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Herding behavior in online P2P lending: An empirical investigation

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ABSTRACT

We study lender behavior in the peer-to-peer (P2P) lending market, where individuals bid on unsecured microloans requested by other individual borrowers. Online P2P exchanges are growing, but lenders in this market are not professional investors. In addition, lenders have to take big risks because loans in P2P lending are granted without collateral. While the P2P lending market shares some characteristics of online markets with respect to herding behavior, it also has characteristics that may discourage it. This study empirically investigates herding behavior in the P2P lending market where seemingly conflicting conditions and features of herding are present. Using a large sample of daily data from one of the largest P2P lending platforms in Korea, we find strong evidence of herding and its diminishing marginal effect as bidding advances. We employ a multinomial logit market-share model in which relevant variables from prior studies on P2P lending are assessed.

1. Introduction

Peer-to-peer (P2P) lending is a breed of financial transactions that occur directly between individuals without the intermediation of a traditional financial institution (en.wikipedia.org/wiki/P2p_lending). It has a short history, but has rapidly grown in recent years. The first online P2P lending company was Zopa (www.zopa.com), launched in 2005 in the United Kingdom. In the United States, Prosper (www.prosper.com) was the first P2P lending firm, and opened to the public in February 2006. It is now the largest P2P lending platform, with over a million members and over US$219 million in personal loans funded as of February 2011. P2P online exchanges are growing in the United States and United Kingdom as an alternative platform to traditional saving and investment (Slavin 2007). *Harvard Business Review* reports that every major bank will have its own P2P lending network within five years, and that P2P lending will be among the most important financial service innovations in the coming decade (Sviokla 2009).

This new phenomenon has garnered significant attention from researchers. Many of them focus on social networks in P2P lending (Freedman and Jin 2008, Herrero-Lopez 2009, Lin et al. 2011). In the P2P lending market, transaction costs are reduced by eliminating expensive intermediaries, but information asymmetry problems become more severe than in traditional markets. This is because most individual lenders in online P2P lending lack financial expertise, and the lending experience takes place in a pseudonymous online environment (Klafft 2008). In this situation, social networks between individuals mitigate adverse selection and lead to better outcomes in all aspects of the lending process (Lin et al. 2011). Social networks on Prosper reveal some soft information about borrower risk, and therefore have the potential to compensate for the lack of hard information (Freedman and Jin 2008). Besides social networks, borrowers' characteristics, including demographic characteristics, financial strength, and effort prior to making a request, are regarded as determinants of funding success in P2P lending (Herzenstein et al. 2008).

Despite those new experimental mechanism designs and system features, the risk of information asymmetry lenders face may not be erased easily. It has been studied that players exhibit herding behaviors in online commerce when they face risk of uncertainty such as information asymmetry. Herding behavior describes many social and economic situations in which an individual's decision-making is highly influenced by the decisions of others (Duan et al. 2009). Therefore, it has been theoretically linked to many economic areas such as investment recommendations (Scharfstein and Stein 1990), price behavior of initial public offerings (IPOs) (Welch 1992), fads and customs (Bikhchandani et al. 1992), and delegated portfolio management (Maug and Naik 1996).

Duan et al. (2009) suggest that herding behavior could be especially prominent on the Internet for two reasons. The first is information overload. There is an excessive amount of information on the Web, so online users have difficulty understanding and using all the information (Brynjolfsson and Smith 2000). Doing what others do could be an efficient and rational way to make decisions in this circumstance. The second reason is that people can easily observe others' choices on the Internet. Most online e-commerce websites provide a way to sort their products in the order of

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previous sales performance. When a customer clicks on a book in one of the largest online bookstores, Amazon, she will not only obtain information about that book, but also see other items that previous customers bought with the particular book.

According to Herzenstein et al. (2008), there is a considerable difference between the number of lenders bidding on funded loan listings and the number of lenders bidding on unfunded loan listings. The average of the former is 62.6, while the average of the latter is only 1.6. What makes such significant difference? Is it the outcome of rational judgment of investors or inflated by herding behaviors? Investigating herding behavior in P2P lending market is the main objective of this study. Since P2P lending platforms are online, it is obvious that they satisfy the aforementioned conditions for herd behaviors that Duan et al. (2009) identify.

When the lenders decide whether to invest their money in a loan request, they can verify the number of lenders who have already participated. If investors are influenced by the decisions of other investors (Devenow and Welch 1996), this number is a kind of signal for lenders. In other words, an auction that already has many bidders may be more attractive to lenders considering investment. We speculate that herding behavior is more common in this market due to the possibility of adverse selection and the limited institutional knowledge mentioned above when lenders face unknown borrowers over the Internet. We empirically examine lenders' herding behaviors in the P2P lending market.

Two things make this study interesting. First, we question whether herding behaviors exist in the P2P lending market because some characteristics of this market are distinctly different from those online markets where herding behaviors are observed. *Herd behavior* refers to people who do what others are doing instead of using their own information (Banerjee 1992). In other words, players take herding strategy because they believe that others are better informed than they are. For example, herding behavior in the stock market is led by expert analysts. Many other cases of herding behavior show that buyers rely on information gathered by other buyers of experience goods. Prior consumers already have experienced various goods and services, and therefore, potential buyers will believe that they may have better information. Thus, they will flock to popular goods or music bands. However, online P2P lending does not seem to have such obvious sources of the better information. Most peers in P2P lending are not professional investors. Also, it will take a much longer time until "true" information is revealed by loan default or payments on time. As a result, the existence of herding in the P2P lending market is questionable, since no clearly superior information source can be identified. In other words, is herding behavior triggered by blind trust of the collective intelligence in the online market? Second, there has been no micro-data from a single P2P lending company that so nobody has been able yet to explore the details of this setting. We have an opportunity to remedy this, based on the unique data set that we have been able to construct.

The rest of the paper is organized as follows. Section 2 presents the related theoretical and empirical literature on P2P lending and herding behavior. Section 3 shows our research hypotheses with the reasoning behind them, and Section 4 describes our data. In Section 5, we develop and analyze the empirical model and discuss the results. We conclude the paper by mentioning limitations and future research in Section 6.

2. Literature review

2.1. Online peer-to-peer lending

Although P2P lending platforms are relatively new, many researchers have studied the P2P lending market. Most of them have focused on finding factors that affect the likelihood of funding success and default rates in P2P lending. Avery et al. (2004) studied consumer lending and showed that a borrower's financial strength is crucial in her ability to obtain secured and unsecured credit from financial institutions. Similarly, a borrower's financial strength plays an important role in the P2P lending market (Iyer et al. 2009, Herzenstein et al. 2008). Prosper assigns each borrower a credit grade by using the financial documents borrowers provide. There are seven credit grades that vary from AA, signifying that the borrower is extremely low risk, to A, B, C, D, E, and HR denoting the borrower as of extremely high risk. Iyer et al. (2009) found that this credit score given to borrowers by Prosper is related to underlying creditworthiness and predicts the default rates.

Herzenstein et al. (2008) also used transaction data from Prosper and found that the likelihood of funding success of borrowers with AA or A is almost 40%, but the funding success rate of borrowers with HR is only 4%. Borrowers' other attributes, such as demographic characteristics and effort prior to making the request, affect the funding success rates as well as financial strength. In addition, loan decision variables, such as loan amount, interest rate offered, and duration of loan listing, mediate between borrower characteristics and the likelihood of funding success (Herzenstein et al. 2008).

Some researchers have applied theories of taste-based discrimination to examine the effect of personal characteristics in P2P lending. According to Pope and Sydnor (2008), there is evidence of significant racial disparities. Blacks are less likely to receive funding and have higher interest rates conditional on receiving a loan. Although Ravina (2008) showed that race does not have a statistically significant effect on the likelihood of funding success, the interest rate that the borrower pays is strongly affected by race in some cases. In addition, Ravina (2008) found the evidence that beautiful borrowers are more likely to get funded and pay lower interest rates but are not less likely to become delinquent.

Besides research about personal characteristics including financial strength and loan decision variables, there are many previous studies addressing roles and impact of social networks on P2P lending. Reliance on existing social networks is a primary feature of informal lending between acquaintances and microfinance as well as online P2P lending. Since informal lenders and microfinance institutions have an information advantage over traditional banks as they utilize borrowers' social networks to ensure good risks (Hope and Stiglitz 1990, Udry 1994, La Ferrara 2003), social networks should also play an important role in P2P lending.

Herrero-Lopez (2009) evaluated the influences of social interactions in the P2P lending market. The research focused on the impact of one-to-one and one-to-many relationships by using data from Prosper. According to the author, affiliations with "trusted groups" on Prosper doubles the likelihood of funding success and makes it so borrowers with *a priori* non-bankable profile to get a loan with reasonable rates. Lin et al. (2011)suggested that social networks as a new source of soft information can alleviate information asymmetries and mitigate the problem of adverse selection, which is particularly severe in online P2P lending. They studied Prosper data for January 2007 to May 2008 and showed that social networks, especially their relational aspects, lead to better outcomes, including lower interest rates and a lower risk of default as well as a higher probability of getting a loan request successfully funded. To identify the effect of social networks in Prosper, the authors controlled for hard credit variables, such as credit ratings, number of credit inquiries, debt to income ratio, loan purpose, image data and descriptive text data.

Everett (2011)refers to online P2P lending as *online social lending*, and employed a series of probit models to test the impact of personal connections on default risk and interest rates within the online social lending community by using Prosper data. Controlling