

Lighthouse in the Dark: Search in Marketplace Lending

SHASHA LI *

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ABSTRACT

This paper sheds light on the search frictions of individuals in the Fintech credit market, and examines the impact of public information service centers on marketplace lending outcomes. From 2012, Private lending registration service centers (PLcenters) were gradually launched by local government in Chinese cities. I apply staggered Difference-In-Difference (DID) analysis based on the data from Renrendai, using a measure of China's political cycle as instrument variable. Results show that PLcenters pushes up the Peer-to-Peer loan trading. Remarkably, PLcenters help borrowers get lower interest rates and reduce the dispersion of interest rates. The effect is mainly driven by the inexperienced. The findings imply that PLcenters reduce search costs, and this work points to a potentially important role of informational public goods in Fintech credit.

JEL classification: G14, G23, G28, O16, D83

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I. Introduction

Financial intermediaries such as banks has been a institutional solution for asymmetric information problem in the credit market in reducing the transaction costs. But the recent fast growing Fintech (FSB, 2019)¹ disintermediate the financial services. Fintech, the technology enabled financial service, improves access to credit for under-served segments (Xiang et al., 2017; Claessens et al., 2018). Less experienced individuals are able to enter the market as far as they get connected to internet. There are tons of marketplace lending platforms available online such as Lending Club in the US and Funding Circle in the UK. For marketplace lending, the loan request is as easy as filling the form, submitting the materials, and clicking the mouse. But similar with the online shopping market (Ellison and Ellison, 2009; Lynch Jr and Ariely, 2000), though the internet brings explosive information and convenience, the search friction still exists and it deviates the market from efficiency. The borrowers, as the retail buyers, do not know all types of contracts in the market. They search for information at a cost, either pecuniary or non-pecuniary.

If the search cost is too high due to the lack of financial knowledge or IT skills (e.g. the use of web-based applications, computers, etc.), individuals will not enter the market or even if they enter the lending happens at sub-optimal interest rates (Salop and Stiglitz, 1977). Chang and Hanna (1992) suggest that consumer education programmes providing basic financial knowledge is needed for the less experienced group to help them get better outcomes in the complicated consumer credit market, and many studies also highlight the importance of financial literacy in the Fintech era (e.g. Elsinger et al., 2018; Panos and Wilson, 2020; Jünger and Mietzner, 2020). Yet, it remains unclear who can help the individuals understand the market better? and how?

¹According to the Financial Stability Board (FSB)’s definition, the Fintech credit, all credit activity facilitated by electronic platforms that intermediate borrowers and lenders, falls into a category of the non-bank sector. It is one of the fastest-growing segments in non-bank, and has swelled from about \$11 billion in 2013 to \$284 billion by the end of 2016 (Claessens et al., 2018). China is the largest Fintech credit market.

It's hard for private firms to educate their customers due to free-riding problem. The potential customers who gain training from a private Fintech company can easily switch to products of other Fintech companies. Dissemination of financial knowledge and market information bears the characteristics of a public good in Fintech credit market.

"A 'rational economic planner' could economize on information costs by eliminating the price dispersion; for with no price dispersion, there is no need for costly search..." (Salop and Stiglitz, 1977).

This paper puts forward a "rational economic planner" kind solution to reduce the dead-weight cost caused by high search cost: public information service center as public goods. Using a dataset from China's leading P2P lending platform, Renrendai, with great detail on borrower and loan characteristics, I provide a novel evidence implying public information service center can work effectively in reducing the search costs. The experiment I look at is the staggered introduction of private lending registration service centers (PLcenters) in Chinese cities since 2012.

The PLcenters are essentially founded by local governments, engaged in gathering, processing, and disseminating the local private lending information and financial knowledge. First, the PLcenter is a one-stop-service center for private lending with all needed agencies in one place: P2P lending companies, notary office, law firm, etc. Second, the PLcenter provides local private lending market information and disseminate financial knowledge. For instance, Wenzhou city's PLcenter publish private lending index regularly, hold finance knowledge seminars, and provide contract templates. Overall, PLcenters can be considered as free-charged public information service centers, and provide information services with the characteristics of public goods: non-rivalrous and non-excludable.

To generate empirical predictions on marketplace lending outcomes, I use a conceptual framework of search cost model following Salop and Stiglitz (1977). There's a identical

commodity, money, in the market². The borrowers seek for money and buy it with a interest rate. However, borrowers do not have the complete information about all interest rates and lenders in the market. They have to search for information, and the information-searching incurs a cost. The cost can be a loss of leisure, time, or money. For instance, people who have never used the Renrendai platform, have to spend time searching on internet for instructions and experience shared by others before opening a loan request. Search frictions can lead to two interest rate equilibrium and thus generate interest rate dispersion. PLcenters enter the framework by lowering the search cost of borrowers.

The empirical analysis uses a staggered difference in difference setting. Exploiting the staggered introduction of PLcenters as a natural experiment, I can isolate the contribution of the introduction of a PLcenter on outcomes of online P2P lending market from changes in the conditions of the P2P industry and from macroeconomic trends. The dataset comprises of all listings of P2P loan application, both failed and successful, on Renrendai from 2010 October to 2015 June. One challenge for this staggered DID setting is that perhaps PLcenters are not randomly assigned across Chinese cities. Some unobserved regional demographic or economic characteristics correlated with the setup of PLcenters may drive the results. To address this problem, I use a measure of political attention on private lending issues in new mayor periods, in the same spirit of political cycle instruments (see [Levitt, 1997](#); [Bian et al., 2017](#)). One crucial assumption for this identification strategy to work is that the assignment of new mayor is not because of the local economic condition. Thus the following online P2P lending outcomes are not driven by political-cycle related factors. With empirical evidence, I argue that this is a valid instrument for the treatment dummy, in the sense that it strongly predicts the opening of the city PLcenters, and it is uncorrelated with online P2P lending outcomes before the treatment.

The findings of this paper are consistent with the search explanation. First, with lower

²To have the identical money, I control for loan characteristics (e.g. maturity, amount, loan use) and borrower characteristics (e.g. age, gender, marriage status) when regress interest rate on PLcenters.

search costs due to the PLcenters, both total loan request and lending amount goes up. There are more loan application and active borrowers in the market. Second, the average interest rates of all application sample and successful sample are lower. It indicates both the expected interest rate of borrowers and the market interest rate are lower. Third, PLcenters reduce the dispersion of interest rate, and the effect is mainly driven by the less experienced. If we push it to the extreme, identical money should have the same price (i.e. interest rate) in the market. Deviation from "Law of One Price" is a sign of market inefficiency. Less varied interest rate implies the market moves closer to the efficiency and PLcenters mediate the search friction. Furthermore, I find there's less extremely low interest rate proposals after having access to PLcenters.

To the best of my knowledge, this is the first paper that explores the role of information service with characteristics of public goods in a Fintech credit market. The findings of this paper have implications both for theory and policy. First, it connects the Fintech credit market with search cost framework, which mainly applied in Industrial Organization or Labor Economy, and highlights the similarities between marketplace lending and retail consumer market: individuals with search frictions. Second, it points to a potentially important role of the government in the Fintech credit market, playing the role of lighthouse by providing public information service. The PLcenters help put all market participants in sight by lowering search costs, and thus boost and improve the private lending market outcomes. Moreover, beyond the scope of this paper, private provision of informational public goods is also a possible direction.

Related Literature

This study contributes to several streams of literature. The first stream is the growing literature of non-banks and Fintech (i.g. [Strausz, 2017](#); [Franks et al., 2016](#); [De Roure et al., 2019](#); [Tang, 2019](#); [Berg et al., 2020](#)), especially the ones related to information efficiency. [Franks et al. \(2016\)](#) used the P2B auction data from Funding Circle and find a sizable de-

viation from the market efficiency. [Grennan and Michaely \(2020\)](#) show that Fintech data contains valuable information, so called "crowd wisdom". Moreover, unlike bank lending the Fintech credit market has a lot of retail borrowers and lenders interacting with each other directly. [Liskovich and Shaton \(2017\)](#)'s findings suggest financial innovation enable less experienced households to participate in credit market. Many studies focus on the decisions made by directly participated and less experienced borrowers and lenders. [Zhang and Liu \(2012\)](#) report novel evidence of rational herding behaviour in the P2P lending market. [Hertzberg et al. \(2018\)](#)'s experiment result suggests that online lending borrowers' choice of maturity contains the private information including their future repayment performance. [Berg et al. \(2020\)](#) look at the sophistication of marketplace lenders and find more the sophisticated perform better in screening loans. This paper connects to the literature by looking at P2P lending borrowers' search friction and how the friction changes the interest rate and other market outcomes. I use the data from a Chinese leading platform, "Renrendai", as in [Wu and Zhang \(2020\)](#), [Braggion et al. \(2020\)](#), [Hasan et al. \(2020\)](#), [Braggion et al. \(2018\)](#) and [Liao et al. \(2017\)](#) and many other papers.

Furthermore, this work highlights the similarity between marketplace lending, especially P2P lending, and the retail consumer market: asymmetric information, search frictions, and retail buyers. The second stream of related literature is search friction and price dispersion (see [Stigler, 1961](#); [Salop, 1977](#); [Salop and Stiglitz, 1977](#); [Varian, 1980](#); [Burdett and Judd, 1983](#); [Pereira, 2005](#)), and especially it's application in the financial market(i.g. [Vayanos and Weill, 2008](#); [Beaubrun-Diant and Tripier, 2015](#); [Stango and Zinman, 2016](#); [Brand et al., 2019](#); [Ambokar and Samaee, 2019](#)). The existence of search friction explains why there's price dispersion in a market with identical commodity. [Xu \(2016\)](#) finds persistent interest rate dispersion in the crowdfunding market due to search frictions. [Bhutta et al. \(2020\)](#) document wide mortgage rates dispersion and show that the financial sophistication of borrowers matters for the rates obtained. [Stango and Zinman \(2016\)](#) reports self-reported borrower search is a important factor of cross-individual variation in credit card borrowing costs dis-

persion. This paper contributes to the literature by applying the search cost model ([Salop, 1977](#); [Salop and Stiglitz, 1977](#); [Varian, 1980](#)) in the context of Fintech credit market. The results in this paper that PLcenter reduce the price dispersion by lowering the search cost is consistent with the findings in search friction and price dispersion literature. The findings point to a potentially important role of public goods ([Coase, 1974](#)) in informal financial markets such as the Fintech credit market where the majority are less experienced: providing public information services as public goods to mediate search friction.

The third stream of literature is economic function of public goods ([Maskus and Reichman, 2004](#); [Straub, 2005](#)). [Coase \(1974\)](#) mentioned that the word "lighthouse" appears in economics "because the light is supposed to throw on the question of economic functions of government". The lighthouse is usually unprofitable, but it provides essential public services. Global public goods including policies and infrastructures that have international externality effects are an example ([Maskus and Reichman, 2004](#)). But few paper have studies the role of public goods in the credit market. This paper tries to fill the gap by showing the case of providing market information and financial knowledge as public goods. The public information service provided by PLcenters has the property of public goods: non-rivalrous and non-excludability. When a citizen learns how to write contract from the PLcenter, the contract template is still there for others to learn (non-rivalrous). No one in the city can be excluded from the access to the PLcenter's information service (non-excludability), and it's free of charge. Though the informational public goods discussed in the paper is provided by the government, there's possibly a space for privately providing public goods ([West Jr, 2000](#); [Menezes et al., 2001](#)).

The rest of this paper is organised as follows. Section 2 talks about the institutional background. Section 3 describes data and pre-test. Section 4 displays the conceptual framework of consumer search and generate predictions. Section 5 lays down Difference-in-Difference analysis. And the last section concludes.

II. Institutional Background

A. *Private lending in China*

The private lending market is indispensable China’s rapid economic growth as it is the main financing source of private sector in China (e.g. [Gregory and Tenev, 2001](#); [Tsai, 2002](#); [Allen et al., 2005](#)). China’s private sector generates more than half of its GDP, provides around 80% of jobs and contributes to more than two-thirds of technological innovation ([Guluzade, 2019](#)). However, Chinese private firms have very limited access to banking credit³. Only 1.3% of loans extended by state banks went to private firms ([Li and Hsu, 2009](#)). Meanwhile, a large number of business owners and ordinary households who have spare money are looking for good investment opportunities. Thus, informal lending market has been thriving in China. According to a survey by the People’s Bank of China, the size of Chinese private lending market is estimated at 2.4 trillion (RMB) (around \$357bn) as the end of the first quarter of 2010, equivalent to 35% of China’s GDP in 2010 or around 6% of China’s total lending⁴. The type of lenders in private lending market includes friends, relatives, pawn shops and loan sharks. In 2011, the annual interest rates of private lending ranged from 36% to more than 150%, while China’s then benchmark lending rates were around 6% and the inflation rate was 5.5%.

But private businesses were unlikely to afford such sky-high interest rates for a long time given the economic slowdown in the wake of 2008 global financial crisis. In late 2011, Wenzhou was the first Chinese city facing severe private credit crunch, with many large-scale local private lending networks collapsed, around 100 bosses reported running away from their private debts and 20% of its private businesses ceased operation ([Lu, 2018](#)). Shortly after the outbreak of private lending crisis in Wenzhou, a nation wide private credit crisis started.

³Banks mainly extend credit to collective and state enterprises.

⁴See also [Farrell et al. \(2006\)](#). These statistics omitted observations of illegal lending activities which is obviously difficult to obtain data.

B. Private lending registration service center (PLcenter)

Chinese government noticed this private credit crash and its non-negligible damages to the real economy. In late March 2012 Chinese central government set up a pilot financial reform in Wenzhou aiming at boosting and stabilising the private lending market. As part of the pilot scheme, Wenzhou Private Lending Registration Service Center (PLcenters) was inaugurated on April 26 2012.

PLcenter acts as a public information service center for private lending. Take Wenzhou PLcenters as an example. Local citizens can get market information and financial knowledge, and complete the whole procedure of private lending in one location through visiting PLcenter. The PLcenter itself provides free information services, such as publishing wenzhou private lending index (e.g., prevailing interest rates in the local private lending market), preparing private loan contract template, and disseminating financial knowledge by seminars. In addition, PLcenter offers almost free office spaces to financial intermediaries and consultants such as P2P companies⁵ and small loan companies, notary office, and legal consultancy office.

<insert table 1 here>

Following Wenzhou, 54 other Chinese cities gradually built PLcenters as of 2015 June. The first group of cities includes Guangzhou, Shaoxing and Ningbo, where the private economy is developed. Table 2 shows the opening dates of PLcenters in Chinese cities. The dates are manually collected from the news and government announcements.

<insert table 2 here>

C. Renrendai P2P marketplace lending platform

The recent advances in digital technology brought new private lending modes. For instance, online P2P marketplace lending, one type of the Fintech credit, enables borrowers

⁵e.g., Creditease, Renrendai, Sudaibang, Eloan, Fpimc and Zhedaitong had offices in Wenzhou PLcenters.

and lenders interact directly with each other over the internet. The history of of online P2P lending can be traced back to the launch of UK-based company Zopa in 2005. China is the largest P2P lending market in the world and has experienced the fastest growth of Fintech credit.

Renrendai, founded in 2010, is one of the leading online P2P lending platforms in China. On August 8 2015, Renrendai's trading volume exceeded 10 billion (RMB) (around \$1.47 billion), and the number of users had increased to approximately 2.5 million. Renrendai opens to users ranging in age from 22 to 60 and the amount of funds requested ranging from 3,000 to 500,000 (RMB). Renrendai requires borrowers to provide credit report from the central bank, work certificate, income certificate and resident identity card when apply P2P loans. Borrowers can voluntarily provide other selective materials such as property ownership certificate and marriage certificate to Renrendai for verification as well. The verification status of personal information is indicated on the online P2P loan application page.

Figure 1 shows how demand side and supply side of Renrendai's online users interact with each other.

<insert figure 1 here>

For a borrower to request a loan, first a listing that specifies the contract terms such as amount, interest rate, and maturity should be created. For example, as shown in figure 1, the borrower requested 10,000 (RMB) at annualized interest rate 13.2% with maturity 24 months. While creating the listing, the borrower also can describe the purpose of the loan and provide information on his gender, education background, debt and so on. The Renrendai platform then assigns borrowers a credit rating, ranging from AA (low risk), A, B, C, D, F to HR (high risk). Majority of borrowers in the market is lower-educated as depicted in figure 2. Around 80% borrowers do not have a bachelor degree.it should be it should be

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Lenders (i.e., investors) observe the loan request listing at the website. They then offer bids (invest money) to the interested borrowers if agree with the posted contract terms. In figure 1, the first lender with nickname 'f*y' offered 1,000 (RMB) to this listing. The bidding is on a "first come first served" basis. When the fourth lender 'o*1' invested 2,000 (RMB), this listing is 100% funded and the loan proceeds are credited into the borrower's bank account. The listing will be visible online at maximum duration of 7 days. After 7 days, if it's not fully funded, the listing closes and it becomes a failed request. Lenders can diversify the risk by offering bids to different borrowers. And automatic bidding facilities are available to lenders.

It should be noted that other than borrowers directly applying online (denoted as "credit" type), there're borrowers applying through Renrendai's offline branches (denoted as "field" type). "Field" type borrowers visit the offline branches in person with their materials. And the officers there will complete the whole procedure of listing online on behalf of the borrowers⁶ "Field" type has A rating and the interest rate is usually fixed by the offline office⁷.

D. China's political cycle: a new broom sweeps clean

Unlike the bottom-to-top political systems in most European countries and America, China has a top-to-bottom political system (see Nordhaus, 1975; Rogoff, 1990; Yao and Geng, 2016). Most mayors are assigned by their senior level government and the tenure is not fixed, though officially the head of the local governments are supposed to be elected every five years. According to the Chinese Mayor Database, the average tenure is around three years. Several studies suggest that meritocracy is an important factor for the political

⁶This paper rules out the "institution" type and "auto" type which accounts for 4% of all listings on Renrendai platform. Because they are essentially from other companies such as Zhong An Credit (中安信业), An Sheng (安盛) and Fu Ji (富基). But including them does not change the results.

⁷In this paper the interest rate of offline sourced P2P request is broadly considered as set by the borrower since I simplify the P2P lending market with only borrowers and lenders. The "borrower" and "lender" discussed in this paper, especially the consumer search framework, are assumed to absorb the role of the platform in demand and supply sides.

selection in China (Maskin et al., 2000; Bo, 1996; Li and Zhou, 2005; Chen et al., 2005; Jia et al., 2015). Local leaders are more likely to be promoted if they have better performance.

With the expectation of short tenure and performance pressure, mayors are eager to have a good record as early as possible. Otherwise the credit of policy implementation may go to their successor. Thus, mayors are more active in addressing social and economic problems in their newly assigned year. The new mayor story of China’s political cycle is similar with the typical electoral cycle story in political economy literature (see Levitt, 2002, 1997).

There’s a Chinese old saying conveying similar message: a new broom sweeps clean (新官上任三把火). In the context of politics, it means that newly selected leaders are more motivated and active to pursuit achievements than those who have served for long time (Luo and Duan, 2016). For the purpose of this paper, I use a measure of private lending attention in new mayor periods as an instrument for the introduction of the private lending registration service center (PLcenter) in a city. When there’s high attention on private lending issues, a newly appointed mayor is more likely to set up PLcenters aiming at gaining political achievement in their first year.

III. Data and Description

This section describes the data of marketplace lending and private lending problem news, and results of tests. I also place the marketplace lending in the context of a consumer search model (Salop, 1977; Salop and Stiglitz, 1977).

A. *Online P2P lending data from Renrendai*

The online P2P loan data of this paper consists of 639,948 retail listings (san biao in Chinese pinyin), both successful and failed listings, from Renrendai platform in the period of 2010 October to 2015 June, with the detailed information about loan, borrower and lender

characteristics⁸.

In July 2015, China’s State Council issued the ”Guiding Opinions on Advancing the Healthy Development of Internet Finance”, officially giving the China Banking Regulatory Commission (CBRC) the responsibility to regulate P2P platforms. To rule out the effect caused by regulation and better estimate the effects of PLcenters, this paper only looks at the period before 2015 July. Moreover, I remove the cities where there was no P2P application at Renrendai before 2012 April, due to the concern of sample bias⁹.

During the sample period, 118,694 out of 437,534 loan applications successfully got funded through Renrendai.com. In average, borrowers request P2P loans with an amount of \$9,050, maturity of 18-month and an annual interest rate of 13.56%. The average borrower is 35 years old with credit score 59 (at the credit level HR). The successful loan applications, in average offer an annual interest rate of 12.54% with an amount of \$8482 and a maturity of 26-month. The average borrower who successfully got funds is 39 years old with credit score 164 (at the credit level AA).

To estimate the effects of Pcenters on outcomes of online P2P lending, I aggregate the original listing level data by year-month and borrower’s working city¹⁰. It ends up in 15,642 observations.

B. Private Lending News

The data of private lending news for each Chinese city is from news.baidu.com, which is often called ”China’s Google”, by searching for the keywords ”private lending” and ”city name” contained in the title. News can be in neutral, negative or positive tones. Many collected news reported ”private lending lawsuits”, ”bankrupt private firms”, ”runaway bosses”,

⁸The bidding list of each loan request only reveals the userid of each lender. Matching this unique userid with borrower’s userid, we can obtain the lender’s characteristics who have been borrower.

⁹In 2012 April, Wenzhou city opened the first PLcenter in China. Among China’s 343 prefecture cities (di ji shi in Chinese pingyin, 地级市), 10 cities had no observation before 2012 April.

¹⁰Note that borrower’s working certificate is verified by the platform.

and "private lending workshops".

C. City Level Data

The city level data is from China Stock Market & Accounting Research Database (CSMAR), including the economic and demographic variables such as GDP growth rate, Population growth, government expenditure, number of books per 100 citizens and transportation. To construct the political cycle measure, I use the data from Chinese Mayor Database, which is also available in CSMAR.

D. Pre-treatment Balance Test

China's first PLcenter was opened in 2012 April. Using data before 2012 (i.e., the assignment of treatment), table 3 reports the result of pre-treatment balance test for borrower characteristics between the treatment group and the control group.

On Renrendai, P2P borrowers working in the cities that had PLcenters after 2012 are slightly older and richer than the ones from cities without PLcenter even after 2012. But the difference is not statistically significant at the level of 5%. In both groups, the majority of borrowers are lower educated, male and not working in finance or law industry. Other borrower characteristics such as marriage status, income level, credit rating, and whether had loan before are quite similar in two groups¹¹.

<insert table 3 here>

E. Search Cost in Online P2P Market

On Renrendai, borrowers post loan requests online and lenders invest in the interested loan requests. Since the borrower and lender directly interact with each other, the online

¹¹In the empirical analysis I control for borrower characteristics such as income, age, industry and credit rating.

P2P market works very similar to retail consumer market. Borrowers buy money to finance their investment or consumption with attractive prices (interest rates). While the lenders have spare money and offer a distribution of acceptable prices (interest rates).

As discussed in [Salop \(1977\)](#), the information a borrower requires in order to obtain the best (i.e. lowest and successfully matched) interest rate must be produced at a cost. This cost includes the loss of leisure and the time used to gather information. For example, borrowers pay for subscription of the analyst’s report and spend time reading Fintech credit market report. Moreover, borrower’s search ability varies due to knowledge heterogeneity. Usually high-educated are more efficient information searchers and on average obtain better buys (get fund with better interest rate). Search frictions in the market can lead to market separation and price dispersion. The higher the search cost, the more dispersed the price.

Thus often in the literature, researchers use price dispersion as a proxy of the consumer’s search cost. Search cost is correlated with the consumer’s education, age, income and financial experience. The data of Renrendai’s P2P lending shows the interest rates set by low-educated borrowers and borrowers who do not work in finance or law industry are more dispersed, consistent with the literature. In this paper, I use standard deviation as a measure of dispersion. As we can see in [table 4](#), there’s a negative correlation between education and interest rate dispersion. Borrowers with at least bachelor degree face less search cost. Also consistent with the intuition, it’s less costly for borrowers working in finance or law industry to gather information. [Table 4](#) reports the result of maturity dispersion and amount dispersion as well.

<insert table 4 here>

IV. Conceptual Framework and Predictions

Before turning to empirical analysis, this section shows that a simple borrower search framework with asymmetric information and search cost, following [Salop and Stiglitz \(1977\)](#),

can generate predictions of the public information service's effects on marketplace lending.

A. Setup of Search Cost Framework

Consider a economy with a large number, L of risk-neutral borrowers who want to borrow money for their investment or consumption. Each borrower has an identical inelastic demand curve for one and only one unit of money. The maximum interest rate a borrower will pay (the reservation interest rate) is denoted by r^u . In another word, each one of L borrowers wants to buy a unit of money with a interest rate not higher than r^u .

In the economy, there are n private lenders who have spare money and each lender charges a interest rate from a vector of acceptable interest rates $\underline{r} = \{r_1, r_2, \dots, r_n\}$. As in [Salop and Stiglitz \(1977\)](#), all lenders have identical opportunity cost of lending the money out and each unit of money are considered as identical commodity.

Assume that the borrower is freely endowed with the interest rate vector \underline{r} but s/he does not know which private lender charges which interest rate¹². The borrower can pay a search cost, either pecuniary or non-pecuniary, to gather the complete information and find the lowest interest rate in the lending market. Assume there are two types of borrowers with different search costs. αL of the L borrowers are knowledgeable borrowers with a low search cost c_1 , and the rest $(1 - \alpha)L$ are naive borrowers with a high search cost of c_2 , where $c_2 > c_1 > 0$. For example, more financial experienced borrowers can collect interest rates of P2P loans from different platforms and do statistic analysis to find the best interest rate, while low-educated may take a long time to find the access to the information and they usually do random buy.

Assume every private lender have identical U-shaped average cost (AC) curve. The cost of the lender includes the time it spends to understand the market and the money to buy a the computer. For example, to start lending out money a private lender has to spend a lot of

¹²In the context of marketplace lending, borrowers don't know which investor will appear online when he applies.

time, a fixed cost T , searching for platform. With the increase in the amount of lending, the average price of lending (interest) goes down first and then rebounds. This is reasonable since if the private lender has a lot of money, it might be more profitable for him/her to do some high-return business instead of lending out the money and bear the default risk. Assume private lenders know the distribution of borrowers' search costs, and L is large enough such that private lenders face no uncertainty.

Furthermore, assume the borrower decide a optimal search strategy to minimize the total expected expenditure, $r^i + c^i$. If s/he search, the interest rate s/he paid is r^{min} , the lowest interest rate in the market, but bearing a search cost $c^i > 0$. Otherwise s/he randomly borrow and the total expected expenditure is $\bar{r} = (1/n) \sum_{j=1}^n r_j$. The borrower i will search if $c^i < \bar{r} - r^{min}$. And the borrower will enter the market if and only if his total cost does not exceed the reservation interest rate, r^u , i.e. if and only if

$$r^u \geq \min [r^{min} + c^i, \bar{r}]$$

Consistent with the intuition, knowledgeable borrowers are more likely to search and enter the market than the naive borrowers. Remind that the majority of the market participants in the marketplace lending are naive individuals who are lack of the financial knowledge and search skills. So the search friction in the market is not trivial.

It is assumed that the private lender selects a interest rate to maximize its profit given the interest rates of other private lenders and the search strategy of borrowers. Finally, assume that entry of private lenders occurs as long as profits are positive.

B. Equilibrium, Search Cost and Interest Rate Dispersion

Given the setup, a equilibrium in this market is defined by a interest rate vector $\underline{r}^* = \{r_1^*, r_2^*, \dots, r_n^*\}$, a number n^* of private lenders in the market, and a percentage α^* of borrowers that gather information that obey the following conditions:

(i) *Profit Maximization.* Every private lender $j \in [1, 2, \dots, n^*]$ solves the optimization problem below,

$$\max_r \pi(r_j | \underline{r}^{*-j}) = r_j D(r_j | \underline{r}^{*-j}) - D(r_j | \underline{r}^{*-j}) AC [D(r_j | \underline{r}^{*-j})].$$

(ii) *Zero Profits.* Every private lender $j \in [1, 2, \dots, n^*]$ has zero profit: $\pi(r_j^* | \underline{r}^{*-j}) = 0$.

(iii) *Search Equilibrium.* At equilibrium, borrowers gather information optimally, and will search only if expected benefit is greater than the search cost.

$$\alpha^* = \begin{cases} 1 & \text{for } c_1 < c_2 < \bar{r} - r^{min} \\ \alpha & \text{for } c_1 < \bar{r} - r^{min} \leq c_2 \\ 0 & \text{for } \bar{r} - r^{min} \leq c_1 < c_2 \end{cases}$$

As proved in [Salop and Stiglitz \(1977\)](#), there are two types of equilibria in the economy, Single Price Equilibrium (SPE) with a single price r^u and Two Price Equilibrium (TPE). Since the evidence shows there's price dispersion in the online P2P lending (see table 4), this paper only focuses on the TPE case.

B.1. Two Price Equilibrium (TPE)

As pictured below, in a TPE there are n^* lenders entered the market and their profits are zero. βn^* lenders are lower-priced, r_l , lending a larger quantity of money, q_l , than the high-priced, r_h , private lenders. The αL knowledgeable borrowers decide to search and hence borrow from a r_l private lender. And the $(1 - \alpha)L$ high information cost borrowers choose to stay uninformed and borrow randomly. This equilibrium property contains the possible interest rate dispersion.

The two interest rates equilibrium (TPE) is summarized as follows ¹³,

¹³Please check the proof of lemma 3 and lemma 4 in [Salop and Stiglitz \(1977\)](#)

$$A\left((1-\alpha)\frac{L}{n}\right) = \min\left(r^u, r^* + \frac{c_2}{(1-\beta)}\right) \quad (1)$$

$$A\left((1-\alpha + \frac{\alpha}{\beta})\frac{L}{n}\right) = r^* \quad (2)$$

Denote the competitive quantity as $A(q^*) = p^*$. From equation (2) we have

$$q^* = (1-\alpha + \frac{\alpha}{\beta})\frac{L}{n} \quad (3)$$

<insert figure 3 here>

The average market interest rate is $r_m = \frac{q_l}{q_l + q_h}r_l + \frac{q_h}{q_l + q_h}r_h$.

C. A "Rational Economic Planner"

Salop and Stiglitz (1977) states that in a economy with an identical commodity "A 'rational economic planner' could economize on information costs by eliminating the price dispersion; for with no price dispersion, there is no need for costly search." We introduce a weaker version of rational "economic planner" into the framework.

Now there's a pubic information service center established by the government. The public information includes dissemination of private lending information and financial knowledge. Visiting the center can help the borrower lower the search cost by Δc . For example, in the context of this paper, a local borrower can find a better interest rate by consulting the PLcenter for market index, or attending PLcenter's seminars.

This public information service is free of charge, and it has the characteristics of public goods. A private lender is not able to function as public information service center due to the free riding problem. Note that very few people in real life are willing to pay for basic financial knowledge. Imagine now there's a private lender providing free training courses to lower consumers' search costs. Since conducting a course is costly, the average cost of this

private lender goes up. It means this private lender can never provide the lowest price since other lenders do not bear the cost of training. However, after training borrowers can find the lowest interest rate and switch to other private lenders.

D. Comparative Statics and Predictions

To guide the empirical investigation, we derive the main comparative statistics. The proofs are in appendix. The first comparative statistic indicates lower search cost especially c_2 should boost trading volume in the market.

Prediction 1. PLcenters will boost trading volume since following a search cost decrease trading quantities goes up, $\frac{\partial(q_l + q_h)}{\partial c_2} > 0$

With this prediction, we expect to see larger total lending amount in the market. Other than trading volume, the second comparative statistic provides a prediction of interest rate change.

Prediction 2. With PLcenters, marketplace lending will have lower interest rate since $\frac{\partial r_m}{\partial c_2} > 0$.

It is better for the market due to less dead-weight loss caused by search frictions. The lower interest rate effect is especially important for the high information-gathering cost borrowers.

Relating to the multi-priced equilibrium, we can also expect to see a lower interest rate dispersion with lower search costs as stated in predict 3 below,

Prediction 3. Changes in search cost caused by PLcenters should be followed by changes in interest rate dispersion $\frac{\partial sd(r)}{\partial c_2} > 0$. There will be lower interest rate dispersion.

Ideally, if the market is efficient and if there's no search friction, the identical commodity should have the same price. If "law of one price" holds, there should be no interest rate dispersion for the same type of contract (identical borrower and lender characteristics and identical risks). The introduction of public information service lowers the search friction, the market moves closer to the efficient "law of one price" world.

V. Empirical Analysis

The conceptual framework of borrower search suggests that, following the introduction of PLcenters, private lending market should experience higher trading volume, lower interest rate, as well as reduction in interest rate dispersion. This section starts by showing the basic specification of regressions and an identification strategy.

A. Basic Specification

The basic regression specification is a staggered DID model, written in two-way fixed effects form,

$$Y_{ct} = \beta_0 + \beta_1 Treated_{ct} + \beta_2 Post_{ct} + \beta_3 Treat_c + \beta_4 X_{c,t}^c + \beta_5 X_{c,t}^b + \beta_6 X_{c,t}^l + \alpha_c + \nu_t + \epsilon_{ct} \quad (4)$$

where $Treated_{ct} = Treat_c \times Post_{ct}$ equals 1 if the borrower's working city c has opened PLcenters in year-month t . $X_{c,t}^c$ is the city control variables such as government spending and number of book per 100 citizens. $X_{c,t}^b$ is the borrower characteristics to better control for the "identical commodity" setting as in the conceptual framework¹⁴. $X_{c,t}^l$ is the lender characteristics including average lending amount, average number of lenders, and proportion of manual bids (denoted as normal), to better fit in the identical private lender setting in the conceptual framework. α_c and ν_t represent city and year-month fixed effects. Y is the outcome of interest, which includes loan characteristics (i.g. interest rate, interest rate dispersion) and local market variables (i.g. total lending amount).

The coefficient of interest is β_1 . Based on the basic specification I also average borrower characteristics, city controls, and lender controls to capture the propositional change of bor-

¹⁴Moreover, when regress interest rate on treated, average maturity and lending amount are controlled to better fit in the "identical commodity" setting. Regressions of maturity and lending amount are conducted similarly.

rowers, time-varying city variables and lender's affects. City fixed effects α_c in equation (4) control for factors changing each month that are common to all Chinese cities for a given month. Time fixed effects ν_t in equation (4) control for factors that are common to all the time but specific to each city.

Nonetheless, key challenges remain if we use the basic specification (4) to estimate the effects of PLcenters. The opening of PLcenters may be correlated with other unobserved variables that could affect the online P2P lending outcomes as well. Some people may suspect that local governments decide to open the PLcenters due to the bad performance of the local private economy which could also affect the online P2P lending. Thus, I use an instrumental variable, the timing of private lending attention in the Chinese local political cycle, to instrument the main dependent dummy $Treated_{ct}$ following [Levitt \(1997\)](#), [Bian et al. \(2017\)](#) and [Ponticelli and Alencar \(2016\)](#), and apply Two-Stage Least Squares (2SLS) to estimate equations.

B. Identification

To address the endogeneity, I use a measure of new mayor's career concern on private lending issues, denoted as $NewmayorPLP_{ct}$, to instrument the introduction of PLcenters, $Treated_{ct}$.

The first stage of 2SLS regressions is denoted as equation (5) below,

$$Treated_{ct} = \gamma_0 + \gamma_1 NewmayorPLP_{ct} + \gamma_2 X_{ct}^c + \gamma_3 X_{c,t}^b + \gamma_4 X_{c,t}^l + \alpha_c + \nu_t + \epsilon_{ct} \quad (5)$$

where the dependent variable $Treated_{ct} = Treat_c \times Post_t$ equals one if city c has the PLcenter opened at time t . The instrumental variable is $NewmayorPLP_{ct}$, which is the number of times the city c has a new mayor with career concern on private lending before time t .

A new mayor is defined as a mayor who is in the first year of his/her tenure. His/her

career concern on private lending are proxied by the abnormal attention on private lending of the same province's other cities. As explained before, new mayors try to achieve good credits as early as possible (in the first year in our context) with a expectation of short tenure. A city mayor's next step in his/her political career is to be promoted to provincial level. If the province government has high attention on private lending issues, the city mayor gets motivated to gain achievement in private lending (opening a PLcenter in our context). Because the province government's opinion matters most to the promotion of the city mayor. To rule out the possible direct effect of the Instrument Variable on marketplace lending outcomes, I use same province's other cities' abnormal private lending attention, in the spirit of the IV construction in [Ponticelli and Alencar \(2016\)](#). The abnormal private lending attention of other cities in the province should not affect the marketplace lending outcomes in city c , but it raises city c 's mayor's career concern on private lending.

More precisely, $NewmayorPLP_{ct} = \sum_{\tau}^t \left(D(Newmayor)_{c\tau} \times D(PLAttention)_{c\tau} \right)$, where $D(Newmayor)_{c\tau}$ equals to 1 if at time τ there's a new mayor in city c and $D(PLAttention)_{c\tau}$ equals to 1 if other cities of city c 's same province have abnormal attention on private lending. The abnormal attention on private lending is captured by the number of a city's private lending news. If the number of the city's private lending news online is higher than the last six months' average number, the city gets abnormal attention on private lending in that month.

The new mayor period of a Chinese is similar to the "bottom-to-up" political system's political cycle (during the election or just before the election), and political cycle has been used as a instrument for many policy implementations such as the ones in [Levitt \(1997\)](#) and [Bian et al. \(2017\)](#).

To address the concern that perhaps a new mayor with attention on private lending conduct policies other than opening PLcenters that affects the result of marketplace lending, I add a set of city controls X_{ct}^c such as government expenditure to control for the possible affect of other policies.

Table 5 reports the results of first stage regressions for originally all listings and only successful applications. Both Cragg-Donald Wald F statistic and Kleibergen-Paap rk Wald F statistic are largely greater than 10.

<insert table 5 here>

This measure of new mayor’s career concern on private lending is a valid instrument for the establishment of PLcenters, in the sense that it strongly predicts the introduction of PLcenters (as shown in table 5) and only affect the marketplace lending results through PLcenters, conditional on a set of city controls. The evidences are provided below.

Exclusion Restriction and Exogeneity

There’s a concern that the assignment of new mayor may be correlated with the economic condition in the city, which may possibly alter the result in P2P lending. For example, perhaps a city’s economic performance is bad thus a new mayor is assigned to solve the problem. The evidence in table 6 also shows whether there’s a new mayor or not does not depend on the economic condition of the city. City c ’s GDP in the last year does not predict the assignment of new mayor at time t .

<insert table 6 here>

To further address the concern about the endogeneity of the IV, I run the basic specification based on the data before 2012 April when there’s even no PLcenter. If the new mayor’s career concern on private lending issues, *NewmayorPLP*, affects the result of P2P lending through channels other than PLcenters, we expect to see significant effect of *NewmayorPLP* on P2P lending interest rate based on this restricted sample. However, Table reports no significance, which implies politician’s concern on private lending affects the P2P lending through PLcenter.

<insert table 7 here>

C. Effects of PLcenters on Marketplace Lending Outcomes

In this section I study the effects of PLcenters on marketplace lending outcomes and check whether the estimates are consistent with the predictions from the conceptual framework.

Result 1. PLcenters boost the marketplace lending

First, Table 8 indicates that PLcenters push up the online P2P lending trading volume, as predicted by the search cost model. The variables of interest are total amount of application and total lending amount of successful application. I also check how the number of active borrowers and the number of loan applications relate to the introduction of PLcenters.

<insert table 8 here>

Table 8 in column (1) and (5) shows that the effect of PLcenters on total trading amount of capital is positive and significant. PLcenters push up total traded amount by \$455,500 per month, and total applied amount of capital by \$1,711,800 per month. Both the numbers of successful loans and applicants increase by around 60 per month, as shown in column (6) and (7), and those of applications and applicants increase by 170 per month. The positive effect is in line with Prediction 1.

In addition, PLcenters increase the success rate. Success rate is defined as the proportion of listings successfully funded among all Renrendai loan request listings from city c at year-month t . Column (4) of table 8 reports that PLcenters increase the success rate by 4.5%.

Result 2. PLcenters Lowers the interest rate

In table 9, column (4) indicate the interest rate on Renrendai goes down by 1.6% if borrowers have the access to the PLcenter, as predicted by Prediction 2. When borrowers' search costs are smaller, more private lenders will choose low interest rate. The average interest rate of application also goes down by 0.98% (column 1). Moreover, the maturity goes up slightly by around two months according to the results listed in column (2) and (5).

It is a more efficient outcome since a competitive market with an identical good should have only one price, the lowest one. Due to the search friction caused by limited knowledge

and lack of search skills of borrowers, the interest rate is higher than the competitive interest rate (lowest). When there's a private lending center helping borrowers understand the market better, the interest rate will naturally go down.

The too high interest rate has long been a problem in private lending. Private lending is the main financing source for most private firms. Interest rate decrease can help the private firms lower the cost of capital and in turn enable firm to make investment and management decisions closer to the optimal ones. The public information service as public goods not only benefit the low-educated individual borrowers, but also may stimulate the economy.

<insert table 9 here>

Result 3. PLcenters reduce the dispersion of contract terms

As foreseen by Prediction 3, this section finds that the dispersion of interest rate goes down after having the PLcenters in borrowers' working cities, and the effect is mainly driven by the less experienced group.

In this paper, I use the standard deviation (s.d.) as a measure of the dispersion of contract terms (Borenstein and Rose, 1994). As reported in column (1) to (4) of Table 10, analysis based on both all listings and successful applications of sample period consistently find negative significant coefficient of treatment dummy. It indicates that the introduction of PLcenters reduces the variation of interest rates in the marketplace lending. Borrowers with access to PLcenters' public information services tend to propose less dispersed interest rates when they apply for loans. More importantly, the successfully sample sees a significant decrease in dispersion of interest rates. With other variables constant, the PLcenter reduce the standard deviation of interest rate by -0.71.

When local people get access to the PLcenters, they can ask for legal consultant service or ask information from officers in the centers. They may understand better about the usual contract settings and what are the good lenders. They'll also find the small loan companies and P2P lending platforms inside the PLcenter, which makes their searching much more

convenient. The PLcenters help filled the knowledge gap between experienced people and inexperienced people.

With the search cost framework in mind, I conjecture the effects of PLcenters mainly go through the inexperienced. If PLcenters indeed lower search costs, the reduction in dispersion of interest rates should be more significant in a group with less informed people. To test this guess, I check how the lower dispersion effect is associated with financial experience of borrowers. I split the borrowers into two groups based on their working industry. Columns (2) and (5) reports the result of the group of borrowers who work in finance or law industry, the experienced group, and the rest columns (3) and (6) is the result of the inexperienced group. The negativity and significance of the coefficient of interest only appear in the experienced.

<insert table 10 here>

The distribution of interest rates before and after the introduction of PLcenters show in figure 4 suggests that there's less extremely low interest rates after having the PLcenters. This can be explained in search framework. The borrowers with high search costs have higher expected expenditure ($r^i + c^i$). If the search cost is very cost to the reservation interest rate r^u . Their proposal for interest rate will be extremely low. But with PLcenters, this super high search cost problem is mediated.

<insert figure 4 here>

VI. Conclusion

The scale of flows and the direct participation of individuals in Fintech credit market is stirring concerns(FSB, 2018). This paper focuses on the search frictions in the marketplace lending and explores how the introduction of information as lighthouse, public goods, affects the market. I put the marketplace lending in a context of search cost model (Salop and Stiglitz, 1977) and empirically test the derived predictions by using P2P lending data from Renrendai to examine the effects of PLcenters introduced in China.

Results show that PLcenters boost marketplace lending in terms of lending volume. The interest rate in the market significantly goes down, and more remarkably PLcenters reduce the dispersion of interest rate, and the effect is mainly driven by the group who do not work in finance or law industry (less experienced). The findings are in line with the explanation in search cost framework, where borrowers' search cost and interest rate level, interest rate dispersion are highly correlated.

This work contributes to the literature by empirically testing the role of informational public goods in the Fintech credit. It has an important policy implication for mediating search frictions, financial literacy and market efficiency.

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Appendix A. Tables and Graphs

Tables

Table 1. Wenzhou Private Lending Index, overall 20.14% on March 18 2013

Maturity (month)	1	3	6	12	12+
Interest rate	21.93	19.63	18.43	13.66	14.44

Table 2. Opening Dates of Private Lending Registration Service Centers

City Name	Open Date	City Name	Open Date
Wenzhou	2012-04-26	Hangzhou	2014-06-18
Guangzhou	2012-06-28	Weinan	2014-06-26
Zhenjiang	2012-07-18	Nanchang	2014-06-30
Eerduosi	2012-11-18	Xian	2014-07-29
Dongying	2012-11-29	Jilin	2014-08-06
Shaoxing	2013-01-26	Weihai	2014-08-30
Changsha	2013-04-23	Jian	2014-09-19
Zibo	2013-05-08	Shangrao	2014-09-22
Jinzhong	2013-05-22	Fuzhou	2014-10-16
Anyang	2013-05-28	Kaifeng	2014-10-21
Yueyang	2013-06-14	Xiangtan	2014-12-05
Foshan	2013-09-01	Binzhou	2014-12-18
Ningbo	2013-10-16	Yantai	2015-01-01
Chengdu	2013-10-24	Bijie	2015-01-08
Dongguan	2013-10-30	Zhoushan	2015-01-09
Zhuzhou	2013-11-13	Zhuhai	2015-01-18
Quanzhou	2013-12-04	Qianxin	2015-02-01
Changzhi	2013-12-31	Mudanjiang	2015-03-01
Guiyang	2014-02-23	Siping	2015-03-08
Taizhou	2014-03-17	Tongliao	2015-03-18
Huzhou	2014-03-19	Lishui	2015-03-18
Xining	2014-04-03	Yiyang	2015-04-16
Jinan	2014-04-20	Hulunbeier	2015-05-01
Taian	2014-04-25	Putian	2015-05-04
Jinhua	2014-05-11	Enshi	2015-05-09
Daqing	2014-05-12	Xinganmeng	2015-05-22
Wuhan	2014-05-28	Bayzhou	2015-06-03
Weifang	2014-06-16		

Table 3. Pre-treatment Balance Test

This table shows the pre-treatment balance test of covariates between treatment group and control group. The original sample comprises all listings of 333 Chinese cities before 2011 December from Renrendai. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively.

	Control			Treatment			
	n	mean	sd	n	mean	sd	Diff
Degree(1=Bachelor)	10178	0.21	0.41	5868	0.18	0.39	-0.023
Marriage(1=Married)	10178	0.45	0.50	5868	0.42	0.49	-0.033
Incomeindex	10167	3.31	1.08	5862	3.42	1.13	0.108*
Gender(1=F)	10178	0.13	0.34	5868	0.14	0.35	0.008
Age	10178	34.20	5.88	5868	33.84	5.69	-0.363*
CreditRating	10178	2.02	0.26	5868	2.02	0.27	0.002
Degree(1=Bachelor)	10178	0.21	0.41	5868	0.18	0.39	-0.023
Industry(1=Fin/Law)	10178	0.05	0.22	5868	0.04	0.20	-0.007
HaveLoan	10178	0.14	0.35	5868	0.12	0.32	-0.020

Table 4. Search Cost in P2P Lending Market

This table shows the OLS regression coefficients of contract term dispersion on borrower characteristics. First, aggregate the data in borrower and year level and get the dispersion for each borrow. Second, regress dispersion on borrower characteristics such as degree and income, controlling for year fixed effects. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively.

	full	sucess
	(1)	(2)
	sdr	sdr
Marriage(1=Married)	-0.00461 (-0.38)	0.224*** (3.36)
Incomeindex	-0.0249*** (-5.04)	-0.0136 (-0.66)
Gender(1=F)	-0.0910*** (-5.45)	-0.0417 (-0.47)
Age	-0.0125*** (-13.43)	-0.0220*** (-4.61)
CreditRating	0.0180* (1.80)	0.0587** (2.04)
Degree(1=Bachelor)	-0.0335** (-2.48)	-0.0160 (-0.25)
Industry(1=Fin/Law)	-0.0144 (-0.49)	0.181 (1.27)
LoanType(1=Consump.)	0.0126 (1.50)	0.0773* (1.87)
HaveLoan	0.0000203 (0.00)	0.0475 (0.76)
Maturity	-0.0442*** (-63.67)	-0.0185*** (-3.05)
R	0.136*** (58.10)	0.142*** (11.20)
Year-Month FE	Yes	Yes
Observations	63866	2130

t statistics in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5. First Stage Regression

This table reports the first stage estimates from 2SLS regressions. The sample period is from 2010 October to 2015 June. The full sample comprises all listings of Renrendai loan requests. The success sample comprises successful applications.

$$Treated_{ct} = \gamma_0 + \gamma_1 NewmayorPLP_{ct} + \gamma_2 X_{ct}^c + \gamma_3 X_{c,t}^b + \gamma_4 X_{c,t}^l + \alpha_c + \nu_t + \epsilon_{ct}$$

where $Treated_{ct} = Treat_c \times Post_t$ equals to 1 if city c has PLcenters in month t . $Treat_{ct}$ is instrumented by $NewmayorPLP_{ct} = \sum_{\tau}^t \left(D(Newmayor)_{c\tau} \times D(PLAttention)_{c\tau} \right)$, where $D(Newmayor)_{c\tau}$ is one if city c 's mayor is in the first year of his/her tenure and $D(PLAttention)_{c\tau}$ equals to one if city c 's province's other cities get abnormal attention on private lending. The abnormal attention is captured by larger number of private lending news than the last six months' average number. All regressions include city fixed effects α_c and year-month fixed effects ν_t . Borrower characteristic controls are aggregated at (city month) level by taking the mean. T statistics are reported in parentheses. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively.

	full	success
	(1)	(2)
	Treated	Treated
NewmayorPLP	0.0497*** (26.20)	0.0553*** (16.49)
GovExpenditure	0.00000475 (0.55)	-0.0000140 (-1.28)
Bookper100	-0.0000220 (-0.91)	-0.0000235 (-0.78)
Constant	0.0540** (2.54)	0.135*** (3.94)
City FE	Yes	Yes
Year-Month FE	Yes	Yes
BorrowerControls	Yes	Yes
LenderControls	Yes	Yes
R^2	0.475	0.598
F	48.38	20.05
Observations	13057	6296

Table 6. Economic Condition and New Mayor

This table reports coefficients estimates from the regression relating the dummy of new mayor to last year's GDP. The sample period is from 2010 October to 2015 June. The full sample comprises all listings of Renrendai loan requests. The success sample comprises successful applications.

$$D(Newmayor)_{c,t} = \beta_0 + \beta_1 GDP_{c,t-12} + \beta_2 X_{c,t}^c + \alpha_c + \nu_t + \epsilon_{c,t}$$

where $D(Newmayor)_{ct}$ is a dummy equals to 1 if city c 's mayor is in the first year of his/her tenure. $GDP_{c,t-12}$ is city c 's last year GDP. pop is the population and $area$ is the area. All regressions include city fixed effects α_c and year-month fixed effects ν_t . T statistics are reported in parentheses. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively.

	full
	(1)
	D(Newmayor)
L12.GDP	0.00000590 (0.33)
population	0.000234 (0.45)
area	-0.00000748** (-2.45)
Constant	0.353 (1.47)
City FE	Yes
Year-Month FE	Yes
R^2	0.191
Observations	9900

Table 7. Placebo Test, time period without PLcenters

This table reports coefficients estimates from the regressions relating the dummy of new mayor to interest rate based on all listings of Renrendai loan requests and successful samples. The sample period is from 2010 October to 2012 March.

$$InterestRate_{c,t} = \beta_0 + \beta_1 NewmayorPLP_{c,t} + \beta_2 X_{c,t}^c + \beta_3 X_{c,t}^b + \beta_4 X_{c,t}^l + \alpha_c + \nu_t + \epsilon_{c,t}$$

where $IV = NewmayorPLP_{c,t}$ is the instrument variable. $GDP_{c,t-12}$ is city c 's last year GDP. pop is the population and $area$ is the area. All regressions include city fixed effects α_c and year-month fixed effects ν_t . T statistics are reported in parentheses. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively.

	full	success
	(1)	(2)
	R	R
IV	-0.0308 (-0.24)	0.0264 (0.13)
Govexpend	0.000780 (0.43)	0.000450 (0.22)
Bookper100	0.000600 (0.67)	0.000812 (0.96)
Maturity	-0.0635*** (-5.29)	0.0516** (2.35)
Avg.A	0.0194 (1.08)	0.0213 (0.50)
Constant	8.786*** (7.13)	15.66*** (3.93)
BorrowerControls	Yes	Yes
LenderControls	Yes	Yes
City FE	Yes	Yes
Year-Month FE	Yes	Yes
R^2	0.444	0.466
Observations	3154	870

Table 8. The Effect of Private Lending Centers on Trading Volume

This table reports coefficients estimates from DID regressions relating the trading volume to the introduction of PLcenters in the borrower's working city. The sample period is from 2010 October to 2015 June. The full sample comprises all listings of Renrendai loan requests (column 1-4). The success sample comprises successful applications (column 5-7).

$$Y_{ct} = \beta_0 + \beta_1 Treated_{ct} + \beta_2 Post_{ct} + \beta_3 Treat_c + \beta_4 X_{c,t}^c + \beta_5 X_{c,t}^b + \beta_6 X_{c,t}^l + \alpha_c + \nu_t + \epsilon_{ct}$$

where $Treated_{ct} = Treat_c \times Post_{ct}$ equals to 1 if borrower's working city c 's has Pcenters in month t . $X_{c,t}^b$ are borrower characteristics including marriage status, income level, gender, age, credit rating, education, working industry, loan use, and have car/house loan or not. $X_{c,t}^l$ controls average number of lenders and lender's average lending amount on each request, and proportion of manual bids. All regressions include city fixed effects α_c and year-month fixed effects ν_t . Borrower characteristic controls are aggregated at (city month) level by taking the mean. T statistics are reported in parentheses. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively.

	full				success		
	(1) Tot.A	(2) N(L)	(3) N(A)	(4) SuccR	(5) Tot.A	(6) N(L)	(7) N(A)
Treated	1711.8*** (15.73)	170.2*** (15.95)	170.2*** (15.95)	0.0572*** (2.62)	455.5*** (5.56)	56.20*** (6.43)	56.20*** (6.43)
Marriage(1=Married)	-19.25 (-0.96)	-0.354 (-0.18)	-0.354 (-0.18)	0.0235*** (5.85)	13.36 (1.18)	1.738 (1.43)	1.738 (1.43)
Incomeindex	21.87*** (2.63)	-1.817** (-2.23)	-1.817** (-2.23)	0.000536 (0.32)	-5.158 (-1.30)	-0.719* (-1.70)	-0.719* (-1.70)
Gender(1=F)	31.74 (1.20)	2.151 (0.83)	2.151 (0.83)	-0.00687 (-1.30)	17.63 (1.19)	1.505 (0.95)	1.505 (0.95)
Age	5.943*** (3.92)	0.268* (1.81)	0.268* (1.81)	0.00140*** (4.62)	2.003*** (2.72)	0.170** (2.16)	0.170** (2.16)
CreditRating	235.3*** (22.10)	24.37*** (23.35)	24.37*** (23.35)	0.0209*** (9.81)	31.64*** (6.33)	2.459*** (4.61)	2.459*** (4.61)
Degree(1=Bachelor)	-50.05** (-2.22)	-4.734** (-2.14)	-4.734** (-2.14)	0.0245*** (5.41)	-19.41* (-1.84)	-1.630 (-1.45)	-1.630 (-1.45)
Industry(1=Fin/Law)	-26.91 (-0.57)	-3.142 (-0.68)	-3.142 (-0.68)	0.0105 (1.11)	5.890 (0.24)	0.750 (0.29)	0.750 (0.29)
LoanType(1=Consump.)	35.61*** (4.25)	4.375*** (5.33)	4.375*** (5.33)	0.00807*** (4.81)	24.38*** (4.42)	3.150*** (5.35)	3.150*** (5.35)
HaveLoan	102.1*** (4.10)	7.018*** (2.87)	7.018*** (2.87)	0.0406*** (8.12)	32.88*** (3.19)	0.783 (0.71)	0.783 (0.71)
City FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LenderControls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CityControls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13057	13057	13057	13057	6296	6296	6296
R^2	0.076	0.114	0.114	0.627	0.476	0.474	0.474

Table 9. The Effect of Private Lending Centers on Contract Terms

This table reports coefficients estimates from DID regressions relating the contract terms to the introduction of PLcenters in the borrower's working city. The sample period is from 2010 October to 2015 June. The full sample comprises all listings of Renrendai loan requests (column 1-3). The success sample comprises successful applications (column 4-6).

$$Y_{ct} = \beta_0 + \beta_1 Treated_{ct} + \beta_2 Post_{ct} + \beta_3 Treat_c + \beta_4 X_{c,t}^c + \beta_5 X_{c,t}^b + \beta_6 X_{c,t}^l + \alpha_c + \nu_t + \epsilon_{ct}$$

where $Treated_{ct} = Treat_c \times Post_{ct}$ equals to 1 if borrower's working city c 's has Pcenters in month t . $X_{c,t}^b$ are borrower characteristics including marriage status, income level, gender, age, credit rating, education, working industry, loan use, and have car/house loan or not. $X_{c,t}^l$ controls average number of lenders and lender's average lending amount on each request, and proportion of manual bids. All regressions include city fixed effects α_c and year-month fixed effects ν_t . Borrower characteristic controls are aggregated at (city month) level by taking the mean. T statistics are reported in parentheses. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively.

	full			success		
	(1) R	(2) Maturity	(3) Avg.A	(4) R	(5) Maturity	(6) Avg.A
Treated	-0.979** (-2.25)	2.100** (2.54)	0.490 (0.36)	-1.559*** (-2.86)	1.975 (1.29)	0.0154 (0.02)
Marriage(1=Married)	-0.293*** (-3.66)	0.116 (0.77)	0.118 (0.47)	-0.342*** (-4.53)	0.268 (1.26)	0.00548 (0.05)
Incomeindex	-0.0188 (-0.54)	-0.822*** (-12.42)	3.995*** (38.11)	-0.148*** (-5.48)	-0.311*** (-4.10)	0.664*** (16.74)
Gender(1=F)	-0.338*** (-3.19)	1.213*** (6.05)	-0.351 (-1.05)	-0.338*** (-3.42)	0.622** (2.24)	0.519*** (3.50)
Age	-0.00851 (-1.40)	0.0243** (2.11)	0.209*** (10.95)	-0.000201 (-0.04)	0.0286** (2.05)	0.0924*** (12.54)
CreditRating	0.170*** (3.95)	1.185*** (14.66)	-0.297** (-2.19)	-0.135*** (-4.05)	0.183* (1.95)	0.104** (2.08)
Degree(1=Bachelor)	-0.371*** (-4.11)	-0.414** (-2.42)	1.451*** (5.10)	-0.392*** (-5.59)	0.0302 (0.15)	0.158 (1.50)
Industry(1=Fin/Law)	0.0970 (0.52)	-0.246 (-0.69)	0.707 (1.20)	-0.512*** (-3.18)	1.100** (2.43)	-0.109 (-0.45)
LoanType(1=Consump.)	0.0602* (1.80)	0.194*** (3.05)	-0.332*** (-3.14)	-0.0239 (-0.65)	0.501*** (4.85)	-0.0348 (-0.63)
HaveLoan	-0.388*** (-3.88)	1.097*** (5.79)	1.169*** (3.71)	-0.190*** (-2.77)	0.415** (2.16)	-0.0651 (-0.63)
Maturity	0.0128*** (2.73)		0.343*** (23.67)	0.0999*** (22.50)		0.0451*** (6.52)
Avg.A	0.0122*** (4.33)	0.123*** (23.59)		0.0378*** (4.38)	0.158*** (6.54)	
R		0.0445*** (2.63)	0.122*** (4.37)		0.806*** (22.62)	0.0898*** (4.53)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
LenderControls	Yes	Yes	Yes	Yes	Yes	Yes
CityControls	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.061	0.177	0.179	0.085	0.406	0.706
Observations	13057	13057	13057	6296	6296	6296

Table 10. The Effect of Private Lending Centers on Interest Rate Dispersion

This table reports coefficients estimates from DID regressions relating the interest rate dispersion to the introduction of PLcenters in the borrower's working city. The sample period is from 2010 October to 2015 June. The full sample comprises all listings of Renrendai loan requests. The success sample comprises successful applications.

$$Y_{ct} = \beta_0 + \beta_1 Treated_{ct} + \beta_2 Post_{ct} + \beta_3 Treat_c + \beta_4 X_{c,t}^c + \beta_5 X_{c,t}^b + \beta_6 X_{c,t}^l + \alpha_c + \nu_t + \epsilon_{ct}$$

where $Treated_{ct} = Treat_c \times Post_{ct}$ equals to 1 if borrower's working city c 's has Pcenters in month t . $X_{c,t}^b$ are borrower characteristics including marriage status, income level, gender, age, credit rating, education, working industry, loan use, and have car/house loan or not. $X_{c,t}^l$ controls average number of lenders and lender's average lending amount on each request, and proportion of manual bids. All regressions include city fixed effects α_c and year-month fixed effects ν_t . Borrower characteristic controls are aggregated at (city month) level by taking the mean. T statistics are reported in parentheses. *, **, and *** indicate statistically different from zero at the 10%, 5%, and 1% level of significance, respectively.

	full	full,/finlaw	full,finlaw	success	success,/finlaw	success,finlaw
	(1)	(2)	(3)	(4)	(5)	(6)
	sd(R)	sd(R)	sd(R)	sd(R)	sd(R)	sd(R)
Treated	-1.040*** (-3.49)	-0.975*** (-3.27)	-1.118 (-1.34)	-0.711* (-1.72)	-0.786* (-1.71)	0.255 (0.13)
Marriage(1=Married)	-0.0149 (-0.24)	-0.0381 (-0.61)	0.0850 (0.73)	0.164* (1.93)	0.120 (1.37)	0.00196 (0.01)
Incomeindex	-0.0200 (-0.74)	-0.0265 (-0.99)	0.0892 (1.50)	-0.0704** (-2.44)	-0.0696** (-2.37)	0.0861 (1.58)
Gender(1=F)	0.0218 (0.26)	-0.0605 (-0.72)	-0.137 (-0.98)	-0.168 (-1.58)	-0.141 (-1.30)	-0.167 (-1.14)
Age	-0.0132*** (-2.90)	-0.0140*** (-3.07)	-0.00418 (-0.48)	-0.00428 (-0.76)	-0.00400 (-0.69)	-0.00747 (-1.45)
CreditRating	0.0565* (1.76)	0.128*** (3.38)	0.0497 (0.40)	0.0259 (0.71)	0.0379 (1.02)	-0.266* (-1.85)
Degree(1=Bachelor)	-0.0445 (-0.64)	-0.0439 (-0.62)	-0.0585 (-0.55)	-0.118 (-1.50)	-0.107 (-1.30)	-0.0589 (-0.54)
Industry(1=Fin/Law)	-0.219 (-1.49)			-0.165 (-0.93)		
LoanType(1=Consump.)	-0.0720*** (-2.58)	-0.0343 (-1.22)	0.113** (2.06)	0.0155 (0.39)	0.0332 (0.80)	-0.00648 (-0.11)
HaveLoan	0.180** (2.34)	0.117 (1.51)	-0.130 (-1.00)	0.0704 (0.94)	0.0779 (1.01)	0.0285 (0.30)
Maturity	-0.0710*** (-19.58)	-0.0704*** (-19.11)	-0.0578*** (-9.81)	-0.0271*** (-5.60)	-0.0255*** (-5.16)	-0.0644*** (-7.19)
Avg.A	-0.00289 (-1.34)	-0.00318 (-1.48)	-0.00435 (-0.96)	-0.00187 (-0.19)	-0.00217 (-0.21)	0.00953 (1.08)
minR		-0.0259 (-0.37)	0.146 (0.95)	-0.258*** (-5.41)	-0.265*** (-5.46)	0.253** (2.14)
minR		0.0706*** (3.91)	0.0111 (0.30)	0.113*** (8.10)	0.116*** (8.24)	-0.0410 (-1.09)
City FE	Yes	Yes	Yes	Yes	Yes	Yes
Year-Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11971	11885	2261	3829	3711	411
R^2	0.035	0.043	0.045	0.079	0.076	0.441
BorrowerControls	Yes	Yes	Yes	Yes	Yes	Yes
LenderControls	Yes	Yes	Yes	Yes	Yes	Yes
CityControls	Yes	Yes	Yes	Yes	Yes	Yes

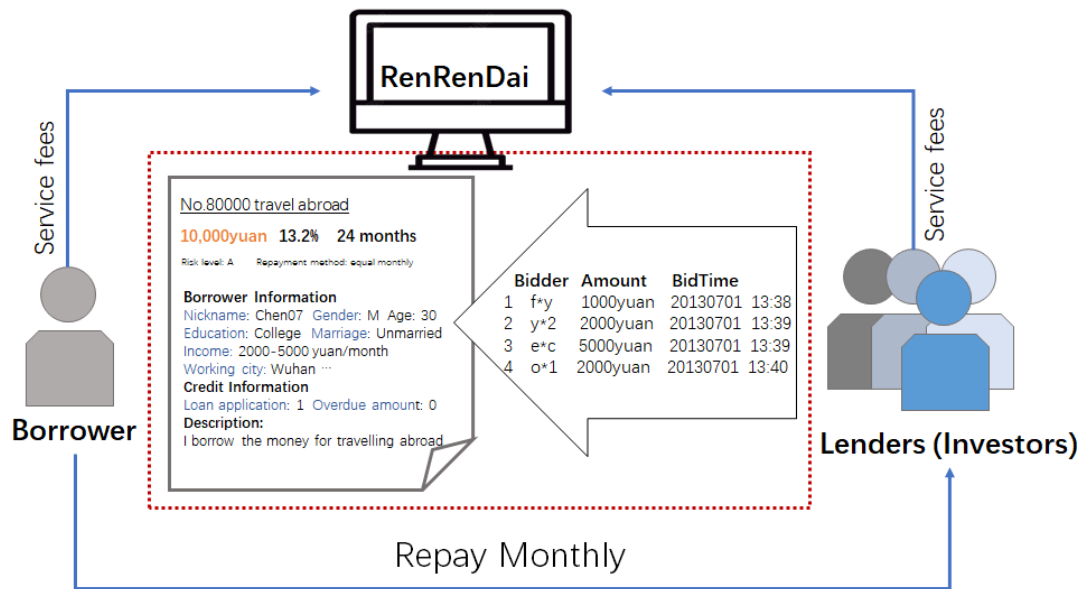


Figure 1. Renrendai loan bids.

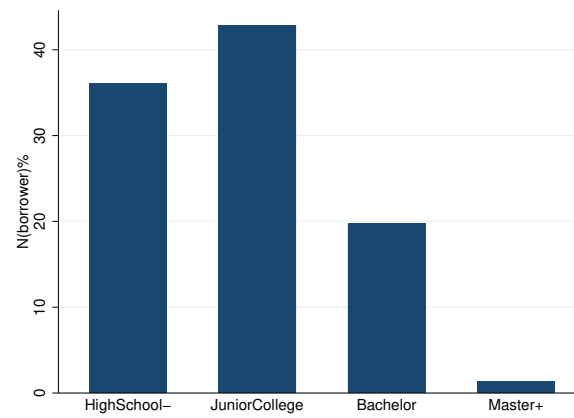


Figure 2. Renrendai Borrowers' Education.

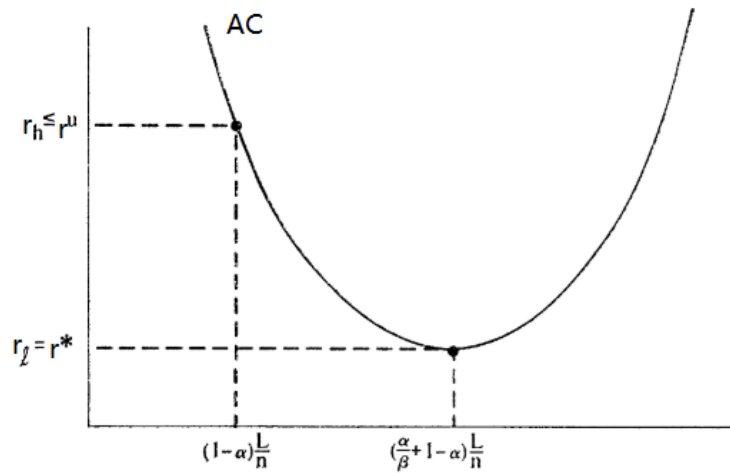
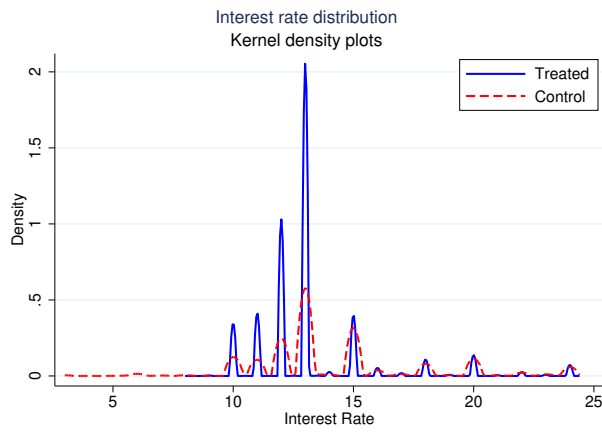
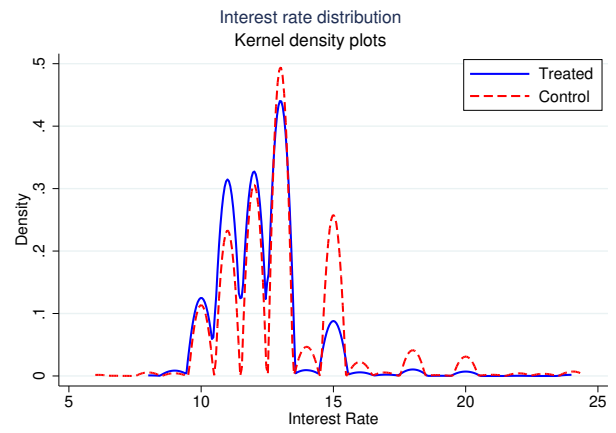


Figure 3. Two Price Equilibrium



((a)) full sample



((b)) success sample

Figure 4. Interest Rate Distribution