Term Structure of Debt 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 begins immediately after loan disbursement with a contract that provides a two-month grace period prior to repayment. The shift to a grace period contract increased short-run business investments and long-run profits. Alongside, 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. Microfinance contracts which require early initiation of repayment reduces risk to financiers but also the potential impact of microfinance on enterprise growth and household poverty.

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1 Introduction

Financiers across the world structure debt contracts to limit the risk of entrepreneurial lending. Increasingly, a common contractual form available to the poor is 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 emerging empirical evidence suggests limited impacts of microfinance borrowing on the average investment levels and income growth of micro-entrepreneurs (Banerjee et al., 2009; Karlan and Zinman, 2009; Kaboski and Townsend, ming), despite evidence of high returns to capital in small-scale enterprises in developing countries (de Mel et al., 2008).

This paper asks whether the immediate repayment obligations of the classic microfinance contract – widely held as important for reducing default – inhibit entrepreneurship by making high return, but illiquid, investments too risky. We use data from a field experiment conducted 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.

Clients in our sample were typically engaged in micro-enterprise activity in the informal service sector.[1]After the microfinance institution (MFI) had formed loan groups of five clients, we randomly assigned groups to one of two debt contracts. Clients in loan groups that formed the control sample received a contract that required them to initiate repayment two weeks after receiving their loan, as is standard practice in microfinance. In contrast, clients in groups assigned to treatment received a contract that provided for 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 showed that micro-enterprise investment was approximately 6.0% higher and the likelihood of starting a new business more than twice as high among

[1]The two most common activities are running a convenience store and selling clothes, and the average household business has two employees.

clients who receive the grace period contract relative to those on the classic contract. Nearly three years after receiving the loan, business profits and household income for grace period clients are, on average, 30% and 17% higher.

Yet, half a year after the loan due date grace period clients were more than three times as likely to have defaulted on their loan. Paralleling this, we observe that the variability of profits after three years was 130% higher for grace period clients. These clients also reported more risk-taking in business practices: grace period clients are more likely to extend credit to customers through loans and pre-orders, and provide a significantly wider array of goods and services suggesting they are willing to reduce their access to liquid funds and experiment with product and client diversification.

These large impacts 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 where riskier investment choices yield higher returns. Case study evidence supports this interpretation of the patterns in the data. We use a simple model of financial contracting to demonstrate how introducing a grace period in the debt contract can make investment in high-return but illiquid alternatives viable. If relatively illiquid investments are riskier (or, more generally, increase the expected variance of household income by reducing short run ability to deal with shocks), then default may rise even as average investment returns increase. Put differently, by encouraging less risky investment choices, immediate repayment obligations may simultaneously limit default *and* income growth.[2]

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 micro-finance 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

[2]In theory, early repayment may also discourage risky investments by improving loan officers' ability to monitor borrower activities early on in the loan cycle. We ignore this channel in the analysis since loan officers in our study (hired, trained and supervised by our research team) do not undertake any monitoring activities during loan meetings.

literature examines the role of repayment frequency in reducing default in MFIs, but focuses on channels other than investment choice (e.g. Fisher and Ghatak (2010)).[3]

In contrast, the idea that the structure of debt contracts influences entrepreneurial risk-taking behavior exist 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 investment yield higher returns. Therefore, the incentives of a default-averse MFI are no longer aligned with maximizing expected returns. This leads to a contractual choice 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 basic empirical strategy. Section 3 reports our findings and in Section 4 we use case studies and a simple model of financial contracting to interpret these findings. Section 5 concludes.

2 Background

Our study was conducted with Village Financial Services (VFS), a 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.

[3]Fisher and Ghatak (2010) show how present biased borrowers may lead to the optimal contract (in terms of loan size) reqruiring frequent small repayments. On the empirical front, selection issues inhibit causal interpretations of several non-experimental studies of how greater repayment flexibility affects default, and may explain the mixed findings: 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 experimental papers examine the impact of changing repayment frequency. In the short run, the authors observe no change in default however in the medium-run they find that more frequent meeting can improve clients' informal risk-sharing arrangements and, therefore, long-run ability to repay Field and Pande (2008); Feigenberg et al. (2010).

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, with batch assignment 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, including interest charges. 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 this, also see Feigenberg et al. (2010)).

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 given that interest rates are relatively low (12% annually for the control group) and loan sizes are small.[4]

[4]Holding the interest rate constant across treatment arms would have implied ∼$21 in interest charges as opposed to the ∼$18 all clients are charged.

2.2 Data

Our data is assembled from multiple sources. We conducted baseline surveys with clients as they entered the study between April and August 2007. The survey gathered background information on household business activities, socio-economic status, and demographic characteristics One limitation is that 76% of surveys occurred after loan disbursement, although on average only 3.6 weeks later.[5]

In Panel A, Table 1 we report variables that are not endogenous to contract type such as client education and loan size. The majority of clients are literate and married, and the average client has two children living at home. An important variable is the indicator variable for whether the household had any microenterprise activity at the time of entering our study ("Has business"). We construct this using baseline information on the duration of existing household business activities.[6] 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 of the baseline survey. Of these, roughly 80% report that the female client closely manages and can answer detailed questions about at least one household business. Based on the more detailed business survey that we conducted in 2010, virtually all households in the sample (97%) are engaged in some type of business activity around the time they were given a loan through our study ("Has Business (broad measure)").[7] In Figure 1, we show the distribution of businesses at baseline: clothing sellers and skilled service work are the two largest categories.

Panel B of Table 1 reports relevant but potentially endogenous variables. Households experience a high rate of shocks: 60% report a shock to household income over the past month and 42% of clients report having missed days of work due to a shock within the

[5]The reason for this delay was that baseline surveying had to take place between group formation and loan disbursement, and because new groups were formed on a rolling basis that was not spread evenly over time, during periods of peak formation, it was difficult to reach all clients within this short interval.

[6]It is possible that we miss business activities that closed between loan disbursement and administration of the baseline survey, but we expect this to be minimal since the average lag is only two weeks.

[7]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.

last 30 days.[8] 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 illness of a household member.

Column (3), Table 1 reports average differences across regular and grace period contract clients for baseline characteristics. 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.[9] 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. The first endline survey was completed between January and November 2008 by 93% of clients (on average, one year after loan disbursement).[10] 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.

To evaluate long-run outcomes we also conducted a detailed business survey between April and July 2010, almost three years after loan disbursement. Of the 845 clients entering our intervention we administered long-run surveys to 773 clients, or 91% of the sample. We observe no significant difference in survey response between treatment and control groups.

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

[9]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.

[10]This is slightly longer than the duration of the baseline due to delays in tracking clients. The minimum time between baseline and follow-up was 10 months – the duration of the loan cycle – and the maximum time was 16 months, with a mean time between baseline and follow-up of 12 months.

Column 4 of Table 1 shows that the sample remains balanced even after accounting for attrition at the follow-up survey stage.[11] This survey provides detailed data on microenterprise profits and scale (for up to three businesses), and household income. It also includes information on client business practices.

Finally, 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 log book on meeting activities for the purpose of our experiment; this 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%).

Since some clients repay their loans long after the due date, we present results for different lengths of delinquency. Our preferred measure is 52 weeks overdue, the longest period for which we observe all clients in the sample, since it comes the closest to approximating permanent differences in default.[12]

2.3 Empirical Strategy

Randomization of contract type across groups implies that a comparison of average outcomes across clients assigned to different contracts has a causal interpretation. We estimate:

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

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

[12] There are no explicit penalties according to duration of delinquency but it is widely understood that the degree of delinquency influences approval rates and amounts of future loans.

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 The Economic Impacts of Debt Structure

We first document how 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 income, profits, and default outcomes in the long-run.

3.1 First Stage Estimates

All clients in a loan group receive their loans on the same day at which point their first repayment meeting date is announced. We examine the first stage effect of our experimental manipulation on two aspects of client repayment patterns – the time interval between loan disbursement and first repayment and time interval between two successive repayments. We calculate the latter as the average over the first 120 days of the loan cycle, starting with the first repayment meeting. Our data comes from a compilation of VFS transactions data and the data collected by loan officers at each group meeting.

The results are in Table 2. Panels A and B report regressions without and with controls respectively. 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 the clients on the regular contract, or

approximately two months later.[13] Column (2) uses data collected by loan officers during group meetings to show that, once repayment starts, the average time lapsed between two consecutive meetings is identical across the two contracts (14 days).

3.2 Loan Use and New Business Formation

A first question of interest is whether differences in the term structure of the debt contract 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. Close to 91% of the clients spent atleast some of their loan on business related expenditures. 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 expand business spending and reduce spending on house repairs.

In Figure 3, we decompose business spending into three components: inventory and raw material, business equipment and others. The difference in business spending across clients on regular and grace period contracts appears to be driven by differences in spending on inputs, made up of inventory purchases and raw materials. Close to 70% of the clients report spending in this category. This category includes the three most common spending items: saris, wood, and sewing materials. Notably, these are relatively illiquid investments. Raw materials, for instance, are valuable if clients can find a market for the finished product, but if demand is uncertain, it may take several months to realize the returns from the investment. Furthermore, raw materials cannot be liquidated at cost once they have been transformed, which makes them a riskier investment. The median client in our sample states that she would incur a loss of 25% if she has to liquidate her business stock in a day.

In Table 3, we investigate these differences by estimating equation (1). Panel A and B

[13]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 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.

report the coefficients from regressions without and with controls respectively. In column (1) we observe significantly higher business business spending among the 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 material. In column (4) we observe a decline in non-business spending by grace period clients. This is made up of a significant reduction in spending on house repairs of Rs. 250 (column 5) and a significant but relatively small decline in spending on food (Rs. 28, column 9). We observe no changes in spending on education and health (human capital), savings and lending to others ("relending"). If we examine the extensive margin of spending then we observe that a move to a grace period contract does not influence the likelihood of spending on business but halves the likelihood that the client spends any loan money on house repairs (results available from authors). In column (10) we examine client response 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 (14%) but noisily estimated decline 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 of interest is an indicator variable that equals one if a client reported starting a new business within a month of receiving the loan.[14] Overall, the rate of new business formation is low - in the control sample only 1.6% of clients start new businesses within the two-month period. But the likelihood of starting a new business is doubled among grace period clients. In Figures 4 and 5 we show the breakdown

[14]For about two-thirds of clients who were given the baseline survey 4-6 weeks after receiving the loan, 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 baseline surveys before or less than 4 weeks after receiving the loan, we construct a comparable measure of new business activity within a month of the loan using the baseline survey combined with the follow-up data collected three years after loan disbursement. Hence, for these clients, the new business indicator is measured with significantly more error. Importantly, the timing of the baseline survey was balanced across treatment arms. Furthermore, the result is robust to excluding clients surveyed fewer than 4 weeks after loan disbursement. See data appendix for an exact description of how this variable was constructed.

of new business types for grace period and non-grace period clients. While the sample size (of new businesses) is small we see that vendor businesses are *only* present in the grace period sample. Arguably, starting a new vendor business involves inventory purchase which is illiquid in the very short run.

In addition to being a key measure of entrepreneurship, 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 behavior 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 criticism.

3.3 Long-run business outcomes

Next, in Table 4 we use the three-year follow-up data to study long-run differences in micro-enterprise profits and household income. 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 of more than 0.5% of the cumulative distribution of each variable (in all cases, only four observations are dropped).

Columns (1) and (2) show that household income is an estimated 17% higher for grace period clients three years after loan disbursement ($\sim$2 years after the loan was due). As shown in columns (3)-(4), this appears to be driven 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 an 2.5-4% increase in household income.

In columns (5)-(6) we see that, not only are the level of profits higher for grace period

clients in the long-run, but so is the variance. After excluding the 4 outlier observations, the variance in profits is more than twice as high for grace period clients as it is for those on the regular contract. 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.

Given these findings, we next examine whether business scale and business practices were also influenced by the term structure of debt. 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 2.83 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.[15]

Column (6) of Table 5 shows that, in addition to having larger and more profitable businesses in operation, grace period clients are significantly less likely to report a business closure between loan disbursal and the three-year follow-up. 39% of control group clients report a business closure, as opposed to only 32% of grace period clients. At first, this result may seem at odds with grace period clients experiencing higher variance of profits (Table 4). However, since we only observe the profits of businesses that survived three years, it is suggestive of 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. Our survey also asked households to report major changes that have occurred in each business they operated between loan disbursement and the long run business survey. We then coded a dummy variable indicating whether a household reported having closed its business in the period.

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

When we use this outcome as an alternative measure of business closure we find an effect size of similar magnitude (-.04) which is significant at the 5% level.[16]

One reason why clients may particularly care about short run profits is repayment obligations. 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 such activity relative to regular contract clients. (The significance of this estimate, however, is sensitive to the inclusion of controls; the t-statistic falls to 1.5 with the full set of controls).

In Table 6 we examine whether clients' reported business practices are influenced by the term structure of the debt contract. We start by examining client willingness to sell to clients on credit. Over 43% of the clients in our sample state such a willingness. Offering merchandise on credit is a risky business investment in that it increases business scale but entails substantial risk and is a completely illiquid investment. In columns (1) and (2) we observe that grace period subjects are 9 percentage points more willing to advance goods or services on credit more often and 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. Pre-ordering services arguably makes a business more vulnerable to hold-up and, therefore, constitutes another risky but potentially high return business practice. 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 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.

3.4 Loan Repayment

Our empirical estimates suggest that introducing a grace period increases variance of profits and willingness to undertake risky business activities. We next investigate whether the grace

[16]Results available from authors.

period contract also increases 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 who 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 available: 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 8 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).

One potential channel through which a grace period may increase default is by reducing clients' fiscal discipline by not putting them in the habit of making regular payments from the start of the loan cycle, or leading them to believe that prompt payment has fewer consequences so increasing strategic default. However, were either of these the true mechanism, we would expect to 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) 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 differences in delinquency early in the loan cycle, which 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.

4 Making Sense of the Results

In a world with perfect credit markets, changing the term structure of debt while holding interest rate fixed should not influence investment choices. Our empirical results, in contrast, 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. Only 16% of the clients in our sample report having a non-VFS loan at baseline (and only a third have any savings) suggesting that terms of their VFS loan may significantly determine the terms of credit access.

We start by using case studies to gain some insights on the nature of risk associated with entrepreneurial activity and the implications of a grace period contract. Next, we develop a simple model of financial contracting that highlights the interaction between debt structure (in an environment where entrepreneurs face borrowing constraints) and illiquidity of high return investments. We conclude by providing a back of the envelope calculation to recover the implied return to capital.

4.1 Case Studies

We conducted in-depth interviews with a sari seller and a tailor – the two predominant occupations in our sample – who had been randomized into the grace period treatment. 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 sair 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 by 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, and also allowed 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 in the subsequent month to meet her 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.

Both subjects also 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. This qualitative evidence helps motivate the assumptions underlying our model of debt structure, to which we turn next.

4.2 A Model of Debt Structure

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. Second, we relate riskiness of investment to time till investment returns are realized. In other words, illiquid investments are longer term investments that carry significant risk. These ideas are clear in the case studies and we also see it in our survey data – the median client in our sample states that she would incur a loss of 25% if she has 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. 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.

Finally, we follow VFS practices and assume MFI loans are (physical) collateral-free and the penalty for default is exclusion from future lending. We assume that the cost of default is independent of debt size and that the bank 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 $t = 2$ such that $P_1 + P_2 = P$. A client

has a utility function $u_i(c_0, c_1, c_2) = c_0 + c_1 + c_2 - I_i D_i$ if $c_0, c_1, c_2 \geq 0$ and $u(c_0, c_1, c_2) = -\infty$ otherwise. c_t is time t consumption and I_i is an indicator equal to one if the client chooses to default and zero otherwise. D_i is the utility penalty for default, and is distributed over the client population according to the continuously differentiable distribution function $F(\cdot)$ with corresponding density $f(x) \equiv F'(x) > 0 \; \forall \; x \in [0, \infty]$ and $f(x) = 0$ for $x < \infty$.

At $t = 0$ the client divides loan amount B across two investment opportunities:

1. An *illiquid*, *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 *liquid* investment that pays off R_L after one period for each unit invested.

The return from the liquid asset exceeds payment need to repay the loan ($R_L^2 B \geq P$) and the expected return from the illiquid investment exceeds the liquid 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 liquidity premium from the illiquid asset 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. 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. If this effect is large enough, then the grace period will lead clients to invest *less* in the illiquid asset since setting aside P is less costly. Condition 2 insures that the relative attractiveness of the illiquid asset to the liquid asset is great enough that the income effect does not dominate. Stated equivalently, it insures that R_L is small enough.

4.2.2 Debt Structure and Investment Choice

First, under a grace period contract ($P_1 = 0$ and $P_2 = P$) the client chooses between investing everything in the risky asset or leaving enough in the liquid asset to ensure repayment. Comparing her expected utility from the two alternatives (see Appendix for details) shows that client i will reduce investment in the risky asset to $B - P/R_L^2$ if and only if:

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

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 $t = 2$.

Turning to the regular contract ($P_1 > 0$ and $P_2 = P - P_1$) the client chooses between investing everything in the risky asset, investing enough in the liquid aset to pay the first installment and investing enough in the liquid asset to repay both installments. Comparing the pay-offs from each (see Appendix for details), we can define cut-offs:

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

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

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

Setting aside money for P_1 and P_2 is preferred to setting aside money for just P_1 if and only if $D_i > D^{bf}$. Setting aside money for both is preferred to setting aside money for neither if and only if $D_i > D^{bn}$, and setting aside money for the first only is preferred to setting aside money for neither if and only if $D_i > D^{fn}$. Based on the cut-offs, we see that for D_i low enough, it is optimal to set aside no money. Further, for D_i high enough, setting aside both payments is preferred. Moreover,

Claim 1 *Investing enough in the liquid asset to ensure only the first payment is never optimal*

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, clients switch from setting aside no money for either payment to setting aside money for both payments at D^{bn}.

Proof is in Appendix. For P_1 small enough that condition 7 does not hold, as D_i increases from 0 to ∞ the borrower shifts from optimally investing 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

Under the maintained assumptions given above, we can characterize how, for a given D_i, how client investment differs across debt contracts:

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 investing enough in the liquid asset to make the first loan payment for sure to investing nothing in the liquid asset.

(ii) $D_i \in [D_{bf}, D_{bn}^{gp}]$ will switch from investing enough in the liquid asset to repay the full loan amount for sure to investing nothing in the liquid asset.

(iii) Small default costs ($D_i < D_{bf}$) or large default costs ($D_i > D_{bn}^{gp}$) will not change their investment behavior.

See appendix for proof.

Claim 3 *If P_1 is relatively high (Equation 7 holds) the grace period will cause clients with*

(i) $D_i \in [D^{bn}, D_{bn}^{gp}]$ to switch from investing enough in the liquid asset to repay the full loan amount for sure to investing nothing in the liquid asset.

(ii) Small default costs ($D_i < D_{bn}$) or large default costs ($D_i > D_{bn}^{gp}$) will not change their investment behavior.

See appendix for proof.

To summarize, moving from a grace period contract to a regular contract will lead some clients to switch from paying neither installment to paying both and others from paying neither installment to paying just the first. As size of the first payment (P_1) increases, setting aside enough for the first payment alone will be dominated by the other options. In this case, immediate payment requirements will cause a switch from paying neither installment to paying both (with the caveat that this relies on the income effect being relatively small). Importantly, borrowers will not switch down to paying a smaller fraction of the loan under the early payment contract. These results are summarized in Figure 2 and Figure 3.

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 illiquid asset investment. This investment has higher expected return for the borrower not only because the social return ($p_g R_g$) is assumed higher than the return on the liquid asset, but also because in the case of default, the borrower does not repay the loan. The variance of profits increases under the grace period 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 borrower does not set aside the second installment and the investment fails, which is more likely to happen under the grace period contract

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 the grace period and regular contract 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 significantly default averse. An important reason is that MFIs face significant regulatory constraints on the interest rates they can charge and are usually unable to offer alternative loan products (with different interest rate and term structures). This is likely to explain why MFIs don't offer contracts that maximize expected returns but rather contracts that minimize expected default.

Risk Aversion

Even though clients' utility is linear in consumption for positive values of consumption, clients are not risk neutral since utility is infinitely negative for negative values of consumption. In practice, clients will always choose to default rather than have negative consumption, so that the default cost provides the lower bound for utility. 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.

Income effect

Moving from a regular contract to a grace period contract potentially influences client investment decisions for two reasons: a *portfolio* effect which makes illiquid investments more viable and an *income* effect which increases total repayment time (and, thus, making it easier for a client to accumulate the income needed for repayment). This income effect purely reflects the fact that grace period clients have a lower net-present value of payments relative to non-grace period clients.

[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.

The model has explored the economic impact of the portfolio effect. We briefly examine whether an alternative model, which solely relies on the income effect (i.e. a lower discounted present value of loan payments), can 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 2 or 10 weeks following loan disbursement. The client has access to a perfectly liquid investment opportunity with monthly return on capital $1 + r_L$. Each fortnight, the client consumes a fraction α_c of the income generated by the investment and re-invests the remaining fraction $1 - \alpha_c$ in the investment net of loan payments.[18] We set B equal to the median loan size in our sample (8,000 Rupees) and use different values of the parameters α_c and r_L to assess the differential in capital stock levels between a client with a 2 week compared with 10 week gap between loan disbursement and first repayment.

Using the highest return to capital that we estimate with our data $r_L = .12$, in order to generate a capital stock gap of 28,000 Rupees, α_c must be less than .17. In other words, for every 100 Rupees in profits generated by the business, the client would have to consume only 17 and reinvest the rest. This is considerably lower than the observed ratio of consumption to income in the data which is 93%. Further, given a marginal propensity to consume out of investment income of .17, the grace period client would have accumulated a capital stock of 107,000 Rupees by the end of three years using *only the invested loan amount*. This is almost two and half times the *total* capital stock value we observe at endline.

A conservative ratio of consumption to income of 0.50 generates an observed differential in capital stock after three years of only 5500 Rupees.[19] We conclude that the income effect is unlikely to explain the observed differences in capital stock at endline.

[18] We assume that there is no minimum investment size so that profits may be re-invested fortnightly. The income effect will be smaller if instead investment requires a minimum capital amount in which case the client investment would compound on a less than fortnightly frequency.

[19] If we introduce default as simply choosing to stop repaying one's loan nine payments before the final payment is due, and use the proportions 2% and 9% defaulting for grace period and non-grace period, the results do not change by much.

4.3 Differential Investment Returns and Returns to Capital

We conclude by examining whether the mechanism highlighted in the model can quantitatively explain the empirical findings. The model abstracted from both consumption and non-investment income to focus on the interaction between repayment timing, investment and default. However, in bringing the model to the data, we will need to introduce consumption. We model consumption as a constant fraction of investment income.

First, we examine whether the large difference in capital stock three years after the loan could be generated by larger returns for the grace period client during the loan period. Assuming a marginal propensity to consume out of investment income of 0.50 and a return on capital of 4% for non-grace period clients over the course of the loan contract, followed by a return of 12% during the subsequent period, and a return of 12% for grace period clients before and after, the differential in capital stock at endline will be $18,000$ Rupees. This is of the same order of magnitude as the observed capital stock differentials of between 20,000 and 45,000 Rupees.

Modeling consumption as a fixed fraction of investment income is problematic if the grace period causes clients to change their consumption behavior. Specifically, to the extent that the illiquid investment constrains grace period clients to consume less each period than they would with a more liquid investment, the gap in capital stocks will be further increased.

Finally, we use our estimates to derive the implied return to capital. To compare our results more precisely with the literature on small business returns to capital, we follow de Mel et al. (2008) and compute the returns to capital implied by our parameter estimates. To ease comparability with the literature, we use the long-run data used to produce the estimates in Tables 4 and 5 to estimate the linear production function:

$$\pi_i = \beta K_i + \theta L_i + \epsilon_i \tag{8}$$

where π_i is profits, K_i is total business capital stock, and L_i is hours worked. Estimating this equation by OLS yields an estimate of β between .01 and .04 implying monthly returns

between 1% and 4%. Given measurement error in capital and hours worked as well as the endogeneity of capital stock, the estimate of β is a biased estimate of the returns to capital. We also estimate β using the grace period treatment as an instrument for business capital. This yields an estimate of β between .08 and .13, which is simply the difference in monthly profits between treatment and control divided by the difference in business capital.

These returns are nearly 2 to 3 times higher than de Mel et al. (2008)'s estimates of 5.5%.They are, however, much lower than the returns of 20-33% per month estimated by McKenzie and Woodruff (2008) for Mexican enterprises.

As de Mel et al. (2008) discuss, there are many reasons why these estimates may not correspond to the marginal return to capital. Returns to capital may not be linear, may be heterogeneous across the population and correlated with the impact of the treatment on capital. Other inputs to the business may have changed at the same time as capital investment changed. Importantly, as highlighted by our model, the grace period clients will not only invest more in their business but may shift towards less liquid, higher return activities. The estimates above include this composition effect. Not only do grace period clients have more capital at endline, the capital that they do have may be more productive. Therefore, while the returns estimated here are within the ballpark of other estimates, one possible explanation for why our estimated returns are higher than de Mel et al. (2008) and Dupas and Robinson (2009) returns of 5-6% per month for similar entrepreneurial activity is that the early payment requirements lead clients on the regular contract to shift to a capital stock with a lower over all return.

To see that this effect could be quite large given our estimates, suppose that grace period clients earn the unconstrained optimal return on capital of 5.5% as estimated by de Mel et al. (2008). The profit differential is $\pi_{gp} - \pi_e = .055K_{gp} - r_eK_e$, where K_e denotes the capital stock for grace period and early payment clients, and r_e denotes the return to capital for early payment clients. Assuming $K_{gp} = 51,000$ and $K_e = 33,000$ and that the differential in monthly profits is $\pi_{gp} - \pi_e = 1700$ as we estimate for the trimmed sample, the implied return on the early payment client's capital stock is 3.3%. This implies a yearly

return differential of $(1.055^{12} - 1.033^{12}) = 42\%$ for grace period relative to non-grace period clients. These lower implied returns for clients under the standard MFI loan contract are perhaps not surprising in light of the evidence presented in Banerjee et al. (2009) that the profit and income generation of standard MFI loans appears to be quite low.

Although this exercise suggests that the liquidity constraints underlying the early payment contract could lead to large differences in the returns to capital stock, it is important to emphasize that the caveats discussed by de Mel et al. (2008) apply to these results. In particular, in the above we made heavy use of the assumption of linear returns to capital. We also cannot rule out that the returns to capital for our sample are simply higher than the returns for the samples studied by de Mel et al. (2008) and Dupas and Robinson (2009).

5 Conclusion

Our findings suggest that introducing flexibility into MFI debt contracts in the form of a grace period presents a trade-off for banks and clients. On the one hand, average levels of default and delinquency rise when clients are offered a grace period contract. This basic 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, our findings are consistent with a model in which delayed repayment encourages more profitable, though riskier, investment. 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.[20] Consistent with the trade-offs we model here,

[20]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-

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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6 Appendix

6.1 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 above that do not admit any logical contradictions. Either $D_{fn} < D_{bn} < D_{bf}$ or $D_{bf} < D_{bn} < D_{fn}$. Under the first ordering, 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.

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

6.2 Data

6.2.1 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.

6.2.2 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 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 were administered after the loan disbursement. Hence, the baseline data provides a first source of information.[21] 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. For clients whose baseline surveys were administered either before or within 30 days after loan disbursement, we supplemented our data with information from the long run endline survey, which also asked about the dates of business creation and closing for each business.

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 answers to restrospective question on the Business Income survey. Respondents were asked whether within or XX days before receiving the relevant loan household members engaged in any non-salaried activity for which they received compensation (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 $44 + X$

[21] The baseline survey 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.

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.[22]

[22]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.

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) and (2), and

(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

(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

(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
	(1)	(2)
Panel A (no controls)		
Grace Period	51.79***	0.277
	(1.502)	(0.261)
Panel B (with controls)		
Grace Period	51.27***	0.309
	(1.388)	(0.250)
Observations	845	6502
Control Mean	14.64	14.33
	(0.983)	(0.215)

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) and number of days between each group meeting for the first 120 days since the first loan repayment meeting (column 2).

(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						Saved (some) loan for repayments	New business
	All	Inventory and Raw Materials	Equipment	All	Home Repairs	Human Capital	Money for Relending	Savings	Food Consumption		
	(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*	-27.42	0.0259*
	(180.1)	(279.9)	(234.1)	(172.4)	(137.1)	(90.26)	(70.61)	(47.12)	(14.29)	(70.61)	(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*	-34.74	0.0269*
	(186.4)	(276.2)	(234.2)	(179.1)	(145.4)	(89.16)	(69.67)	(49.06)	(14.33)	(69.67)	(0.0140)
Observations	845	845	845	845	845	845	845	845	845	845	830
Control Mean	6142.4	4521.4	1536.5	1149.1	557.2	237.9	197.6	131.6	24.81	197.6	0.0165
	(162.4)	(226.3)	(172.4)	(149.1)	(116.0)	(76.88)	(56.74)	(35.97)	(14.60)	(56.74)	(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) We report OLS regressions whcih include stratification fixed effects, and standard errors are clustered by loan group correlation. Regressions in Panel B also include controls presented in Panel A of Table 1 and loan officer fixed effects. Table 2 notes describe our strategy for missing control variables. We also include a dummy if total loan use adds up to more than loan size.

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)	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A (no controls)						
Grace Period	0.177**	0.169**	869.9**	450.0**	4595	449***
	(0.0798)	(0.0793)	(384.1)	(176.8)	(3860)	(149)
Trimmed	No	Yes	No	Yes	No	Yes
Observations	749	745	752	748	752	748
Panel B (with controls)						
Grace Period	0.198**	0.192**	849.0**	483.2***	3778	421***
	(0.0792)	(0.0780)	(333.3)	(178.8)	(3066)	(142)
Trimmed	No	Yes	No	Yes	No	Yes
Observations	749	745	752	748	752	748
Control Mean	9.317	9.305	1586.9	1513.8	5400	345
	(0.0527)	(0.0534)	(121.8)	(102.7)	(1985)	(494)

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.

(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	4991.5**	3143.5**	24866.3**	14767.4**	0.301	-0.0647*	-0.0219*
	(2165.3)	(1555.0)	(10638.7)	(6529.4)	(0.304)	(0.0328)	(0.0127)
Trimmed	No	Yes	No	Yes	No	No	No
Observations	765	761	765	761	755	770	752
Panel B (with controls)							
Grace Period	5358.2**	3718.2**	28889.8**	17098.8**	0.282	-0.0662*	-0.0158
	(2339.1)	(1611.0)	(11484.5)	(6607.4)	(0.290)	(0.0337)	(0.0121)
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
	(1)	(2)	(3)	(4)	(5)
Panel A (no controls)					
Grace Period	0.0962***	5.589**	0.101***	4.882*	5.789**
	(0.0364)	(2.421)	(0.0360)	(2.906)	(2.625)
Panel B (with controls)					
Grace Period	0.116***	6.204***	0.113***	5.751*	6.614**
	(0.0369)	(2.370)	(0.0359)	(2.963)	(2.948)
Observations	769	769	769	769	769
Control Mean	0.432	20.65	0.395	23.65	5.571
	(0.0270)	(1.601)	(0.0236)	(1.981)	(0.476)

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)).

(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	0.0851**	0.0670**	0.0643**	-0.0138	-0.0282	0.0238
	(0.0336)	(0.0275)	(0.0252)	(0.0157)	(0.0540)	(0.0247)
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.

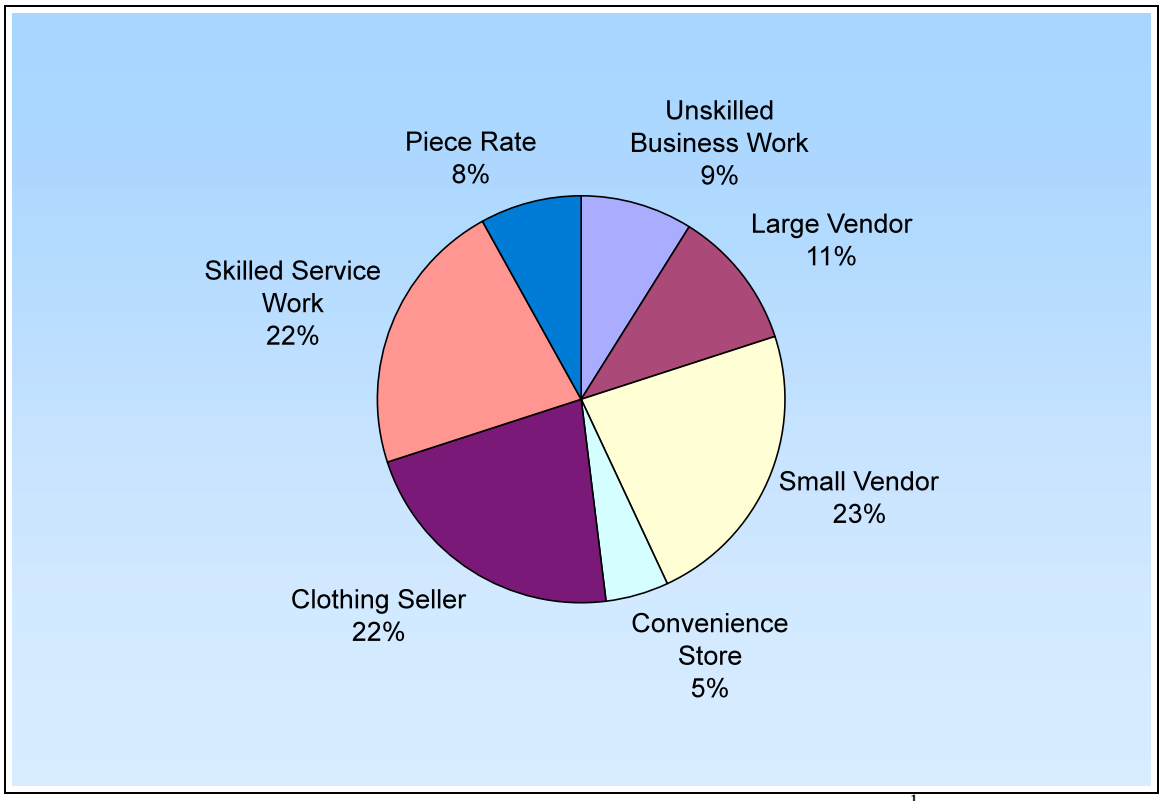
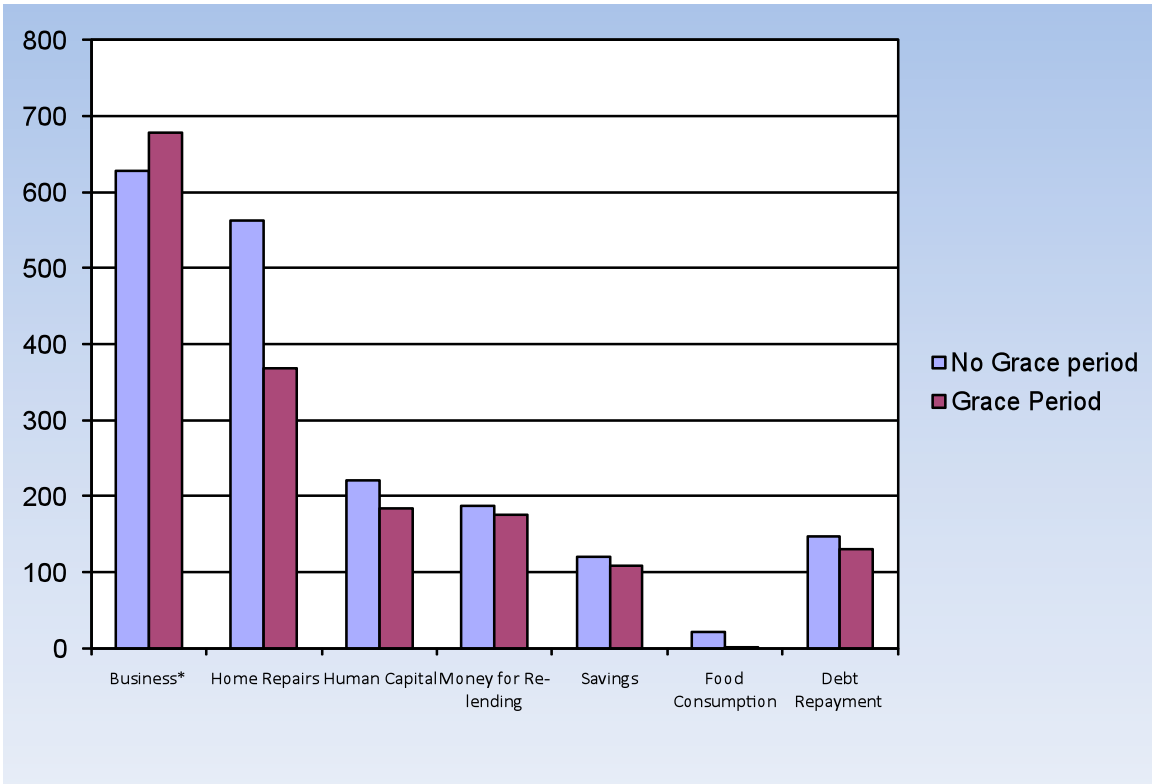


Figure 1: Distribution of Household Business Types[1]

[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

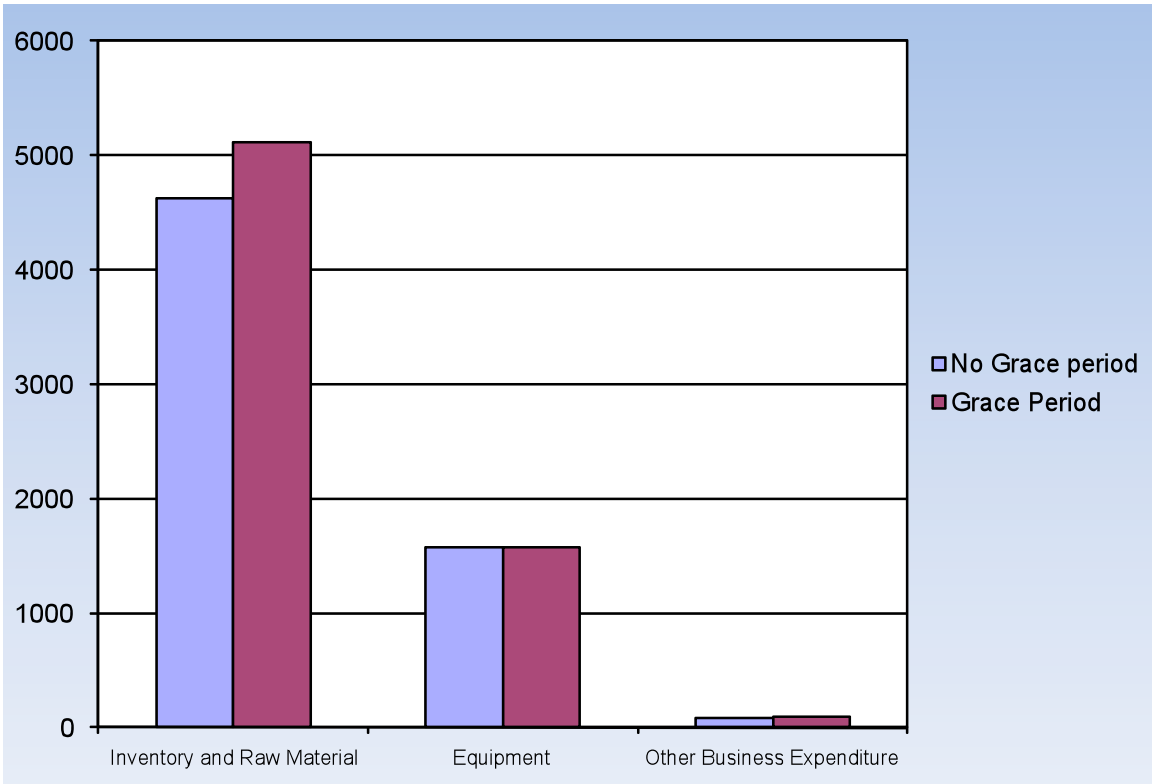


Figure 3: Business Expenditure Categories by Grace Period and No Grace Period Clients

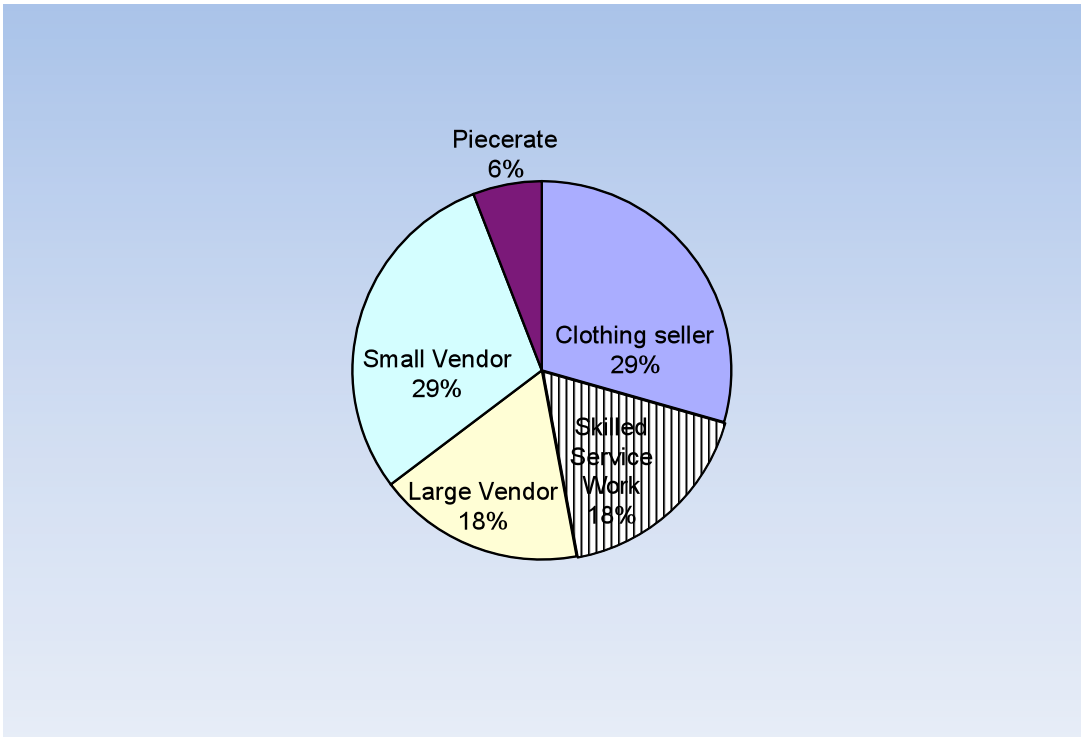


Figure 4: Distribution of Business Types for New Businesses of Grace Period Clients[2]

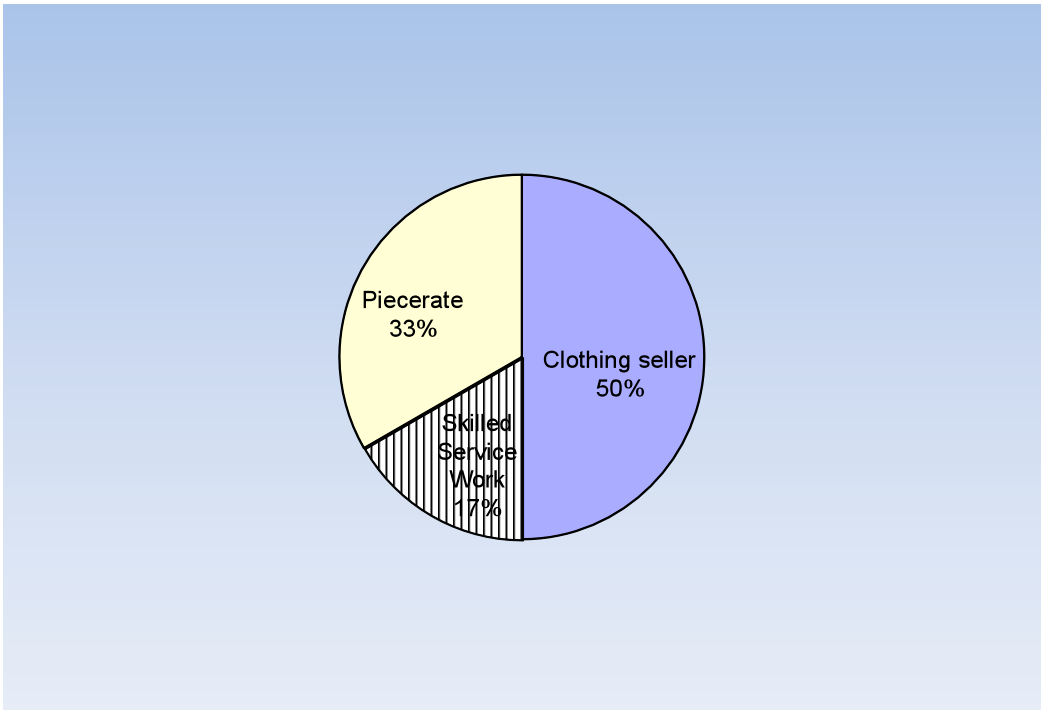


Figure 5: Distribution of Business Types for New Businesses of Non Grace Period Clients

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

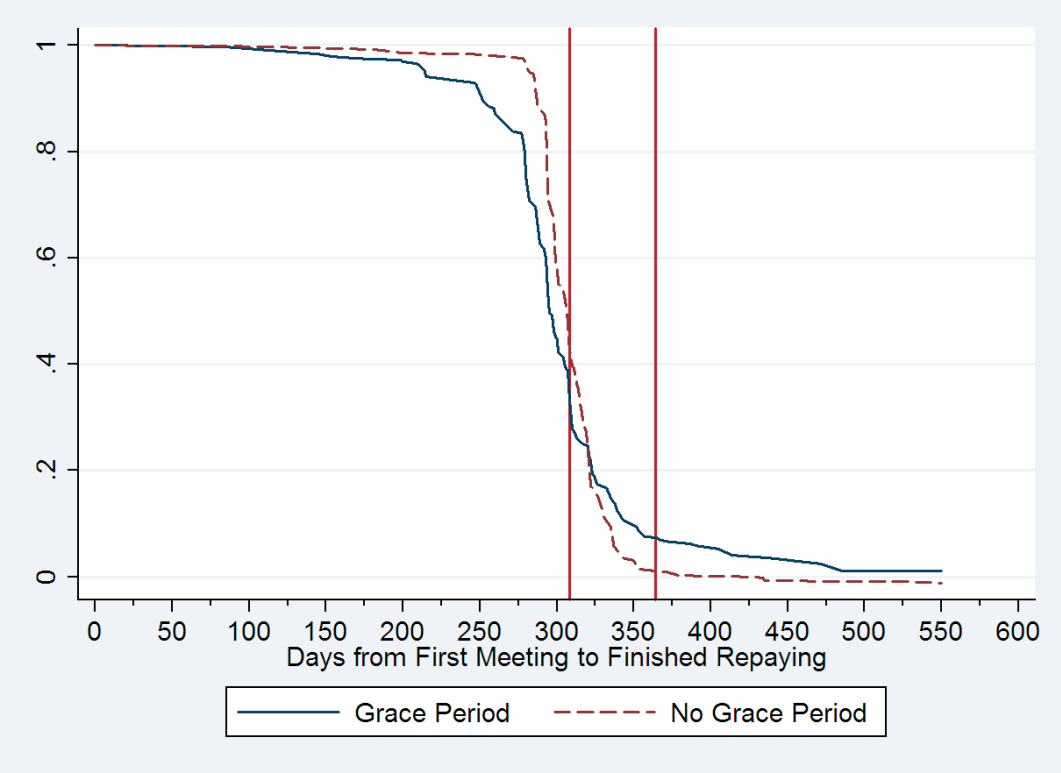


Figure 6: Fraction of Clients Who Have Not Repaid

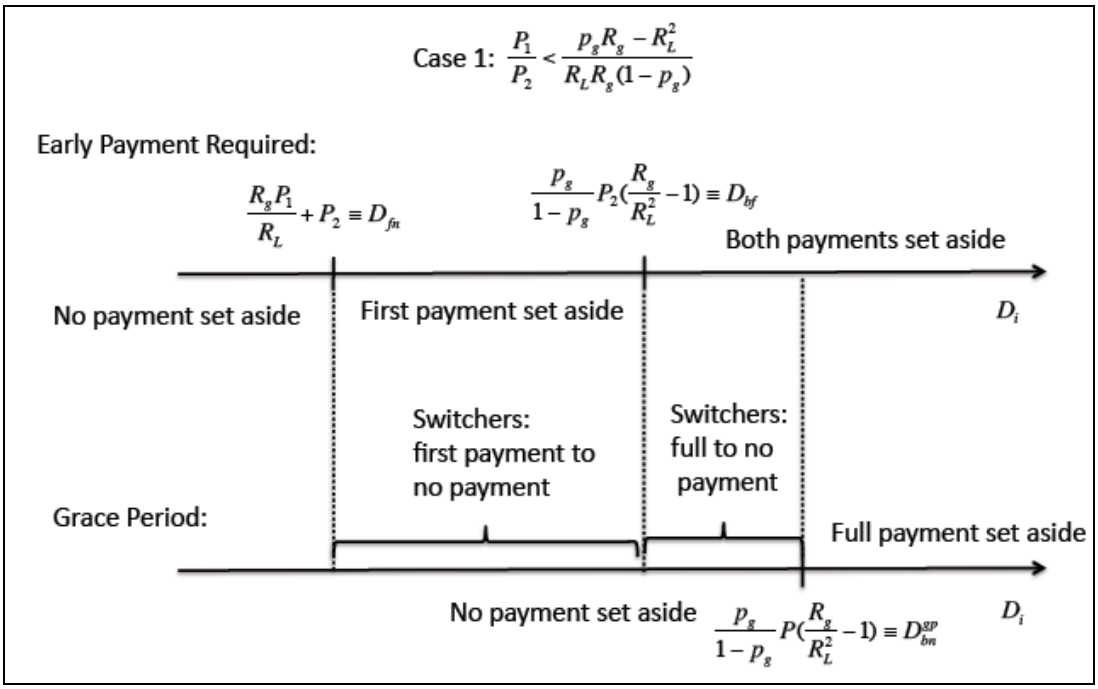


Figure 7: Grace period contract vs. contract with low early repayment obligation

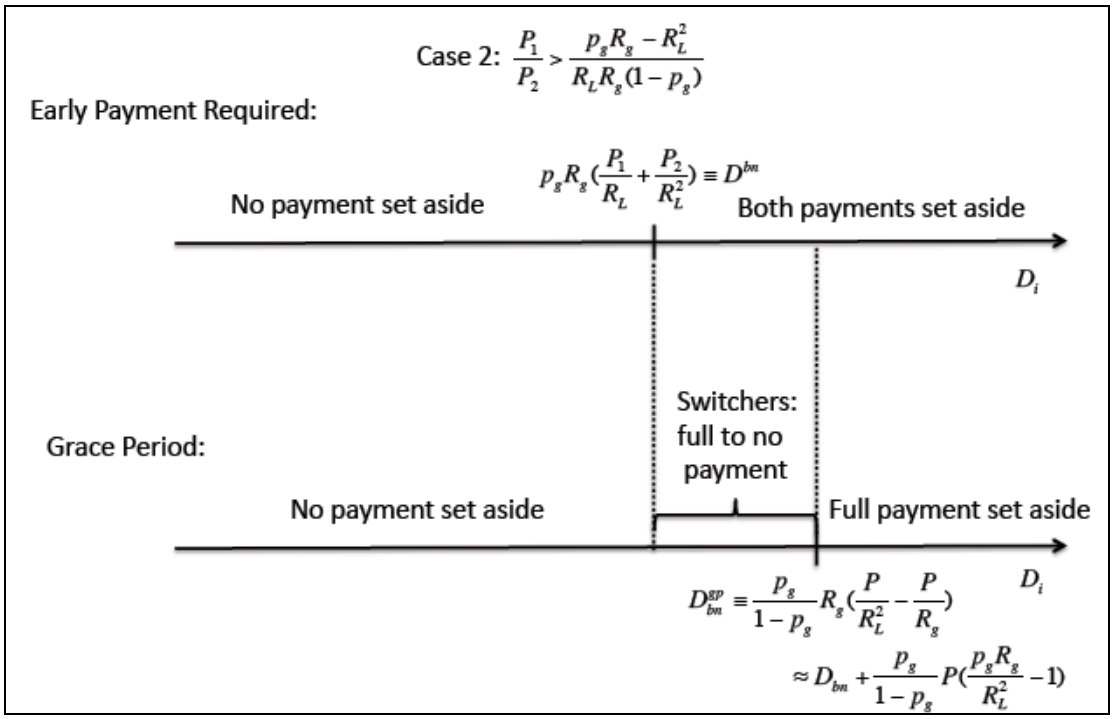


Figure 8: Grace period contract vs. contract with high early repayment obligation