%	-0.88%	-0.31%
13/7/18	0.78%	-1.45%	0.02%	-0.69%	-0.34%	-0.23%	-0.66%	-0.08%
13/7/19	4.14%	0.41%	0.03%	0.61%	0.88%	1.25%	0.91%	1.07%