Intermediaries vs Peer-to-Peer: A Study of Lenders' Incentive on a Donation-based Crowdfunding Platform

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Abstract

Donation-based crowdfunding platform Kiva seems to hold the promise of peer-to-peer lending with zero interest rate to help the poor. However, it is actually intermediated by microfinance institutions, which raise funds from Kiva lenders, disburse the funds to borrowers and collect high interest. Later Kiva launched another platform Kiva Zip that implements interest-free loans directly from lenders to borrowers. This unique setup enables us to examine how lenders choose between Kiva and Kiva Zip, i.e. a platform with intermediaries and a real P2P platform. We develop a theoretical model and explicate that the lenders trade-off is between the sustainability of her donation money and the welfare of individual borrowers. We also provide initial empirical evidence that only highly altruistic lenders select Zip and they tend to shift their loans from Kiva to Zip after Zip's introduction.

Keywords

Crowdfunding, Intermediaries, Kiva, Peer-to-Peer, Lenders' Incentive.

Introduction

Crowdfunding is an emerging mechanism that raises capital from individuals instead of professional parties through online platforms. As pointed out in the World Bank's 2013 report on crowdfunding (World Bank 2013), it is especially promising for poverty relief projects, which usually involve poor people borrowing several hundred dollars to finance a small business project. In the past several decades, financing for such projects has mainly been through microfinance institutions, which operate as ordinary banks in the way that they would vet borrowers and projects, visit them regularly, monitor project progress and supervise repayment schedule. Due to the high risk and cost nature of poverty projects, the interest rate of microfinance is considerably higher than traditional banking, in the range from 20% to more than 50% to sustain themselves (Morduch 1999). Ever since its emergence in the 70s, the positive impact and effectiveness of microfinancing has always been in debate and microfinance institutions are widely criticized for their high interest rates.

Crowdfunding platforms have enabled microfinance institutions to acquire capital more easily and conveniently from individuals all over the world. However, they are reported to still charge borrowers high interest rates. This seems to be against the very basic idea of crowdfunding: borrowers and lenders should be able to identify each other, implement transactions through the platform and avoid any costly intermediary. Thus, a natural question is whether it is viable to bypass seemingly very costly microfinance intermediaries and implement the idea of donation-based crowdfunding, i.e. zero-interest loans directly from lenders through crowdfunding platforms. How would lenders choose, direct zero-interest loans to borrowers, or high-interest loans to borrowers through microfinance intermediaries?

Recent development at kiva.org has motivated us to seek answers for these questions. Kiva.org was launched in 2005 and now is the largest crowdfunding platform that allows people to make small

donations to people in poverty for their small business projects around the world. It appears that Kiva enables direct connection and transaction: borrowers post their projects, get funded from Kiva members and repay loans with zero-interest installments. However, in fact, it relies on so-called field partners, which are mostly microfinance institutions around the world. Field partners vet and post projects on Kiva, manage raised money, monitor projects and repay lenders through Kiva. It has been widely criticized that field partners charge high interests and fees (an average of 34.65% for Kiva partners) while they get interest-free money from Kiva lenders.

As a platform powered with the idea of peer-to-peer (P2P) and information technology, Kiva was under pressure to get rid of "middlemen" and create real direct links between borrowers and lenders. Kiva launched a new platform, Kiva Zip, in 2012, as its effort to try out a real version of interest-free P2P lending. On Kiva Zip, people can support borrowers from the US and Kenya. Kenya is selected because Kenya has M-Pesa, a mobile money system that allows anyone with a Kenya ID to deposit, withdraw, and transfer money easily with a mobile device and thus direct disbursement is possible. There is no field partner, and borrowers would have truly zero interest. But the repayment rate on Kiva Zip (87.9%) is significantly lower than original Kiva (99%).

This natural experiment setup of Kiva enables us to examine both direct and intermediated lending made available through the crowdfunding platform. We develop a theoretical model to analyze the lenders' incentives to choose between Kiva and Kiva Zip. Based on our model prediction, the lender's trade-off is between the sustainability of her donation money and the welfare of individual borrowers. The high interest rate of field partners sustains the high repayment rate on Kiva so that the lenders' money can be paid back and continues to support more projects. Kiva Zip loans, although are ideal for individual borrowers, are much riskier for lenders. Thus, the donation money has higher probability to lose and is not sustainable. How would lenders respond to such trade-off? We investigate the question with data collected from Kiva.

Next, we briefly review the literature on donation-based crowdfunding, followed by our theoretical model. We then describe our data and report some initial empirical results and potential future analysis.

Literature Review

The literature on crowdfunding is emerging. Several types of funding mechanisms have been studied: loan-based (Lin and Viswanathan 2013), reward-based (Agarwal et al. 2011) and donation-based (Burch et al. 2014a). Kiva.org belongs to donation-based crowdfunding. Prior research has examined the impact of geographic, social, economic and demographic characteristics of projects and borrowers on fundraising success. Lin and Viswanathan (2013) found evidence of an apparent home bias. Agarwal et al. (2011) also provide evidence of lenders' aversion to geographic distance. Using Kiva data, Burch et al. (2014b) conclude that pro-social lenders prefer to contribute funds locally and to culturally similar others. Extant research on pro-social behavior has demonstrated that individuals are more likely to support others in need when they can empathize (Piff et al. 2010), or when they view themselves as part of the same "in-group" (Baron and Szymanska 2011). Beyond these factors, studies have confirmed that investors consider similar risk indicators such as credit rating, debt-to-income ratio, and the number of delinquencies etc. as traditional banking does. To the best of our knowledge, most research focuses on who is lending to whom. In general, there is a lack of understanding how lenders choose between different lending mechanisms such as the direct peer-to-peer and the indirect intermediated platforms.

We also draw on the literature in economics on borrower-lender interaction and the role of intermediaries. For instance, markets with intermediaries can segment customers with different preferences using price discrimination (DeGraba 1990). Diamond (1982) provides a general analysis of the effect of diversification on resolving incentive problems between borrowers and lenders. We complement this line of research by showing the intermediary's role of market segmentation in a two-sided crowdfunding market.

The Model

Assume each borrower demands $1 loan to finance her project. Each lender lends $1 and gets back $1 if the funded project is successful. Further assume the two-sided market consists of a unit mass of lenders and borrowers, respectively. To model the incentives of lenders, we adopt the impure altruism view of

pro-social behavior (e.g. Andreoni 1989, Offerman et al. 1996). The impure altruism view argues that when people contribute to social goods at their own expenses, what they get in return includes both the pure interest in the welfare of the recipients (altruism in our term) and a "warm glow" towards themselves, a positive feeling from helping others (lending utility in our term) (Andreoni 1989). Thus in our model, the lenders are heterogeneous in terms of both their lending utility $v_i \in [0,1]$ and their altruism level $\alpha_i \in [0,1]$. The borrowers are heterogeneous in terms of the likelihood of their project success $b_j \in [0,1]$. All variables, and v_i, α_i and b_j are assumed to follow a continuous uniform distribution. We limit our attention to social benefit and social effect of lending as the lender's primary motivation to contribute, rather than monetary incentives.

A lender whose lending utility is v_i and altruism level is α_i will get a base intangible lending utility v_i if she lends on Kiva. The lender will enjoy an additional altruism value $\alpha_i v_i$ if she lends on Zip. The multiplicative form indicates that the higher the base lending utility, the higher the altruism value.

Denote the expected return on Kiva as k, and that on Zip as z. Since Zip is a low-cost, high-risk platform, we assume the repayment rate on Zip is lower than that on Kiva; that is $k > z$. The relatively high repayment rate on Kiva is guaranteed by the field partners who monitor the repayment of loans. Assume the field partner charges an interest rate $r > 0$ for each loan it handles. We note that Kiva is not an interest-free platform. We also note that Kiva does not charge borrowers, lenders or field partners. All operational costs of Kiva itself are covered with fund raised by Kiva elsewhere. The cost of going on Kiva or Zip for field partners or direct borrowers is merely about preparing and uploading project details. Thus, we did not model of the cost of using different platforms.

We model the lender's net utility of lending on Kiva is $U_k = v + k - 1$, where the first term is the intangible lending utility, and the second and third terms compute the net return by lending \$1 on the Kiva platform. Similarly, the lender's net utility of lending on Zip is $U_z = (1 + \alpha)v + z - 1$. If only Kiva is available, then lenders whose $U_k > 0$ will lend. That is, if the lending utility is higher than the expected loss, then the lender will lend. If both platforms are available, then lenders whose $U_k > U_z$ will lend on Kiva, and vice versa. Accordingly, we have the following results about the lender's platform choices.

Proposition 1 (Lender's Incentive). The lender's incentive to lend on Kiva and Zip depends on the lender's altruism level and their lending utility:

1) If $\alpha \in [0, k - z)$, lenders whose $v > 1 - k$ only lend on Kiva,
2) If $\alpha \in [k - z, \frac{k-z}{1-k})$, leaders whose valuation $v > \frac{k-z}{\alpha}$ lend on Zip, and $1 - k \leq v \leq \frac{k-z}{\alpha}$ lend on Kiva.
3) If $\alpha \in [\frac{k-z}{1-k}, 1]$, then lenders whose $v > \frac{1-z}{1+\alpha}$ lend on Zip.

Proposition 1 shows that, the higher the lending utility, the higher the altruism level, the more likely the lender chooses to lend on Zip.

Empirical Analysis

We collected data from Kiva and Kiva Zip. The data included detailed information of projects, lenders and lending activities from the time Kiva launched in 2005 until June 2014 on both Kiva and Kiva.zip. There are a total of 670,865 projects, 988,560 lenders and 250 field partners. Project features include the requested amount, whether group borrowing, project type, women borrower, term, etc. Lenders are characterized with whether they lend on Kiva or Kiva Zip or both, the projects they lend to, the teams they associated with and the time they joined Kiva etc. As Kiva does not require much information disclosure of lenders, there is no sufficient background information about each lender. Information about field partners includes the interest rate they charge, Kiva's risk rating, profitability, delinquency rate, etc.

The empirical analysis intends to provide evidence to support our theoretical predictions about lenders' incentives. As we demonstrated in our theoretical analysis, the lender's trade-off is between the sustainability of her donation money and the welfare of borrowers. Only lenders who gain more utility from social good or care more about the utility of borrowers would lend on Zip. Based on this proposition, we may derive hypotheses that can be empirically tested.

First, we would expect that the profile of lenders on Zip should be different from those who only lend on Kiva. Since they are more altruistic and seasoned enough to understand the difference between Kiva and

Zip, they should be early adopters and bigger donors. Thus, we estimated the probability of a lender to lend on Zip based on her tenure on Kiva and the number of loans she supported. The descriptive statistics are in Table 1 while the results are shown in Table 2. Both tenure and number of loans have significant positive impact on the probability of joining Zip.

Variables	On Zip	Age	Mean	Std. Dev.	Min	Max
Joining Zip			0.0185	0.1347	0	1
Tenure (Months)	0.0244**		32.6907	20.4313	0	80
Number of Loans	0.0488**	0.0568**	13.2028	151.8659	1	79,220

Table 1. Descriptive Statistics

Second, we would expect Zip lenders who are also Kiva lenders would exhibit changes in their lending activities on Kiva after Zip was introduced. We perform a simple T-test to compare monthly average loans before and after Zip (Table 3). Since every member joined Zip at different time points, the length of the "Before" period is matched to everyone's tenure on Zip until our data collection date. For instance, a lender joined Zip on January 2014, six months before our data collection date, so the "Before" period is the six months before she joined Zip and we calculate monthly average loans based on these periods. The results suggest that monthly average of loans they made on Kiva is significantly less in the "After" period. When adding loans on Kiva and Zip together, there is no significant difference between "Before" and "After" periods. The evidence may suggest that there was a shift from Kiva to Zip for Zip lenders.

Dependent Variable	Joining Zip
Number of Loans	0.00004*** (0.00000)
Tenure	0.00014*** (0.00000)
Intercept	0.01330*** (0.00031)
No. Of Observations	676,989
R^2	0.0029

Standard errors in parentheses, * $p<0.05$ ** $p<0.01$ *** $p<0.001$

Table 2. Estimation of the probability of lenders joining Zip

	Before Zip		After Zip		Paired t-test
	Mean	Standard error	Mean	Standard error	t-stats
Monthly average loans on Kiva	2.1077	0.1083	1.9046	0.1413	-2.8034**
Monthly average loans on Kiva and Zip	2.1077	0.1083	2.1223	0.1445	0.1968

Table 3. T-test for "Before" and "After" Zip

Discussion and Future Work

We investigated a unique setup of donation-based crowdfunding where lenders are presented with two lending mechanisms: pure peer-to-peer lending or lending through intermediaries. We developed a theoretical model to analyze incentives and decisions of lenders. Our analysis confirms that only lenders with high altruistic concerns tend to lend on Zip. With no intermediation, lenders who care about the sustainability of donation money would not donate. With intermediation, borrowers are separated into high and low quality groups. High quality borrowers will go through intermediaries and get higher chances of funding even if it means they need to pay for interest rate. Although the low quality borrowers are left out to Zip, some highly altruistic lenders are willing to take the risk to lend to them. This effectively solves the market failure issue under asymmetric information.

We also seek to provide empirical evidence for the theoretical predictions about lenders' incentives with data from Kiva and Zip. First, we found that more seasoned and generous lenders, who apparently are more altruistic, are more likely to be on Zip. We also explored changes in activities of lenders after Zip introduction. We identified significant lower activities on Kiva after lenders joined Zip. Our findings support that people who are more altruistic will be more likely to adopt Zip platform and shift their lending activities to those risky borrowers.

Our ongoing analysis is to further examine the impact of Zip introduction on lenders' lending activities. First, we need to confirm the Zip impact using regressions. We first identify a matching group of lenders who only lend on Kiva using propensity score method. The matching criteria include a lender's tenure, total number as well as the number of Kenya and US loans lent before Zip, and the number of countries lent to, which indicate the diversity of the lending pattern. We would estimate the impact of Zip introduction on the amount and number of projects lent using the following model.

$$KivaLoan_{it} = \beta_0 + \beta_1\, AfterZip_{it} + \gamma Z_{it} + \varepsilon_{it}$$

To further analyze lenders' choices, we tend to use a mixed-logit model to estimate the probability of a lender lending to a project by considering all available projects on both Kiva and Kiva Zip at each period. Lenders make choices based on the features of projects, field partners and themselves. We hope to identify that whether a project being on Kiva or Zip matters to the probability of it getting funded when everything else holds the same. The analysis is still ongoing and we are excited to present our further findings at the conference.

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