VOLUNTARY VERIFIABLE INFORMATION DISCLOSURE AND LOAN FUNDING PERFORMANCE: EVIDENCE FROM PAIPAIDAI IN CHINA

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We investigate what mechanism helps to motivate the willingness of Chinese people to lend money to strangers online in the peer-to-peer (P2P) lending market. We argue that the voluntary verifiable information disclosure created by Chinese P2P practitioners helps to mitigate the asymmetric information problem and facilitates lending transactions between lenders and borrowers. We exploit a unique individual level data set obtained from Paipaidai, a leading Chinese P2P company, and evaluate the extent that the voluntary verifiable information disclosure helps to ease adverse selection problems. We find that information disclosure does increase the probability that a loan listing will be successfully funded by around 10% on average. We also find that the voluntary verifiable information disclosure helps to decrease the equilibrium interest rate by around 0.2% on average.

Keywords: Information asymmetry; voluntary information disclosure; verifiable information; online peer-to-peer lending.

JEL Classification: D80, L86, G10

1. Introduction

Online peer-to-peer (P2P) lending is the practice of lending money directly to unrelated individuals by using the Internet as a platform without going through a financial intermediary to provide the professional service. Recently, online P2P lending has emerged as an important business model in the financial industry in both China and other economies. P2P lending can provide short-term liquidity for both small businesses and individual consumers. Given the fact that it is very hard for Chinese small businesses to obtain financial support from traditional financial intermediaries, P2P lending has significant practical and policy importance. Some Chinese industry insiders have pointed out that

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internet financing is changing the landscape of China's financial sector in a dramatic and unprecedented way (Hou, 2013).

However, the online P2P market suffers from the traditional asymmetric information problem. Since Akerlof (1970), researchers have been aware of the adverse selection problems caused by asymmetric information. Adverse selection problems might be the key obstacle that affect the development of the online loan lending market because they create more obscurity for lenders when they want to obtain information on the type (superior or inferior) of borrower who is sitting on the other side of the internet connection. The fact that China lacks well-functioning credit and legal systems worsens the situation. However, the current observation is that the P2P lending has experienced fast growth in China. In 2014, there were more than 1800 P2P platforms in China and the accumulated transaction size online was over ¥382.9 billion.[1] This thus leads to the question of why having P2P lending practices in China have proven robust against the adverse selection issue. In other words, why would the Chinese be willing to lend money to strangers on the other side of the internet, which under normal circumstances (offline situations) would never happen? What is the mechanism behind the online P2P market in China that facilitates this phenomenon?

In this paper, we investigate and evaluate how the mechanism the Chinese P2P online platform companies create helps to mitigate the asymmetric information problem. Specifically, we want to evaluate how the verifiable voluntary information disclosure system created by the Chinese P2P platforms helps to ease adverse selection problems. Unlike the US, there are no credit score agencies in China that monitor and provide the credit history of borrowers to lenders. Therefore, a leading Chinese P2P company, Paipaidai, has introduced a new mechanisms by providing a platform for borrowers to voluntarily disclose certain information such as face-to-face personal details, bank account information, education information, etc., which are further verified by Paipaidai. Based on the verified disclosed information, the system will give a score to each borrower, which can be made available to all lenders without cost.

Classical theories found in Grossman and Hart (1980), Grossman (1981) and Milgrom (1981) argue that information disclosure might mitigate the adverse selection problems discussed in Akerlof (1970). However, there are several important assumptions which need to be addressed. The information has to be verifiable and the cost to disclose this information is zero. The idea is that if the borrower obtains better information about herself and it does not cost anything to reveal this verifiable information, she will choose to do so. As for the lenders, they will infer that non-disclosure is a bad sign of the borrower. It will follow that in the equilibrium, the good-type borrowers will choose to reveal the information to signal her quality.

In reality, these assumptions are hard to hold in the online lending market. If the information disclosure platform of Paipaidai does not check and then reveal the information, the lenders will find it difficult to verify the information disclosed by the borrower. For example, the lenders would probably have to put forth a substantial amount of effort to verify whether the picture provided by the borrower is authentic. Meanwhile, it will also be

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[1] *Source*: 01caijing.com (accessed on October 5, 2015).

costly for borrowers to provide the information to the potential lenders without a proper platform. The borrower would probably have to find a way to convince the lenders that she is disclosing authentic information which could incur a substantial cost. Therefore, the system provided by Paipaidai which involves voluntary disclosure of verifiable information actually serves as an important mechanism to turn the information disclosure verifiable and reduce the costs of correspondence. We argue that this verifiable voluntary information disclosure mechanism helps to increase the online P2P lending transactions.

In this study, we test whether disclosed information will increase the probability that a loan will be successfully financed by lenders and if so, the extent, by exploiting a unique individual level data set obtained from Paipaidai, a leading Chinese P2P company. We find that information disclosure does increase the probability of successfully securing a loan by around 10%. We also find that the voluntary verifiable information disclosure helps to reduce the transaction interest rate by around 0.2%.

This paper contributes to the literature in several ways. First, the work contributes to the fast-growing volume of literature on practices in the P2P loan market. There is a wide variety of work in the literature that examines the different aspects of practices in the P2P market. It is always of great interest for both the academia and policymakers to understand what factors facilitate or hinder the loan transactions. Recently, several studies have examined how gender, appearance, reputation, income and other factors affect loan behaviors (see Pope and Sydnor, 2011; Gonzalez and McAleer, 2011; Duarte *et al.*, 2012; Michels, 2012). Unlike the US, there are no credit score agencies in China that monitor and provide the credit scores of potential borrowers to P2P lending companies. In this study, we aim to exploit a unique institutional setup in China to understand how voluntary information disclosure by loan borrowers affects success of securing a loan with emphasis on new mechanism design by Paipaidai. Specifically, we examine how the system design for voluntary verifiable information disclosure affects lending behaviors. To the best of our knowledge, this is the first empirical work that investigates this issue in the online P2P loan market.

This paper is also related to the empirical literature on how voluntary information disclosure affects firm performance in the capital market. In practice, listed companies may choose to voluntarily disclose certain information which comprises only a small fraction compared to mandatory information filing. There have been a number of studies that have examined the impacts of voluntary disclosure on the capital market (see Healy *et al.*, 1999; Gelb and Zarowin, 2000; Botosan, 1997; Diamond and Verrecchia, 1991). They argue that voluntary disclosure reduces information asymmetry among informed and uninformed investors. Botosan (1997) provides some evidence of a negative relation between the cost of equity capital and the extent of voluntary disclosure of firms with a low analyst following. This paper provides evidence about how voluntary information disclosure affects loan performance and equilibrium interest rate in China's online loan market.

The paper consists of five sections. Section 2 will outline the industry background of the P2P loan market in China and the scoring system of information disclosure on Paipaidai. Section 3 describes the data used in this paper. Section 4 sets up the hypothesis. Section 5 presents the regression results and Section 6 concludes.
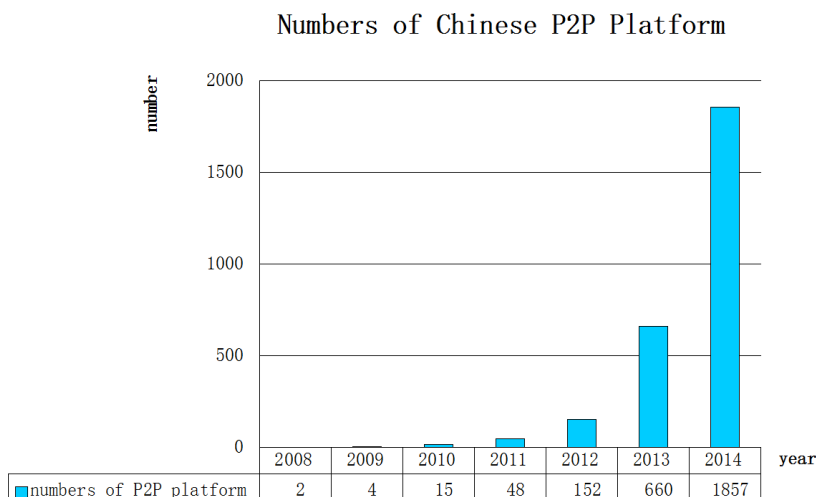
2. Industry Background and Data

2.1. *P2P lending industry in China*

Online P2P lending is the practice of lending money directly to unrelated individuals through an internet platform without going through a financial intermediary. Online P2P lending has recently emerged as an important business model in the financial industry.

P2P lending first appeared in China in 2007, and since 2012 has rapidly developed (Figure 1). Figure 1 shows that there were more than 1800 P2P platforms in China in 2014 and the accumulated transaction size online was over ¥382.9 billion.

The P2P loan market is open to everyone in China. Taking Paipaidai as an example, anyone with a mainland China identity card between the ages of 22–65 years old is qualified to register for an account on Paipaidai.com and become a borrower. On the other hand, anyone who is over 18 years old can be a lender.

The lending process works in the following way. First, an individual who wants to borrow money through Paipaidai.com may apply for a microloan by posting a loan listing with an amount that she would like to borrow, the interest rate she is willing to pay and the terms of this loan. Besides, the loan applicant may also provide information that pertains to her own personal demographics and characteristics, such as gender, age, location, photos, etc., on a voluntary basis. This information is usually not verified. Then, potential lenders who believe that it is worth investing in this loan applicant may bid on the loan listing with the amount that they are willing to lend. If the bid amount covers the amount to be borrowed within the stipulated time, a loan is generated and the money will transfer from the lenders to this borrower. Otherwise, the attempt to secure a loan will have failed.

Numbers of Chinese P2P Platform

year	2008	2009	2010	2011	2012	2013	2014
numbers of P2P platform	2	4	15	48	152	660	1857

Source: 01caijing.com (accessed on October 5, 2015).

Figure 1. Number of Chinese P2P Platforms

Borrowers who successfully secure a loan have the obligation to make monthly repayments to their lenders until the loan expires.

P2P lending companies provide a platform that helps match borrowers and lenders. P2P lending has several advantages compared with other means of securing a loan, which are usually conventionally realized through lending institutions. First, it is more convenient compared to the traditional loan application process. Borrowers can complete an application online and obtain a loan without collateral. Second, the approval process is much simpler than that of traditional financial institutions which means that borrowers wait for a shorter period of time. For example, most of the P2P loan platforms only have minimum requirements of the borrowers. Once the requirements are satisfied, the borrowers can place their loan proposal onto the platform. Third, the current P2P lending practice is more geared toward small businesses in China. The special relationship between state-owned giant enterprises and national banks means that financial institutions often favor state-owned enterprises. It is well known that small businesses in China find it difficult to obtain loans. The emergence of the online P2P lending therefore meets the demands of Chinese small businesses for financial resources. Lastly, P2P lending online also acts as an investment channel for individual Chinese investors. According to the Chinese Mass Affluent Report 2014, the total amount of personal investable assets was approximately ¥94.1 trillion in 2013 and around 41% of mass affluent investors have participated in internet financing activities. The traditional financial institutions in China mainly focus on wealth management services for high-end net-worth individuals, which means that it is difficult for mass affluent investors to satisfy their investment demands. The characteristics of P2P lending are therefore suitable for mass affluent investors.

Despite the advantages of online P2P lending in China, the lack of national credit monitoring agencies and a well-functioning legal system in China will only serve to amplify the information asymmetry problem. In China, there are no independent and professional credit agencies. The only agency that can provide credit reports is the Credit Reference Center affiliated with The People's Bank of China. According to information provided on the website of The People's Bank of China, the Credit Reference Center has maintained credit records for 0.8 billion naturalized persons in 2013, which is only about 60% of the population.[2] Meanwhile, credit reports in China are not as comprehensive as those in the US. They only include basic personal and bank account information such as credit-card usage and overdue payments. Moreover, these reports are hard to obtain.

The lack of a well-functioning legal system for enforcement of debt contract in China is another issue (see Lubman, 1999: 266–269; Clarke, 1996: 1–91; Cohen, 2005: 31–37). In the US, there are specific credit administrative bureaus like Equifax, Experian and Transunion. There is also a comprehensive legal system which is directly related to credit management and provides legislations such as the Fair Credit Reporting Act, Fair Credit Billing Act and Equal Credit Opportunity Act. However, in China, there is no law that is directly related to credit management; only the Credit Reporting Industry Regulations which went into effect on 15 March 2013.

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[2] *Source*: http://www.pbccrc.org.cn/crc/zxgk/index_list_list.shtml (accessed on October 10, 2016).

In sum, the lack of a mature personal reporting system and well-functioning legal system pose a great challenge to the online P2P lending industry in China. Yet why is this industry growing at an exorbitant rate? We argue that the voluntary verifiable information disclosure mechanisms designed by P2P lending companies in China help to alleviate these adverse selection problems. In the following section, we will outline the details of the design of the information disclosure system of Paipaidai.

2.2. *Scoring system of Paipaidai*

Paipaidai is the largest P2P lending platform in China. Similar to other P2P lending platforms online, the borrower needs to specify the following information for each loan listing: the proposed loan amount and the corresponding interest rate, and other information such as the length of the loan period, the intended purpose of the loan (e.g., operating a small business or for personal consumption), etc. Potential investors will review the loan listings and make their selection. Figure 2 shows an example of a loan listing on the Paipaidai platform. Once a listing receives enough bids, it is fully funded and becomes a loan.

Since Chinese platforms do not have a third-party credit score for reference purposes, Paipaidai has designed a unique scoring system which consists of two components. One component is associated with the verified voluntarily provided information from

Figure 2. Paipaidai P2P Platform

Figure 3. Scoring Based on Voluntary Information Disclosure

borrowers, such as their personal and financial information. The second component concerns the credit history of the borrower. Figure 3 illustrates the rules of the system for voluntary information disclosure.

Paipaidai allows borrowers to voluntarily disclose certain information and then reward the disclosure by giving score credits to the borrower. For instance, if the borrower provides a video, Paipaidai staff members can therefore identify the borrower through the live video, and the borrower is given 10 points as part of her Paipaidai credits toward her score. Details of the rules and the disclosed items are as follows:

National ID: Ten points are given to borrower if ID is verified by Paipaidai staff members, 0 otherwise. Besides, if the borrower provides more information, such as Household Register Certification and ID card of family member, she is likely to secure the 10 points.

Video: Borrower receives 10 points if she can be identified through a live video by Paipaidai staff members, 0 otherwise.

Education: Borrower receives 5 points if education certificates or education certification from government are provided to Paipaidai, 0 otherwise.

Mobile Phone: Borrower awarded 10 points for mobile phone with real name that can be verified by Paipaidai, 0 otherwise.

Online Bank Account: Borrower given 3 points for an online bank account statement that shows a deposit tied to her Paipaidai account, 0 otherwise.

Other Information: Paipaidai awards points for other information such as age, job, income and other types of relevant information. Besides, borrowers can provide as much information as they like, such as personal credit report, credit-card statement and housing ownership rights certificate to increase the number of points.

Online Community Participation: Paipaidai also awards the online community partici-
pation of a borrower. More points are given for active users while points are taken away if
users express improper remarks or behave inappropriately.

In the second component of the scoring system, Paipaidai creates a score that reflects
the credit history of the borrowers, which is very similar to the credit score in the US. The
process is as follows: if the borrower fully pays off the loan amount every month, 1 point
will be added to the accumulated score, and 0 otherwise (no more than 1 point is added
each month). If payment is overdue for more than 15 days, then 2 points will be deducted
for the corresponding month. By creating this credit score, Paipaidai can provide the
lenders with information on loan history. For instance, if a borrower has a very high credit
score, then this suggests that the borrower has a good credit history and paid back the
monthly payment in full many times. Repayment can comprise full repayment or defaulting
of repayment.

Full Repayment: A cumulative number that shows repayment performance. One point is
awarded each time that a monthly payment is paid off. No more than one point can be
awarded every month.

Post Repayment: A cumulative number that reflects overdue or defaulted payments.
Two points are deducted each time that a monthly payment has been overdue for more than
15 days.

In the end, a total score will be publicly available on each borrower which is obtained by
adding up the scores from the voluntary disclosure of information and credit history. This
study focuses on how voluntary disclosure of information and credit score could affect
online P2P lending activity by exploring a unique individual level data set obtained from
Paipaidai.

3. Data

The data were obtained from Paipaidai for the time period of October–December 2012.
The advantage of this data set is its rich information as well as the panel structure which
can trace each individual's loan transaction.

Table 1 shows the summary statistics of all of the loan listings on Paipaidai from October
to December 2012. There are 5706 loan listings in the data set. On average, the loan size is
44,581 RMB; the interest rate is 19% and the duration of the loan is 6.67 months. The loan
amount ranges from ¥3000 to ¥300,000. The loan interest rate ranges from 9% to 25.24%. The
longest loan period is 12 months, and the short loan only lasts for 1 month.

Table 1. Summary Statistics of All Loan Listings

Variable	Obs	Mean	Std. Dev.	Min	Max
Loan amount	5706	44,581.63	70,153.81	3000	300,000
Loan interest rate (%)	5706	19.26424	2.383103	9	25.24
Loan term (month)	5706	6.671419	2.985211	1	12

Table 2. Summary Statistics of All Successfully Funded Loan Listings

Variable	Obs	Mean	Std. Dev.	Min	Max
Loan amount	3517	45,491.95	70,646.78	3000	300,000
Loan interest rate (%)	3517	19.20155	2.36618	9	25.24
Loan term (month)	3517	6.686931	2.983281	1	12

Table 2 shows that, among the 5706 loan listings, 3517 are successfully funded, which means a successful funded rate of 61.64%. Among the successful loan listings, the average loan amount is 45,491 RMB; the average interest rate of the successful listings is 19.20%, which is much higher than that of traditional loans; and the average duration of the loan is around 6.68 months which is similar to that of all loans.

Table 3 shows the information of all borrowers. There are in total 4662 borrowers. They have an average credit score of 48. The majority are male, representing around 80.35% of the borrowers. For these 4662 borrowers, the average number of loans which each borrower has successfully received full money for is 3. Some individual borrower has made 51 successful loans. The average number of loans of each borrower which fails to receive enough money is 1.4. Someone has made 26 failure loan requests.

Table 4 shows that, among these 4662 borrowers, there are 2876 borrowers who successfully received funding from October to December 2012. This means that nearly half of the borrowers successfully received funding. The average credit score of these successful borrowers is about 49.6, which is higher than the average score of all borrowers. Among

Table 3. Information of All Borrowers

Variable	Obs	Mean	Std. Dev.	Min	Max
Successfully funded	4662	3.004554	6.122401	0	51
Failed to receive funds	4662	1.424287	2.37824	0	26
Borrower's score	4662	47.57769	23.61694	0	137

Gender	Frequency	Percent (%)
Male	3746	80.35
Female	593	12.72
Unknown	323	6.93

Age	Frequency	Percent (%)
20–25	1624	34.83
26–31	1815	38.93
32–38	886	19.00
Unknown	3	0.06
Over 39	334	7.16

Table 4. Information of Successfully Funded Borrowers

Variable	Obs	Mean	Std. Dev.	Min	Max
Successfully funded	2876	2.72879	5.022677	0	50
Failed to receive funds	2876	1.687065	2.388404	0	26
Borrower score	2876	49.65195	20.71703	0	137

Gender	Frequency	Percent (%)
Male	2317	80.56
Female	384	13.35
Unknown	175	6.08

Age	Frequency	Percent (%)
20–25	691	24.03
26–31	1263	43.92
32–38	684	23.78
Unknown	2	0.07
Over 39	236	8.21

these successful borrowers, the male borrowers represent about 80.56%, which is very close to ratio for all borrowers.

As discussed earlier, the Paipaidai scoring system has two components: score of verifiable voluntarily information from borrowers and credit history of the borrowers.

Table 5 shows the summary statistics of items of information disclosure. Moreover, the table also presents the difference between the rate of successfully receiving funding and interest rate for loan listings that have disclosed or not disclosed information. Most of the borrowers (98.22%) provide ID information, so this is helpful for increasing the rate of success of being funded but does not mean a reduction in interest rate. About one-third or 38% of the borrowers provided a video, and their interest rate for the funded loan was subsequently reduced by 1.31%. There are very few borrowers who disclosed information about their education, but those who did disclose had the highest rate of success of receiving funding. Around 73% of the successful borrowers disclosed their online bank account information. In doing so, their rate of being successfully funded is higher and is the second most viable means of reducing the interest rate. In sum, the simple summary statistics suggest that disclosure has a significant influence on funding success and reduced interest rate.

Table 6 presents the summary statistics of the variables that mainly reflect the credit history of the borrowers. The table shows that some of the borrowers have a good credit history because they have a high "full_repayment" score.

Table 7 shows the correlation between each variable. The correlation coefficients among several variables are significantly positive. This suggests that borrowers might disclose several items of information. Therefore, we need to carefully control for the different items

Table 5. Comparison of Disclosed and Undisclosed Loan Listings

Item	ID			Video			Education			Mobile Phone			Online Bank Account		
Disclosure	dis	undis	**dif.**	dis	undis	**dif.**	dis	undis	**dif.**	dis	undis	**dif.**	dis	undis	**dif.**
Freq.	5507	199	5308	2137	3569	−1432	1170	4536	−3366	2953	2753	200	4043	1663	2380
Percent (%)	96.51	3.49	93.02	37.46	62.55	−25.09	20.50	79.50	−59	51.75	48.25	3.5	70.86	29.14	41.72
Successful rate (%)	63.59	7.54	56.05**	99.06	39.23	59.83**	99.06	51.98	47.08**	94.55	26.33	68.22**	85.68	3.19	82.49**
Interest rate (%)	20.60	22.02	−1.42*	19.15	21.55	−2.40*	19.29	21.00	−1.71*	19.61	21.76	−2.15*	20.01	22.22	−2.21*

Notes: In the 5706 loan listings, there were 2137, 1179 and 2953 disclosed videos, education qualifications and mobile phone information, respectively. Most of the borrowers disclosed their ID information. The rate of successfully receiving funding is much higher when there is a disclosure. The successful reduction of the interest rate for disclosure is low, except when ID is provided.
*$p < 0.05$.
**$p < 0.01$.

Table 6. Summary Statistics of Previous Borrowing Performance

Variable	Obs	Mean	Std. Dev.	Min	Max
Full_repayment	5706	3.06	6.14	0	49
Post_repayment	5706	0.05	0.81	−40	1
Other information	5706	10.53	10.80	−2	56
Online community participation	5706	0.18	1.49	−2	29

Notes: Among the 5706 loan listings, the average score for online community participation is only 0.18, which is very low. This shows that few borrowers have participated in the online community. Besides, the full repayment score ranges from 0 to 49 while post repayment ranges from −40 to 1. The standard deviation of the scores for other information is relatively high.

in the regression to identify the impact of each single information disclosure item on the loan performance.

4. Hypothesis Development

In this section, several hypotheses are discussed, which were used to examine whether the verifiable voluntary information disclosure in the Paipaidai platform affects the market performance of P2P loan transactions online and if so, to what extent.

4.1. *Information disclosure and probability of funding success*

In P2P lending, lenders cannot have face-to-face meetings or the opportunity to talk with the borrowers. Under normal circumstances, it is highly unlikely that anyone would lend money to strangers based on descriptions of their need for a loan, which have not been verified. The information disclosure platform therefore plays an important role in helping to ease the information asymmetry in this market.

In the context of Paipaidai, as discussed earlier, borrowers are given the option to voluntarily disclose some of their private information which would be verified by Paipaidai. After collecting the information, Paipaidai will provide a score for each borrower based on the information that she has disclosed and provide the lenders with these scores.

From the perspective of the lender, the cost of verification is zero because Paipaidai has already verified the information on their behalf without cost. Then, the volume of disclosed information, which is associated with the individual score, will provide information on the borrower to the lender. Holding other things equal, borrowers who are worthy of lending money, or those who are more likely to repay the money, will feel more confident to disclose more private information. On the contrary, borrowers with higher probability to default will be more reluctant to disclose private information because the disclosed information in the end will be used by Paipaidai to pursue repayment which is more costly to her if she defaults. Therefore, this verified voluntarily disclosed information is an invaluable sign for the lenders. Consequently, lenders would be more likely to lend money to borrowers with a higher credit score. Thus, the following hypothesis is derived.

Table 7. Correlation

	LAMT	TER	ID	VID	EDU	PHONE	OACC	FPAY	PPAY	OINFO	OPER
TER	0.0630*	1									
ID	0.0061	0.0013	1								
VID	0.1520*	0.1477*	0.1411*	1							
EDU	0.0195	0.0438*	0.0942*	0.2329*	1						
PHONE	0.0460*	0.0936*	0.1950*	0.5440*	0.2689*	1					
OACC	0.0750*	0.0821*	0.2565*	0.5495*	0.3180*	0.6086*	1				
FPAY	0.0831*	0.1950*	0.0944*	0.5241*	0.2678*	0.4424*	0.4339*	1			
PPAY	0.0019	−0.0320*	−0.0118	−0.0575*	−0.0620*	−0.0491*	−0.0484*	−0.1035*	1		
OINFO	0.0535*	0.1361*	0.1814*	0.5915*	0.3601*	0.5902*	0.6601*	0.6883*	−0.0835*	1	
OPER	−0.0211*	−0.0191	0.0220	−0.0839	−0.0522*	−0.0494	−0.1542	−0.0466*	0.0193	−0.1116*	1

Notes: The 5706 loan listings were used to examine the correlation between each variable. The correlation coefficient between providing a video and mobile phone, online bank account, full repayment and other information is more than 0.5, which may indicate multicollinearity.
*$p < 0.05$.

H1: *In equilibrium, the probability that a loan is successful is positively correlated to the amount of information disclosed.*

In order to examine the relationship between disclosure and the rate of success of receiving funding, we adopt a logit model to show the relationship between the probability of being successfully funded. The logit model is as follows:

$$\text{Logist}(\text{FSUCC}_i) = \beta_0 + \beta_1 \times \text{IR}_i + \beta_2 \times \text{LAMT}_i + \beta_3 \times \text{TER}_i + \beta_4 \times \text{ID}_i$$
$$+ \beta_5 \times \text{VID}_i + \beta_6 \times \text{EDU}_i + \beta_7 \times \text{PHONE}_i + \beta_8 \times \text{OACC}_i + \beta_9$$
$$\times \text{FPAY}_i + \beta_{10} \times \text{PPAY}_i + \beta_{11} \times \text{OINFO}_i + \beta_{12} \times \text{OPER}_{i+} \varepsilon_i, \quad (1)$$

where

FSUCC = a dummy variable that indicates whether the loan listing is successfully funded or not;
IR = final annual interest rate that a borrower is willing to pay;
LAMT = total amount of money that a borrower requires in a loan listing;
TER = loan term (monthly);
ID = indicator variable, taking a value of 10 if ID certification is verified, 0 otherwise;
VID = indicator variable, taking a value of 10 if video has been submitted, 0 otherwise;
EDU = indicator variable, taking a value of 5 if education certification is verified, 0 otherwise;
PHONE = indicator variable, taking a value of 10 if mobile phone is verified, 0 otherwise;
OACC = indicator variable, taking a value of 3 if deposit made into online bank account tied to Paipaidai user account, 0 otherwise;
FPAY = accumulated score, 1 each time a monthly repayment is fully paid, 0 otherwise (no more than 1 point for each month);
PPAY = accumulated score, −2 each time a monthly repayment is overdue for more than 15 days, 0 otherwise;
OINFO = points given by Paipaidai according to other information submitted by the borrower;
OPER = score given by Paipaidai depending on online community participation of borrower, additional point for active users and subtracted points for improper remarks and inappropriate behavior; and
i is the subscription of listings.

Table 8 shows the definition of all the variables.[3]

Here, the variables ID, VID, EDU, PHONE and OACC are related to the type of information disclosure. If the borrower discloses the information, the value of the variable will take 1. It is anticipated that the coefficients of these variables are positive if information disclosure helps to address the asymmetric information problem.

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[3] The time variable, which records when the loan projects are posted online, might also be an important variable. For instance, if the loan project is put online in the early evening, more people might notice the project and lend money to the project than if the loan is put online after midnight. Unfortunately, we do not have the data of when a loan was posted online. However, we argue that, although the time variable might potentially affect the successful rate of the loan, it is plausible to believe that it might not significantly affect the relationship between the information disclosure affects and the loan success rate. Specifically, if the investors like the disclosed information of the loan package, this preference probably will not be significantly affected by whether it is in the morning or in the evening.

Table 8. Variable Definitions

Variable	Definition
Loan Amount (LAMT)	Total amount of money that a borrower requires in a loan listing
Interest Rate (IR)	Final annual interest rate that a borrower is willing to pay
Term (TER)	Loan term (monthly)
ID (ID)	10 if ID is verified, 0 otherwise
Video (VID)	10 if video has been submitted, 0 otherwise
Education (EDU)	5 if education certification is verified, 0 otherwise
Mobile Phone (PHONE)	10 if mobile phone is verified, 0 otherwise
Online Bank Account (OACC)	3 if deposit made into online bank account tied to Paipaidai user account, 0 otherwise
Full Repayment (FPAY)	Accumulated score, 1 each time a monthly repayment is fully paid, 0 otherwise (no more than one point added for each month)
Post Repayment (PPAY)	Accumulated score, -2 each time a monthly repayment is overdue for more than 15 days, 0 otherwise
Other Information (OINFO)	Points given by Paipaidai according to other information submitted by the borrower
Online Community Performance (OPER)	Scores given by Paipaidai according to borrower's online community participation, plus point for active user and points subtracted for improper remarks and inappropriate behavior
Funding Success (FSUCC)	A dummy variable that indicates whether the loan listing is successfully funded or not

In the regression, previous credit performance variables are also controlled, which include FPAY and PPAY. Meanwhile, the loan amount, loan interest rate and loan term are also controlled, since they may affect the performance of the loan.

4.2. *Information disclosure and interest rate*

Following the above argument, we look at the relationship between the amount of information disclosure and interest rate of the loan. In equilibrium, if lenders prefer to finance loans with more information disclosure, borrowers with less amount of information disclosure would have to increase the interest rate to compensate negative effect. Therefore, given that all of the other factors are constant, we should observe that less information disclosure is associated with higher interest rates. Thus, this leads to the second hypothesis.

H2: *In equilibrium, the interest rates of loans are negatively correlated with the amount of information disclosure.*

To study the relationship between disclosure and interest rate, an OLS regression is used for empirical analysis. The regression model is as follows:

$$\begin{aligned} IR_i = {} & \beta_0 + \beta_1 \times LAMT_i + \beta_2 \times TER_i + \beta_3 \times ID_i + \beta_4 \times VID_i \\ & + \beta_5 \times EDU_i + \beta_6 \times PHONE_i + \beta_7 \times OACC_i + \beta_8 \times FPAY_i \\ & + \beta_9 \times PPAY_i + \beta_{10} \times OINFO_i + \beta_{11} \times OPER_i + \varepsilon_i. \end{aligned} \tag{2}$$

The definition of the variables is the same as that of Equation (2).

In the regression, the variables ID, VID, EDU, PHONE and OACC are related to disclosure of information. We anticipate that the coefficients of these variables are negative if less information is disclosed which is correlated with higher interest rates.

In the regression, we also include previous credit performance variables which include FPAY and PPAY. Meanwhile, the loan amount and loan term are also controlled, since they may affect the interest rate level according to previous studies. Besides, we are only examining the sample of successfully funded loans instead of all loan listings during this period of time.

4.3. *Information disclosure versus credit history*

We also want to understand the interaction between information disclosure and credit history. The system created by Paipaidai actually provides two scores. There is the score based on the amount of information disclosed by the borrowers. A higher score means more information has been disclosed. Then there is the score based on the payment history of the borrowers. For instance, if the borrower pays back the stipulated amount on time each month, she will be given 1 point; if not, there will be deducted points. This score reflects her credit history, which is similar to the credit score given by credit agencies in the US.

Following the previous argument, information disclosure should have a constructive impact on the decision of lenders. Then, how would information disclosure affect the behavior of lenders in combination with the credit score? In other words, do information disclosure and credit score substitute or complement each other?

From the perspective of the lenders, more information disclosed will motivate lending; the same can be said with a higher credit score. However, when these two types of information are taken together, there might be two possible channels that they influence the decision of the lender.

First, it is possible that some lenders may only want to rely on the amount of information disclosed to make their decision when the borrower lacks credit history. However, when the borrower has some credit history or a credit score, it is possible that some lenders might give more weight to a higher credit score due to their own preference of using the past history of the borrower instead of her current information disclosure. If this is the case, the information disclosed might serve as a substitute to the credit score.

Meanwhile, it is also possible that a higher credit score will motivate lenders and reinforce their confidence toward the information disclosure level of the borrower, instead of reducing their reliance on the information disclosure. If this is the case, information disclosed and credit score complement each other.

Of course, it is also possible that the two do not have any influence on each other when it comes to decision-making on money lending.

Therefore, the dominant means is determined by the field data. This leads to the following hypotheses:

H3a: *In equilibrium, the score from information disclosure is an alternative to the credit history score.*

H3b: *In equilibrium, the score from information disclosure complements the credit history score.*

The following logit regression is used to test the above hypotheses. It is similar to Equation (1) with some modifications:

$$\text{Logist}(\text{FSUCC}_i) = \beta_0 + \beta_1 \times \text{InfoDisc}_i + \beta_2 \times \text{Credit}_i + \beta_3 \times \text{InfoDisc}_i \times \text{Credit}_i$$
$$+ \beta_4 \times \text{IR}_i + \beta_5 \times \text{LAMT}_i + \beta_6 \times \text{TER}_i + \varepsilon_i. \tag{3}$$

Here, FSUCC is the dummy which denotes whether the loan listing is successful in receiving a full loan. InfoDisc_i is a measure of the amount of information disclosed which is the summation of the values of all the information disclosure variables: ID, VID, EDU, PHONE and OACC. Credit is a measure of the credit of the borrowers. It is the summation of the values of two credit-related variables: FPAY and PPAY. Other control variables include IR_i, LAMT_i and TER_i.

We are interested in the impact of the interaction term $\text{InfoDisc}_i \times \text{Credit}_i$ on the loan listing performance. If positive, it means that information disclosure and credit are reinforcing each other. Therefore, they complement each other. If the coefficient is negative, then they are alternatives for each other.

5. Empirical Results

5.1. *Relationship between information disclosure and rate of success of receiving funding*

Table 9 shows the logit regression results for successfully funded loan listings. The sample size is 5671. The coefficients have been calculated to reflect the marginal effects. In the first column, the model is only run with the control and disclosed information variables. The second column is the result of the regression with the control variables and previous credit performance of borrowers as the independent variable. The third column presents the result of entire regression model which includes both disclosed information and previous credit performance.

First, the results show that the variables of voluntary information disclosure have strong impacts on the probability of success of securing a loan. If the borrower voluntarily provides a video, the probability of successfully securing a loan will increase by 8%. Similarly, the regression results show that providing an education certificate will increase the probability of successfully securing a loan by 11%; disclosing phone information will increase the probability by 7% and disclosing online banking information will increase the probability by 8%.[4]

The table also indicates that the credit performance of the borrowers impacts funding success, especially full repayment. If the borrower has made a monthly repayment (FPAY), the probability of successfully securing a loan will increase by 5.1%. However, if she/he defaults on a payment (PPAY), this will reduce the probability of successfully securing a loan by 5%.

Table 9 also shows the impact of other control variables on the probability of successfully securing a loan. For instance, the interest rate is set by the borrowers and the

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[4]Technically speaking, without completely addressing the unobserved heterogeneity issue due to the data constraint, the current findings are not cleanly identifying the causal relationships. Therefore, rigorously speaking, the current results might reflect more on the statistical correlation. With more data available in the future, it might be possible to completely address the endogeneity issue, which will be left for future work. We thank one of the anonymous referees for pointing this out.

Table 9. Information Disclosure and Probability of Successfully Securing Loan

	(1) FSUCC	(2) FSUCC	(3) FSUCC
IR	−0.79*	−0.36	−0.66*
	(−2.03)	(−1.58)	(−2.17)
LAMT	0.000011***	9.63e−06*	9.52e−06***
	(4.20)	(2.48)	(3.78)
TER	−0.0022	−0.00075	−0.0026*
	(−1.96)	(−1.55)	(−2.15)
ID	−0.0020		−0.0049
	(−0.15)		(−0.32)
VID	0.068*		0.079*
	(2.17)		(2.50)
EDU	0.088*		0.11*
	(2.16)		(2.47)
PHONE	0.062*		0.073*
	(2.13)		(2.45)
OACC	0.081*		0.081*
	(2.10)		(2.38)
FPAY		0.039	0.051*
		(1.64)	(2.34)
PPAY		−0.032	−0.052*
		(−1.69)	(−2.30)
OINFO		0.0015	0.00092*
		(1.62)	(2.02)
OPER		−0.035	−0.0587396
		(−1.87)	(−1.61)
_cons	2.45	0.99	−1.19
	(1.60)	(0.74)	(−0.70)

Notes: *t*-statistics in parentheses.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

result shows that when the interest rate is reduced by 1%, the probability of successfully securing a loan will increase by 0.6%. Although the loan amount and loan term also have significant effects, their signs are consistent with our intuitions.

In sum, the voluntary disclosure of information has a significantly positive impact on the success of a loan listing in securing funds. On average, the disclosure of each item increases the probability of success by around 10%.

5.2. *Relationship between information disclosure and interest rate*

The next regression examines the impact of information disclosure on the equilibrium interest rate. We employ an OLS regression with 3482 observations. Table 10 shows the results. Three regressions are conducted. The first one only includes the information-disclosure-related

Table 10. Information Disclosure and Interest Rate

	(1) IR	(2) IR	(3) IR
LAMT	−1.99e−07***	−2.24e−07***	−2.09e−07***
	(−10.93)	(−12.35)	(−11.77)
TER	−0.00043***	−0.00056***	−0.00030*
	(−3.28)	(−4.20)	(−2.33)
ID	0.0055		0.0083
	(0.88)		(1.33)
VID	−0.0019*		−0.00020
	(−2.16)		(−0.23)
EDU	−0.0031***		−0.0016*
	(−3.73)		(−1.94)
PHONE	−0.00089*		−0.0025*
	(0.84)		(2.42)
OACC	0.0012		0.0023
	(0.37)		(0.71)
FPAY	−0.024***		−0.018***
	(−26.66)		(−15.86)
PPAY		−0.0032	0.0059**
		(−1.79)	(3.23)
OINFO		−0.0012***	−0.00065***
		(−30.41)	(−12.59)
OPER		−0.00067	−0.0013771
		(−0.30)	(−0.64)
_cons	0.209***	0.218***	0.214***
	(33.40)	(111.26)	(33.71)

Notes: *t* statistics in parentheses.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

variables. The second regression only uses other control variables and previous credit performance of borrowers as the independent variables. The third regression incorporates all of the variables including information-disclosure-related variables and the credit performance of the borrowers.

First, the results show that providing a video, education certificate, online bank account information and mobile phone can help to reduce the interest rate, which is also consistent with Hypothesis 1. An education certificate will reduce the interest rate by 0.16%.[5] Disclosing mobile phone information will reduce the interest rate by 0.25%. The results show

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[5] As one of the anonymous referees points out, there might be two mechanisms via which the education influences interest rate. One is the information disclosure effect. That is, lenders may like more information to be released by the borrower. The other mechanism might be education effect itself. Specifically, the interest rate might be lowered due to the high level of education of the borrowers. If the education levels of the borrowers are controlled in the regression, we can potentially identify these two effects separately by exploiting the variations of the education levels of the borrowers, and then evaluate the relative importance of these two effects in the P2P loan platform. However, unfortunately, the Paipaidai system does not provide the data about the education level of the borrowers.

that providing a video or online banking information also helps to reduce the interest rate, but the results are not statistically significant. Meanwhile, there is no evidence that providing ID can help to reduce the interest rate. This could be because 98% of the borrowers provided an ID so that disclosing identification is not a useful sign to lenders.

In addition, the previous credit performance of borrowers also has very significant impacts on reducing the interest rate. This result also is consistent with the findings of Hypothesis 1. The results show that full repayment of previous loan amounts on a monthly basis reduces the interest rate by around 1.8%. Post payment means default or delayed payment, but the borrower will eventually pay back the full amount. So when post payment happens, the interest rate increases by 0.6%.

In sum, the second hypothesis also holds. The voluntary information disclosure has a significant impact on reducing the equilibrium interest rate. On average, the magnitude of the interest rate decrease is about 0.2%.

5.3. *Relationship between information disclosure and credit history*

Hypothesis 3 is further examined in this section. Table 11 shows the logit regression results. InfoDisc is a measure of the amount of information disclosed which is the summation of the values of all the information disclosure variables: ID, VID, EDU, PHONE and OACC. Credit measures the credit of the borrowers. It is the summation of the values of FPAY and PPAY, which are the two credit-related variables.

Table 11. Relationship Between Score of Information Disclosure and Credit Score

	(1) FSUCC	(2) FSUCC	(3) FSUCC
Infodisc	3.59***	4.02***	4.03***
	(6.13)	(6.75)	(6.75)
Credit	3.65**	4.13**	4.14**
	(2.42)	(2.68)	(2.70)
Infodisc × Credit	−0.61	−0.84	−0.80
	(−1.10)	(−1.49)	(−1.43)
IR	−60.7***	−32.9***	−32.8***
	(−11.99)	(−5.82)	(−5.90)
LAMT		0.00057***	0.00057***
		(4.82)	(4.91)
TER			−0.12***
			(−5.11)
_cons	2.75	−6.15**	−5.60**
	(1.46)	(−2.94)	(−2.71)

Note: *t* statistics in parentheses.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

The results show that both information disclosure and credit history have significantly positive impacts on the probability that a loan listing will successfully secure funds. This result is consistent with previous findings. We pay special attention to the coefficients of the interaction term: Infodisc × Credit. The value is negative but not significant. In other words, there is no strong evidence that information disclosure and credit history complement each other or are alternatives. Instead, the finding here suggests that these two factors do not have any influence on each other when it comes to decision-making on money lending.

6. Conclusions

The online P2P lending industry has experienced rapid growth in the past decade not only in China but also globally. An interesting observation has led to the question what motivates the willingness of Chinese people to lend money to strangers online in the P2P market, when they are unlikely to lend money to strangers under normal circumstances? We argue that a system of voluntary disclosure of verifiable information created by online P2P companies in China might have an important role in easing the adverse selection problem. In this study, we examine whether disclosed information will increase the probability that a loan will be successfully financed by lenders and if so, the extent.

By exploiting a data set from a leading online P2P lending company in China, we show that disclosure of individual information including the provision of a video, education certificate, mobile phone number as well as online bank account information will have positive effects on funding and can significantly reduce the interest rate. Besides, good credit performance in the past such as full repayment of monthly amount in a timely manner also has similar effects. In sum, the results confirm the significant effects of disclosure of verifiable information toward mitigating asymmetric information problems in online P2P lending.

Based on the current findings, one further question is whether borrowers who voluntarily reveal their information are also less likely to default on the loan. Specifically, if more disclosed information induces more lenders to lend money to the project, is the higher level of information disclosure also correlated with less likelihood to default? This question has important policy implications and is definitely worth further exploration. However, the default data of the loans at Paipaidai platform are currently not accessible. But this question is definitely worth further exploration in the future to complement the current findings.

This study has important policy implications for practitioners in this field. First, the study offers an appropriate means supported theoretically which can significantly help to mitigate asymmetric information problems and increase the chance that a loan listing will successfully receive funding. We have to, however, point out that the information disclosure system of Paipaidai is still very simple in terms of the disclosed items of information. Other information can be also further solicited for disclosure such as the home address, employer and so on and so forth. Therefore, a question that results would be what is an optimal information disclosure system or the volume of disclosed information that would best contribute to the practice of P2P lending? To maintain the healthy development

of the online P2P lending market, both policymakers and practitioners need to further explore answers for this question.

Acknowledgment

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