PERFORMANCE AS A SIGNAL TO INFORMATION ASYMMETRY PROBLEM IN ONLINE PEER-TO-PEER LENDING

Lei Yang, The Chinese University of Hong Kong, yanglei@baf.cuhk.edu.hk
Lai, Vincent Siu-king, The Chinese University of Hong Kong, vslai@cuhk.edu.hk

Abstract

The online peer-to-peer (P2P) lending market, in which it is the practice of making unsecured microloans to other individual borrowers, is becoming more and more popular worldwide. In this market, information asymmetry between lenders and borrowers may create the adverse selection problem -- the lenders may fund sub-prime borrowers with high risk of defaulting. In this study, we propose a model to evaluate how performance – individual and group can be used as signals to reduce information asymmetry problems. We also propose these performance signals can interact with lenders risk attitude to affect funding success. Data from PaiPaiDai will be collected to evaluate our research model, along with our proposed research hypotheses.

Key words: peer-to-peer lending; signaling; information asymmetry; group performance;
1 INTRODUCTION

Online Peer-to-Peer (P2P) lending is the practice of making unsecured microloans to other individual borrowers, or "peers", through online platforms without the mediation of a traditional financial intermediary such as a bank or any other traditional financial institution (Chen & Han 2012; Collier & Hampshire 2010). This form of lending has been developing rapidly since 2005 (Lin & Prabhala 2012). In general, online P2P lending market is less transparent and riskier, as compared to the traditional offline financial market (Greiner & Wang 2009). The reason is that banks and financial institutions require borrowers to disclose their financial background, credit history, income and employment when loan applications are made. However, online P2P lenders are more relaxed on these requirements, which eventually resulted in higher loan default rate and borrower risk. Hence, online P2P lenders are often uncertain of whether their loans will turn out to be a good or bad investment. The P2P borrowers, however, are able to retrieve information that they need on lenders and loans. When online lenders have inadequate borrower information but borrowers have their required loan information, it creates an information asymmetry (Spence 2002) problem in online loan transactions. This imbalance of information between lenders and borrowers can cause adverse selection problem (Akerlog 1970), which will mislead online lenders to fund higher risk sub-prime borrowers. Adverse selection will also push interest rate higher and attract riskier borrowers to seek for loans in the marketplace (Shen et al. 2010).

There are two primary solutions to information asymmetry problem -- signaling and screening (Akerlof 1970). Signaling is the observable actions taken or signals given by the more informed party to the less informed party (Spence 1973). For example, higher education is a signal of higher job competency and extended warranty is signal of better product quality. Screening, on the other hand, is the attempt by the less informed party to learn more information from the other party. By screening, the less informed party can reduce information asymmetry by learning from the other party (Stiglitz 1973). For example, asking consulting firms to provide references helps screening ineffective and incompatible firms. In the context of online P2P lending, screening may be less appropriate than signaling in reducing information asymmetry problem. The reason is that borrowers have all the incentives to misrepresent and overstate their repayment ability in order to secure a loan at a lower interest rate (Greiner & Wang 2009). As a consequence, it may be more applicable to turn to signaling solutions by observing the performance of borrowers and/or other social factors to make more informed funding decisions. The social factors include group ratings, friendship, and endorsement from group leaders (Shen et al. 2010; Lin et al. 2013).

In situations when communication is not possible, the environment is uncertain, but the transaction is deemed needed, trust between buyers and sellers could become critical. Prior research studies have shown that sellers’ reputation is correlated to sellers’ trust, which, in turn correlates to their perceived risk (Jarvenpaa et al. 2000). Prior studies also found that trust is transferable among sellers in a group setting. . Whena group is rated for its overall group performance, all of its group members will be tied to this rating, meaning that this rating is transferable among all group members. Hence, the use of group performance could probably be relevant in reducing information asymmetry.

In this research, we intend to study the effect of individual and group performance on loan success in online P2P market. We propose to use individual and group performance as signals to help lenders in their determination of loaning. We aim to test whether higher individual and group performance can lead to higher probability of funding success and lower interest rate. Each group will have its own selection criteria, some will require the background of applications and some others will require some basic information (e.g. age, income). In a group, every member’s action (transaction) will impact the credit score of the group (group performance). Their delay, or default, in loan payment would cause another effect called stigma cost. That means that if a group member delays or defaults a loan, the group’s score will be adversely affected. Hence, sub-prime borrowers could be expelled from a group because their behavior had negative effect on the group scores. Therefore, in the group, where its members would like to have successful loan funded at a lower interest rate, group members will supervise each other to obey the disciplines or repay the loans on time in order to receive higher group
scores. By this token, P2P lenders could regard group scores as a credible signal to base their loan decisions.

In this research, we also aim to evaluate the moderation effect of lenders’ risk attitude on the relationship between performance and loan success. Risk taking ability of lenders has been perceived to be an important factor in lending process (Klafft 2008). When lenders are more risk taking, they may tolerate lower individual or group performance but still choose to loan out their money. However, more risk averse lenders may think otherwise in this scenario and choose to give up the lending.

Our research has two important contributions. First, it is a pioneer project that employs empirical data to investigate online P2P lending behavior in China. Our findings could provide evidence on the effectiveness on individual and group performance as signals to reduce information asymmetry associated with online P2P lending in China. These findings could contribute to the cumulative findings in online P2P lending research, adding additional insights to those that have already been derived from other countries. Second, our research explores P2P funding success with a dual perspective of both borrowers and lenders. Most other P2P lending research only adopts one perspective, which may restrict their findings to explain the loan matching process between borrowers’ listings and lenders’ biddings. Our findings, however, could provide evidence to clarify the behaviour of lenders in assessing the funding request of borrowers.

2 RESEARCH BACKGROUND

2.1 PaiPaiDai.com

Prior to the use of PaiPaiDai’s service, a user must register with the website by providing information on user name, mobile phone number, account password, and role (lender or borrower). By the time a registered user initiates a financial transaction, he has to provide additional information (such as ID card, personal credit report, certificate of employment, and details of pay card in the last three months) for verification. To ensure privacy of borrowers and lenders in the transaction, the true identity of them are not revealed in the website. All loan participants are only identified by their user-names, which were created when they signed up for their accounts.

When PaiPaiDai has validated a user as a qualified lender or borrower, an approval email will be sent to the applicant. At this stage, the borrower can begin his loan auction by preparing an online loan request or listing, including the loan amount, maximum interest rate, and optionally, loan purpose. Auctions will be closed as soon as the loan listing gets fully funded at the borrower’s asking interest rate.

If the registered user is a lender, this user has to transfer enough money to their noninterest individual account before bidding. An individual lender can bid for an amount of ¥50 or more and specify the minimum interest rate desired for the loan. The actual bidding process uses a proxy bidding mechanism. If the loan has not been fully funded, lenders can still continue the bid at the borrower’s asking rate, disregarding what lenders’ minimum interest rates are. After all the listing has been fully funded, the system will close the auction. All bids cannot be withdrawn once the loan auction is complete. If the loan is not fully funded at the end of the auction, the request is deemed to have failed and no funds are transferred: No partial funding is allowed. Successful auctions will trigger lenders’ money to be transferred to the borrower’s account immediately, with the deduction of a commission fee up to 5% of the loan amount. Loans on PaiPaiDai have a fixed maturity of 36 months with repayments in equal monthly instalments automatically deducted from a borrower’s bank account and distributed to lenders’ accounts. If the monthly payment is made on time, the loan status for that month is considered as current. If a monthly bill is not paid on time, the loan status will be changed to “late”, “one month late”, “two months late”, etc. If a loan is late for two months or more, the loan information will be sent to a collection agency for further actions. Delinquencies are reported to credit report agencies, which eventually can affect borrowers’ credit scores. Borrowers who default on their loans are not allowed to borrow using PaiPaiDai again. When loan is defaulted, lenders must agree to accept the proceeds from collections as a full settlement of their loans.
2.2 Prior Research on P2P Lending

Prior research studies on P2P lending are quite limited. Most of these studies are empirical explorations using data from Prosper.com. A thorough analysis of these studies suggests that there are four research directions for online P2P lending.

- **P2P success determinants**: The purpose of this research is to figure out characteristics of lenders and borrowers that influence lending success. In this line of research, the financial characteristics of borrowers have received much attention. Iyer et al. (2009) and Klafft (2008), for example, suggest that borrowers’ credit rating, debt to income, existence of bank account are critical to funding success and interest rate determination. In addition, research on borrowers’ demographic characteristics has also produced fruitful results. Pope & Sydnor (2008), for example, confirmed that race, age, and gender are critical determinants of P2P lending. Ravina (2008) has also suggested that the resemblance of borrowers and lenders (such as same city, same ethnic, same gender) has a strong positive impact on lending decision. When lenders in the context of P2P are explored, Barasinska (2009) found that female lenders are less risk-averse than male lenders in their lending decisions (Barasinska 2009).

- **Social capital effect**: This line of research focuses on the investigation of the effect of relational factors (such as trust, friendship and social network) on P2P lending. Although social capital can complement and supplement financial and credit information in lending decision, Greiner & Wang (2009) argued that it is not a good predictor of loan payment and a good indicator to use for better lending decision. Moreover, social features are still useful in funding decision, particularly when financial features are insufficient to construct a successful loan request (Herrero-Lopez 2009). The social features that received more attention include friends and photos. Freedman & Jin (2008) finds that loans endorsed by friends have lower loan default and late payment. The reason is that friends are more aware of borrower’s risk and trustworthiness due to the private information derived from their personal relationship. Findings of photos also suggest that when borrower’s photo is included in the listings, it will affect the likelihood of loan success, but not the determination of interest rate (Klafft 2008). Ravina (2007) shows that borrowers who look beautiful in photos are more likely to get a loan at a better interest rate. Borrowers who do not include photos in their listings or look unhappy in their photos are perceived negatively by lenders (Pope & Syndor 2008).

- **Group intermediation**: Most P2P lending platforms allow their members to form special communities or groups, making possible their members more likely to be funded (Freedman & Jin 2008). As such, a few research studies are found to investigate the effect of group intermediation on P2P lending. Typical examples of this research include Berger (2009) and Greiner & Wang (2009), who find that mere membership in a group can reduce the interest rate of funded loans. The ratio of lenders to borrowers within a group is also related to interest rate determination, in which higher lender ratio can result in lower interest rate (Freedman & Jin 2008; Greiner & Wang 2009). Research on group size and leadership, however, do not produce consistence findings. While some researchers (such as Berger & Gleisner 2009; Collier & Hampshire 2010) find bigger groups to result in lower interest rate, others (such as Freedman & Jin 2008) conclude contradictory results of bigger group and higher interest rate. Similar inconsistent results are also reported on the correlation of group leader and lending. For example, Kumar (2007) finds that the endorsement of a listing by group leader can have a positive impact on loan success and interest rate determination. Berger & Gleisner (2009) and Freedman & Jin (2008), however, report group leader to have no effect and adverse effect, respectively, on interest rate. Though conflicting results are reported on group size and leaders.

- **Herding Effect**: This research track focuses on the investigation of herding effect on lending behavior. Researchers (such as Ceyhan et al. 2011; Herzenstein et al. 2011; Shen et al. 2010) in this track mostly based their investigations on Prosper.com by evaluating lender’s biddings on borrower’s listings. Their empirical findings suggest that there were significant herding effects on P2P lending decisions. Lenders were found to have a greater likelihood of bidding on
borrower’s partially funded auction listings that have more bids, but this herding shows a steep decline once the listings are fully funded. More specifically, Yum et al. (2012) confirms that herding is only sought by lenders when information on borrower’s creditworthiness is extremely limited, but they will switch back to their own judgment when more signals are available in the marketplace. Lee & Lee (2012) find that even lenders’ herding behavior to have a diminishing marginal effect, suggesting that listings attracting more bids in an early auction stage are more likely to be fully funded than listings with the same bidding rate in the latter auction stage. Herzenstein et al. (2011) believes that herding behavior is strategic as it can deal with lender’s adverse selection problem effectively. Zhang & Liu (2012) even claimed herding to be rational in the P2P marketplace, as it is an observatory learning of lenders from herd activity.

3. RESEARCH MODEL AND HYPOTHESES

Our research model, which is shown in Figure 1, includes variables that evaluate the quality of borrowers and riskiness of lenders in the P2P lending context. In the evaluation of borrowers, we believe that their qualities and affiliated groups are informational signals that lenders could use to mitigate adverse selection problems. Of the borrower’s variables, credit worthiness and friendship network are signals that can suggest to lenders their extent of trustworthiness and defaulting. Credit worthiness is the evaluation of borrowers’ credit history, rating, and financial ability. Friendship network is the friend types the borrowers have established in the online lending market.

In the context of PaiPaiDai, registered users are organized into groups. Within each group, the appointed group leader is responsible for managing the group’s internal and external activities. Hence, a group’s performance is heavily reliant on group cohesiveness. In fact, research studies have already concluded that the more cohesive is a group, the better performance is the group (Evans & Dion 1991; Keller 1986; Murdock 1989). However, the performance of a group is not only confined to group level performance. It could also be attributed to how well group members are related and motivated (George & Bettenhausen 1990; Jehn & Mannix 2001). In fact, PaiPaiDai also rates group performance using multidimensional criteria. This group rating score is announced and shared among borrowers and lenders. Based on this contextual situation, we choose both group cohesiveness and group ratings as signals to evaluate borrowers’ potentials.

P2P lending involves both borrowers and lenders. Lenders have discretionary rights on borrower selection. Most likely their preferences are borrowers who have creditable history from well-performed groups. However, if lenders are more risk taking, they may prefer less creditable borrowers who are willing to pay higher interest rate. In other words, the risk attitude of lenders may moderate the effect of individual and group performance on loan success by evaluating the effect of lenders’ risk attitude on borrowers’ quality. As such, our research adopts a dual perspective in exploring loan success by evaluating both lenders’ riskiness and borrowers’ qualities.
In traditional lending market (lending money from banks), borrowers are required to provide financial and credit information to determine their creditworthiness. Higher creditworthiness levels suggest greater reliability of the borrowers, thus resulting in their loans at a lower interest rate (Brewer et al. 2000). An individual’s credit worthiness has also been investigated widely in P2P lending research. The general consensus of these studies is that borrowers with good credit rating and history will have more favorable bids from lenders, thus resulting in better chances of loan success (Iyer et al. 2009). In other words, individuals who are rated to be more creditworthy will suggest to lenders a lower chance of loan default and a better guarantee of on-time loan payment. In general, credit-worthy borrowers are perceived to be well worth of investment, disregarding the risk attitude of lenders. However, Pope & Sydnor (2008) believes that lenders may respond differently to borrowers of different level of creditworthiness. Barasinska (2009) also points out that more risk-taking lenders may prefer higher return to better credit ratings. Hence, they may risk their investment on sub-prime borrowers for higher interest returns. Based on these reasoning, we propose:

**H1a:** Borrower’s creditworthiness has a positive effect on funding success.

**H1b:** Risk attitude moderates the effect of credit-worthiness on loan success. More specifically, risk taking lenders are more likely to fund borrowers with lower credit ratings. However, risk averse lenders are more likely to fund borrowers with higher credit ratings.

### 3.2 Friendship Network

Selman (1980) finds that friendship has a direct positive relationship on trust. Lin et al. (2013) studies the influence of friend types on the likelihood of funding success using data from Prosper.com. They believe that loan default produces social stigma costs to borrowers. Hence, borrowers who are more likely to default will avoid friendship to minimize stigma costs. Among different friend types, friends at higher levels are more difficult to establish, due mainly to the selectivity involved in moving up to higher friend levels. Lin et al’s findings suggest that borrowers having friends at higher levels made them more trustable, thus resulting in higher probability of their funding success and lower interest
rate. Hence, higher levels of friendship borrowers secured in the lending market is a strong informational cue of their trustworthiness and loanability.

In case the lender is less risk taking, this lender is very likely to lend a loan to widely networked borrowers who are projected to be trustworthy (Barasinska 2009). However, risk taking lenders may be more conscious of investment return, suggesting that their preference may be higher interest rate rather than borrower’s trustworthiness. Hence, we propose:

H2a: Borrower’s friendship network has a positive effect on funding success.

H2b: Risk attitude moderates the effect of friendship network on loan success. More specifically, risk taking lenders are more likely to fund borrowers with lower friendship levels. However, risk averse lenders are more likely to fund borrowers with higher friendship levels.

3.3 Group cohesiveness

Mullen & Copper (1994) studies the relationship between group cohesiveness and group performance and confirms a direct positive relationship between these two variables. Moreland & Myaskovsky (2000) also confirm the effect of group cohesiveness on training effectiveness. In the context of P2P lending, group cohesiveness suggests the concerto effort of group leader and members in sustaining the image of the group’s creditworthiness. In other words, it suggests the ability of a group leader in managing the image of the group and the effectiveness of group members in enforcing each other to the achievement of the best possible credit rating of the group. Martens & Peterson (1971) find out that group cohesiveness is an important determinant of success. We believe that if a group can convey to lenders of its cohesiveness in the achievement of group performance, lenders may be more inclined to bid for listings coming from this group, thus resulting in greater funding success of this group. However, the riskier lender may weaken the effect of group cohesiveness on funding success. The reason is that risk taking lenders are more concerned of their investment return, thus trading off group cohesiveness for higher interest rate. Hence, we propose:

H3a: Group cohesiveness has a positive effect on funding success.

H3b: Risk attitude moderates the effect of group cohesiveness on loan success. More specifically, risk taking lenders are more likely to fund borrowers from lower cohesive groups. However, risk averse lenders are more likely to fund borrowers from higher cohesive groups.

3.4 Group rating

Researchers (Kat & Menexe, 2003; Artis & Taylor, 1988) confirm the importance of group rating on group performance, thus suggesting a better group’s track record projects more trustable group image. Prior studies in P2P lending (Berger 2009; Greiner & Wang 2009) also confirm the importance of group ratings on loan success, a higher group rating means that members of this group are more trustable. The correlation of group rating and loan success, however, is subject to the deliberation of lenders. Lenders may put more weight on individual borrowers rather than their affiliated group. A group’s rating may not suggest its members’ creditworthiness. Riskier lenders may even be more biased towards return and bid for listings that offer greater benefits. Hence, we propose:

H4a: Group rating has a positive effect on funding success.

H4b: Risk attitude moderates the effect of group rating on loan success. More specifically, risk taking lenders are more likely to fund borrowers from lower rating groups. However, risk averse lenders are more likely to fund borrowers from higher rating groups

3.5 Control variable

We incorporate four control variables (borrower age, borrower gender, borrower race, group size) into our research model. These controls have repeatedly been confirmed to have significant impact on online P2P funding success (Freedman & Jin 2008; Berger & Gleisner 2009).
4. METHODOLOGY

4.1 Data Collection

In this study, both objective data (data from PaiPaiDai.com) and subjective data (survey for group information) will be randomly collected from lenders and borrowers from PaiPaiDai following a five-stage process. First, loan biddings completed recently in PaiPaiDai will be randomly selected. Second, 1000 lenders and borrowers will be randomly chosen from this list. Third, the chosen participants will be contacted through PaiPaiDai’s online instant messaging system. They will be sent a brief introduction to the study, including the research objective and requirements, and an invitation to participate in the survey. Fourth, respondents agreed to the survey will be sent the questionnaire. Fifth, user IDs will then be used to match survey respondents with their loan listing and bidding information recorded in PaiPaiDai for objective data collection. Both the subjective survey and objective bidding data will be used to evaluate the research model and hypotheses.

4.2 Variable Operationalization

Our research has six variables. Funding success, which is our dependent variable, will be determined by evaluating whether loan listings are successfully funded or not. We also evaluate the interest rate secured by each successful bid, to determine whether it is higher or lower than the market interest rate. Individual creditworthiness will be measured by combining borrowers’ credit rating and their performance on previous loans. Friendship network is adapted from Lin & Prabhala’s (2012) five-levels friend types. Level 1 friends are those registered PaiPaiDai members. Level 2 friends are those PaiPaiDai members whose identity (social security number, bank accounts, and driver’s license) has been validated. These friends can be further classed as either as lenders or borrowers. Lenders must pass minimum income and wealth screens. Level 3 friends are differentiated into lenders who are merely registered and those who actually have a lending history. Friendship with lenders who actually bid is a more credible signal of quality. Level 4 friends are those borrowers with lender as friends and these lender friends have experience bidding on the borrower’s listing. Level 5 friends are those borrowers with lender as friends, and these friends do not only bid on listing, but have also won the bidding in the list. If a borrower has more higher level friendship, it means that the borrower is more trustable.

Because the group members in a group usually do not know each other in real world, we tend to assume that if they do more communication about the group or their loans, the group cohesiveness of the group will be higher. Group Cohesiveness will be determined by the extent of within- and between-group communications, as measured by the extent of using the online tools provided by PaiPaiDai, cause there are not any theoretically-supported proxies in P2P lending platform. Group rating will be measured by group’s track record assigned by PaiPaiDai. Lenders’ risk attitude is measured by using survey data collected from users in P2P lending. In our study, the survey is designed by a series of questions. Every answer equals to a particular grade. The final grade is divided into five parts: Conservative, steadiness but conservative, steadiness, steadiness but radicalness, radicalness.
References


