Debt Structure, Entrepreneurship, and Risk: Evidence from Microfinance *

Erica Field†, Rohini Pande‡, John Papp§and Natalia Rigol¶

September 8, 2011

Abstract

This paper examines whether and how the repayment structure of a debt contract influences entrepreneurship. Using a field experiment, we contrast the classic microfinance contract which requires that repayment begin immediately after loan disbursement with a contract that includes a two-month grace-period. The shift to a grace-period contract increased short-run business investments and long-run profits. Alongside, the variance of profits and default rates increase. These findings suggest that liquidity constraints imposed by debt structure inhibit investment in high-return but illiquid investment opportunities. Debt contracts that require early repayment discourage risky investments but limit the potential impact of microfinance on microenterprise growth and household poverty.

*We thank Emmerich Davies, Sitaram Mukherjee and Anup Roy for superb field work, the Village Financial Services (formerly known as Village Welfare Society) and Center for MicroFinance for hosting this study and Yeunbee Jeanette Park for exceptional research assistance. Theresa Chen, Annie Duflo, Nachiket Mor and Justin Oliver for enabling this work. We thank ICICI Foundation, Exxon-Mobil and IGC for funding. We thank Abhijit Banerjee, Tim Besley, Dominic Leggett and seminar participants for comments.

†Duke University, field.erica@gmail.com

‡Harvard University, rohini_pande@harvard.edu

§Princeton University, jpapp@princeton.edu

¶MIT, nrigol@gmail.com

1 Introduction

Financiers across the world structure debt contracts to limit the risk of entrepreneurial lending. Arguably, this risk is particularly high for loans not secured by collateral, such as microfinance loans to poor borrowers (Daley-Harris, 2006). Early initiation of repayment is widely considered a key element for reducing the risk of lending to the poor and thereby enabling the rapid expansion of microfinance institutions (MFIs) over the past two decades.[1] Yet, despite this apparent success, there is growing evidence that microfinance loans have had limited impact on average microenterprise growth and poverty (Banerjee et al., 2009; Karlan and Zinman, 2011; Kaboski and Townsend, 2011). This is particularly surprising given substantial evidence that credit constraints inhibit small business expansion (Evans and Jovanovic, 1989; Banerjee and Duflo, 2005) and that returns to capital in this sector are high (de Mel et al., 2008).

This paper examines whether the immediate repayment obligations of the classic microfinance contract inhibit entrepreneurship, and therefore the potential impact of microfinance, by making high-return investments too risky for poor borrowers. To do so, we conducted a field experiment with poor urban borrowers in India that evaluates the short- and long-run impacts of relaxing the liquidity demands imposed by the classic "Grameen Bank" contract early in the loan cycle. We randomly assigned loan groups of five clients to one of two debt contracts: Clients assigned to the control group received the regular contract that required them to initiate repayment two weeks after receiving their loan, as is standard practice in microfinance. Meanwhile, clients assigned to the treatment group received a two-month grace-period before repayment began. All debt contracts were individual liability contracts, and once repayment began, all clients repaid at an identical frequency.

Survey data on loan use and long-run business profit showed that the introduction of a grace period into the debt contract led to a significant change in business activity and household well-being: Micro-enterprise investment was approximately 6.0% higher

[1] In 2008, MFIs had an estimated 130-190 million borrowers worldwide and outstanding microfinance loans exceeded $43 billion (Gonzalez, 2010).

and the likelihood of starting a new business more than twice as high among clients who received the grace-period contract relative to those on the regular contract. Furthermore, nearly three years after receiving the loan, weekly business profits and monthly household income for grace-period clients were, on average, 33% and 18% higher. While large, a simple accounting exercise verifies that these differences are consistent with reasonable assumptions regarding the initial difference in investment behavior followed by compounding of these returns over the next three years.

At the same time, relative to clients on the regular contract, grace-period clients were more than three times as likely to default on their loan. These clients also reported more risk-taking in business practices: Grace-period clients were more likely to extend credit to customers through loans and pre-orders and offered a significantly wider array of goods and services, suggesting a willingness to reduce their access to liquid funds and experiment with product and client diversification. Correspondingly, the variability of profits after three years was 130% higher for grace-period clients.

These large effects of debt structure on investment behavior cannot be reconciled with perfect credit markets. Rather, they suggest an environment in which clients face borrowing constraints and in which riskier investments yield higher returns, an interpretation that is also supported by case study evidence.[2] We, therefore, develop a model of financial contracting that clarifies how introducing a grace-period into a debt contract can make investment in high-return but illiquid alternatives more viable and, in turn, increase both expected business profits and default rates. This occurs because, in the presence of borrowing constraints, relatively illiquid investments remain riskier since they reduce short-run ability to deal with shocks. Hence, as clients shift to less liquid investments, income variance and therefore the probability of default increases. Put differently, by encouraging less risky investment choices, the immediate repayment obligations of the classic microfinance lending model may simultaneously limit default *and* income growth.

While there is a growing empirical literature on the impact of microfinance on income

[2] Our assumption that riskier investments yield higher returns differs from much of theoretical microcredit literature (Ghatak and Guinnane, 1999). Reasons to anticipate default aversion among MFIs include the strict regulatory environment in much of the developing world.

and consumption of the poor, to the best of our knowledge, this is the first paper to demonstrate how the term structure of microfinance loans may distort investment in microenterprises. The lack of even observational evidence on this question reflects the fact that MFIs almost universally follow this practice. A small and predominantly theoretical literature examines the role of repayment frequency in reducing default in MFIs, but focuses on channels other than investment choice (Fischer and Ghatak, 2010).[3]

In contrast, the idea that the structure of debt contracts influences entrepreneurial risk-taking and investment exists in many corporate finance models. One line of reasoning argues that longer term debt makes investment less attractive since debt-holders capture part of the returns of new growth opportunities (Myers, 1977). As a result, longer term debt may decrease risk-taking by residual claimants. On the other hand, share-holders may use risky investments as a way to capture debt-holder wealth (Jensen and Meckling, 1976; Tirole, 2005). In this case, similar to the case presented here, shorter term debt can reduce entrepreneurial risk-taking (Barnea et al., 1980; Leland and Toft, 1996). The empirical literature presents support for both mechanisms (Barclay and Smith, 1995; Brockman et al., 2010).

We investigate the relationship between investment and debt-maturity for entrepreneurs operating small household businesses. There are important differences between these businesses and the large firms studied in the existing corporate finance literature. For one, large firms are often assumed to be able to choose among debt of various maturities. In contrast, a more appropriate assumption for MFI lending in our economic environment is that clients are constrained to choose the contract offered by the MFI or opt for no debt. Second, lenders in our environment have limited ability to seize assets in the event default.

[3] Fischer and Ghatak (2010) show with present biased borrowers, the optimal contract (in terms of loan size) requires frequent small repayments. On the empirical front, descriptive studies of how greater repayment flexibility affects default report mixed findings (possibly reflecting selection bias): Armendariz and Morduch (2005) reports that more flexible repayment is associated with higher default in Bangladesh, while McIntosh (2008) finds that Ugandan MFI clients who choose more flexible repayment schedules are less likely to be delinquent. Two recent papers circumvent the selection issue by providing experimental evidence on the impact of changing repayment frequency. In the short run, Field and Pande (2008) observe no change in default. In the medium run, however, more frequent meeting can improve clients' informal risk-sharing arrangements and, therefore, long-run ability to repay (Feigenberg et al., 2010).

One important commonality is that both large firms (Berlin, 2006) and the clients running household businesses in our sample have as a first order concern the need to match the maturity of investments and liabilities.

Our results also inform the literature on liquidity constraints and entrepreneurship. The existing literature has documented a strong positive relationship between personal wealth and entrepreneurship (Evans and Jovanovic, 1989; Gentry and Hubbard, 2004). However, whether this correlation reflects the causal impact of liquidity constraints remains debated (Hurst and Lusardi, 2004). Further, many empirical papers that seek to identify this relationship are unable to disentangle the impact of increased liquidity from wealth effects (see for instance Lindh and Ohlsson (1996) who exploit lottery induced variation in wealth). Our field experiment is able to more convincingly isolate the liquidity channel and therefore provides stronger support for the view that liquidity constraints inhibit entrepreneurship.

Section 2 describes the experimental intervention, data and empirical strategy, and Section 3 reports our experimental findings. In Section 4 we use case studies and a simple model of financial contracting to interpret these findings. Section 5 compares the long-run increases in profit and returns to capital implied by our model with the existing literature and discusses alternative implications. Section 6 concludes.

2 Experimental Design

Our study was conducted with Village Financial Services (VFS), an MFI that makes individual-liability loans to women in low-income neighborhoods of Kolkata. Below, we describe our experimental protocol and data.

2.1 Protocol

Between March and December 2007 VFS formed 169 five-member loan groups designated for inclusion in the study, giving us a study sample of 845 clients. Each client received an individual-liability loan, and loan sizes varied from Rs. 4,000 (∼$90) to Rs. 10,000

(∼$225) with a modal loan amount of Rs. 8,000. The standard VFS debt contract required repayment through fixed installments starting two weeks after loan disbursement.

After group formation and loan approval, but prior to loan disbursement, groups were randomized into one of two repayment schedules. Treatment status was assigned within batches of 20 groups at a time, determined by the timing of group formation. No clients dropped out of the experiment between randomization and loan disbursement.

Eighty-four groups were assigned the contract with a grace-period and 85 groups were assigned to the regular contract with repayment starting two weeks after loan disbursement. Other features of the loan contract were held constant across the two groups: Once repayment began, all groups were required to repay fortnightly over the course of 44 weeks. Repayment occurred in a group meeting conducted every two weeks by a loan officer in a group member's home.[4] Both groups faced the same interest charges. However, longer debt maturity (55 as opposed to 44 weeks before full loan amount was due) combined with the same total interest charges implied that grace-period clients faced a slightly lower effective interest rate on the loan, although the potential income effect of this difference is minimal (see Section 5.2).

2.2 Data

Our data is assembled from multiple sources. Client surveys gathered information on household business activities, socioeconomic status, and demographic characteristics at three points in time: shortly after they entered the study (Survey 1), shortly after they completed the experimental loan cycle (Survey 2), and two years after the experiment had ended (Survey 3).

Panel A of Table 1 reports time-invariant client characteristics such as client education from Survey 1, which we also use for a randomization check. Panel B, Table 1 reports client characteristics excluded from the randomization check, either because they are potentially influenced by treatment assignment or because the survey question was only

[4] On the conduct of group meetings, also see Feigenberg et al. (2010).

administered to a subset of clients. An important variable is whether the household had any microenterprise activity at the time of entering our study ("Has business"). We construct this measure using Survey 1 data on the duration of existing household business activities.[5] Over three-quarters of households had some kind of microenterprise at the time they entered the study. The more detailed business questions in Survey 3 suggests that virtually all households in the sample (97%) were engaged in some type of business activity around the time they entered the experiment ("Has Business (broad measure)").[6] Online Appendix Figure 1 shows the distribution of business types at baseline: clothing sellers and skilled service work are the two largest categories. Roughly 80% of business owners report that the female client closely manages and can answer detailed questions about at least one household business.

Households experience a high rate of shocks: 60% report a shock to household income over the past month and 16 % of clients report having missed days of work due to a shock within the last 30 days.[7] At the same time, access to savings and informal sources to finance shocks and entrepreneurial activities is relatively limited. Paralleling this, clients report a high rate of business closure: over 35% of businesses that were active at baseline are reported as shut three years later. Roughly a third of these (11.5% of businesses) were closed due to the illness of a household member.

To verify that our randomization produced treatment groups balanced on observable characteristics, column (3), Table 1 reports average differences in baseline characteristics across regular and grace-period contract clients. Unfortunately, the absence of a true baseline survey implies that we are restricted in the variables we can use for this purpose to those that are not potentially influenced by treatment assignment. In Panel A, treatment and control groups are imbalanced in only one out of 11 baseline characteristics (married), with the difference statistically significant at the 5% level. However, the

[5] The likelihood of missing business activities that closed between loan disbursement and Survey 1 is likelysmall since most clients received Survey 1 within two months of loan disbursement.

[6] The difference in reported rates of business activity across the baseline and follow-up surveys is due to additional effort we put into capturing all microenterprise ventures and self-employment in the follow-up, which we believe was underestimated at baseline.

[7] Household events include illness, birth, death, and weather (flood).

point estimates of the difference is small and a joint test of significance (chi-squared) of mean differences across all Panel A variables indicates that our randomization produced a balanced sample.[8] To confirm that small differences in treatment arm balance are not biasing the experimental results, we estimate regressions with and without the controls listed in Panel A, Table 1.

Outcome variables were collected from several data sources. First we use Survey 1, which was conducted an average of eight weeks after loan disbursement, to measure the fraction of clients who invest their loans in new businesses. Next we use Survey 2, which was completed roughly one year after loan disbursement by 93% of clients and contained a detailed loan use module, to study differences in short-run investment behavior.[9] Clients were asked to describe the allocation of their VFS loan across the following expenditure categories: business, human capital (health and school), housing repair, food expenditure, savings, re-lending and other.

Finally, to evaluate long-run outcomes, we conducted a detailed business survey (Survey 3) almost three years after loan disbursement (April - July 2010). Ninety-one percent of study clients were successfully recontacted and administered Survey 3. This survey provides detailed data on long-run microenterprise profits and scale for up to five businesses, and household income. It also includes information on client business practices. We observe no significant difference in survey response rates between treatment and control groups, and column (4) of Table 1 shows that the Survey 2 sample remains balanced.

To study delinquency and default, we tracked client repayment behavior using VFS administrative data in which the repayment date and amount paid were recorded by loan officers on a continuous basis in clients' passbooks and then compiled into a centralized bank database. We have data on all clients through January 2010, by which date at least

[8] For the randomization check, the p value of joint significance is computed by jointly estimating a system of seemingly unrelated regressions consisting of a dummy variable indicating assignment to the grace-period treatment, with standard errors adjusted for correlation within loan groups. The joint test also includes loan officer dummies.

[9] Survey 2 was completed between January and November 2008, a period that is slightly longer than the duration of Survey 1 due to delays in tracking clients. The minimum time between Survey 1 and Survey 2 was 10 months – the duration of the loan cycle – and the maximum time was 16 months, with the average being 12 months.

52 weeks had passed since the loan due date for all loan groups.

As a check on VFS administrative data, we also collected repayment data from loan officers. Each loan officer was required to keep a logbook on meeting activities for the purpose of our experiment, which recorded date of meeting, number of clients present, and names of clients who repaid at the meeting. Although the measures differ slightly, this alternative measure gives the same approximate default rate in the full sample as the VFS administrative data (4.9% compared with 5.4%).

3 The Impact of Grace-Period Contract

We first describe our empirical strategy and then report findings on how assignment to a grace-period contract changed clients' short-run investment decisions and long-run income, profits, and default.

3.1 Empirical Strategy

Randomization of contract type across groups implies that a comparison of average outcomes across clients assigned to different contracts can be interpreted as a causal association. We estimate:

$$y_{ig} = \beta G_g + B_g + \delta X_{ig} + \epsilon_{ig} \tag{1}$$

where y_{ig} is the outcome of interest for client i in group g, and G_g is an indicator variable that equals one if the group was assigned to the grace-period contract. All regressions control for stratification batch (B_g) and correct standard errors for clustering within loan groups. Regression tables 2-6 report regression estimates both without controls (Panel A) and with the controls (X_{ig}) listed in Panel A of Table 1 and loan officer fixed effects (Panel B). Since no client dropped out after assignment to contract schedule, these intent to treat (ITT) estimates are the average treatment effects of being on a grace-period contract.

In Appendix Table 1 we use VFS transactions data and the data collected by loan

officers at each group meeting to document compliance with the experiment protocol. Outcomes are measured at the group level, and Panel B includes loan officer fixed effects as controls. Column (1) considers the time interval between loan disbursement and first repayment for each client.[10] Consistent with the grace-period contract stipulating a period of eight weeks before the first payment, clients in groups that received the grace-period contact made their first loan installment an average of 52 days after those assigned to the regular contract, or approximately two months later. Column (2) shows that treatment assignment had no influence on the frequency of repayment after the grace-period: Once repayment starts, the average time lapsed between two consecutive meetings is identical across the two contracts (14 days).[11] Column (3) shows that the average repayment meeting lasted 18 minutes and was not influenced by contract type.

3.2 Loan Use and New Business Formation

A first question of interest is whether the introduction of a grace-period influenced loan use. Figure 1 shows average loan spending in seven broad categories separately for grace-period and regular contract clients. The largest category is business spending. Over 91% of the clients spent at least some of their loan on business-related expenditures, and on average, a client spent 83% of her loan on business-related activities. The second largest category is home repairs. However, only 8.5% of clients report spending on home repairs. Relative to clients on a regular contract, grace-period clients increase business spending and reduce spending on house repairs.

In Figure 2, we decompose business spending into inventory and raw materials, business equipment and other. The difference in business spending across regular and grace-period clients appears to be driven by differences in spending on inputs, composed of inventory and raw materials. Close to 70% of clients report spending in this category, which includes the three most common expenditures: saris, wood, and sewing materi-

[10] All clients in a loan group received their loans on the same day, at which point their first repayment meeting date is announced.

[11] For each client, we consider all meetings that occurred over the first 120 days of the loan cycle, starting with the first repayment meeting.

als. Notably, these are relatively illiquid investments. Raw materials, for instance, are valuable if clients can find markets for the finished product, but if demand is uncertain, it may take several months to realize the returns. Meanwhile, raw materials cannot be liquidated at cost once they have been transformed.

In Table 2, we investigate the statistical significance of these differences by estimating equation (1). In column (1) we observe significantly higher business spending among grace-period clients. The average client on the grace-period contract spends roughly 6% (Rs. 365) more on business items. In columns (2) and (3) we divide total business spending into inventory and raw materials, and business equipment. While the estimates are noisy, we see that grace-period clients predominantly shift loan use towards inventory and raw materials. In column (4) we observe a corresponding decline in non-business spending by grace-period clients, driven primarily by a significant reduction in spending on house repairs of Rs. 254 (column 5) and a significant but relatively small decline in spending on food (Rs. 25, column 9). Relative to business spending, home repairs are a relatively safe but low-return investment. We observe no changes in spending on education and health (human capital), savings and lending to others ("re-lending").

Next, in column (10) we examine propensity to start a new business around the time of receiving the loan measured by a dummy that equals one if a client reported starting a new business within a month of receiving the loan.[12] Overall, new business formation is low: In the control sample, only 1.6% of clients start new businesses within the two-month period surrounding loan disbursal. However, the likelihood of starting a new business is almost thrice as high among the grace-period clients and this difference is statistically significant at the 10% level. Figures 2 and 3 in the Online Appendix provide a breakdown

[12] For half the clients who were administered Survey 1 more than one month after receiving the loan but before the end of the first loan cycle, this variable is measured close to actual business formation and is not subject to significant recall error. For clients who were administered Survey 1 less than four weeks after receiving the loan, we measure new business activity within a month of the loan using both Survey 1 reports of new business activity between loan disbursal and Survey 1 and retrospective data on new business formation within a month of loan disbursal that were collected in Survey 3 (three years later). For this second category of clients, the new business indicator is measured with significantly more error. Importantly, the timing of Survey 1 was balanced across treatment arms. We have also checked that the result is robust to excluding clients surveyed fewer than four weeks after loan disbursal. See online Appendix for variable construction.

of new business types for grace-period and regular clients and we observe more vendor businesses among grace-period clients. Arguably, starting a vendor business involves an inventory purchase that is illiquid in the short run.

The observed differences in the rate of business formation not only provide evidence of differences in entrepreneurial risk-taking as a result of debt contract, but also provide a consistency check on the business spending results. Specifically, since business creation was measured independently of how a client reported spending her loan, it is not subject to the concern that being on the grace-period contract may have changed mental accounting regarding loan use but not actual expenditures.

3.3 Long-Run Business Outcomes

Next in Table 3 we use the three-year follow-up data to study long-run differences in microenterprise profits and household income. Both were measured with single survey questions: "Can you please tell us the average weekly profit you have now or when your business was last operational?" and, "During the past 30 days, how much total income did your household earn?"[13] To address the concern of noise in survey responses to questions that require a high level of aggregation, we report regressions with the full sample (odd columns) and regressions with a trimmed sample (even columns). In trimming we exclude outliers defined as the top 0.5% of the cumulative distribution of each variable (this results in only four observations being dropped in all cases).

Columns (1) and (2) show that household income is an estimated 18% higher for grace-period clients three years after loan disbursement ($\sim$2 years after the loan was due). As shown in columns (3) and (4), this appears to be driven entirely by a change in household business profits. Households that were on a grace-period contract report 33-54% higher weekly profits, which alone correspond to a 10-18% increase in household income (where mean weekly household income is Rs. 4,708).

In columns (5) and (6) we see that both the level and variance of long-run profits are

[13] de Mel et al. (2009) provide evidence that simply asking profits provides a more accurate measure of small entrepreneur profits than detailed questions on revenues and expenses.

higher for grace-period clients. After excluding the four outlier observations, variance in profits is more than twice as high for grace-period clients relative to regular clients. In all Table 4 regressions, results are almost identical in magnitude and significance with or without controls. Likewise, trimming outliers influences statistical significance only when the outcome is variance of profits. Finally, in column (7) we consider a within-household measure of business profit variance. The outcome variable is the difference in reported profits in months of high and low profits (averaged across all household businesses). This measure suggests a higher month-to-month variance in household profits for clients on the grace-period contract.

Consistent with the profits results, columns (1)-(4) of Table 4 show that micro-enterprise activities in grace-period households are around 50% larger in terms of assets and inventory. We also observe more workers in grace-period households relative to regular contract households (2.89 versus 2.53 workers), though the difference is statistically insignificant. The fact that scale of business operations adjusts more rapidly than size of the micro-enterprise workforce is consistent with the fact that informal enterprises are likely unable to perfectly substitute outside for in-family labor, and are thus constrained in terms of increasing number of workers.[14]

Column (6) of Table 4 shows that grace-period clients are also significantly less likely to report a business closure between loan disbursal and the three-year follow-up. 39% of the regular contract clients but only 31.4% of grace-period clients report a business closure.[15] While this result may seem at odds with grace-period clients experiencing higher variance of profits (Table 5), the combination of results suggests a scenario in which repayment obligations are less likely to cause grace-period clients to shut down businesses that do not earn a sufficiently high profit in the short run. Indeed, when we regress the treatment

[14] All results in Table 4 other than liquidating business assets to make loan payments are robust to the inclusion of control variables.

[15] We constructed an alternative measure of business closure from an open-ended survey question that asked households to report changes in each business they had operated since loan disbursement. We constructed a dummy variable indicating whether a household reported having closed its business. Using this measure of business closure, we find an effect size of similar magnitude (-.04) which is significant at the 5% level. Results available from authors.

indicator on a dummy for whether a client reports having ever sold goods or services at a discount in order to meet loan repayment obligations (column 7), we find that grace-period clients are significantly less likely to report doing so relative to regular contract clients. The significance of this estimate, however, is sensitive to the inclusion of controls; the t-statistic falls to 1.2 with the full set of controls. We interpret the findings on business closure and liquidation as evidence that introducing a grace-period helps client maintain business operations in the face of fluctuations in demand or productivity.

Given these findings, we next examine whether the term structure of debt also influenced business practices. In Table 5, we regress treatment on clients' willingness to engage in risky business practices, including willingness to sell to clients on credit and willingness to let clients pre-order manufactured goods. Over 47% of the clients in our sample claim that they regularly offer goods and services on credit, and 44% let clients pre-order items. Extending credit is a risky business investment in that it increases business scale but, without enforceable contracts, entails substantial risk. Pre-ordering services arguably makes a business more vulnerable to hold-up and, therefore, constitutes another risky, but potentially high-return, business practice. In columns (1) and (2) we observe that grace-period subjects are nine percentage points more willing to advance goods or services on credit and are willing to do so to a greater fraction of their clients. In columns (3) and (4) we also see that grace-period clients state a higher willingness to let clients pre-order items. Finally, in column (5) we observe that grace-period clients offer a significantly wider array of business goods and services, indicating that they are not only expanding but also diversifying business operations.

Although consistent with the previous results on variance in profits, one important caveat in interpreting the Table 5 results is that, since the data were collected three years after the loan, it is not possible to identify whether more risky business behavior is a direct consequence of having a grace-period or an indirect consequence of grace-period clients having larger and more profitable businesses.

3.4 Loan Repayment

Our empirical estimates suggest that introducing a grace-period increases variance of profits and willingness to undertake risky business activities. We next investigate whether moving to the grace-period contract has a corresponding effect on default. Figure 3 graphs the fraction of clients who have not repaid in full relative to the date of first installment. The vertical bars indicate the loan due date and eight weeks after the loan was due. We observe a clear difference in that relative to regular contract clients a lower fraction of grace-period clients have repaid in full four months past the due date.

To test for the statistical significance of these patterns, in Table 6 we examine the impact of grace-period contract on default at three points in time: whether the client repaid within eight, 24, and 52 weeks of the loan due date (defined as the date when the final installment was due). In all cases we observe a robust difference in default patterns between the clients on the regular and grace-period contracts. Grace-period clients are, on average, between six to nine percentage points more likely to default than regular clients. Twenty-four weeks after the loan was due, 2% of the regular clients and 9% of the grace-period clients have failed to repay. Including controls in the regressions has very little impact on the point estimates. Even after one year, the experimental difference is roughly the same (column 3).

4 Making Sense of the Results

We find very significant impacts of contractual form on short-run investment choices and long-run economic outcomes. In a world with perfect credit markets, changing the term structure of debt while holding the interest rate fixed should not influence investments. However, only 5% of our study clients report having a non-VFS loan at baseline and only a third have any savings which suggests significant constraints on credit access.

We start by using case studies to gain insight into the nature of risk associated with entrepreneurial activity and hence the implications of a grace-period contract. Next, we develop a simple model of financial contracting that highlights the interaction between

debt structure and illiquidity of high return investments when access to credit is limited.

4.1 Case Studies

Just prior to our long-run survey (Survey 3) we conducted in-depth interviews with grace-period clients randomly chosen from each of the five main occupations in our sample. Here we focus on discussions with a sari seller and a tailor, the two largest occupations in our sample (each covered 12% of study clients). Both clients were second-time borrowers from VFS and their businesses had been in operation for at least 3 years. Neither had loans from any other formal source. Only the sari seller had a savings account. The sari seller repaid her loan on time while the tailor was delinquent and repaid the full loan only 24 weeks after the due date. While the sari seller had taken the loan out for her own business, in the other household, the respondent had borrowed for her husband's tailoring business. Hence, for the tailor household responses about loan use and business activity were given by the husband, who was present at the time of the interview.

When asked directly how the grace-period had influenced loan use, both said that the two-month delay had given them the security to invest the entire loan amount into their businesses as opposed to setting aside a portion for initial repayment installments.[16] A two-month delay provided a sufficient time buffer to expect a return that would arrive quickly enough and be large enough to cover the first installment. Expanding their investment, in turn, increased short-run profits through economies of scale in purchasing inputs. For instance, the sari-seller explained that because she was able to invest the full amount of the loan, she was able to take advantage of larger discounts from her wholesaler.

Variability in demand was a concern. Over half of the sari seller's clients bought on credit and repaid in small monthly installments. On average, she could sell Rs. 3,000 worth of merchandise for Rs. 3,800-4,500. However, during her low season, which was typically a non-consecutive third of the year, she earned as little as Rs. 300 per month. Her monthly payments on her Rs. 10,000 loan was Rs. 500. She felt that the grace-

[16] Both respondents affirmed that they had saved a portion of their previous VFS loan (which had no grace-period) to pay their first few installments.

period helped reduce default during such low months because of the delay in start of repayment combined with higher return afforded by investments made while on a grace period contract. In contrast, if she were on a regular contract and had invested her entire loan then repayment requirements during a month of low sales soon after taking the loan would require her to liquidate part of her stock just to be able to repay. The sari seller explained that liquidating during a low season month would certainly mean selling saris at a loss. Additionally, it would reduce earnings in subsequent months and increase default risk. The tailor gave a similar account of the grace-period reducing fear of being unable to make a payment during a low season.

Finally both clients stated that the grace-period encouraged them to experiment with new business opportunities. In addition to increasing investment, they indicated a greater willingness to take on entrepreneurial risk. For instance, in addition to increasing her stock of saris, the sari seller chose to expand the variety of saris she was offering. Prior to the second loan, the tailor had operated his business with a borrowed sewing machine or sewing by hand. He invested the VFS loan in a sewing machine as well as in raw materials that allowed him to expand into the ready-made market. This expansion also prompted him to establish connections in Assam, a neighboring state, where he occasionally sold his ready-made merchandise.

4.2 A Model of Debt Structure

This qualitative evidence motivates the assumptions underlying our model of debt structure. To capture the intuition of credit constraints in the simplest possible manner, we assume zero outside access to credit, so that clients' only source for financing business investments is the MFI loan.

Second, we assume investments differ along two dimensions: mean expected returns and time until returns are realized. We relate the time until investment returns are realized to the riskiness of the investment (variance of expected returns) by assuming that investments cannot be liquidated at cost. In other words, investments with longer

time horizons are riskier. This idea is clear in both the case studies and in the survey data – the median client in our sample states that she would incur a loss of 25% if she had to liquidate her business stock within a day.[17]

Finally, in accordance with MFI practices we assume that the loan is collateral-free and that the MFI cannot seize assets in case of default. The penalty for default is exclusion from future lending, which we model as a disutility that varies across clients and is independent of debt size.

4.2.1 Economic Environment

The economy lasts three periods $t = 0, 1, 2$ and is populated by a continuum of MFI clients, $i \in [0, n]$. At $t = 0$ each client receives a loan of size B and the debt contract specifies repayment in two installments, P_1 at $t = 1$ and P_2 at $t = 2$, where $P_1 + P_2 = P$.[18] Each client has a utility function $u_i(c_0, c_1, c_2) = c_0 + c_1 + c_2 - I_i D_i$. c_t is time t consumption and I_i is an indicator equal to one if the client chooses to default and zero otherwise. Clients are borrowing constrained and, therefore, cannot attain negative values of consumption. D_i is the utility penalty for default and is distributed over the client population according to the continuously differentiable distribution function $F(\cdot)$ with corresponding density $f(x) \equiv F'(x) > 0 \; \forall \; x \in (0, \infty]$ and $f(x) = 0$ for $x < 0$.

Clients have two investment options. They can invest in a safe, low-returns project that pays off after one period, or they can invest in a risky project in which the pay-off is uncertain and realized with a lag. In particular, at $t = 0$ the client divides loan amount B across two investment opportunities:

1. A *risky* investment that pays off R_g with probability p_g and R_b with probability $1 - p_g$

[17] A different but related justification is if investment returns are modeled as a random walk with positive drift, then the longer time horizon of illiquid investments directly increases variance. It is possible to construct a model that yields some of the same predictions by only varying the riskiness and not the time horizon of the investment. However, in this model predicted differences in investment and default are ambiguous. Further, and perhaps more importantly, we believe the illiquidity of investment opportunities better approximates the actual investment choices in our setting.

[18] The present value of loan payments $P_1 + P_2/R_L$ increases as P_1 increases relative to P_2, so that clients with higher P_2 relative to P_1 are effectively richer. This assumption matches the experiment which held $P_1 + P_2$ fixed rather than $P_1 + P_2/R_L$. Section 5.2 shows this "income effect" is not large enough to explain our results.

after two periods for each unit invested. We normalize R_b to zero.

2. A *safe* investment that pays off R_L after one period for each unit invested.

We assume the return from the safe asset exceeds the payment needed to repay the loan ($R_L^2 B \geq P$) and the expected return from the risky investment exceeds the safe investment $p_g R_g > R_L^2$. We consider two debt contracts: a *regular* contract where $P_1 > 0$ and $P_2 = P - P_1$ and a *grace-period* contract where $P_1 = 0$ and $P_2 = P$. We assume the risk premium of the risky asset is large enough that:

$$p_g R_g - R_L^2 > (R_L - 1) p_g R_g P_1 \tag{2}$$

The condition ensures that the "income effect" due to the grace-period contract requiring a lower present value of payments is not too large. A key decision faced by clients is whether to set aside money in the liquid asset to make their loan payments for sure or to invest that money in the illiquid asset. Default considerations aside, the income effect implies that grace-period clients face a lower opportunity cost of setting aside P. Since avoiding default by setting aside P is more attractive for these clients, if R_L is sufficiently large, then the grace-period will lead clients to invest *less* in the risky asset. Condition 2 insures that the relative attractiveness of the risky asset compared to the safe asset is large enough that the income effect does not dominate.

4.2.2 Debt Structure and Investment Choice

If the default cost is lower than the utility of consuming the loan payments, clients will trivially default for sure. We focus on the case in which $D_i \geq P$ so that if clients have funds available, they will repay. Under a grace-period contract ($P_1 = 0$ and $P_2 = P$) the client chooses between investing everything (B) in the risky asset or leaving enough in the safe asset to ensure repayment (P/R_L^2) and only investing the remainder in the higher-return venture. Comparing her expected utility from the two alternatives (see Appendix for details) shows that client i will choose the lower amount of investment in the risky

asset $(B - P/R_L^2)$ if and only if:

$$D_i > \frac{p_g}{1-p_g} P(\frac{R_g}{R_L^2} - 1) \equiv D_{bn}^{gp} \tag{3}$$

Stated equivalently, as long as p_g and R_g are high enough relative to R_L, she will invest all funds in the risky investment and default at $t = 2$ with probability $(1 - p_g)$.

Turning to the regular contract ($P_1 > 0$ and $P_2 = P - P_1$) the client chooses between investing everything in the risky asset (B "high investment"), investing everything except that which is required to pay the first installment ($B - P_1/R_L$ "intermediate investment"), and investing only what exceeds the amount required to repay both installments ($B - P_1/R_L - P_2/R_L^2$ "low investment"). Comparing the payoffs, we can define cut-offs that relate client's investment in the risky asset to her cost of default (see Appendix for details):

$$D_{bf} \equiv \frac{p_g}{1-p_g}(R_g/R_L^2 - 1)P_2 \tag{4}$$

$$D_{bn} \equiv p_g R_g (P_1/R_L + P_2/R_L^2) \tag{5}$$

$$D_{fn} \equiv \frac{R_g P_1}{R_L} + P_2 \tag{6}$$

As a result, for D_i small enough, it is optimal to invest everything in the risky asset. Further, for D_i large enough, only the lowest level of investment in the risky asset is preferred. Figures 4 and 5 present this relationship graphically. Moreover,

Claim 1 *Investing in the safe asset to ensure only the first payment (intermediate investment) is never optimal if and only if P_1 is large enough ("High P_1) s.t.*

$$\frac{P_1}{P_2} > \frac{p_g R_g - R_L^2}{R_L R_g (1 - p_g)} \tag{7}$$

In this case, as default costs increase, clients switch from setting aside no money for either payment to setting aside money for both payments at D_{bn}.

The proof is in the Appendix. For P_1 small enough that condition (7) is violated, as D_i increases from 0 to ∞ the client shifts from optimally investing the entire loan in the risky asset to setting aside enough money for the first payment and finally to setting aside money for both payments. The corresponding cut-offs are D_{fn} and D_{bf} with $D_{fn} < D_{bf}$.

4.2.3 Comparative Statics

We use the above results to characterize, for a given D_i, how client investment changes when a grace-period is introduced into the debt contract:

Claim 2: *If P_1 is relatively low (Equation 7 is reversed) moving from a regular to grace-period contract will cause clients with:*
(i) $D_i \in [D_{fn}, D_{bf}]$ to switch from intermediate to high investment in the risky asset.
(ii) $D_i \in [D_{bf}, D_{bn}^{gp}]$ to switch from low to high investment in the risky asset.
(iii) Small default costs ($D_i < D_{bf}$) or large default costs ($D_i > D_{bn}^{gp}$) to not change investment.

Claim 3 *If P_1 is relatively high (Equation 7 holds) moving from a regular to grace-period contract will cause clients with:*
(i) $D_i \in [D_{bn}, D_{bn}^{gp}]$ to switch from low to high investment in the risky asset.
(ii) Small default costs ($D_i < D_{bn}$) or large default costs ($D_i > D_{bn}^{gp}$) to not change investment.

See Appendix for the proofs. These results tell us that moving from a regular to a grace-period contract induces some clients to increase investment in the risky asset. Average investment in the risky asset is therefore higher for grace-period clients. We provide a graphic summary in Figures 4 and 5. The results also provide predictions for the impact of the grace-period contract on profits (level and variance) and default:

Prediction 1 *Moving from the regular to grace-period contract increases average client profits and the variance of profits.*

The proof is in the Appendix. The introduction of a grace-period contract increases expected returns because it leads to higher average investment in the risky asset and the return on the risky asset ($p_g R_g$) is higher than the return on the safe asset. The variance of profits increases since the variance is increasing in the amount invested in the risky asset.

Prediction 2 *Moving from regular to grace-period contract increases average default.*

The proof is in the Appendix. Default occurs when the client does not set aside the second installment and the investment fails, which is more likely to happen under the grace-period contract, as detailed in Claims 2 and 3.

These predictions match the patterns we observe in the data. We conclude by discussing some of the model's assumptions in the context of our experiment.

4.2.4 Timing of Payments and Investment Returns

In our experiment once repayment began, clients on both the grace-period and regular contracts repaid every two weeks. The key difference was that grace-period clients began repayment eight weeks after regular contract clients. Translating these experimental features to the model, P_1 is most clearly interpreted as all payments made during the grace period (before the 10 week mark) and P_2 as the sum of all payments required after the grace-period concludes.[19] With this set-up, the return on the illiquid investment is assumed to be realized between 10 and 32 weeks after investment.

[19] Once the grace-period ends, clients on both contracts face essentially the same decision problem; the only differences being the relative size of payments left to make and their cash on hand. For this reason, we combine all 22 and 18 payments into one payment P_2. Similar results to claims 1 and 2 hold if we break P_1 up into four separate payments. The only difference is that each payment has a different discount factor.

4.2.5 Risk Aversion

Even though clients' utility is linear in consumption for positive values of consumption, clients are not risk-neutral since default incurs a utility penalty. Because the default costs are incurred only when cash on hand drops low enough, one way to motivate heterogeneity in default costs is as variation in clients' risk aversion. A higher cost of default will make clients less likely to invest in the riskier asset because the low-return state is worse relative to the high-return state.

5 Connecting the Model to the Empirics

We now examine whether the mechanism highlighted in the model can quantitatively explain our empirical findings and assess the validity of alternative explanations.

5.1 Returns to Capital

Calculating the anticipated difference in long-run profits from the introduction of a grace period requires an assumption about returns to capital. We develop a framework for calculating returns to capital with the experimental data, which we can also use to compare our results to the literature on the returns to capital in developing countries. Following de Mel et al. (2008), we specify a linear relationship between capital and profits and estimate the relationship:

$$PROFITS_i = \beta CAPITAL_i + \epsilon \tag{8}$$

Capital is likely correlated with ability and other inputs to production. We therefore instrument total capital using the grace-period treatment. To control for labor inputs we include hours worked as a covariate. Table 2 in the online Appendix reports these estimates. The IV estimates imply a monthly weighted return of between 6% and 13%. These returns are within the somewhat wide range of returns in the existing literature. Returns of 5.5% are estimated by de Mel et al. (2008), while McKenzie and Woodruff (2008) esti-

mate returns of 20-33% per month for Mexican enterprises. Dupas and Robinson (2009) find implied median returns of capital of 5.9%.

Our estimates are identified off the change in capital induced by the grace-period contract. The mechanism highlighted in the model is that grace-period clients invest in higher-return capital. If this difference in the composition of capital persists three years after loan disbursement, then we are estimating the return for the higher return capital (although that is also true for some of the existing estimates).

The following accounting exercise uses these estimates as a guide for the returns to capital in our sample. In particular, our preferred estimates are 6-9% based on the trimmed sample.

The endline differences in capital and profits may appear large given the seemingly small contract change of allowing a two-month grace-period. One view is that after three years, any difference attributable to the grace-period should have been washed out by random events and shocks. Another view is that three years is a long time for even a modest difference in returns to compound into a substantial difference. We conduct a simple accounting exercise to gauge whether observed differences in profits are close to what one would anticipate accumulating over three years under reasonable assumptions.

Suppose the average grace-period and regular client invests Rs. 6,500 and Rs. 6,100 respectively (as we observe from Table 3). Further, suppose that grace-period clients earn a net monthly return of $(X + Z)\%$ compared with a return of X% for regular clients. If all returns are re-invested, then the differential in capital stocks at endline three years later will be $(1 + X + Z)^{36}6500 - (1 + X)^{36}6100$. With $X = .04$ and $Z = .02$, this yields a difference of Rs. 28,000, which is close to the difference of Rs. 30,000 that we observe.

Figure 4 in the online Appendix shows that the observed capital stock differential is easily generated by reasonable values for X and Z. We assume that the return differential persists for the full three years because the evidence presented on differential investment composition is from the long-run survey. However, in results not presented, we make the more conservative assumption that the return differential persists for only three months. An initial return differential of 8% in the first three months followed by a return of 8%

for *both* grace-period and regular clients yields a capital stock differential of Rs. 26,000.

It is difficult to know exactly what X and Z are, since they capture both returns and reinvestment. A reasonable benchmark might be the returns estimated in the previous section and in that case the required values of X and Z are well within the interval of the estimates from above.

Clearly, a differential return in investment followed by compounding over roughly three years has the potential to quantitatively explain the results. We should note, however, that the exercise abstracts from labor income and makes no attempt to model consumption behavior. In particular, if investment is not only illiquid but can only be made in non-divisible increments as in Kaboski and Townsend (2011), then grace-period clients may reduce consumption in the short term in order to reach the investment threshold.

A remaining puzzle is why clients do not gradually invest in illiquid investments out of their own income. One possible explanation is that in practice, illiquid investments may have a minimum investment size required to be profitable (Kaboski and Townsend, 2011). If clients face constraints to saving large sums of money, then this could prevent them from investing out of their own savings. Bauer et al. (2011) document a strong correlation between present-biased preferences and microfinance loan take-up, suggesting that one reason for the high demand for microfinance loans is that the rigid repayment structure allows clients to turn a series of small payments into one large sum. Fischer and Ghatak (2010) show that for present-biased borrowers a frequent repayment schedule increases the size of the loan that they will optimally choose to repay. Present-biased preferences are an alternative reason clients may prefer illiquid investments when given a grace-period contract.

5.2 Alternative Explanations

We conclude this section by discussing the likely validity of alternative explanations for the increases in default and business profit. Note, however, that no single alternative hypothesis can explain both patterns, so only a combination of these stories would explain

our findings.

5.2.1 Income Effect

The grace-period contract potentially encompasses two effects. A *portfolio* effect which makes illiquid investments more viable and an *income* effect which increases total repayment time by two months, making it easier for a client to accumulate the income needed for repayment. Our model and accounting exercise focussed on the portfolio effect.
In contrast, the income effect is driven purely by grace-period clients having a lower net-present value of payments relative to regular clients. To examine whether the income effect could explain our results, assume a client receives a loan of size B with a flat interest rate of 10% to be repaid fortnightly over a 44-week period starting either two or 10-weeks following loan disbursement. The client has access to a perfectly liquid investment opportunity with monthly return on capital $1 + r_L$ in which she invests I. Each fortnight, the client pays the required loan payment and reinvests any remaining profits. We set B equal to the median loan size in our sample which is Rs. 8,000 and set initial investment size equal to Rs. 6,400 as observed in the data. We assume that the remaining Rs. 1,600 (8,000-6,400) are set aside to pay off the first four installments.[20] Using a return to capital of $r_L = 0.08$, even if all returns are re-invested, the endline capital stock differential will be Rs.10,000, which is roughly one-third of the difference observed in the data. The subsequent monthly rate of return would have to be over 11% to generate the observed capital differential. In addition, the income effect alone cannot explain the default results.

5.2.2 Income from Default

Difference in default rates meant that on average, grace-period clients had Rs. 149 more of outstanding loan payments one year after the loan due date compared with regular clients.

[20] If we instead assume that the installments are consumed, so that all loan payments come out of the invested capital, the income effect is able to explain even less of the capital differential at endline.

Even if this money was invested with a monthly return of 8%, the resulting difference one year later would be less than 2% of the observed capital stock differential (Rs. 373).

5.2.3 Habit Formation

A grace-period contract may increase default by not allowing clients to acquire the habit of making regular payments from the start of the loan cycle, or it may lead them to believe that prompt payment has fewer consequences, and thereby increase strategic default. However, in either case we should see immediate differences in propensity to make loan payments. That is, differences in habit-formation would presumably be the most stark at the onset of regular repayment when the grace-period subjects have just had two months off, and likewise, strategic default should be concentrated early on in the loan cycle when the benefit of defaulting is highest. In contrast, the results in columns (4)- (6) of Table 6 indicate that grace-period and regular clients were just as likely to make their first and their first half of loan payments, and just as likely to repay at least half of the loan. [21]

5.2.4 Monitoring and Loan Officer Effects

In theory, early repayment may improve loan officers' ability to monitor borrower activities early on in the loan cycle. However, we do not consider this to be an important channel since loan officers in our study do not undertake any monitoring activities during loan meetings or even discuss clients' business activities. Each of our loan officers serviced groups on both the regular and grace-period contract (in all tables the Panel B regressions include loan officer fixed effects).

[21] There is also a potential concern that not meeting right at the start restricted social ties between group members and that this, in turn, increased their likelihood of default by reducing the provision of informal insurance. To examine this, we construct an index of network ties between group members using survey data on social and financial interactions among them collected in Survey 2. We do not observe any difference in network ties across clients on different contract types. The results are available from the authors.

6 Conclusion

Introducing flexibility into MFI debt contracts in the form of a grace-period presents a trade-off for financiers and clients. On the one hand, average levels of default and delinquency rise when clients receive a grace-period contract. This finding supports the predominant view among MFIs that requiring partial early repayment is critical to maintaining low rates of default among poor borrowers. On the other hand, delayed repayment encourages more profitable, though riskier, investment. Thus, the relatively high returns to capital suggest that default aversion on the part of MFIs may come at the cost of entrepreneurial activity.

Given the large increases in income and relatively low differential between grace-period and regular contract clients in terms of amount left unpaid, it is tempting to recommend that MFIs offer a grace-period contract with an interest rate high enough to compensate for the increase in default. In this context, it is relevant to note that the typical small-business loan contract is significantly more flexible than a typical MFI contract.[22] Possibly as a result of this increased flexibility, default rates on Small Business Administration loans in the US are between 13-15% compared to 2-5% on typical MFI loans (Glennon and Nigro, 2005).[23]

However, understanding how changes in product design alter client selection is important for evaluating the full impact of a grace period contract for a MFI. It is possible that charging a higher interest rate may itself cause more default by both selecting a riskier client pool and encouraging ex-ante and ex-post moral hazard (Karlan and Zinman, 2009). Alternatively, by expanding its portfolio of loan products to include grace period contracts the MFI may be able to expand its client base. Client surveys, certainly, suggest that at least half the clients prefer a grace-period contract to a regular contract.

[22] For instance, flexible repayment options are available on Small Business Administration (SBA) loans in the U.S., and typically negotiated on a loan-by-loan basis. Payments are typically via monthly installments of principal and interest. There are no balloon payments, and borrowers may delay their first payment up to three months with prior arrangement. For details, see for instance https://www.key.com/html/spotlight-quantum-health.html.

[23] One reason that US lending institutions may be willing to withstand higher default rates is that SBA loans are guaranteed by the SBA. In addition, the SBA sets interest rate caps for SBA loans.

At the same time, it is clear that the current regulatory environment faced by MFIs (wherein they face significant constraints on the interest rate they can charge) tends to make them default-averse.

More broadly, the results in this paper suggest that evaluating the economic impact of debt contract design can provide valuable insights on entrepreneurial behavior and help identify alternative methods of reducing liquidity constraints. For instance, our findings suggest that increasing loan size may also encourage greater entrepreneurship and raises interesting questions about the trade-offs faced by MFIs when deciding loan size. [24]

References

Armendariz, B. and J. Morduch (2005). *The Economics of Microfinance*. Cambridge, MA: MIT Press.

Banerjee, A. and E. Duflo (2005). *Handbook of Economic Growth*, Volume 1, Chapter Growth Theory through the Lens of Development Economics. Elsevier Science.

Banerjee, A., E. Duflo, R. Glennerster, and C. Kinnan (2009). The Miracle of Microfinance? Evidence from a Randomized Evaluation. mimeo, MIT.

Barclay, M. J. and C. W. Smith, Jr. (1995). The Maturity Structure of Corporate Debt. *Journal of Finance 50*(2), 609–631.

Barnea, A., R. A. Haugen, and L. W. Senbet (1980). A Rationale for Debt Maturity Structure and Call Provisions in the Agency Theoretic Framework. *Journal of Finance 35*, 1223–1234.

Bauer, M., J. Chytilova, and J. Morduch (2011). Behavioral Foundations of Microcredit:

[24] To the extent that clients lack access to riskless savings with an interest rate equal to the interest rate charged by the MFI, the larger loan will mean that clients pay more in interest payments to make the same sized illiquid investment. This suggests that the larger loan is less attractive than a smaller grace-period contract and we anticipate that clients will be willing to pay a higher interest rate for the grace-period loan.

Experimental and Survey Evidence from Rural India. *American Economic Review*. Forthcoming.

Berlin, M. (2006). Debt Maturity: What do Economists Say? What Do CFOs Say? *Business Review* (Q1), 3–10.

Brockman, P., X. Martin, and E. Unlu (2010, June). Executive Compensation and the Maturity Structure of Corporate Debt. *The Journal of Finance 65*(3), 1123–1161.

Daley-Harris, S. (2006). State of the Microcredit Summit Campaign Report 2006.

de Mel, S., D. McKenzie, and C. Woodruff (2008). Returns to Capital in Microenterprises: Evidence from a Field Experiment. *Quarterly Journal of Economics 123*(4), 1329–1372.

de Mel, S., D. J. McKenzie, and C. Woodruff (2009). Measuring Microenterprise Profits: Must We Ask How the Sausage is Made? *Journal of Development Economics 88*(1), 19–31.

Dupas, P. and J. Robinson (2009). Savings Constraints and Microenterprise Development: Evidence from a Field Experiment in Kenya. mimeo, UCLA.

Evans, D. S. and B. Jovanovic (1989). An Estimated Model of Entrepreneurial Choice under Liquidity Constraints. *Journal of Political Economy 97*(4), 808–827.

Feigenberg, B., E. Field, and R. Pande (May 2010). Building Social Capital through Microfinance. NBER Working Paper No.16018.

Field, E. and R. Pande (2008). Repayment Frequency and Default in Micro-finance: Evidence from India. *Journal of European Economic Association Papers and Proceedings 6*(2-3), 501–550.

Fischer, G. and M. Ghatak (2010). Repayment Frequency in Microfinance Contracts with Present-Biased Borrowers. Working Paper, London School of Economics.

Gentry, W. and G. Hubbard (2004). Entrepreneurship and Household Saving. *Advances in Economic Analysis and Policy 4*.

Ghatak, M. and T. W. Guinnane (1999). The Economics of Lending with Joint Liability: Theory and Practice. *Journal of Development Economics 60*, 195–228.

Glennon, D. and P. Nigro (2005). Measuring the Default Risk of Small Business Loans: A Survival Analysis Approach. *Journal of Money, Credit and Banking 37*(5), 923–947.

Gonzalez, A. (2010). Is Microfinance Growing Too Fast? *Microfinance Information Exchange MIX Data Brief No.5*.

Hurst, E. and A. Lusardi (2004). Liquidity Constraints, Household Wealth, and Entrepreneurship. *Journal of Political Economy 112*, 319–347.

Jensen, M. C. and W. H. Meckling (1976). Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure. *Journal of Financial Economics 3*, 305–360.

Kaboski, J. and R. M. Townsend (2011). A Structural Evaluation of a Large-Scale Quasi-Experimental Microfinance Initiative. *Econometrica*. Forthcoming.

Karlan, D. and J. Zinman (2009, November). Observing Unobservables: Identifiying Information Asymmetries With a Consumer Credit Field Experiment. *Econometrica 77*(6), 1993–2008.

Karlan, D. and J. Zinman (2011, June). Microcredit in Theory and Practice: Using Randomized Credit Scoring for Impact Evaluation. *Science 332*(6035), 1278–1284.

Leland, H. E. and K. B. Toft (1996). Optimal Capital Structure, Endogenous Bankruptcy, and the Term Structure of Credit Spreads. *Journal of Finance 51*, 987–1019.

Lindh, T. and H. Ohlsson (1996). Self-Employment and Windfall Gains: Evidence from the Swedish Lottery. *The Economic Journal 106*, 1515–1526.

McIntosh, C. (2008). Estimating Treatment Effects from Spatial Policy Experiments: An Application to Ugandan Microfinance. *Review of Economics and Statistics 90*(1), 15–28.

McKenzie, D. and C. Woodruff (2008). Experimental Evidence on Returns to Capital and Access to Finance in Mexico. *The World Bank Economic Review 22*(3), 457–482.

Myers, S. (1977). Determinants of Corporate Borrowing. *Journal of Financial Economics 5*, 147–175.

Tirole, J. (2005). *The Theory of Corporate Finance*. Princeton University Press.

7 Theory Appendix

Investment Choices under Different Contracts With a grace-period contract, client i's expected utility from the two alternatives are :

1. Invest B in the risky asset:

$$p_g(BR_g - P) - (1 - p_g)D_i \tag{9}$$

2. Invest $B - P/R_L^2$ in risky asset (and rest in liquid asset):

$$p_g R_g(B - P/R_L^2) \tag{10}$$

Combining equations (9) and (10) shows that client i will reduce investment in the risky asset to $B - P/R_L^2$ if and only if:

$$D_i > \frac{p_g}{1 - p_g} P(\frac{R_g}{R_L^2} - 1) \equiv D_{bn}^{gp} \tag{11}$$

That is, as long as p_g and R_g are high enough relative to R_L, she will choose the risky investment and with probability $(1 - p_g)$, default at $t = 2$.

With a regular contract client i's expected utility associated with investment choices are:

1. Invest B in the risky asset: $p_g R_g B - D_i$
2. Invest only enough in the liquid asset to pay the first installment: $p_g(R_g(B - P_1/R_L) - P_2) - (1 - p_g)D_i$
3. Invest enough in the liquid asset to pay the first and second installments:

   $p_g R_g(B - P_1/R_L - P_2/R_L^2)$

Proof of Claim 1 Investment payoffs for a regular contract client are:

1. Invest everything in the risky asset: $p_g R_g B - D$
2. Invest only enough in the liquid asset to pay the first installment: $p_g(R_g(B - P_1/R_L) - P_2) - (1 - p_g)D$
3. Invest enough in the liquid asset to pay the first and second installments:

   $p_g R_g(B - P_1/R_L - P_2/R_L^2)$

which yield cut-offs for the default cost:

$$D_{bf} \equiv \frac{p_g}{1 - p_g}(R_g/R_L^2 - 1)P_2 \tag{12}$$

$$D_{bn} \equiv p_g R_g(P_1/R_L + P_2/R_L^2) \tag{13}$$

$$D_{fn} \equiv \frac{R_g P_1}{R_L} + P_2 \tag{14}$$

There are two possible orderings of the cut-offs, depending upon whether it is ever optimal to set aside only the first installment. There will be an interval of default costs such that setting aside only the first installment is optimal if and only if $D_{fn} < D_{bf}$. In this case, $D_{fn} < D_{bn} < D_{bf}$, and for $D < D_{fn}$, the borrower will optimally invest all her money in the risky asset. For $D \in [D_{fn}, D_{bf}]$, it is optimal to set aside money for just the first installment, and for $D > D_{bf}$ it is optimal to set aside money for both installments.

Alternatively, if $D_{fn} > D_{bf}$, then $D_{bf} < D_{bn} < D_{fn}$, and so it is never optimal to set aside money for the first installment only. Under this ordering, the investor switches from setting aside money for neither installment to setting aside money for both installments when D crosses D_{bn}. As a result, the second ordering holds if and only if $D_{fn} > D_{bn}$ or

$$\frac{P_1}{P_2} > \frac{p_g R_g - R_L^2}{R_L R_g (1 - p_g)}$$

which is the condition given in the text defining the cut-off value for P_1.

Proof of Claim 2 For small enough P_1 Equation 7 is reversed, and as shown in the proof of Claim 1, we will have $D_{fn} < D_{bn} < D_{bf}$. Since $D_{bf} < D_{bf} + (\frac{R_g}{R_L^2} - 1)\frac{p_g}{1-p_g}P_1 = D_{bn}^{gp}$ for $P_1 > 0$, Claim 2 follows by definition of the default cut-offs D_{fn}, D_{bn}, D_{bf} and D_{bn}^{gp}. Figure 4 presents the result graphically.

Proof of Claim 3 As P_1 increases, Equation 7 will eventually hold. Once it does, as shown in the proof of Claim 1, we will have $D_{bf} < D_{bn} < D_{fn}$. Under this ordering, the investor switches from setting aside money for neither installment to setting aside money for both installments when D crosses D_{bn}. Therefore, we must show that $D_{bn}^{gp} > D^{bn}$ or equivalently:

$$p_g R_g (\frac{P_1}{R_L} + \frac{P_2}{R_L^2}) < p_g R_g \frac{P_1 + P_2}{R_L^2} + \frac{p_g}{1 - p_g} P (\frac{p_g R_g}{R_L^2} - 1)$$

Assumption 2 ensures that this inequality holds (also see Figure 5).

Proof of Predictions 1 and 2 We wish to show that the probability of default, variance of profits and level of profits are all larger for the pool of clients on the grace-period contract as compared with the early-payment contract. Let $g_{gp}(x)$ denote the default probability, variance or profit for a client on the grace-period contract with default cost $D = x$. And let $g_e(x)$ denote the default probability, variance or profit for a client on the contract requiring early payment. We wish to show that

$$\int_0^\infty g_{gp}(x) f(x) dx > \int_0^\infty g_e(x) f(x) dx$$

Note that for any integrable functions $g_1(x)$ and $g_0(x)$ with $g_1(x) \geq g_0(x)\ \forall\ x$ with strict inequality for all x in some non-empty interval $[x_l, x_h]$:

$$\int_0^\infty g_1(x)f(x)dx > \int_0^\infty g_0(x)f(x)dx$$

All that remains is to show that $g_{gp}(x) \geq g_e(x)\ \forall\ x$ with strict inequality for all x in some non-empty interval $[x_l, x_h]$ for each of default probability, variance and profit.

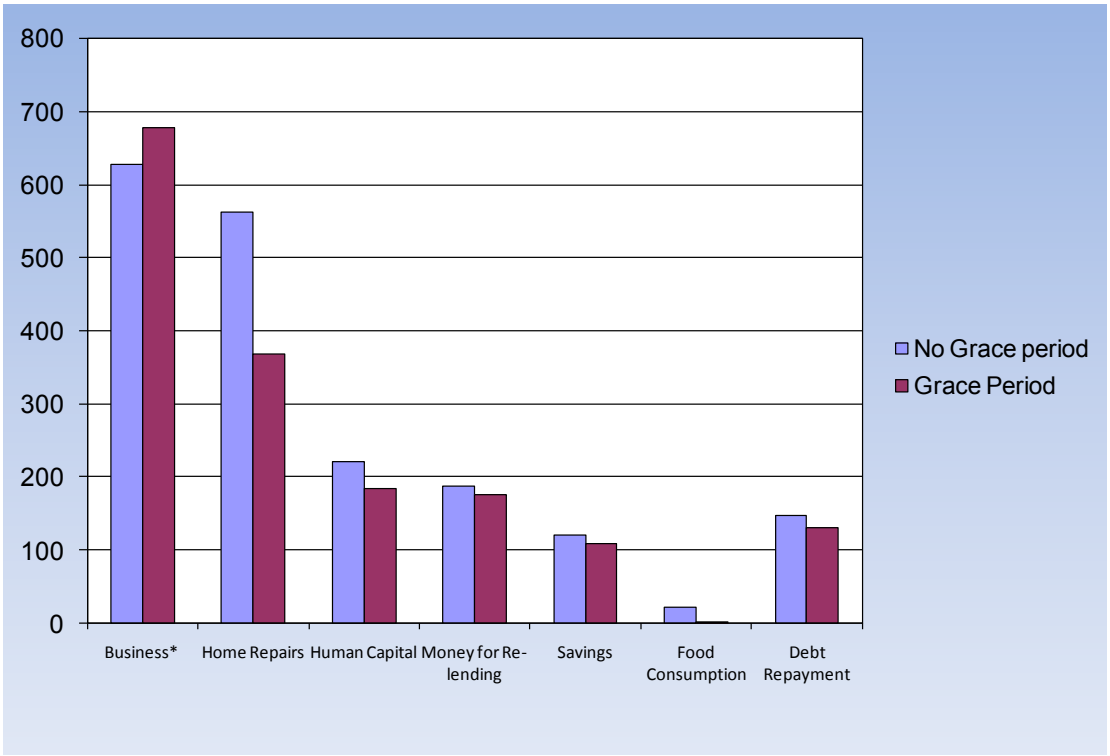
Consider first the probability of default, so that $g_{gp}(x)$ is the probability that a client with a grace-period contract and default cost $D = x$ defaults, and $g_e(x)$ is the probability that a client with positive early-payment obligation defaults. For clients with a grace-period contract, the probability of default is $1 - p_g$ if no payments are set aside and 0 otherwise. For clients with a contract requiring early-payment, the probability of default is 1 if neither payment is set aside, $1 - p_g$ if only the first payment is set aside and 0 if both payments are set aside. It then follows from Claims 1 and 2 that $g_{gp}(x) \geq g_e(x)\ \forall\ x \geq 0$ and that it holds with strict inequality for $x \in [D_{bf}, D_{bn}^{gp}]$ if P_1 is small (Equation 7 does not hold) and holds with strict inequality for $x \in [D_{bn}, D_{bn}^{gp}]$ if P_1 is large enough (Equation 7 holds).

Next, let $g_{gp}(x)$ and $g_e(x)$ denote the level of profits. We define profit as revenue from investments made net of loan payments. All results continue to hold with if we normalize profit by subtracting the investment size B. A client who invests the full loan in the illiquid asset will receive expected profits $p_g(R_gB - P)$ regardless of the contract she faces. This pay-off is larger than the expected profit for a client on an early-payment contract who either chooses to set aside the first payment ($p_g(R_g(B - \frac{P_1}{R_L}) - P_2)$) or both payments ($p_gR_g(B - \frac{P_1}{R_L} - \frac{P_2}{R_L^2})$). Finally, profits for a grace-period client who sets aside both payments ($p_gR_g(B - \frac{P}{R_L^2})$ are greater than profits for an early-payment client who sets aside both payments.

Using Claims 1 and 2, we have that $g_{gp}(x) \geq g_e(x)\ \forall\ x \geq 0$ and that it holds with strict inequality for $x \in [D_{fn}, D_{bn}^{gp}]$ if P_1 is small (Equation 7 does not hold) and holds with strict inequality for $x \in [D_{bn}, D_{bn}^{gp}]$ if P_1 is large enough (Equation 7 holds). Note that the profit

differential is widened by the fact that default is a utility cost and therefore because the grace-period clients default default more, comparing profits rather than pay-offs widens the gap between grace-period and early payment clients.

Finally, note that the variance of profits is simply given by $p_g(1-p_g)(R_gI)^2$ where I is the amount invested in the illiquid asset. This shows that the variance of profits is strictly increasing in the amount invested in the illiquid asset. Claims 1 and 2 show that the amount invested in the illiquid asset under the grace-period contract is greater than or equal to the amount invested under the early payment contract with strict inequality for cost of default $x \in [D_{fn}, D_{bn}^{gp}]$ if P_1 is small (Equation 7 does not hold) and cost of default $x \in [D_{bn}, D_{bn}^{gp}]$ if P_1 is large enough (Equation 7 holds). Therefore, it follows that the variance of profits under the grace-period and early payment contracts satisfy the same conditions, which is what we set out to prove.



* scaled down by factor of 10

Figure 1: Loan Expenditure Categories by Grace Period and No Grace Period Clients

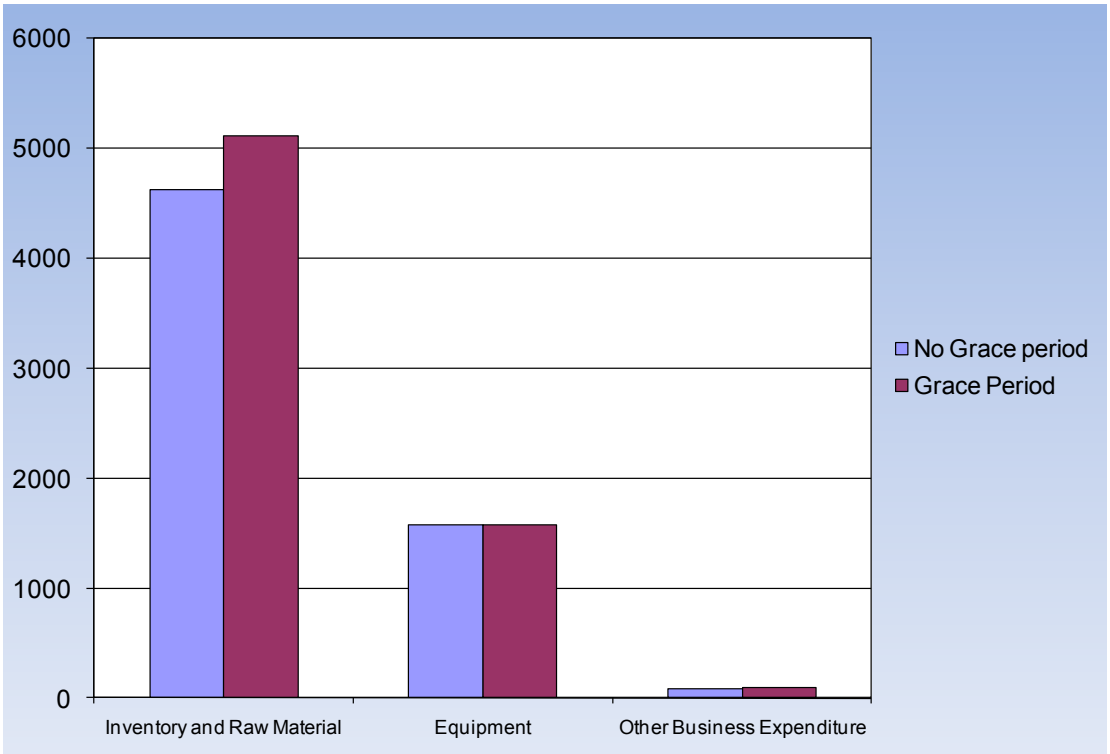


Figure 2: Business Expenditure Categories by Grace Period and No Grace Period Clients

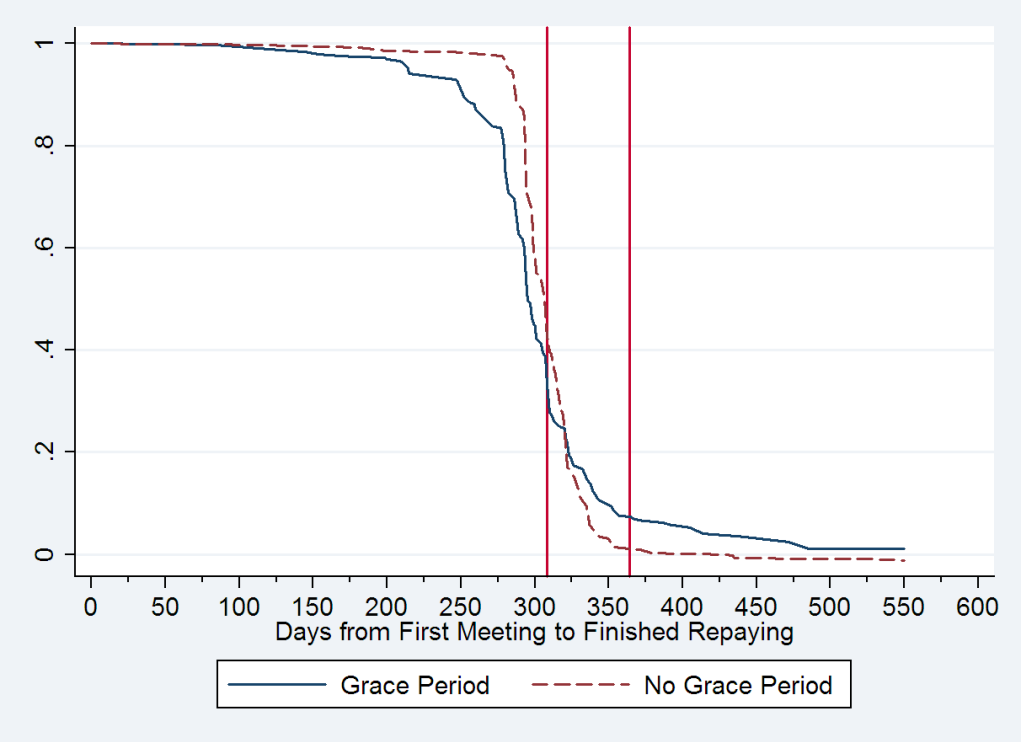


Figure 3: Fraction of Clients Who Have Not Repaid

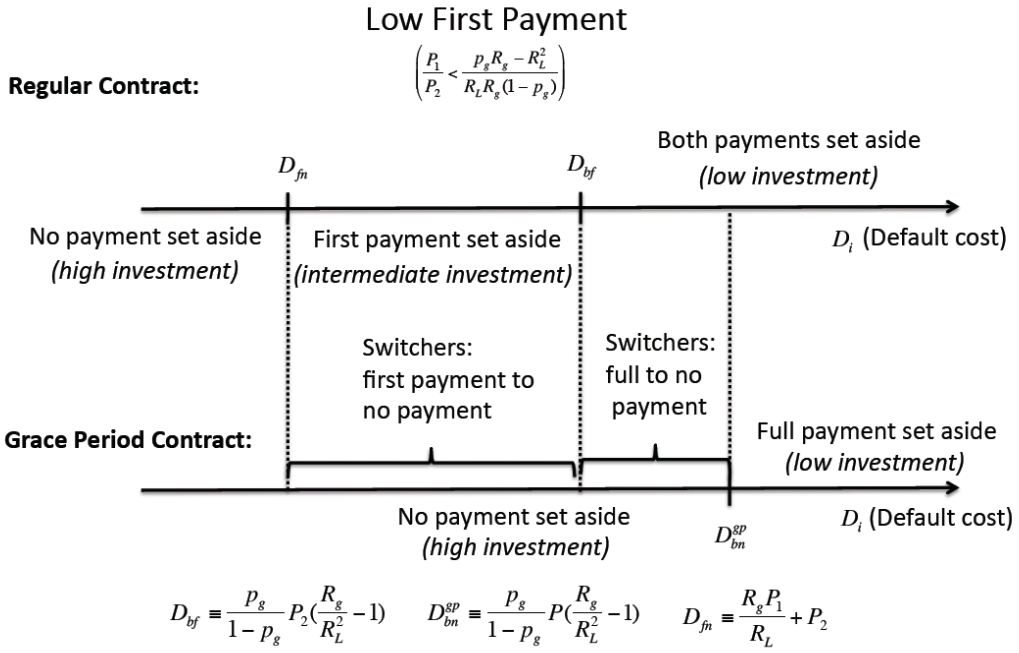


Figure 4: Grace period contract vs. regular contract

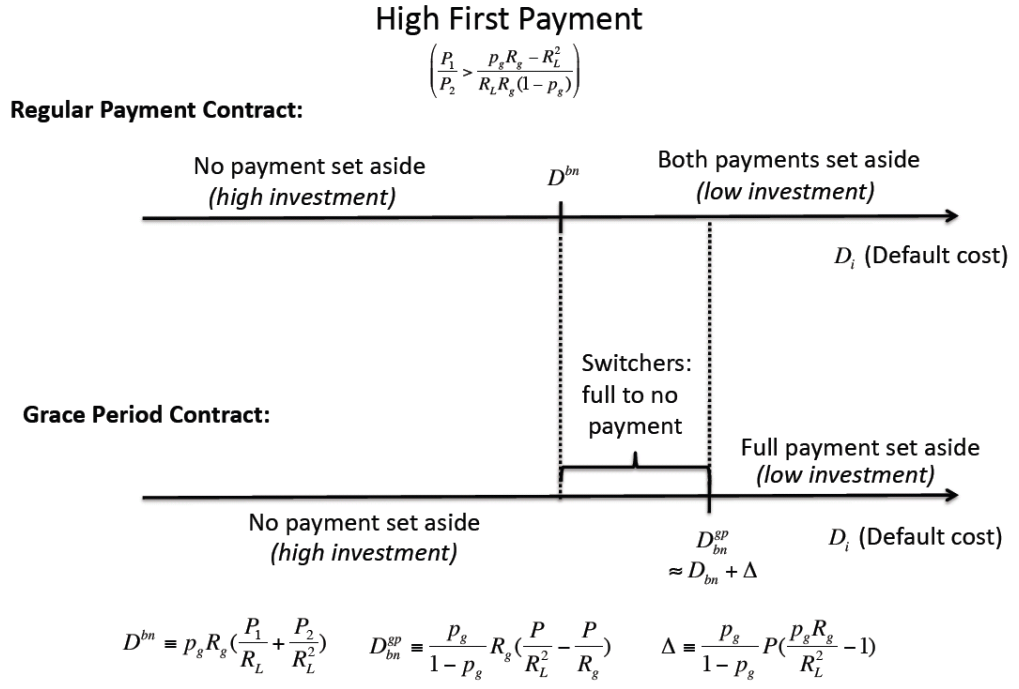


Figure 5: Grace period contract vs. regular contract

Table 1: Randomization Check

	Control	Treat	Survey 1	Survey 2	Survey 3
	(1)	(2)	(3)	(4)	(5)
Panel A: Controls for subsequent specifications (where indicated that controls included)					
Age	34.5080	33.7990	-0.7131	-0.6563	-0.5909
	(0.408)	(0.413)	(0.573)	(0.5976)	(0.5916)
Married	0.9110	0.8640	-0.0470**	-0.0509**	-0.0615***
	(0.014)	(0.017)	(0.0223)	(0.0229)	(0.0221)
Muslim	0.0070	0.0220	0.0145	0.0130	0.0159
	(0.004)	(0.007)	(0.0125)	(0.0121)	(0.0136)
Years of Education	6.6090	6.4880	-0.1200	-0.2625	-0.2566
	(0.172)	(0.195)	(0.3316)	(0.3434)	(0.3441)
Household Size	4.0680	4.1800	0.1106	0.1574	0.0961
	(0.069)	(0.071)	(0.1042)	(0.1071)	(0.1096)
Household Shock	0.6070	0.6320	0.0248	0.0092	0.0132
	(0.024)	(0.024)	(0.0609)	(0.0629)	(0.0616)
Has a Business (Narrow	0.7720	0.7850	0.0129	0.0122	0.0199
	(0.02)	(0.02)	(0.0407)	(0.0423)	(0.0422)
Owns Home	0.8160	0.8090	-0.0071	0.0174	-0.0006
	(0.019)	(0.019)	(0.0344)	(0.0351)	(0.0352)
Has Financial Control	0.8380	0.8250	-0.0134	-0.0100	-0.0162
	(0.018)	(0.019)	(0.0391)	(0.0408)	(0.0409)
Loan Amt 4000 RPS	0.0120	0.0140	0.0025	0.0052	0.0028
	(0.005)	(0.006)	(0.0102)	(0.0088)	(0.0112)
Loan Amt 5000 RPS	0.0470	0.0380	-0.0093	-0.0100	-0.0046
	(0.01)	(0.009)	(0.0186)	(0.0195)	(0.0199)
Loan Amt 6000 RPS	0.2890	0.2310	-0.0579	-0.0597	-0.0617
	(0.022)	(0.021)	(0.0436)	(0.0447)	(0.0427)
Loan Amt 8000 RPS	0.5670	0.5810	0.0162	0.0051	0.0102
	(0.024)	(0.024)	(0.0506)	(0.0051)	(0.0508)
Loan Amt 9000 RPS	0.0000	0.0050	0.0047	0.0503	0.0052
	(0)	(0.003)	(0.0047)	(0.0376)	(0.0052)
Loan Amount 10000	0.0820	0.1310	0.0461	0.0000	0.0507
	(0.013)	(0.017)	(0.0368)	(0)	(0.0371)
No Drain in Neighborhood	0.1290	0.1050	-0.0239	-0.0179	-0.0210
	(0.016)	(0.015)	(0.0365)	(0.0383)	(0.0383)
Joint Test p-value			0.1948	0.1581	0.156
Panel B: Additional summary statistics					
Has a Business (Broad definition)	0.9770	0.9790	0.0023	-0.0003	0.0023
	(0.008)	(0.007)	(0.0102)	(0.0105)	(0.0102)
Waged work	0.2000	0.2040	0.0046	0.0186	0.0297
	(0.019)	(0.02)	(0.0334)	(0.0348)	(0.0347)
Has Savings	0.3110	0.3450	0.0341	0.0372	0.0298
	(0.022)	(0.024)	(0.0405)	(0.0426)	(0.042)
Socioeconomic Index (PCA)	-0.1030	0.1050	0.2011	0.1819	0.1734
	(0.07)	(0.072)	(0.1272)	(0.1288)	(0.1325)
Lost workdays due to shock (broad measure of shock)	0.1860	0.1340	-0.0522	-0.0437	-0.0621
	(0.019)	(0.017)	(0.0371)	(0.0391)	(0.039)
Spent money due to shock (broad measure of shock)	0.0550	0.0610	0.0059	0.0085	0.0093
	(0.011)	(0.012)	(0.0201)	(0.021)	(0.0213)
Had Non-VFS loan in past year from baseline	0.0630	0.0360	-0.0263	-0.0308	-0.0334
	(0.014)	(0.012)	(0.0208)	(0.0218)	(0.0226)
Manages HH business	0.7840	0.7990	0.0147	0.0217	0.0070
	(0.022)	(0.022)	(0.0384)	(0.039)	(0.0382)

* significant at 10% level ** significant at 5% level *** significant at 1% level

(1) Columns (1) and (2) report means with standard deviations in parentheses.

(2) Columns (3) to (5) report test of differences of means across columns (1) and (2) for Surveys 1, 2, and 3 where survey 1 is the baseline survey, survey 2 is the endline survey, and survey 3 is the long-run business survey

(3) Joint Test is the Chi-Sq. Statistic, which is computed by jointly estimating a system of seemingly unrelated regressions where the explanatory variable is a dummy for grace period with standard errors adjusted for within loan group correlation and the regressions include stratification dummies

(4) Household shock is a dummy for whether household has experienced a birth, death, or heavy rain or flood in the last 30 days

(5) Has a Business (Narrow definition) is a dummy for whether household reported having at least one business in operation at baseline, excluding businesses formed during the 30 days prior to loan group formation and businesses formed after loan group formation.

(6) Has Financial Control is a dummy for whether client answered "yes" to the following question: "If a close relative like your

(7) Table 1 omits the residual category of loan size 7000 RPS.

(8) Has a Business (Broad definition) is a dummy for whether according to the business start and end dates reported by clients in Survey 3, the client would have had at least one business open at the time of the loan disbursement.

(9) Socieconomic Index is a principal component analysis index of whether the household had owned a radio, cassette player, camera, refrigerator, washing machine, heater, television, VCR, pressure lamp, tubewell, wristwatch, or clock for longer than one year. The question was not asked of 99 of the respondents and so they are excluded from the analysis of the SEI.

(10) Lost workdays and spent money due to shock reference any negative shocks the household reports in the last 30 days including birth, death, heavy rain/flood, or illness.

(11) The dummy variable measuring whether the client had non-VWS loan in past year is drawn from both the first intervention baseline and the second intervention baseline.

(12) Manages household business is a dummy variable measuring whether client answered that she was involved in the managing of and can answer detailed questions about at least one business that the household owns.

(13) All variables listed in Panel A are included in each regression in Tables 2-6 and Appendix Table 1 specified as including controls. Variables listed in Panel B are not used as controls.

Table 2: Impact of Grace Period on Loan Use and Business Formation

	Loan Use: Business			Loan Use: Non-business						
	All	Inventory and Raw Materials	Equipment	All	Home Repairs	Human Capital	Money for Relending	Savings	Food Consumption	New Business
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A (loan size controls)										
Grace Period	364.9**	337.1	8.786	-356.1**	-253.9*	-34.97	-27.42	-15.02	-24.81*	0.0268**
	(180.1)	(279.9)	(234.1)	(172.4)	(137.1)	(90.26)	(70.61)	(47.12)	(14.29)	(0.0135)
Panel B (with controls)										
Grace Period	383.9**	367.6	-14.40	-371.6**	-271.0*	-33.06	-30.13	-10.75	-26.62*	0.0258*
	(185.2)	(272.8)	(227.1)	(178.7)	(142.5)	(91.99)	(69.51)	(47.48)	(15.19)	(0.0139)
Observations	845	845	845	845	845	845	845	845	845	845
Control Mean	6142.4	4521.4	1536.5	1149.1	557.2	237.9	197.6	131.6	24.81	0.0178
	(162.4)	(226.3)	(172.4)	(149.1)	(116.0)	(76.88)	(56.74)	(35.97)	(14.60)	(0.00648)

Notes:

* significant at 10% level ** significant at 5% level *** significant at 1% level

(1) The outcomes in Columns (1) to (9) are category-wise spending of loan amount as reported by client (in Rs.). The outcome in column (10) is an indicator variable which equals one if the household reported having started a business up to 30 days before or up to 30 days after loan disbursal

(2) Regressions include stratification fixed effects, and standard errors are clustered by loan group . Regressions in Panel A include loan size controls. Regressions in Panel B also include all controls presented in Panel A of Table 1 and loan officer fixed effects. In cases when a control variable is missing, its value is set to zero and a dummy is included for whether the variable is missing.

Table 3: Impact of Grace Period on Long Run Income and Profits

	Log of monthly HH income		Average Weekly Profits		Variability of Average Weekly Profits (Tens of Thousands)		Average Difference in Profits Between High and Low Profit Months
	All	Trimmed	All	Trimmed	All	Trimmed	All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A (no controls)							
Grace Period	0.195**	0.182**	906.5**	503.8***	4399	474***	686.6*
	(0.0805)	(0.0804)	(373.7)	(182.8)	(3660)	(169)	(375.683)
Panel B (with controls)							
Grace Period	0.199**	0.192**	902.9**	486.5***	4363	420***	679.0*
	(0.0782)	(0.0775)	(370.2)	(176.8)	(3650)	(142)	(383.566)
Observations	749	745	752	748	752	748	751
Control Mean	20,544	17,960	1586.9	1513.8	5398	344	2361.6
	(56,419)	(25,432)	(121.8)	(102.7)	(1985)	(494)	(242.0)

Notes:

* significant at 10% level ** significant at 5% level *** significant at 1% level

(1) The outcome variables are (a) "During the past 30 days, how much total income did your household earn?" (columns 1 and 2); (b) "Can you please tell us the average weekly profit you have now or when your business was last operational?" (columns 3 and 4). Variability in average weekly profits is defined as the square distance of household profits from the mean of profits, where mean profits are calculated separately for treatment and control. Clients were asked to report profits during high and low profit months. Column (7) reports the averaged difference in profits between high and low profit months across all household businesses.

(2) Regressions include stratification fixed effects, and standard errors are clustered by loan group. Regressions in Panel B also include all controls presented in Panel A of Table 1 and loan officer fixed effects. In cases when a control variable is missing, its value is set to zero and a dummy is included for whether the variable is missing. The trimmed sample excludes the top 0.5% of outcome values, which means the sample is reduced by 4 observation in the trimmed regressions.

Table 4: Impact of Grace Period on Business Size

	Raw Materials and Inventory		Equipment		Number of Workers	Business Closure	Sold Goods or Services at a Discount to Make Loan Payment
	All	Trimmed	All	Trimmed	All	All	All
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A (no controls)							
Grace Period	4916.3**	3269.5**	23,854**	13,875**	0.363	-0.0718**	-0.0232*
	(2166.6)	(1601.7)	(10,564)	(6485.9)	(0.310)	(0.0324)	(0.0128)
Panel B (with controls)							
Grace Period	5434.6**	3617.1**	30,299**	17,272***	0.277	-0.0597*	-0.0194
	(2395.5)	(1618.2)	(12,219)	(6628.2)	(0.277)	(0.0335)	(0.0127)
Observations	766	762	766	762	751	766	764
Control Mean	6586.2	6083.8	29,144	26,557	2.534	0.386	0.0468
	(953.8)	(851.3)	(4811.8)	(3987.1)	(0.180)	(0.0243)	(0.0112)

Notes:

* significant at 10% level ** significant at 5% level *** significant at 1% level

(1) The outcome variables are: total value (Rs.) of raw materials and inventory (columns 1 and 2), and equipment (columns 3 and 4) clients report having in all businesses in operation at the time of the survey. Column (5) outcome is the total number of workers clients report in all of their businesses at the time of their survey (including themselves). Column (6) outcome is whether a client reported having closed a household business that was operating at the time of loan disbursement. We counted a seasonal business as a business currently in operation. The outcome in column (7) is whether clients reported having sold their goods or services at a discount to make a loan payment.

(2) Columns (2) and (4) run the regression on a trimmed sample, which excludes the top 0.5% of outcome values, which means the sample is reduced by 4 observation in the trimmed regressions

(3) Regressions include stratification fixed effects, and standard errors are clustered by loan group. Regressions in Panel B also include all controls presented in Panel A of Table 1 and loan officer fixed effects. In cases when a control variable is missing, its value is set to zero and a dummy is included for whether the variable is missing.

Table 5: Impact of Grace Period on Business Behavior

	Customers Buy on Credit	Percent of Customers that Buy on Credit	Customers Pre-Order Goods or Service	Percent of Customers that Pre-Order Goods or Services	Number of Goods and Services Provided
	(1)	(2)	(3)	(4)	(5)
Panel A (no controls)					
Grace Period	0.0972**	5.686**	0.0989***	4.937*	5.543**
	(0.0373)	(2.431)	(0.0356)	(2.902)	(2.467)
Panel B (with controls)					
Grace Period	0.113**	6.132*	0.112**	5.824	6.311*
	(0.0369)	(2.359)	(0.036)	(2.993)	(2.716)
Observations	769	769	769	769	769
Control Mean	0.432	20.65	0.395	23.65	5.607
	(0.0270)	(1.601)	(0.0236)	(1.981)	(0.475)

Notes:

* significant at 10% level ** significant at 5% level *** significant at 1% level

(1) Columns (1) to (5) show the impact of grace period on whether clients report that they had customers who bought from them on credit and what percent of their customers bought on credit (Columns (1) and (2)) , whether clients report that they had customers who pre-ordered goods or services from them and what percent of their customers pre-ordered (Columns (3) and (4)) and the number of types of goods or services clients offered to their customers (Column 5).

(2) Regressions include stratification fixed effects, and standard errors are clustered by loan group. Regressions in Panel B also include all controls presented in Panel A of Table 1 and loan officer fixed effects. In cases when a control variable is missing, its value is set to zero and a dummy is included for whether the variable is missing.

Table 6: Impact of Grace Period on Default

	Full loan not repaid				Repayment History		
	Within 8 Weeks of Due Date	Within 24 Weeks of Due Date	Within 52 Weeks of Due Date	Amount Outstanding Within 52 Weeks of Due Date	Repaid at Least 50 Percent of the Loan	Made First Half of Loan Repayments on Time	Made First Payment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A (no controls)							
Grace Period	0.0901**	0.0696**	0.0614**	148.7*	-0.0137	-0.00842	0.0288
	(0.0349)	(0.0280)	(0.0251)	(83.61)	(0.0151)	(0.0613)	(0.0261)
Panel B (with controls)							
Grace Period	0.0839**	0.0649**	0.0615**	149.7*	-0.0152	-0.0219	0.0239
	(0.0332)	(0.0266)	(0.0253)	(85.00)	(0.0162)	(0.0535)	(0.0238)
Observations	845	845	845	845	845	845	845
Control Mean	0.0424	0.0212	0.0165	69.65	0.988	0.501	0.953
	(0.0142)	(0.0101)	(0.00899)	(40.15)	(0.00774)	(0.0427)	(0.0231)

Notes:

* significant at 10% level ** significant at 5% level *** significant at 1% level

(1) Columns (1) to (3) report the impact of grace period on default rates, as measured at increasing number of weeks after due date. Column (4) reports the outstanding balance on the loan by clients who had not repaid within 52 weeks of the due date. The outstanding amount is defined as the loan amount plus the interest minus the 10% security deposit given by clients prior to loan disbursal. Columns (5) and (6) report whether clients paid at least fifty percent of their loan balance (updated as recently as January 2010) and whether they were able to make their first loan payment on time (column 7). All outcomes are constructed using administrative and group meeting data.

(2) Regressions include stratification fixed effects, and standard errors are clustered by loan group. Regressions in Panel B also include all controls presented in Panel A of Table 1 and loan officer fixed effects. In cases when a control variable is missing, its value is set to zero and a dummy is included for whether the variable is missing.