

P2P Lending and Screening Incentives

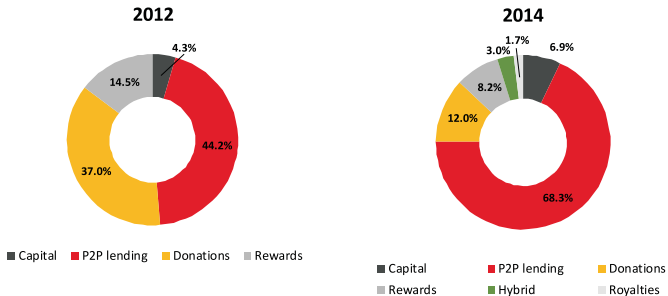
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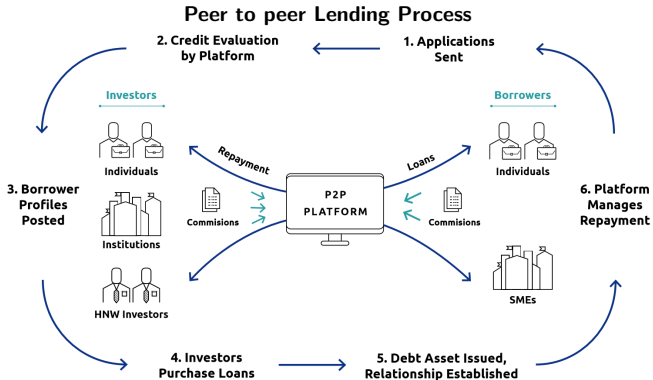
Overview

- 1 Introduction
- 2 Advantages
- 3 Adverse Selection, Trust and Reputation
- 4 The Model
 - Perfect Screening
 - Imperfect Screening
 - Financial Inclusion and Welfare
- 5 Welfare Analysis
- 6 Conclusions

Composition of Crowdfunding by category



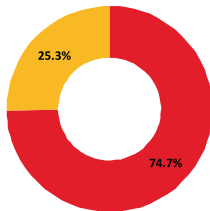
Source: Company Data, Morgan Stanley Research estimates



Source: Aveni(2015)

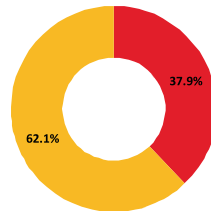
Loan Distribution Originated by P2P platform

Panel A. Europe (Without UK) in 2014



■ Consumer Loans ■ Commercial Loans

Panel B. UK in 2015



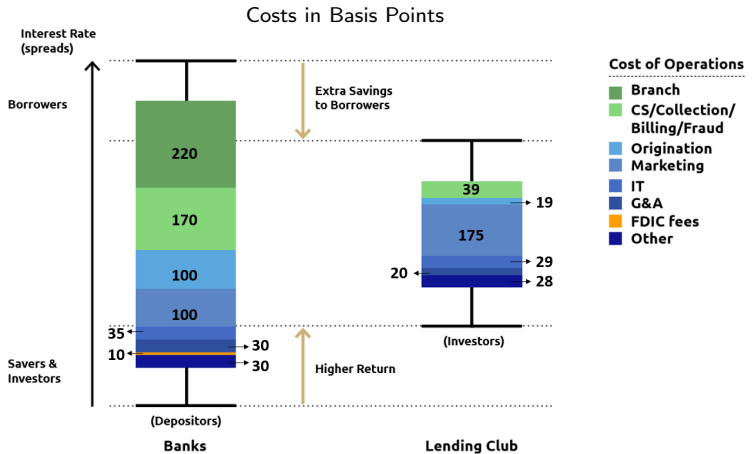
■ Consumer Loans ■ Commercial Loans

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



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?

Monopoly Case

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.

Loans are approved to borrowers with low-risk projects.

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.

Monopoly Case

The profit function:

$$\Pi_{Bank}^{ps}(k) = k\lambda\pi^L - rL - k^2z \quad (1)$$

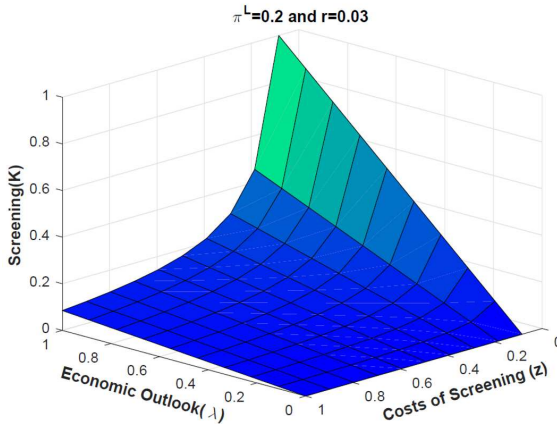
$L = k\lambda$ is the amount of loans that the bank grants

The optimal amount of loans granted by the bank is:

$$L_M^{ps} = \frac{\lambda^2\pi^L - r\lambda^2}{2z} \quad (2)$$

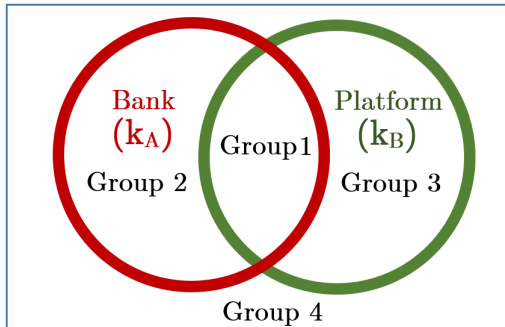
Monopoly Case

Amount of loan applications screened by the bank

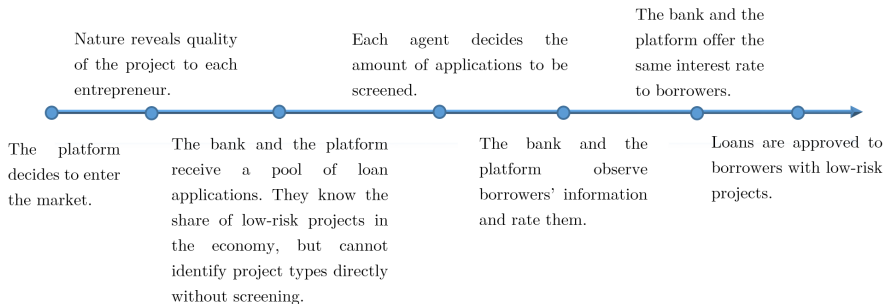


Duopoly Case

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:



Sequence of decisions in a Duopoly lending industry with Perfect Screening



Duopoly Case

The profit function for agent i is:

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

$$z_A > z_B$$

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

$$L_i^{ps} = k_i k_j \frac{\lambda}{2} + k_i (1 - k_j) \lambda \quad (4)$$

Duopoly Case

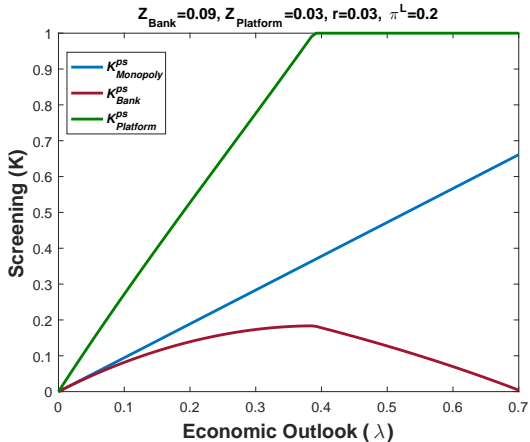
The optimal values of k_A and k_B expressed through the exogenous parameters are:

$$k_A^{ps} = \frac{\frac{\lambda^2}{2}(r - \pi^L)^2 + 2\lambda(r - \pi^L)z_B}{\frac{\lambda^2}{4}(r - \pi^L)^2 - 4z_A z_B} \quad (5)$$

$$k_B^{ps} = \frac{\frac{\lambda^2}{2}(r - \pi^L)^2 + 2\lambda(r - \pi^L)z_A}{\frac{\lambda^2}{4}(r - \pi^L)^2 - 4z_A z_B} \quad (6)$$

Duopoly Case

Screening and Economic Outlook



Monopoly Case

- 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 β increases.
- Mistakenly approved bad projects have a strictly negative expected revenue for the agent.

The profit function for the bank is then as follows:

$$\Pi_{Bank}^{is}(k) = k[\lambda\pi^L + (1 - \lambda)\beta\pi^H] - rL - k^2z \quad (7)$$

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

$$L = k[\lambda + (1 - \lambda)\beta] \quad (8)$$

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

$$k_M^{is} = \frac{\lambda\pi^L + (1 - \lambda)\beta\pi^H - r[\lambda + (1 - \lambda)\beta]}{2z} \quad (9)$$

Duopoly Case

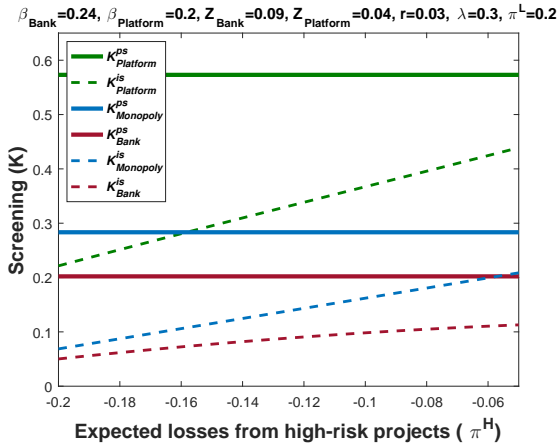
- Both the screening costs, z , and the probability β differ among the bank and the platform.
- The groups also include high-risk projects, given the probability of misclassification.
- We assume that the platform has a better technology to screen ($\beta_B < \beta_A$) and it is also more efficient in the screening process ($z_B < z_A$).

According to these new conditions, the profit functions will be for the bank and the platform, respectively:

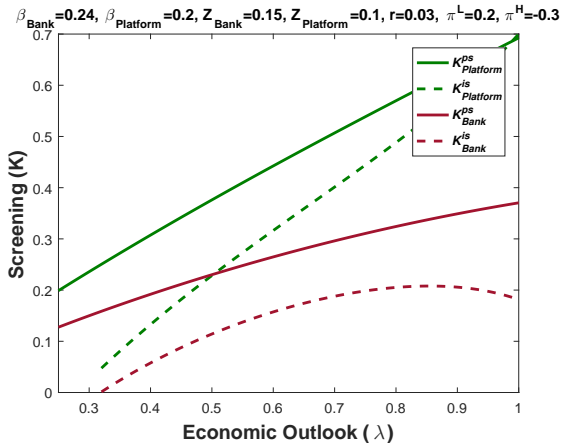
$$\begin{aligned} \Pi_A^{is}(k_A, k_B) &= \frac{k_A[\lambda\pi^L + (1-\lambda)\beta_A\pi^H]k_B[\lambda\pi^L + (1-\lambda)\beta_B\pi^H]}{2} \\ &+ k_A(1-k_B)[\lambda\pi^L + (1-\lambda)\beta_A\pi^H] - rL_A - k_A^2z_A \end{aligned} \quad (10)$$

$$\begin{aligned} \Pi_B^{is}(k_A, k_B) &= \frac{k_A[\lambda\pi^L + (1-\lambda)\beta_A\pi^H]k_B[\lambda\pi^L + (1-\lambda)\beta_B\pi^H]}{2} \\ &+ k_B(1-k_A)[\lambda\pi^L + (1-\lambda)\beta_B\pi^H] - rL_B - k_B^2z_B \end{aligned} \quad (11)$$

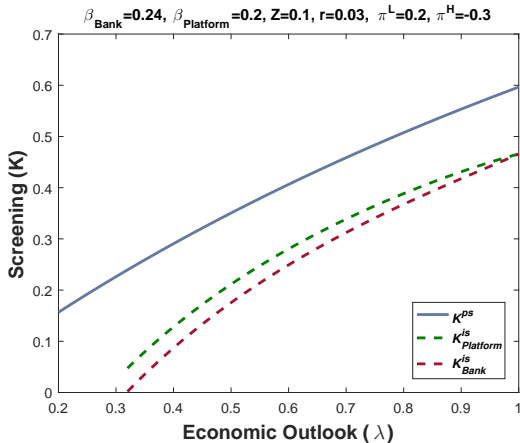
Screening and Expected Losses



Screening and Economic Outlook



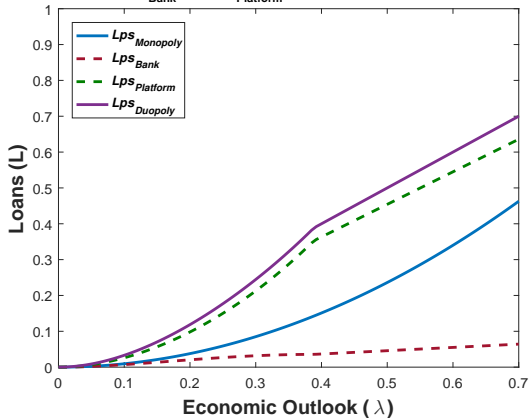
Screening and Economic Outlook



Perfect Screening

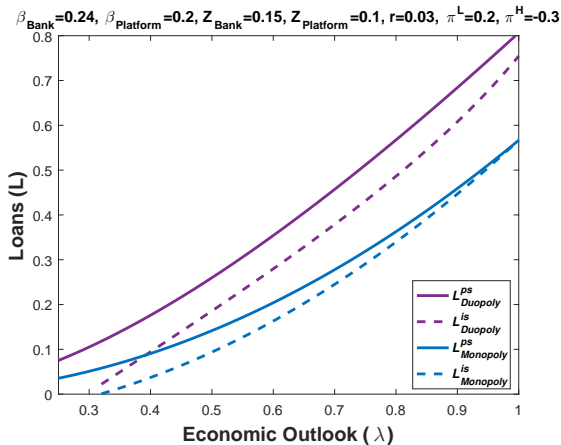
Loans and Economic Outlook

$$Z_{\text{Bank}}=0.09, Z_{\text{Platform}}=0.03, r=0.03, \pi^L=0.2$$



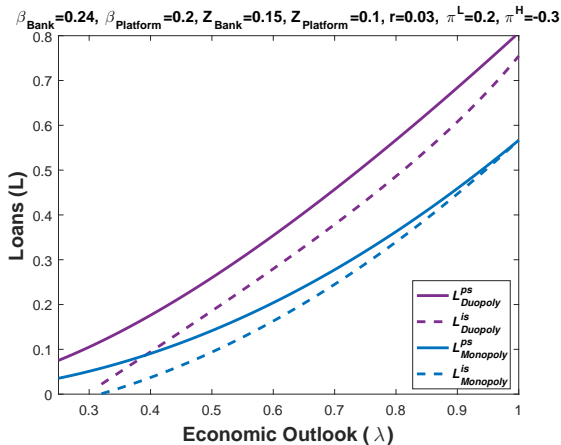
Imperfect Screening

Loans and Economic Outlook



Imperfect Screening

Loans and Economic Outlook



Welfare Analysis

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

$$k_M^{ps*} = \frac{\lambda\pi^L}{2z} > k_M^{ps} = \frac{\lambda\pi^L - r\lambda}{2z} \quad (12)$$

- 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.