

Vive la Différence: Social Banks and Reciprocity in the Credit Market

Simon Cornée and Ariane Szafarz

Social banks are financial intermediaries paying attention to non-economic (i.e. social, ethical, and environmental) criteria. To investigate the behavior of social banks on the credit market, this paper proposes both theory and empirics. Our theoretical model rationalizes the idea that reciprocity can generate better repayment performances. Based on a unique hand-collected dataset released by a French social bank, our empirical results are twofold. First, we show that the bank charges below-market interest rates for social projects. Second, regardless of their creditworthiness, motivated borrowers respond to advantageous credit terms by significantly lowering their probability of default. We interpret this outcome as the first evidence of reciprocity in the credit market.

Keywords: Social bank; reciprocity; social identity

JEL Classifications: G21, D63, G24, H25

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Abstract

Social banks are financial intermediaries paying attention to non-economic (i.e. social, ethical, and environmental) criteria. To investigate the behavior of social banks on the credit market, this paper proposes both theory and empirics. Our theoretical model rationalizes the idea that reciprocity can generate better repayment performances. Based on a unique hand-collected dataset released by a French social bank, our empirical results are twofold. First, we show that the bank charges below-market interest rates for social projects. Second, regardless of their creditworthiness, motivated borrowers respond to advantageous credit terms by significantly lowering their probability of default. We interpret this outcome as the first evidence of reciprocity in the credit market.

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1. Introduction

Reciprocity in the credit market is a phenomenon whereby borrowers who consider themselves fairly treated by the credit institution need no enforcement devices (incentives, monitoring, etc.) to repay their debt swiftly. Reciprocity is typically based on trust and common values. It can act as a powerful antagonist to perverse mechanisms such as moral hazard and strategic default, which are known to plague the functioning of credit markets (Jaffee and Rusel, 1976; Stiglitz and Weiss, 1981; Fehr *et al.*, 2009). However, the feasibility for a bank to inspire reciprocity in its borrowers seems to be a challenge, if not an illusion. Doubts about this feasibility are especially relevant in the current context where the credit crisis has deeply compromised the reputation of the financial sector.

Still, there is good news. Experimental evidence supports the existence of reciprocity in the credit market (Fehr and Zehnder, 2006; Brown and Zehnder, 2007; Cornée *et al.*, 2012). Moreover, Karlan (2005) observes that laboratory evidence is often consistent with real-life behavior in financial matters. So far, however, no study has ever confirmed the existence of reciprocity in real-life credit markets. This paper fills the gap by using a database released by a French social bank. To this end, we investigate the bank's behavior in loan granting and the resulting repayment conduct of the borrowers. We show that moral values shared by the bank and its motivated borrowers lead to a two-step virtuous mechanism. In the first place, the social bank proposes advantageous credit terms to its motivated borrowers. Then, these borrowers respond by defaulting less frequently than their standard counterparts. We also propose a simple model to rationalize the facts.

The role of other-regarding preferences in economic decision making has attracted increasing attention from scholars over the last twenty years. While there is considerable heterogeneity in agents' attitudes, evidence demonstrates that not everyone maximizes self-

interest. In particular, a substantial fraction of the population exhibits social preferences. Fehr and Schmidt (2003) show that a share of 40% to 60% of the population pursues fairness by favoring pro-social outcomes even if this implies forgoing personal gains. Similarly, Fehr and Fischbacher (2002) find that a number of people are willing to sacrifice material payoffs to reward kind actions or punish unfriendly ones. Socially-minded agents tend to share windfall gains in equitable ways even though they stand no chance of benefiting from doing so. They also tend to sanction people who split gains unfairly. People with social preferences still care for their self-interest, but *in addition* they exhibit a concern for fairness (Fehr and Schmidt, 1999) and/or reciprocity (Rabin, 1993; Dufwenberg and Kirchsteiger, 2004; Adbulkardiroglu and Bagwell, 2013). Experimental evidence indicates that reciprocity is a powerful motivation for contract enforceability. This is especially the case when the contract is incomplete and the agent's commitment is unobservable (Fehr *et al.*, 1997; Gächter and Falk, 2004; Brown *et al.*, 2009).

More generally, *social identity* seems to be a driving force for reciprocity. Social identity is generally defined as an individual's sense of self, derived from perceived membership of a relevant social group (Chen and Li, 2009). Each individual has several social identities stemming among other things from gender, ethnicity, nationality, social class, and corporate culture. These more or less salient identities affect attitudes. And they can have major implications for economic decisions and outcomes. In the model proposed by Akerlof and Kranton (2000), identities are associated with behavioral prescriptions or norms. Individuals who deviate from these prescriptions suffer disutility. Interestingly, identities may play a crucial role in the case of principal-agent setting with contract incompleteness and unobservable effort, such as the lender-borrower relationship. Social identification, i.e. the fact that the agent identifies herself with her principal's values, can mitigate moral hazard problems. Akerlof and Kranton (2005) argue that such a phenomenon occurs in employment

relationships. In addition, social identification fosters reciprocity (Chen and Li, 2009; McLeish and Oxoby, 2011). Agents reciprocate more intensively if they identify with counterparty to a trade than if they do not.

In the credit market, borrowers' reciprocity may thus stem from their social identification with the lender. In this regard, social banks offer fertile ground for investigation. By nature, social–or ethical–banks pay attention to the non-economic (i.e. social and environmental) consequences of their activity (Green, 1989; Taupin and Glémain, 2007; Benedikter, 2011; Weber and Remer, 2011). These banks pass the financial sacrifices of their motivated shareholders and savers through to borrowing firms, which share the social values the banks wish to promote. They thus act, at least partly, as drivers of corporate social responsibility (Scholtens, 2006) or “philanthropic intermediaries” (Benabou and Tirole, 2010). Their main goal consists in serving community-oriented projects and social enterprises, which put the emphasis not only on financial returns but also—and often chiefly—on social aims (Defourny, 2001). Even though social banks are still niche institutions, they have spread considerably in recent years. Between 2007 and 2010, their asset growth rate reached 53.41%, compared with 8.37% for mainstream banking.¹ In Europe, their stronghold, their combined assets exceeded €20 billion in 2009.²

Notwithstanding their increasingly popularity and the fact that they represent an alternative to conventional banking, evidence on social banks' operating methods is scant. Here we offer two major contributions. First, we set up a simple theoretical model in which the interest rate charged by the social bank acts as a credible signal of value-sharing by the social bank and a motivated borrower. In this model the borrower's project choice is not enforceable by the bank. However, the social bank is ready to invest in a costly screening

¹ Own calculations based on the figures in GABV (2012).

² We refer to the figures of the European Federation of Ethical and Alternative Banks (FEBEA) available on www.febea.org.

device that allows it to recognize the motivated borrowers, i.e. the ones who share its social values. Accordingly, the bank signals their privileged status to these borrowers by offering them a low interest rate. Then, in line with their social identity, rationalized by a positive cost of cheating, the motivated borrowers reciprocate the bank's gesture by undertaking an efficient investment project with a low default risk.

Second, we conduct an empirical analysis. We exploit a unique hand-collected dataset including detailed information on 389 business loans granted by a French social bank between 2001 and 2004. Each borrower in our sample is graded on both a social and a financial scale. The social bank uses the social rating to measure the degree of proximity between its own social identity and that of borrowers. The bank is thus able to identify its motivated borrowers. In line with the theoretical model, our empirical results show that the bank charges lower interest rates to its motivated borrowers, all else being equal. We also find that these borrowers repay more swiftly than others with equal *ex ante* creditworthiness. We complete the study by carrying out a rough cost-benefit analysis of reciprocity. It appears that the benefits of reciprocity do not offset the costs associated with both the interest rate rebate and social screening.

The rest of this paper is organized as follows. Section 2 presents our model on social banking and reciprocity. Section 3 introduces our database. Sections 4 and 5 investigate the interest rate charged by the bank, and the probability of default, respectively. Section 6 proposes a cost-benefit analysis of reciprocity. Section 7 offers robustness checks. Section 8 concludes.

2. A Model of Social Banking and Reciprocity

The recent financial crisis has revealed the limits of mainstream banking and put alternative forms of financial intermediation into the spotlight. In particular, social banks characterized by a double bottom line have become increasingly popular. Somewhat surprisingly, they remain poorly investigated in the academic literature. Accordingly, this section starts with a short overview of the sector. Next, it presents a simple model explaining how reciprocity can emerge in social banking.

Beyond their economic function, social banks aim to foster a community of values by matching the two sides of financial intermediation: socially-minded investors (i.e. shareholders and savers) and motivated borrowers. Social banks are financial intermediaries with a double bottom line.³ They advertise social achievements as their main goal. Financial concerns are justified by the need for economic sustainability rather than profit maximization (Becchetti and Garcia, 2011; Becchetti *et al.*, 2011; San-Jose *et al.*, 2011). In addition, social banks are ruled by foundational principles such as transparency, accountability, and fair redistribution of profits (Cowton and Thompson, 2000; Cowton, 2002; Becchetti *et al.*, 2011; San-Jose *et al.*, 2011).⁴

Regarding investment strategy, social banks follow two fundamental rules. First, they commit themselves to finance the “real economy.” They grant credit to projects with social value added. Second, they ban purely speculative transactions (San-Jose *et al.*, 2011). Their financial transactions rely on simple intermediation, and result in high deposits-to-assets and

³ We henceforth use “social bank” to describe any bank claiming to pay attention to extra-financial criteria, regardless of their specific nature, be they social, ethical, or environmental. Arguably, a triple bottom line may be advocated (Global Report Initiative, 2011) insofar as social banks often combine ethical and environmental concerns. Akin to other works on socially responsible lending (e.g. Gutierrez-Nieto *et al.*, 2011), we consider environmental concern as part of social concerns. Moreover, Norman and MacDonald (2004) state that the triple-bottom-line rhetoric may be misleading and act as a smokescreen.

⁴ Becchetti *et al.* (2011) identify the following foundational principles of social banks: 1) awareness of non-economic consequences, 2) access to finance as a human right, 3) efficiency and probity, 4) fair redistribution of profits, 5) full transparency, 6) encouragement of active involvement of shareholders and savers in decision making, and 7) ethical inspiration in all activities.

loans-to-assets ratios. Social banks also differentiate themselves from their commercial counterparts by adopting specific corporate governance rules. They favor the involvement of stakeholders in strategic and operational decision making (San-Jose *et al.*, 2011). To prevent the presence of dominant shareholders, most social banks operate under the legal status of cooperatives (GABV, 2012).⁵ The few that have a capitalistic ownership structure rely on self-regulatory arrangements to limit power concentration. For example, shareholders' voting rights at *Alternative Bank Schweiz* (ABS, Switzerland) and *Triodos Bank* (The Netherlands and Belgium) are capped.⁶ Alternative forms of stakeholder involvement are promoted, such as the participation of non-shareholders in governing and executive bodies.

How do social banks put their social mission into practice? The stakeholders' identity-sharing⁷ with the bank is essential to capture social banks' operating methods. In line with Akerlof and Kranton's (2000) theory, socially-minded investors put their money into a social bank in order to receive an extra stream of utility and reinforce their pro-social identity. Subsequently, they are ready to forgo a significant part of their financial returns as long as the social bank funds motivated borrowers, i.e. borrowers aiming at financing a pro-social business project. The intensity of the investors' social motivation can be measured by their financial sacrifice, in other words the spread between the interest paid to them by a social bank and by a comparable mainstream bank. Becchetti and Garcia (2011) evaluate this sacrifice at *Banca Etica*, an Italian social bank, at around 150 basis points in 2007. The bank's

⁵ Cooperative status affects not only the design of the institution's governance but also the capital structure of its balance sheet. Ferri *et al.* (2010) show that financial cooperatives tend to be better capitalized than commercial retail banks. Plausibly, this set-up is stronger in social banks. Management can use the diffuse ownership structure to easily retain earnings within the bank. This strategy is in line with the investors' commitment to forgo financial returns in exchange for the accomplishment of the bank's social mission. In addition, the cooperative status helps aligning the managers' behavior with the bank's social mission (Kitson, 1996). Becchetti and Huybrechts (2008) draw the same conclusion for fair-trade organizations.

⁶ Each ABS shareholder must remain below the three-percent voting-right threshold. *Triodos Bank's* shares are held in trust by an *ad hoc* foundation, whose board is appointed by depository receipt holders with limited voting rights.

⁷ We only consider the two key categories of stakeholders: investors (shareholders, savers) and borrowers, and disregard other categories such as the staff. Nevertheless, Cornée *et al.* (2012) show that employees of social banks exhibit higher social preferences than their counterparts working in mainstream banks.

owners also make sacrifices. San-Jose *et al.* (2011, p. 152) report that “ethical banks do not generally distribute benefits between shareholders and, if at all they do so, the distribution is very limited, and profit is, therefore, only residual.”

Capturing the way social banks operate in the credit market is far more complex for at least two reasons. First, as demonstrated by Stiglitz and Weiss (1981), in imperfect markets with asymmetric information, interest rates will not perform their clearing function. The credit market is thus characterized by credit rationing, and the demand side of the market is partially unobservable. Second, credit scoring is bank-specific, even for small-business lending alone (Cowan and Cowan, 2006). For social banks, the issue is even more acute due to the presence of a double bottom line. In addition, the interaction of social and financial missions remains poorly elucidated, and stylized facts on credit terms are scarce. In the context of microcredit,⁸ Hudon (2007) emphasizes that the level of interest rates is instrumental from an ethical standpoint. In our model, the interest rate is the device used by a social bank to signal identity-sharing with motivated borrowers.

Credit allocation is only one side of the problem. To obtain a global picture of how social banks’ system of reciprocity operates, we also need to pay attention to the way borrowers behave. Typically, asymmetric information prevents the lender from observing the borrowers’ actual investment choice. We thus need an alternative rationale for motivated borrowers behaving virtuously toward the social bank. In the model proposed by Bariggozzi and Tedeschi (2011), a motivated borrower who trades with the social bank perceives an extra stream of utility if her project is successful. Therefore, a forward-looking motivated borrower is more willing to repay her debt to a social bank than to a profit-maximizing one. In this

⁸ Paradoxically, more evidence is available on microfinance institutions active in developing countries than on social banks active in developed countries. The existing evidence on microcredit activity is, however, not transposable to social banking because the microcredit lending methodology is specific. It is based on the supply of standardized small loans without collateral (Armendariz and Morduch, 2010). Microfinance institutions typically charge identical interest rates to most – if not all – borrowers, and simply tailor loan size to their borrowers’ perceived creditworthiness (Agier and Szafarz, 2013a).

framework, the borrower's reaction is dictated by the nature of the social bank, not by a signal. In the real world, however, borrowers constitute a heterogeneous set of agents. They need a credible signal to realize that they belong to the bank's privileged clientele. Once a borrower has learned about her privileged status, she might wish to reciprocate the gesture by making an efficient investment with a low default risk. In our model, this mechanism is rationalized by introducing the cost of cheating, which is incurred by motivated borrowers only.

Let us now present our model. Consider a social bank active in a competitive credit market with two types of borrowers: opportunistic and motivated. A social bank differs from a mainstream bank in the way it screens loan applicants. Its goal is to target motivated borrowers and offer them fair credit terms. To do so, the social bank pays the extra costs associated with its social screening mechanism. In practice, screening is based on an evaluation of the applicants' motivation. As a result, the social bank is able to recognize motivated borrowers. These borrowers share an identity with the social bank, and this makes them reluctant to cheat on their project choice. Parameter c denotes the (positive) cost of cheating for motivated borrowers.⁹ In contrast, opportunistic borrowers face zero cost of cheating. We assume that the social bank not only observes the type of each borrower but also correctly estimates parameter c .

In line with Fehr and Zehnder (2006), we assume that all the borrowers are risk-neutral and have the choice between two projects. First, project A is an efficient low-risk project yielding return \bar{R}_A with probability π_A and zero return with probability $(1 - \pi_A)$. Second, project B is an inefficient high-risk project yielding return $\bar{R}_B (> \bar{R}_A)$ with probability

⁹ Actually, our model includes a homogenous group of opportunistic borrowers (zero cost of cheating) and a continuum of motivated borrowers characterized by their degree of motivation, defined by their cost of cheating.

$\pi_B (< \pi_A)$ and zero return with probability $(1 - \pi_B)$. Borrowers have limited liability: The repayment of a loan cannot exceed the return on the project.

All the loans have the same size, normalized to one. Each borrower applies for the financing of a given project (A or B), but asymmetric information makes it impossible for the bank to enforce the undertaking of the announced project. The social bank is a price-taker. The market interest rates are r_A on project A and r_B on project B , with $r_B > r_A$. We assume that:

$$\pi_B (\bar{R}_B - (1 + r_A)) \geq \pi_A (\bar{R}_A - (1 + r_A)) \geq \pi_B (\bar{R}_B - (1 + r_B)), \quad (1)$$

which implies that *ex ante* the borrowers are better off applying for project A and undertaking it than applying for project B and undertaking it. Therefore, no borrower will ever apply for a loan by announcing project B . However, once the loan is released, the choice of project is private information to the borrower and cannot be enforced by the bank. As a result, opportunistic borrowers will apply for credit with project A but will subsequently undertake project B . Since the social bank observes the type of each borrower, it will charge rate r_B to opportunistic borrowers.

In contrast, motivated borrowers face a trade-off: Either they announce project A and subsequently undertake project A , or they announce project A but then cheat and undertake project B . In the first case, their expected profit is $\pi_A (\bar{R}_A - (1 + r))$, where r is the interest rate charged by the bank. In the second, the expected profit is $\pi_B (\bar{R}_B - (1 + r)) - c$. More precisely, a motivated borrower will undertake project A if:

$$\pi_A (\bar{R}_A - (1 + r)) > \pi_B (\bar{R}_B - (1 + r)) - c,$$

or equivalently if:

$$\pi_B \bar{R}_B - \pi_A \bar{R}_A < c - (\pi_A - \pi_B)(1 + r). \quad (2)$$

Hence, the project choice of the motivated borrowers depends on the interplay between the interest rates, r_A and r_B , and the cost of cheating, c . According to Eq. (2), we have three possibilities:

- (i) c is high: $\pi_B \bar{R}_B - \pi_A \bar{R}_A < c - (\pi_A - \pi_B)(1 + r_A) < c - (\pi_A - \pi_B)(1 + r_B)$
- (ii) c is moderate: $c - (\pi_A - \pi_B)(1 + r_A) < \pi_B \bar{R}_B - \pi_A \bar{R}_A < c - (\pi_A - \pi_B)(1 + r_B)$
- (iii) c is low: $c - (\pi_A - \pi_B)(1 + r_A) < c - (\pi_A - \pi_B)(1 + r_B) < \pi_B \bar{R}_B - \pi_A \bar{R}_A$

In the two polar cases, (i) and (iii), the behavior of the motivated borrowers does not depend on the interest rate charged. In case (i), cheating is very costly and the borrowers will undertake project A. Since the bank estimates the value of c correctly, it knows that the announcement of project A is trustworthy. Therefore, it will charge rate r_A . In case (iii), the cost of cheating is low enough to make the borrowers cheat regardless of the interest rate charged by the bank. Accordingly, the informed bank will charge rate r_B . Motivated borrowers facing a low cost of cheating behave like their opportunistic counterparts.

The situation depicted in case (ii) is more interesting. The decision of motivated borrowers facing moderate cheating costs depends on the rate charged by the bank. If the bank charges rate r_A , the borrower will not cheat and undertake project A. Alternatively, if the bank charges rate r_B , cheating becomes more profitable than being trustworthy, and the borrowers will undertake project B. Remarkably, in case (ii) the social bank determines the borrowers' project choice even though the bank can neither observe nor enforce it.

To further interpret the findings of the model, let us compare the situations of standard and social banks. A standard bank shares no identity with its borrowers. Hence, it charges all of them r_B , and ends up financing inefficient high-risk projects only. In contrast, by sharing

an identity with some of its borrowers, namely the motivated ones, the social bank manages to finance efficient low-risk projects. It does so by charging rate r_A to borrowers facing moderate or high cheating costs. Actually, these borrowers know that they are privileged by the bank because they are charged r_A rather than r_B . In the real life, borrowers perceive this credible signal when negotiating the credit terms.

In practice however, identifying motivated borrowers and estimating their individual cost of cheating can prove very costly for the social bank. This may explain why social banks are ultimately less profitable than standard ones. In the framework of our empirical study, we interpret the social rating (SR) as an estimate of the cost of cheating. This follows from the intuition that for a borrower, higher motivation entails a higher cost of cheating a social bank. Moreover, the model shows that among the motivated borrowers, those with a high value of c will never cheat while others, with a moderate value of c , will refrain from cheating only if the bank signals its confidence by charging rate r_A . In this case, the signal will generate reciprocity in the form of undertaking project A .

Overall, the message from our model is that social banks serving, at least partly, motivated borrowers end up with a less risky loan portfolio than do standard banks, and thus obtain better repayment performances. They also enhance global welfare by increasing the share of efficient low-risk projects in the economy. Nevertheless, given the additional screening costs faced by social banks, the overall differences in profitability between standard and social banks remain ambiguous. We will further explore this issue in Section 5.

3. Data and Preliminary Analysis

The hand-collected data used in this study come from *La Nef*,¹⁰ a French social bank established in 1988. San-Jose *et al.* (2011) list *La Nef* among the social banks that best align their managerial deeds with their ethical principles. *La Nef* is a financial cooperative operating throughout France under the supervision of *Banque de France*, the French central bank. With 27,135 members in 2010, it had total assets amounting to €288 million. *La Nef* implements basic intermediation rules. Its resources come from the savings¹¹ of cooperative members, who are motivated by social returns. This motivation is testified by financial returns lying slightly above inflation (*La Nef*'s annual report, 2010), which is consistent with the financial sacrifice of 150 basis-points mentioned by Becchetti and Garcia (2011) for *Banca Etica*. *La Nef* is committed to transparency, publishing details of its investments every year. This constitutes a channel for direct relationships between savers and borrowers.

Our study stretches from 2001 to 2008. We consider loans granted over the 2001-2004 period. In addition, we use a four-year window (2005-2008) to record the occurrences of default.¹² During the 2001-2004 period, *La Nef* operated three branches,¹³ and its clientele was spread all over France (see Table A1 in Appendix A). Loans are extended to borrowers in rural areas (50.41%), town and cities (25.07%), and suburbs (24.52%).¹⁴ This geographic dispersion is linked to the diversity of activities funded by *La Nef*. The pool of borrowers is mainly composed of small businesses, community-oriented project holders, and social enterprises. Over the 2001-2004 period, the bank granted 630 loans. Only 476 of them were

¹⁰ See www.lanef.com.

¹¹ In 2010, its deposits-to-assets ratio was 85.92% and its loans-to-assets ratio was 40.12%, which is quite low. However, the resources not directly used for loans are entrusted to *Le Crédit Coopératif*, a partner cooperative bank sharing *La Nef*'s social values. In 2010, this represented 35.76% of the balance sheet (*La Nef*, 2010).

¹² The data were collected in November 2008. The sample period for loan granting stretches from January 1, 2001 to November 25, 2004. The November 2004-November 2008 period is used only as a feedback period.

¹³ Since September 2007, *La Nef* has operated four branches.

¹⁴ The *Ile-de-France*, *Provence-Alpes-Côtes-d'Azur* and *Rhône-Alpes* regions are overrepresented since they include the three largest French cities: Paris, Marseille and Lyon, respectively.

effectively extended. We managed to gain access to the complete credit files for 389 extended loans, which gives our sample 81 percent representativeness. Missing files are proportionately less frequent in the second half of the sample period (see Table 1), due to improvements in the bank’s information system.¹⁵

Table 1: Sample Yearly Composition

Year	Extended loans	Observed loans	Representativeness
2001	87	50	57.47%
2002	106	84	79.25%
2003	143	129	90.21%
2004	140	126	90.00%
Full sample	476	389	81.72%

The borrowers are relatively young businesses (5.34 years old, on average) and include 49% of start-ups. Average turnover is about €540,000, and the average number of employees is 7.59. These companies operate in four sectors: environmental protection and ecology (46%), fair trade and community-based services (30%), culture and health (12%), economic inclusion and microfinance (12%). Regarding legal status, 43.5% are unlimited companies, 37.5% are limited companies, and 19% are cooperatives.¹⁶ All the loans are pledged with collateral. The average level of collateralization is equal to 84%, in line with the figures for mainstream banking (see Becchetti and Garcia, 2011). This, however, contrasts with the 42% of uncollateralized loans reported by Becchetti and Garcia (2011) for *Banca Etica*. The difference is likely attributable to the fact that *Banca Etica* trades with borrowers belonging to consortiums. Hence, existing long-term relationships between these consortiums and the bank

¹⁵ Most likely, our sample does not suffer from a selection bias. The missing loans were excluded by accident, not on purpose. Unfortunately, we had no access to information on the denied applications. This in turn limits the possibility of observing the bank's full selection process.

¹⁶ Due to data unavailability, the statistics for turnover and staff are obtained from a sub-sample made of 55 firms (14.13% of the full sample). Likewise, the statistics for age and firm status are obtained from a sub-sample made of 369 firms (94.85% of the full sample).

act as a substitute for collateral, even though the consortiums themselves provide no formal guarantee for the loans.

Table 2 presents the variables used in the empirical study, broken down into four categories. First, each borrower is characterized by a financial rating (FIN) and a social responsibility rating (SR). These ratings are established in-house by the loan officers who systematically pay a visit to the applicants.

Both ratings are given on a one-to-three scale, three being the best grade. The FIN rating gives a general appraisal on both backward-looking and forward-looking perspectives. It assesses 1) business risks and prospects, 2) financial statements, and 3) profitability. Since the bank's clientele includes a large share of start-ups, this approach is more relevant to its practice than the conventional backward-looking point-in-time measure used to evaluate bankruptcy risks (Grunert *et al.*, 2005).

The SR rating assesses the foreseen social and environmental accomplishments of the project. This rating is assigned in two steps. The credit officer who meets up with the credit applicant on the spot makes the first appraisal. Then, the credit committee makes the final decision according to guidelines provided by the so-called ethics committee appointed by the board of the bank. In contrast to FIN, SR is not determined according to strict rules. Rather, it involves judgments on non-tangible characteristics, such as moral rectitude, social motivation, the ethicality and environment-friendliness of the business activity, and corporate responsibility towards stakeholders. These characteristics can be interpreted as an assessment tool for the proximity between the applicant's and the bank's social identities. *La Nef's* Annual report (2006) sets out the assessment guidelines. "SR = 1" means that granting the loan would favor financial inclusion, i.e. no special characteristics are necessary for the applicant; "SR = 2" means the applicant is concerned with environmental *or* social

responsibility; “SR = 3” means the applicant is concerned with environmental *and* social responsibility.

Second, the three contractual features of the loans are: charged interest rate (RATE), loan size in €10,000 (LOANSIZE), and share of the loan that is not collateralized (NONCOLLAT). These features are set by the bank.

Third, as in previous studies (Petersen and Rajan, 1994; Berger and Udell, 1995; Elsas and Krahn, 1998), for each loan we have collected the same-day three-month Paris Inter Bank Offered Rate (PIBOR3M), which proxies the bank’s refinancing rate.

Table 2: Variables in the Database

VARIABLES	DEFINITIONS
Financial and social ratings	
FIN	Financial rating: from 3 (excellent) to 1 (distress)
SR	Social responsibility rating: from 3 (best) to 1 (worst)
Contractual features	
RATE	Nominal rate at which the loan is granted (100 basis points)
LOANSIZE	Amount extended in €10,000
NONCOLLAT	Share of the loan unpledged by collateral (in %)
Refinancing interest rate	
PIBOR3M	Three-month Paris Inter Bank Offered Rate (100 basis points)
Additional characteristics	
STARTUP	= 1 if the loan is extended to a start-up; 0 otherwise
RELATIONSHIP	= 1 if the firm had a banking relationship prior to loan approval; 0 otherwise
DEFAULT	= 1 if the firm defaults within the four years after loan extension; 0 otherwise

Fourth, three dummy variables account for the borrowing firm being a start-up (STARTUP), having a banking relationship prior to loan extension (RELATIONSHIP), and having experienced a default within the four years following loan extension, respectively. The first two characteristics are observed by the bank when determining credit condition; the third is observed *ex post*.

Table 3: Descriptive Statistics by Social Responsibility Levels

Sample	Full sample (n = 389)		SR = 1 (n = 74)		SR = 2 (n = 174)		SR = 3 (n = 141)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
FIN	1.97	0.02	1.89	0.04	1.99*	0.03	1.99	0.04
RATE (in %)	5.87	0.03	6.09	0.07	5.94*	0.04	5.67***	0.06
LOANSIZE (in €10,000)	4.68	0.23	3.15	0.32	4.53***	0.34	5.67**	0.44
NONCOLLAT (in %)	0.16	0.00	0.16	0.01	0.15	0.01	0.17	0.01
PIBOR3M (in %)	2.70	0.03						
STARTUP	0.48	0.02	0.68	0.05	0.49***	0.03	0.36**	0.04
RELATIONSHIP	0.17	0.02	0.06	0.02	0.17**	0.02	0.22	0.03
DEFAULT	0.23	0.02	0.39	0.05	0.24**	0.03	0.14**	0.02

*: equality rejected with $p < 10\%$, **: equality rejected with $p < 5\%$, ***: equality rejected with $p < 1\%$

Table 3 gives an overview of the whole sample as well as figures averaged within fixed SR levels, and tests for differences across these levels. It appears that 18% of the funded projects have a low SR rating (SR = 1), 44% have a mid-range one (SR = 2), and 38% have a high one (SR = 3). In line with its mission, the bank favors socially oriented projects, but its portfolio is not restricted to high-SR projects. This may be attributable to diversification motives and/or scarcity of such projects.¹⁷

The yearly interest rate charged by the bank is 5.87% on average, while the average refinancing rate (PIBOR3M) is 2.70% over the period. The average loan size is €46,800. In

¹⁷ The relatively low loans-to-assets ratio (40.12%) may derive from a scarcity of social projects that break even.

line with the bank's social mission, the interest rate charged is negatively related to SR, while loan size is positively related to it. Collateralization, in contrast, is insensitive to SR, since the non-collateralized share of the loans varies little (between 15% and 17%). Most importantly, the social and financial ratings seem weakly related.

Table 3 indicates that the share of start-ups decreases with SR. Startups represent 83% of the firms with SR = 1, but only 57% of those with SR = 2, and 40% of those with SR = 3. One possible explanation lies in the bank's prudence in assessing SR for start-ups. Information asymmetries are evidently high for start-ups. This evidence points to the necessity of taking the start-up status explicitly into account in the regression analysis. In the same vein, benefitting from a relationship with the bank increases the likelihood of reaching higher SR, but this effect is significant only for the transition from SR = 1 to SR = 2.

A full 23% of the borrowing firms experienced repayment issues within the four-year period following loan extension. These issues, grouped under the "default" denomination, are: moratoriums, loan provisions, credit withdrawals, disposal of collateral, and liquidation. This broad definition of default is consistent with the recommendation issued by the Basel Committee on Banking Supervision (Second Consultative Document, 2001, recommendation 272). Based on out-of-sample figures from 2007, we estimate that around 15% of the defaulted loans are eventually liquidated. According to this estimate, only 3.5% of the bank's loan portfolio would end up in liquidation. Expectedly, defaults are more frequent for start-ups (32%) than for existing firms (14%). Based on 2007 data, we estimate that liquidation concerns about 2% of the loans extended to existing companies and about 5% to start-ups. Default occurrences decrease sharply with SR. Passing from SR = 1 to SR = 3 lowers the

probability of default from 0.39 to 0.14.¹⁸ This key figure will be further explored in Section 5.

On the whole, the descriptive statistics reveal that high-SR firms get lower interest rates and higher loan sizes, which is consistent with the bank's stated social orientation. At this stage, however, we cannot exclude that credit conditions are also determined by other factors interacting with SR.

Table 4: Correlation Matrix: All Firms

	SR	FIN	RATE	LOANSIZE	NON COLLAT	STARTUP	RELATIO NSHIP
SR	1.00						
FIN	0.05	1.00					
RATE	-0.27***	-0.12**	1.00				
LOANSIZE	0.19***	0.05	-0.25*** ^p	1.00			
NONCOLLAT	-0.00	-0.08*	-0.18*** ^p	0.07 ^p	1.00		
STARTUP	-0.22***	-0.05	0.06	-0.24*	0.15***	1.0000	
RELATIONSHIP	0.13***	0.17***	-0.14***	0.02	-0.00	-0.36***	1.0000
DEFAULT	-0.20***	-0.14***	0.04	-0.02	0.07	0.21***	-0.15***

Subscript “p” means Pearson correlations, the other correlations are Spearman rank correlations.

*: zero correlation rejected with $p < 10\%$, **: zero correlation rejected with $p < 5\%$, ***: zero correlation rejected with $p < 1\%$

Social banks can support motivated borrowers in at least two ways. First, they can help social firms otherwise redlined by profit-oriented credit providers. Second, they can provide below-market credit conditions, such as low interest rates, to profitable projects in order to increase the chances of success. While these two strategies may be combined, their practical consequences are dramatically different. In the first case, the social bank acts as a substitute for public subsidy, and launches social but unprofitable activities. In the second, it acts as a profit accelerator for already well-performing social firms, a target mostly disregarded by public funding schemes. To empirically disentangle these strategies, we use the correlation between the financial and social ratings of the selected projects.

¹⁸ Loan-loss provisioning is governed by law. Therefore, we rule out the possibility that loans with different social ratings are treated differently by the bank.

Table 4 gives the correlation matrix. The most important figure concerns the correlation between the social and financial ratings. Because our sample is made up of granted loans only, it is subject to an endogenous selection bias. Assuming that the pool of applicants is large enough to let the bank make a meaningful selection, we view the correlation between the two ratings as a consequence of the selection mechanism. Accordingly, a negative correlation *in our sample* would signal that the selection is less stringent for motivated borrowers than for standard ones. In contrast, a positive correlation would be incompatible with the bank's social mission.¹⁹

Table 4 reveals that the correlation between the two ratings is not significantly different from zero. We interpret this key figure as the consequence of a selection mechanism that is not biased towards high SR ratings. In particular, this is consistent with the bank using a financial-based denial rule, such as rejecting below-break-even projects. This type of rule is frequent in mainstream banking. In social banking, it is often combined with a similar rule rejecting projects with below-standard social ratings. What matters from our standpoint is that the social rating is not used to mitigate the importance of the financial rating in the selection phase. As a consequence, we rule out the possibility that the bank is softer on social projects. The social bank does not target social projects with low profitability. Rather, it seems concerned with enhancing the probability of success of viable social projects. By concentrating on profitable projects, the social bank acts as a complement to public funding schemes rather than a substitute for them.

Table 4 also indicates that the interest rate exhibits significantly negative correlations with both ratings, social and financial. Low interest rates tend to be associated with large

¹⁹ Admittedly, this argument would be stronger if we had access to data on denied loans, which is unfortunately not the case. Instead, we rely here on the assumption that the loan selection is made within a pool of applications large enough to allow the bank to make unconstrained choices. Although this assumption is debatable, we see no realistic scenario that would make the observed zero correlation spurious.

loans, high collateralization, and existing banking relationship. The latter finding is consistent with empirical studies suggesting that the cost of credit decreases as a function of the intensity of the banking relationship (Berger and Udell, 1995; Uzzi, 1999; Berger *et al.*, 2007).

Start-ups tend to face lower collateral requirements. This striking correlation may be explained by the fact that, in France, loans to start-ups are often secured by public guarantee funds. In all, 69.02% of start-up loans are guaranteed by public collateral (41.68% of total loans).²⁰ Public collateral is highly reliable because it is automatically released when loans are liquidated. As a result, the bank needs proportionately less public than private collateralization to reach a given level of guarantee.

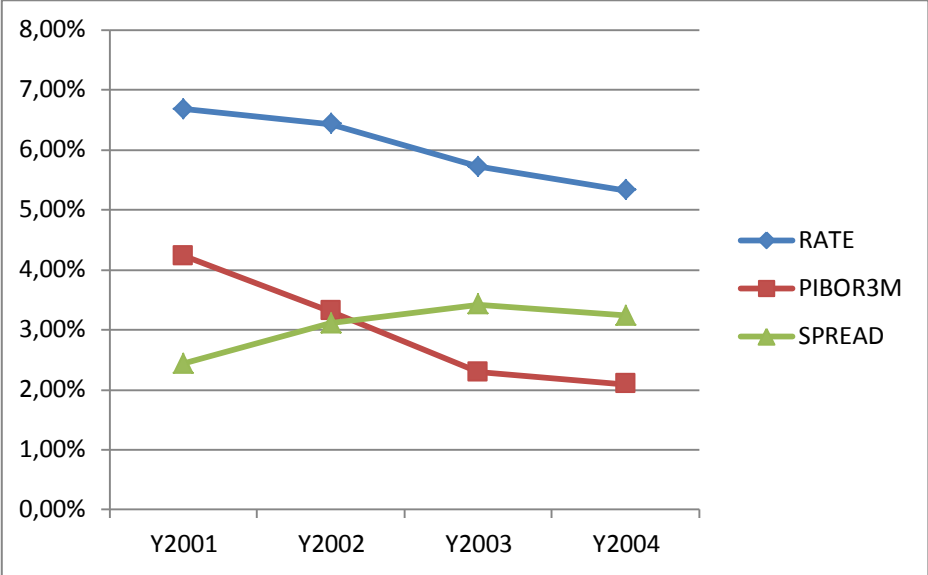
The zero correlation between RELATIONSHIP and NONCOLLAT in Table 4 is counter-intuitive. A large body of empirical studies strongly supports the argument that relationship lending reduces collateral requirements (Petersen and Rajan, 1994; Berger and Udell, 1995; Boot, 2000; Degryse and Van Cayseele, 2000; Chakraborty and Hu, 2006). In our sample, though, the raw correlation may be flawed by ignoring the STARTUP factor, which is correlated positively with NONCOLLAT and negatively with RELATIONSHIP. The regression analysis will confirm that the apparent anomaly disappears when the start-up status is properly accounted for.

Unlike previous studies (Petersen and Rajan, 1994; Berger and Udell, 1995; Elsas and Krahen, 1998), we use the charged interest rate (RATE) and the refinancing rate (PIBOR3M) as two distinct variables (see Table 2), instead of focusing solely on their difference—the spread. This choice is motivated by the joint movements of the variables at stake. Fig. 1 draws the dynamics of three variables: RATE, PIBOR3M, and the spread. From 2001 to 2004, RATE steadily decreased, roughly following PIBOR3M. Over the same period,

²⁰ These percentages are obtained from a sub-sample of 367 firms.

the spread experienced a dramatic shift, widening from 2.40% in 2001 to 3.39% in 2003.²¹ This shift may result from the use of a rate-smoothing strategy. In periods of downtrending market interest rates, banks tend to charge higher spreads in order to rebuild their margins (Machauer and Weber, 1998). Conservatively, we have decided to work with both the RATE and PIBOR3M variables, the former being a dependent variable, the latter an independent one. The resulting econometric specifications are more flexible than those built from the spread only.²²

Figure 1: Charged Interest Rate, Refinancing Rate (PIBOR3M), and Spread



4. Impact of Social Rating on Interest Rate

In this section, we examine how the social rating influences the interest rate that the social bank charges its borrowers. The social rating is our focus because this is what makes social banks special among credit providers. In the empirical literature, little is known about the way

²¹ The overall evolutions of the FIN and SR variables are stable. This excludes the possibility for the shift in spreads being driven by a change in the composition of the clientele.

²² We have also estimated a model explaining the spread. The estimation results are similar to those in Table 4 (Section 3), regarding signs, amplitudes, and levels of significance. However, explaining the spread rather than the interest rate is detrimental to the quality of fit.

social characteristics affect the interest rates charged by social banks. We investigate this issue through regression analysis.

Table 5 presents the results for three specifications explaining the interest rate. In specification (1), the main explanatory variables are the social (SR) and financial (FIN) ratings. The benchmark interest rate (PIBOR3M) is added to account for the bank's refinancing rate. This specification makes sense if one assumes that all the borrowers' characteristics are well summarized by the two ratings. Specification (2) takes explicitly into consideration the two variables related to informational asymmetries, namely STARTUP and RELATIONSHIP. These variables are included because the borrowers know more about the characteristics of their own projects than the lender does. Specification (3) adds loan size and collateralization. These two variables interact with the interest rate, as shown by the correlation matrix in Table 4. However, including them as explanatory variables might raise an endogeneity issue because the three credit conditions (interest rate, loan size, and collateralization) are simultaneously determined. To address this issue, we also estimate a multivariate model for the three credit terms (see Table C1 in Appendix C). The estimates obtained from the multivariate regression are similar to those from the univariate regressions for the interest rate.

Table 5 shows that, in all specifications, both the social and the financial ratings influence the charged interest rate negatively. Specification (2) shows that STARTUP and RELATIONSHIP have no direct impact on the determination of the interest rate. The R-squared obtained for Specification (3) is hardly affected by the inclusion of loan size and collateralization. Still, the load of loan size is significantly negative. This could indicate that social banks favor larger loans.

As expected, higher financial ratings are valued in terms of lower interest rates. More interestingly, social firms get cheaper credit from the bank, all other things being equal. The bank's social orientation results in interest rate rebates to social firms. This rebate is interpreted as a social premium. More precisely, a one-unit increase in the social rating is associated with a thirteen-to-sixteen basis-points premium in the charged interest rate. Qualitatively speaking, this result confirms the findings of the theoretical model that the social bank charges a lower interest rate to borrowers exhibiting higher motivation.

Table 5: Interest Rate: OLS Estimations

VARIABLES	(1) RATE	(2) RATE	(3) RATE
SR	-0.16*** (0.031)	-0.15*** (0.032)	-0.13*** (0.032)
FIN	-0.16*** (0.047)	-0.15*** (0.048)	-0.16*** (0.047)
PIBOR3M	0.61*** (0.029)	0.61*** (0.029)	0.59*** (0.030)
STARTUP		0.03 (0.050)	-0.01 (0.050)
RELATIONSHIP		-0.02 (0.066)	-0.02 (0.065)
LOANSIZE			-0.02*** (0.005)
NONCOLLAT			-0.15 (0.146)
CONSTANT	4.86*** (0.140)	4.84*** (0.148)	4.99*** (0.152)
Observations	389	389	389
R-squared	0.57	0.57	0.59

*: significant at the 10% level, **: significant at the 5% level, ***: significant at the 1% level.

5. Social Rating and Probability of Default

In this section, we study the reactions of motivated borrowers who benefit from a social premium. To check whether the social premium influences repayment performance, we use

the information on defaults. A loan is said to be defaulted if the borrower experiences reimbursement issues during the four years after the loan was granted.²³

In Table 6, we estimate the probability of default through probit estimations²⁴ under several specifications, for the sake of robustness. In specification (1), only the social rating is used to explain default probability. In specification (2), the financial rating is added. In addition, specification (3) controls for the two variables associated with asymmetric information. Last, specification (4) also includes the credit conditions.

Table 6: Probability of Default: Probit Estimations

VARIABLES	(1) DEFAULT	(2) DEFAULT	(3) DEFAULT	(4) DEFAULT
SR	-0.12*** (0.029)	-0.11*** (0.029)	-0.09*** (0.029)	-0.09*** (0.029)
FIN		-0.13*** (0.046)	-0.12*** (0.046)	-0.12*** (0.046)
STARTUP			0.12*** (0.045)	0.13*** (0.045)
RELATIONSHIP			-0.09 (0.056)	-0.10 (0.056)
RATE				-0.02 (0.034)
LOANSIZE				0.00 (0.005)
NONCOLLAT				-0.01 (0.154)
Observations	389	389	389	389
Log (L)	-203.50	-199.22	-191.60	-191.15

The table reports marginal effects at the mean.

*: significant at the 10% level, **: significant at the 5% level, ***: significant at the 1% level.

Table 6 reports the marginal effects at the mean. There is overwhelming evidence of significantly negative impacts of both the social and the financial ratings on default probability. Interestingly, these two effects share similar sizes in all specifications. This is

²³ The loans are extended for periods varying from one to twenty years. This four-year convention, fixed by the bank, is thus somewhat arbitrary. Still, 87% of defaults occur within the four years following credit granting.

²⁴ Logit estimations (not reported) bring similar results.

confirmed by formal tests for equal coefficients. While the negative impact of the financial rating on default probability was expected, that of the social rating was not, especially since both ratings are uncorrelated. Moreover, both effects are far from negligible. An additional unit of any rating brings around a 10% decrease in the probability of default.

There are two possible explanations for the impact of the social rating on default probability. First, higher ratings encourage significant rebates in interest rates. This automatically decreases the borrower's financial burden and makes the loans easier to reimburse. This "rational" explanation is, however, contradicted by the estimation of specification (4), which controls for credit conditions in general, and interest rates in particular. None of the credit conditions has a significant direct influence on the probability of default. In addition, the financial benefits associated with interest rate rebates are modest given the historically low levels of rates over the study period.

The second, more convincing explanation involves a reciprocity effect driven by favorable credit conditions acting as a signal. This is the gist of our theoretical model. The results in Table 6 demonstrate that motivated borrowers virtuously respond to fair credit conditions by increasing the effort they put into meeting their financial obligations to the social lender. Accordingly, our estimations provide the first empirical confirmation of the intuition that reciprocity exists in credit markets, posited by Fehr and Zehnder (2004) and Brown and Zehnder (2007) and formalized in our model.

Still, we cannot rule out that at least some motivated borrowers exhibit a lower probability of default regardless of the interest rate rebate they receive. In our theoretical model, the borrowers with a high cost of cheating do not need a signal to undertake an efficient low-risk project. However, even in that situation the social bank supplies them with the fair interest rate corresponding to the risk level of their actual project. Similarly, one could

imagine that some of *La Nef's* motivated borrowers would spontaneously make a greater effort to fulfill their project than would their same-creditworthiness opportunistic counterparts. This could simply be due to the fact that they are dealing with a social bank. If this is the case, the interest rate rebate is a “pure gift” from the bank, stemming from a shared social identity. Empirically, “pure gift” and reciprocity are impossible to disentangle because they appear to be observationally equivalent.

It could even be that motivated borrowers are more concerned with fulfilling their projects than are other borrowers regardless of the financing institution. They would then exhibit good repayment performances in relation to any bank, social or not. One could object to the argument that if socially-responsible borrowers were systematically more trustworthy than opportunistic ones, then banks would have learned this from experience. As a result, assessing social responsibility would have become part and parcel of standard financial assessment. In practice, this is obviously not the case. Conversely, it is generally very difficult to obtain financial support from mainstream banks for social projects. This fact is actually the very reason for the emergence of social banks.

6. Cost-Benefit Analysis of Reciprocity

To gauge the economic impact of reciprocity for a social bank, we sketch a cost-benefit evaluation of *La Nef's* socially-oriented lending policy. The net benefit of reciprocity in year t , NBR_t , is the difference between the benefit of reciprocity and its costs. The benefit stems from the decrease in default occurrences. The costs are twofold. First, motivated borrowers receive social premiums, which result in lower interest cashed in by the bank. Second, the social bank faces specific costs associated with social screening. NBR_t is thus computed in the following way:

$$NBR_t = \Delta CD_t - \Delta I_t - SC_t \quad (3)$$

where ΔCD_t is the year- t reduction in the cost of default driven by the virtuous repayment conduct of motivated borrowers, ΔI_t is the year- t reduction in cashed-in interests stemming from social premiums offered to motivated borrowers, and SC_t represents the year- t screening costs associated with assessing the applicants' social ratings.

Evaluating the components of NBR_t is an arduous task entailing the possibility of significant measurement errors. Here, we outline the basic assumptions, while providing technical details in Appendix B. When discounting is needed, we use a 6% rate corresponding to a rough estimate of the bank's weighted average cost of capital.²⁵

First, to estimate ΔCD_t we use the bank's loan-loss provisions (LLPs), which reflect the expectations of future losses on defaulted loans.²⁶ To derive the share of LLPs attributable to the bank's social orientation, we need a benchmark. Hence, we introduce a hypothetical non-social bank serving the same clientele as *La Nef*. This benchmark bank is assumed to grant credit in the same way that *La Nef* treats its clients, with $SR = 1$. Doing so neutralizes the effects of reciprocity embedded in granting advantageous conditions to borrowers with $SRI = 2$ and $SRI = 3$. We use regression analysis to simulate the cash flows generated by the benchmark bank, and proxy ΔCD_t by taking the differences between these simulated cash flows and the ones observed for *La Nef*.

Second, to compute ΔI_t , we rely on the results from Table 5. We determine the loan-specific rebates on interest rates with respect to the $SRI = 1$ benchmark. For each loan with $SRI = 2$ and 3, we simulate the yearly interest payments forgone by the social bank over the

²⁵ Sensitivity analysis reveals that variations in this parameter have little effect on the estimates of the NBR_t 's.

²⁶ Loans in default are non-performing loans at least 90 days in arrears. Actually, LLP can also be manipulated strategically. For instance, banks have incentives to use provisions to manage earnings and regulatory capital as well as to signal information about future prospects (Ahmed *et al.*, 1999). Nevertheless, working with differential—rather than absolute—costs likely offsets any strategic biases.

duration of the loan and we add up their discounted values. Summing all the forgone payments in year t yields our estimation of ΔI_t .

Third, the cost of social screening, SC_t , is hardest to assess. The burden associated with social screening translates into higher costs for at least two reasons: the bank's time-consuming screening technique and the geographic dispersion of the borrowers. Financially sustainable social projects are scarce. The bank is thus inclined to search for business opportunities all over the country. In addition, the borrower's evaluation is systemically conducted on-site by a loan officer. Ultimately, 50.41% of the loans are extended to borrowers living in remote rural areas. To get a sense of the excess operating costs attributable to the search for and assessment of social projects, we compare the 80% operating ratio of *La Nef* to that of comparable French banks over the same period.²⁷ We use data from *La Nef*'s annual reports and estimate SC_t as the share of overhead expenses for screening operations dedicated to the social screening in year t .

Table 7: Yearly Net Benefits of Reciprocity (NBR)

	2001	2002	2003	2004	Average
ΔCD_t (€)	59,688.58	90,056.45	141,367.68	186,395.90	119,377.15
ΔI_t (€)	15,442.89	28,486.43	56,658.87	65,538.41	41,531.65
SC_t (€)	53,492.74	88,818.14	131,973.85	132,664.05	101,737.19
NBR_t (€) = $\Delta CD_t - \Delta I_t - SC_t$	- 9,247.06	- 27,248.12	- 47,265.04	- 11,806.55	- 23,891.69
NOI_t (€)	51,017.00	208,814.00	235,800.00	199,151.00	173,695.50
NBR_t / NOI_t (%)	- 18.13	- 13.05	- 20.04	- 5.93	- 14.29

ΔCD_t is the year- t reduction in the cost of default driven by the virtuous repayment conduct of motivated borrowers. ΔI_t is the year- t reduction in cashed-in interests stemming from social premiums offered to motivated borrowers. SC_t represents the year- t screening costs associated with assessing the applicants' social ratings. NBR_t is the net benefit of reciprocity in year t . NOI_t indicates the yearly net operating incomes of *La Nef*.

Table 7 summarizes the results. Noticeably, all the estimated values of NBR_t are negative, in line with the evidence that investing in social banks entails financial sacrifices

²⁷ For French banks, Gouteroux (2006) and Ory *et al.* (2006) obtain operating ratios of between 62.5% and 68.5%. In this respect, *La Nef* undoubtedly represents an outlier.

(Becchetti and Garcia, 2011; San-Jose *et al.*, 2011). With reference with our theoretical model in Section 2, the figures reveal that the costs associated with social screening (SC_t) are high.

Table 7 also indicates the yearly net operating incomes of *La Nef*, NOI_t and the values of NBR_t scaled by NOI_t . The figures reveal that the bank's social orientation has a significant cost amounting an average 14.29% of net operating income. However, this cost is not steady over time.

We run sensitivity analyses with regard to two key parameters. First, we allow the discount rate—set at 6% in our estimations—to take a wide range of values. Our computations (not reported here) show that NBR_t is quite insensitive to a variation in the discount rate. For instance, with discount rates of 2% and 10%, the average NBR would represent 12.17% and 16.7% of the average NOI , respectively. Second, we investigate the impact of the share of overheads attributed to social screening. This share, estimated at 31.84% in Appendix B, is used to build a proxy for SC_t . Actually, the analysis reveals that SC_t —and hence NBR_t —is sensitive the share of overheads attributed to social screening. More precisely, reciprocity is costly (i.e. the average value of NBR is positive) as soon as the share lies above 24.36%. Determining whether this threshold is realistic remains an open question.

More generally, our model shows that social banks have spillover effects on the whole economy since reciprocity permits the financing of low-risk, efficient projects. However, this positive impact has not been accounted for in the cost-benefit analysis, which is restricted to the bank's perspective.

7. Robustness Checks

This section proposes robustness checks on the reciprocity effect detected in Tables 5 and 6. We run new regressions controlling for four groups of dummy variables neglected so far. We

include each set of variables separately to avoid potential multicollinearity. Additional checks are offered in Appendix C.

The results are summarized in Table 8. In columns (1) and (2), we add year dummies to account for two effects. First, incomplete—and subsequently excluded—files are proportionately more frequent during the first year of observation (i.e. 2001). Second, the global economic climate might have influenced both the bank's lending strategy and the creditworthiness of its borrowers. Allowing for year effects is a way to correct for biases potentially introduced by these two facts.

Table 8: Robustness Checks: Additional Dummies

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS RATE	Probit ^a DEFAULT	OLS RATE	Probit ^a DEFAULT	OLS RATE	Probit ^a DEFAULT	OLS RATE	Probit ^a DEFAULT
SR	-0.09*** (0.031)	-0.09*** (0.030)	-0.11*** (0.034)	-0.10*** (0.030)	-0.14*** (0.032)	-0.09*** (0.031)	-0.13*** (0.032)	-0.08*** (0.031)
FIN	-0.16*** (0.045)	-0.12*** (0.047)	-0.15*** (0.048)	-0.10*** (0.047)	-0.16*** (0.046)	-0.13*** (0.048)	-0.16*** (0.046)	-0.13*** (0.048)
PIBOR3M	0.43*** (0.089)		0.58*** (0.034)		0.60*** (0.029)		0.60*** (0.029)	
STARTUP	-0.01 (0.048)	0.12*** (0.047)	-0.01 (0.051)	0.10*** (0.056)	0.03 (0.050)	0.12*** (0.049)	0.02 (0.050)	0.08*** (0.061)
RELATIONSHIP	-0.03 (0.062)	-0.10 (0.055)	-0.04 (0.066)	-0.09 (0.056)	0.06 (0.065)	-0.08 (0.060)	0.05 (0.065)	-0.08 (0.060)
RATE		-0.01 (0.05)		-0.00 (0.05)		-0.01 (0.03)		-0.02 (0.03)
LOANSIZE	-0.02*** (0.005)	0.00 (0.004)	-0.02*** (0.005)	0.00 (0.004)	-0.02*** (0.005)	0.00 (0.005)	-0.02*** (0.005)	0.00 (0.005)
NONCOLLAT	-0.14 (0.140)	-0.03 (0.154)	-0.16 (0.151)	-0.08 (0.161)	-0.33** (0.155)	-0.01 (0.173)	-0.33** (0.157)	-0.02 (0.174)
CONSTANT	5.47*** (0.205)		4.90*** (0.212)		5.00*** (0.153)		4.95*** (0.154)	
Year dummies	Yes	Yes	No	No	No	No	No	No
Credit officer dummies	No	No	Yes	Yes	No	No	No	No
Bank branch dummies	No	No	No	No	Yes	Yes	No	No
Geo. dispersion dummies	No	No	No	No	No	No	Yes	Yes
Observations	389	389	389	389	367	367	367	367
R-squared	0.63	.	0.59	.	0.62	.	0.62	.
Log (L)	.	-189.46	.	-181.73	.	-180.35	.	-181.11

^a: The column reports marginal effects at the mean.

*: significant at the 10% level, **: significant at the 5% level, ***: significant at the 1% level.

In columns (3) and (4), we control for credit officers, since their role is crucial in the measurement of SR. In columns (5) and (6), we control for bank branches to reflect the diversity of the French regions. Moreover, the distance between the branches and *La Nef*'s headquarters varies. Distance could indeed matter in communicating soft information to the credit committee (Liberti and Mian, 2009).²⁸ In Columns (7) and (8), we take into account the borrower's location (town, rural area or suburb). Location is a natural proxy for competition intensity. Banking competition is likely less fierce in remote rural areas or in suburbs than in cities endowed with abundant financial services. Overall, Table 8 shows that the previous results resist the inclusion of all the dummies. Moreover, the influence of the refinancing rate (PIBOR3M) is not eliminated by the presence of these variables. This can be seen as confirmation that the bank smoothes interest rates in response to time variations in market rates.

On the whole, the robustness checks confirm our previous findings on the impacts of social rating on both credit conditions and probability of default, respectively. Motivated firms benefit from advantageous interest rates and loan sizes from the social bank, and subsequently reimburse their loans more responsibly than regular firms, all else being equal.

8. Conclusion

Social banks are committed to paying attention to non-financial outcomes of their investments. Their mission differs significantly from that of typical capitalistic banks. That they are able to accomplish this mission is due to the specific orientation of their stakeholders.

²⁸ Even though *La Nef* has several branches, it has a single nationwide credit committee. This committee is composed of two persons: a headquarters-based manager and the loan officer. Importantly, branch-based loan officers take active part in the committee's decision making. They can communicate all the relevant soft information either by being on-site or by phone. Since the headquarters are located in the South-East branch, loan officers from that branch perhaps influence the credit conditions more than their colleagues from other branches.

As savers, cooperative members, or shareholders, social investors accept lower-than-market financial returns provided their money is channeled into social projects. However, this foundational principle imposes no clear-cut investment rules on the managers of social banks. As a consequence, it is worth studying how these institutions grant credit in practice.

Based on a representative European case study, this paper examines how a social bank passes its investors' financial sacrifices through to socially minded borrowers. Our empirical analysis delivers two key messages. First, we show that the sacrifices made by social investors result in rebates on the interest rates charged to borrowers aiming to fund profitable social projects. Well-run motivated firms are eventually able to decrease their cost of capital by borrowing from a social bank. Surprisingly, the growing literature on socially responsible investment is silent on this finding. Second, we document the existence of a reciprocity effect from motivated borrowers. While theoretical and experimental evidence has previously raised that possibility, this paper is the first—to our knowledge—to exhibit a real-life situation involving reciprocity in the banking industry. This innovative result offers promising grounds for further investigation of the features that enhance repayment performances. Relationship lending has long been recognized as a way to overcome moral hazard. But relationships take time to build, and evidently do not apply to start-ups, which are in dire need of funding opportunities. While reciprocity applies only to a specific segment of the banking industry, where investors and borrowers share common values, it may prove to be more efficient in practice.

Additionally, we show that the social bank is more concerned with increasing the probability of success of viable social projects rather than targeting projects otherwise redlined by commercial banks. Offering cheap credit to such projects likely entails lower financial sacrifices—in terms of both risk and expected returns—than funding below-break-even social projects. This strategy should imply that investing in social banks is safer but less

profitable than in mainstream banks. Our results show that, despite the existence of reciprocity, social concern is costly to the bank studied in this paper. Further work could be done to assess the impact of social goals on risk-taking attitudes.

By voluntarily restricting its activity to basic financial intermediation, social banking offers an attractive alternative to the “big bank” model undermined by the recent crisis. Is this a new model applicable to the industry as a whole or is it limited to double-bottom-line institutions? This is debatable. Indeed, social banks currently account for a limited segment of the banking industry, and their action affects the economy only marginally. Moreover, as observed in the microfinance industry, growth is sometimes associated with mission drift (Armendariz and Szafarz, 2011).

It may also be wondered whether the development of social banking would crowd out standard borrowers from the credit market. In a hypothetical world where a significant portion of banks value social performances and total credit is rationed, the share of credit left to non-social projects would shrink. However, this scenario is unrealistic in a profit-driven capitalistic economy. Moreover, social and non-social firms naturally belong to different economic sectors. Therefore, social banking hardly distorts competition mechanisms.

The findings of this paper bring important but preliminary insights into the fast-growing industry of social banking. Working with a single institution inevitably restricts the external validity of our conclusions. While *La Nef's* operating method is fairly representative of European social banks, further work is needed to assess the degree of generalization of our results. Features such as country of origin, legal status, size, age, and governance design might matter.

Admittedly, like most studies concerned with explaining credit terms, our analysis is not immune from selection biases. First, we observe actual loans only and have no information on

denied applications. Second, the social nature of the bank could drive a self-selection bias stemming from the applicants' perception of the bank's objectives. Third, in a dynamic perspective, firms with poor social and economic performances are likely washed out. Therefore, the reciprocity effect we detect could be partly attributable to a survival bias. While our theoretical model helps in addressing these arguments, further empirical work is still needed to disentangle the reciprocity effect from the reputation effect associated with relationship lending.

Technically, building a social rating raises specific issues. In the bank under scrutiny in this paper, the social rating is meant to measure idiosyncratic characteristics, such as the borrower's moral rectitude and social motivation, the ethicality of the core business, the corporate responsibility to stakeholders, environmental and social concerns, etc. The computation of this social rating does not abide by strict rules, and is therefore difficult to assess through a standardized procedure. It relies heavily on soft information, mainly collected by loan officers whose objectivity may be questioned (Agier and Szafarz, 2013b).²⁹ This new type of agency problem may compromise the fulfillment of the bank's social mission.

On the whole, this paper contributes to the understanding of the way social banks operate in the credit market, a topic largely overlooked in the literature so far. In particular, it shows that the loans granted by social banks share characteristics both with commercial loans from mainstream banks and with subsidized credit from public institutions. This new and promising model of banking activity undoubtedly calls for further investigation.

²⁹ In other social banks, the social assessment is carried out according to distinct procedures. For example, in *Banca Etica* (Italy), a thorough social audit is conducted by the so-called "social auditors or experts", who are cooperative members trained by the bank.

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APPENDIX A: *La Nef's* Organizational Characteristics

Table A1: Geographic Breakdown of the Loans Granted by *La Nef* (2001-2004)

Bank Branch	Metropolitan regions	Loans
SOUTH EAST	Provence-Alpes-Côte d'Azur	53
	Rhône-Alpes	38
	Bourgogne	6
	Alsace	0
	Corse	0
	Franche-Comté	5
	Auvergne	8
	Languedoc	9
	Total	119
PARIS, NORTH WEST	Basse-Normandie	43
	Bretagne	28
	Centre	7
	Champagne	2
	Haute-Normandie	7
	Ile-de-France	86
	Lorraine	5
	Nord	2
	Pays-de-la-Loire	15
	Picardie	3
	Total	198
SOUTH WEST	Aquitaine	6
	Midi-Pyrénées	27
	Limousin	7
	Poitou-Charente	10
	Total	50
Grand total		367

Note: Over the study period, the regional remit of some branches has changed. When this is the case, we have favored the branch in charge of the region for the longest period.

Appendix B: Technicalities in the Cost-Benefit Analysis of Reciprocity

Here we report the detailed computation of three components of NBR in Eq. (3).

1) Computation of ΔCD_t

La Nef is committed to report loan-disaggregated LLPs to the French banking authority on a quarterly basis. We managed to gain access to the report released in the first quarter of 2007 (this also gives the level of provisioning for the last quarter of 2006), while our sample period ends in November 2008. As a result, we have detailed information on LLPs for 65 loans out of the 91 defaulted loans in our sample (i.e. 71.4%). We have estimated the missing LLPs by multiplying the respective loan sizes by the average provisioning rate computed from the observable LLPs. This average rate is 27.54%.³⁰ One could object that LLPs are adjusted over time in reaction to changes in default expectations. In practice, however, the adjustments prove to be limited. Between the last quarter of 2006 and the first quarter of 2007, the average LLP adjustment was 2.58% only. Therefore, we consider that the missing one-year adjustment does not affect ΔDC much. Last, we discounted all the LLPs according to the year of default.

To measure how reciprocity reduces the cost of default, we run a Tobit regression (see Table B1). The explained variable is the present value of LLPs for defaulted loans, and 0 otherwise. The explanatory variable of interest is SR. We also include control variables accounting for contractual features, financial risk characteristics, and relational aspects. The marginal effects reported in Column (2) indicate that the present value of LLP decreases by €1,047.72 per unit of SR. In this way, we obtain the differential LLPs driven by each actual loan with $SR = 2$ or 3. Summing up, we obtain an estimate of the total benefit attributable to the reduction in yearly default occurrences.

³⁰ The provisioning rate of a loan in default is equal to $LLP / \text{loan size}$.

Table B1: Tobit Regression for LLP (discount rate = 6%)

VARIABLES	(1) LLP	(2) Marg. Effects
SR	-4,855.54** (2,033.055)	-1,047.17** (432.960)
FIN	-8,717.91*** (3,216.189)	-1,880.14*** (680.200)
STARTUP	8,953.55*** (3,225.034)	1,928.87*** (696.110)
RELATIONSHIP	-4,881.30 (4,806.737)	-1,004.81 (939.300)
RATE	597.75 (3,475.278)	128.91 (749.520)
LOAN SIZE	0.08** (0.035)	0.01** (0.007)
NONCOLLAT	7,589.73 (9,958.397)	1,636.83 (2,147.300)
CONSTANT	-5,041.89 (26,374.540)	
Year dummies	Yes	Yes
Observations	389	389
Log (L)	-1,112.27	.

2) Computation of ΔI_t

We compute the differential in cashed-in interests as follows. For each loan in our sample, we compare two situations: The actual one and its “SRI = 1” simulated counterpart. The aim is to compute the discounted cashed-in interests for the two situations, and then take the difference between them. To simplify the computations, we work out annual installment (constant annuities) even though borrowers repay in monthly installments.

Table B2 depicts an example. The 5-year loan amounts €50,000. The actual interest charged by the bank on this loan is 5% and the actual social rating is 3. From Table 5, we find that the simulated counterpart of the loan bears interest at 5.30%. Table 5 extracts the annual interest paid on both loans (5% and 5.30%). Annual differences are then computed and discounted at a 6% rate. The final result is the sum of these figures, i.e. €418.05. Similar calculations are conducted for all the loans in our sample.

Table B2: Difference in Cashed-in Interests: An Example (loan size = € 50,000; SR = 3)

	Year					
	1	2	3	4	5	
Actual interests paid (r = 5%)	2,500.00	2,047.56	1,572.50	1,073.69	549.94	
Simulated interests if SR = 1 (r = 5.30%)	2,650.00	2,173.28	1,671.30	1,142.71	586.10	
Difference in cashed-in interests	150.00	125.72	98.80	69.02	36.16	Total
Discounted difference in cashed-in interests	141.51	111.89	82.95	54.67	27.02	418.05

3) Computation of SC_t

Loan officers represent the main cost drivers of screening costs. To evaluate the proportion of the extra cost dedicated to social screening, we gauge the productivity of *La Nef's* loan officers compared with that of loan officers in non-social banks dealing with the same type of borrowers (i.e. small-and-medium-sized enterprises, henceforth SMEs). The productivity of a loan officer is proxied by the number of loans she grants annually. Informal contacts with *La Nef's* managers have revealed that, according to their standard, a full-time loan officer grants 25 loans annually. In comparable non-social banks, we have estimated this load to be 36.67.³¹ We therefore attribute 31.84% of the workload of loan officers in *La Nef* to social screening.

We use the conservative assumption that the screening operation overheads (SCO) are fully captured by the operational costs associated with loan officers, including wages. To determine those costs, we proceed as follows (see Table B3). First, we extract from *La Nef's*

³¹ To obtain this figure, we have combined two sources of information. First, Robert de Massy and Lhomme (2008), mention that on average 15.97% of total staff in French banks are devoted to the screening of SME loan applicants. Second, from annual reports (2010 annual report of *Banque Populaire de l'Ouest*, 2010 annual report of *Crédit Agricole Ille-et-Vilaine*, and 2011 annual report of *Crédit Mutuel Arkéa*) of regional branches of the three major French cooperative banks dealing with SMEs we estimate their numbers of SME loans per officer: 41.09, 35.25 and 33.68 for *Banque Populaire de l'Ouest*, *Crédit Agricole Ille-et-Vilaine*, and *Crédit Mutuel Arkéa*, respectively. Averaging these figures yields 36.67 loans granted per officer per year. This computation is somewhat heroic since the activity sector, the type of clientele, and the lending technology should be held constant.

annual reports the yearly overhead expenses incurred by all the bank’s operations, the yearly full staff sizes, and the yearly numbers of active loan officers (*La Nef*, 2001, 2002, 2003, and 2004). Second, we compute the year-*t* average cost per staff member by dividing the overhead expenses in year *t* by the number of full-time staff members active during year *t*. Third, we derive the year-*t* SCO by multiplying the number of full-time loan officers active in year *t* by the year-*t* average cost per staff member. The SCOs include both financial and social screening costs but exclude those associated with back-office personnel. Last, to estimate SC_t , we multiply the year-*t* SCO by the 31.84% factor representing the excess workload of loan officers due to social screening.

Table B3: Computation of SC_t

Year	2001	2002	2003	2004
Average cost per staff member	68,041.96	75,066.67	79,937.50	81,128.21
Full-time loan officers	2.47	3.72	5.19	5.14
Screening operation overheads (SCO)	168,004.83	278,951.44	414,490.74	416,658.44
$SC = 31.84\% * SCO$	53,492.74	88,181.14	131,973.85	132,664.05

Appendix C: Additional Robustness Checks

We propose four additional robustness checks. First, Table C1 gives the results from the multivariate estimation of specification (2) in Table 5. It is based on reduced-form estimation. In this way, we assess the impacts of loan characteristics on credit conditions, while avoiding potential endogeneity biases.

Table C1: Robustness Check: Multivariate Regression for the Credit Conditions

VARIABLES	(1) RATE	(2) LOANSIZE	(3) NONCOLLAT
SR	-0.15*** (0.032)	0.90*** (0.325)	0.01 (0.011)
FIN	-0.15*** (0.048)	-0.03 (0.483)	-0.02 (0.017)
PIBOR3M	0.61*** (0.029)	-0.83*** (0.295)	-0.04*** (0.010)
STARTUP	0.03 (0.050)	-2.13*** (0.500)	0.03* (0.017)
RELATIONSHIP	-0.02 (0.066)	-0.72 (0.661)	0.04* (0.023)
CONSTANT	4.84*** (0.148)	6.17*** (1.489)	0.25*** (0.051)
Observations	389	389	389
R-squared	0.57	0.10	0.06

*: significant at the 10% level, **: significant at the 5% level, ***: significant at the 1% level.

Overall, the figures in the first column of Table C1 confirm those in Table 5 regarding the impact of the social rating on interest rates. R-squares indicate that the adjustment is poor for the other credit conditions. This can be attributed to two factors. First, loan size alone is a loose indicator of credit rationing. Its determination is most likely influenced by the requested amount, which is unobservable. Second, collateralization for start-ups is highly dependent on public guarantees, which are also unobservable. Both limitations might create missing-variable distortions in the estimations of loan size and collateralization. Nevertheless, reduced-form estimation has the merit of freeing the interest rate loadings from these distortions.

Table C2: Robustness Check: Pure Social Ratings

	(1)	(2)	(3)
VARIABLES	Ordered Probit ^a SR	OLS RATE	Probit ^a DEFAULT
Pure SR		-0.13*** (0.032)	-0.09*** (0.029)
FIN	0.10 (0.122)	-0.16*** (0.047)	-0.13*** (0.046)
PIBOR3M		0.59*** (0.030)	
STARTUP	-0.45*** (0.123)	0.03 (0.050)	0.16*** (0.046)
RELATIONSHIP	0.19 (0.167)	-0.04 (0.065)	-0.10* (0.05)
RATE			-0.02 (0.034)
LOANSIZE		-0.02*** (0.005)	0.00 (0.005)
NONCOLLAT		-0.15 (0.146)	-0.01 (0.154)
CONSTANT		4.70*** (0.136)	
Cut 1	-0.89*** (0.257)		
Cut 2	0.38 (0.254)		
Observations	389	389	389
R-squared		0.57	
Log (L)			-194.14

^a: The column reports marginal effects at the mean.

*: significant at the 10% level, **: significant at the 5% level, ***: significant at the 1% level.

Second, in Table C2 we use two-step estimations to clean the social rating of its interactions with other loan characteristics. An ordered probit regression model extracts the residuals of SR when regressed on FIN, STARTUP, and RELATIONSHIP. These residuals constitute “pure” social ratings (PSR). Column (1) in Table C2 shows that only the start-up dummy is significant in the first-path regression. Then, the multivariate estimation of credit conditions (columns (2) in Table C2) is performed by substituting PSR for SR. The empirical results prove to be robust to this change. The negative impact of PSR on the probability of

default (column (3) in Table C2) is the same as that of SR in Table 6. We thus exclude any spurious effect due to accidental correlations between the social rating and other loan characteristics. Table C2 not only confirms our previous results, it also emphasizes that they are driven by purely social motives.

Table C3: Robustness Check: Additional Explanatory Variables

VARIABLES	(1)	(2)	(3)	(4)
	OLS RATE	Probit ^a DEFAULT	OLS RATE	Probit ^a DEFAULT
SR	-0.16*** (0.045)	-0.08** (0.043)	-0.13*** (0.031)	-0.08** (0.030)
FIN	-0.16*** (0.047)	-0.12*** (0.046)	-0.16*** (0.047)	-0.12*** (0.048)
PIBOR3M	0.59*** (0.030)		0.59*** (0.028)	
STARTUP	-0.01 (0.050)	0.13*** (0.047)	0.06 (0.055)	0.02 (0.055)
RELATIONSHIP	-0.02 (0.065)	-0.10 (0.056)	0.03 (0.064)	-0.07 (0.061)
RATE100		-0.02 (0.034)		-0.00 (0.036)
LOANSIZE	-0.04* (0.019)	0.00 (0.017)	-0.02* (0.018)	0.00 (0.005)
NONCOLLAT	-0.14 (0.147)	-0.015 (0.155)	-0.34 (0.154)	-0.06 (0.155)
SR*LOANSIZE	0.01 (0.008)	-0.00 (0.007)		
PUBLIC COLLAT			-0.08 (0.05)	0.21*** (0.055)
CONSTANT	5.06*** (0.174)		5.06*** (0.174)	
Observations	389	389	367	367
R-squared	0.59		0.61	

^a: The column reports marginal effects at the mean.

*: significant at the 10% level, **: significant at the 5% level, ***: significant at the 1% level.

Third, we run instrumental-variable estimation to account for the possibility of SR being endogenous. The results (not reported here) show that the Durbin-Wu-Hausman test fails to reject the null hypothesis that SR is exogenous ($p = 0.6584$).³²

³² We used the following instrumental variables: ENVIRONMENT (dummy variable taking value 1 if the borrowing firm works in the environmental sector, and zero otherwise), RURAL (dummy variable taking value 1

Fourth, Table C3 proposes two specifications including additional explanatory variables. Columns (1) and (2) in Table C3 examine whether the impact of the social ratings is partly attributable to loan size. The descriptive statistics in Section 3 pointed out that borrowers with higher social ratings tend to receive larger loans. In fact, we checked the potential effect of loan size in two ways. First, we estimated the two equations (for rate and default) on a censored sample obtained by excluding the largest loans. Several cut-off points were used (results not reported). All of them produced results consistent with those from our baseline regressions. Second, we added the interaction between loan size and social rating among the explanatory variables. Table C3 reveals that the loadings of this interaction term in our two regressions of interest are insignificant. Loan size does not interfere with the reciprocity effect.

As explained in Section 3, some loans, especially those made to start-ups, benefit from public collateral. The subsequent incentive may affect the bank's lending behavior. We investigate this possibility in Columns (3) and (4) in Table C3 by including the dummy variable PUBLIC COLLAT (equal to 1 if the loan benefits from public collateral, and 0 otherwise). The regression results show that public collateral has a significantly negative impact on the probability of default. Meanwhile, the STARTUP dummy loses significance, which might indicate the presence of multicollinearity between STARTUP and PUBLIC COLLAT. In any case, the impacts of our variables of interest, SR and FIN, remain consistent with those obtained from our baseline regressions.

if the borrowing firm is located in a rural area, and zero otherwise), NONPROF (dummy variable taking value 1 if the borrowing firm is a not-for-profit organization, and zero otherwise), UNLIMITED (dummy variable taking value 1 if the borrowing firm is an unlimited company, and zero otherwise), CONSORTIUM (dummy variable taking value 1 if the borrowing firm belongs to a consortium, and zero otherwise), and the duplicates (STARTUP and RELATIONSHIP).