



# The supply- and demand-side impacts of credit market information

Alain de Janvry <sup>a</sup>, Craig McIntosh <sup>b</sup>, Elisabeth Sadoulet <sup>a,\*</sup>

<sup>a</sup> University of California, Berkeley, United States

<sup>b</sup> University of California, San Diego, United States

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## ABSTRACT

We utilize a unique pair of experiments to isolate the ways in which reductions in asymmetric information alter credit market outcomes. A Guatemalan microfinance lender gradually started using a credit bureau across its branches without letting borrowers know about it. One year later, we ran a large randomized credit information course that described the existence and workings of the bureau to the clients of this lender. This pairing of natural and randomized experiments allows us to separately identify how new information enters on the supply and the demand sides of the market. Our results indicate that the credit bureau generated large efficiency gains for the lender, and that these gains were augmented when borrowers understood the rules of the game. The credit bureau rewarded good borrowers but penalized weaker ones, increasing economic differentiation.

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## 1. Introduction

Asymmetric information problems bedevil credit transactions, and these problems are particularly severe in poverty-focused credit markets where borrowers lack collateral and credit histories. A broad range of social capital-based lending mechanisms have emerged in recent years to overcome these problems, helping more than a hundred million previously unbanked borrowers enter credit markets over the past decade. Ironically, this surge in lending is increasingly undermining the very mechanisms that made such lending possible, as competing lenders reduce each others' ability to contract without formal collateral. In this environment, credit bureaus can become an attractive means for reducing asymmetric information.

We use a unique confluence of data and identification methods to analyze how lending outcomes have responded to the introduction of a credit bureau in Guatemala's microfinance market. In August of 2001 a major microfinance lender began to install hardware permitting branches to communicate information with the bureau, a process that was completed in ten waves over the course of 18 months. The lender did not inform borrowers of the use of the bureau, however, and we found knowledge of it to be almost non-existent in a survey of borrowers implemented after the rollout of the bureau was complete.

We therefore conducted a randomized training campaign in which we informed 5000 borrowers of the use of the system, how the bureau worked, and the opportunities and risks that it presented for them. We then used institutional data from the lender and from the bureau itself to track how a variety of lending outcomes emerged from this unusual structure in which asymmetric information was reduced on the two sides of the market at two different points in time. We are thus able to disentangle the supply- and demand-side impacts of credit market information.

A new experimental literature has sprung up in recent years working to separate the effects on credit markets of moral hazard and adverse selection as they operate through the price mechanism. Karlan and Zinman (2010) use a two-stage experiment in which borrowers are first offered randomized interest rates in order to measure adverse selection effects, and then among those who come for loans the rate is further randomized downward by surprise in order to isolate moral hazard. This provides an experimental decomposition of the impact of interest rates on hidden information and hidden actions, a relationship originally posited by Stiglitz and Weiss (1981). What we offer here, however, is the estimation of a more primal relationship, because we are able to see how asymmetric information alters outcomes in credit markets *directly*, rather than via the indirect mechanism of interest rates. That is to say, rather than holding the overall amount of asymmetric information constant and using prices to alter who ends up on the credit market, bureaus offer lenders a vehicle through which they can improve selection and alter

\* Corresponding author.

E-mail addresses: [alain@berkeley.edu](mailto:alain@berkeley.edu) (A. de Janvry), [ctmcintosh@ucsd.edu](mailto:ctmcintosh@ucsd.edu) (C. McIntosh), [esadoulet@berkeley.edu](mailto:esadoulet@berkeley.edu) (E. Sadoulet).

behavior based on a first-order reduction in the quantity of asymmetric information in the marketplace.<sup>1</sup>

Before the existence of the bureau, borrowers were supposed to disclose information about past defaults and current debts on their loan screening forms. The improved screening ability generated by use of the bureau results in large increases in profitability for the lender, indicating that there was strategic behavior by potential clients over past loan information and that it was indeed creating a substantial adverse selection problem for the lender. The specific sequence through which the bureau was rolled out for use by the lender and information about the bureau randomly provided to borrowers allows us to identify separately the roles of adverse selection, moral hazard, and incentives on group composition. This two-fold experiment – natural and randomized – allows to perform this identification that is, to our knowledge, new to the literature.

To formalize these tests, we first develop a simple theoretical model of the lender's credit scoring problem, and use it to understand the effects of the new information revealed in the bureau. We capture in the model an unusual feature of microfinance credit bureaus, which is that they report on the behavior of *groups* rather than *individuals* when loans are made to jointly liable borrowers. Because the lender can observe and correlate demographic characteristics and outcomes from its own clientele in a scoring model, the *new* information revealed by the bureau is orthogonal to what could previously be predicted. Despite this, we show that the probability of the lender selecting a borrower in (out) as a result of the bureau is increasing (decreasing) in the pre-bureau score, and that the variance of the prediction error on the client quality is an increasing function of the size of the group in which a borrower takes loans. We then specify how borrowers respond to the bureau both through a reduction in moral hazard and through altering the process by which they screen new members in joint liability groups.

We find impacts of informational changes on both sides of the market. In terms of adverse selection, the ejection rate rises by 15% when the lender first uses the bureau, but this impact on the size of the loan portfolio is more than compensated for by new loans made to borrowers to whom the institution had never previously lent. Borrowers selected using the credit bureau are better clients, with better repayment performance and higher growth of future loans. Ongoing clients who are not ejected are able to take larger loans but their performance exhibits a small deterioration. The selection process benefits more women than men. In terms of moral hazard, the repayment performance shows a modest and temporary improvement when borrowers become aware of the bureau. Groups then also exhibit an adverse selection effect, ejecting some worse-performing members, and unexpectedly it is now women who lose access to credit more than men. We use data from the bureau itself to demonstrate that the training induces a 10% jump in the probability that a client will take a loan from an outside lender, and we see sharp differences across borrower types in the ability to handle this surge in total debt. Overall, the bureau permits a substantial expansion of credit among lenders in the system while simultaneously driving down delinquency.

## 2. Reducing asymmetric information

Credit bureaus are a formalized approach to information sharing among lenders. In the absence of such an institution, lenders of non-collateralized loans must resort to an array of informal mechanisms ranging from joint liability (Besley and Coate, 1995; Ghatak and Guinnane, 1999; Gine and Karlan 2006), to relationship banking, and to information sharing in the 'credit officer lunch' (McIntosh et al,

2006). Within social networks, North (1990) and Grief (1994) show that the transfer of reputation and multilateral punishment can enable a 'localized honesty equilibrium' in spite of the individual pursuit of self-interest. The broadening of this equilibrium to a 'generalized honesty equilibrium' supporting anonymous exchange in very large groups requires the emergence of institutional innovations to formalize the transfer of reputation and the sharing of information (Platteau, 2000). Microfinance markets provide a particularly interesting environment in which to study the impact of this formalization, both because of the rapid creation of bureaus in recent years and because microfinance provides a continuous range of contracts across which informal and formalized tools are interchanged (Navajas et al., 2003; Morduch, 1999; Morduch and Armendariz de Aghion, 2005).

The decision to form a bureau is one fraught with strategic risks for lenders (Padilla and Pagano, 1997). Lenders are of course happy to see the data of others, and in general do not have problems sharing 'negative' information (on default), but sharing their own 'positive' information (on current lending) creates the possibility that their competitors will try to cherry-pick their own best clients (Gehrig and Stenbacka, 2007). Set against this peril are expected benefits from a decrease in portfolio risk (Campion and Valenzuela, 2001; Jappelli and Pagano, 1999), restraining multiple contracting by borrowers (McIntosh et al, 2006), and the preservation of reputation effects through the formation of long-term credit histories (Vercammen, 1995; Padilla and Pagano, 2000)<sup>2</sup>.

Concern over a rising level of default in the Guatemalan market led the country's three major microfinance lenders (Genesis, BanCafé, and Banrural) to agree to the formation of a bureau (called Crediref) in 2001.<sup>3</sup> Strategic fears about the use of the bureau were alleviated through several simple mechanisms. First, only institutions that share information into Crediref are allowed to consult it. Secondly, the system does not allow users to identify the lender who issued the loan, respecting lender information privacy. The bureau has attracted smaller lenders with the passage of time, and now contains data from 14 different institutions.

Our setting does not allow us to observe directly the quantity of asymmetric information in the marketplace. Genesis is a well-respected lender that used the typical labor-intensive practices for screening loans prior to the creation of the bureau, including detailed application forms and visits to the enterprise and home of the applicant. The bureau includes the majority, but not all of, the major microfinance lenders and contains no information on informal loans, utilities payments, or commercial banking activity. Therefore substantial information existed in the market prior to the use of the bureau, and even subsequent to its advent asymmetric information persisted. Nonetheless, we are able to conclusively detect the implications of improved information in this marketplace. When the lender begins using the bureau, average loan sizes increase and the overall lending portfolio increases without an increase in default (interest rates, typical of the microfinance sector, remain fixed over the short run). This pattern, in the absence of any real awareness of the existence of the bureau among clients, indicates decreased adverse selection. When we train borrowers mid-loan on the existence of the bureau, we see a modest repayment improvement within a given client base on loans administered prior to the training. This is evidence of pure moral hazard in the marketplace. Finally, the pattern of turnover in groups changes after the training, indicating that a form of adverse selection exists in the group selection process as

<sup>1</sup> In this sense our asymmetric information problem is more similar to Navajas et al. (2003), who consider a lender choosing between a costly but effective screening technology and joint liability screening.

<sup>2</sup> Note that both of these papers discuss the possibility that sharing *too much* information (too long a history in Vercammen (1995) and information over types in Padilla and Pagano (2000)) can create a disincentive to effort.

<sup>3</sup> BanCafé and Banrural are both national full-service banks which only share microlending information in Crediref, and not information from their commercial banking divisions.

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