Term Structure of Debt Structure and Entrepreneurship? Experimental Evidence from Microfinance

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Abstract

This paper provides an experimental evaluation of how the term structure of debt influences entrepreneurship among poor borrowers. We contrast the classic microfinance contract which requires that repayment begin immediately after loan disbursement with a contract that provides a two-month grace period. The shift to a grace period contract increased short-run business investments and long-run profits. At the same time, we observe higher variance of profits and a tripling of default rates. These findings suggest an economic environment in which entrepreneurs have access to high return illiquid investment opportunities but face borrowing constraints. Debt contracts that require early initiation of repayment discourage risky investments but thereby limit the potential impact of microfinance on microenterprise growth and household poverty.

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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 – a classic example being the microfinance loan contract (Daley-Harris, 2006). In 2008, microfinance institutions had an estimated 130-190 million borrowers worldwide and outstanding microfinance loans stood at more than $43 billion (Gonzalez, 2010). Yet, while credit constraints are assumed to be a key factor limiting small business expansion, emerging empirical evidence suggests limited impact of microfinance borrowing on microenterprise growth (Banerjee et al., 2009; Karlan and Zinman, 2009; Kaboski and Townsend, 2011) despite evidence of high returns to capital in small-scale enterprises in developing countries (de Mel et al., 2008).

This paper examines whether the immediate repayment obligations of the classic microfinance contract – widely held as important for limiting default – inhibit entrepreneurship by making high-return investments too risky. To do so, we conducted a field experiment with poor urban microfinance clients to evaluate the short- and long-run impacts of relaxing the liquidity demands imposed by the classic "Grameen Bank" contract early in the loan cycle.

Like most microfinance borrowers, clients in our sample were engaged in microenterprise activity in the informal service sector.[1]After our partner microfinance institution (MFI) had formed loan groups of five clients, we randomly assigned groups 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 contract that contained 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

[1]The two most common activities among clients in our sample were running a convenience store and selling clothes and the average household business had two employees.

of a grace period led to a significant change in business activity and household well-being: Micro-enterprise investment was approximately 6.0% higher 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, 30% and 17% higher. While these differences in profits may appear large, a simple accounting exercise verifies that our results are well within the range of what we would anticipate under 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 that they were willing 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, our findings strongly point to an economic environment in which clients face significant borrowing constraints and in which riskier investment choices yield higher returns, an interpretation that is also supported by case study evidence. We use a simple model of financial contracting to clarify the circumstances under which introducing a grace period into the debt contract can make investment in high-return but illiquid alternatives more viable and, in turn, increase expected business profits. However, at the same time default rates can rise. The reason is that in the presence of borrowing constraints relatively illiquid investments remain riskier (or, more generally, relatively illiquid investments increase the expected variance of income by reducing short-run ability to deal with shocks). Hence, as clients shift to less liquid investments, the clients' variance of income and therefore probability of default increases. Put differently, by encouraging less risky investment choices,

immediate repayment obligations may simultaneously limit default *and* income growth.

While there is a growing empirical literature on the impact of microfinance on income 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 (e.g. Fischer and Ghatak (2010)).[2]

In contrast, the idea that the structure of debt contracts influences entrepreneurial risk-taking behavior exists in many corporate finance models. (See, for example, Tirole (2005) or Ghatak and Guinnane (1999) for an application to micro-credit in particular.) A unique feature of our model is that, unlike much of the micro-credit literature, we assume that riskier investments yield higher returns. Therefore, the incentives of a default-averse MFI are no longer aligned with maximizing expected returns.[3] This leads MFIs to select a contract under which clients forego higher return projects in order to minimize short-run risk, consistent with the empirical patterns observed in the data.

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. Sections 5 calculate the long-run increases in profit implied by our model for comparison with the empirical findings and discuss alternative implications. Section 6 concludes.

[2]Fischer and Ghatak (2010) show that the existence of present biased borrowers may lead to the optimal contract (in terms of loan size) requiring frequent small repayments. On the empirical front, non-experimental 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).

[3]There are many reasons to anticipate default aversion among MFIs, including the strict regulatory environment in much of the developing world.

2 Microfinance Contract Experiment

Our study was conducted with Village Financial Services (VFS), an MFI that makes individual-liability loans to women in low-income neighborhoods of Kolkata. In this section, we describe the study design, sample population and empirical strategy.

2.1 Experimental Design

Between March and December 2007 we formed 169 five-member loan groups giving us a 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 clients were required to repay fortnightly over the course of 44 weeks. Repayment occurred in a group setting at a neighborhood meeting conducted every two weeks by a loan officer in one group member's home (on the conduct of group meetings, also see Feigenberg et al. (2010)). In addition, both groups faced the same interest charges. However, since clients with a grace period had longer debt maturity (a total of 55 as opposed to 44 weeks before their full loan amount was due) and faced the same total interest charges, they also faced a slightly lower effective interest rate on the loan, although the potential income effect of this difference is minimal as demonstrated in Section 5.2.

2.2 Data

Our data is assembled from multiple sources. We first conducted surveys with clients that gathered information on household business activities, socio-economic status, and demographic characteristics at three points in time: shortly after they entered the study (Survey 1), shortly after they completed the experiment (Survey 2), and two years after the experiment had ended (Survey 3).

In Panel A, Table 1 we report time-invariant client characteristics such as client education and loan size from Survey 1 that can be used to conduct a randomization check. Panel B of Table 1 reports other client characteristics that are relevant to the analysis but excluded from the randomization check either because they are potentially influenced by treatment assignment or because the survey question was only administered to a subset of clients. The majority of clients are literate and married, and the average client has two children living at home. An important variable is whether the household had any microenterprise activity at the time of entering our study ("Has business"). In the absence of a true baseline survey, we construct this using Survey 1 data on the duration of existing household business activities.[4] Consistent with the type of clients targeted by many MFIs, over three-quarters of households in the sample ran some kind of microenterprise at the time they entered the study. In Figure 1, we show 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. Based on the more detailed business questions in Survey 3, virtually all households in the sample (97%) were engaged in some type of business activity around the time they were given a loan through our study ("Has Business (broad measure)").[5]

Households experience a high rate of shocks: 60% report a shock to household income

[4]It is possible that we miss business activities that closed between loan disbursement and Survey 1, but we expect this to be minimal since the vast majority of clients were administered Survey 1 within two months of entering the study.

[5]The difference in reported rates of business activity as measured in the baseline versus follow-up surveys is due to additional effort we put into capturing all possible forms of microenterprise ventures and self-employment in the follow-up, which we believe had been underestimated at baseline.

over the past month and 42% of clients report having missed days of work due to a shock within the last 30 days.[6] We also see that 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. In Panel A, treatment and control groups are imbalanced in only 1 out of 12 baseline characteristics (literacy), with the difference statistically significant at the 10% level. However, the 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.[7] 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 on average of 8 weeks after loan disbursement, to measure the fraction of clients who invest their loans into new businesses. Survey 2 was completed on average one year after loan disbursement by 93% of clients.[8] We use this survey, which contained a detailed loan use module, to study differences in short-run investment behavior. 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, relending and other.

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

[7]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.

[8]The survey 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.

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 clients entering our study were successfully recontacted and administered Survey 3.[9] 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 sample remains balanced even after accounting for attrition.

To study delinquency and default, we tracked client repayment behavior using two sources. First, we used VFS administrative data in which 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 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 Economic Impact of Debt Structure

We first document how the introduction of a grace period in the debt contract influenced the timing of loan repayment. We then estimate the direct impact of assignment to a grace period contract on short-run investment decisions and long-run income, profits, and default.

[9] Ten percent of clients were interviewed in November 2010 because they could not be tracked during this initial stage.

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). Throughout, we report regressions with and without the controls (X_{ig}) listed in Panel A of Table 1 and loan officer fixed effects. All regressions correct standard errors for clustering within loan groups, the unit of treatment assignment.

No client dropped out after assignment to contract schedule. Hence the intent to treat (ITT) estimates are the average treatment effects of being on a grace period contract.

3.2 First Stage Estimates

We begin by documenting the first stage impacts of our experimental manipulation. Our data come from a compilation of VFS transactions data and the data collected by loan officers at each group meeting and the results are presented in Table 2. Panels A and B report regressions without and with controls respectively.

We first consider 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 is due, column (1) shows that grace period clients made their first loan installment an average of 52 days after clients on the regular contract, or approximately two months later.[11] Next, we examine the time interval between two successive repayments.

[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] The results for the dependent variable loan disbursement to repayment date are very similar. In practice, clients often choose to repay the loan before it is actually due, although they are prohibited from repaying in full before five months after loan disbursal. Separate estimates (unreported) show that clients do not choose to repay early at a significantly higher rate when offered the grace period.

For each client, we consider all meetings that occurred over the first 120 days of the loan cycle, starting with the first repayment meeting. Column (2) shows that treatment assignment has 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). In column (3) we examine whether contract-type influenced the duration of group meeting. The average repayment meeting lasted 18 minutes and was not influenced by contract type. Finally, in column (4) our outcome of interest is an index of network ties between group members. Here, we use information on social and financial interactions among group members from Survey 2. We do not observe any difference in network ties across clients on different contract types.

3.3 Loan Use and New Business Formation

A first question of interest is whether the introduction of a grace period influenced loan use. Figure 2 shows average 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 82% of her loan on business-related activities. The second largest category was home repairs. However, only 8.5% of clients report spending on home repairs. Relative to clients on a regular contract, grace period clients appear to increase business spending and reduce spending on house repairs.

In Figure 3, we decompose business spending into three categories: inventory and raw materials, business equipment and other. The difference in business spending across clients on regular and grace period contracts appears to be driven by differences in spending on inputs, composed of inventory purchases and raw materials. Close to 70% of clients report spending in this category, which includes the three most common expenditures: saris, wood, and sewing materials. 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 from the investment. Meanwhile,

raw materials cannot be liquidated at cost once they have been transformed. The median client in our sample states that she would incur a loss of 25% if she had to liquidate her business stock in a day.

In Table 3, we investigate the statistical significance of these differences by estimating equation (1). Panel A and B report the coefficients from regressions without and with controls respectively. 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 between inventory and raw material 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. 26, column 9). We observe no changes in spending on education and health (human capital), savings and lending to others ("relending"). In column (10) we examine client responses to the question of whether they saved any of their loan for repayment purposes. Clients in the control group report saving (roughly) the first loan installment out of their loan. We observe a small (19%) but noisily estimated decline in savings for grace period clients.

Finally, we examine propensity to start a new business around the time of receiving the loan (column 11). The outcome variable is a dummy that equals one if a client reported starting a new business within a month of receiving the loan.[12] Overall, the rate of new

[12]For about half of 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 very close to the time of new business formation so is not subject to significant recall error. For the remainder of 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, combined with retrospective data on new business formation within a month of loan disbursal that were collected in Survey 3 (three years later). Hence, for the 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. Furthermore, the result is robust to excluding clients with incomplete Survey 1 data on new business formation (those surveyed fewer than 4 weeks after loan disbursal). See Appendix for a description of variable

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 three times as high among grace period clients. Nearly 5% of households in this group start new microenterprises at the start of the loan cycle, and the difference in rates of business formation is statistically significant at the 10% level with or without controls. In Figures 4 and 5 we show the breakdown of new business types for grace period and non-grace period clients, which reveals an increase in vendor businesses among grace period sample. Arguably, starting a new vendor business involves an inventory purchase that is illiquid in the short run.

In addition to being a key measure of entrepreneurial risk-taking, observing a difference in the rate of business formation also provides a consistency check on our business spending results. That is, one concern with changes in reported spending is that being on the grace period may have changed mental accounting but not actual expenditures. Specifically, clients may report spending more of their loan on investments without having significantly increased investments. Since business creation was measured independently of how a client reported spending her loan, it is not subject to the same concerns.

3.4 Long-Run Business Outcomes

Next we use the three-year follow-up data to study long-run differences in microenterprise profits and household income. These results are reported in Table 4. Both profits and income 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?" 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).

construction.

Columns (1) and (2) show that household income is an estimated 18% higher for grace period clients three years after loan disbursement (∼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, as we would expect. Households that were on a grace period contract report 30-54% higher weekly profits, which alone corresponds 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, not only is the level of profits higher for grace period clients in the long run but so is the variance. After excluding the four outlier observations, variance in profits is more than twice as high for grace period clients as it is for those on the regular contract and the difference is statistically significant at the 1% level. 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 variance in household profits for clients on the grace period contract.

Consistent with the profits results, columns (1)-(4) of Table 5 show that microenterprise activities in grace period households are around 50% larger in terms of assets and inventory. The untrimmed estimates (which include the four outliers that are in the top 0.5% of the distribution) are almost twice as large. Additionally, while the average household in the control group has only 2.53 workers employed in household businesses, the average grace period household has 2.89 workers, although the difference is not statistically significant (column 5). The fact that scale of business operations adjusts more rapidly than size of the microenterprise 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.[13]

Column (6) of Table 5 shows that, in addition to having larger and more profitable

[13]All results in Table 5 other than liquidating business assets to make loan payments are robust to the inclusion of control variables.

businesses in operation three years after receiving the loan, grace period clients are significantly less likely to report a business closure between loan disbursal and the three-year follow-up. In total, 39% of control group clients report a business closure as opposed to only 31.4% of grace period clients. While this result may seem at odds with grace period clients experiencing higher variance of profits (Table 4), since we only observe the profits of businesses that survived for three years, the combination of results suggests a scenario in which grace period clients are less likely to shut down businesses that do not earn a sufficiently high profit in the short run so surviving businesses have a higher variance of profits.

We also considered an alternative measure of business closure using an open-ended survey question that asked households to report all major changes that had occurred in each business they had operated since loan disbursement. We constructed a dummy variable indicating whether a household reported having closed its business during this period. Using this alternative measure of business closure, we find an effect size of similar magnitude (-.04) which is significant at the 5% level.[14]

The results suggest that immediate repayment obligations cause clients on the regular contract to forego long-run profits in order to minimize variance in short-run profits. Indeed, when we regress the treatment 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 set of findings on business closure and liquidation as direct evidence that introducing a grace period relaxes binding constraints on maintaining business operations in the face of fluctuations in demand or productivity. In other words, clients on a grace period contract feel less need to liquidate inventories early on in the loan cycle when faced with a shock to household income because they do not face repayment obligations. Alternatively, if the grace period encourages clients to shift into new business activities as

[14]Results available from authors.

Table 3, Column 11 indicates, they may have greater difficulty liquidating business assets at cost due to differences in the nature of business investments they have undertaken.

Given these findings, we last examine whether business practices were also influenced by the term structure of debt. In Table 6 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 43% of the clients in our sample claim that they regularly offer goods and services on credit, and 404% let clients pre-order items. Extending credit can be viewed as 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 9 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.

Although these differences in business behavior are consistent with the previous results on variance in profits, one important caveat in interpreting the Table 6 results is that, since the data were collected three years after the loan, it is not possible to identify whether higher willingness to undertake risky business behaviors is a direct consequence of having a grace period or an indirect consequence of grace period clients having larger and more profitable businesses.

3.5 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 the grace period contract has a corresponding effect on default. Figure 6 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 8 weeks after the loan was due. We observe a clear difference in the fraction of grace period clients that have repaid in full four months past the due date.

To test for the statistical significance of these patterns, in Table 7 we estimate regressions of experimental assignment on default using three default measures: whether the client repaid within 8, 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 6 to 9 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 (columns 3).

4 Making Sense of the Results

Our empirical results show very significant impacts of contractual form on short-run investment choices and long-run economic outcomes. Grace period clients increase their raw material and inventory holdings in the short run and are more likely to undertake business practices that reduce their short-run cash holdings. In a world with perfect credit markets, changing the term structure of debt while holding the interest rate fixed should not influence investment choices. However, since only 16% of the clients in our sample report having a non-VFS loan at baseline and only a third have any savings, perfect access to credit is unlikely to be a reasonable assumption. As a result, there is significant scope for the terms of the VFS loan to influence clients' investment choices.

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

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 clients from the two predominant occupations in our sample – a sari seller and a tailor (these two occupations each covered 12% of clients in the sample). Both business owners 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. The sari seller but not the tailor 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.

When asked directly how the grace period had influenced their loan expenditure, both respondents 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. Both respondents affirmed that, while they had saved a portion of their previous VFS loan (which had no grace period) to pay their first few installments, a two-month delay provided a sufficient time buffer to invest the full loan amount and expect a return that would arrive quickly enough and be large enough to at least cover the first installment. They said that expanding their investment increased short-run profits through economies of scale due to increasing volume. 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 for both entrepreneurs. Over 50% of the sari seller's clients bought on credit and repaid in small monthly installments. On average, she could sell 3,000 Rs. worth of merchandise for 3,800-4,500 Rs. However, during her low season, which was typically a non-consecutive third of the year, she earned as little as 300 Rs. per month. Her monthly payments on her 10,000 Rs. loan was 500 Rs. She felt that the grace period gave her a buffer against default in the case that she encountered a low month because she would be able to collect a sufficiently large amount from investing the full loan amount by the time repayment began to meet her subsequent loan payments.

Typically, repayment requirements during a month of low sales soon after taking the loan (when she had invested her full loan amount) would require her to liquidate part of her stock just to be able to repay her first installment. The sari seller explained that, if she were forced to liquidate, she may be able to sell a stock of 3,000 Rs. in 2 weeks for at most 3,500 Rs., although liquidating during a low season month would certainly mean selling saris at a loss. Additionally, liquidating would reduce earnings in subsequent months, putting her at a greater risk of default. The tailor gave a similar account of the grace period reducing his fear of being unable to make a payment during a low season.

In addition, the grace period increased long-run profits by encouraging them to experiment with new business opportunities. In particular, both subjects indicated some amount of willingness to take on greater entrepreneurial risk as the amount invested increased. For instance, in addition to increasing the stock of saris she was already selling, the sari seller chose to expand the variety of saris she was offering. In the case of the tailor, the VFS loan was invested in a sewing machine as well as raw materials to expand into the readymade market. This expansion had prompted him to establish connections in Assam, a neighboring state, where he occasionally sold his ready- made merchandise. Prior to the second loan, the tailor had operated his business with a borrowed sewing machine or sewing by hand. As a secondary effect, the tailor explained that the grace period made him feel less pressure so he found that he had worked fewer hours per day during the first two months after disbursal.

4.2 A Model of Debt Structure

This qualitative evidence helps motivate the assumptions underlying our simple model of debt structure and investment in risky business activities. A first key ingredient of our model is that clients face borrowing constraints and their only source for financing business investments is the MFI loan. To capture the intuition in the simplest possible manner, we consider the stark case of zero outside access to credit.

Second, investments differ along two dimensions: mean expected returns and time until returns are realized. Furthermore, 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, we assume that 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 and only 30% of the clients state that they would consider selling products or assets at a discount in order to meet the demands of such a shock.[15]

In accordance with VFS practices, we assume that MFI loans are (physical) collateral-free. The penalty for default is exclusion from future lending, which we model as a disutility that is heterogeneous across clients. Motivated by the fact that loans do not require physical collateral, we assume that the cost of default is independent of debt size and that the MFI cannot seize assets in case of default.

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 $t = 0$ the 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 $P_1 + P_2 = P$.[16] A 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. We assume that 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

[15] A different but related justification for this assumption is that, if investment returns are modeled as a random walk with positive drift, then the longer time horizon of illiquid investments will directly increase variance. It is also possible to construct a model that yields some of the same predictions by directly varying the riskiness and not the time horizon of the investment. However, in such a model the 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.

[16] Note that 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. We make this assumption because it matches the experiment which held $P_1 + P_2$ fixed rather than $P_1 + P_2/R_L$. We assess to what extent this "income effect" can explain our results in section 5.2.

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 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 $1 - p_g$ after two periods for each unit invested. We normalize R_b to be 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 $P_2 = P$. Further, we assume that the risk premium is large enough so 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. That is, 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 clients with the grace period face a lower cost of setting aside P. Since avoiding default by setting aside P is less costly for grace period 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 great 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. From now on, we focus on the case in which $D_i \geq P$ so that assuming the funds are available, clients will repay. However, clients may find it optimal to make investment choices that lead them to not have enough money to pay the loan installments. 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 choose 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 from each, we can define cut-offs that relate client's degree of investment in the risky asset to her cost of default (see Appendix for details):

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

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

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

Low investment is preferred to intermediate investment if and only if $D_i > D_{bf}$. Low

investment is preferred to high investment if and only if $D_i > D_{bn}$, and intermediate to high investment if and only if $D_i > D_{fn}$. Based on these cut-offs, we see that for D_i low enough, it is optimal to invest everything in the risky asset. Further, for D_i high enough, only the lowest level of investment is preferred. Moreover,

Claim 1 *Investing enough in the safe asset to ensure only the first payment (intermediate investment level) is never optimal if and only if P_1 is large enough such that*

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

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) $D_i \in [D_{bf}, D_{bn}^{gp}]$ will 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 their investment behavior.

See Appendix for the proof.

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 behavior.

See Appendix for the proof.

To summarize, moving from a regular contract to a grace period contract induces some clients to increase investment in the risky asset. These results are summarized in Figure 2 and Figure 3.

Finally, this model yields predictions which match our findings on the impact of the grace period 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 intuition is straightforward. A client who moves to the grace period contract will increase her investment in relatively risky assets. This investment has higher expected return for the borrower not only because the return ($p_g R_g$) is higher than the return on the safe asset, but also because in the case of default, the client does not repay the loan. The variance of profits increases under the grace period contract because variance is increasing in the amount invested in the risky, illiquid investment.

Prediction 2 *Moving from the regular to grace period contract increases 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.

4.2.4 Some Comments

Timing of Payments and Investment Returns

Once repayment began, clients on both the grace period and regular contracts repaid every two weeks. The key difference is that repayment for grace period clients began eight weeks after regular contract clients. Our model abstracts from multiple repayments. P_2 is most clearly interpreted as the sum of all payments required after the grace period concludes. P_1 corresponds to all payments made before the 10 week mark. However, 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.[17] With this set-up, the return on the illiquid investment is assumed to be realized between 10 and 32 weeks after investment.

Contractual Choice

Existing evidence suggests that MFIs are default averse. An important reason is significant regulatory constraints on the interest rates MFIs can charge. They are also usually unable to offer alternative loan products (with different interest rate and term structures). This can explain why MFIs favor contracts that minimize expected default rather than contracts that maximize expected return.

Risk Aversion

Even though clients' utility is linear in consumption for positive values of consumption, clients are not risk neutral since default carries with it 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 Can Differential Returns to Capital Explain the Findings?

Finally, we examining whether the mechanism highlighted in the model can quantitatively explain the empirical findings and discuss some alternative explanation.

[17] 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.

5.1 Returns to Capital

5.1.1 Matching the Literature

Calculating the anticipated difference in long-run profits from the introduction of a grace period in the debt contract requires an assumption about returns to capital. We first 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:

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

Estimating this equation using OLS is problematic because 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 co-variate. Appendix Table 1 reports these estimates. The IV estimates imply a monthly weighted return of between 6% and 13%. These returns are higher than de Mel et al. (2008)'s estimates of 5.5%, and lower than the returns of 20-33% per month estimated by McKenzie and Woodruff (2008) for Mexican enterprises.

We should be cautious in comparing these estimates to other estimates in the literature since ours are identified off of 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 will be 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.

5.1.2 Accounting Exercise

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. Here 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 that the average grace period client invests Rs. 6,500 while the average regular client invests Rs. 6,100 (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 9 shows the observed capital stock differential for various values of X and Z. The observed capital 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 early payment clients yields a capital stock differential of Rs. 26,000.

It is difficult to know exactly what X and Z will be in practice, since they capture both returns and reinvestment, but a reasonable benchmark might be the returns estimated in the previous section. If this is the case, then 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. However, the exercise should not be taken too literally for many reasons. For instance, the exercise abstracts from labor income and makes no attempt to model consumption behavior.

5.2 Alternative Explanations

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 explored the economic impact of the portfolio effect, and our accounting exercise shows that the portfolio effect can quantitatively explain the results.

The income effect, on the other hand, is driven purely by the fact that grace period clients have a lower net-present value of payments relative to regular clients. Here we show that a model which solely relies on the income effect (i.e. a lower discounted present value of loan payments) cannot under reasonable assumptions explain the differential capital and profits observed three years later.

Assume that 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. 8000 and set initial investment size equal to 6400 as observed in the data. We assume that the remaining Rs. 1600 (8000-6400) are set aside to pay off the first four installments.[18] Using a return to capital of $r_L = .08$, 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 monthly rate of return would have to be over 11% to

[18]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.

generate the observed capital differential. It is also worth noting that the income effect alone cannot explain the default results.

5.2.2 Monitoring and Loan Officer Effects

In theory, early repayment may also influence business investments by improving 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. The Panel B regressions (which include loan officer fixed effects) demonstrate that our findings are not driven by the behavior of specific loan officers.

5.3 Income from Default

Relative to regular contract clients, grace period clients were more likely to stop repaying their loans and this should directly provide them more money. However, the difference in repayment levels cannot generate the observed endline differential in capital stocks. On average, grace period clients had Rs. 140 more of outstanding loan payments one year after the loan due date compared with regular clients. If this money was invested with a monthly return of 8%, the resulting difference one year later would be Rs. 350, which is less than 2% of the observed capital stock differential.

5.4 Habit Formation

One potential channel through which a grace period contract may increase default is by reducing clients' fiscal discipline. It may not allow them 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, were either of these mechanisms at work, 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), (5) and (6) of Table 7 indicate that grace period 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.

These patterns indicate that the grace period contract did not simply increase strategic default or delinquency early in the loan cycle. This boosts confidence in our interpretation that default results reflect differences in the degree of risk-taking in business investments and associated variance in profits and income.

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 micro-lenders 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 significantly lower entrepreneurial activity.

The contractual form underlying lending to very small business loan applicants in rich countries provides a good benchmark for comparison. Despite similar risk profiles of the client base, the typical small business loan contract in developed countries is significantly more flexible than a typical MFI contract.[19] Consistent with the trade-offs we model here,

[19]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.

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).

Our findings also speak to the current ongoing debate on microfinance regulation. There has been significant discussion about the need to cap interest rates when lending to the poor. However, such interest rate caps are likely to go hand-in-hand with MFIs adopting debt structures aimed at minimizing default. Our results suggest that the cost in terms of reduced entrepreneurship may be high.

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7 Appendix

7.1 Theory

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:

$$p_g R_g B - D_i \tag{12}$$

2. Invest only enough in the liquid asset to pay the first installment:

$$p_g(R_g(B - P_1/R_L) - P_2) - (1 - p_g)D_i \tag{13}$$

3. Invest enough in the liquid asset to pay the first and second installments:

$$p_g R_g (B - P_1/R_L - P_2/R_L^2) \tag{14}$$

Proof of Claim 1 The investment payoffs for a client on the regular contract 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:

$$D_{bf} \equiv \frac{p_g}{1 - p_g} (R_g/R_L^2 - 1) P_2 \tag{15}$$

$$D_{bn} \equiv p_g R_g (P_1/R_L + P_2/R_L^2) \tag{16}$$

$$D_{fn} \equiv \frac{R_g P_1}{R_L} + P_2 \tag{17}$$

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 7 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. Figure 8 presents the result graphically.

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 $p_g(1-p_g)(R_g I)^2$ 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.

7.2 Data

7.2.1 Survey: Design and Attrition

Depending on time of enrollment and previous loan history clients received one of three different versions of the baseline survey. We were unable to survey 15 clients (1.7%) at the baseline. Two endline surveys were conducted, the first one year after loan disbursement and the second three years after loan disbursement. We were unable to survey 45 clients (5.3%) in the first endline survey and 89 (10.5%) in the long run endline survey (we administered the full survey to 763 clients and an abbreviated survey to 13 additional clients. In all cases attrition was balanced across treatment and control groups.

7.2.2 Variable definition

Notes to the Tables provide variable definitions. Here we provide further details for specific outcomes where variable construction was more complicated.

New Business Households were designated as having started a new business if they started a business in the period of up to 30 days prior to and 6 months after the loan group formation. We relied on two sources of data. As discussed in Section 2.2 a high proportion of baseline surveys(Survey 1) were administered after the loan disbursement. Hence, the baseline data provides a first source of information and in particular we focus on clients who received the baseline starting at 30 days after loan disbursal.[20] Using the answers to the question on business formation, we determined if a household had started a new business in the designated time period relative to the date of their loan group formation. We used data from Survey 3 to supplement the Survey 1 data for the clients described above as well as a primary source of information about new businesses for clients whose baseline surveys were administered either before or within 30 days after loan disbursement. Data from Survey 3 allowed us to retrospectively reconstruct new businesses since it asked about the dates of business creation and closing for each business in existence between receiving the loan and when Survey 3 was administered.

Has Business Has Business refers to whether a household was operating a business at the time of loan disbursement. To measure this we use both the baseline surveys and the Long Run Endline survey (which included retrospective questions) to construct a narrow and a broad measure of business activity. The narrow Has Business measure only uses the baseline survey, where we asked the respondent about any enterprises owned or operated by a member of the household. We counted the number of enterprises reported by each respondent, excluding any businesses that would be considered a new business (i.e. was started within 30 days of loan disbursement). The broad Has Business measure uses clients

[20]Survey 1 asked clients who had never been surveyed before about the businesses that the household owned at that time. They were also asked about how long the business had been operating. Clients who had been surveyed earlier (as part of the study reported in Feigenberg et al. (2010)) were asked only about businesses started within the past year and how long these businesses had been in operation.

answers to restrospective question on the Business Income survey. Respondents were asked to describe all the non-salaried activities for which they received compensation in the span between receiving their VFS loan and the when Survey 3 was conducted, including the dates of business creation and shut down. (Investigators were trained and encouraged to ask about the full array of non-salaried activities undertaken by household members). This additional probing by investigators resulted in a broader measurement of household enterprises.

Delinquency and Default Our default measure come from the VFS administrative records. Matching between VFS records and study clients was conducted based on branch name, date of loan disbursement, loan disbursement amount, group name, and client name. All 845 clients were matched. We present four measures of default in the paper defined as those clients who have not repaid their loan amount X weeks after the full loan was due, or $44+X$ weeks after the first payment where X is 8, 24, and 52. Due to holidays and issues outlined below 44 weeks after the first meeting may not correspond to the exact due date. As a check on the VFS administrative records, loan officers were required to keep a record of payments at each group meeting. Based on consulting with loan officers, we also computed a separate measure of default. This measure differs slightly but it is not biased towards more or fewer reported defaults.[21]

[21] Using the most recent administrative records available to us, we are able to measure default rates at 30 weeks past the due date for the entire sample. At 30 weeks past the due date, the administrative records indicate default rates at 4.9% compared with 5.4% for the measure reported by loan officers.

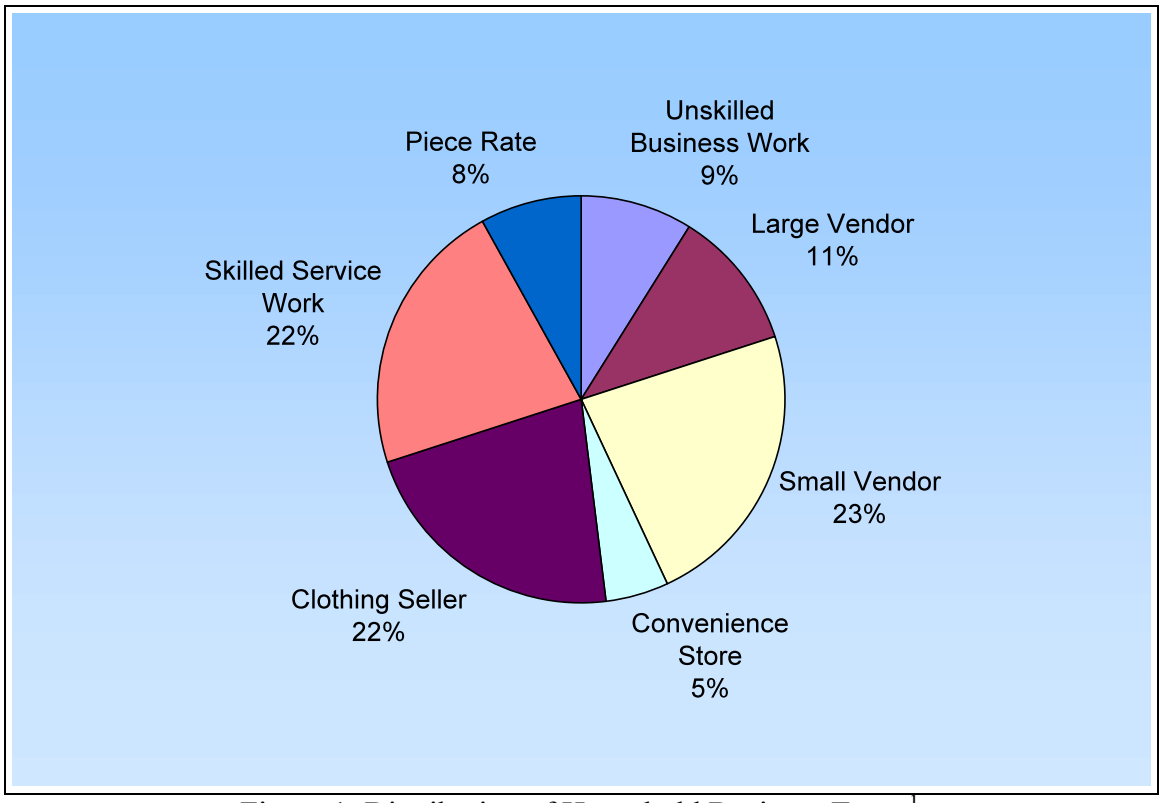
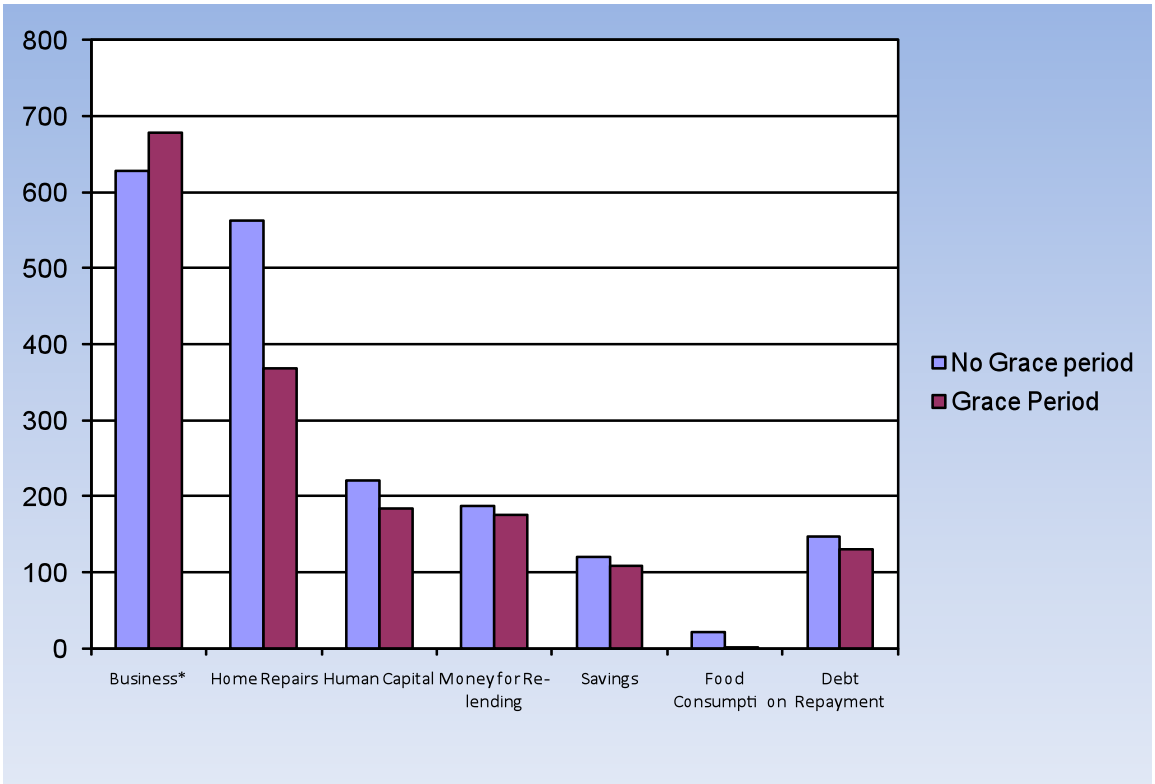


Figure 1: Distribution of Household Business Types[1]

[1] Three large occupations in each grouping are as follows: Unskilled Business Work (Rickshaw puller, Collector of Raw Materials, Laundry); Large Vendor (Rickshaw owner and/or repair shop, Electronics shop, Construction business); Small Vendor (Vegetable monger, Fish monger, Flower/Incense shop); Convenience store (Grocery shop, Tea stall); Clothing seller (Seller of Readymade garments, Seller of Saris, Selling of Hoisery); Tea stall (Tea shop); Skilled Service Work (Carpenter, Tailor, Electrician)



* scaled down by factor of 10

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

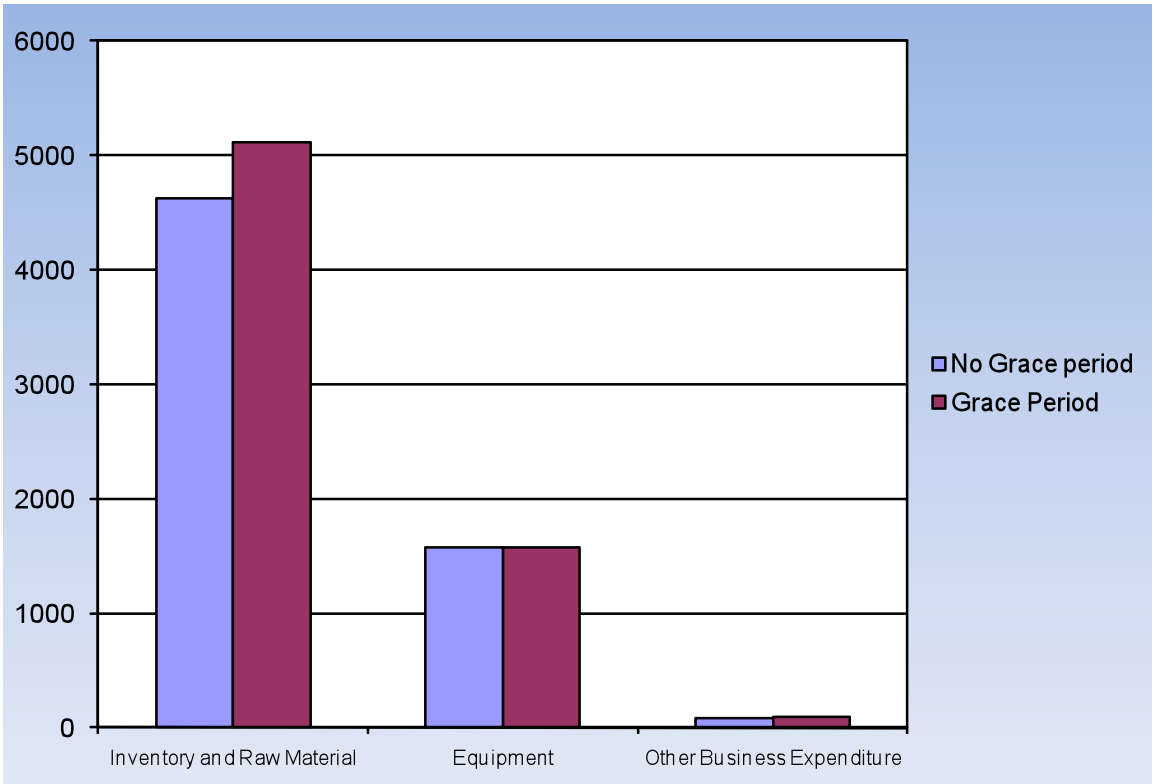


Figure 3: Business Expenditure Categories by Grace Period and No Grace Period Clients

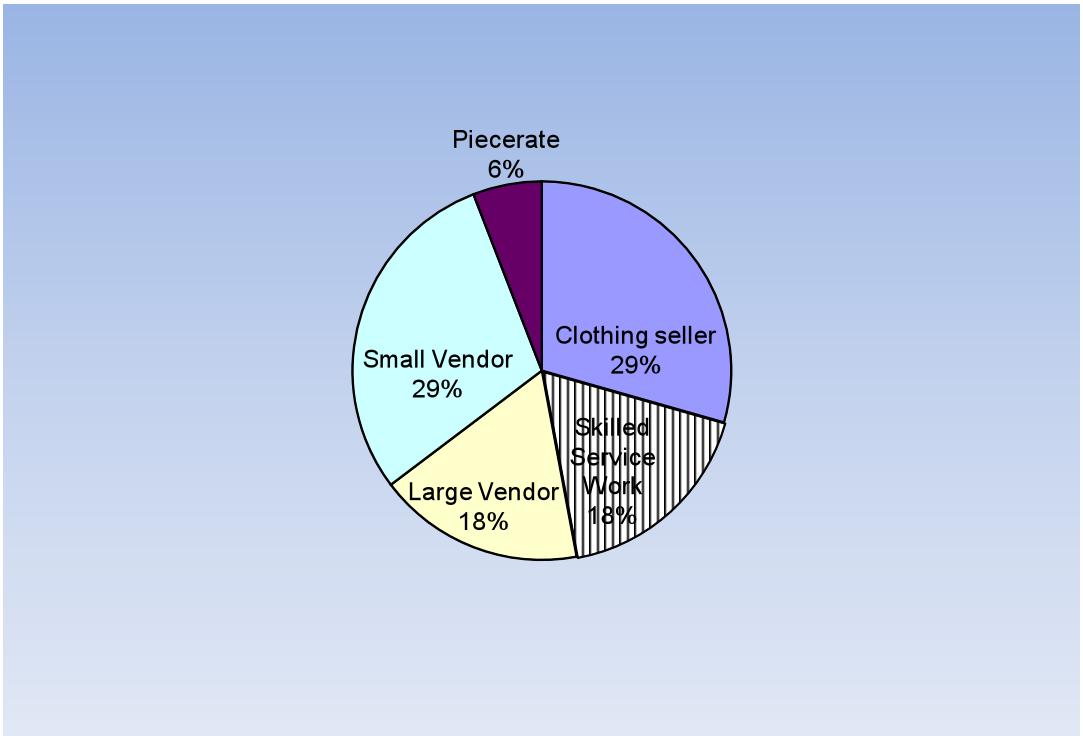


Figure 4: Distribution of Business Types for New Businesses of Grace Period Clients[2]

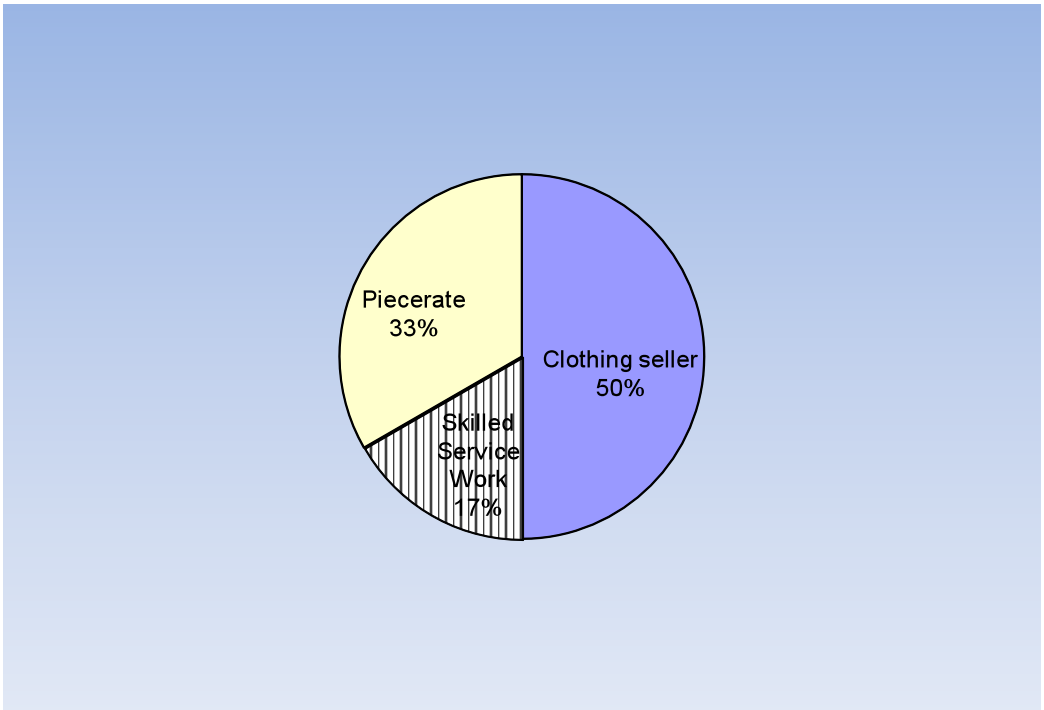


Figure 5: Distribution of Business Types for New Businesses of Non Grace Period Clients

[2] See Footnote 1 for description of major types of businesses within each grouping.

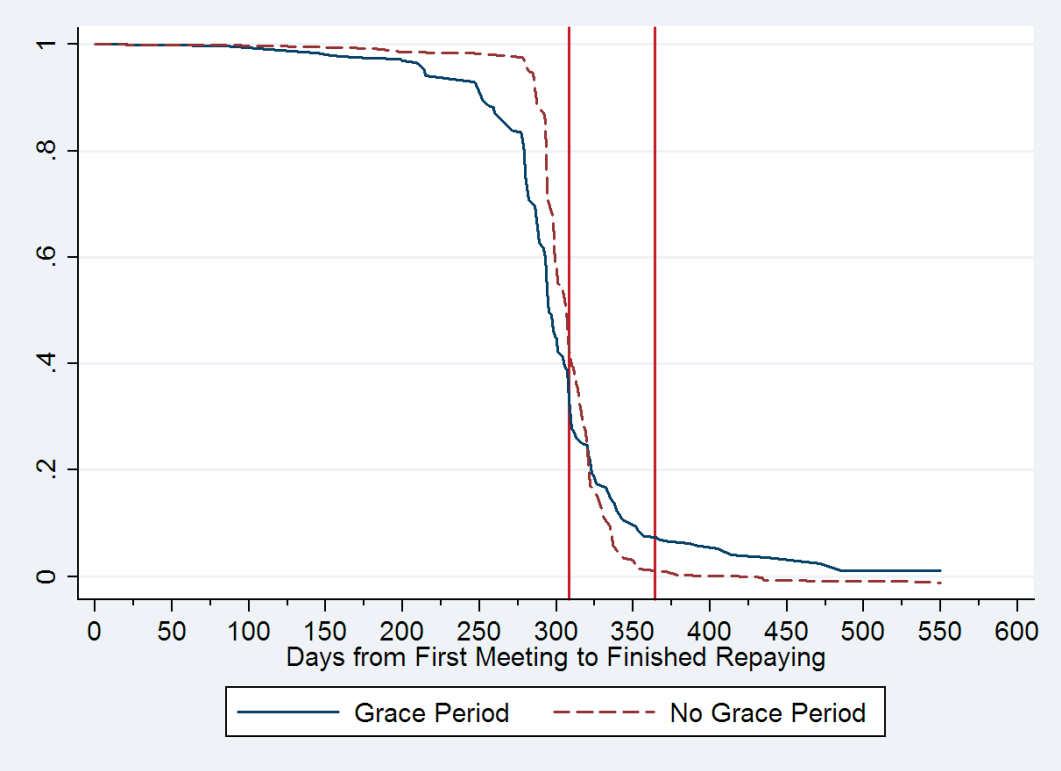


Figure 6: Fraction of Clients Who Have Not Repaid

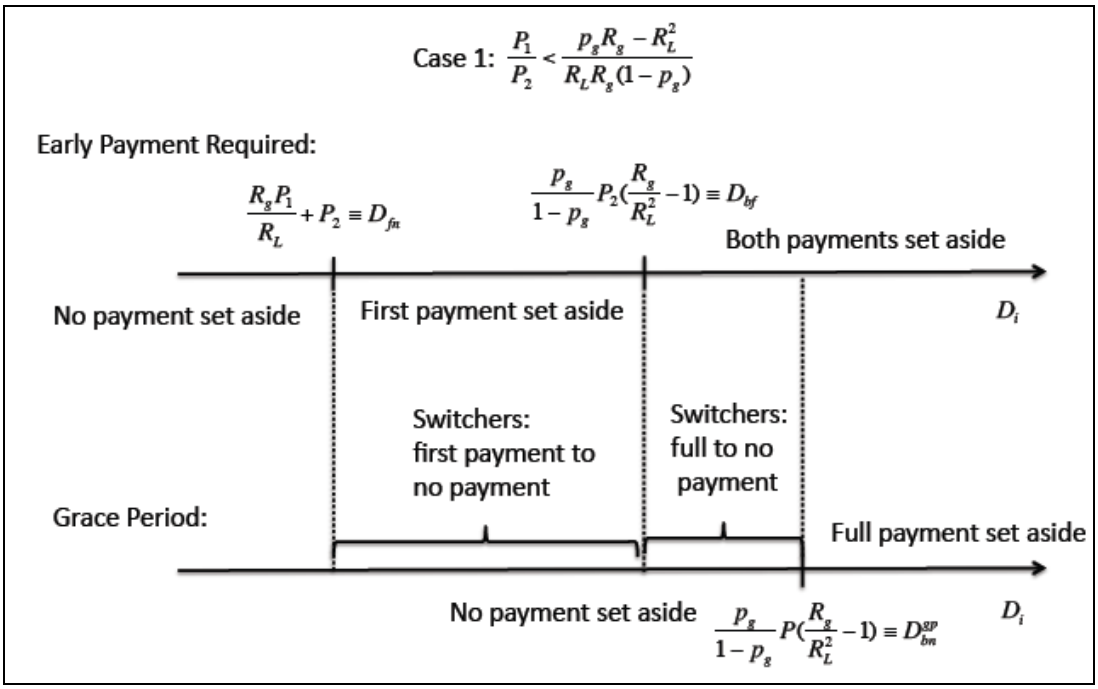


Figure 7: Grace period contract vs. contract with low early repayment obligation

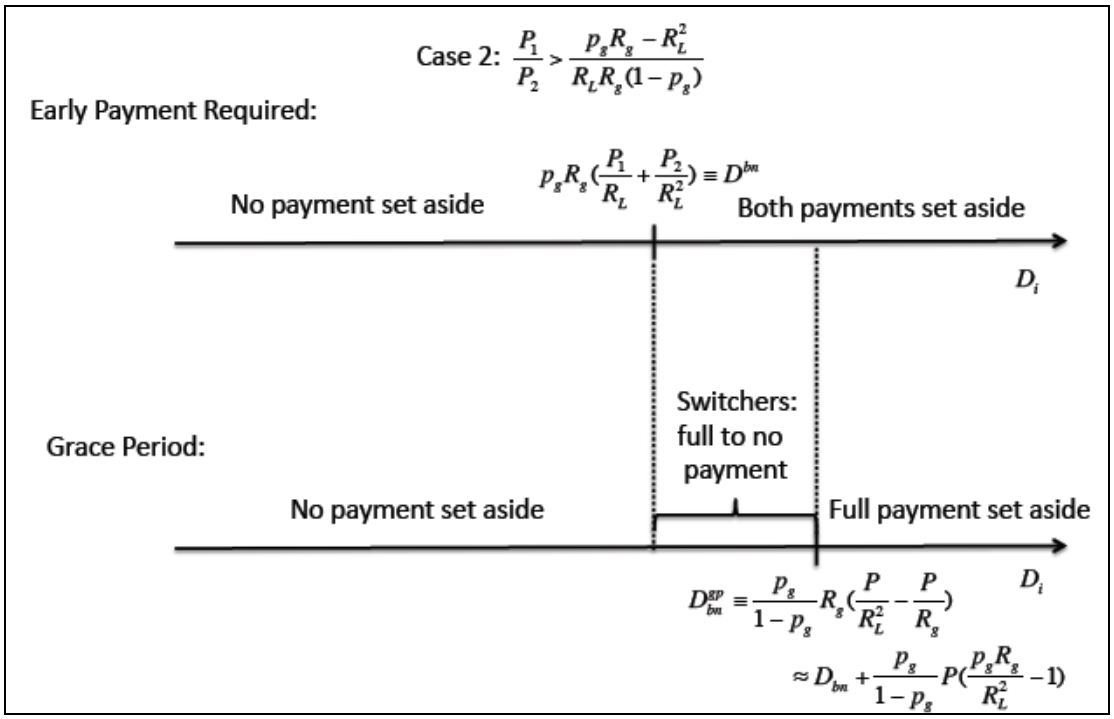


Figure 8: Grace period contract vs. contract with high early repayment obligation

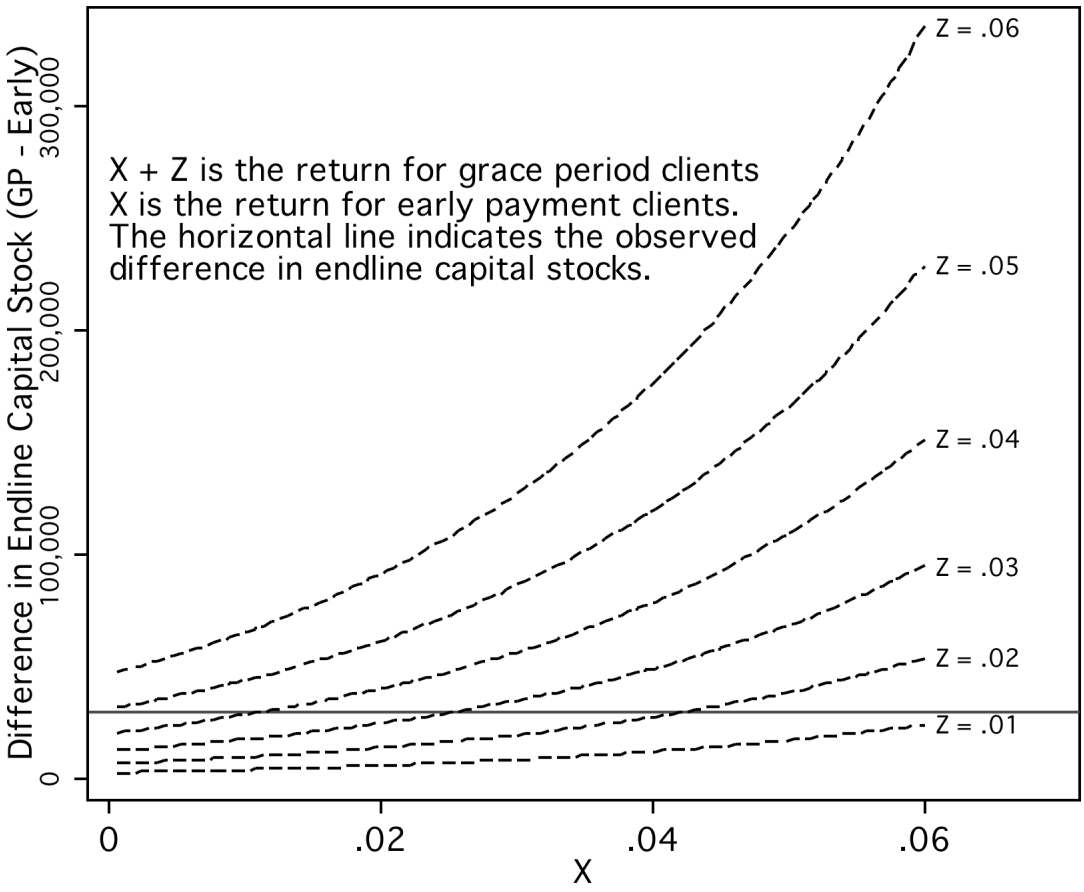


Figure 9: Simulations of Endline Capital Differential

Table 1: Randomization Check

	Client-level variable	Control (1)	Treat (2)	Diff (2)-(1) full sample (3)	Diff (2)-(1) surveyed sample (4)	N of full sample Control/ Treat (5)	N of surveyed sample Control/ Treat (6)
Panel A: Controls for subsequent specifications (where indicated that controls included)							
1	Age	34.5080	33.7990	-0.7523	-0.7059	425/416	387/380
		(0.408)	(0.413)	(0.57)	(0.5894)		
2	Married	0.9110	0.8640	-0.0475**	-0.0358*	425/416	387/380
		(0.014)	(0.017)	(0.0223)	(0.0216)		
3	Literate	0.8750	0.8240	-0.0508*	-0.0654*	425/418	387/381
		(0.016)	(0.019)	(0.0278)	(0.0342)		
4	Muslim	0.0070	0.0220	0.0130	0.0132	425/418	387/381
		(0.004)	(0.007)	(0.0116)	(0.0123)		
5	Years of Education	6.6090	6.4880	-0.1156	-0.1184	413/409	376/375
		(0.172)	(0.195)	(0.335)	(0.3116)		
6	Household Size	4.0680	4.1800	0.1111	0.1034	425/418	387/381
		(0.069)	(0.071)	(0.1043)	(0.1331)		
7	Household Shock	0.6070	0.6320	0.0211	0.0157	420/410	384/376
		(0.024)	(0.024)	(0.0618)	(0.0622)		
8	Has a Business (Narrow definition)	0.7720	0.7850	0.0131	0.0093	423/415	386/380
		(0.02)	(0.02)	(0.0406)	(0.0426)		
9	Owns Home	0.8160	0.8090	-0.0045	-0.0041	408/403	374/370
		(0.019)	(0.019)	(0.0344)	(0.0335)		
10	Has Financial Control	0.8380	0.8250	-0.0091	-0.0212	399/394	364/359
		(0.018)	(0.019)	(0.0391)	(0.0355)		
11	Loan Amt 4000 RPS	0.0120	0.0140	0.0025	0.0028	425/420	387/382
		(0.005)	(0.006)	(0.0102)	(0.0112)		
12	Loan Amt 5000 RPS	0.0470	0.0380	-0.0093	-0.0046	425/420	387/382
		(0.01)	(0.009)	(0.0186)	(0.0199)		
13	Loan Amt 6000 RPS	0.2890	0.2310	-0.0579	-0.0617	425/420	387/382
		(0.022)	(0.021)	(0.0436)	(0.0427)		
14	Loan Amt 8000 RPS	0.5670	0.5810	0.0162	0.0102	425/420	387/382
		(0.024)	(0.024)	(0.0506)	(0.0508)		
15	Loan Amt 9000 RPS	0.0000	0.0050	0.0047	0.0052	425/420	387/382
		(0)	(0.003)	(0.0047)	(0.0052)		
16	Loan Amount 10000	0.0820	0.1310	0.0461	0.0507	425/420	387/382
		(0.013)	(0.017)	(0.0368)	(0.0371)		
	Joint Test p-value			0.1229	0.2611		
Panel B: Additional summary statistics							
17	Has a Business (Broad definition)	0.9680	0.9730	0.0045	0.0049	343/328	343/328
		(0.010)	(0.009)	(0.0144)	(0.0145)		
18	Waged work	0.200	0.2040	0.0045	0.029	425/416	387/380
		(0.400)	(0.403)	(0.033)	(0.0345)		
19	Has Savings	0.3200	0.3390	0.0193	0.0196	425/418	387/381
		(0.467)	(0.474)	(0.0376)	(0.0389)		
20	Lost workdays due to shock (broad measure of shock)	0.419	0.3900	-0.0414	-0.0697	255/200	229/182
		(0.494)	(0.488)	(0.0562)	(0.0593)		
21	Spent money due to shock (broad measure of shock)	0.443	0.4300	-0.0137	-0.0244	255/200	229/182
		(0.497)	(0.496)	(0.0548)	(0.0560)		
22	Had Non-VWS loan in past year from baseline	0.16	0.1240	-0.0381	-0.0342	425/418	387/381
		(0.367)	(0.330)	(0.0338)	(0.0336)		
23	Manages HH business	0.784	0.7980	-0.0009	-0.0084	344/328	339/325
		(0.411)	(0.401)	(0.0380)	(0.0381)		

Notes:

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

(1) Columns (1) and (2) report means with standard deviations in parentheses. Column (3) reports test of differences of means across columns (1)

(2) N in columns (5) and (6) refers to the number of non-missing observations for each variable.

(3) Joint Test is the Chi-Sq. Statistic, which is computed by jointly estimating a system of seemingly unrelated regressions consisting of a dummy for no delay/delay with standard errors adjusted for within loan group correlation. The Joint Test includes loan officer dummies, which are not shown here. Joint-test results reported at bottom of Column (3) is for the entire sample while those reported at the bottom of Column (4) is for the surveyed sample only.

(4) Household shock in row 7 is a dummy for whether household has experienced any of the following events in the last 30 days: birth, death, heavy rain or flood.

(5) Has a Business (Narrow definition) in row 8 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 in row 11 is a dummy for whether client answered "yes" to the following question: "If a close relative like your parents or siblings fell sick and needed money would you be able to lend money to that relative, if you had the exta money?"

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

(8) Has a Business (Broad definition) in row 17 is a dummy for whether according to the business start and end dates reported by clients in the Business Income survey, the client would have had at least once business open at the time of the loan disbursement. In the Business Income survey, surveyors were given extra training and instructions to probe for any non-salaried activities for which a household member was compensated in order to get the broadest measure of business activity.

(9) Rows 20 and 21 reference any negative shocks the household reports in the last 30 days including birth, death, heavy rain/flood, or illness. Since not all of the baseline survey versions asked about illness, we only include the clients who took the survey which included illness in the section about shocks for these rows.

(10) Row 22 is a dummy variable measuring whether client had non-VWS loan in past year from a baseline survey. This is drawn from both the first intervention baseline and the second intervention baseline.

(11) Row 23 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.

All variables listed in Panel A are included in each regression in Tables 2-9 specified as including controls. Variables listed in Panel B are not used as controls.

Table 2: Impact of Grace Period on Time to Repayment

	Disbursement to first repayment	Days Between Meetings	Duration of Meeting	Index of Network
	(1)	(2)	(3)	(4)
Panel A (no controls)				
Grace Period	51.79***	0.277	0.704	-1.505
	(1.502)	(0.261)	(1.052)	(2.480)
Panel B (with controls)				
Grace Period	51.27***	0.309	-0.0837	-1.895
	(1.388)	(0.250)	(0.405)	(2.444)
Observations	845	6502	16389	533
Control Mean	14.64	14.33	18.44	14.52
	(0.983)	(0.215)	(0.768)	(1.864)

Notes:

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

(1) The outcome variable are: number of days from loan disbursement to first repayment (column 1), number of days between each group meeting for the first 120 days since the first loan repayment meeting (column 2), the number of minutes spent at each meeting (column 3), an equally weighted average of the following four questions: (1) Who is the person you talk to the most about personal issues? (2) Who is the person you trust enough to lend Rs. 50 to for 24 hours? (3) Who is the person you would go to if you needed to borrow kerosene or rice for one day? (4) In case of a health emergency, who would you go to to borrow Rs. 500?

(2) Regressions include stratification fixed effects, and standard errors are clustered by loan group correlation. 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 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	Saved (some) loan for repayments	New Business
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel A (no controls)											
Grace Period	364.9**	337.1	8.786	-356.1**	-253.9*	-34.97	-27.42	-15.02	-24.81*	-18.61	0.0259*
	(180.1)	(279.9)	(234.1)	(172.4)	(137.1)	(90.26)	(70.61)	(47.12)	(14.29)	(56.61)	(0.0133)
Panel B (with controls)											
Grace Period	369.5**	372.3	-37.56	-367.0**	-261.6*	-44.94	-34.74	-0.704	-24.99*	-9.082	0.0286*
	(186.4)	(276.2)	(234.2)	(179.1)	(145.4)	(89.16)	(69.67)	(49.06)	(14.33)	(57.81)	(0.0149)
Observations	845	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	160.8	0.0165
	(162.4)	(226.3)	(172.4)	(149.1)	(116.0)	(76.88)	(56.74)	(35.97)	(14.60)	(44.37)	(0.00600)

Notes:

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

(1) The outcomes in Columns (1)-(9) are categorywise respending of loan as reported by client (in Rs.). Column 10 reports the amount the household set aside for loan repayment. The sum of columns (1)-(10) is the total loan amount spent by the household. The outcome in column (11) is an indicator variable which equals one if the household reported having started a business up to 30 days before and within 6 months of loan disbursal

(2) Regressions include stratification fixed effects, and standard errors are clustered by loan group correlation. 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 4: 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 between High and Low Profit Months
	(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)	(375.7)
Trimmed	No	Yes	No	Yes	No	Yes	No
Panel B (with controls)							
Grace Period	0.195**	0.188**	856.0**	491.3***	3719	409***	735.2*
	(0.0803)	(0.0791)	(332.7)	(180.7)	(3035)	(138)	(395.1)
Trimmed	No	Yes	No	Yes	No	Yes	No
Observations	749	745	752	748	752	748	751
Control Mean	20157.24	20157.24	1586.9	1513.8	5400	345	2361.6
	(55977.97)	(55977.97)	(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 in (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) and (c) Columns (5) and (6) are obtained by calculating the square distance of each household from the mean of profits used in columns (3) and (4) conditional on having received the grace period or not. Clients were asked to report profits during high and low profit months. Column (7) reports the average difference across all household businesses..

(2) Regressions include stratification fixed effects, and standard errors are clustered by loan group correlation. Regressions in Panel B also include all controls presented in Panel A of Table 1 and loan officer fixed effects. Table 2 notes describe our strategy for missing control variables.The trimmed sample excludes the top 0.5% of outcome values.

Table 5: Impact of Grace Period on Business Size

	Raw Materials and Inventory		Equipment		Number of Employees	Business Closure	Sold Goods or Services at a Discount to Make Loan Payment
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A (no controls)							
Grace Period	4916.3**	3269.5**	23853.9**	13875.0**	0.363	-0.0718**	-0.0232*
	(2166.6)	(1601.7)	(10563.7)	(6485.9)	(0.310)	(0.0324)	(0.0128)
Trimmed	No	Yes	No	Yes	No	No	No
Observations	766	762	766	762	751	766	764
Panel B (with controls)							
Grace Period	5345.1**	3687.9**	29935.6**	17662.8***	0.287	-0.0660*	-0.0158
	(2394.7)	(1632.9)	(11777.7)	(6694.1)	(0.293)	(0.0336)	(0.0122)
Trimmed	No	Yes	No	Yes	No	No	No
Observations	766	762	766	762	751	766	764
Control Mean	6586.2	6083.8	29144	26557.3	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 employees 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. Any seasonal businesses, we counted it as a business currently in operation.Column (7) outcome 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.

(3) Regressions include stratification fixed effects, and standard errors are clustered by loan group correlation. 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 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 Business Provides	Access to Savings or Microfinance in Case of Shock
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A (no controls)						
Grace Period	0.0972**	5.686**	0.0989***	4.937*	5.543**	0.103**
	(0.0373)	(2.431)	(0.0356)	(2.902)	(2.467)	(0.0446)
Panel B (with controls)						
Grace Period	0.113**	6.087*	0.111**	5.672	6.154*	0.0924*
	(3.04)	(2.54)	(3.07)	(1.91)	(2.38)	(2.04)
Observations	769	769	769	769	769	768
Control Mean	0.432	20.65	0.395	23.65	5.571	0.525
	(0.0270)	(1.601)	(0.0236)	(1.981)	(0.476)	(0.0314)

Notes:

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

(1) Columns (1)-(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)-(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)-(4)) and the total types of goods or services clients offered to their customers (Column (5)). Column 6 is a dummy if the household reported that in the case of a major flood, it would access "savings" or "microfinance" to cover costs

(2) Regressions include stratification fixed effects, and standard errors are clustered by loan group correlation. 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 7: 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	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)
Panel A (no controls)						
Grace Period	0.0901**	0.0696**	0.0633**	-0.0137	-0.00842	0.0288
	(0.0349)	(0.0280)	(0.0251)	(0.0151)	(0.0613)	(0.0261)
Panel B (with controls)						
Grace Period	0.0839**	0.0649**	0.0636**	-0.0152	-0.0219	0.0239
	(0.0332)	(0.0266)	(0.0252)	(0.0162)	(0.0535)	(0.0238)
Observations	845	845	845	845	845	845
Control Mean	0.0424	0.0212	0.0165	0.988	0.501	0.953
	(0.0142)	(0.0101)	(0.00899)	(0.00774)	(0.0427)	(0.0231)

Notes:

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

(1) Columns (1)-(4) report the impact of grace period on default rates, as measured at increasing number of weeks after due date. 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. All outcomes are constructed using administrative and group meeting data.

(2) Regressions include stratification fixed effects, and standard errors are clustered by loan group correlation. 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.

Appendix Table 1: Estimating the Production Function

	Capital First Stage IV	Average Weekly Profits	Capital First Stage IV	Average Weekly Profits Trimmed
	(1)	(2)	(3)	(4)
Panel A (no controls)				
Grace Period	28336.08***		25039.89 ***	
	(10477.58)		(10278.92)	
Capital		0.0325**		0.0212**
		(0.0155)		(0.0101)
Total Hours	774.03***	3.533	690.79***	1.327
	(114.52)	(9.577)	(113.0347)	(6.534)
Panel B (with controls)				
Grace Period	36155.4***		36155.4***	
	(10847.26)		(10847.26)	
Capital		0.0247**		0.0156**
		(0.0111)		(0.0069)
Total Hours	815.13***	6.382	737.28***	3.52
	(118.36)	(7.656)	(116.28)	(4.768)
Observations	752	752	748	748
Control Mean	35730.16	1586.9	35730.16	1513.8
	(93264.52)	(121.8)	(93264.52)	(102.7)

Notes:

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

(1) Columns (2) shows the regressions on a trimmed sample (see notes to Table 4). The outcome variables in Columns (1) and (2) are response to the question "Can you please tell us the average weekly profit you have now or when your business was last operational?" Capital (defined as the sum of equipment, raw materials, and inventory in table 5) is instrumented with grace period assignment.

(2) Regressions include stratification fixed effects, and standard errors are clustered by loan group correlation. Regressions in Panel B also include all controls presented in Panel A of Table 1 and loan officer fixed effects. See Table 2 notes for our strategy with missing control variables.