

Skin in the Game in the Originate-to-Distribute Model: Evidence from the Online Social Lending Market

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This paper analyzes the certification mechanisms and incentives that enable lending markets to match demand and supply despite the absence of financial intermediaries with skin in the game. Our analysis of the online social lending market, in which there is no financial intermediary, shows that the creation of self-organized groups helps the market to work efficiently but allowing group leader rewards, similar to origination fees in securitization, is detrimental. We are able to take advantage of a natural experiment in which group rewards are eliminated to examine how the same groups behave once these origination fees are removed. In general, group leaders signal borrower quality to other lenders by endorsing and submitting bids for listings in their groups. Borrowers in these groups have a significantly higher likelihood of receiving a loan, pay significantly lower interest rates, and default less often than comparable borrowers outside groups. However, when group leaders receive an origination fee for successful loan listings, it creates adverse incentives so despite bids and endorsement, loans originated by such group leaders have higher default rates. Group leaders become more careful in screening after the elimination of these rewards, and if their loan participation is high, i.e. when they have skin in the game and are thus severely hurt by a borrower default. These results have important implications for the question of how lending markets can function properly and for the ongoing debate about the future of securitization and the originate-to-distribute model.

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1. Introduction

The functioning of markets crucially depends on the matching of demand and supply, and this holds in particular for financial markets such as the lending market. Borrowers and lenders face substantial information asymmetries, which may eventually lead to the breakdown of this market as described by Akerlof (1970) and Stiglitz and Weiss (1981) - and as observed in the recent financial crisis. Banks have traditionally taken the role of financial intermediaries to screen and monitor potential borrowers by using public and private information to overcome – at least partly – these information asymmetries and to allow the lending market to work, i.e. to give creditworthy borrowers access to credit at sustainable interest rates that incorporate the borrowers' risk of default. Their commitment to the scrutiny of the screening and monitoring process has traditionally been secured by their skin in the game, as described in Holmstrom (1979) and Holmstrom and Tirole (1997). However, the widespread use of loan securitization and the originate-to-distribute model have altered the incentives for financial intermediaries and raised the important question whether and to what extent the lack of skin in the game have affected the quality of screening and monitoring. Discussion about this question has been at the forefront of the regulatory and academic debate about the financial crisis.¹ Further, with the recent advances in information technology, new lending platforms have emerged that do not rely on the existence of a financial intermediary any more and in which lenders and borrowers do not have the chance for personal interaction. Important open questions are how markets can match demand and supply despite the lack of a financial intermediary and skin in the game as well as which conditions have to be fulfilled and what incentives have to be given to market participants to make the market work efficiently. The answers to these questions have potentially far-reaching implications for the future of the financial industry.

¹ For example, Secretary Geithner declared in his Written Testimony to the House Committee on Financial Services in March 2010: "Opaque structures, inflated triple-A ratings by credit ratings agencies and lack of "skin in the game" in the "originate to distribute" model helped to foster bad lending practices."

We address some of these questions by examining the online social lending platform Prosper.com, on which lenders can give their money directly to borrowers without the intermediation of a financial institution. Prosper.com has attracted over 365,000 requests for loans with a total volume of more than \$2,700,000,000 since its inception in 2006. As an outcome, 32,245 of these loan requests have resulted in actual loans with a volume of \$193,000,000. Prosper.com has thus developed into the market leader for online social lending and can be seen as an ideal opportunity for our analysis as it provides on its webpage detailed information on individual borrowers, their loan requests, funding success, interest rates, and subsequent loan performance.

We are able to examine which incentives work well in this market. We can draw some parallels with incentives in securitization and originate-to-distribute markets though, of course, one needs to be careful in generalizing the results. We find that one important mechanism that allows this market to work efficiently is the creation of self-organized groups that are headed by a group leader and joined voluntarily by further members. The group leader is allowed to grant or deny members access to their group, ask for verification of the information provided by the group members and define the purpose of the group as well as the nature and interests of its members. In particular, the group leader can endorse and submit bids for the borrower listings in her group, i.e. put her money where her mouth is, or have “skin in the game.” Groups can have the equivalent of an origination fee wherein the group leader is allowed to charge a fee for his role in matching demand and supply for loans. This fee regularly comprised an immediate closing fee and additional interest over the lifetime of the loan. Prosper.com abolished this group leader reward on 09/12/2007. This provides us with a natural experiment in which we can analyze the functioning of the market before and after this change in the reward structure for the group leader. Importantly, we can see the behavior of the same groups before and after the removal of origination fees and assess differences in the kinds of loans originated and their performance.

We find that groups have a positive effect in that borrowers in groups have a significantly higher likelihood of getting a loan than those who are not in groups. Borrowers also pay

significantly lower interest rates and default less often. However, group rewards have an adverse effect. Borrowers in groups with rewards have a lower probability of getting a loan, face higher interest rates and higher default rates. Group leaders use bids and endorsements frequently in these reward groups as well, and these also lead to a higher listing success. However, there is a remarkable difference for the default rates before and after the change of the reward structure. When group leaders can still earn rewards for successful listings in their groups, the default rates are substantially higher for loans with than for loans without group leader bids and endorsements. From an economic standpoint, it still pays for the group leader to endorse or submit bids even for weaker listings. The successful closure of these listings provides him with a reward that exceeds the losses from the increased likelihood of default, while other lenders lose on these loans. In strict contrast, after the change in the reward structure when the group leader does not receive any fees for a successful closure of a listing any more, group leader bids and endorsements are used much more selectively and are thus associated with significantly lower default rates.

Similarly, even before the elimination of group leader rewards, a group leader bid and endorsement is credible when the group leader contributes a substantial fraction to the requested loan amount. In this case, the default rates are significantly lower than for other loans and almost identical to those for loans after the elimination of group leader rewards. These results suggest that a group leader has the right incentives to screen only if he has substantial skin in the game and is severely hurt by losing money when a borrower defaults. This evidence has important implications for the current debate about the future of the originate-to-distribute model as it suggests that only originators who retain a substantial share of the originated loan have the right incentives to screen loans efficiently.

Our paper is related to different strands of the literature. First, it deals with the general questions raised in Akerlof (1970) and Stiglitz and Weiss (1981) of how to match demand and supply and thus enable the lending market to work. We provide evidence how group leader bids and endorsements as well as group leaders' skin in the game

provide credible signals to other lenders and thus induce them to bid on these listings. The paper thus directly relates to the literature that focuses on the unobservable actions by the lender in checking potential borrowers' creditworthiness. The theoretical work by Holmstrom (1979) and Holmstrom and Tirole (1997) as well as the empirical work by Sufi (2007) stress the importance of the share of the loan retained by financial intermediaries to overcome information asymmetries. Second, we analyze which particular role important concepts from the banking literature play in this context. One important related concept is the differentiation between hard and soft information such as in Stein (2002), and Berger, Miller, Petersen, Rajan, and Stein (2005). An important change due to the use of new technologies in finance such as online lending is a greater reliance on hard relative to soft information in financial transactions. At the same time, information technology may lead to the hardening of soft information, i.e. the possibility to transform the nature of the information from soft into hard as for example in credit ratings. Another important related concept is the inherent risk of free-riding in monitoring when a larger number of lenders face a single borrower, along the lines in Bolton and Scharfstein (1996). Finally, there is a growing number of papers that analyze the lending behavior on Prosper.com. Hulme and Wright (2006) provide an overview of the historical origins and contemporary social trends of online social lending and conduct a case study of the world's first online social lending platform, Zopa. Ravina (2008) and Pope and Sydnor (2008) analyze whether there is discrimination on Prosper.com in terms of socio-demographic variables such as race and gender. Iyer et al. (2009), test whether lenders can infer soft information in Prosper. Lin, Prabhala, and Viswanathan (2009) test which role social networks and in particular "the company that borrowers keep", i.e. the borrowers' friends, play for the lending outcome. In our study, we focus on the creation of groups and group leader bids and endorsements as mechanisms used by the group leader to promote listings. Specifically, we examine the natural experiment caused by the elimination of group leader rewards and study in detail its consequences for funding success, the resulting interest rate, and loan performance. This parallels and helps us to better understand the implications of the use of origination fees in securitization, without having the accompanying skin in the game.

The rest of the paper is structured as follows. The next section describes the institutional setting on the platform and provides an overview over the data. Section 3 presents the analysis and the univariate and multivariate results. Section 4 concludes.

2. Institutional Setting and Data

2.1. The General Setup

Prosper.com provides a basis for the interaction between two sides: on the one side the potential borrowers, who are looking for money for some specific purpose; on the other side the potential lenders, who are interested in opportunities and projects to invest their money into.² After registering on the platform, borrowers can post a listing in which they ask for money and provide different types of information so that potential lenders can better assess their creditworthiness. These types of information can be classified into hard and soft information:

- *Hard information*
 - *On the borrower:* Prosper.com assigns a unique identification number to each borrower and requires him to provide his social security number, driver's license number, and bank account information so that Prosper.com can verify his identity and obtain his Experian Scorex PLUSSM credit report. Of particular importance here is the credit grade, which ranges from AA for the best customers over A, B, C, D, and E to HR for the worst customers and which is assigned to potential borrowers based on their Experian credit score. The credit report, which is not reviewed or verified by Prosper.com, also includes the borrower's default history, which is thus observable by potential lenders.
 - *On the listing:* Borrowers set the amount they request, which is between \$1,000 and \$25,000, as well as the maximum interest rate they are willing to pay. In some states, there are interest rate caps, while in the other states the

² Institutions are not allowed on Prosper.com during the sample period, so only private persons may serve as borrowers or lenders.

maximum interest rate may go up to 35% – an interest rate cap set by Prosper.com.

- *Soft information*

This information is provided by the borrower herself and only some of it is verified. Examples of this soft information are borrower state, income range, and house ownership. Additionally, the borrower has the possibility to post one or more photos, e.g. of her or the object that she wants to finance with the loan. Borrowers can explain what they want to spend the money on, how they intend to pay it back by providing a budget, and why they are particularly reliable and trustworthy.

Lenders have the possibility to screen the listings and can place one or several bids of at least \$50 on any of them at any interest rate below or equal to the maximum interest rate requested by the borrower. These bids cannot be canceled or withdrawn. The bidding on the listing is performed as an open uniform-price auction. As long as the aggregate supply on a listing does not exceed the borrower's demand, bidders can see the amount of the other bids, but not the interest rates of those bids. They only observe the maximum interest rate that the borrower is willing to pay. Once the aggregate supply exceeds the borrower's demand, bidders can also see the marginal interest rate so that they know which rate they have to underbid to be able to serve as a lender. As a consequence, lenders who offer the highest interest rates are outbid, so that the resulting interest rate is bid down until the duration of the listing expires and the listing becomes a loan. Alternatively, borrowers can also choose that the listing is closed and the loan is funded as soon as the total amount bid reaches the amount requested. In the end, all winning bidders receive the same interest rate, which is the marginal interest rate. In case the total amount bid does not reach or exceed the amount requested within the duration time, the listing expires and no transaction takes place. All loans on Prosper.com are 36-months annuity loans, which can be paid back in advance though.

The platform makes money from charging fees to borrowers and lenders once a listing is completely funded and becomes a loan. Borrowers pay – depending on their credit grade – a one-time fee (between 1% and 5% of the loan amount), which is subtracted from the gross loan amount. Lenders pay a 1% annual servicing fee.

A borrower who defaults on his loan is reported to credit bureaus so that this information is recorded in the borrower's credit report. Prosper.com uses collection agencies to recover the outstanding balances, and the fees for these agencies are borne by the defaulting borrowers' lenders. Loans are unsecured and there is no second market for these loans unless they become overdue; Prosper.com then reserves the right to sell the loans to outside debt buyers.

On Prosper.com, platform members can organize themselves in groups in order to facilitate the process of borrowing and lending as well as the interaction between each other. Each user of Prosper.com can be member of at most one group, and each group is administered by one user, called group leader, who can additionally act as a lender and / or borrower on the platform. This group leader has different possibilities to promote the listings posted in her group among potential lenders: she can place a bid on the respective listing, thereby potentially signaling a financial commitment to the trustworthiness of the borrower. Furthermore, the group leader can write an endorsement for the potential borrower, i.e. a short text in which she describes why this respective borrower is particularly trustworthy. While bids and endorsements can also be made by other members of Prosper.com, we concentrate on the analysis of bids and endorsements by group leaders, who are much more active than other group members and are the key facilitators in their respective groups. Group leader bids and group leader endorsements are often given together. We thus use the following approach. First, in the univariate analysis, we consider the two signaling mechanisms separately. Later, in the multivariate analysis, we analyze group leader bids and group leader endorsements simultaneously.

Many group leaders request additional information from the potential borrower before deciding on which listings they should promote by group leader bids or endorsements.

This process is referred to as “Vetting”. Furthermore, some group leaders request to review every listing before it is posted in the group. Finally, there are group leaders who explicitly offer help to the potential borrower in writing and designing the listing.

2.2. Reward Groups, No-Reward Groups, and the Elimination of Group Leader Rewards

Apart from the fact that groups aim at different purposes and people, they are very heterogeneous by nature: Group leaders may either provide their service for free or charge a fee on loans closed in their group.³ Therefore, in our analysis we distinguish between *no-reward groups* and *reward groups*. More precisely, we define a group as a reward group if the group leader requires a group leader reward at least for one listing in her group. Otherwise, the group is defined as a no-reward group.

Prosper.com started its business officially in 2006. Since then, there have been several policy changes on the platform to adjust the business model to changes in the macroeconomic environment and to the constantly better understanding of how online social lending works. Figure 1 provides a corresponding timeline of these policy changes.

In our analysis, we focus on one specific policy change: the elimination of group leader rewards, which takes place on 09/12/2007. This event constitutes a natural experiment and systematically changes the incentives for group leaders of reward groups. To exclude possible influences of other significant policy changes, we restrict our analysis to the loans originated between 02/13/2007 and 04/15/2008 in which no other significant policy change occurs and follow their performance until 03/01/2010.⁴ On 02/12/2007,

³ The group leader obtains a one-time reward (“match reward”, 0.5% of the loan amount except for E-loans and HR-loans) once the listing is completely funded and a monthly payment (“payment reward”, 1% p.a. for AA-loans and A-loans, 2% p.a. for B-loans, C-loans and D-loans, 4% p.a. for E-loans and HR-loans.). Alternatively, the group leader can also choose to only partly capture this reward.

⁴ During the sample period, there are two minor policy changes: On 10/30/2007, Prosper.com changes the lender servicing fee from 0.5% to 1% for A-loans and from 0.5% to 0% for AA-loans. Moreover, from this date on Prosper.com allows borrowers who already have a current loan to create a new listing in order to obtain a second loan. Second loans are allowed only for borrowers whose first loan has been active for some time and whose two loans together do not exceed the maximum amount of \$25,000. To control for this latter policy change, we remove from the analysis the corresponding listings in which borrowers apply for second loans. On 01/04/2008, Prosper.com changes the borrower closing fees from 1% to 2% for the

Prosper.com redefines the credit grades E and HR, excludes borrowers without any credit grade from the platform, changes the borrower closing fee from 1% to 2% for the credit grades E and HR and the lender servicing fee from 0.5% to 1% for the credit grades B-HR. Also, endorsements for friends are introduced in addition to group leader endorsements. On 04/15/2008, Prosper.com increases the lender servicing fee for AA-loans from 0% to 1%. The policy change of interest in our study – the elimination of group leader rewards – is thus well centered in the sample period.

2.3. Descriptive Statistics

Until today, 32,245 loans have been originated out of more than 365,000 listings on Prosper.com. The total amount funded exceeds \$193,000,000. The company makes a snapshot of its entire public data available on its website for download and data analysis. After restricting the sample period as discussed above, we obtain a final sample of 153,541 listings, 34,858 of which are posted in groups.

Table 1 provides the summary statistics for the most important variables.⁵ Panel A shows the distribution of listings by credit grades and by groups. Most listings are either posted outside a group (118,683) or in a reward group (32,966); much fewer listings are posted in no-reward groups (1,892). Listings with the credit grade HR present by far the most dominant group of listings with 66,734 observations, again mostly outside a group and in reward groups.

From panel B of Table 1 we see that this does not hold true for the distribution of loans. From the 12,183 loans, only 1,167 originate from successfully funded HR-listings, while there are by far more AA/A-loans (3,143). Only for E-loans, the number of loans is smaller than for HR-loans. The results in panel B also suggest that the listing probability is highest in no-reward groups, followed by that in reward groups and outside groups.

credit grades A and B, from 1% to 3% for the credit grades C and D, and from 2% to 3% for the credit grades E and HR.

⁵ Variable definitions for all variables in the tables of the paper are given in Table 9.

The number of loans in no-reward groups of 654 constitutes almost 35% of the number of listings of 1,892 in these groups, while this rate decreases to about 12% for reward groups and 6% outside groups.

In panel C of Table 1, the information on group-specific characteristics is summarized. Despite the fact that they are not compensated for their work, group leaders are relatively more active in no-reward groups than in reward groups in terms of bidding and endorsing listings. They are also more involved in terms of vetting, i.e. they review and certify the information given to them by the potential borrowers, reviewing listings, and offering help to the borrower. For example, the share of listings with at least one group leader bid is considerably higher in no-reward groups (45.8%) than in reward groups (32.0%).

3. Empirical Analysis and Results

3.1. Univariate Analysis

3.1.1. Reward Groups and No-Reward Groups

We analyze the functioning of the different types of groups along three dimensions. These dimensions comprise the listing success, which is the probability with which a listing becomes a loan, the interest charged for each loan, and the loan performance, i.e. its likelihood of default. Table 2 presents the results for these dimensions for listings that are submitted in no-reward and reward groups as well as outside groups. These results are shown for each of the group types as well as for each credit grade within a group type.

Panel A of Table 2 shows the results for the listing success. The success is highest for listings in no-reward groups, followed by listings in reward groups and listings outside groups. For example, listings for loan applicants with the highest credit grade of AA/A have a 60% probability of receiving a loan in no-reward groups, 40% probability in reward groups, and 30% probability outside groups. The differences between these probabilities as well as those for the other credit grades are statistically significant throughout at the 1% level. This means that – for each credit grade – the success rate of

listings in no-reward groups is significantly higher than the success rate in reward groups, which in turn is higher than the success rate posted outside groups.

Panel B of Table 2 presents the results for the analysis of the interest rates of loans, i.e. funded listings. The interest rates are borrower interest rates, so that – for reward groups and before the elimination of group leader rewards – they also include the group leader reward the borrower has to pay if the loan is funded. Independently of the group type, the interest rates of loans decrease in credit quality. More importantly for the purpose of this study, they are significantly smaller in no-reward groups than in reward groups and outside groups for each credit grade. For the comparison of interest rates of loans in reward groups and outside groups, low-risk borrowers with credit grades AA/A, B, and C do not benefit from having their listing funded in a reward group; but borrowers with credit grades D, E and HR pay lower interest rates in reward groups than outside groups.⁶

Finally, panel C of Table 2 presents failure rates of loans per 1,000 loan-days.⁷ We employ this measure to be able to compare the performance of loans with different observation lengths in our sample period; we can track the full 36-month performance only for those loans originated at the beginning of the sample period. Any payment that is not made on time is considered as a failure, so that failure events comprise late payments, charge-offs and defaults.⁸ As expected, these failure rates decrease in credit quality. For the comparison of the different group types, the failure rates of loans originated in no-reward groups (11.0) are the lowest ones, significantly lower than those in reward groups (17.6) and those outside groups (12.1). This is the case for all credit grades except HR. The default rates in reward groups are significantly higher than those in no-reward groups

⁶ Borrowers with the credit grades AA/A even pay significantly higher interest rates in reward groups (11.3%) than outside groups (10.9%).

⁷ We repeat this analysis by just considering defaults with the first year after loan originations. The results are very similar to those obtained in this analysis.

⁸ This is a very conservative assumption mainly made for data reasons. In fact, in our entire sample period, Prosper.com declared only very sporadically loans as defaulted, and if they did so, then it often was a huge number of loans at the same time. We believe that this does not mirror the real picture of defaulted loans and therefore consider the alternative specification described above. The results we obtain in the descriptive statistics and later in the multivariate models are robust with respect to a specification where failure events are defaults, charge-offs or payments that are four or more months late.

and outside groups for each of the different credit grades and thus show the worst performance of all loans.

Taken together, the results suggest that no-reward groups work best. Listings in these groups have the highest listing success, and the resulting loans have the lowest interest rates and the best loan performance. In contrast, reward groups do not work well. While listings in these groups have a higher listing success than those outside groups and – for the worse credit grades – the resulting loans have lower interest rates than those outside groups, they exhibit significantly higher default rates than other loans. This raises the question why reward groups do not work in comparison to no-reward groups.

3.1.2. Group Leader Bids and Group Leader Endorsements

One hypothesis for the worse performance of reward groups is that the rewards may create adverse incentives for group leaders and induce them to persuade other lenders to bid on weak listings. They could achieve this by endorsing and bidding on listings and thus make other lenders believe that these listings are creditworthy.

In general, group leaders can use their bids as one important mechanism to promote listings in their groups. In the observed period, group leaders bid on 32.7% of the listings and these bids tend to be successful: among all first group leader bids on a listing, only 13% are outbid. Mostly, these bids constitute small amounts – very often \$50 or \$100 – so that the median amount of the first group leader bid is \$70. Usually, these bids are placed very fast. Indeed, if a group leader bids, her first bid is typically also the first overall bid on the respective listing.

Table 3 analyzes for no-reward and reward groups the listing success, interest rates, and loan performance based on whether the group leaders bids on or endorses a listing or whether he abstains from either of the two.

Panel A of Table 3 shows how success rates of listings are related to group leader bids and group leader endorsements. In no-reward groups, success rates for listings with a group leader bid (52.8%) or a group leader endorsement (60.6%) are much higher than for those which have neither (16.6%). This is true for all credit grades, which shows that both group leader bids and group leader endorsements increase the probability of funding regardless of the riskiness of the listing. The analysis of reward groups draws a similar picture: here, only 6.9% of the listings without a group leader bid and without a group leader endorsement are funded, while the listing success is significantly increased by group leader bids (22.4%) and group leader endorsements (39.3%).

From panel B of Table 3 we observe that in no-reward groups, neither group leader bids nor group leader endorsements significantly influence the interest the borrower has to pay, except for slightly lower interest rates for credit grades D and HR. The effect is more pronounced for reward groups. The analysis by credit grade reveals that loans with a group leader bid or a group leader endorsement are associated with significantly smaller interest rates, in particular for the riskier credit grades. For example, borrowers with a loan in the credit grade HR pay on average 26.1% if the listing has neither a group leader bid nor a group leader endorsement, but only 24.2% if the group leader bids on the listing and only 24.3% if the group leader writes an endorsement.

From panel C of Table 3 we see that in no-reward groups, loans of the riskier credit grades E and HR have lower default rates if they have a group leader bid or a group leader endorsement. By sharp contrast, loans in reward groups with a group leader bid or a group leader endorsement in general have significantly higher failure rates than loans without any of these two (18.9 / 19.0 vs. 15.7). This is the case for almost all credit grades. Apparently, group leader bids and group leader endorsements do not work as credible signals in reward groups.

Taken together, in both group types the success rates of listings with group leader bids and endorsements are much higher than for listings without group leader bids and endorsements. Yet, while in no-reward groups these two promotion mechanisms are

associated with listings of good quality despite their bad credit grade E or HR, in reward groups default rates are systematically increased for listings with a group leader bid or a group leader endorsement. Group leader bids and endorsements thus lead to adverse outcomes in reward groups. If this is due to adverse incentives for group leaders, then we should expect to see a change in behavior with a change in reward structure.

3.1.3. Group Leader Behavior Before and After the Elimination of Group Leader Rewards

We thus analyze next whether and how the change in reward structure affects the group leader behavior. Panel A of Figure 2 shows the weekly share of listings with at least one group leader bid in no-reward groups and in reward groups over the sample period. In no-reward groups, the share of listings with at least one group leader bid does not show any remarkable trend over the sample period. By sharp contrast, in reward groups this share decreases dramatically from about 40% to less than 10% once group leader rewards are eliminated.

Panel B of Figure 2 draws a similar picture for the other important mechanism: group leader endorsements. In particular, the share of listings with a group leader endorsement decreases significantly in reward groups from about 20% to less than 10% after the elimination of group leader rewards. The slight and rather slow increase of the respective share in the no-reward groups can be explained by the fact that friend endorsements were introduced only shortly before the beginning of our sample period (also see Figure 1), so that if nothing had changed – i.e. if group leader rewards had not been eliminated – we would have expected the same trend for no-reward groups and reward groups.

Table 4 confirms the results from Figure 2 by considering different credit grades. The results in panel A suggest that the share of listings with a group leader bid in no-reward groups does not change significantly after the elimination of group leader rewards for any credit grade. It remains at a level of about 45%. In strict contrast, the decrease in reward

groups is significant for all credit grades, and it is most distinct for riskier credit grades. For example, it decreases from 34.7% to 3.9% for credit grade HR.

The results in panel B show the respective results for the group leader endorsements. In no-reward groups, the share of listings with group leader endorsements increases on average after the elimination of group leader rewards, consistent with Figure 2. In contrast, in reward groups, the share of listings with a group leader endorsement decreases after the elimination of group leader rewards from 13.9% to 6.8%, which is especially due to the significant decrease in the corresponding shares of the high-risk listings with credit grades C, D, E and HR.

In sum, these results indicate that group leaders of reward groups significantly lower the effort they put into listings and in particular risky listings after the elimination of group leader rewards – as opposed to group leaders of no-reward groups who do not change their behavior. The resulting open question is how this change in behavior affects outcomes.

3.1.4. Effect of Change in Group Leader Behavior

A first piece of evidence for the effect of the change in group leader behavior on outcomes is provided by Figure 3, which shows success rates of listings posted outside groups as well as of listings posted in no-reward groups and in reward groups. As shown before, success rates of listings in no-reward groups are generally the highest ones: they are significantly higher than those of listings in reward groups and those of listings posted outside groups. Success rates of listings in reward groups are also higher than those not posted in groups, but, most importantly for the purpose of this study, only before group leader rewards are eliminated and in a short transition period after the change.

The changes in outcome patterns are analyzed in more detail in Table 5. Panel A of Table 5 shows that the overall success rate remains constant at 34.6% in no-reward groups before and after the elimination of group leader rewards. The results are also very similar

for each of the different credit grades, with the exception of HR. In strict contrast to no-reward groups, success rates in reward groups decrease significantly from 13.4% to 8.6%. This decrease is particularly pronounced in the risky credit grades C to HR, while there is no significant change for the credit grades AA/A and B. This means that worse credit grades have a substantially lower chance of getting funded after the elimination of group leader rewards.

Panel B of Table 5 suggests that interest rates do not significantly change after the elimination of group leader rewards, neither in no-reward groups nor in reward groups. The only exceptions are interest rates for credit grade B in no-reward groups and credit grades E and HR in reward groups, which pay slightly more after the change.

As shown in panel C of Table 5, failure rates in reward groups consistently decrease after the elimination of group leader rewards across all credit grades. The average decrease in failure rates of loans per 1,000 loan-days amounts to about 4. In the extreme case, failure rates decrease from 17.9 to 11.2 for credit grade D. In no-reward groups, no systematic pattern can be found. While failure rates increase for credit grades AA/A, they decrease for credit grade HR.

Taken together, these results show that no-reward groups work the same way before and after the elimination of group leader rewards. In contrast, reward groups work much better after the elimination of group leader rewards than before, as default rates are substantially lower. A decrease in listing success along with a decrease in defaults after the elimination of group leader rewards suggests that group leaders now much more carefully screen and choose the listings that are funded.

3.2. Multivariate Analysis

In order to determine the driving factors behind the results described above and to control for the joint influences, we now turn to the multivariate analysis.

3.2.1. Listing Success

Table 6 shows odds ratios of logistic regressions of listing success.⁹ In specification (1), we consider all listings, i.e. those posted in groups as well as those posted outside groups. Almost all covariates are highly significant and go into the expected direction: Listing success is decreasing in credit grade risk, debt-to-income ratio, and the number of historical and current records in the credit report; it is increasing in homeownership and in income. Self-employed and in particular retired or unemployed borrowers face a particularly low funding probability. In terms of the listing characteristics, listing success is decreasing in the amount requested and increasing in the duration of the listing. Potential borrowers who decide to close their listing as soon as it is funded also exhibit higher chances to have their listing funded; obviously potential lenders tend to jump on these listings as there is a good chance to earn high interest rates given that one cannot be outbid.

Similarly to the results in descriptive statistics, listing success highly depends on whether the listing is posted in a group and – if this is the case – the group type: Specification (1) shows that listings that are not posted in a group (*No Group*) or that are posted in a reward group (*Reward Group*) have significantly lower funding probabilities than those posted in no-reward groups, which is the reference group in all our regressions. Finally, after the elimination of group leader rewards (*After*), listing success decreases.

In specifications (2) to (4) of Table 6, we concentrate on those listings that are posted in groups and analyze in particular the different group-specific variables.¹⁰ The probability that the listing is funded increases significantly if the group leader requires the listing to be reviewed before it is posted in the group (*Listing Review Requirement*) or if the group

⁹ Odds ratio = exponentiated logit regression coefficient. Odds ratios provide a particularly easy and intuitive interpretation for dummy variables: the ratio of the odds of funding occurring in the dummy group to the odds of it occurring in the reference group. Example: The reference group in our regressions is AA/A-listings. The coefficient of 0.027 for the dummy variable “Credit Grade: HR” in specification (1) of Table 6 therefore means that a HR-listing has a 2.7% chance to be funded when compared to an AA/A-listing. The evaluation benchmark is 1: Odds ratios smaller than 1 report smaller chances compared to the reference group, odds ratios bigger than 1 stand for bigger chances than in the reference group.

¹⁰ The results obtained with respect to the other covariates are robust across the different specifications.

leader offers help in designing the listing (*Group Leader Offers Help*). Vetting, i.e. the verification of the information by the group leader, seems surprisingly unimportant for the success of the listing. However, by far the most important group variables in terms of listing success are group leader bids and group leader endorsements at the top of specifications (2) to (4), which we analyze now more closely.

In specification (2), we include dummy variables for group leader bids and group leader endorsements into the regression and distinguish between *Only GL Bid*, *Only GL Endorsement* and *GL Bid & GL Endorsement*. Listings that have *GL Bid & GL Endorsement* exhibit particularly high funding probabilities. Listings with just one of these two elements are still about two to three times more likely to be funded than listings without any of these two. When comparing the coefficients for *Only GL Endorsement* and *Only GL Bid*, it may seem surprising at first sight that *Only GL Endorsement* – where there is no monetary commitment by the group leader at stake, i.e. where group leaders do not have “skin in the game” – has an even slightly higher positive influence on the funding probability than *Only GL Bid* has. We analyze this observation more carefully in the next specification.

In specification (3), we break down the influence of group leader bids and group leader endorsements for reward and no-reward groups. The results show that *Only GL Bid*, *Only GL Endorsement* and *GL Bid & GL Endorsement* work in the same way in reward and no-reward groups. However, *Only GL Endorsement* works particularly well in reward groups, while *Only GL Bid* works better in no-reward groups. The larger coefficient for *Only GL Endorsement* in specification (2) is thus solely due to its higher listing success in reward groups. We will later analyze whether these endorsements eventually also lead to loans with lower default rates, or whether the group leader simply persuades potential lenders to participate in a loan so that he can earn the upfront reward associated with a successful listing.

Finally, specification (4) evaluates the influence of the elimination of group leader rewards. It shows that after this event the influence of the combination of a group leader

bid and a group leader endorsement in the reward groups is significantly higher than before.¹¹ The result indicates that – after the elimination of group leader rewards – potential lenders trust much more than before the correctness of the group leader’s signal that comes from his bid and endorsement. This suggests that after this change, lenders might be less concerned about the group leader behaving opportunistically and promoting listings only for his own benefit.

3.2.2. Interest Rates of Loans

In order to determine the influence of the different variables on the interest rates that borrowers have to pay to the lenders if their listing is funded, we run Tobit regressions of this interest rate (in percent) on the same independent variables as in the regressions in Table 6. Table 7 reports the results, where the dependent variable is truncated at left at 0% and at right at 35%, which is the maximum interest rate possible on Prosper.com.¹² Naturally, the sample is restricted to those listings that are completely funded and therefore become loans.

The interest rate of loans in the reference group, which are AA/A-loans, is about 5%. As before, most covariates are significant and have the expected signs. The borrower’s credit grade is by far the most important influencing factor for the interest rate charged to the borrower. Apart from that, the borrower interest rate is increasing in the debt-to-income ratio and in the number of historical and current records in the credit report. It is also decreasing in income, although this effect becomes insignificant if only group loans in specifications (2) to (4) are considered. Furthermore, a higher amount requested typically increases the interest rate. The interest rate increases by about 3% if the borrower chooses that the listing shall be closed as soon as it is completely funded; the interest rates cannot be bid down in this case.

¹¹ Due to the high correlation of group leader bids and group leader endorsements and the resulting low sample size for “Only Group Leader Bid” and “Only Group Leader Endorsement” after the elimination of group leader rewards, we do not distinguish the two variables “Only Group Leader Bid” and “Only Group Leader Endorsement” in the reward groups between before and after the elimination of group leader rewards.

¹² OLS regression results differ only marginally and are therefore not reported here.

Specification (1) confirms the results from the univariate analyses and shows that interest rates of loans funded outside groups (*No Group*) or in reward groups (*Reward Group*) are higher than those of loans in no-reward groups. Specification (2) shows that loans originated from listings with *Only GL Bid* benefit from particularly low interest rates, and interest rates are even lower for loans with *GL Bid & GL Endorsement*. We also find that the interest rate of the loan is significantly lower if the group leader claims to verify additional information from the borrower (*Vetting*) or if the group leader offers help in designing the listing (*Group Leader Offers Help*).

Specification (3) shows the results for reward and no-reward groups. Loans with *Only GL Endorsement* do not benefit from significantly lower interest rates. Otherwise, group leader bids and endorsements lead to lower interest rates both in reward and no-reward groups.

Finally, from specification (4) we deduce that after the elimination of group leader rewards, the interest rate of loans with *GL Bid & GL Endorsement* in reward groups is about 1% smaller than before. This result indicates that after this event, group leader bids and group leader endorsements have a significantly higher influence on the resulting interest rate in this group type. This suggests again that the signal of a group leader bid and endorsement is much more credible after the elimination of group leader rewards than before.

3.2.3. Loan Performance

In order to analyze the determinants of loan performance, we specify Cox proportional hazards models with the same independent variables as before. The underlying assumption of the models is that the coefficients are not time-varying, i.e. the importance

of a variable for the probability of defaulting or being late is constant over time.¹³ Loans are exposed to the process from the time they are originated until they are either completely paid back, they default or their data runs out. The results of the Cox proportional hazards models are reported in Table 8.

Specification (1) of Table 8 shows that hazard rates are increasing in the credit grade risk and the debt-to-income ratio. Borrowers who use their bankcard exhibit lower hazard rates. Hazard rates are decreasing in income, whereas borrowers who are unemployed or retired have higher hazard rates. In terms of the listing characteristics, hazard rates are increasing in the loan amount. Furthermore, if the listing has a short duration or if it is closed as soon as it is funded, the corresponding loan is potentially exposed to a higher hazard rate. Together, this suggests that borrowers in urgent need of money exhibit higher hazard rates. For the key variables of interest, the group type significantly influences hazard rates even after controlling for other factors. Loans in reward groups (*Reward Group*) and loans resulting from listings posted outside groups (*No Group*) exhibit significantly higher hazard rates than loans in no-reward groups as the reference group. This result confirms the evidence from the univariate analysis.

The results in specifications (2) to (5) suggest that hazard rates are also reduced if the group leader verifies the information provided (*Vetting*) or if he generally offers help in designing the listing (*Group Leader Offers Help*). Most importantly for the purpose of this study, specification (2) shows that while *Only GL Bid* is insignificant in explaining the default rate of a loan, the opposite is the case for *Only GL Endorsement* or the combination *GL Bid & GL Endorsement*, which increase default rates. Obviously, group leader endorsements do not work properly as a signal of good listing quality.

From specification (3) we see that this is only a problem in reward groups, whereas in no-reward groups *Only GL Bid*, *Only GL Endorsement* as well as the combination *GL Bid &*

¹³ If e.g. a loan with credit grade HR is more susceptible to have a failure than a loan of the reference group AA/A, the strength of this relationship does not depend on time. Thus, for example, the HR-loan does not become more susceptible to fail over time, compared to the AA/A-loan.

GL Endorsement significantly lower the hazard rate of the loan. One may wonder whether before the elimination of group leader rewards it is profitable for the group leaders of reward groups to promote listings in their groups by placing a group leader bid on them. Further analysis shows that in this time period the group leader rewards more than compensate for the slightly higher default rates in these groups.¹⁴

Most importantly, the influence of the elimination of group leader rewards on loan performance in reward groups can be deduced from specification (4): while before this policy change the combination of *GL Bid & GL Endorsement* hints at a ceteris paribus higher hazard rate (coefficient of 1.154), after this event the hazard rate is significantly smaller not only than before the change but also than the benchmark of 1 (coefficient of 0.823). Consequently, the results suggest that – before the elimination of group leader rewards – group leaders of reward groups overpromote bad listings with the help of group leader bids and especially group leader endorsements, which lead to higher default rates for these types of loans. In contrast, after this policy change, the mechanism works properly as the group leader has now no incentive any more to behave opportunistically.

The evidence so far suggests that rewards give group leaders an incentive to even promote and bid on bad listings as these rewards more than offset the losses due to the higher likelihood of default. This behavior changes once the reward is eliminated, which changes the group leaders' trade-off between rewards and losses. An alternative way to align incentives, i.e. to make group leaders screen listings very carefully, is that – even before the elimination of group leader rewards – group leaders participate to a large fraction in the loan and thus have substantial skin in the game. We therefore further differentiate in specification (5) whether a group leader participates in more or less than

¹⁴ To be specific, we calculate the median internal rate of return (IRR) of three different investments the group leader can make: (i) investment in a listing in her reward group by placing a group leader bid, (ii) investment in a listing in a no-reward group and (iii) investment in a listing not posted in any group. The median IRRs of investments (ii) and (iii) are negative with -22.4% and -37.0% as most loans are not yet paid back completely. Only the median IRR of investment (i) is already positive with 7.2% – due to the additional reward the group leader obtains. This clearly shows that it is profitable for the group leader of a reward group to promote listings in her group so that she obtains the group leader reward.

33% of the loan.¹⁵ The results show that the default rates decrease substantially when the group leader participates in more than 33% of the loan; this holds for no-reward groups as well as reward groups before and after the elimination of group leader rewards. However, only in reward groups before the event, the default rate is higher than 1 if the group leader participates in less than 33% of the loan. This means that the potential losses in this case are not high enough to outweigh the rewards. Or, interpreted differently, only a large commitment and thus substantial skin in the game induces a group leader to carefully screen borrowers and promote the creditworthy listings, even if he can earn rewards. The coefficient of 0.821 in this case is almost identical to that of 0.823 in specification (4), which captures the default probability after the elimination of the rewards. These results suggest that a high bid by the group leader serves indeed as a signal about the quality of screening, as the other lenders correctly assume that a higher participation leads to more skin in the game and thus a more careful screening process.

4. Conclusion

Lenders and borrowers in markets without financial intermediaries with skin in the game are confronted with even more substantial information asymmetries than agents in traditional lending markets. An important open question is thus how mechanism design can still allow the markets to work properly and efficiently, i.e. to give borrowers access

¹⁵ The threshold of 33% is obtained as follows: A listing yields a negative payoff to a regular bidder under the following simplified condition: $-\alpha + \alpha I (1 - p) + \alpha (1 - p) < 0$, where α = share of the loan amount supplied by this bidder, I = interest rate obtained, p = probability of default. The recovery rate is assumed to be zero. This can be simplified to $-\alpha (I p + p - I) < 0$, so that $\alpha > 0$ implies $(I p + p - I) > 0$ for a listing with a negative payoff. Suppose the group leader knows p and I from historical data. To make it profitable for him to still bid on a listing with a negative payoff, group leader fees and upfront payment have to outweigh the loss: $F (1 - p) + U > \alpha (I p + p - I)$, where F = group leader fee (interest rate paid on the full loan amount), and U = upfront payment to the group leader (relative to the loan amount). Since $(I p + p - I) > 0$ as before, $(F (1 - p) + U) / (I p + p - I) > \alpha$ yields an upper bound for a profitable group leader bid on this listing. For each credit grade we compute the critical value α according to this last formula. As an example, consider a borrower with the credit grade B in a reward group. For this borrower, we have the average interest rate $I = 15\%$, the probability of default $p = 18\%$, the group leader fee $F = 2\%$ and the upfront fee $U = 0.5\%$. According to the formula above this yields a cutoff-criterion of $(0.02 \times (1 - 0.18) + 0.005) / (0.15 \times 0.18 + 0.18 - 0.15) = 0.37 > \alpha$. Consequently, the group leader should not participate in more than 37% of B-loans in which a regular bidder would lose money. The resulting overall critical value of 33% is the weighted average over these critical values of the credit grades.

to credit at rates that incorporate their risk of default. The analyses in this paper for the online social lending market show that information asymmetries can be alleviated by a careful design of a group system in which group leaders credibly signal borrower quality to other lenders by endorsing and submitting bids for carefully screened borrower listings. Groups work well as borrowers in these groups have a significantly higher likelihood of receiving a loan, pay significantly lower interest rates, and default less often than comparable borrowers outside these groups.

The functioning of groups is severely impaired when group leaders are rewarded for successful listings. We thus show that online social lending platforms are indeed right in eliminating or not using rewards that give group leaders adverse incentives to promote non-sustainable loans. After the elimination of group leader rewards, reward groups work well and provide the correct incentive structures to the group leader. Even before the elimination of rewards, these groups work well if the group leader puts his money where his mouth is and participates to a substantial fraction in a loan. Listings are then promoted only if the group leader trusts their quality. These results have important implications for the ongoing academic and regulatory debate on the future of securitization and the originate-to-distribute model, as they show that only a considerable fraction of the loan retained by group leaders induces them to efficiently screen loan listings. This result does not imply that group leaders should generally not be rewarded. Rather some other mechanisms might be considered, e.g. the group leader might obtain a small lump sum from the borrower once the loan is completely paid back.

In sum, the results in this paper are not only important for online social lending platforms, but they potentially have far-reaching implications for the traditional financial and lending industry as well as for more unconventional ways of access to finance such as micro lending. This paper shows that a proper mechanism and group design is crucial for giving borrowers access to credit and to induce lenders to carefully screen loan applicants.

References

Akerlof, G. A. (1970). The market for “lemons”: Quality uncertainty and the market mechanism. *The Quarterly Journal of Economics*, 84(3):488–500.

Berger, A. N., Miller, N. H., Petersen, M. A., Rajan, R. G., and Stein, J. C. (2005). Does function follow organizational form? Evidence from the lending practices of large and small banks. *Journal of Financial Economics*, 76(2): 237-269.

Bolton, P. and Scharfstein, D. S. (1996). Optimal debt structure and the number of creditors. *The Journal of Political Economy*, 104(1):1–25.

Holmstrom, B. (1979), Moral hazard and observability, *Bell Journal of Economics* 10: 74–91.

Holmstrom, B. and Tirole, J. (1997), Financial intermediation, loanable funds, and the real sector, *Quarterly Journal of Economics* 112: 663–691.

Hulme, M. K. and Wright, C. (2006). Internet based social lending: Past, present and future. *Working paper*.

Lin, M., Prabhala, N. R., and Viswanathan, S. (2009). Judging borrowers by the company they keep: Social networks and adverse selection in online peer-to-peer lending. *Working paper*.

Iyer, R., Khwaja, A., Luttmer, E., and Shue, K., Screening in new credit markets: Can individual lenders infer borrower creditworthiness in peer-to-peer lending??" *Working paper*.

Pope, D. G. and Sydnor, J. R. (2008). What's in a picture? Evidence of discrimination from Prosper.com. *Working paper*.

Ravina, E. (2008). Love & loans: The effect of beauty and personal characteristics in credit markets. *Working paper*.

Stein, J. C. (2002). Information Production and Capital Allocation: Decentralized versus Hierarchical Firms. *Journal of Finance*, 57(5): 1891-1921.

Stiglitz, J. E. and Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review*, 71(3):393–410.

Sufi, A. (2007), Information Asymmetry and Financing Arrangements: Evidence from Syndicated Loans, *Journal of Finance*, 62(2): 629-668.

Figure 1: Timeline of Policy Changes on Prosper.com

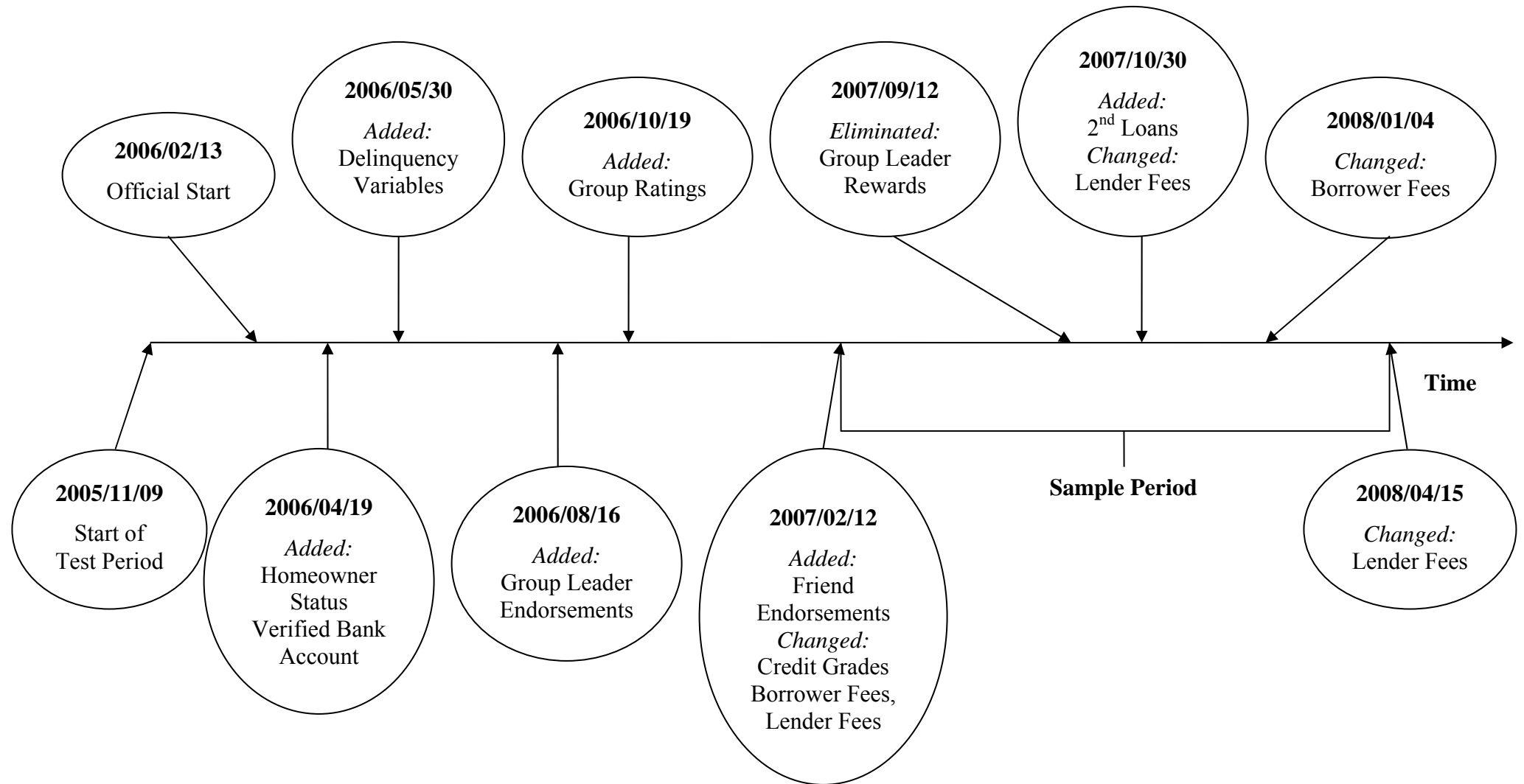
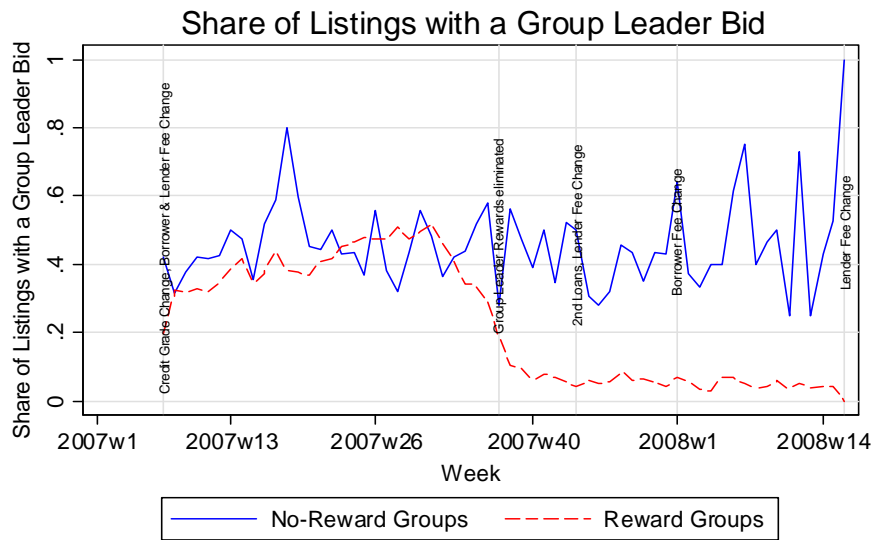
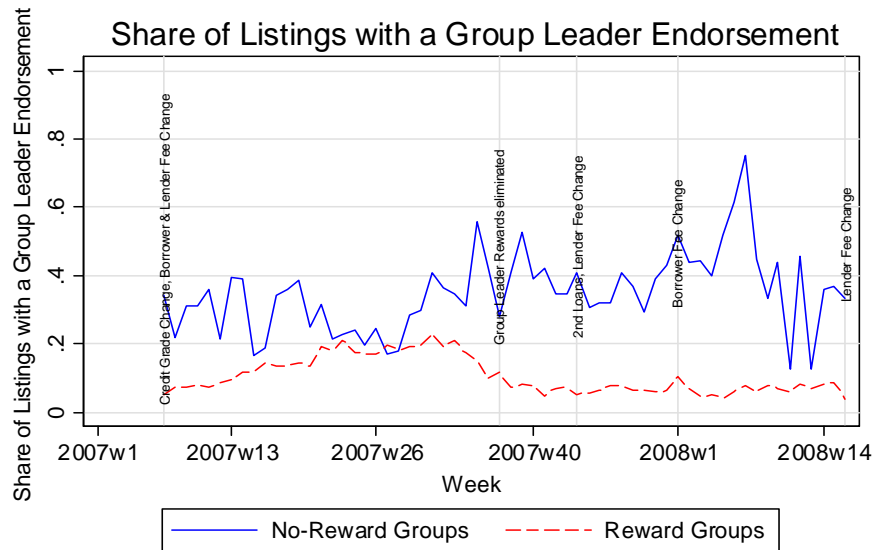


Figure 2: Group Leader Bids and Group Leader Endorsements

Panel A:

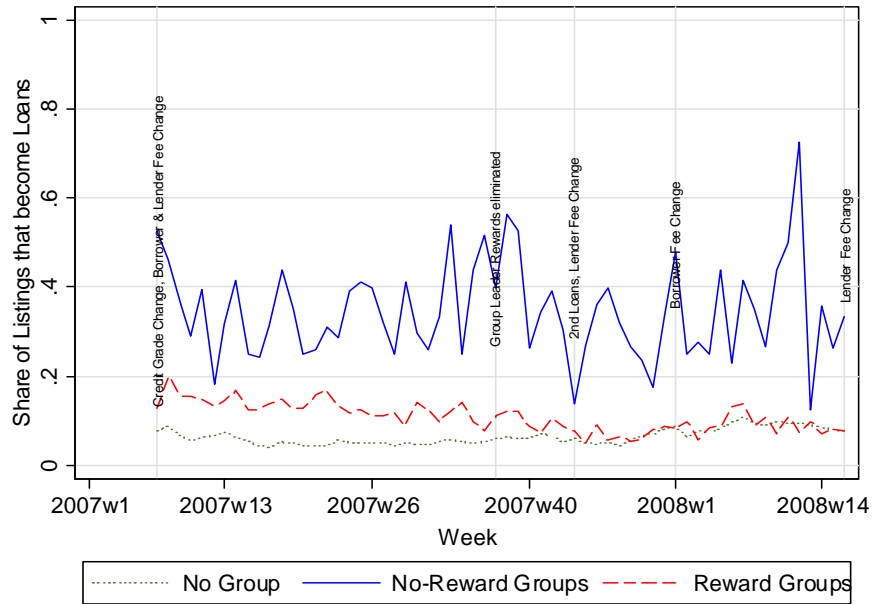


Panel B:



In this figure we report – by group type – the weekly share of listings (i.e. of requests for borrowing money) with at least one group leader bid (Panel A) / with a group leader endorsement (Panel B).

Figure 3: Listing Success



In this figure we report – by group type – the weekly share of successful listings, i.e. the weekly share of the successfully and completely funded requests for borrowing money.

Table 1: Summary Statistics

In this table we report – by group type – summary statistics on the most important variables. Panel A shows the distribution of listings (i.e. of requests for borrowing money) by the different credit grades from AA/A (best) to HR (worst). Panel B shows the corresponding distribution of loans (i.e. of successfully and completely funded requests for borrowing money). Panel C reports general group-specific shares, in particular the share of listings with at least one group leader bid and the share of listings with a group leader endorsement. “Vetting” denotes that the group leader claims to review information sent by the borrower (e.g. diploma or certificates). “Listing Review Requirement” denotes that the group leader checks the listing before it is opened for bidding by potential lenders. “Group Leader Offers Help” denotes that the group leader offers to support the borrower in writing and designing the listing.

	No Group	No-Reward Groups	Reward Groups	Overall
PANEL A: DISTRIBUTION OF LISTINGS (I.E. OF REQUESTS FOR BORROWING MONEY)				
AA/A	7,641	301	1,641	9,583
B	6,532	146	1,839	8,517
C	12,572	293	3,648	16,513
D	18,896	346	5,529	24,771
E	21,005	261	6,157	27,423
HR	52,037	545	14,152	66,734
Total Number of Listings	118,683	1,892	32,966	153,541
PANEL B: DISTRIBUTION OF LOANS (I.E. OF SUCCESSFULLY AND COMPLETELY FUNDED REQUESTS FOR BORROWING MONEY)				
AA/A	2,303	181	659	3,143
B	1,366	73	540	1,979
C	1,572	119	839	2,530
D	1,258	130	904	2,292
E	514	63	495	1,072
HR	432	88	647	1,167
Total Number of Loans	7,445	654	4,084	12,183
PANEL C: GROUP-SPECIFIC INFORMATION				
Share of Listings with at Least One Group Leader Bid		45.8%	32.0%	32.7%
Share of Listings with a Group Leader Endorsement		32.8%	12.4%	13.5%
Share of Listings with “Vetting”		28.6%	9.4%	10.4%
Share of Listings with Listing Review Requirement		66.0%	40.7%	42.1%
Share of Listings where Group Leader Offers Help		18.1%	7.8%	8.3%

Table 2: Listing Success, Interest Rates, and Loan Performance by Group Type

In this table we report univariate results by group type and credit grade. Panel A shows success rates of listings (i.e. of the requests for borrowing money) by the different credit grades from AA/A (best) to HR (worst). Panel B shows the corresponding interest rates of loans (i.e. of the successfully and completely funded requests for borrowing money). Panel C shows failure rates of loans (per 1,000 loan-days). In this panel, any payment which is not made on time is considered as a failure, so that failure events are late payments, charge-offs and defaults. T-statistics of the test on equality between “No-Reward Groups” and “No Group” as well as between “Reward Groups” and “No Group” are reported in parentheses. The rightmost column shows t-statistics on the test of equality between “No-Reward Groups” and “Reward Groups”. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

PANEL A: LISTING SUCCESS

Credit Grade	No Group		No-Reward Groups			Reward Groups			Comparison No-Reward vs. Reward Groups t-statistic
	Listing Success	N	Listing Success	t-statistic	N	Listing Success	t-statistic	N	
AA/A	30.1%	7,641	60.1%	(-10.43)***	301	40.2%	(-7.59)***	1,641	(6.50)***
B	20.9%	6,532	50.0%	(-6.95)***	146	29.4%	(-7.19)***	1,839	(4.81)***
C	12.5%	12,572	40.6%	(-9.73)***	293	23.0%	(-13.87)***	3,648	(5.96)***
D	6.7%	18,896	37.6%	(-11.83)***	346	16.4%	(-18.31)***	5,529	(7.99)***
E	2.4%	21,005	24.1%	(-8.17)***	261	8.0%	(-15.42)***	6,157	(6.02)***
HR	0.8%	52,037	16.1%	(-9.71)***	545	4.6%	(-20.78)***	14,152	(7.29)***
Total	6.3%	118,683	34.6%	(-25.80)***	1,892	12.4%	(-31.42)***	32,966	(20.01)***

PANEL B: INTEREST RATES

Credit Grade	No Group		No-Reward Groups			Reward Groups			Comparison No-Reward vs. Reward Groups t-statistic
	Interest Rate	N	Interest Rate	t-statistic	N	Interest Rate	t-statistic	N	
AA/A	10.9%	2,303	9.3%	(7.67)***	181	11.3%	(-2.82)***	659	(-8.69)***
B	15.1%	1,366	12.9%	(6.25)***	73	15.0%	(0.50)	540	(-5.64)***
C	17.5%	1,572	15.6%	(4.38)***	119	17.5%	(-0.14)	839	(-4.37)***
D	21.1%	1,258	17.7%	(8.37)***	130	20.1%	(5.01)***	904	(-6.03)***
E	26.3%	514	20.9%	(8.32)***	63	24.0%	(7.72)***	495	(-4.95)***
HR	25.5%	432	20.5%	(6.54)***	88	24.9%	(1.70)*	647	(-6.27)***
Total	16.7%	7,445	15.1%	(6.34)***	654	18.7%	(-16.25)***	4,084	(-14.10)***

PANEL C: LOAN PERFORMANCE

Credit Grade	No Group		No-Reward Groups			Reward Groups			Comparison No-Reward vs. Reward Groups t-statistic
	Failure Rate	N	Failure Rate	t-statistic	N	Failure Rate	t-statistic	N	
AA/A	7.1	2,303	4.6	(-11.17)***	181	8.8	(11.28)***	659	(16.76)***
B	11.2	1,366	7.3	(-10.30)***	73	14.8	(16.49)***	540	(18.16)***
C	12.4	1,572	9.7	(-8.01)***	119	16.8	(23.72)***	839	(19.92)***
D	14.6	1,258	10.2	(-13.33)***	130	17.1	(12.51)***	904	(20.01)***
E	19.1	514	14.1	(-8.91)***	63	21.6	(8.08)***	495	(13.41)***
HR	20.7	432	22.8	(3.43)***	88	25.7	(14.85)***	647	(4.92)***
Total	12.1	7,445	11.0	(-7.12)***	654	17.6	(62.13)***	4,084	(39.13)***

Table 3: Listing Success, Interest Rates, and Loan Performance by Group Type and by Listing Promotion Mechanism (Group Leader Bids and Group Leader Endorsements)

In this table we report univariate results by listing promotion mechanism (group leader bids / group leader endorsements) and credit grade. The table distinguishes between No-Reward Groups and Reward Groups. Panel A shows success rates of listings (i.e. of the requests for borrowing money) by the different credit grades from AA/A (best) to HR (worst). Panel B shows the corresponding interest rates of loans (i.e. of the successfully and completely funded requests for borrowing money). Panel C shows failure rates of loans (per 1,000 loan-days). In this panel, any payment which is not made on time is considered as a failure, so that failure events are late payments, charge-offs and defaults. T-statistics of the test on equality between “With GL-Bid” and “None” as well as between “With GL-Endorsement” and “None” are reported in parentheses for both No-Reward Groups and Reward Groups. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

PANEL A: LISTING SUCCESS																
Credit Grade	No-Reward Groups								Reward Groups							
	None		With GL-Bid			With GL-Endorsement			None		With GL-Bid			With GL-Endorsement		
	Listing Success	N	Listing Success	t-statistic	N	Listing Success	t-statistic	N	Listing Success	N	Listing Success	t-statistic	N	Listing Success	t-statistic	N
AA/A	39.5%	129	78.1%	(-6.81)***	128	81.9%	(-7.54)***	116	31.2%	910	50.0%	(-7.56)***	656	69.6%	(-13.29)***	355
B	34.3%	70	64.6%	(-3.67)***	65	76.6%	(-5.00)***	47	20.8%	1,010	38.5%	(-8.06)***	746	60.7%	(-13.87)***	359
C	21.3%	141	60.6%	(-7.31)***	142	70.8%	(-8.31)***	89	14.9%	2,150	33.2%	(-12.21)***	1,346	54.0%	(-17.61)***	574
D	13.2%	144	56.0%	(-9.37)***	193	68.9%	(-10.97)***	122	9.7%	3,397	26.4%	(-15.04)***	2,012	45.5%	(-19.43)***	793
E	9.5%	137	42.5%	(-6.22)***	113	55.4%	(-7.25)***	74	3.4%	4,163	18.0%	(-15.49)***	1,843	31.2%	(-15.28)***	666
HR	4.3%	278	32.4%	(-8.38)***	225	33.1%	(-7.58)***	172	2.0%	9,964	11.1%	(-17.54)***	3,940	19.6%	(-16.03)***	1,334
Total	16.6%	899	52.8%	(-17.22)***	866	60.6%	(-18.97)***	620	6.9%	21,594	22.4%	(-35.17)***	10,543	39.3%	(-41.37)***	4,081

PANEL B: INTEREST RATES																
Credit Grade	No-Reward Groups								Reward Groups							
	None		With GL-Bid			With GL-Endorsement			None		With GL-Bid			With GL-Endorsement		
	Interest Rate	N	Interest Rate	t-statistic	N	Interest Rate	t-statistic	N	Interest Rate	N	Interest Rate	t-statistic	N	Interest Rate	t-statistic	N
AA/A	9.3%	51	9.3%	(-0.11)	100	9.5%	(-0.37)	95	11.0%	284	11.4%	(-2.10)**	328	11.7%	(-2.79)***	247
B	13.4%	24	12.4%	(1.34)	42	12.9%	(0.61)	36	15.2%	210	14.6%	(1.65)*	287	14.9%	(0.85)	218
C	15.8%	30	15.6%	(0.22)	86	15.6%	(0.17)	43	18.2%	321	16.8%	(4.73)***	447	17.1%	(3.49)***	310
D	19.2%	19	17.4%	(1.94)*	108	17.1%	(2.10)**	84	20.9%	331	19.7%	(3.97)***	531	19.6%	(4.22)***	361
E	21.5%	13	20.6%	(0.62)	48	20.4%	(0.72)	41	24.8%	143	23.8%	(2.24)**	331	23.5%	(2.58)***	208
HR	24.7%	12	19.7%	(2.37)**	73	20.7%	(1.89)*	57	26.1%	200	24.2%	(4.50)***	439	24.3%	(4.06)***	261
Total	14.8%	149	15.5%	(-1.20)	457	15.4%	(-1.03)	376	18.7%	1,489	18.8%	(-0.53)	2,363	18.5%	(0.77)	1,605

PANEL C: LOAN PERFORMANCE

Credit Grade	No-Reward Groups									Reward Groups								
	None		With GL-Bid			With GL-Endorsement				None		With GL-Bid			With GL-Endorsement			
	Failure Rate	N	Failure Rate	t-statistic	N	Failure Rate	t-statistic	N	Failure Rate	N	Failure Rate	t-statistic	N	Failure Rate	t-statistic	N		
AA/A	2.8	51	6.3	(7.70)***	100	4.5	(3.97)**	95	6.6	284	10.6	(14.16)***	328	11.0	(14.26)***	247		
B	7.7	24	3.5	(-5.54)***	42	7.0	(-0.81)	36	13.3	210	15.8	(6.42)***	287	15.5	(5.27)***	218		
C	8.8	30	10.3	(2.04)**	86	8.7	(-0.09)	43	16.7	321	16.8	(0.34)	447	16.3	(-1.21)	310		
D	9.6	19	10.5	(1.02)	108	9.5	(-0.13)	84	16.8	331	17.5	(2.05)**	531	16.9	(0.21)	361		
E	19.4	13	13.2	(-4.33)***	48	12.4	(-4.79)***	41	18.5	143	22.9	(9.21)***	331	25.5	(12.89)***	208		
HR	31.4	12	21.1	(-5.66)***	73	22.9	(-4.62)***	57	23.7	200	26.4	(5.70)***	439	29.1	(10.26)***	261		
Total	10.6	149	11.4	(2.10)**	457	10.9	(0.87)	376	15.7	1,489	18.9	(20.79)***	2,363	19.0	(19.98)***	1,605		

Table 4: Group Leader Bids and Group Leader Endorsements by Group Type

In this table we report the share of listings (i.e. of requests for borrowing money) with at least one group leader bid (panel A) and the share of listings with a group leader endorsement (panel B) by group type and credit grade. T-statistics of the test on equality (before vs. after the elimination of group leader rewards) are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Credit Grade	No-Reward Groups					Reward Groups				
	Before Share	N	After Share	N	Difference t-statistic	Before Share	N	After Share	N	Difference t-statistic
PANEL A: SHARE OF LISTINGS WITH A GROUP LEADER BID										
AA/A	42.6%	202	42.4%	99	(0.02)	43.3%	1,358	24.0%	283	(6.70)***
B	44.2%	86	45.0%	60	(-0.10)	45.4%	1,547	15.1%	292	(12.37)***
C	52.2%	180	42.5%	113	(1.63)	42.7%	2,991	10.4%	657	(21.67)***
D	57.3%	246	52.0%	100	(0.90)	44.2%	4,400	5.9%	1,129	(37.25)***
E	45.0%	180	39.5%	81	(0.83)	37.6%	4,695	5.2%	1,462	(35.45)***
HR	40.1%	379	44.0%	166	(-0.84)	34.7%	10,999	3.9%	3,153	(54.03)***
Total	46.5%	1,273	44.3%	619	(0.92)	38.8%	25,990	6.4%	6,976	(77.10)***
PANEL B: SHARE OF LISTINGS WITH A GROUP LEADER ENDORSEMENT										
AA/A	40.6%	202	34.3%	99	(1.06)	22.0%	1,358	19.8%	283	(0.85)
B	26.7%	86	40.0%	60	(-1.66)	20.1%	1,547	16.4%	292	(1.53)
C	27.8%	180	34.5%	113	(-1.20)	17.0%	2,991	9.9%	657	(5.26)***
D	30.5%	246	47.0%	100	(-2.84)***	16.4%	4,400	6.2%	1,129	(11.25)***
E	23.9%	180	38.3%	81	(-2.28)**	12.2%	4,695	6.3%	1,462	(7.46)***
HR	25.9%	379	44.6%	166	(-4.18)***	10.8%	10,999	4.6%	3,153	(12.93)***
Total	29.1%	1,273	40.2%	619	(-4.72)***	13.9%	25,990	6.8%	6,976	(18.97)***

Table 5: Elimination of Group Leader Rewards

In this table we report univariate results by group type and credit grade. We also distinguish whether the listing (i.e. the request for borrowing money) or the loan (i.e. the successfully and completely funded request for borrowing money) was created before or after the elimination of group leader rewards. Panel A shows success rates of listings by the different credit grades from AA/A (best) to HR (worst). Panel B shows the corresponding interest rates of loans. Panel C shows failure rates of loans (per 1,000 loan-days). In this panel, any payment which is not made on time is considered as a failure, so that failure events are late payments, charge-offs and defaults. T-statistics of the test on equality (before vs. after the elimination of group leader rewards) are reported in parentheses for both No-Reward Groups and Reward Groups. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

PANEL A: LISTING SUCCESS

Credit Grade	No-Reward Groups					Reward Groups				
	Before		After		Difference	Before		After		Difference
	Listing Success	N	Listing Success	N		t-statistic	Listing Success	N	Listing Success	
AA/A	59.9%	202	60.6%	99	(-0.12)	40.0%	1,358	41.0%	283	(-0.31)
B	47.7%	86	53.3%	60	(-0.67)	29.4%	1,547	29.1%	292	(0.10)
C	40.6%	180	40.7%	113	(-0.03)	24.1%	2,991	18.0%	657	(3.64)***
D	36.6%	246	40.0%	100	(-0.59)	17.7%	4,400	11.0%	1,129	(6.16)***
E	23.3%	180	25.9%	81	(-0.44)	9.2%	4,695	4.2%	1,462	(7.37)***
HR	19.3%	379	9.0%	166	(3.39)***	5.0%	10,999	3.0%	3,153	(5.31)***
Total	34.6%	1,273	34.6%	619	(0.00)	13.4%	25,990	8.6%	6,976	(12.06)***

PANEL B: INTEREST RATES

Credit Grade	No-Reward Groups					Reward Groups				
	Before		After		Difference	Before		After		Difference
	Interest Rate	N	Interest Rate	N		t-statistic	Interest Rate	N	Interest Rate	
AA/A	9.1%	121	9.7%	60	(-1.16)	11.3%	543	11.2%	116	(0.36)
B	12.5%	41	13.6%	32	(-1.70)*	14.9%	455	15.3%	85	(-0.90)
C	15.1%	73	16.3%	46	(-1.30)	17.4%	721	18.1%	118	(-1.52)
D	17.4%	90	18.4%	40	(-1.24)	20.1%	780	20.1%	124	(0.17)
E	21.3%	42	20.0%	21	(0.91)	23.9%	433	25.4%	62	(-1.79)*
HR	20.2%	73	21.7%	15	(-0.72)	24.5%	551	26.8%	96	(-3.07)***
Total	15.1%	440	15.2%	214	(-0.09)	18.7%	3,483	18.9%	601	(-0.78)

PANEL C: LOAN PERFORMANCE

Credit Grade	No-Reward Groups (N=654)					Reward Groups (N=4,084)				
	Before		After		Difference	Before		After		Difference
	Failure Rate	N	Failure Rate	N		t-statistic	Failure Rate	N	Failure Rate	
AA/A	3.5	121	6.7	60	(6.37)***	9.0	543	8.0	116	(-2.56)**
B	7.3	41	7.3	32	(-0.06)	14.9	455	13.8	85	(-2.22)**
C	9.6	73	9.8	46	(0.25)	17.3	721	13.4	118	(-9.08)***
D	10.2	90	10.1	40	(-0.11)	17.9	780	11.2	124	(-17.32)***
E	14.2	42	13.7	21	(-0.42)	22.2	433	17.1	62	(-7.75)***
HR	24.3	73	14.2	15	(-7.80)***	26.2	551	22.5	96	(-6.12)***
Total	11.6	440	9.5	214	(-6.61)***	18.1	3,483	14.0	601	(-20.43)***

Table 6: Listing Success – Multivariate Analysis

In this table we report odds ratios of the logistic regression of funding success, i.e. the exponentiated regression coefficients. Coefficients larger (respectively smaller) than 1 indicate relatively higher (respectively smaller) success probabilities than in the reference group. In specification (1) all listings (i.e. all requests for borrowing money) are considered, in specifications (2) to (4) only group listings are analyzed. Specification (2) reports the overall effect of a group leader bid and / or a group leader endorsement on listing success. Specification (3) additionally distinguishes whether the group leader bid and / or the group leader endorsement occurs in a listing in a no-reward group or in a reward group. Specification (4) compares the joint effect of a group leader bid and a group leader endorsement before and after the elimination of group leader rewards on listing success in the reward groups. The reference is AA/A-listings before the elimination of group leader rewards in no-reward groups without a group leader bid or a group leader endorsement. T-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	All Listings		Only Listings in Groups			
	(1)	(2)	(3)	(4)		
Group Leader Bids and Group Leader Endorsements						
Only GL Bid		1.829*** (12.64)				
Only GL Bid: No-Reward			2.192*** (4.85)	2.172*** (4.80)		
Only GL Bid: Reward			1.796*** (11.82)	1.772*** (11.53)		
Only GL Endorsement		2.919*** (12.06)				
Only GL Endorsement: No-Reward			1.913** (2.56)	1.916** (2.56)		
Only GL Endorsement: Reward			3.149*** (12.22)	3.157*** (12.24)		
GL Bid & GL Endorsement		7.739*** (38.53)				
GL Bid & GL Endorsement: No-Reward			11.584*** (16.11)	11.580*** (16.11)		
GL Bid & GL Endorsement: Reward			7.368*** (35.86)			
GL Bid & GL Endorsement: Reward, Before				7.038*** (33.89)		
GL Bid & GL Endorsement: Reward, After				11.801*** (15.27)		
Group Characteristics						
No Group	0.162*** (-29.83)					
Reward Group	0.414*** (-14.18)	0.573*** (-8.56)	0.669*** (-3.76)	0.661*** (-3.87)		
Vetting		1.085 (1.40)	1.099 (1.61)	1.071 (1.15)		
Listing Review Requirement		1.492*** (9.64)	1.494*** (9.65)	1.491*** (9.61)		
Group Leader Offers Help		1.375*** (5.08)	1.336*** (4.56)	1.334*** (4.53)		
Listing Characteristics						
After Elimination of Group Leader Rewards	0.857*** (-6.09)	0.790*** (-4.50)	0.781*** (-4.70)	0.740*** (-5.41)		
Amount Requested (in \$1,000)	0.887*** (-57.39)	0.894*** (-29.83)	0.893*** (-29.82)	0.893*** (-29.90)		
Duration	1.063*** (11.67)	1.036*** (3.70)	1.038*** (3.82)	1.038*** (3.82)		
Listing Closed As Soon As Funded	1.140*** (5.13)	0.939 (-1.38)	0.938 (-1.40)	0.938 (-1.40)		
Borrower Characteristics						
Credit Grade: B	0.612*** (-12.81)	0.663*** (-5.20)	0.656*** (-5.33)	0.658*** (-5.29)		
Credit Grade: C	0.302*** (-32.71)	0.426*** (-11.91)	0.419*** (-12.10)	0.422*** (-11.99)		
Credit Grade: D	0.153*** (-47.83)	0.237*** (-19.44)	0.234*** (-19.61)	0.236*** (-19.48)		
Credit Grade: E	0.060*** (-56.96)	0.102*** (-26.60)	0.100*** (-26.73)	0.101*** (-26.61)		
Credit Grade: HR	0.027*** (-71.02)	0.055*** (-33.19)	0.055*** (-33.29)	0.055*** (-33.21)		
Debt-to-Income Ratio	0.900*** (-9.89)	0.967** (-2.48)	0.967** (-2.52)	0.966*** (-2.60)		
Is Borrower Home Owner	1.167*** (6.22)	1.160*** (3.45)	1.163*** (3.52)	1.164*** (3.53)		
\$1-24,999	1.316*** (2.70)	0.827 (-1.20)	0.830 (-1.17)	0.830 (-1.18)		
\$25,000-49,999	1.895*** (6.35)	1.233 (1.32)	1.231 (1.31)	1.234 (1.33)		
\$50,000-74,999	2.391*** (8.54)	1.658*** (3.14)	1.657*** (3.14)	1.661*** (3.15)		
\$75,000-99,999	3.000*** (10.42)	2.038*** (4.23)	2.040*** (4.23)	2.049*** (4.26)		
\$100,000	3.409*** (11.42)	2.432*** (5.12)	2.434*** (5.12)	2.451*** (5.16)		
Part-Time	1.000 (0.00)	0.864 (-1.40)	0.854 (-1.50)	0.853 (-1.51)		
Self-Employed	0.924* (-1.86)	1.074 (1.00)	1.070 (0.94)	1.071 (0.96)		
Retired	0.643*** (-5.72)	0.692*** (-2.84)	0.686*** (-2.90)	0.688*** (-2.88)		
Not Employed	0.632*** (-3.18)	0.597** (-2.38)	0.591** (-2.43)	0.593** (-2.41)		
Current Delinquencies	0.917*** (-14.53)	0.961*** (-4.91)	0.961*** (-4.91)	0.962*** (-4.86)		
Delinquencies Last 7 Years	0.995*** (-5.07)	0.997 (-1.63)	0.997 (-1.62)	0.997 (-1.59)		
Public Records Last 10 Years	0.970** (-2.38)	0.959** (-1.97)	0.959** (-1.97)	0.958** (-2.00)		
Total Credit Lines	0.993*** (-5.57)	0.994*** (-3.22)	0.993*** (-3.30)	0.993*** (-3.31)		
Inquiries Last 6 Months	0.974*** (-8.93)	0.986*** (-3.29)	0.986*** (-3.24)	0.986*** (-3.19)		
Amount Delinquent (in \$1,000)	0.993*** (-2.89)	0.991** (-2.46)	0.991** (-2.46)	0.990** (-2.51)		
Public Records Last 12 Months	1.084* (1.88)	1.087 (1.21)	1.089 (1.24)	1.091 (1.27)		
Current Credit Lines	1.004 (0.59)	1.034*** (3.34)	1.033*** (3.31)	1.033*** (3.29)		
Open Credit Lines	0.973*** (-4.25)	0.957*** (-4.09)	0.957*** (-4.04)	0.958*** (-4.02)		
Revolving Credit Balance (in \$1,000)	1.000 (1.09)	0.999 (-1.31)	0.999 (-1.40)	0.999 (-1.40)		
Bankcard Utilization	1.081** (2.43)	1.005 (0.09)	1.003 (0.06)	1.005 (0.10)		
Months in Current Occupation	1.000*** (-2.62)	0.999** (-2.34)	0.999** (-2.28)	0.999** (-2.31)		
N	153,541	34,858	34,858	34,858		
pseudo R ²	0.258	0.275	0.276	0.276		

Note: In specification (4), the difference between the regression coefficients of “GL Bid & GL Endorsement: Reward, Before” and “GL Bid & GL Endorsement: Reward, After” is significant at 1%.

Table 7: Interest Rates – Multivariate Analysis

In this table we report the regression coefficients from Tobit regressions of the lender interest rate of loans (i.e. of successfully and completely funded requests for borrowing money). In specification (1) all loans are considered, in specifications (2) to (4) only group loans are analyzed. Specification (2) reports the overall effect of a group leader bid and / or a group leader endorsement on the borrower interest rate. Specification (3) additionally distinguishes whether the group leader bid and / or the group leader endorsement occurs in a loan in a no-reward group or in a reward group. Specification (4) compares the joint effect of a group leader bid and a group leader endorsement before and after the elimination of group leader rewards on the borrower interest rate of loans in the reward groups. The reference is AA/A-loans before the elimination of group leader rewards in no-reward groups without a group leader bid or a group leader endorsement. T-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	All Loans		Only Loans in Groups			
	(1)		(2)	(3)	(4)	
Group Leader Bids and Group Leader Endorsements						
Only GL Bid			-0.713*** (-5.07)			
Only GL Bid: No-Reward				-1.320*** (-3.22)	-1.285*** (-3.14)	
Only GL Bid: Reward				-0.642*** (-4.35)	-0.595*** (-4.01)	
Only GL Endorsement			0.213 (0.95)			
Only GL Endorsement: No-Reward				-0.067 (-0.12)	-0.052 (-0.09)	
Only GL Endorsement: Reward				0.242 (0.99)	0.261 (1.07)	
GL Bid & GL Endorsement			-0.886*** (-6.27)			
GL Bid & GL Endorsement: No-Reward				-1.076*** (-3.11)	-1.061*** (-3.06)	
GL Bid & GL Endorsement: Reward				-0.878*** (-5.90)		
GL Bid & GL Endorsement: Reward, Before					-0.755*** (-4.90)	
GL Bid & GL Endorsement: Reward, After					-1.807*** (-5.24)	
Group Characteristics						
No Group	2.060*** (12.76)					
Reward Group	1.342*** (8.14)	1.263*** (8.41)	1.010*** (3.45)	1.052*** (3.60)		
Vetting		-0.501*** (-3.50)	-0.496*** (-3.44)	-0.421*** (-2.88)		
Listing Review Requirement		0.118 (0.98)	0.128 (1.07)	0.130 (1.09)		
Group Leader Offers Help		-0.721*** (-4.72)	-0.712*** (-4.62)	-0.713*** (-4.63)		
Listing Characteristics						
After Elimination of Group Leader Rewards	1.345*** (15.42)	1.499*** (10.59)	1.500*** (10.58)	1.691*** (10.88)		
Amount Requested (in \$1,000)	0.253*** (36.49)	0.290*** (29.02)	0.290*** (29.03)	0.291*** (29.18)		
Duration	-0.007 (-0.39)	0.009 (0.37)	0.008 (0.32)	0.009 (0.36)		
Listing Closed As Soon As Funded	3.286*** (37.07)	2.961*** (22.85)	2.971*** (22.90)	2.977*** (22.96)		
Borrower Characteristics						
Credit Grade: B	3.619*** (31.20)	2.896*** (15.69)	2.895*** (15.67)	2.880*** (15.60)		
Credit Grade: C	6.299*** (54.49)	5.732*** (33.47)	5.729*** (33.36)	5.706*** (33.23)		
Credit Grade: D	9.586*** (74.34)	8.634*** (47.41)	8.635*** (47.36)	8.611*** (47.23)		
Credit Grade: E	13.580*** (80.37)	12.249*** (54.57)	12.241*** (54.51)	12.206*** (54.33)		
Credit Grade: HR	13.420*** (75.66)	12.917*** (55.77)	12.916*** (55.76)	12.892*** (55.67)		
Debt-to-Income Ratio	0.157*** (4.70)	0.162*** (4.45)	0.161*** (4.43)	0.166*** (4.57)		
Is Borrower Home Owner	-0.152* (-1.82)	-0.500*** (-4.35)	-0.499*** (-4.34)	-0.502*** (-4.37)		
\$1-24,999	0.220 (0.64)	0.971** (2.27)	0.966** (2.26)	0.956** (2.24)		
\$25,000-49,999	-0.340 (-1.00)	0.455 (1.08)	0.456 (1.08)	0.449 (1.06)		
\$50,000-74,999	-0.473 (-1.38)	0.232 (0.54)	0.235 (0.55)	0.226 (0.53)		
\$75,000-99,999	-0.733** (-2.08)	-0.180 (-0.41)	-0.181 (-0.41)	-0.194 (-0.44)		
\$100,000	-1.132*** (-3.16)	-0.579 (-1.27)	-0.580 (-1.27)	-0.594 (-1.31)		
Part-Time	-0.423** (-2.19)	-0.034 (-0.12)	-0.041 (-0.15)	-0.047 (-0.17)		
Self-Employed	0.221 (1.55)	0.145 (0.75)	0.136 (0.71)	0.132 (0.69)		
Retired	0.129 (0.49)	-0.258 (-0.72)	-0.246 (-0.68)	-0.248 (-0.69)		
Not Employed	0.605 (1.18)	1.125* (1.81)	1.123* (1.81)	1.095* (1.76)		
Current Delinquencies	0.072*** (4.15)	0.069*** (3.28)	0.068*** (3.28)	0.068*** (3.28)		
Delinquencies Last 7 Years	0.025*** (7.07)	0.021*** (4.57)	0.020*** (4.54)	0.020*** (4.55)		
Public Records Last 10 Years	0.203*** (4.70)	0.224*** (3.70)	0.224*** (3.70)	0.226*** (3.74)		
Total Credit Lines	0.019*** (4.83)	0.013** (2.48)	0.014** (2.53)	0.014** (2.53)		
Inquiries Last 6 Months	0.141*** (14.18)	0.076*** (6.16)	0.076*** (6.14)	0.075*** (6.09)		
Amount Delinquent (in \$1,000)	0.018*** (3.14)	0.015 (1.55)	0.015 (1.58)	0.016 (1.63)		
Public Records Last 12 Months	0.445*** (2.83)	0.179 (0.83)	0.177 (0.82)	0.171 (0.79)		
Current Credit Lines	-0.054*** (-2.59)	-0.028 (-1.02)	-0.029 (-1.06)	-0.028 (-1.02)		
Open Credit Lines	0.054** (2.40)	0.023 (0.80)	0.024 (0.81)	0.022 (0.76)		
Revolving Credit Balance (in \$1,000)	0.001 (1.29)	0.004** (2.00)	0.004** (1.98)	0.004* (1.95)		
Bankcard Utilization	0.416*** (3.73)	0.449*** (3.09)	0.445*** (3.07)	0.443*** (3.05)		
Months in Current Occupation	0.001 (0.97)	0.001 (0.91)	0.001 (0.93)	0.001 (0.98)		
Constant	5.087*** (12.68)	5.817*** (11.73)	6.053*** (10.99)	5.957*** (10.81)		
N	12,183	4,738	4,738	4,738		
pseudo R ²	0.160	0.180	0.180	0.180		

Note: In specification (4), the difference between the regression coefficients of “GL Bid & GL Endorsement: Reward, Before” and “GL Bid & GL Endorsement: Reward, After” is significant at 1%.

Table 8: Loan Performance – Multivariate Analysis

In this table we report the exponentiated regression coefficients obtained from a Cox Proportional Hazards Model. Any payment which is not made on time is considered as a failure, so that failure events are late payments, charge-offs and defaults. In specification (1) all loans (i.e. all successfully and completely funded requests for borrowing money) are considered, in specifications (2) to (5) only group loans are analyzed. Specification (2) reports the overall effect of a group leader bid and / or a group leader endorsement on the failure probability of loans. Specification (3) additionally distinguishes whether the group leader bid and / or the group leader endorsement occurs in a loan in a no-reward group or in a reward group. Specification (4) compares the joint effect of a group leader bid and a group leader endorsement before and after the elimination of group leader rewards on the failure probability of loans in the reward groups. Finally, specification (5) analyzes whether before the elimination of group leader rewards, the group leader participates with more than 1/3 of the listing amount in the listing, if she places a bid and an endorsement on the listing (i.e. whether she “has skin in the game”). The reference is AA/A-loans before the elimination of group leader rewards in no-reward groups without a group leader bid or a group leader endorsement. T-statistics are reported in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	All Loans		Only Loans in Groups					
	(1)	(2)	(3)	(4)	(5)	(5)	(5)	
Group Leader Bids and Group Leader Endorsements								
Only GL Bid		0.998 (-0.14)						
Only GL Bid: No-Reward			0.906* (-1.85)	0.914* (-1.68)	0.951 (-0.94)			
Only GL Bid: Reward			1.001 (0.05)	1.013 (0.90)	1.014 (0.97)			
Only GL Endorsement		1.106*** (4.25)						
Only GL Endorsement: No-Reward			0.814** (-2.35)	0.816** (-2.33)	0.847* (-1.89)			
Only GL Endorsement: Reward			1.124*** (4.79)	1.128*** (4.94)	1.134*** (5.16)			
GL Bid & GL Endorsement		1.105*** (7.23)						
GL Bid & GL Endorsement: No-Reward			0.841*** (-3.80)	0.845*** (-3.71)				
GL Bid & GL Endorsement: No-Reward, Participation ≤ 33%					0.950 (-1.12)			
GL Bid & GL Endorsement: No-Reward, Participation > 33%					0.337*** (-8.73)			
GL Bid & GL Endorsement: Reward			1.125*** (8.39)					
GL Bid & GL Endorsement: Reward, Before				1.154*** (9.94)				
GL Bid & GL Endorsement: Reward, Before, Participation ≤ 33%					1.172*** (10.92)			
GL Bid & GL Endorsement: Reward, Before, Participation > 33%					0.821*** (-3.85)			
GL Bid & GL Endorsement: Reward, After				0.823*** (-4.60)				
GL Bid & GL Endorsement: Reward, After, Participation ≤ 33%					0.869*** (-3.30)			
GL Bid & GL Endorsement: Reward, After, Participation > 33%					0.084*** (-4.95)			
Group Characteristics								
No Group	1.307*** (15.12)							
Reward Group	1.419*** (20.02)	1.425*** (19.34)	1.172*** (4.04)	1.182*** (4.26)	1.225*** (5.10)			
Vetting		0.865*** (-9.61)	0.856*** (-10.23)	0.874*** (-8.84)	0.882*** (-8.23)			
Listing Review Requirement		0.994 (-0.51)	0.997 (-0.24)	0.997 (-0.26)	0.993 (-0.64)			
Group Leader Offers Help		0.947*** (-3.53)	0.957*** (-2.82)	0.957*** (-2.83)	0.941*** (-3.91)			
Listing Characteristics								
After Elimination of Group Leader Rewards	0.836*** (-20.37)	0.825*** (-11.83)	0.830*** (-11.48)	0.883*** (-6.96)	0.884*** (-6.93)			
Amount Requested (in \$1,000)	1.062*** (89.84)	1.061*** (60.08)	1.061*** (60.10)	1.062*** (60.38)	1.061*** (59.57)			
Duration	0.983*** (-10.81)	0.979*** (-8.73)	0.978*** (-8.97)	0.979*** (-8.87)	0.979*** (-8.82)			
Listing Closed As Soon As Funded	1.357*** (40.29)	1.171*** (13.44)	1.172*** (13.47)	1.173*** (13.51)	1.174*** (13.62)			
Borrower Characteristics								
Credit Grade: B	1.747*** (40.83)	1.774*** (24.59)	1.773*** (24.57)	1.770*** (24.51)	1.764*** (24.35)			
Credit Grade: C	2.305*** (62.86)	2.330*** (39.21)	2.333*** (39.23)	2.318*** (38.92)	2.305*** (38.65)			
Credit Grade: D	2.792*** (72.11)	2.627*** (43.00)	2.633*** (43.08)	2.621*** (42.87)	2.604*** (42.56)			
Credit Grade: E	3.812*** (81.09)	3.757*** (52.53)	3.760*** (52.54)	3.729*** (52.20)	3.717*** (52.06)			
Credit Grade: HR	4.741*** (92.24)	5.019*** (63.39)	5.030*** (63.46)	4.992*** (63.14)	4.977*** (62.99)			
Debt-to-Income Ratio	1.017*** (6.43)	1.022*** (6.48)	1.022*** (6.64)	1.023*** (6.82)	1.024*** (7.13)			
Is Borrower Home Owner	1.151*** (17.70)	1.109*** (9.32)	1.110*** (9.36)	1.111*** (9.48)	1.108*** (9.20)			
\$1-24,999	1.126*** (3.76)	1.122*** (2.50)	1.118*** (2.42)	1.117*** (2.39)	1.107*** (2.21)			
\$25,000-49,999	1.074** (2.29)	1.050 (1.08)	1.051 (1.09)	1.050 (1.06)	1.036 (0.77)			
\$50,000-74,999	0.939** (-2.01)	0.938 (-1.40)	0.937 (-1.40)	0.935 (-1.45)	0.928 (-1.62)			
\$75,000-99,999	0.935** (-2.08)	0.986 (-0.31)	0.985 (-0.31)	0.984 (-0.33)	0.971 (-0.63)			
\$100,000	0.827*** (-5.74)	0.855*** (-3.23)	0.852*** (-3.29)	0.847*** (-3.40)	0.840*** (-3.58)			
Part-Time	0.991 (-0.48)	1.122*** (4.04)	1.131*** (4.30)	1.132*** (4.35)	1.120*** (3.98)			
Self-Employed	1.106*** (7.82)	0.952*** (-2.68)	0.952*** (-2.63)	0.951*** (-2.69)	0.948*** (-2.85)			
Retired	1.119*** (4.71)	1.315*** (8.79)	1.315*** (8.78)	1.317*** (8.83)	1.324*** (9.00)			
Not Employed	1.333*** (6.58)	1.326*** (4.54)	1.324*** (4.50)	1.319*** (4.44)	1.351*** (4.81)			
Current Delinquencies	1.023*** (20.59)	1.025*** (17.85)	1.025*** (18.02)	1.025*** (17.98)	1.025*** (17.83)			
Delinquencies Last 7 Years	0.998*** (-7.21)	0.998*** (-5.25)	0.998*** (-5.41)	0.998*** (-5.43)	0.998*** (-4.99)			
Public Records Last 10 Years	1.046*** (14.87)	1.074*** (15.05)	1.075*** (15.14)	1.076*** (15.35)	1.076*** (15.28)			
Total Credit Lines	1.006*** (16.79)	1.005*** (11.05)	1.005*** (11.02)	1.005*** (11.14)	1.005*** (11.19)			
Inquiries Last 6 Months	1.047*** (71.17)	1.043*** (49.79)	1.043*** (49.76)	1.043*** (49.76)	1.043*** (49.91)			
Amount Delinquent (in \$1,000)	1.000 (-0.31)	1.003*** (4.43)	1.003*** (4.45)	1.003*** (4.56)	1.003*** (4.44)			
Public Records Last 12 Months	0.962*** (-3.09)	0.947*** (-2.98)	0.948*** (-2.96)	0.945*** (-3.08)	0.946*** (-3.07)			
Current Credit Lines	1.002 (1.17)	1.005** (1.99)	1.006** (2.18)	1.005** (2.10)	1.005** (1.98)			
Open Credit Lines	0.986*** (-6.79)	0.987*** (-4.45)	0.987*** (-4.61)	0.987*** (-4.59)	0.988*** (-4.41)			
Revolving Credit Balance (in \$1,000)	1.000*** (5.24)	1.001*** (6.11)	1.001*** (6.16)	1.001*** (6.05)	1.001*** (6.11)			
Bankcard Utilization	0.935*** (-6.83)	0.924*** (-5.95)	0.924*** (-5.92)	0.923*** (-5.99)	0.924*** (-5.93)			
Months in Current Occupation	1.000*** (-2.80)	1.000 (-1.61)	1.000* (-1.77)	1.000* (-1.81)	1.000** (-1.99)			

N 374,235 161,000 161,000 161,000 161,000

Note: In specification (4), the difference between the regression coefficients of “GL Bid & GL Endorsement: Reward, Before” and “GL Bid & GL Endorsement: Reward, After” is significant at 1%.

Table 9: Variable Definitions

Variable	Definition
Group Leader Bid	The group leader places a bid on the listing.
Group Leader Endorsement	The group leader writes an endorsement (a short text statement) on the borrower / her listing (before the loan is funded or the listing expires).
Only GL Bid	The group leader places a bid on the listing but does not write an endorsement.
Only GL Endorsement	The group leader writes an endorsement for the listing but does not place a bid.
GL Bid & GL Endorsement	The group leader places a bid on the listing and writes an endorsement.
Before / After	The listing is created before / after the elimination of group leader rewards. "Before" is the reference in the multivariate analyses.
No Group	The listing is not posted in any group.
No-Reward (Group) / Reward (Group)	If the group leader does not request a reward for any listing posted in the group in the sample period, the group is considered as a No-Reward Group. Otherwise the group is considered as a Reward Group. "No-Reward Group" is the reference in the multivariate analyses.
Vetting	The group leader asks the borrower to provide information.
Listing Review Requirement	The group leader reviews the listing before it is open for bidding by the lenders.
Group Leader Offers Help	The group leader provides help in designing and writing the listing.
Credit Grade: AA/A, B, C, D, E, HR	Each borrower is assigned a credit grade based on her Experian credit score. AA designates the lowest risk, HR the highest. "Credit Grade: AA/A" is the reference in the multivariate analyses.
Debt-to-Income Ratio	The debt-to-income ratio of the borrower at the time the listing was created. This value is capped at 1.01.
Is Borrower Home Owner	Specifies whether or not the member is a verified homeowner at the time the listing is created.
Income Information Unavailable / \$1-24,999 / \$25,000-49,999 / \$50,000-74,999 / \$75,000-99,999 / \$100,000+	The income range of the borrower at the time the listing is created. "Income Information Unavailable" is the reference in the multivariate analyses.
Full-Time / Part-Time / Self-Employed / Retired / Not Employed	The occupation status of the borrower at the time the listing is created. „Full-Time“ is the reference in the multivariate analyses.
Current Delinquencies	Number of current delinquencies at the time the listing is created.
Delinquencies Last 7 Years	Number of delinquencies in the last 7 years at the time the listing is created.
Public Records Last 10 Years	Number of public records in the last 10 years at the time the listing is created.
Total Credit Lines	Number of total credit lines at the time the listing is created.
Inquiries Last 6 Months	Number of inquires in the last 6 months at the time the listing is created.
Amount Delinquent (in \$1,000)	The monetary amount delinquent at the time this listing is created. (in \$1,000)
Public Records Last 12 Months	Number of public records in the last 12 months at the time the listing is created.
Current Credit Lines	Number of current credit lines at the time the listing is created.
Open Credit Lines	Number of open credit lines at the time the listing is created.
Revolving Credit Balance (in \$1,000)	The monetary amount of revolving credit balance at the time the listing is created. (in \$1,000)
Bankcard Utilization	Describes whether the borrower uses a banking card for her transactions.
Length Status Months	The length in months of the employment status of the borrower at the time the listing is created.
Amount Requested (in \$1,000)	The amount requested by the borrower in the listing. (in \$1,000)
Duration	The time for which the listing is open for bidding by potential lenders.
Listing Closed As Soon As Funded	The listing is automatically closed as soon as it is completely funded, i.e. once the total amount bid reaches or exceeds the amount requested.