Moral Hazard between Regulators and Regulatees in Chinese P2P Lending Industry

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Abstract: Regulation on P2P lending platform and the lack of it in China has caused social and economic problems that need to be addressed. In this research, we examine the regulation of P2P lending platforms with a principal-agent problem, and give policy implications for regulators to better inform and protect the investors.

1. Introduction

Peer-to-peer (P2P) lending platforms have been popular in China since 2007 (Wei, 2015), until some recent news revealed that many of them may be scams, including a multi-billion RMB platform called Ezubao (Reuters, 2016). Li (2013) has shown that the risk of P2P lending platforms mainly lies in lack of credit validation, supervision of usage of the funds, and the divorcement between disclosure and the actual financial status. Ye (2014) has provided principles for regulating such industry, including clarifying the regulatory body, establishing an industry access system, and formalizing the regulation provisions. However, the long-lasting "regulatory vacuum" (Wei, 2015) implies that such regulation may not be of interest for Chinese regulators, which indirectly led to the burst of a giant bubble.

Recent policy development has shown that the government have begun regulating P2P lending platforms with a market entrance screening process, as well as compelling platforms with high risks to exit (Weiyangwang, 2019). This research aims to analyses such policy under a game theoretical framework, and provide some insights for the regulators and potential investors.

Dealing with governance and regulation has been one of the core concepts of principal-agent problem. However, as Alexander (2006) finds, most research "has addressed the governance issues confronting companies and firms in the non-financial sector." This research also goals to enrich the body of analysis in financial sector regarding the principal-agent problem, especially the moral hazard problem. We plan to do this by introducing and analyzing a moral hazard game to describe the regulation in P2P lending industry, and provide economic intuition and policy suggestion according to the analysis.

2. Game Analysis of P2P Lending Regulation

2.1 Basic Model

As suggested in Bier and Lin (2013), the situation where "regulator relies on disclosure of risk information by regulated parties" in order to reduce risk can be well represented by a principal-agent problem with asymmetric information. Their framework can be adopted to our analysis on P2P lending industry.

Consider a principal (regulator) who has the right to permit an agent (P2P lending platform) to operate. However, as opposed to Bier and Lin's work where the agents are firms producing environmental pollutions whose levels of pollution are known before regulator issuing licenses, in the case of P2P platforms, information asymmetry appears after the agent receives operating permission, since each platform can choose the level of risk it takes from selecting the borrowers, etc. Therefore,

this situation is closer to a moral hazard problem. How the platforms select their borrowers, however, can be extended to another agency problem that is beyond the scope of this work.

The settings are as follows. The principal issues permission based on agent's promise to keep risk r under some specified level $\overline{r}$, and may inspect afterwards with probability p. After starting the operation, an agent learns its cost of selecting good borrowers $c \in \{c_H, c_L\}$, $c_H \geq 1$, $c_L \in [0,1]$, and chooses risk $r \in [0,1]$ and scale (profit) $x(r) \in [0,1]$ accordingly. While the level of risk is only known to the agent, the range of risk levels and the operating scale are known to everyone. The principal tends to inspect the platforms with larger scales: $p'(x) > 0$, where it shuts down agents whose risk is higher than the threshold level $r > \overline{r}$ and impose a fine F on them. Therefore, a platform's payoff with $c = c_i$ can be represented as

$$\pi = \begin{cases} -c_i \cdot (1-r) + x(r) & r \leq \overline{r} \\ -c_i \cdot (1-r) + (1-p) \cdot x(r) - pF & r > \overline{r} \end{cases}$$

The principal solves the following problem:

$$\max_{\overline{r},p,F} \quad (1-r) \cdot x(r)$$

subject to

$$\begin{cases} -c_i \cdot (1-r) + x(r) \geq 0 & r \leq \overline{r} \\ -c_i \cdot (1-r) + (1-p) \cdot x(r) - pF \leq 0 & r \geq \overline{r} \end{cases}$$

Assume that the platforms are risk seeking, $x'(r) \geq 0$. Under the assumption, it is easy to see that when the platforms comply with $r \leq \overline{r}$, platforms with $c = c_L$, the range of r where they can make a profit is larger than those with $c = c_H$ (Fig. 1), which makes them more likely to participate but less likely to comply with $r \leq \overline{r}$. (see subsection 2.2.2.)

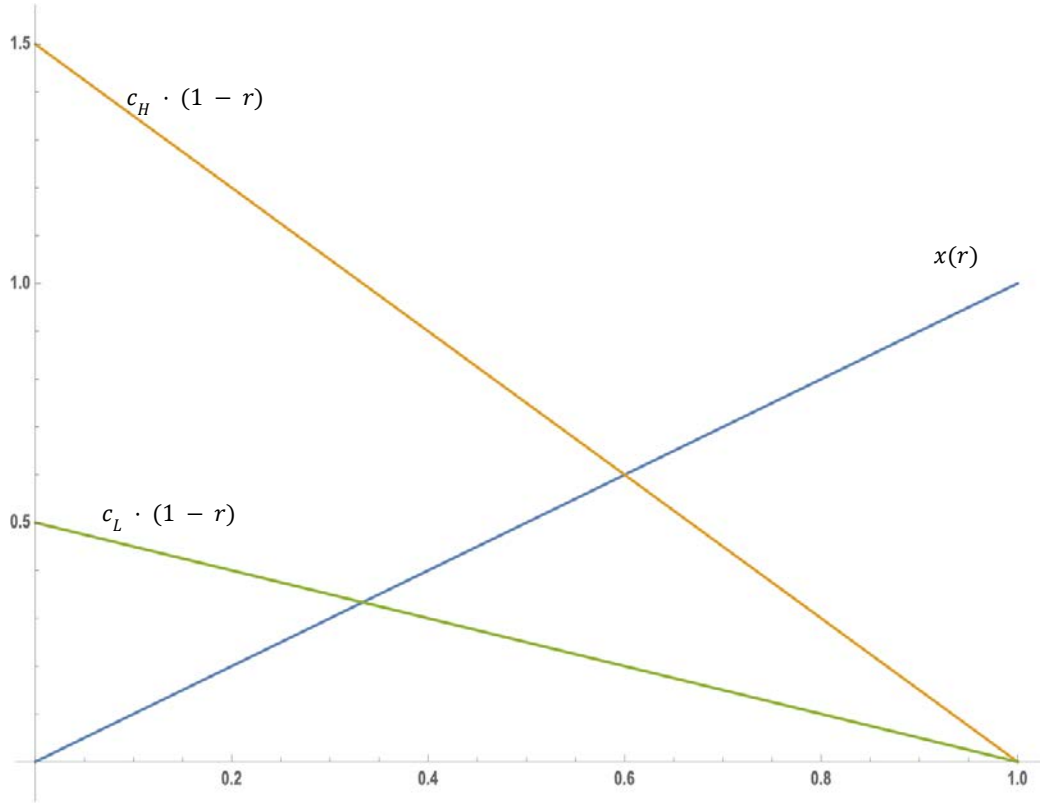

Fig. 1 Constraint 1 ($c_H = 1.5,\ c_L = 0.5$)

2.2 Solving for the Parameters

2.2.1. First-best

Without asymmetric information, since $x'(r) \geq 0$, solving

$$\max_{r} \quad (1-r) \cdot x(r)$$

gives r^{FB} s.t.

$$x(r^{FB}) - (1-r^{FB}) \cdot x'(r^{FB}) = 0$$

2.2.2. Second-best

With asymmetric information, however, we can show that the platforms with low cost receive rent from this information, and those with high cost are faced with binding participation constraint. The first constraint from principal's problem gives

$$\begin{matrix} -c_H \cdot (1-r) + x(r) \geq 0 & (PC_H) \\ -c_L \cdot (1-r) + x(r) \geq 0 & (PC_L) \end{matrix}, \; r \leq \overline{r}$$

Solving (PC_H) yields

$$\begin{aligned} x(\overline{r}) &\geq c_H \cdot (1-\overline{r}) \\ &> c_L \cdot (1-\overline{r}) \end{aligned}$$

therefore, (PC_L) is slack, and the principal sets $\overline{r}$ such that platforms with high cost are indifferent between operating or not, that is,

$$x(\overline{r}) = c_H \cdot (1-\overline{r})$$

Now consider the second constraint.

$$\begin{matrix} -c_H \cdot (1-r) + (1-p) \cdot x(r) - pF & \leq -c_H \cdot (1-\overline{r}) + x(\overline{r}) & (IC_H) \\ -c_L \cdot (1-r) + (1-p) \cdot x(r) - pF & \leq -c_L \cdot (1-\overline{r}) + x(\overline{r}) & (IC_L) \end{matrix}, \; r > \overline{r}$$

Like the previous argument, we can show that the platforms with low cost have binding incentive constraint, whilst those with high cost have slack constraint. Since

$$\begin{aligned} 0 &= -c_H \cdot (1-\overline{r}) + x(\overline{r}) \\ &\leq -c_L \cdot (1-\overline{r}) + x(\overline{r}) \end{aligned}$$

the platforms with low cost are more profitable if they do not comply with $r \leq \overline{r}$. Therefore, (IC_L) is binding and (IC_H) is slack. Solving (IC_L) yields

$$F = \frac{1}{p}[c_L \cdot (r-\overline{r}) + (x(r) - x(\overline{r}))] - x(r)$$

Plugging back into principal's problem gives

$$\max_{\overline{r},p} \quad (1-\overline{r}) \cdot x(\overline{r})$$

solving which gives

$$x(\overline{r}) - (1-\overline{r}) \cdot x'(\overline{r}) = 0$$

therefore, when r^{FB} is such that $x(r^{FB}) \geq c_H \cdot (1 - r^{FB})$, $\overline{r} = r^{FB}$ solves the principal's problem.

However, when $x(r^{FB}) < c_H \cdot (1 - r^{FB})$, that is, $\overline{r} = r^{FB}$ violates (PC_H), regulator must compare

$$\pi \cdot (1 - r^{FB}) \cdot x(r^{FB}) - (1 - r^H) \cdot x(r^H)$$
$$= (\pi \cdot x(r^{FB}) - x(r^H)) - (\pi \cdot r^{FB} \cdot x(r^{FB}) - r^H \cdot x(r^H))$$

where r^H is such that $x(r^H) = c_H \cdot (1 - r^H)$, and π is the proportion of low-cost platforms among all platforms. Therefore, when π is large enough, the regulator can choose $\overline{r} = r^{FB}$ and do not allow platforms with high cost to operate at all. Otherwise, the regulator should choose $\overline{r} = r^H$.

2.3 Additional Factors

For the settings in this study, fixed costs of the regulator to establish such a regulation institution does not affect the game theoretical results. However, if the cost is significantly large, regulators facing financial difficulties or having other projects to finance may tend to not regulate the P2P market at all, undermining social and economic turbulence which happened in China, as mentioned previously.

On the other hand, it is not clear what kind of effect will an application cost for the operate permission for the firms create on the outcome of this game, which we will leave for the future studies to discuss.

3. Policy Implications

First, it is important for regulation to exist, as the recent news from China illustrated what is possible in the P2P industry with weak or no regulation at all. However, as Navaretti and Pozzolo (2017) point out, "the trade-off between competition and financial stability" must also be always considered. Although a discussion about regulatory frameworks is beyond the scope of the study, we need to point out that it is the regulator's responsibility to act for the best interest of both the lenders and the borrowers.

Second, there is urgent need for a public information system for P2P platforms, which can both provide netizens seeking for platforms to invest or borrow with low-risk platforms, and encourage the platforms themselves to actively control the risk they bear.

Last but not least, we noticed that even some P2P platforms that are owned by or linked to famous banks are operating under significant risk (Jinrondao, 2019), which can lead to even worse consequences because investors trust these banks and do less research before they invest their money in such projects. Banks need to strengthen their screening process to decrease the risk associated with such platforms, and fully inform the investors of the potential risk before advising them to invest.

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