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Evidence from the Largest German Lending Platform

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Does Gender Affect Funding Success at the Peer-to-Peer Credit Markets? Evidence from the Largest German Lending Platform*

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Abstract

Studies of peer-to-peer lending in the USA find that female borrowers have better chances of getting funds than males. Is differential treatment of borrowers of different sexes a common feature of peer-to-peer lending markets or is it subject to specific business models, ways of fixing loan contracts and even national financial systems? We aim at answering this question by providing evidence on loan procurement at the largest German peer-to-peer lending platform *Smava.de*. Our results show that gender does not affect individual borrower's chances of funding success on this platform, *ceteris paribus*. Hence, gender discrimination seems to be a platform-specific phenomenon rather than a common attribute of this innovative form of credit markets.

Keywords: gender, access to credit, peer-to-peer lending

JEL Classification: G21, J16

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1 Introduction

One of the more notable innovations in the financial services industry is the emergence of a new type of credit market known as peer-to-peer (thereafter P2P) lending. P2P lending is carried out directly between borrowers and lenders without intermediation of a traditional credit institution. Moreover, borrower-lender interactions are conducted anonymously via internet-based market places (also called platforms). Currently, more than 30 P2P lending platforms with different business models and loan procurement mechanisms exist in various countries. With $ 1 Billion of outstanding loans, P2P lending is still a niche segment compared to the size of traditional credit market.[1] Nevertheless, it is attracting a growing number of market participants. For borrowers, P2P lending provides an additional source of funds outside the banking system. Lenders in turn obtain access to a new investment instrument. The awareness of this phenomenon grows not only among the general public but also among financial industry professionals and scholars.[2]

For scholars, P2P lending presents a unique framework for studying various aspects of individuals' financial behavior in a real-life setting. One of the central research questions of recent studies is whether personal characteristics of loan applicants such as race, gender and physical looks affect their chances of getting funds at P2P credit (Ravina 2008, Pope & Sydnor 2008, Duarte & Young 2009). Using the data Prosper.com – the largest P2P lending platform in the USA – these studies show that women are more likely to get funds on the platform than men. This finding stands out from the evidence provided by literature investigating gender discrimination in the traditional credit markets. According to this literature, there is either discrimination against female borrowers or

[1] Deutscher Bundestag: Kleine Anfrage zum Thema "Private Kreditvergabe im Internet", Drucksache 17/1832.

[2] See Meyer (2009), FTD (2009), Sviokla (2009), Kim (2009), Ravina (2008), Pope & Sydnor (2008), Duarte & Young (2009).

no gender discrimination (Peterson 1981, Holtz-Eakin et al. 1994, Blanchflower & Oswald 1998, Blanchflower et al. 2003, Cavalluzzo et al. 2002, Alesina et al. 2009). Furthermore, current P2P lending market is very heterogenous. Existing platforms employ different business models and mechanisms of procurement and operate in different financial systems and cultural environments. Against this background, a justified question is whether evidence from *Prosper* can be generalized for all P2P lending platforms.

The present study contributes to answering this question by providing evidence on the treatment of male and female loan applicants at a P2P platform that differs from Prosper in several important ways. The platform considered is *Smava* and is the largest market place for P2P lending in Germany. In contrast to Prosper, loans at *Smava* are not auctioned but procured on a "take-it-or-leave-it" basis. For instance, loan conditions are set by loan applicants while lenders are the takers of these conditions. Furthermore, a loan applicant at the German platform can get a loan even when the requested sum is not completely funded. At Prosper, only individuals who succeed to raise 100% of the requested sum can get a loan. The next distinguishing feature of *Smava* is the existence of an interior insurance system that protects lenders from total losses. Finally, *Smava* is operating in a bank-based financial system and, thus, matches individuals (borrowers and lenders) who have primarily gained their financial experience in this financial system. Given the uniqueness of the German platform, it is an open question whether treatment of borrowers is similar to that observed at Prosper.

The goal of the study is to find out whether males and females have different chances of getting funds at *Smava*. Compared to existing papers on the determinants of funding success at P2P credit markets, our study has two novel features. Firstly, we employ three different indicators of funding success and examine whether results depend on the choice of indicator. Our first indicator

of funding success is that a loan applicant manages to raise 100% of the desired amount. The second indicator is that at least 25% of the requested amount is provided. The 25%-percent cutoff is chosen because platform returns the raised money back to lenders when less than 25% is raised. The third indicator of funding success is that a loan request managed to attract at least one lender regardless of the amount offered by the lender.

The second distinguishing feature of our study, compared to the analysis based on the Prosper-data, is the accuracy of identification of applicants' gender. At Prosper, applicants are not obliged to reveal their gender and many do not do so. To infer applicants' gender, previous studies relied on pictures uploaded by applicants at the platform. Yet, only 40% of applicants provided a picture showing people. Even assuming that the pictures truthfully show the actual applicants (and not someone else), researchers obtained information about gender only for some applicants. An analysis of how lenders treat loan applicants of different gender that is based on a sub-sample of applicants with pictures may yield biased evidence due to self-selection of individuals into those who provide pictures and those who do not. The issue of this problem is that lenders may obtain more accurate information about applicants' gender from verbal descriptions provided by applicants. To our knowledge, this information is not taken into account in the existing studies. An analysis based on the *Smava*-data is free of this problem: At the German platform, loan applicants are obliged to reveal their gender, which is information pubically observable to both lenders and researchers. This feature enables an accurate measurement of the effect of gender on the funding success.

We test the effect of applicants' gender on the probability of funding success by means of a multivariate regression analysis. Our results show that gender has no significant effect on funding success. Lenders seem to be equally willing to fund male and female applicants, *ceteris paribus*. This finding holds for

different indicators of funding success and a variety of robustness tests. Thus, we are confident that the obtained results reflect the true state rather than being an artifact of a specific estimation technique. All in all, the result of positive discrimination obtained for the US-American platform could not be confirmed with the German data. At *Smava*, access to credit appears to be equally likely for both genders. Therefore we cannot support the claim that gender discrimination is a common feature of P2P lending markets.

The remainder of the paper is organized as follows. The next section provides an overview of the lending mechanism at *Smava* and describes the data. In section 3 we formulate the research hypothesis and describe the test methodology. Section 4 describes the results of the multivariate probit regression. In section 5, we offer a number of robustness checks. The last section concludes by suggesting some explanations of why our results differ from that obtained for Prosper.

2 Data

2.1 Lending at *Smava*

Peer-to-peer lending means direct lending and borrowing between individuals ("peers") without intermediation of a traditional financial institution. Historical forms of peer-to-peer lending include borrowing from friends, family members or business partners. Recent advances in the Internet-based technologies enabled lending transactions to be carried out at online marketplaces ("platforms") where people who need money are linked to those who are willing to lend money. The first online platform for peer-to-peer lending, *Zopa*, was founded in 2005 in the UK.

Data used in this study are collected from the largest peer-to-peer lending platform in Germany – *Smava*. The platform was launched in March 2007 and specializes in facilitating loans between private individuals. All loans are fixed rate annuities paid back in fixed monthly payments. During the observation period spanning 3 years – from March 2007 to March 2010 – the platform procured 3,602 loans in total volume of € 27 million. The number of originated loans and its volume grew continuously (Figure 1). At present, up to 200 new loans in total volume of € 2 million are procured monthly. The majority of loans are typical consumer loans. Small business loans are also procured and make about a quarter of all loans. As of March 2010, 3,401 loan applicants and more than 5,000 lenders were registered on the platform.

Loan applications. Loan applications may only be posted on the platform by private persons who comply with a number of requirements. Firstly, applicants must be at least 18 years old and have a personal monthly income of at least € 1,000. Secondly, only those whose individual financial burden does not exceed 67 % are eligible to borrow at the platform. Financial burden is defined as a ratio of monthly payments that the applying individual must make on all outstanding debts (including the loans taken at *Smava*) to the personal monthly disposable income. Mortgage payments are treated as expenditures and subtracted from the disposable income. Neither income of other household members nor household savings are taken into account. Depending on the obtained ratio, applicants are rated on a scale from 1 (low financial burden) to 4 (high financial burden), as described in Table 3. Furthermore, the platform accepts only applicants with Schufa-rating grades ranging from A to H. Schufa-rating is assigned to individuals by the German national credit bureau and measures individuals' creditworthiness on a 12-point scale from A (the best) to M (the worst). Each rating grade corresponds to an estimate of the probability that an individual defaults on his/her obligations (see Table 2). Applicants' identity is verified via

the *postident* procedure: Each prospective applicant has to provide officials of the Deutsche Post (German Postal Office) documents that prove his or her identity and address.[3] Compliance with the aforementioned requirements is verified by the platform based on the income statement and the bank account statements that applicants are obliged to send to the platform.

After a successful verification, an accepted applicant posts a loan application where he/she specifies the desired loan amount and the loan terms. The specified loan terms include loan duration and nominal annual interest rate that the applicant is willing to pay. According to the rules imposed by the platform, applicants may not request less than € 500 or more than € 50,000; loan duration may be either 36 or 60 months; and the interest rate has to be between 2 and 18 %. A loan application can be seen as a "take-it-or-leave-it" offer to lenders, because lenders cannot negotiate the terms set by the applicant. However, lenders can refrain from lending if they consider the offer terms unsatisfactory.

Apart from the loan terms, applications also contain some personal information about loan applicants which can be subdivided into "hard" and "soft" information. Hard information includes data that applicants are obliged to provide. These data include age, gender, place of residence, occupation, Schufa-rating, financial burden and, if applicable, past payment history at *Smava*. This information is displayed in a standardized way in each application. Additionally, applicants may (but are not obliged to) provide "soft" information such as, for example, a description of the loan purpose, details of current employment, and family status. Applicants may also upload a picture. In contrast to Prosper, only a negligibly small fraction of loan applicants at *Smava* use this option and provide a photograph. All information provided in a loan application is made public and can be seen by lenders and all other users of the platform.

[3]The *postindent* procedure is a standard procedure used in Germany by institutions and firms to verify the identity of prospective clients.

Funding. Lenders may fund a loan during the 14 days following the moment that a loan application is posted. To conduct a lending transaction, a lender submits electronic offer specifying the amount he/she wants to lend. A single lender usually provides only a fraction of the amount requested by an applicant. By limiting the amount given to a single borrower, lenders try to control the counterparty risk exposure. It takes usually several lenders to fund a single loan. The number ranges between 1 and 73. On average, each loan is funded by 15 lenders. According to the rules set by the platform, the amount invested in one loan can be 250 Euro at minimum and 25,000 Euro at maximum and has to be a multiple of 250. By submitting an offer, lenders "sign" a binding contract and commit to providing the specified amount of money at terms set in the application. An important peculiarity of *Smava* is that, in contrast to many other peer-to-peer lending sites, loans are *not* auctioned. Lenders cannot underbid offers of other lenders by offering a lower interest rate.

Not every loan applicant manages to raise the desired amount of money. Table 1 describes distribution of loan applications by funding success. The fraction of fully funded loans makes 81% of all loan applications.[4]. Remarkably, the fraction of successful applications is somewhat higher for females than males. In contrast to *Prosper*, borrowers at *Smava* are allowed to take the raised amount even if it is smaller than the initially requested amount. The raised money is not paid out only if the raised amount makes less than 25% of the requested sum. In this case, the raised money (if any raised) is returned to lenders. An applicant can post his application again, eventually, specifying different loan terms. Loan applicants are charged by the platform with a fee only when at least 25% of the desired sum is raised and the loan applicant agrees to borrow the raised sum. Depending on the amount of obtained loan, the fee is between 2 and 2.5% of the amount obtained.

[4]This fraction is very high when compared to the 9%-funding rate reported for *Prosper*

Borrowers' liability. Loans procured at the platform are neither secured by collateral nor guaranteed by third parties. Nevertheless borrowers have full liability. If a borrower remains in arrears for six weeks, the claims of lenders on the outstanding loan amount are sold to a collections agency. The agency pays lenders a fee equal 15 to 20 % of the outstanding debt. By buying the claims, the agency acquires the legal right to take a hold of the debtor's total assets to recover the debt. In addition, delinquent borrowers get a negative report in their Schufa credit profile. Both instruments – unlimited liability and creditworthiness downgrade – should have a disciplining effect on borrowers.

Interior insurance of invested capital. In addition to the partial recovery of invested capital through sale of delinquent loans to a collections agency, a further part of the capital can be recovered though an interior insurance employed by the platform. This insurance is accomplished by assigning lenders into groups so that individual risks are shared among the members of one group. Specifically, all lenders who financed loans of the same duration and Schufa-Rating belong to the same group. For example, lenders who granted loans to borrowers with rating "A" for 60 months constitute one group. Due to existence of 8 rating classes and 2 duration types, there are a total of 16 groups. Monthly principal payments received by lenders of the same group are pooled together and each lender gets an amount proportional to his stake in the pool. Each lender's stake is equal to the monthly principal payment stipulated in the loan contract between the lender and the respective borrower. When a borrower fails to pay, the size of the pool decreases by the amount of the missed monthly payment and the remainder is divided among the lenders of the group proportional to their stakes. In effect, all lenders of one group – including those who actually invested in the loan in arrears and those whose borrowers paid on time – get a fraction of the stipulated monthly payment. This faction is called the *recovery rate*. Table 4 report the recovery rates observed at the platform in the past. In-

terest payments are exempted from the pooling mechanism so that lenders get 100% of the stipulated monthly interest payment if their borrowers pay on time and get 0 otherwise.

2.2 The Data Set

Our data set includes information on all loan applications posted at the platform from March 2007 to March 2010. A total of 3,401 individuals applied for loans. Females account for 935 (27%) and males account for 2,466 (73%) of loan applicants. The total number of applications is 4,146: 1,114 (27%) applications posted by females and 3,032 (73%) posted by males. The total number of applications exceeds the number of applicants, because each individual may apply for multiple loans or resubmit an application once it is turned down. The list of variables, with definitions, is given in Table 5. Summary statistics of the variables by applicants' gender are summarized in Table 6. There are some differences between applications of males and females. Firstly, females request, on average, smaller loans than males. Secondly, females offer to pay, on average, 0.3 percent higher interest rates than males. There are also some gender differences in applicants' personal characteristics. For instance, female applicants are on average 4 years older than males. Further, females are less numerous than males among free-lancers, managing partners, but more numerous in the group of retirees. Figure 2 plots distributions of applications by loan purpose. The observed gender differences correspond with popular gender stereotypes: Males prevail in the groups related to business, electronics and cars, while females dominate in categories such as health care, family, housekeeping, health care and education but also among those specifying no purpose.

3 Research Hypothesis and Test Methodology

The credit market studied in this paper has two types of participants: loan applicants indexed with j and lenders indexed with i. Loan applicants specify the desired loan amount L_j, duration D_j and nominal annual interest rate I_j they are willing to pay. The desired loan amount of applicant j is funded if there are at least N lenders at the market willing to provide funds such that $\sum_{i=1}^{N} L_i = L_j$. Lenders' willingness to provide funds to applicant j depends on their expectations regarding the return to this investment. Return from a loan is determined by the loan's nominal interest rate I_j, duration D_j, amount L_j and loan applicant's probability of default p_j. Lenders do not observe p_j. However, they may infer p_j from loan applicants' observable characteristics captured in vector $\mathbf{X}$. Assume that, given $\mathbf{X}$, all lenders expect to get the same return.

Our research question is whether male and female loan applicants have equal chances of getting funds given that they offer equal loan terms and are similar with respect to all observable characteristics. Gender can affect applicants' chances of funding success only when lenders discriminate against loan applicants of a particular sex. Discrimination in a credit market may emerge because of two reasons. On the one hand, imperfect information about borrowers' quality may lead to statistical discrimination (Phelps 1972, Arrow 1973). For instance, because lenders do not observe applicants' probability of default, they may use applicants' gender as a screening device if they believe that gender is correlated with the probability of default. In this case, two applicants who are identical in all observable characteristics except gender will be assigned different probabilities of default. Let the probability of default of a female borrower, as perceived by lenders, be p, and the probability of default of a male borrower be $p + \delta$. For profit maximizing lenders, $\delta \neq 0$ provides an incentive to charge a higher risk premium from a borrower with a higher probability of default, *ceteris paribus*. On the other hand, Becker (1957) argues that even in the absence of

statistical discrimination, lenders may have taste-based preference against applicants of a particular sex due to distaste or prejudice. In this case, lenders will require an additional compensation for lending to unfavored applicants even when these applicants are not actually riskier than others. All in all, both types of discrimination imply that loan applicants of a particular gender have to pay a higher price for credit than other applicants, *ceteris paribus*. Respectively, loan applicants of different gender who offer the same loan terms have different probability of getting credit, *ceteris paribus*. Hence, the hypothesis that we test reads:

If loan applicants of different gender offer the same loan terms and are similar with respect to other observable characteristics, the applicant from the discriminated gender group will face a lower probability of funding success.

The remainder of the paper is devoted to the test of this hypothesis. The test relies on a reduced form equation

$$Pr(Funding_j = 1) = \Phi(\beta_0 + \beta_1 Male_j + \beta_2 I_j + \beta_3 D_j + \beta_4 L_j + \beta_5 \mathbf{X_j}), \qquad (1)$$

where $\Phi(\cdot)$ is the standard normal cumulative distribution function, and $\mathbf{X}_j$ is a vector of variables capturing all observable characteristics of loan applicants and loan terms. The model's coefficients are estimated by means of a probit regression. The dependent variable in the regression equation is a binary variable equal 1 if a loan is successfully funded and 0 otherwise. We use three different indicators of funding success. According to the first indicator, only loan requests that were completely funded are considered as funding success. Under the second indicator, cases where applicants raised at least 25% of the requested amount are considered to be funding success. Under the third indicator, all loan requests that received at least one offer from lenders (regardless of the offered amount) are considered as successful.

The main variable of interest is the dummy variable *Male* equal 1 if loan applicant is male and 0 if female. The effect of gender is captured in the coefficient β_1. The estimate of β_1 shows whether loan applicants' gender has an effect on the probability of funding success. In particular, $\hat{\beta}_1 > 0$ ($\hat{\beta}_1 < 0$) would indicate that males have better (worse) chances of getting funds than females.[5]

4 Estimation Results

Table 7 reports the estimated marginal effects of the explanatory variables. The first two columns of the table report results for the case when the dependent variable equals 1 if a loan request is funded completely and 0 otherwise. Column (1) summarizes the results of a baseline specification of Equation 1 that includes a dummy variable *Male*, a set of variables capturing loan terms, a set of dummy variables indicating applicants' Schufa-rating scores, and a set of dummy variable capturing the time effects (quarterly dummies). Column (2) reports results for an extended specification of the regression equation that includes all observed attributes of loan applicants, loan terms and time effects. Both model specifications predict a strong positive relationship between the offered interest rate and the probability of funding. Loans with duration of 60 months have lower probability of being funded compared to loans with a shorter duration of 36 months. The requested loan amount has a negative effect on the probability of outcome.[6] Apparently, and similar to traditional bank lending, lenders associate longer durations and higher loan amounts with more

[5] $\hat{\beta}_1 \neq 0$ would indicate that lenders discriminate against borrowers of a particular sex. The estimation procedure does not however allow identification of the type of discrimination – statistical or taste-based. Identification of the type of discrimination is beyond the scope of this paper.

[6] The variable capturing loan amount is calculated by dividing the loan value measured in Euro by 250. We do this adjustment because applicants may request only amounts that are multiples of 250. Thus, the coefficient of the variable *Amount* should be interpreted as follows: An increase in requested amount by 250 Euro, decreases the probability of funding success by 0.4 percentage points.

uncertainty in repayments and therefore require higher premia compared to short-term loans and smaller loan amounts. Altogether, variables representing loan terms seem to be highly predictive of the probability of funding success. In contrast, applicants' gender has no statistically significant effect on the probability of raising the requested sum. This result holds also when we extend the model's specification by including additional control variables (see column (2)). According to the respective values of $Pseudo - R^2$, the extended model describes the variation in the probability of outcome better than the baseline specification. Some of the applicant-specific attributes seem to play a role in the funding success. For instance, we find a positive relationship between the applicant's financial burden and probability of funding success. At first glance, this finding seems counterintuitive. Yet, availability of other debts (mostly bank loans) may be viewed by lenders as an indicator of good quality of a borrower (banks would not have lent money otherwise). In these circumstances, additional indebtedness of loan applicants is more appealing to lenders than absence of any information about individuals' credit histories. Other control variables seem to have a limited effect on the probability of funding success.

Columns (3) and (4) of Table 7 report the results for the case when the dependent variable equals 1 if at least to 25% of the requested loan amount are funded and 0 otherwise. As previously, the baseline equation includes only few explanatory variables and the second one includes all observable characteristics. Similar to the previous specification of the dependent variable, the effect of gender is found to be insignificant, while loan terms and some of individual characteristics remain important determinants of the probability of funding.

Finally, estimation results for the case when the dependent variable is equal 1 if at least some funds are offered to an applicant are reported in column (5) and (6). For the baseline specification of the regression equation, the effect of gender is again statistically insignificant. For the extended specification, the ef-

fect of gender is statistically significant at 10% level. The estimated coefficient of variable *Male* suggests that males are by 1.2 percentage points less likely to get at least some offers from lenders than females. In relation to the overall fraction of 92% of loan applications with at least one offer, a difference of 1.2 percentage points means only a 1% decrease in the probability of success. Hence, the magnitude of the effect is very small to claim that gender makes a difference.

5 Robustness Checks

5.1 Does Gender Effect Vary With Rating and Interest Rate?

According to Equation 1, the effect of gender is captured in a single coefficient β_1. Such model specification restricts the effect of gender to be the same for all values of other explanatory variables. Yet, we cannot exclude the possibility that lenders' attitudes towards borrowers of particular sex depend on loan terms. For instance, lenders may be indifferent between male and female applicants as long as the offered interest rate is either very low or very high. They may also be equally willing to lend to male and female borrowers if they have the best rating scores, but discriminate against borrowers of a particular sex if the rating is poor. In both cases, the effect of gender should vary across different levels of interest rate and across rating grades. To allow for a varying gender effect, we extend Equation 1 by including interactions of the dummy variable *Male* with the continuous variable *Interest rate* and with the set of dummy variables indicating borrowers' rating.

Results of the estimation are reported in Table 8. Column 1 of the table shows the results for the case when funding success is defined as a loan being fully funded. Here, the estimates of coefficients of the interaction terms are statistically insignificant, meaning that gender has no effect on the funding success

regardless of the level of interest rate and applicants' rating score. Column 2 of the table reports coefficient estimates for the case when funding success is defined as a loan being funded at least to 25%. In this case, the effect of gender is also insignificant across all levels of interest rate and rating. The third column of the table reports the results for the case when all loan applications that received at least one offer from lenders are considered as successful. According to the coefficient estimates, the level of offered interest rate and applicants' rating seem to have some effect on gender differences in the probability of getting at least one offer from lenders. For instance, male applicants are predicted to be less likely to get an offer than female applicants as the interest rate increases. However, males with Schufa-Rating grade "B" and "D" seem to have somewhat higher probability of success than females with the same rating grades. All in all, we can confirm our previous findings that gender does not affect the probability of loan being funded completely or at least to 25%. It is only the probability to get at least one offer from lenders that depends to some extent on the applicant's gender. However, the direction of the effect may change depending on the individual combination of the characteristics of a loan applicant.

5.2 Endogenous Regressors

A potential concern with equation 1 is that two variables – the offered interest rate and the loan amount – are endogenous. Borrowers can influence own chances of funding success by offering the appropriate loan terms. For instance, higher loan rates and lower loan amounts are associated with higher probability of funding, *ceteris paribus*. Borrowers who wish to increase their chances for success might offer higher interest rates or request lower loan amounts. In this circumstance, the loan rate and the loan amount are not exogenous factors. Rather there emerges a reciprocal causation (or simultaneity) between these factors and the probability of funding success. The problem of reciprocal causation

is widely discussed in the statistical literature (Heckman 1978, Amemiya 1978, 1979). In the presence of simultaneity, the standard estimation method applied earlier in this paper may produce biased estimates. This bias can be corrected by using a two-stage estimation procedure whereby endogenous variables in Equation 1 are replaced with exogenous instruments.[7] For the sake of brevity, we conduct the two-state estimation procedure only for the case when funding success is defined as a loan being fully funded.

In the first stage, we estimate two auxiliary regressions. The first one is an OLS regression of the requested loan amount, divided by 250, on a set of exogenous variables. This set includes loan applicants' gender, Schufa-rating, financial burden, employment status, age, place of residence, loan maturity, loan purpose, length of description and time-dummies. The second auxiliary OLS regression estimates the effect of the same set of exogenous variables on the offered interest rate.[8] The estimation results of the two auxiliary regressions are reported in Panel *A* of Table 9.

After the two auxiliary regressions are estimated, the fitted values of interest rate and loan amount can serve as instruments for the endogenous variables in Equation 1. In order to fulfill the identification conditions, some of the exogenous variables entering the auxiliary regressions must be excluded from the

[7]The estimation is conducted according to the minimum-chi-squared estimation method developed by Newey (1987).

[8]One might think that loan amount should also be taken into account as a determinant of loan interest rate. In the traditional bank lending, dependence of interest rate on loan amount is driven by the fact that marginal costs of providing credit vary with loan amount. In contrast, in the context of P2P, the costs faced by each individual lender are not necessarily related to the total amount requested by a loan applicant. For instance, due to a fixed fee of 4 Euro paid by a lender each time he/she lends money, the costs of lending are a function of the amount lent and not on the amount of requested by the applicant. As described earlier, each lender usually lends only a fraction of the total requested sum. Hence, in the considered credit market loan amount is not expected to affect the loan interest rate. To prove that this is indeed the case, we regress the interest rates on all observable loan- and borrower-specific characteristics and a set of dummy-variables indicating deciles of the requested loan amount. The flexible functional form of loan amount should allow us to capture non-linear relationship between interest rate and amount if such exist. The results of OLS estimation show however that the requested amount has no statistically significant effect on the offered interest rate. Hence, we can argue that the requested loan amount must not enter the equation describing the offered interest rate.

main equation. We suggest excluding borrowers' employment status and place of residence. Borrowers' employment status is clearly one of the factors that affect borrower riskiness. Compare, for example, a civil servant whose income is quite safe with a self-employed person whose income may be very uncertain. Hence, certain jobs should be associated with higher interest rate as lenders require higher risk premia from riskier jobs. Indeed, results from the auxiliary regression of interest rate confirm this conjecture: Civil servants offer on average lower interest rates than individuals with other employment statuses, whereas sole proprietors and retirees offer the highest interest rates among all loan applicants. While being relevant for the level of interest rate, employment status should not affect the probability of getting a loan. As soon as job-related risks are compensated with an appropriate risk premium, lenders should be indifferent with respect to borrowers' employment status. Because lenders themselves have different employment statuses, their individual taste-based preferences in favor (or against) certain jobs should not systematically affect borrowers' probability of funding success. Indeed, when looking at the estimation results in Table 7, borrower employment status has barely an effect on the probability of success. The negative effect of the indicator variable *Retired* probably captures the effect of age and the associated mortality risks, rather than the retirement status per se.

The exclusion of variables indicating place of residence is justified by different costs of living across federal states. Significant discrepancies in these costs imply that loan applicants from "more expensive" lands should request higher loan amounts for the same purpose than applicants from "less expensive" lands. At the same time, place of residence should not affect loan applicants' chances of funding, because lenders live in various federal states and altogether cannot systematically affect the results of outcomes in favor or against some of the states. Results of the auxiliary regression of loan amount on applicants' place of resi-

dence and other observable characteristics show in fact, that four federal states – Bavaria, Bremen, Schleswig-Holstein and Saxony – are associated with higher loan amounts as compared to Berlin. In contrast, regression results in Table 7 revealed no systematic relationship between federal state and the probability of funding success.

The estimation results of the second-stage equation are reported in Panel *B* of Table 9. At the bottom of the table is a Wald test for the exogeneity of the two instrumented variables *Loan amount* and *Interest rate*. The test statistic is not significant. Hence, the null hypothesis of exogeneity cannot be rejected. Thus, the initial estimation of Equation 1 by means of a simple probit regression is also appropriate and yields consistent estimates. Moreover, the coefficient estimate for variable *Male* in the two-stage regression is also statistically insignificant. Hence, our robustness checks confirm the earlier obtained result that applicants' gender has no influence on the probability of getting a loan, *ceteris paribus*.

5.3 Discrepancies in Observable Characteristics

Parameter estimates obtained in the first-stage regression (Panel *A* of Table 9) show that male applicants offer lower interest rates and at the same time request higher loan amounts than female applicants. Moreover, as revealed by descriptive statistics in Table 6, apart from the requested loan amount and interest rate, significant gender differences also exist with respect to applicants' age and employment status. Substantial dissimilarities between the two gender groups with respect to observable characteristics may render the estimates of the *ceteris paribus* effects of gender inconsistent. In order to test the robustness of our results with respect to this sample problem, we conduct Heckman's difference-in-difference matching estimation using kernel matching to determine the weights of matched observations (Heckman et al. 1998, Smith & Todd 2005). The goal is to estimate the effect of gender using a sample of matched individuals, that

is, loan applicants who differ only with respect to gender but are similar with respect to all other characteristics.

Similarity of loan applicants is determined based on their propensity score. A propensity score presents the probability that a loan applicant is male given all observable characteristics of the applicant and the application. This probability is estimated by means of a logit regression whereby an indicator variable *Male* is regressed on all observable variables. Distributions of male and female applicants by estimated propensity scores are plotted in Figure 3. The shapes of the distributions are very similar. Hence, there is a good chance that for every loan applicant we find "twins" of the opposite sex. Indeed, only 25 males happen to fall outside the common support which means that they remain unmatched as there are no females with similar propensity scores. These 25 loan applicants are excluded from the further analysis. Observations that are on the common support are then used to calculate the matching estimator of the effect of gender on the probability of funding success. According to the results, difference in the probability of funding success between male and females equals -0.003 and is statistically not significant.[9] Thus, the results of the robustness check confirm the results obtained in the initial estimation procedure.

6 Conclusions

The question of whether evidence obtained from *Prosper* can be generalized to other P2P platforms motivated us to analyze the role of gender at the largest German platform *Smava*. The results of our analysis do not reveal any significant gender differences in the probability of funding success when all observable characteristics of loan applicants and loan terms are taken into account. The

[9] We test the balancing of variables between the matched male and females using the method of Rosenbaum & Rubin (1985). According to the test results, the differences between the two sub-sample are statistically not significant.

obtained result is robust to different definitions of funding success and a number of robustness checks. Therefore, we conclude that no gender discrimination takes place on the German platform.

There are three possible explanations of why our results differ from the evidence obtained from the *Prosper*-data. Firstly, the results obtained for *Prosper* may be driven by the discrepancies between the information about applicants' gender that is observable to lenders and the information analyzed by researchers. Secondly, we may have found no discrimination at *Smava* because the platform is relatively young and lenders do not have enough *ex-post* evidence on borrowers' payment behavior. As documented by recent literature, market experience and especially loss experience exerts significant influence on the behavior of market participants (Braga et al. 2009). Hence, it is expected that lenders will adjust their behavior if they learn from updated information that borrowers' gender affects payment behavior. The same consideration applies to the US-American platform. Although it was founded two years earlier than the German platform, the majority of procured loans have not yet matured. This motivates further investigation of lending behavior at the P2P markets as they become more mature. Finally, divergent results obtained for the US-American and the German platform might be determined by the specifics of the platforms' procurement mechanism or the fact that they operate in different financial systems. However, because all existing studies, including the present one, are confined to a single P2P platform, no conclusions regarding the role of these factors can be derived. It is a goal of future research to conduct a comparative analysis of different P2P platforms in order to identify implications of different procurement mechanisms and environmental factors for the behavior of lenders and borrowers.

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Appendix

Figure 1: Loan applications at *Smava*

This graph plots the number of new loan applications posted at the platform each month and the total amount requested by the applicants

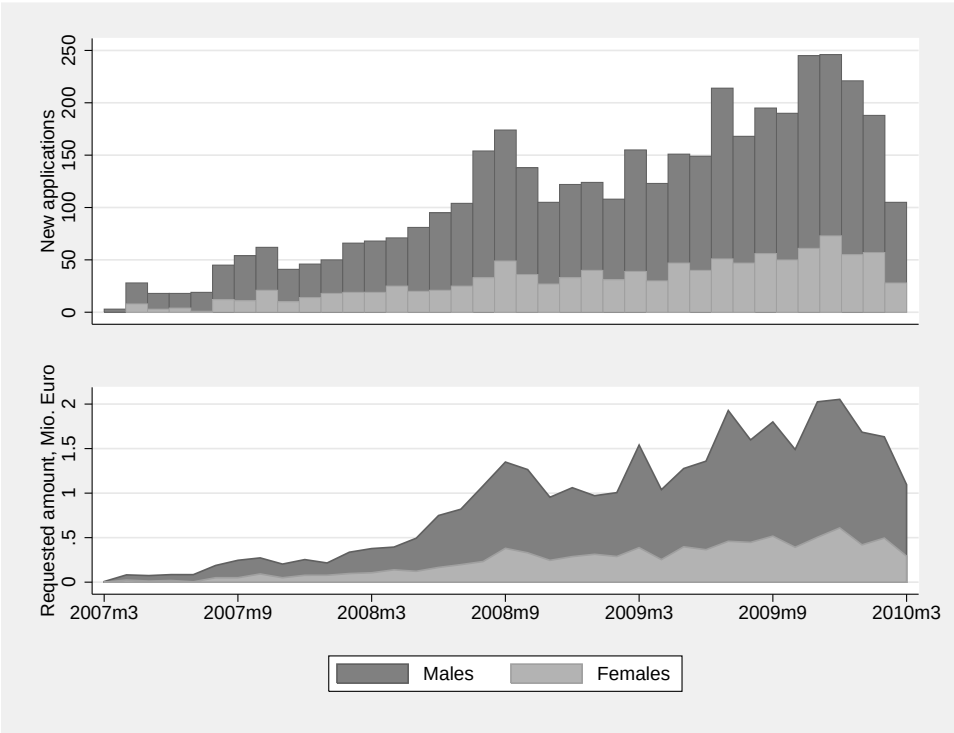

Figure 2: Distribution of applications by loan purpose

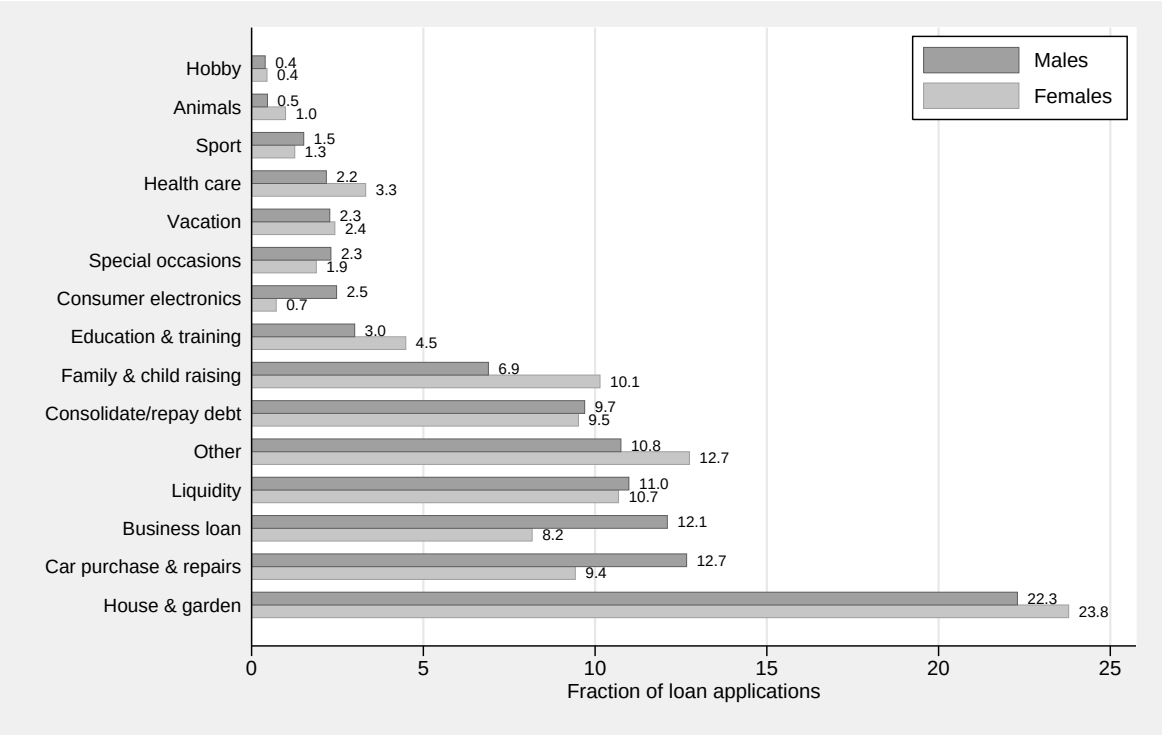

Figure 3: Distribution of male and female applicants by propensity score

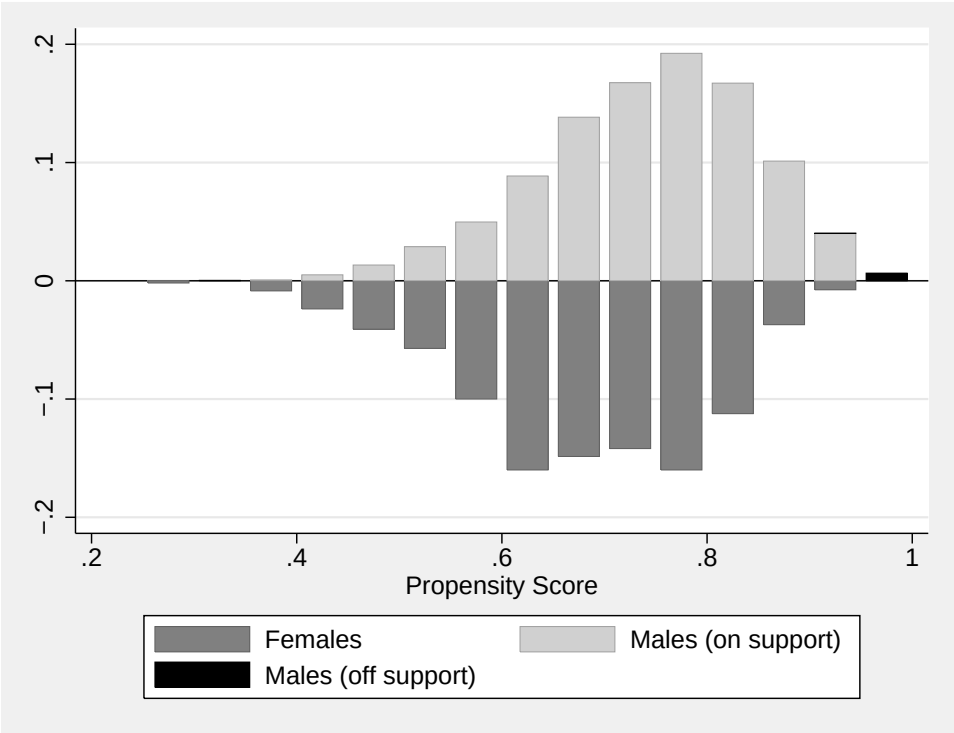

Table 1: Distribution of applications by funding success

Funded amount in % of requested amount	**Fraction of applications, in %**		
	by all applicants N = 4,146	**by females** N = 1,114	**by males** N = 3,032
0 % raised (no bids submitted)	7.72	5.75	8.44
> 0 but < 25 % raised	5.40	5.39	5.41
≥ 25 but < 100 % raised	5.96	5.75	6.04
100 % raised	80.92	83.12	80.11
Total	100.00	100.00	100.00

Table 2: Schufa rating scores

This table shows the Schufa-Rating scores with respective estimates of the probability of an applicant's default. The rating is assigned to individuals by the German national credit bureau SCHUFA.

Rating score	A	B	C	D	E	F	G	H
Probability of default, in %	1.38	2.46	3.56	4.41	5.57	7.16	10.72	15.02

Table 3: Measure of financial burden

Financial burden	Fraction of monthly income utilized to serve outstanding debts
low	0 - 20%
moderate	20 - 40%
substantial	40 - 60%
high	60 - 67%

Table 4: Recovery rates

This table reports average historical recovery rates (in % of the invested sum) in the groups of lenders. Source: http://www.smava.de.

Schufa-Rating							
A	B	C	D	E	F	G	H
Loans with duration 36 months							
97.7	95.1	97.6	95.0	94.0	91.0	88.8	86.2
Loans with duration 60 months							
99.2	97.9	98.3	93.0	94.9	94.7	87.3	85.7

Table 5: Variables and definitions

Variable name	Description
Interest rate	Nominal interest rate offered by applicant in the application, in % p.a.
Duration: 60 months	dummy variable equal 1 if loan requested for 60 months and 0 if for 36 months
Loan amount	Loan amount requested by applicant, in Euro.
Schufa-Rating	Categorical variable with 8 values corresponding to Schufa-Rating scores (see Table 2)
Financial burden	Categorical variable with 4 values corresponding to the severity of financial burden defined in Table 3
Employment status	Categorical variable indicating applicants' employment status: Employee, Civil servant, Freelancer, Managing partner, Sole proprietor or Retiree
Age	Age of applicant in years
Loan purpose	Categorical variable with 12 values showing loan purpose
Description	Logarithm of the number of characters in the detailed description of loan purpose and own personality
Place of residence	Categorical variable one of the 16 federal states where the applicant lives

Table 6: Descriptive statistics

	Male applicants		Female applicants			
Variable	**Mean**	**St.Dev.**	**Mean**	**St.Dev.**	**t-Test**	**p-Value**
Interest rate	9.78	3.45	10.15	3.44	-3.06	0.00
Duration: 60 months	0.42	0.49	0.40	0.49	1.04	0.30
Loan amount	8169.94	6296.07	7475.54	5668.68	3.23	0.00
Schufa-Rating:						
A	0.16	0.36	0.14	0.35	1.29	0.20
B	0.16	0.37	0.15	0.36	0.43	0.67
C	0.09	0.29	0.10	0.30	-0.22	0.82
D	0.10	0.30	0.10	0.29	0.46	0.65
E	0.11	0.31	0.10	0.30	0.59	0.56
F	0.12	0.32	0.13	0.34	-1.22	0.22
G	0.16	0.37	0.16	0.37	-0.12	0.91
H	0.11	0.31	0.12	0.33	-1.37	0.17
Financial burden:						
low	0.17	0.38	0.15	0.36	1.73	0.08
moderate	0.23	0.42	0.25	0.43	-1.55	0.12
substantial	0.33	0.47	0.35	0.48	-1.00	0.32
high	0.27	0.44	0.25	0.43	1.10	0.27
Employment status:						
Employee	0.52	0.50	0.54	0.50	-0.93	0.35
Civil servant	0.04	0.20	0.03	0.18	1.49	0.14
Freelancer	0.09	0.28	0.06	0.25	2.41	0.02
Managing partner	0.06	0.22	0.03	0.15	4.02	0.00
Sole proprietor	0.21	0.41	0.19	0.40	1.17	0.24
Retiree	0.08	0.27	0.15	0.35	-5.79	0.00
Age	43.21	13.02	47.02	14.81	-8.04	0.00
Description	5.76	1.11	5.70	1.13	1.44	0.15
Place of residence:						
Baden-Württemberg	0.14	0.35	0.11	0.31	2.66	0.01
Bayern	0.16	0.37	0.17	0.38	-0.59	0.55
Berlin	0.07	0.25	0.10	0.30	-3.98	0.00
Brandenburg	0.03	0.17	0.04	0.18	-1.05	0.29
Bremen	0.01	0.09	0.01	0.08	0.34	0.73
Hamburg	0.03	0.17	0.03	0.18	-0.36	0.72
Hessen	0.09	0.28	0.09	0.28	-0.02	0.98
Mecklenburg-Vorpommern	0.01	0.11	0.02	0.14	-1.34	0.18
Niedersachsen	0.09	0.28	0.07	0.26	1.90	0.06
Nordrhein-Westfalen	0.20	0.40	0.19	0.39	1.06	0.29
Rheinland-Pfalz	0.05	0.21	0.05	0.22	-0.52	0.60
Saarland	0.01	0.10	0.01	0.08	1.01	0.31
Sachsen	0.04	0.19	0.05	0.21	-0.94	0.35
Sachsen-Anhalt	0.02	0.15	0.02	0.12	1.33	0.18
Schleswig-Holstein	0.03	0.18	0.03	0.18	0.21	0.83
Thüringen	0.02	0.14	0.03	0.17	-1.52	0.13

Table 7: Determinants of funding success

This table reports estimated marginal effects and standard errors (in parentheses) after probit regression. Column (1) and (2) report results for equation 1 with a dependent variable equal to 1 if a loan application raised 100% of the requested sum, 0 otherwise. Column (3) and (4) report results for the case where the dependent variable is a dummy equal to 1 if a loan was funded at least to 25% and 0 otherwise. Column (5) and (6) report results for the case when the dependent variable is a dummy equal to 1 if a loan application received at least on offer from lenders, and 0 otherwise. ***, ** and * indicate significance at 0.01, 0.05 and 0.1 levels respectively. The number of observations in all specifications is 4,144.

	(1)	(2)	(3)	(4)	(5)	(6)
Male	-0.008	-0.012	-0.008	-0.008	-0.010	-0.012*
	(0.010)	(0.010)	(0.008)	(0.008)	(0.007)	(0.006)
Interest rate	0.063***	0.055***	0.052***	0.043***	0.030***	0.026***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Duration: 60 months	-0.052***	-0.064***	-0.054***	-0.059***	-0.028***	-0.031***
	(0.012)	(0.011)	(0.010)	(0.009)	(0.008)	(0.008)
Loan amount (divided by 250)	-0.004***	-0.003***	-0.002***	-0.002***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rating						
A (reference category)						
B	-0.046***	-0.048***	-0.026***	-0.025***	-0.010**	-0.010**
	(0.007)	(0.008)	(0.006)	(0.006)	(0.005)	(0.005)
C	-0.067***	-0.064***	-0.037***	-0.035***	-0.020***	-0.022***
	(0.010)	(0.010)	(0.009)	(0.009)	(0.009)	(0.009)
D	-0.121***	-0.121***	-0.097***	-0.093***	-0.053***	-0.050***
	(0.014)	(0.014)	(0.013)	(0.011)	(0.010)	(0.010)
E	-0.152***	-0.146***	-0.118***	-0.104***	-0.083***	-0.072***
	(0.013)	(0.013)	(0.013)	(0.012)	(0.012)	(0.011)
F	-0.265***	-0.262***	-0.232***	-0.222***	-0.137***	-0.128***
	(0.017)	(0.017)	(0.016)	(0.018)	(0.017)	(0.018)
G	-0.403***	-0.383***	-0.394***	-0.365***	-0.272***	-0.244***
	(0.018)	(0.019)	(0.019)	(0.020)	(0.025)	(0.023)
H	-0.551***	-0.535***	-0.554***	-0.521***	-0.422***	-0.377***
	(0.023)	(0.024)	(0.023)	(0.026)	(0.031)	(0.031)
Financial burden						
low (reference category)						
moderate	-	0.047***	-	0.047***	-	0.018**
		(0.015)		(0.013)		(0.009)
substantial	-	0.081***	-	0.084***	-	0.035***
		(0.014)		(0.013)		(0.009)
high	-	0.110***	-	0.100***	-	0.041***
		(0.015)		(0.013)		(0.010)
Employment status						
Civil servant (reference category)						
Employee	-	-0.034*	-	-0.003	-	-0.007
		(0.019)		(0.017)		(0.012)
Free-lancer	-	-0.014	-	0.009	-	-0.012
		(0.023)		(0.020)		(0.016)
Managing partner	-	-0.034	-	0.015	-	0.022
		(0.027)		(0.025)		(0.019)
Sole proprietor	-	-0.035	-	0.007	-	-0.005
		(0.020)		(0.018)		(0.014)
Retiree	-	-0.073***	-	-0.025	-	-0.024
		(0.026)		(0.023)		(0.016)
Age	-	-0.001*	-	-0.001*	-	-0.000
		(0.000)		(0.000)		(0.000)
Description	-	0.031***	-	0.010***	-	0.010***
		(0.005)		(0.004)		(0.003)

(continued on the next page)

	(1)	(2)	(3)	(4)	(5)	(6)
Loan purpose						
House & garden (reference category)						
Education & training	-	-0.012	-	0.017	-	0.006
		(0.022)		(0.019)		(0.020)
Car purchase & repairs	-	-0.031**	-	-0.013	-	-0.024**
		(0.015)		(0.012)		(0.010)
Business loan	-	0.021	-	0.024	-	0.028**
		(0.017)		(0.014)		(0.012)
Family & child raising	-	-0.008	-	-0.001	-	-0.009
		(0.017)		(0.014)		(0.013)
Special occasions	-	-0.059*	-	-0.029	-	-0.007
		(0.034)		(0.025)		(0.016)
Health care	-	0.002	-	0.031	-	0.002
		(0.023)		(0.018)		(0.014)
Liquidity	-	0.008	-	0.007	-	0.013
		(0.016)		(0.013)		(0.011)
Vacation	-	-0.030	-	-0.046*	-	-0.051**
		(0.031)		(0.026)		(0.025)
Hobby	-	-0.017	-	-0.008	-	-0.084***
		(0.067)		(0.028)		(0.039)
Other/Not specified	-	-0.050***	-	-0.011	-	-0.012
		(0.016)		(0.013)		(0.010)
Sport	-	0.015	-	0.010	-	0.004
		(0.029)		(0.025)		(0.013)
Animals	-	-0.050	-	-0.007	-	-0.022
		(0.047)		(0.049)		(0.042)
Consolidate/repay debt	-	-0.015	-	0.006	-	-0.008
		(0.017)		(0.013)		(0.010)
Consumer electronics	-	-0.028	-	-0.008	-	0.003
		(0.024)		(0.021)		(0.021)
Place of residence						
Berlin (reference category)						
Baden-Württemberg	-	0.025	-	-0.015	-	-0.005
		(0.020)		(0.017)		(0.013)
Bayern	-	0.017	-	-0.000	-	0.007
		(0.020)		(0.017)		(0.012)
Brandenburg	-	0.004	-	0.002	-	0.023
		(0.032)		(0.021)		(0.015)
Bremen	-	-0.019	-	-0.020	-	0.031
		(0.074)		(0.035)		(0.061)
Hamburg	-	0.072**	-	0.029	-	0.019
		(0.028)		(0.024)		(0.021)
Hessen	-	0.030	-	-0.003	-	0.016
		(0.022)		(0.019)		(0.013)
Mecklenburg-Vorpommern	-	0.047	-	-0.018	-	0.020
		(0.030)		(0.024)		(0.016)
Niedersachsen	-	0.034	-	-0.004	-	0.006
		(0.022)		(0.018)		(0.015)
Nordrhein-Westfalen	-	0.016	-	-0.014	-	-0.002
		(0.019)		(0.016)		(0.012)
Rheinland-Pfalz	-	0.024	-	-0.007	-	-0.000
		(0.024)		(0.020)		(0.015)
Saarland	-	-0.029	-	-0.087*	-	-0.068
		(0.052)		(0.055)		(0.064)
Sachsen	-	0.004	-	-0.030	-	-0.001
		(0.028)		(0.024)		(0.017)
Sachsen-Anhalt	-	0.008	-	-0.042	-	-0.036
		(0.034)		(0.028)		(0.028)
Schleswig-Holstein	-	0.063**	-	0.014	-	-0.005
		(0.026)		(0.023)		(0.019)
Thüringen	-	0.034	-	-0.019	-	-0.004
		(0.030)		(0.027)		(0.018)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2	0.466	0.515	0.529	0.581	0.557	0.609

Table 8: Determinants of funding success (with interaction terms)

This table reports the estimated coefficients and standard errors (in parentheses) after probit regression. Column (1) reports results for equation with a dependent variable equal 1 if a loan application raised 100% of the requested sum, 0 otherwise. Column (2) reports results for the case when dependent variable is a dummy equal 1 if a loan was funded at least to 25% and 0 otherwise. Column (3) reports results for the case where the dependent variable is a dummy equal 1 if a loan application received at least on offer from lenders, and 0 otherwise. ***, ** and * indicate significance at 0.01, 0.05 and 0.1 levels respectively. The number of observations in all specifications is 4,144.

	(1)	(2)	(3)
Male	-0.488	-0.038	0.381
	(0.628)	(0.703)	(0.830)
Interest rate	0.731***	0.932***	1.039***
	(0.066)	(0.078)	(0.105)
Male × Interest rate	0.043	-0.034	-0.193*
	(0.068)	(0.077)	(0.103)
Rating			
A (reference category)			
B	-1.473***	-1.247**	-1.877***
	(0.399)	(0.492)	(0.546)
C	-2.025***	-2.513***	-2.822**
	(0.520)	(0.706)	(1.261)
D	-2.504***	-3.062***	-4.032***
	(0.559)	(0.677)	(0.832)
E	-2.648***	-3.485***	-3.201***
	(0.562)	(0.711)	(0.870)
F	-4.748***	-5.503***	-4.098***
	(0.506)	(0.658)	(0.945)
G	-5.161***	-6.695***	-6.653***
	(0.570)	(0.668)	(0.864)
H	-6.703***	-8.482***	-8.842***
	(0.673)	(0.759)	(0.898)
Male × Rating = B	0.171	0.121	1.497**
	(0.475)	(0.577)	(0.653)
Male × Rating = C	0.583	1.508*	1.853
	(0.595)	(0.799)	(1.349)
Male × Rating = D	-0.163	0.111	2.020**
	(0.625)	(0.746)	(0.907)
Male × Rating = E	-0.470	0.375	0.288
	(0.628)	(0.781)	(0.937)
Male × Rating = F	0.464	0.550	-0.064
	(0.574)	(0.726)	(1.048)
Male × Rating = G	-0.856	-0.220	0.795
	(0.638)	(0.731)	(0.916)
Male × Rating = H	-0.596	0.175	1.585
	(0.745)	(0.833)	(0.979)
Duration: 60 months	-1.009***	-1.360***	-1.106***
	(0.161)	(0.202)	(0.246)
Loan amount	-0.049***	-0.040***	-0.023***
	(0.003)	(0.004)	(0.005)
Financial burden	Yes	Yes	Yes
Employment status	Yes	Yes	Yes
Age	-0.015**	-0.021***	-0.017*
	(0.006)	(0.008)	(0.010)
Description	0.374***	0.156**	0.327***
	(0.067)	(0.074)	(0.089)
Place of residence	Yes	Yes	Yes
Loan purpose	Yes	Yes	Yes
Time effects	Yes	Yes	Yes
Pseudo-R^2	0.518	0.584	0.616

Table 9: Two-stage estimation of Equation 1

The table reports results of the two-stage estimation of Equation 1 with dependent variable equal 1 if loan application is completely funded and 0 otherwise. Panel *A* reports results of the first-stage auxiliary probit regressions whereby loan amount and interest rate are regressed on a set of exogenous variables. Panel *B* summarizes results of the second-stage estimation. Here, variables *Loan amount* and *Interest rate* are the respective fitted values obtained from the first-stage regressions. Estimated standard errors are reported in parentheses. ***, ** and * indicate significance at 0.01, 0.05 and 0.1 levels respectively. The number of observations is 4,144.

Panel *A*: First-stage regressions

	Loan amount/250		*Interest rate*	
Male	1.748**	(0.746)	-0.233***	(0.070)
Duration: 60 months	12.283***	(0.774)	0.193***	(0.073)
Rating				
A (reference category)				
B	-2.087*	(1.170)	0.658***	(0.111)
C	-1.685	(1.344)	1.559***	(0.127)
D	-4.256***	(1.329)	1.972***	(0.126)
E	-4.316***	(1.313)	2.998***	(0.124)
F	-2.474**	(1.261)	3.889***	(0.119)
G	-4.545***	(1.194)	5.271***	(0.113)
H	-7.737***	(1.313)	6.661***	(0.124)
Financial burden				
low (reference category)				
moderate	-4.414***	(1.054)	0.866***	(0.100)
substantial	-3.805***	(1.005)	1.301***	(0.095)
high	-7.847***	(1.039)	1.872***	(0.098)
Employment status				
Civil servant (reference category)				
Employee	-0.573	(1.692)	0.490***	(0.161)
Free-lancer	15.864***	(2.014)	1.015***	(0.191)
Managing partner	19.867***	(2.263)	1.118***	(0.215)
Sole proprietor	14.184***	(1.817)	1.270***	(0.173)
Retiree	-8.757***	(2.108)	1.309***	(0.200)
Age	0.199***	(0.033)	-0.006**	(0.003)
Description	2.087***	(0.313)	-0.076***	(0.029)
Loan purpose				
House & garden (reference category)				
Education & training	-2.376	(1.901)	-0.184	(0.181)
Car purchase & repairs	0.276	(1.170)	-0.414***	(0.111)
Business loan	7.161***	(1.348)	-0.300**	(0.128)
Family & child raising	-1.226	(1.352)	0.154	(0.128)
Special occasions	-1.932	(2.297)	0.151	(0.218)
Health care	-6.698***	(2.165)	-0.247	(0.206)
Liquidity	0.908	(1.259)	-0.418***	(0.120)
Vacation	-5.828***	(2.240)	-0.455**	(0.213)
Hobby	7.520	(5.110)	0.642	(0.485)
Other/Not specified	0.004	(1.195)	0.012	(0.114)
Sport	0.738	(2.775)	-0.071	(0.264)
Animals	7.013*	(4.223)	0.109	(0.401)
Consolidate/repay debt	-0.123	(1.262)	-0.389***	(0.120)
Consumer electronics	-4.855**	(2.403)	0.177	(0.228)
Place of residence				
Berlin (reference category)				
Baden-Württemberg	2.428	(1.480)	0.296**	(0.141)
Bayern	4.217***	(1.426)	-0.032	(0.135)
Brandenburg	3.673	(2.198)	-0.059	(0.209)
Bremen	8.388**	(3.815)	0.034	(0.362)
Hamburg	1.841	(2.163)	0.397*	(0.206)
Hessen	0.227	(1.610)	0.250	(0.153)
Mecklenburg-Vorpommern	0.788	(2.919)	0.027	(0.277)
Niedersachsen	0.743	(1.634)	0.033	(0.155)
Nordrhein-Westfalen	2.201	(1.387)	0.198	(0.132)
Rheinland-Pfalz	1.652	(1.907)	0.236	(0.181)

(continued on the next page)

	Loan amount/250		*Interest rate*	
Saarland	0.311	(3.675)	0.491	(0.349)
Sachsen	6.041***	(1.984)	0.352*	(0.188)
Sachsen-Anhalt	3.169	(2.579)	0.434*	(0.245)
Schleswig-Holstein	3.927**	(2.130)	0.353*	(0.202)
Thüringen	2.873	(2.448)	0.255	(0.233)
Time effects	Yes		Yes	
Adj. R^2	0.289		0.674	

Panel *B*: Second-stage regression

	Probability of funding success	
Male	-0.111	(0.081)
Interest rate	0.244**	(0.104)
Duration: 60 months	-0.500***	(0.096)
Loan amount/250	-0.024***	(0.005)
Rating		
A (reference category)		
B	-0.607***	(0.149)
C	-0.627***	(0.224)
D	-1.096***	(0.264)
E	-1.133***	(0.358)
F	-1.736***	(0.438)
G	-2.264***	(0.583)
H	-2.737***	(0.732)
Financial burden		
low (reference category)		
moderate	0.472***	(0.139)
substantial	0.817***	(0.174)
high	1.176***	(0.238)
Age	-0.010***	(0.003)
Description	0.177***	(0.037)
Loan purpose		
House & garden (reference category)		
Education & training	-0.129	(0.202)
Car purchase & repairs	-0.326***	(0.122)
Business loan	0.178	(0.160)
Family & child raising	-0.030	(0.133)
Special occasions	-0.471**	(0.216)
Health care	0.015	(0.221)
Liquidity	0.046	(0.143)
Vacation	-0.154	(0.234)
Hobby	-0.056	(0.450)
Other/Not specified	-0.440***	(0.113)
Sport	0.254	(0.289)
Animals	-0.298	(0.342)
Consolidate/repay debt	-0.277**	(0.141)
Consumer electronics	-0.078	(0.225)
Time effects	Yes	
Wald-test of exogeneity	χ^2 = 2.56	Prob = 0.277