

Access to Finance: Ideas and Evidence

Credit Market Innovations

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Credit market innovations

Theorists and practitioners often assume that problems, such as information asymmetries and difficulties enforcing legal contracts, undermine credit markets in developing countries. Yet in practice, deep methodological challenges have frustrated social scientists attempting to study the existence, extent, and nature of such problems. This is not to say there is evidence *against* the existence of market failures. But the mere fact that a micro-entrepreneur does not use credit is not sufficient cause to argue that a credit market failure exists. Several steps must be shown empirically in order to identify a market failure, form well-reasoned policy prescriptions, and finally to assess the welfare implications of resolving the market failure.

The simplest evidence of a credit market failure comes from evaluation of interventions which show increased use of credit after some shift in supply. This has been shown both for microenterprises (Banerjee et al., 2009 in India, and Karlan and Zinman, 2009a in the Philippines), consumers (Karlan and Zinman, 2009b in South Africa) and small and medium enterprises (Banerjee and Duflo, 2008 in India). Had these studies showed instead a substitution from one source of credit (presumably more expensive on some margin) to another, the evidence of credit constraints *per se* would not have been as clear.

However, noting the mere presence of credit constraints is not sufficient for policy. The following section attempts to illuminate four essential questions regarding a presumed credit market failure: (1) What is the exact nature of the presumed market failure? (2) Is there a particular policy prescription that would mitigate a particular type of information asymmetry? (3) Does this particular policy solve, or diminish, the market failure? And (4) does it lead to a welfare improvement?

The previous section addressed the question of whether or not the lack of credit we observe in developing countries is economically efficient. Specifically we explored whether entrepreneurs are borrowing less than optimally because of a lack of profitable opportunities or whether, instead, there are other constraints at play which limit demand for credit. We presented evidence from experiments in developing country settings to suggest that returns to capital are in fact often high on average, but that heterogeneity in returns, due to different levels of social connections and human capital, may lead to low demand by some for entrepreneurial credit. An important area for further research is to understand the nature of heterogeneity in returns and the relevance of such heterogeneity for assessing the extent of market failure.

The interaction between informal and formal markets will recur as a theme in the discussion below. Merely observing a formal market failure need not lead to inefficiency if the informal market is complete. Examining the mechanics of the informal market is crucial for two reasons. First, the strength of the informal market is important for measuring and predicting how effective specific formal sector interventions will be. Second, lessons learned in the informal markets can help shape policy in the formal markets. Group lending, for example, is based largely on lessons learned from observing risk-sharing and credit and savings associations in informal markets.

A second important theme is the application of the theoretical literature on information asymmetries to consumption loan markets. While theories on information asymmetries are often

applied to discussions of entrepreneurial credit markets, the same theories are relevant to consumer credit as well for several reasons. As a start, the line between entrepreneurial “investment” and consumption “smoothing” is rarely evident for small, closely held businesses. Money is fungible. Empirical evidence from Johnston and Morduch (2008, Table 6) shows how even entrepreneurs report using loan proceeds to pay for consumption. In data from Indonesia, clients of BRI reported that about half of their loans were being used for non-entrepreneurial activities. More generally, asymmetric information problems as applied to risky “projects” have natural and close analogs for consumption loan borrowers. Just as entrepreneurs may respond to interest rates according to unobservable fixed characteristics of the return structure of their “project”, so too may the elasticity of demand depend on unobservable fixed personality traits (e.g., trustworthiness) or behaviors (e.g., the probability of incurring bad shocks). These unobservables may have significant impact on the likelihood of repayment. Similarly, if entrepreneurs unobservably change effort levels or repayment choices in response to interest rates, individuals may change their effort in activities such as maintaining wage employment or securing alternative sources of cash in the event of a bad shock. And, of course, individuals may also default strategically.

1 Nature of frictions and policy examples

Understanding how and why markets fail to provide credit access for the poor is critical to designing and replicating innovations that improve access. For example, if the problem is adverse selection, then policies that help reveal hidden information should help lenders screen and tie prices appropriately to risks. Such policies can be at the product or process level within the firm, or at the regulatory level, with credit bureaus. For example, Ghosh and Ray (2001) and Drugov and Macchiavello (2008) show theoretically how small, initial “tester” loans can provide information to lenders useful for assessing risk on subsequent, larger loans. Karlan et al. (2008) show in a field experiment how social networks can be used to generate referrals of “good” clients, improving loan repayment.

Identifying the specific nature of a market failure is difficult, however. Take, as an example, information asymmetries generated through the interest rates on credit. Even if a lender were to randomize its interest rates across borrowers, merely observing that high rates lead to higher default does not disentangle selection from moral hazard and income effects. In a study of consumer loans in South Africa, individuals were marketed a randomly assigned interest rate and then, following the loan take-up decision, the lender randomly assigned a contract interest rate (lower than the initially offered rate), and a dynamic incentive (Karlan and Zinman, 2009b). This double-tiered randomization (before and after selection into credit) provided for a separation of adverse selection from moral hazard,² and perhaps most importantly, provided a roadmap for using experimentation to test theories in which selection is useful to separate from ex-post incentives. Karlan and Zinman found weak evidence for adverse selection, only

² “Adverse selection” in this context also includes “lower anticipated effort” which may be generated through the same pooling process that traditional adverse selection on risk-type generates. Such an “anticipated effort” effect requires moral hazard to be possible, since if effort is perfectly observable this effect would not occur. However, hidden information must also be present for this mechanism to be relevant, since otherwise firms would price according to anticipated effort by the borrower.

statistically significant for females, and stronger evidence for moral hazard, in particular the dynamic incentive (lower interest rate on future loans).

In some cases, the hidden information is not hidden *per se*, but rather just not used. Interventions that work with lenders to improve their data processing can also improve efficiency. This has been shown in both insurance markets (Finkelstein and Poterba, 2002) and credit markets (Karlán and Zinman, 2009b). Credit bureaus also provide institutional and market level mechanisms for revealing hidden information. Theoretically, it is also the case that introduction of credit bureaus can mitigate moral hazard, as the consequences of default increase if lenders share information with each other (de Janvry et al., 2008). On the other hand, public credit bureaus can have adverse effects, leading to coordination failures (Hertzberg et al., 2008). We will discuss these more below.

If the problem is moral hazard, on the other hand, solutions may differ. Again, one could categorize solutions at the business or product level, and separately at the institutional or market level. At the firm level, policies include contracts with dynamic incentives, tighter enforcement, or even business or financial training to improve the outcomes of the micro-enterprises or cash management of the borrowers. Note that *ex-ante* moral hazard, i.e., choice in effort, is often construed as an analytically derived, forward-thinking “decision” by the agent. A set of behavioral stories also fit into the *ex-ante* moral hazard category, albeit without a “conscious” decision to shirk. For example, someone who succumbs to temptation (hyperbolic, quasi-hyperbolic) and thus finds herself without sufficient cash to repay a loan would fall under *ex-ante* moral hazard. Thus interventions aimed at addressing cash management of borrowers should be categorized as interventions to address *ex-ante* moral hazard. At the institutional level, interventions include improving legal institutions for enforcement as well as improving internal banking information and payment systems so that banks can engage in enforcement activities more efficiently.

We now review the three main categories of market failures. We note however that although the theory as currently written clearly separates these mechanisms, in practice markets may, and likely do, contain elements of all three. For example, high interest rates may attract individuals who intend to exert less effort (as compared to the traditional adverse selection story that high interest rates attract individuals with risky projects). We will discuss such interactions below in more detail.

Adverse and advantageous selection

Lenders set interest rates to maximize returns and may charge higher rates to riskier borrowers to compensate for higher anticipated default. Stiglitz and Weiss (1981) demonstrates that under imperfect information (in particular about borrowers’ production functions) higher interest rates can lead to adverse selection, as only borrowers with riskier projects (and higher returns in a positive state) will be willing to pay such prices. Moreover, by lowering returns in all states, higher interest rates can induce all borrowers to undertake riskier activities.

Advantageous selection is also a possibility, and if such models accurately describe credit markets, would lead to very different policy implications. de Meza and Webb (1987, 1989)

discuss the mechanics of such a model, and the difference between their prediction and that of Stiglitz and Weiss (1981). The key difference lies in the assumption about the relationship between risk and return. The de Meza and Webb papers assume that entrepreneurs with higher intrinsic quality have higher returns that first-order stochastically dominate lower-quality entrepreneurs. This leads to the opposite result of adverse selection: as a bank raises its interest rate, the marginal client that drops out is a low-quality client.

Boucher and Carter (2005, 2008) develop a model demonstrating that imperfect information can lead to a form of rationing of credit in which would-be borrowers are deterred based on the terms of the contract, rather than price. Under this model of “risk rationing,” by raising collateral requirements lenders shift so much contractual risk to borrowers that even borrowers with the collateral required to qualify for a loan choose not to borrow under these terms for fear of losing vital collateral. Note that “risk” to the borrower is both about explicit risks such as loss of collateral, whether physical or social, but also is about “ambiguity,” where “ambiguity” describes the borrower’s fear of dealing with formal institutions with which borrowers have little experience. Ambiguity here may also describe the fear of being stigmatized by formal institutions for being poor. Breaking through these barriers may require significant bravery on the part of borrowers. This model assumes that the risk-averse clients, the ones who refuse to borrow at offered terms because they fear the mental anguish of default or the risks of unknown or ambiguous legal and social consequences, are also the low risk clients in terms of the projects they pursue. As a result, high-return entrepreneurship is limited, particularly among the less wealthy, and welfare is reduced, as risk-averse agents choose safer but lower-paid employment or lower-return entrepreneurial activities.

Ex-ante moral hazard (effort)

A second source of friction in credit markets is ex-ante moral hazard, or effort. This can take on many forms. By lowering the net profits for a given business, higher interest rates, combined with limited liability, reduce the incentive to invest extra effort in production. Reduced effort diminishes returns to borrowers even when projects are successful and also increases the probability of failed projects and, by reducing the probability of sufficient returns, increases the likelihood of default.

Note that increased default at higher rates is not necessarily due to traditional entrepreneurial shirking or to adverse selection as discussed above. While the lender sees only whether or not the loan is repaid, there may be more nuanced explanations for defaulters’ lack of sufficient cash flow to make payments. In household finance, higher interest rates may affect borrowers’ effort to retain or obtain employment, to tap alternative sources of cash (e.g., borrow from a family member) in the event of a bad shock, or to manage consumption in order to retain sufficient funds for loan repayment. These examples do not relate to a firm’s production function, but the same logic applies: at higher interest rates, consumers may exert lesser effort to make sure they have the cash available to repay the loan.

The above examples all pertain to *conscious* shirking. However, other mechanisms may be at play, which exhibit the same reduced form prediction: insufficient cash is available at the time of repayment, and the lack of cash is a result of decisions of the borrower. For instance, temptation

models predict that, under uncertainty, some types of consumers will consume more in the future than they consider optimal at the time of their decision to borrow. Thus they will have less money available to repay the loan.

Lack of entrepreneurial skills is another source of information asymmetry. If entrepreneurial skills are fixed but unobservable characteristics, one could argue this is also appropriately labeled adverse selection since the lender cannot tell ex-ante which individuals will likely put in effective effort. The problem is that the lender here cannot enforce “effort” (e.g., being creative, being assertive), similarly to the discussion above regarding Karlan and Zinman (2009b) with respect to interest rates and information asymmetries.

One way to generate insight into whether entrepreneurial skills are fixed is to try to teach these skills. Karlan and Valdivia (2009) conducted a field experiment in which microcredit borrowers were randomly selected to receive free business training on topics including cash management, business selection, and marketing. Results were mixed. Treated individuals earned greater profits in their businesses, and in particular greater profits in bad months, although this result was not robust to alternative econometric specifications. Along with marginally improved repayment, client retention increased significantly, suggesting the clients placed great value on the training they received. These institutional benefits led training to be profitable for the microfinance institution, even with no cost-sharing on the part of clients.

Ex-post moral hazard (voluntary default)

Voluntary default is distinct from ex-ante moral hazard because here the borrower has the ability to repay and chooses not to do so. Thus the problem lies strictly with enforcement of repayment. In the simplest construction, with respect to interest rates, borrowers are more likely to default voluntarily at higher rates than at lower rates since the cost of repaying rises, but the benefits of repaying remain the same. Much of the rhetoric around lending to the poor, including Yunus’s strategy with respect to the Grameen Bank, assumes that voluntary default is extremely rare and that entrepreneurial individuals will repay as long as they can.

Demonstration of the presence or absence of ex-post moral hazard requires identifying situations in which, despite the availability of cash, individuals default on loans by choice. Provided good survey measures, observational data on borrowers should allow us to identify whether default occurs even among clients who have the funds to repay. One could also identify ex-post moral hazard indirectly, by showing that “trustworthy” individuals are more likely to repay loans. In Karlan (2005), individual borrowers from FINCA, a Peruvian micro-lending program, played a “trust” game and completed the General Social Survey, which contains questions about trust, fairness and helping others. Both the survey and the “trust” game were intended to measure individuals’ trustworthiness. The “trust” game was conducted with two players and an administrator. First, each player received three Peruvian soles coins. Player A is then instructed pass to Player B any or all of her three coins, which the administrator then doubles. Player B then chooses how much money to return to Player A in response (the administrator does not double the return). Individuals who return more when playing as Player B than when playing as Player A are considered trustworthy. Repayment records from the entrepreneurs’ microfinance association show that individuals who show trustworthiness in this game exhibit lower default,

lower drop-out, and higher savings balances. The survey yielded similar results, showing that individuals who respond more positively to General Social Survey questions about trust, fairness and helping others, are more likely to repay their loans one year later.

Drawing such inferences about personality types can lead to a gray area between moral hazard and adverse selection that the theoretical literature has yet to delineate. In the classic case of adverse selection individuals with riskier production functions are more likely to borrow at higher rates, and less likely to repay. The effort borrowers invest in ensuring the success of their projects might normally be associated with moral hazard, but if higher interest rates attract borrowers who are inherently apt to expend less effort in their businesses the issue is really selection. Moral hazard is here interlinked with adverse selection.

2 Interventions and mechanisms

Group lending in theory

Group lending is perhaps the first and most oft-discussed “solution” to information asymmetries in developing countries. Adverse selection and moral hazard are dealt with by effectively shifting the responsibility of screening, monitoring, and enforcement from the lender to clients. Group liability requires that if one group member defaults, her fellow group members will be responsible for her payment. Under group liability schemes then, clients have an incentive to screen other clients so that only trustworthy individuals are allowed into the program. Ghatak (1999) describes how group lending can, in theory, mitigate adverse selection through group formation. Potential clients, selecting fellow borrowers with whom they will be jointly liable for loans, will exploit information known to borrowers but not to banks to screen out bad credit risks. Groups segregate according to riskiness, with riskier borrowers joining with other risky borrowers. Thus, the cross-subsidization of risky customers by safer customers that is presumed to be inherent in individual liability schemes is mitigated. Group lending also addresses moral hazard by providing incentives for clients to employ peer pressure to ensure that funds are invested properly and effort exerted until the loans are repaid in full. By lowering default, the expected total cost of borrowing for borrowers can be reduced, improving welfare especially for households without collateral. Still, because clients face the potential of default from fellow group members, group liability could also be seen as a tax, effectively increasing the net interest rate on safer borrowers (Stiglitz, 1990).

Just as social networks can facilitate informal insurance mechanisms between households, borrowers, who often know each other, can serve as mutual insurance pools for fellow borrowers, covering loan payments when a fellow group member is unable to. Moreover, their familiarity should allow for mutual monitoring to avoid making payouts due to moral hazard. If social networks are important in fostering repayment under group liability we should see higher repayment where borrowers are more connected to each other. Wydick (1999) provided early evidence of this in Guatemala, testing the effect of three different types of social cohesion: peer monitoring, social ties, and borrowing group pressure. Wydick finds monitoring to be the most important of the different forms of cohesion, with little effect from social ties. Ahlin and Townsend (2007), with data from Thailand, find social ties (measured by sharing among non-

relatives, cooperation, clustering of relatives, and village-run savings and loan institutions) actually *reduce* repayment rates, though stronger social sanctions improve them.

The conclusions one can safely draw from these findings are limited however; because borrowers self-select into groups group formation is determined by factors endogenous to the forces of liability scheme itself. If, for instance, borrowers with successful enterprises have greater social networks there may be a correlation between social ties and repayment that has nothing to do with group monitoring, enforcement, or cohesion, but rather is due to success in entrepreneurship. Karlan (2007) uses quasi-random variation in the group-formation process at a Peruvian microfinance institution to show that groups with greater levels of social connection (ethnic ties and geographic proximity) have lower default and higher savings rates. Greater knowledge of default status among fellow borrowers, and deterioration of relationships after default, suggests both monitoring and enforcement play a role.

The structure of group-liability contracts produces an ambiguous effect on risk-taking in entrepreneurial investments, and thus on returns (Fischer, 2008). The insurance aspect of joint liability creates an incentive to take risks by lowering the cost of default, while the monitoring and enforcement (group pressure) aspects increase the cost of default. To generate empirical data on the balance of the effect, Fischer ran a series of investment games in which microfinance clients in India “borrowed” and “invested” according to different types of contracts where players could share risk by making income transfers to their partners. Returns were randomized and payouts from the contracts were in real money of up to a typical week’s income. Each treatment was conducted under both complete information, where all actions and outcomes were observable, and limited information, where players observed only whether their partners earned sufficient income to repay their loans.

Several key implications of joint liability emerged from the results. First, joint liability produced free-riding: risk-tolerant individuals (as measured in a separate risk game) made significantly riskier investments under limited information, without compensating their partners for the insurance they provided. However, under complete information joint liability did not encourage greater risk-taking. Peer monitoring via approval over partners’ investment decisions mitigated *ex ante* moral hazard by discouraging risky investment choices.

Fischer’s results are broadly consistent with those in Giné et al. (2009), generated from games conducted with entrepreneurs in Lima, Peru. Here, too, joint liability encourages free riding, but the mutual insurance it provides prevents default from increasing. Moral hazard is reduced by allowing clients to form their own two-person groups, but interestingly there is no apparent pattern of matching between risk-averse partners. Instead the effect seems to be one of fairness: though safe-risky investment pairings are viable over the long term, and generate higher returns, both partners opt to either both choose risky investments or both choose safe investments. This leads to suboptimal risk-taking overall. The policy conclusions from these findings depend on the returns to real-world investment choices, but the assumption that riskier projects would be rewarded seems reasonable.

Conning (2005) develops a model to compare outcomes under both individual and joint liability and finds no clear winner: each is optimal under different circumstances, depending on the type

of borrower. Interestingly his conclusions do not rely on an information advantage of borrowers over bank delegates. The microfinance industry collects a great deal of information on the financial performance of its institutions, and this data is helpfully broken down by institution type, including lending methodology. Drawing useful inferences from the cross-sectional data about which specific interventions, like group lending, mitigate information asymmetries can be difficult because of the difference in target markets served by each lender type. Individual loans, for instance, are most often offered to borrowers at the upper tier of the microfinance market. These borrowers are likely to have levels of assets (including working capital, human capital, and collateral) and production functions distinct from the type of entrepreneurs typically served by group-lending institutions. Interest rates, too, are correlated with poverty levels: the fixed costs of processing loans imply that interest rates will be higher on smaller loans.

Cull et al. (2007) use a dataset comprising 124 microfinance institutions across 49 countries to analyze MFI performance and outreach. They find patterns in the data in line with the theoretical literature on adverse selection and moral hazard, but only for certain types of institutions. Specifically, lenders making individual loans show higher portfolio-at-risk (PAR) as interest rates increase, and after a certain point (60 percent annualized percentage rate) profits fall off. Reduced demand at higher rates likely contributes to this effect. This trend does not hold however for group lenders, suggesting that they are better able to mitigate problems stemming from information asymmetries.

Group lending and related mechanisms in practice

While lenders have been attracted to the intuitive appeal of relying on borrowers to monitor themselves, through group enforcement, recent successes of several MFIs offering collateral-free individual-liability loans to poor borrowers have caught the attention of the microfinance industry. While individual-liability schemes cannot overcome the problem of information asymmetries between client and lender, the methodology does avoid other problems typical of group lending, such as strategic default among group members. Nevertheless, the strong financial performance of a few lenders is not sufficient evidence to advocate the end of group lending. The low default rates among existing individual-liability borrowers may be indicative of superior management skills among these few programs, heroic (or coercive) efforts by field staff to ensure repayment, a culture of repayment in these regions (notably Bangladesh), or credit constraints among clients (who want to maintain access to future loans).

Armendáriz and Morduch (2000) report on microfinance institutions in Eastern Europe and Asia that use a combination of mechanisms, such as rebates, larger loan sizes, and faster loan approval for safe clients, making individual lending possible and profitable. Whether the bank employs incentives or sanctions, in theory the bank will extract payoffs up to the borrower's opportunity cost of not repaying. The size of the opportunity cost will depend on borrowers' outside options for credit. It can therefore be difficult to predict borrower behavior under different contracts. In two experiments with a microlender in the Philippines, Giné and Karlan (2009) first randomly assign groups of joint liability clients to either remain under joint liability or to have their loans converted to individual liability, and second randomized before the initial creation of lending groups whether they would be group or individual liability lending groups. All other aspects of

the loan contract—interest rate, payments, and term—remained the same. For the first experiment, follow-up of the study participants after three years revealed that converting from group to individual liability had no adverse affect on default rates, despite the fact that the conversion reduced peer monitoring of loans (note that group meetings remained intact, just the group liability was removed). Furthermore, results showed greater client retention among individual-liability borrowers, making the switch appear profitable for the bank and appealing to clients. The second experiment then also allowed for selection effects from the group liability, by pre-announcing before the creation of groups whether or not the village was eligible for group or individual liability loans (again, keeping group meetings intact, and just varying the liability rules). Similar to the first experiment, repayment rates remained high, near 100%. However the credit officers in this second were less likely to enter certain villages and create groups, thus indicating fear of default from the bankers' perspective. This could either be because credit officers know the relative risks, or due to the lack of learning by the credit officers that the group liability is in fact not a necessary component to generate high repayment.

Repayment schedules

Rutherford (2000) argues that “financial services for poor people are largely a matter of mechanisms that allow them to convert a series of savings into usefully large lump sums.” The difference between credit and savings is simply whether the lump sum is taken at the beginning or the end of the cycle. The deposits are small, of necessity, while the lump sums are used for all sorts of expenditures: life-cycle events (births, school fees, home-building, deaths), emergencies, and investments. By way of describing several types of financial institutions for the poor, from a homegrown “merry-go-round” savings scheme to an NGO-created MFI, Rutherford maps out the relationship between the complexity of the institution and the flexibility of the products they offer. The more formal the institution the more likely it is to be able to turn savings into a lump sum at a time that is convenient for clients. With simple savings clubs members must wait for their turn at the lump sum handed out each week, and often the club must be reformed at the end of every cycle. But there can be tradeoffs on the other end too; the local moneylenders and deposit collectors of the informal market provide services with convenience, a measure on which formal sector services have fallen short.

Seen in this way, credit can be a useful mechanism to help people *save* toward the purchase of an asset. Microfinance programs emphasize small, frequent, regular payments, and create incentives for clients to make those payments. For those who have trouble making regular savings deposits, borrowing can be a way to commit to making those payments (albeit at greater total cost to the borrower). But are bank contracts sufficient, or do these savers need the social pressure of group loans to continue the payments? Basu (2008) develops a model showing hyperbolic discounters, who place a greater value on present consumption than future consumption (and therefore find it harder to set aside savings) will prefer to remain in ROSCAs even when there are no sanctions for absconding with their loans—because it is preferable to have the commitment device of the ROSCA over the long run than free money today. Following a similar logic, Bauer, Chytilova, and Morduch (2008) use data from south India to show that hyperbolic discounters borrow more and save less than others, conditional on household characteristics, and that they are especially likely to borrow from microcredit programs which offer helpful structure and social support.

Rutherford emphasizes flexibility in addition to stability and security as important factors in clients' take-up decisions, but it is unclear which institution types are best in this regard. While some MFIs offer a range of loan, savings, and insurance products, others offer only one: for example, a four- or twelve-month enterprise loan with a weekly payment schedule that may not match the cash flow of the poor. It is striking how many MFIs require loan repayments beginning only two weeks after disbursement—and how few microfinance account officers believe their clients' investments will start to pay off by that time (Armendáriz and Morduch, 2000). Moreover, there is a substantial transaction cost to conducting these meetings, for both the clients and the MFI. However, many MFI managers consider weekly payments essential for several reasons: 1) the smaller repayment amounts are easier for clients to manage; 2) it creates a culture or discipline of repayment for those not used to formal payment deadlines; and 3) the regular meetings prevent attention problems (e.g. forgetting when the repayment meeting is supposed to take place). In a theoretical paper, Jain and Mansuri (2003) give another possible reason: that the frequent repayment schedules force borrowers to turn in part to the informal sector, which is beneficial if the banks can then piggy-back on monitoring by moneylenders.

Empirically, the question of what is the optimal repayment frequency for borrower and lender remains unanswered. Field and Pande (2008) conducted a simple field experiment in India in which they randomly assigned new borrowers either to traditional weekly payments or to monthly payments. They find no difference in repayment, although the results are preliminary (after one year), pertain to small-sized loans only, and hold for new borrowers, not long-term borrowers. McIntosh (2008) extends the Field and Pande result with a study of a Ugandan MFI in which the bank offered its village banks a choice between weekly or bi-weekly repayment. The choice had to be made by unanimous vote of each village bank's members. A simple comparison of the repayment performance of weekly to bi-weekly banks would be laden with two sources of bias: geographic selection by the MFI, and self-selection by the clients. McIntosh constructs a comparison group by asking clients in ineligible regions to decide whether they would want to switch from bi-weekly repayment, had it been offered to them. By making two comparisons: groups that switch to bi-weekly payments vs. ineligible groups, and would-be switchers vs. those who would not choose to switch McIntosh is able to eliminate some of the bias in the estimate. He finds no drop in repayment (actually a slight improvement) and a large increase in client retention (dropout is reduced by 40%).

Credit scoring and credit bureaus

Adverse selection problems can be mitigated by lenders through better screening processes, a process which lenders have been continually refining. Credit scoring has become more sophisticated over time, but most developing countries still lack credit bureaus (and in many cases, unique identification numbers for citizens). It is often difficult to evaluate implementations of national programs but de Janvry, McIntosh and Sadoulet (2008) exploit a natural experiment in which a large MFI in Guatemala installed a new credit reporting hardware in waves, allowing the researchers to compare early adopting branches to late adopters. Findings from the study show that with the new technology the lender screens out substantially more applicants, but also makes more new loans. New borrowers have higher repayment and take larger loans. In related research the same authors worked with an MFI to randomly assign some

clients to receive training on the importance of credit bureaus to borrowers' credit opportunities. The clients were informed both that late payment with one lender will harm their access to credit at other lenders and that paying on time gives them greater access to credit at potentially lower rates. The authors find that the training led to higher repayment rates by their clients, but also led their clients to borrow elsewhere after establishing a good credit record.

While credit bureaus can clearly play a valuable role in leveling information asymmetries, they nevertheless are only capable of providing data. Lenders must still interpret the data and decide whether to approve loans, and at what terms. Working with a consumer-credit lender in South Africa, Karlan and Zinman (2009b, 2009a) show that there is room for improvement in the screening process. By extending loans to randomly selected applicants who would have been rejected under the bank's own scoring system they show an increase in outreach and profit for the lender, despite the fact that the broader client base carries with it higher default. By comparing welfare of these randomly approved marginal clients to a control group of identically marginal applicants who remain denied, the researchers find that the loans are significantly welfare enhancing for borrower households.

Dynamic incentives

Dynamic incentives have also been credited with helping to solve moral hazard problems. Theoretical work beginning with Bolton and Scharfstein (1990) has shown the conditions under which dynamic incentives, for example the threat of termination of credit, can generate sufficient incentives for the borrower to repay loans. Whereas this work established a clear theoretical understanding of the potential role for dynamic incentives, in practice specific methods of implementing dynamic incentives may or may not work, and evidence is needed to understand how this theory can be employed to improve product design. For example, progressive lending, in which initial loan sizes are capped low and progressively larger loans are only available after successful repayment, has become the norm for many microfinance lenders.

Clear evidence on dynamic incentive components of the contract structure are more difficult to show, as most lenders only vary contract terms endogenously, for selected clients. In one study in South Africa, discussed above as well, Karlan and Zinman (2009b) worked with a lender who randomly offered some clients a dynamic incentive, a discount on future loans assuming successful repayment of their current loans. This offer led to a 10% reduction in default (from a base default rate of 15%), and the responsiveness was proportional to the size of the incentive. This simple experiment naturally opens the door to further questions, such as whether the framing of the incentive matters (e.g. loss versus gain framing), and whether a dynamic incentive can continue to work over the long term or will instead collapse over time, either due to capacity constraints of the lender or to changes in responsiveness to incentives over time by the borrowers.

Controlled laboratory experiments can shed insight into questions that may be difficult to answer through a natural field experiment (for a taxonomy of field experiment methodologies, see Harrison and List, 2004). Lenders are often resistant to making the changes to operations required of a field experiment. Few lenders will, for example, agree to a field experiment in which further loans are made after default, or the reverse, to pledging not to lend any more even

to good borrowers. For such tests, we turn to controlled laboratory experiments. Several papers have examined the power of dynamic incentives, on topics far afield from microfinance. Relevant papers include Charness and Genicot (2007), and, as described above, on microfinance by Giné et al. (2009) and Fischer (2008). In each of these papers, the dynamic incentive led to the largest effects on reducing moral hazard problems.

As a general point, dynamic incentives on lending contracts are not much different than conditional transfer programs. Like conditional transfer programs, dynamic incentives provide a future incentive (e.g. larger or cheaper loans rather than cash) in exchange for a change in behavior now (e.g. lower moral hazard rather than higher school attendance). The interesting questions here are not whether people respond to incentives, but rather how to structure the incentives to be socially optimal, how to frame the incentives so as to maximize their immediate and long-term effectiveness, and how to structure and time the incentives so as to maximize social welfare. On the last point, an excellent example comes from Colombia where the government tested the importance of timing in a conditional cash transfer program by randomly assigning some individuals to receive their conditional cash transfers at the time school fees were due rather than before. This is a classic example of Thaler and Sunstein (2006, 2008) employed in developing countries and provides a clear example of how the structure (in this case, the timing) of the incentive, not just the incentive itself, can affect social outcomes.

3 Impacts from solving credit market failures

For a poverty intervention as widespread as microfinance, with an estimated 154 million clients worldwide (Daley-Harris, 2009) and over five billion dollars invested each year (Forster and Reillie, 2008), there is surprisingly little rigorous evidence of the impact of microfinance on household welfare. In part this is due to the difficulties of measuring impact. There ample is reason to think that selection bias may be especially problematic with non-experimental evaluations of microfinance programs. Microfinance clients are likely to possess a special determination and ability to improve their welfare and therefore comparing their outcomes to the outcomes of non-clients (presumably without this drive) will overstate the impact of microfinance. Unfortunately, personal characteristics like “entrepreneurial ability” or “drive” are either difficult to measure or unobservable.

A related challenge is bias from program placement, in which outcomes in program villages are compared to outcomes in non-program villages. The problem with this method is that programs choose where they operate for a reason. They may target the poorest villages, for instance, or they may start cautiously with better-off clients before expanding their outreach. The bias from non-random program placement, therefore, can go either way, depending on whether the evaluation compares program villages to non-program villages that may be (even unobservably) better or worse off.

It will not be clear how serious a problem these omitted variables are until rigorous impact assessments of credit are completed, side-by-side with alternative assessments, and the results can be compared. As a first step Coleman (1999) shows how important selection bias can be in a study of microfinance borrowers in northern Thailand. By forming a group of prospective microfinance clients who signed up a year in advance to participate with two village banks,

Coleman was able to create a comparison group mostly free of selection bias, as both the borrowers and the non-borrowers had selected into the program at the same point in time. Coleman then generates two estimates of the impact of the program: an unbiased estimate using the clients who signed up in advance as the comparison group; and a “naïve” estimate using a group of seemingly similar non-participants (as in typical non-rigorous evaluations). Comparing his unbiased impact estimate to the estimate he would have calculated had he naïvely compared program participants to a group of non-participants Coleman finds the “naïve” estimate substantially overstated the gains from participation on several outcomes (especially women’s landholding) because participants turned out to be initially wealthier than non-participants.

In an ambitious early attempt to solve these identification problems, Pitt and Khandker (1998) surveyed 1,798 member and non-member households of three Bangladeshi MFIs (Grameen Bank, BRAC, and RD-12), and exploit eligibility criteria (landholding totaling less than one-half acre) to obtain measures of impact of credit. While there should be no discontinuity in income between people who own just over or just under a half acre of land, participation in the MFIs would be discontinuous because those who were above the cutoff would be rejected from the programs. They find huge impacts: every 100 taka lent to a female borrower increased household consumption by 18 taka. However, in a re-analysis of the data Morduch (1998) challenges the econometric models and identification assumptions in Pitt and Khandker (1998). Using a difference-in-difference model, he finds little evidence for increased consumption but does find reduction in the variance in consumption across seasons. He argues that in the cross-sectional set-up, non-random program placement is only addressed through restrictive assumptions and that reliable inferences require additional data.

Khandker (2005) refined the earlier model with the benefit of panel data, finding lower impact estimates but greater total impact (from current and past borrowing in the survey rounds conducted in 1991-2 and 1998-9) and substantially lower marginal impact from new borrowing. Poorer clients are found to have larger impacts than the less-poor, and money lent to men is not shown to have any impact at all.

Roodman and Morduch (2009) attempt to find closure to the issue by returning to the data and rebuilding the analysis from scratch. They are unable to replicate results from Pitt and Khandker (1998) or Khandker (2005). In fact, their estimates carry the opposite sign. Rather than concluding that microcredit harms borrowers, however, they unearth a raft of identification issues which are not solved with panel data. Their revised analysis casts doubt on *all* of the findings from the related set of papers, including Morduch (1998)’s finding on consumption smoothing.

Karlan and Zinman (2008) conducted a randomized controlled trial to measure the welfare effects on borrowers at the same time that they worked with the South African consumer-credit lender to deepen outreach. They find the loans are substantially welfare enhancing for the borrowers, who are 11% points more likely to remain employed, are less likely to encounter periods of hunger or to score as poor, and had higher income and improved credit reports. It should be noted this is the impact on a particular set of borrowers: those who would have been rejected under the lender’s standard approval requirements.

Burgess and Pande (2005) use the introduction and eventual repeal of an Indian social banking law to evaluate the impact of access to finance on the rural poor. Between 1977 and 1990 Indian banks wishing to open new branches in locations already served by any commercial bank were required to open four new branches in un-served locations. Since the policy required banks to focus on locations with the lowest level of financial access the authors use the pre-1977 levels of financial intermediation as an instrument for the states that will be most affected by the policy. They find a one percentage point increase in the share of credit disbursed by rural branches reduces rural poverty by 1.5 percentage points while a one percentage point increase in the share of savings held by rural banks reduces poverty by 2.2 percentage points. The opening of one bank branch per 100,000 people in a rural unbanked location reduces rural poverty by 4.7 percent. As optimistic as these results are, the authors caution that default rates during the expansion period were in the 40 percent range, leading to the abandonment of the program. As always, appropriate mechanisms must be designed for credit to be sustainable. The authors' caution also creates uncertainty about whether the results are due to access to finance *per se* or from the fact that a large share of customers received money as loans but never repaid them (creating implicit cash transfers).

Several randomized studies are being conducted on both individual lending as well as randomized program placement designs, similar to the Progresa evaluation in Mexico. These differ from the above mentioned South Africa experiment in that they are traditional "microfinance" credit programs that target entrepreneurs (rather than customers looking for consumer loans). Results from the first two trials, from urban India and the Philippines, challenge popularly held assumptions about the use of credit. Other studies underway in rural India, Morocco, rural Peru, urban and rural Mexico, and China will help paint a more complete picture whether or not microfinance is welfare improving, by what measures, for whom and under what conditions.

Karlan and Zinman (2009a) uses a credit-scoring methodology to evaluate the impact of loans to microentrepreneurs in urban Philippines. The methodology used is similar to Karlan and Zinman (2008), above, but there the focus was on loans made to employees. Here the effects are much more muted, and some findings cast doubt on the traditional microfinance narrative. Business owners' profits increase, but not through investment in productive assets or working capital. Moreover, the treatment effects are stronger for groups that are not typically targeted by microlenders: male and higher-income entrepreneurs. There is evidence that treated businesses actually shrink in size and scope, including the shedding of paid employees. The results suggest that borrowers used credit to re-optimize business investment in a way that produced smaller, lower-cost, and more profitable businesses. The question remains as to how credit enabled this change: why did business owners need to borrow to reduce staff? One potential explanation is household risk management: treated individuals substitute out of formal insurance products, while also reporting a greater ability to borrow from friends or family in an emergency. It is possible that before credit entrepreneurs were retaining unproductive employees as a kind of informal mutual benefit scheme. Those employees, even if unprofitable, were an additional place to turn in times of need.

In urban India, Banerjee et al. (2009) evaluate the impact of a non-profit group-lending microfinance program in the slums of Hyderabad. The researchers randomly assigned 120 slums

to either treatment or control. After 15-18 months the households from the treatment slums were compared to the households in the control slums. The results show impacts on a number of dimensions, though not, critically, on average consumption. The treatment slums have greater investment in business durables, increases in the number of businesses started, and in the profitability of existing businesses. Among households that did not have existing businesses at the start of the program, those with high propensity to become entrepreneurs see a decrease in consumption,³ while those with low propensity to become entrepreneurs increase consumption. Likely this difference is explained by investment in durable goods among those likely to become business owners. While the short-term impacts are clear, this result makes it difficult to anticipate the long-term impacts. As the authors speculate, these investments may pay off in future consumption in the coming years. The increase in consumption among non-business owners has an even more ambiguous future: if these households used credit to temporarily increase consumption they will have to reduce future consumption to pay down debts. Alternatively, if they used the credit to pay down high-cost moneylender debt, then their current consumption should remain high.

³ Characteristics with explanatory power are: whether the wife of the household head is literate, whether the wife of the household head works for a wage, the number of “prime-aged” (18-45) women in the household, and the amount of land owned by the household.

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