P2P Lending and Screening Incentives

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Overview

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4. The Model
   - Perfect Screening
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Composition of Crowdfunding by category

2012
- Capital: 37.0%
- P2P lending: 14.5%
- Donations: 44.2%
- Rewards: 4.3%

2014
- Capital: 68.3%
- P2P lending: 12.0%
- Donations: 8.2%
- Rewards: 3.0%
- Hybrid: 1.7%
- Royalties: 6.9%

Source: Company Data, Morgan Stanley Research estimates
Peer to peer Lending Process

1. Applications Sent
2. Credit Evaluation by Platform
3. Borrower Profiles Posted
4. Investors Purchase Loans
5. Debt Asset Issued, Relationship Established
6. Platform Manages Repayment

Source: Aveni (2015)
Loan Distribution Originated by P2P platform

Panel A. Europe (Without UK) in 2014
- Consumer Loans: 25.3%
- Commercial Loans: 74.7%

Panel B. UK in 2015
- Consumer Loans: 37.9%
- Commercial Loans: 62.1%

Source: Company Data, Morgan Stanley Research estimates
Advantages of P2P Platforms

- Have broader access to information (Big Data)
- Lower costs compared to the intermediation operations of banks
- Improve financial inclusion
- Quick adjustment to new market conditions (technology, new instruments)
Costs and Interest Spreads for Banks and Lending Club

Costs in Basis Points

Sources: Aveni (2015) and Lendit 2013
Information Role

- The agility of the system, customer satisfaction, the success of the platform and its growth depend directly on the number of agents willing to participate in the market on both sides.

- The challenges:
  1. Build a solid performance history to generate credibility.
  2. Maintain users’ confidence in the system.

- Importance of the screening process: platforms are highly interested in enforcing strict lender and borrower requirements to guarantee quality in the transactions, increase reputation and guard against misbehavior and fraud.
A model with screening activities

- Agents receive a pool of loan applications and decide the amount of them to be screened ($k$) in order to grant loans.
- The agents cannot identify directly the type of project without screening, but they know the share of good (low-risk) projects in the economy, [$\lambda \in (0, 1)$].
- The bank’s optimal number of loans granted is small relative to market demand.
- Two questions:
  1. How do the economic outlook, the screening costs and the quality of screening affect the incentives of the bank and the platform to screen potential borrowers?
  2. What is the resulting impact on loan supply in the market?
Timing of the Bank’s problem with Perfect Screening

Nature reveals quality of the project to each entrepreneur.

Bank selects the optimal amount of applications to be screened.

Bank receives a pool of loan applications. It knows the share of low-risk projects in the economy, but cannot identify project types directly without screening.

Bank observes borrowers’ information and rates them.

Loans are approved to borrowers with low-risk projects.
The profit function:

\[ \Pi_{Bank}^{ps}(k) = k\lambda \pi^L - rL - k^2z \]  

(1)

\( L = k\lambda \) is the amount of loans that the bank grants

The optimal amount of loans granted by the bank is:

\[ L_{ps}^M = \frac{\lambda^2 \pi^L - r\lambda^2}{2z} \]  

(2)
Amount of loan applications screened by the bank

\[ \pi^L = 0.2 \text{ and } r = 0.03 \]
A bank and a platform are active in the credit market and they randomly and independently choose which loan applications to assess. Hence, we can find four groups of loan applications:

- **Bank** \((k_A)\)
- **Group 2**
- **Platform** \((k_B)\)
- **Group 3**
- **Group 4**
**Sequence of decisions in a Duopoly lending industry with Perfect Screening**

Nature reveals quality of the project to each entrepreneur.

The platform decides to enter the market.

Each agent decides the amount of applications to be screened.

The bank and the platform receive a pool of loan applications. They know the share of low-risk projects in the economy, but cannot identify project types directly without screening.

The bank and the platform offer the same interest rate to borrowers.

The bank and the platform observe borrowers’ information and rate them.

Loans are approved to borrowers with low-risk projects.
The profit function for agent $i$ is:

$$\Pi_i^{ps}(k_i, k_j) = k_i k_j \frac{\lambda}{2} \pi^L + k_i (1 - k_j) \lambda \pi^L - rL_i - k_i^2 z_i$$  \hspace{1cm} (3)

$$z_A > z_B$$

The number of loan applications that agent $i$ decides to finance is:

$$L_i^{ps} = k_i k_j \frac{\lambda}{2} + k_i (1 - k_j) \lambda$$  \hspace{1cm} (4)
The optimal values of $k_A$ and $k_B$ expressed through the exogenous parameters are:

\[
k^\text{ps}_A = \frac{\lambda^2}{4} \frac{(r - \pi^L)^2 + 2\lambda(r - \pi^L)z_B}{(r - \pi^L)^2 - 4z_Az_B} \tag{5}
\]

\[
k^\text{ps}_B = \frac{\lambda^2}{4} \frac{(r - \pi^L)^2 + 2\lambda(r - \pi^L)z_A}{(r - \pi^L)^2 - 4z_Az_B} \tag{6}
\]
Screening and Economic Outlook

\[ Z_{\text{Bank}} = 0.09, \quad Z_{\text{Platform}} = 0.03, \quad r = 0.03, \quad \pi^L = 0.2 \]
Screening is costly \((z > 0)\) and imperfect, \(\beta \in [0, 1]\). The risk that the bank or the platform approves unqualified loan applications rises as \(\beta\) increases.

Mistakenly approved bad projects have an strictly negative expected revenue for the agent.
The profit function for the bank is then as follows:

$$\Pi_{Bank}^{is}(k) = k[\lambda \pi^L + (1 - \lambda)\beta \pi^H] - rL - k^2z$$

(7)

The number of loans funded also changes, given the misclassification of projects:

$$L = k[\lambda + (1 - \lambda)\beta]$$

(8)

The optimal number of loan applications that the bank should screen to maximize profits is:

$$k_{M}^{is} = \frac{\lambda \pi^L + (1 - \lambda)\beta \pi^H - r[\lambda + (1 - \lambda)\beta]}{2z}$$

(9)
Duopoly Case

- Both the screening costs, $z$, and the probability $\beta$ differ among the bank and the platform.

- The groups also include high-risk projects, given the probability of misclassification.

- We assume that the platform has a better technology to screen ($\beta_B < \beta_A$) and it is also more efficient in the screening process ($z_B < z_A$).
According to these new conditions, the profit functions will be for the bank and the platform, respectively:

\[
\Pi_A^{is}(k_A, k_B) = \frac{k_A[\lambda \pi^L + (1 - \lambda)\beta_A \pi^H]k_B[\lambda \pi^L + (1 - \lambda)\beta_B \pi^H]}{2} + k_A(1 - k_B)[\lambda \pi^L + (1 - \lambda)\beta_A \pi^H] - r_A - k_A^2 z_A
\]  

(10)

\[
\Pi_B^{is}(k_A, k_B) = \frac{k_A[\lambda \pi^L + (1 - \lambda)\beta_A \pi^H]k_B[\lambda \pi^L + (1 - \lambda)\beta_B \pi^H]}{2} + k_B(1 - k_A)[\lambda \pi^L + (1 - \lambda)\beta_B \pi^H] - r_B - k_B^2 z_B
\]  

(11)
Screening and Expected Losses

\[ \beta_{\text{Bank}} = 0.24, \; \beta_{\text{Platform}} = 0.2, \; Z_{\text{Bank}} = 0.09, \; Z_{\text{Platform}} = 0.04, \; r = 0.03, \; \lambda = 0.3, \; \pi^L = 0.2 \]
Screening and Economic Outlook

\( \beta_{\text{Bank}} = 0.24, \beta_{\text{Platform}} = 0.2, Z_{\text{Bank}} = 0.15, Z_{\text{Platform}} = 0.1, r = 0.03, \pi^L = 0.2, \pi^H = -0.3 \)
Screening and Economic Outlook

\[ \beta_{Bank} = 0.24, \beta_{Platform} = 0.2, Z = 0.1, r = 0.03, \pi^L = 0.2, \pi^H = -0.3 \]
Perfect Screening

Loans and Economic Outlook

\[ Z_{\text{Bank}} = 0.09, \quad Z_{\text{Platform}} = 0.03, \quad r = 0.03, \quad \pi^L = 0.2 \]
Loans and Economic Outlook

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Loans and Economic Outlook

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The socially optimal fraction of loan applications that should be screened is greater than the fraction of loan applications that the bank screens.

\[ k_p^* = \frac{\lambda \pi^L}{2z} > k_p = \frac{\lambda \pi^L - r\lambda}{2z} \]  

P2P lending increases loan supply and seems to be a good alternative for those who deserve credit, but do not have access to financial services provided by regulated financial institutions. This would be an important innovation in developing economies, where many people depend on informal mechanisms that have forced them to pay high interest rates and pawn or sell assets.

These results are valid when we evaluate the model under perfect and imperfect screening condition.
The role of regulation

- Riskier borrowers: regulators should require platforms to have accurate screening standards.
- Data and confidentiality
- Algorithms and discrimination
- Platform’s incentives to reveal information
- Monetary Policy
Final Comments

- Lower screening costs, a better economic outlook and higher profits from good projects promotes the platform and the bank to screen more.

- As long as the platform has lower screening costs and better screening quality, then it will grant more loans than the bank.

- A lower quality in screening reduces the incentives of screening of both agents and therefore they provide less credit to the market.

- The gap between the optimal amounts of screening under imperfect and perfect screening conditions reduces as the economic outlook improves.