# Repayment Flexibility and Risk Taking: Experimental Evidence from Credit Contracts*

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March 2019

**Abstract**

A widely-held view is that small firms in developing countries are prevented from making profitable investments by lack of access to credit and insurance markets. One solution is to provide repayment flexibility in credit contracts. Repayment flexibility eases both the credit constraint, as it allows for increased spending during the startup phase, and offers insurance, in case of fluctuations in income. In a field experiment among microcredit borrowers in Bangladesh, we randomly assign the option to delay up to 2 monthly repayments at any point during a 12-month loan cycle. The flexible contract leads to substantial (0.2 standard deviation) improvements in business outcomes and socioeconomic status, combined with lower default rates. The results are driven by an increase in entrepreneurial risk taking, implying that the primary mechanism is insurance provision. Repayment flexibility also attracts less risk-averse borrowers interested in business expansion. Our findings suggest that lack of insurance is an important constraint for small firms but that a simple financial product that increases repayment flexibility can be an effective tool for enabling enterprise growth.

*Keywords*: Repayment flexibility, Insurance, Credit, Microfinance, Entrepreneurship
*JEL codes:* C93, D22, D24, D25, G21, G22, O12, O14, O16

*We are grateful to BRAC Microfinance, in particular Shameran Abed, Dilshad Jerin and Maria May for supporting and enabling this research project. We thank International Growth Centre (IGC) and Private Enterprise Development in Low-income countries (PEDL) for the generous financial support. We benefitted from discussions with Jean-Marie Baland, Giorgia Barboni, Emily Breza, Lorenzo Casaburi, Davide Cantoni, Kristina Czura, Xavier Ginè, Giacomo Di Giorgi, Jessica Goldberg, Mathias Iwanowsky, Eliana La Ferrara, Thomas Le Barbanchon, Jonathan Morduch, Florian Nagler, Michele Pellizzari, Peter Skogman Thoursie, Vincent Somville, Miri Stryjan, Anna Tompsett, Diego Ubfal, Lore Vandewalle, Chris Udry, Dean Yang; as well as comments from seminar participants at Aix-Marseilles School of Economics, Bocconi, EBRD, EUDN Conference (Bonn), Graduate Institute Geneva, IGC Bangladesh Conference, LMU Munich, NCID Navarra, PEDL-IGC Conference (LSE), Stockholm University, University of Alicante, Universitat Rovira i Virigili, and University of Geneva. Mattia Chiapello, Gianluca Gaggiotti, Alessandro Sovera, Giacomo Stazi and Giulia Tommaselli provided excellent research assistance. The experiment was registered at the AEA RCT registry, ID AEARCTR-0002892. All remaining errors are our own.

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# 1 Introduction

Starting or expanding a business often entails undertaking costly and risky investments. In developing countries, where credit and insurance markets are imperfect, entrepreneurs face constraints on both fronts. It is well established that small enterprises are severely credit constrained (de Mel et al., 2008; Banerjee and Duflo, 2014) and operate under high levels of risk, having to tackle frequent aggregate and idiosyncratic shocks (Samphantharak and Townsend, 2018). While improved availability of credit and insurance ought to help aspiring entrepreneurs, the existing evidence shows that conventional microcredit has failed to generate substantial firm growth (Banerjee et al., 2015). In an environment where business growth requires access to capital and insurance against entrepreneurial risk, the ideal financial contract should cater to both of these constraints. In line with this, a large literature in corporate finance highlights the importance of financial flexibility for businesses (Graham and Harvey, 2001; Gamba and Trianti, 2008), but evidence from developing countries is scant.

In this article, we study an innovative product that provides liquidity and reduces uninsured risk and examine which constraint is more important. To this end, we experimentally alter the debt contract terms by making the repayment obligation more flexible. Improved flexibility eases the credit constraint, as it allows for increased spending during the startup phase, and provides insurance, in case of fluctuations in income. We conduct the randomized evaluation of the flexible contract in Bangladesh together with one of the largest microfinance institutions in the world, BRAC. The regular loan product BRAC offers has a 12-month loan repayment cycle with monthly installments of equal size. By contrast, the flexible contract allows borrowers to delay up to 2 monthly repayments at any point during the loan cycle using repayment vouchers. On the day of their monthly repayment, borrowers can present a voucher, thereby postponing the repayment and extending the loan cycle. We primarily focus on collateral-free microfinance provided to women (*Dabi*), where BRAC reaches four million borrowers in Bangladesh alone. To understand the effect of repayment flexibility on larger loans, we also study larger collateral-backed debt (*Progoti*), available to female and male borrowers.[1]

Conceptually, repayment flexibility can both ease microentrepreneurs' credit constraints and deal with incomplete insurance. By delaying early repayments, the flexible loan allows for a larger investment and larger loan size. We think of this as relaxing borrowers' credit constraints relative to the standard contract. Alternatively, borrowers can hold onto the vouchers and use them throughout the loan cycle, in case they face difficulty in making their payments. We think of this as providing borrowers with insurance, enabling riskier

[1] Both loans entail individual liability and a flat 22% annual interest rate. In the case of traditional microfinance (Dabi), borrowers attend monthly group meetings but are individually liable for their loans.

input choices, more experimentation, and lower default rates as compared to the standard contract.

In order to assess the effects of increased flexibility, we collaborated with BRAC to conduct a field experiment in Bangladesh. BRAC identified borrowers with good credit histories deemed to be eligible for the new contract in 50 of its branches. Following this, we surveyed a random sample of these borrowers. After our baseline survey, BRAC offered the flexible loan contract to eligible clients in 25 branches that we randomly selected. The same respondents were then resurveyed 1 and 2 years after the baseline. The experimental variation captures the relative benefit of the flexible versus the standard credit contract and allows us to study the importance of credit and insurance constraints.

We first establish that the flexible contract improves borrowers' business outcomes and their socioeconomic status. The results are driven by an increase in entrepreneurial risk taking, implying that the primary mechanism is insurance provision. We also document that flexibility attracts less risk-averse clients interested business expansion. Together this suggests that lack of insurance is an important constraint for small firms but that a simple financial product that increases repayment flexibility can be an effective tool for enabling enterprise growth.

In particular, we find that repayment flexibility increases business investments and revenues among traditional microfinance (Dabi) clients. The intention-to-treat estimates reveal that the value of their business assets is 51% higher relative to the control group. They generate 87% more revenues, have 25% larger profits, and experience 80% higher sales volatility. Borrowing from BRAC goes up by 15% compared to the control sample. At the same time, they extend more loans or transfers to their social networks (74%). In terms of their socioeconomic status, they end up with higher household income (17%), more household assets (25%), and own more land (26%). A natural question is whether these improvements came at a cost to the lender in terms of default rates. We find that the likelihood of default diminishes among eligible microfinance clients (35%). Moreover, they are more likely to remain as BRAC borrowers.

When we examine the corresponding impact on larger, collateral-backed (Progoti) debt, we find no significant effects in terms of business or household outcomes on average, with the exception of a substantial increase in employment creation (42%).[2] This average effect masks important heterogeneity in the response across the skill level of the entrepreneur: treatment leads to a reduction in revenues and profits for low-skilled entrepreneurs,[3] while the impact is positive for business owners with higher skills at baseline. This implies that when it comes to loans targeting larger firms, repayment flexibility alone may not be sufficient to improve the effectiveness of the loan in terms of business growth.

[2] We also do not find any changes in their borrowing or repayment behavior.

[3] As proxied by their schooling level.

To understand if the gains experienced by traditional microfinance (Dabi) clients are driven by credit or insurance constraints, we proceed in four steps. First, we study the voucher use pattern among clients in treated branches. We find that usage is dispersed over the loan cycle, with a substantial proportion of borrowers not employing any voucher despite taking up the flexible contract. About 60% spend at least one voucher and of those that use both, 3.3 months pass between the first and second voucher. Importantly, only 1.6% employ them in months 1 and 2. This is more in line with state-contingent insurance, where vouchers are used if needed, rather than easing a credit constraint by exhausting the vouchers immediately to boost investment and loan size.

Second, we show that treated entrepreneurs increase the variety of inputs they use, and the unit value of tools and furniture owned by treated businesses is higher. The wider variety of inputs suggests that the flexible contract allows for more risk taking by enabling experimentation. To the extent that some of the assets are more illiquid (for example, machinery or furniture tailored to the specific needs of the business), this could further increase risk. At the same time, the expanded use of costlier inputs could be indicative of relaxed credit constraints.

Third, we test for the importance of access to credit by studying the heterogeneity of the effects with respect to clients' economic status at baseline. If the credit market is a key imperfection, the flexible contract should be particularly valuable to the less wealthy. We find no such evidence, if anything, better-off borrowers seem to benefit more from repayment flexibility.

Fourth, we investigate if the flexible contract increased risk taking. First, we compare the distribution of earnings in the treatment and control samples. We observe that treated households in the left tail of the distribution experience lower revenue and lower income growth relative to the control group, while they do better in the upper quantiles. This is consistent with flexibility leading to greater risk taking, causing some entrepreneurs in the treatment group to lose out (relative to control), while others gain.

To pursue this further, we examine how treated businesses are affected by demand uncertainty. Greater volatility, as captured by expectations or actual shocks, should matter more for borrowers that take on additional risk. We first show that the effects on revenues and profits are driven by borrowers in locations where expected demand uncertainty is higher at baseline.[4] To pin down the mechanism more directly, we explore quasi-experimental variation in the form of local demand shocks. In Bangladesh, excessive flooding during the growing season of the main crop (Boro rice) is particularly harmful and constitutes an important downturn in local economic activity. We find that average treatment effects are

[4]To measure average demand uncertainty in a given location, we rely on subjective probability distributions of expected demand using a representative survey of firms.

positive, only in locations that experienced favorable rainfall. In locations with flooding, the treatment impact is indistinguishable from zero. At the same time, in the absence of floods, business profits and revenues are significantly greater in treatment relative to control. Together the results imply that the flexible contract induced a shift to activities more sensitive to aggregate uncertainty.

Overall, while some evidence such as costlier inputs supports the presence of credit constraints, most findings, including higher sales volatility without increased default rates, vouchers used at distinctly different points in time or not at all, experimentation via a greater variety of assets, and a shift to activities more exposed to demand uncertainty, all speak to the importance of imperfections in the insurance market for entrepreneurial risk.

Finally, we consider how the new contract affected the selection of individuals into borrowing. In particular, we test if the introduction of the flexible loan attracted different types of firms in treated branches relative to control. To do this, we conducted a census of small and medium enterprises (SMEs) operating in the 50 branches at baseline, surveying a random sample of the SMEs prior to branch randomization. We then compare, within this representative sample of SMEs, whether those borrowing from BRAC in treatment branches at follow-up are significantly different in terms of their baseline characteristics. We find that entrepreneurs who were less risk averse and who expressed a desire to start a new business were more likely to become BRAC borrowers in the treated branches. While the new clients were not part of our loan product evaluation, this suggests that the flexible loan has important selection effects, primarily attracting clients interested in growing their business activities as opposed to engaging in consumption smoothing.[5]

In sum, the results imply that repayment flexibility benefits traditional microfinance borrowers mainly through the provision of insurance, enabling riskier investments at lower default rates. It also draws in entrepreneurs that are less averse to risk and more willing to expand their business activities. The findings highlight the benefit of a novel product that simultaneously provides credit and insurance to microfinance clients, contributing to work examining the overall success of microfinance by focusing on the inframarginal borrowers (Banerjee et al., 2015). At the same time, some caution is warranted as the effects for larger loans are less transformative and even negative for low-skilled entrepreneurs.

The present paper builds on and adds to three main literatures. To the best of our knowledge, this is the first paper that provides causal evidence on the joint importance of capital constraints and incomplete insurance on the growth of non-agricultural firms. While a large literature has studied the role of credit constraints for firms (see e.g. Fafchamps

[5]To understand the pattern of selection among BRAC borrowers who were offered the flexible loan, we also study correlates of take up. About half (57%) of the traditional Dabi clients accepted the offer and borrowed under the flexible contract. Less risk-averse clients with a higher entrepreneurship score at baseline, were more likely to take up the flexible loan, confirming the pattern of selection found in the SME sample.

et al., 2014), empirical work on insurance have mainly focused on agriculture. Past studies show that the provision of (subsidized) access to insurance leads to higher farm investment and take up of new technologies, increasing farm profit through greater risk taking (Cole et al., 2017; Giné and Yang, 2009; Mobarak and Rosenzweig, 2013; Carter et al., 2016; Cai, 2016).[6] Our paper is related to Karlan et al. (2014) who evaluate the relative importance of credit and insurance constraints by providing cash grants and rainfall insurance to farmers in Ghana. They find that the binding constraint is uninsured risk, with farmers making riskier production choices when offered insurance. Our results complement Karlan et al. (2014) by highlighting the role of risk taking. Unlike them, we study the incremental effect of a contractual change rather than access to either credit and/or insurance for small retail and manufacturing firms, instead of farmers. Another closely connected study is Bianchi and Bobba (2013) who find that cash transfers in Mexico increased entrepreneurship. Exploiting variation in the timing of the transfers they show that insurance as opposed to liquidity constraints drives this effect. While their focus is on entry into entrepreneurship, we study investments in and the growth of existing businesses.

Second, we link to a small but growing literature that investigates credit contract structure in microfinance, with the most notable precursor to our work being Field et al. (2013). They evaluate the effects of giving a two-month grace period to microfinance clients and find that this leads to an increase in short-term investments and long-run business profits, but also in default rates. Barboni and Agarwal (2018) is another related study showing that three-month blocks of repayment holidays chosen in advance attracts financially disciplined clients and leads to higher repayment rates and higher sales.[7] Unlike previous work, borrowers' complete flexibility over their voucher use allows us to evaluate the relative importance of credit and insurance constraints. As such, the contract we study not only encompasses an early grace period or planned blocks, but also caters to unexpected shocks occurring in any given month throughout the loan cycle.[8,9]

[6] Also, Groh and McKenzie (2016) evaluate an insurance against macroeconomic shocks provided to microfinance clients in Egypt. While demand was high, there are no effects on investments or firm growth. Similarly, Lane (2018) studies the impact of an emergency loan following floods in Bangladesh, showing that it increases consumption and asset levels and reduces default in the event of flooding. By contrast, we focus on the joint provision of credit and insurance (for both aggregate and idiosyncratic shocks) via repayment flexibility for a given loan.

[7] Czura (2015) investigates a loan targeted to dairy farmers that tailored repayments to the period when cattle produces milk, finding that it increased milk production and income as well as default rates.

[8] The ability to handle shocks throughout the entire contract also offers an explanation to why default rates decline with repayment flexibility while it increases under the two-month grace period studied by Field et al. (2013). If both contracts induce investments more sensitive to uncertainty, the flexible loan covers outstanding debt at any point during the loan cycle in the event revenues drop unexpectedly. Meanwhile, this is only viable for the first two months with the grace period, leading to a higher likelihood of default with the latter contract.

[9] By providing evidence on the selection effects of introducing a new loan product with greater repayment flexibility, we also contribute to empirical work gauging selection in developing-country credit markets (see e.g., Karlan and Zinman, 2009; Beaman et al., 2015; Jack et al., 2016; Gulesci et al., 2018).

Finally, the analysis contributes to research in corporate finance on firms' ability to take advantage of opportunities and deal with shocks, and how this affects their capital structure. Work on financial flexibility (Gamba and Trianti, 2008; DeAngelo et al., 2011) and lines of credit (Holmström and Tirole, 1998; Sufi, 2009) emphasizes the capacity to restructure financing to facilitate unexpected changes in cash flows or investment opportunities, especially in a volatile business environment.[10] We provide causal evidence demonstrating that such flexibility increases risk taking, and that this is more valuable when firms face aggregate uncertainty.[11]

The next Section presents a conceptual framework that highlights how credit and insurance constraints are alleviated by repayment flexibility and the type of borrowers it attracts. Section 3 describes the context, the implementation of the field experiment, the dataset, and the baseline characteristics of our sample. Section 4 reports the empirical results, while Section 5 discusses some implications of the findings and Section 6 concludes.

## 2 Conceptual Framework

When markets for credit or insurance are missing, flexibility in debt repayment may influence microentrepreneurs' input choices and subsequent repayment behavior. In what follows, we discuss how the flexible loan eases credit and insurance constraints by better matching repayments to borrowers' cash-flow needs as compared to the standard credit contract.[12] To fit our experimental context, we refer to a loan that requires a regular, constant stream of repayments as the standard contract. By contrast, under the flexible contract, a borrower can access 2 vouchers enabling her to reschedule up to 2 debt repayments on their due date.

Suppose a microentrepreneur wants to carry out an investment. The investment can be lumpy, such as acquiring a machine. It may also involve risk because of uncertainty about realizing the gains from the investment. If the credit market is the main imperfection, the flexible contract allows the entrepreneur to increase investment (and, possibly, loan size) above the level permitted by a standard loan. In particular, by using the two vouchers in the first two months of the repayment cycle, the borrower avoids having to put money aside to cover the initial loan payments. If the investment is an indivisible input, voucher

[10] We also link to studies on the timing of repayments in consumer mortgage products, where flexibility in choosing the monthly payments have been shown to smooth consumption (Cocco, 2013) but also increase delinquency rates (Garmaise, 2013).

[11] The importance of aggregate risk, and its consequences for asset illiquidity, also rationalizes why businesses in our setting prefer the flexible over the standard credit contract. Shleifer and Vishny (1992) show that asset illiquidity resulting from economy-wide shocks lowers firms' debt capacity. With a flexible contract, borrowers avoid having to sell their assets at the same time as everyone else hit by the aggregate shock in order to cover the repayment. This may in turn increase firms' willingness to take on risk.

[12] The ensuing discussion, distinguishing the credit and insurance aspect of the flexible contract, can be formalized in an agricultural household model that allows for missing credit and insurance markets (see e.g., Bardhan and Udry, 1999).

usage early on can also boost the amount borrowed compared to the standard contract. This is because the minimum investment size needed to cover the bulky asset exceeds what the standard contract allows for, leading the entrepreneur to take a smaller loan, or not borrow at all, when offered a standard loan. Importantly, both of these effects should be stronger for more liquidity-constrained entrepreneurs.

With incomplete insurance markets, the flexible contract increases investment in inputs more sensitive to demand uncertainty or to experimentation in the firm, compared to the standard contract. It also reduces the need to sell off assets to repay outstanding debt and lowers default. To see this, suppose the borrower is considering investing in high return but illiquid inputs. These activities expose the business' overall portfolio to more aggregate uncertainty as illiquid inputs (e.g. tools or machines used for a particular purpose) are difficult to resell if demand drops.[13] Since repayment flexibility helps cover loan payments in bad times (unlike the standard loan), we expect larger investments in riskier inputs under the flexible contract. Experimenting with the production process, such as using a wider variety of inputs, also increases the likelihood that repayments cannot be made if production is delayed. Again, flexibility makes it more likely that borrowers take on additional risk compared to the standard loan. The flexible contract also affects firm behavior once demand or production processes have been realized. Under the standard loan, a negative demand shock forces the borrower to sell her assets to meet the debt obligation. If inputs are illiquid, this implies that she defaults on her loan. Failed experimentation and production delays also result in default unless inputs can be sold off to cover outstanding debt. With repayment flexibility, the vouchers allow the borrower to keep the liquid assets and avoid default in the case of illiquid inputs.[14] Summing up, the flexible loan thus induces riskier business activities with default rates remaining the same or declining as the vouchers offset the increased risk taking. As shocks and production delays can occur across the loan cycle, we should observe voucher usage throughout the contract period. Moreover, if the vouchers work strictly as insurance, some borrowers will exploit the option of taking up the flexible contract offer without actually using the vouchers.

If the financial environment is characterized by imperfections in the credit and insurance markets, the flexible contract allows for an increase in lumpy investments and in loan size as well as investments in riskier inputs, experimentation, a greater sensitivity to demand uncertainty, and improved repayment behavior. The exact prediction depends on which

[13]Both in the sense of Williamson (1988) and because of the general equilibrium aspect of asset sales as emphasized by Shleifer and Vishny (1992).

[14]The use of the flexible contract as state-contingent insurance rationalizes why our results differ from Field et al. (2013). They find that an initial two-month grace period increased default rates, an outcome predicted by our conceptual framework if vouchers are spent exclusively in the first two months to boost investment in illiquid inputs. In this case, the likelihood of default should increase if borrowers experience a demand shock later in the loan cycle. However, by using the vouchers as insurance, borrowers are able to circumvent payment difficulties that arise throughout the entire contract.

constraint is more binding. Analogously, voucher use will reflect which market imperfection matters the most. If vouchers are predominantly spent in the first two months, this supports the notion of binding capital constraints. Meanwhile, dispersed use across the loan cycle or taking up the contract but not employing the vouchers, is more in line with imperfect risk markets.

In addition to direct treatment effects, the introduction of the new credit product may affect the type of borrowers attracted by the contract. To the extent the flexible loan primarily draw microentrepreneurs interested in growing their business, this has implications for the risk profile of the borrower pool. Following a literature dating back to Cantillon (1755), Knight (1921), and more recently Kihlstrom and Laffont (1979), entrepreneurs, as business-owning residual claimants, are less risk averse than the population at large.[15] As less risk-averse individuals are more likely to choose uncertain but high-return projects (see e.g., Lybbert et al., 2010), and as flexibility allows for riskier business activities, the contract could increase the share of borrowers that are less averse to risk and more interested in business growth.[16] By contrast, if the flexible contract is used for consumption-smoothing purposes it may instead draw borrowers with high risk aversion.[17]

# 3 Experiment

## 3.1 Context

Our study is set in Bangladesh where our partner, BRAC, is one of the main providers of microfinance services. BRAC's microfinance program mainly targets two types of clients.[18] The most common microfinance product is the "Dabi loan", which is offered to finance small enterprises, typically with no employees except for family workers (e.g. tailoring, small retail shops, poultry and livestock rearing, and carpentry). The average size of a Dabi

[15] Alternatively, the inherent risk involved in entrepreneurship acts as a barrier to new entry rather than as a necessary selection criterion. In this case, the flexible contract might induce more risk-averse individuals to borrow (Hombert et al., 2014).

[16] This prediction is consistent with risk-averse individuals benefiting more from repayment flexibility for a given risk class of projects. Empirically, the latter is difficult to test as the composition of subsequent projects will change across treatment and control branches if the flexible contract induces project selection. That is, if repayment flexibility attracts borrowers less averse to risk that undertake more uncertain projects there are no counterfactual projects to compare with in the control group.

[17] There are other aspects of selection, regardless of loan use, that could affect loan performance. First, the contract might attract opportunistic borrowers that defer payment for as long as possible (using the two vouchers immediately) only to strategically default in the third month when the first payment is due. Second, the flexible loan may increase the temptation to default on any given installment for present-biased borrowers (see e.g., Fischer and Ghatak, 2010; Bauer et al., 2012; Barboni, 2017). The idea is that present-biased borrowers prefer the standard contract as it entails smaller payments spread throughout the loan cycle (thereby minimizing the risk of default at any given point). Similarly, the more complex nature of the contract could impose a cost on financially illiterate borrowers by inducing them to overconsume in the early stages of the loan cycle. If a large share of new borrowers has time-inconsistent preferences or are financially illiterate this might also lower the repayment rates.

[18] BRAC also has specialized loans for sharecroppers, migrant workers' households, and students. We do not study these products.

loan is 275 nominal USD (range between \$100-\$1,000). Currently, BRAC has four million Dabi borrowers in Bangladesh. BRAC also offers "Progoti loans" for small and medium-sized enterprises. The Progoti loans are intended for working capital in shops, agricultural businesses, and small-scale manufacturers and have an average loan size of \$2,200 (range between \$1,000-\$10,000). They require collateral of equal value to the loan and a guarantor. Both types of loan products entail individual liability (with group meetings in the case of Dabi loans), a flat 22% annual interest rate, and a 12-month loan repayment cycle with monthly installments of equal size.

We collaborated with BRAC to implement a pilot assessing the viability of a flexible loan product. The flexible contract allowed borrowers to delay up to two repayments within their loan cycle through the use of repayment vouchers. BRAC decided to offer the option to borrow under the flexible contract to Dabi and Progoti clients with good credit histories. The eligible clients were selected by credit officers at the branch office level on the basis of having no defaults and few or no arrears. Under the flexible contract, borrowers had 2 vouchers that enabled them to postpone 2 monthly repayments in their loan cycle. On the day of the repayment, borrowers could present the voucher thereby postponing the repayment and extending the loan cycle. Specifically, by extending the cycle to 14 instead of 12 months the borrowers had 2 months during which they were not required to make any payments to BRAC. For example, if borrowers skipped the first two installments, the repayments started in month 3 and continued up to month 14 (corresponding to a contract that provides a 2-month grace period). If clients decided to use their vouchers to avoid any other installment(s), the repayment in that month would be skipped and the full loan cycle was extended by an additional month (for example, using the vouchers in months 3 and 7 extended the cycle to 14 months, with repayments occurring in months 1, 2, 4, 5, 6, 8,...13, and 14). Hence, the contract provided the borrowers with full flexibility to tailor-make their loan cycle according to their expected and unexpected cash-flow needs (they were still limited to delaying no more than 2 repayments). Moreover, if borrowers wanted, they could skip 2 repayments and pay up their remaining balance within the 12th month, thus keeping the length of the loan cycle unchanged. As such, the vouchers offered considerable payment flexibility. No extra cost was charged for the use of the voucher(s).

## 3.2 Evaluation and Data

To evaluate the effects of the new loan contract, we randomized the introduction of the flexible loan at the BRAC branch office level. The typical branch office covers an area of a roughly 6-km radius with 200 Progoti and nearly 1,200 Dabi borrowers. BRAC selected fifty branches for the study and credit officers in each branch identified Dabi and Progoti borrowers that they deemed eligible for the flexible loan. BRAC subsequently provided us with a list of the eligible clients in each branch. From this list, we randomly sampled 2,717

eligible borrowers; 1,115 Dabi and 1,602 Progoti clients (the "eligible-borrower sample"). We also obtained a list of all ineligible clients in the same 50 branches.

In addition to eligible BRAC clients, we collected information on a representative sample of SMEs (independent of their borrowing status with BRAC). For this, we first conducted a census within the geographic location of each BRAC branch office by going door-to-door, capturing a comprehensive listing of all SMEs operating in selected sectors in the study branches. The objective was to identify microenterprises with fewer than 10 workers operating in light manufacturing and retail. These characteristics were chosen to make them comparable with potential BRAC borrowers.[19] This provided us with a listing of 7,270 firms. From the census, we randomly sampled and surveyed 3,504 firms at baseline (the "SME sample").[20]

The baseline survey for our two samples was conducted between January and June 2015. After the baseline, we randomly selected half of the 50 branches as treatment and the rest as control. The randomization was stratified by district (15 randomization strata), each containing 2-5 of the branch offices in our study. Figure 1 shows the location of the BRAC branches included and their randomization status. The flexible loan product was launched in mid-August 2015. By the end of September 2015, the intervention had been introduced in all branches. Immediately following the product launch, we collaborated with BRAC to implement an information campaign in the treatment branches. Its goal was to ensure that information regarding the new loan that BRAC was piloting reached the firms in the SME sample. This was achieved through: (i) phone calls, conducted by BRAC's phone call centre, to every business owner in our SME sample. During these phone calls, the terms of the new loan product were explained; (ii) leaflets, describing the same information, delivered by BRAC credit officers to the firms in the SME sample and to firms in the eligible-borrower sample.

Approximately one year after the baseline, between May and July 2016, we implemented the first follow-up survey (the midline). Since the intervention was launched in August 2015, the effects at midline capture short-run impacts (8 to 10 months after treatment started). Nearly one year after the midline (and two years after the baseline), we conducted the endline survey.[21] At the end of that survey (August 2017), we received BRAC's administrative records on its borrowers (eligible and ineligible borrowers at baseline, as well as the new borrowers that joined BRAC after the launch of the experiment). The records contain data on the last as well as past loans of current or past borrowers, provid-

[19] Manufacturing includes SMEs active in food processing, carpentry, plumbing, handicraft, and garments while retail comprises grocery, supermarkets, wholesale shops, clothing, and hardware.

[20] By construction, the SME sample contains both current BRAC clients (about 10%) and non-client firms located within each study location.

[21] The mid- and endline surveys were planned to be in the same period of the year in order to appease concerns about seasonality in profits and other outcomes.

ing us with detailed reports on borrowers' repayment behavior.

Finally, to measure local rainfall shocks, we use monthly rainfall data at 0.25-degree resolution obtained from the NOAA-maintained PERSIANN-CDR dataset which covers the period 1983-2017.[22] The information on precipitation is used to construct local demand shocks across the 50 branches under study.

### 3.3 Descriptives and Validity Checks

Table 1 provides descriptive statistics on the baseline characteristics of eligible Dabi clients (with the corresponding information for Progoti borrowers presented in the Appendix). Column (1) reports the mean and standard deviation in the treatment group and column (2) the equivalent control sample statistics. All monetary values are deflated to 2015 prices, using CPI figures published by the Central Bank of Bangladesh, and converted to USD PPP terms using conversion rates published by the World Bank's International Comparison Program database (1 USD PPP $\approx$ 28.25 TAKAs).

The average eligible Dabi client in our sample is 38-39 years old, has 4.5 years of schooling, and lives in a household with 5 members. Approximately half of them own some land and the typical household labor income is about 7,000 USD PPP per year, with annual per-capita consumption around 1,700 USD PPP. In terms of business ownership, 45% of the microfinance clients reported having a business at baseline. This is similar to the rates of business ownership among microfinance clients in other studies (Field et al., 2013).[23] The average borrower owns 4,300 USD PPP worth of business assets and employs 0.5 workers (excluding the owner of the business but including other family workers). On average, an eligible Dabi client spends about 1,500 hours per year working in the business which generates 4,200 USD PPP worth of annual profits.[24] In order to capture the volatility of their revenues throughout the year, respondents were asked to report the value of their sales in the worst and the best months during the past year. The difference between the highest and the lowest monthly revenue (i.e. the range) is 4,435 USD PPP for the average respondent. Considering that mean annual revenues in the sample are about 35,000 USD PPP (i.e. mean monthly revenue level is around 3,000 USD PPP), this highlights the vast variation in business performance across the year.

The lower part of the table shows that on average, eligible Dabi clients had about 2,000 USD PPP worth of credit from BRAC and only 10% of them borrowed from other sources.

[22] See https://www.ncdc.noaa.gov/cdr/atmospheric/precipitation-persiann-cdr for more details about the rainfall data.

[23] Among eligible Dabi clients in our sample, only 5% reported owning multiple businesses. In the analysis, we focus on the main household business reported by the respondent (the borrower), but the results are similar if we aggregate all business-related variables at the household level.

[24] The measures of profits we use is based on a direct question on the level of profits as opposed to subtracting costs from revenues. de Mel et al. (2009) show that for small businesses, this method provides a more accurate measure of profits compared to calculations based on detailed questions on revenues and costs.

For all these characteristics, Table 1 also reports balance tests where we compare the sample means by treatment status. Column 3 shows the standard difference, column 4 the randomization inference $p$-values, and column 5 reports the normalized difference. With the exception of one outcome (BRAC loan value) all characteristics are statistically similar across the two groups, and the normalized differences are smaller than 1/4th of the combined sample variation, suggesting that linear regression methods are unlikely to be sensitive to specification changes (Imbens and Wooldridge, 2009). Table A.1 in the Appendix provides additional balance tests for the eligible Dabi sample, including outcome variables not reported in Table 1 (for brevity) but used in the analysis. Table A.2 does the same for the sample of eligible Progoti borrowers. The results in these tables show that almost none of the basic differences are statistically significant at baseline and all normalized differences are smaller than 1/4th of the combined sample variation. Hence, we conclude that the randomization was successful in achieving baseline balancing in key observable characteristics.

In Appendix Table A.3 we test for differential attrition at the mid- and endline surveys. At midline, the attrition rate was 5% among eligible Dabi clients, 9% among eligible Progoti borrowers, and 11% in the SME sample. At endline, the rates were slightly higher (9% among eligible Dabi clients, 15% among eligible Progoti borrowers, and 17% in the SME sample). The attrition rates are balanced by treatment status in both followup surveys. Thus, it is unlikely that differential attrition drives the treatment effects we find in the empirical analysis.

# 4 Results

## 4.1 Estimation

To identify the effects of the flexible loan contract on eligible borrowers, we estimate an ANCOVA model (McKenzie, 2012) of the form:

$$y_{it} = \beta \cdot T_i + \lambda \cdot y_{i0} + E_t + \sum_{s=1}^{15} \gamma_s + \epsilon_{it}, \tag{1}$$

where $y_{it}$ is the outcome of interest for respondent $i$ at mid- (t=1) or endline (t=2), $T_i$ is a dummy variable equal to 1 if the respondent is located in a treated branch, $y_{i0}$ is the baseline level of the outcome for individual $i$, $E_t$ is a survey-wave fixed effect, and $\gamma_s$ are district (randomization strata) fixed effects. Since our randomization was conducted at the branch-office level, we cluster standard errors by BRAC branch office (50 clusters). In addition, we report randomization inference $p$-values (Fisher's exact test), estimating the coefficient of interest in 1,000 alternative assignments chosen randomly with replacement from the set of possible assignments given our stratified randomization procedure. The

randomization inference $p$-values report the percentile of the coefficients found under actual treatment in the distribution of coefficients identified under the alternative treatment assignments.[25]

The parameter of interest is $\beta$, the average difference between treatment and control observations at mid- and endline. Under the assumption that the control observations constitute a valid counterfactual for the treatment sample, this identifies the causal effect of the offer of the flexible loan contract to eligible client $i$. In other words, this is the intention to treat (ITT) estimate.[26] We also derive the local average treatment effect (LATE) of actually using the voucher, by estimating an instrumental variable regression whereby take up of the flexible loan contract is instrumented by the random treatment status.

## 4.2 The Effect of Repayment Flexibility

We begin by examining the treatment impact on eligible Dabi clients. Table 2 presents the effects of estimating specification (1) on a range of business outcomes. Panel A comprises the ITT estimates, while panel B contains the LATE results, where we instrument for take up of the flexible loan with the (random) treatment status. On average, 57% of the eligible Dabi clients accepted the offer and borrowed under the flexible contract.[27] Given the take-up rate, the LATE typically scales up the ITT by a factor of 1.75.

The first column of Table 2 shows that the flexible loan does not lead to a significant change in business ownership. Eligible Dabi clients in treatment branches are 3 percentage points more likely to own a business at follow-up relative to control, but this effect is imprecisely estimated. In terms of inputs, treated borrowers invest significantly more in their business assets but not in labor. The treatment effect on business assets (1,881 USD PPP) is equivalent to a 51% increase relative to the mean in the control group. We do not find any significant effect in terms of labor inputs (number of workers, business operating hours, and hours worked by the business owner). Column 6 shows that treatment raised revenues by 28,153 USD PPP (annually) relative to the control sample. This corresponds to a statistically and economically significant increase of 86%, with a randomization inference (RI) p-value of 0.002. Eligible clients also had higher costs which is likely related to the larger investments in their business capital (for example, cost of purchasing inventories or tools). The ITT estimate on annual business profits (column 8) shows a sizable increase (of 25%) relative to the control group, but this is imprecisely estimated at conventional lev-

[25] This corresponds to "randomization-c" in Young (2018).

[26] To test if the treatment effect differs across the two follow-up surveys, we also estimate: $y_{it}=\beta \cdot T_i + \delta \cdot T_i \cdot E_t + \lambda \cdot y_{i0} + E_t + \sum_{s=1}^{15} \gamma_s + \epsilon_{it}$, where $\beta$ identifies the treatment effect at midline and $\delta$ identifies the difference in the treatment effect at endline relative to midline. As treatment effects for the majority of outcomes do not differ significantly between surveys, we pool the mid- and endline observations and report estimates from specification (1) as our main result to gain statistical power.

[27] In Section 4.5.1 we examine the borrower characteristics that are correlated with take up of the flexible loan product to shed light on the type of borrowers that prefer the flexible over the standard contract.

els (RI p-value=0.169). Column 9 indicates that the effect on monthly profits (during the month preceding the survey) is precisely estimated at the 10% level (RI p-value=0.143), equivalent to a 26% effect relative to the control group.[28] Column 10 shows that businesses in the treatment group had more volatile revenues. As a proxy for volatility, we use the range of monthly revenues. The ITT estimate reveals that the treatment group had nearly 80% higher sales volatility relative to the control group (RI p-value=0.026). Finally, the last column of Table 2 presents the effect on an aggregate index that combines the 10 indicators related to the business outcomes of Dabi clients. We find that the aggregate index is significantly higher by 0.18 standard deviations (SDs) among the treatment group relative to control (RI p-value=0.038). Overall, these findings suggest that the flexible contract not only led to more business activity and greater business investments, but also increased the volatility of the monthly business revenues.

Table 3 explores the credit market outcomes of eligible Dabi borrowers. Columns 1-3 report incoming loans and transfers and show that treated clients take larger BRAC loans: the loan value increases by 15 percent or 305 USD PPP compared to the control group (RI p-value<0.01).[29] While the corresponding effect for loans from other, non-BRAC lenders is negative, the impact is small and imprecisely estimated (column 2). Eligible borrowers also receive more informal transfers from their social network (with the point estimate similar in size to the effect on the BRAC loan), albeit insignificantly so (column 3). Column 4 examines transfers and loans provided to the social network. It shows that the financial outflow from the average respondent in the treatment group increased by 122 USD PPP – a 73% boost relative to the control sample (RI p-value<0.01). Overall, net borrowing and transfers combined is positively but insignificantly affected (RI p-value=0.21). We conclude that access to the flexible contract led to important changes in the Dabi clients' credit market outcomes, as demonstrated by the significant increase of 0.19 SDs in the aggregate index in column 6 (RI p-value<0.01).

While we delay a more thorough discussion of the mechanisms underlying the treatment effects until Section 4.4, these findings provide some initial evidence of the importance of credit constraints and uninsured risk. The increase in loan size suggests that the credit channel could be at work, although the boost in loans and transfers given to others undoes this effect to a certain extent – ultimately, the impact on net borrowing and transfers is

[28] Micro-enterprise profit is a notoriously noisy outcome and recall bias may affect the measured impact. This could explain why the treatment effect on monthly profit is somewhat more precisely estimated while the corresponding effect on annual profit is not. The LATE estimates in Panel B show that among the treated Dabi borrowers, both annual and monthly profits increase by approximately 45% and both are precisely estimated at 90% confidence.

[29] The information on BRAC loan size comes from BRAC's administrative records. We are not able to identify all of the eligible borrowers in the baseline sample. The match is less than 100%, possibly because some clients dropped out of BRAC's database, or due to measurement error in the borrower ID number preventing us from merging the two datasets. The match rate is balanced across treatment and control branches – see Table A.1 in the Appendix.

positively but imprecisely affected. On the other hand, the higher volatility in business revenues indicates that treated clients may have invested in riskier projects that exposed them to more idiosyncratic and aggregate uncertainty.

Next, we examine the effects of the intervention on the socioeconomic status of eligible clients. Table 4 shows that eligible borrowers in the treatment group had higher household (labor) income, corresponding to an increase of 16% relative to the control sample. The rest of the table indicates that, while there was no significant impact on per-capita consumption, the value of non-business assets owned by the respondent's household increased by 25% compared to control (RI p-value=0.01). Treated clients were also 8 percentage points more likely to own land (RI p-value<0.01), with land size increasing by 10 decimals (0.04 hectares) or 27% relative to the control group mean.[30] Assessing land use reveals that most of the new, larger landholdings, were rented out (see Table A.4). Treated borrowers are twice as likely to rent out land and hold four times as much land for this purpose (RI p-value<0.01), increasing the land rent received by about 47 USD PPP (RI p-value=0.011) – nearly a 100% increase relative to the control group. Given that land ownership is a key indicator of socioeconomic status in rural Bangladesh, this is an important sign that the status of eligible Dabi clients improved as a result of the intervention. The aggregate index in column 6 also shows a significant increase of 0.19 SDs (RI p-value=0.011).

Figure 2a provides a summary of the treatment impact on eligible Dabi clients. It plots the ITT effects on standardized indicators related to the three families of outcomes we study (business, credit market, and household economic status). All outcomes, with the exception of non-BRAC loan value and per-capita consumption expenditure, are positively affected, with a majority of them being statistically significant. In particular, we observe large effects on business revenues (0.24 SDs), profits (0.13 SDs), and household income (0.14 SDs). In the Appendix, we present the results of estimating the treatment effects at mid- and endline separately and test for the differential impact between the two surveys to shed light on the dynamics. Table A.5 shows this for the ITT estimates. Overall, the treatment impact does not appear to be significantly different for most outcome variables across the two surveys. Notably, there is no significant difference in the aggregate indices

[30] These findings are in line with existing evidence on land ownership and land transactions in Bangladesh. According to the most recent agricultural census (Bangladesh Bureau of Statistics, 2010), the average census household holds 79 decimals of land with 53% of the households being landowners, which is similar to the characteristics of our baseline Dabi borrowers. The changes in land ownership and in the size of land are also broadly consistent with data on land transactions obtained from the Bangladesh Integrated Household Survey. In the surveys from 2012 and 2015, the average increase in land ownership over the survey rounds by a representative sample of Bangladeshi households was 12.9%, with the size of newly acquired land going up by a mean of 4.3 decimals. A simple back-of-the-envelope calculation implies that the flexible contract allowed treated landless Dabi borrowers to become landowners during a 2-year period at a rate that would normally take the average Bangladeshi household about 4 years. Alternatively, that the contract permitted treated borrowers to acquire as much land as it would take the average household 7-8 years to obtain. Available from `https://doi.org/10.7910/DVN/OR6MHT (2012) and https://doi.org/10.7910/DVN/BXSYEL (2015).`

for the three families of outcomes across mid- and endline.

The corresponding treatment effects on eligible Progoti clients are summarized in Figure 2b. Overall, we do not find evidence of a significant average impact on the outcomes of Progoti clients. One business outcome where we do observe a significant treatment effect is the number of workers employed in Progoti clients' businesses. The borrowers in the treatment group hire on average 1 additional worker, which implies a 42% increase relative to the control group (RI p-value=0.04). The LATE estimate indicates that eligible Progoti clients who took up the flexible loan product hired 2 additional workers relative to the control sample.[31] As hiring and training workers takes time, this may not have yet resulted in increased revenues or profits for Progoti clients' businesses. Nevertheless, since the effect is observed on only 1 out of a number of business outcomes, we conclude that repayment flexibility did not have a transformative impact on Progoti clients' businesses, at least on average. In Section 5, we provide evidence showing that there is important heterogeneity in the effectiveness of flexibility by exploring the role of the Progoti borrowers' skill level.

## 4.3 Client Retention and Default Rates

To assess the impact on eligible borrowers' repayment behavior, we use BRAC's administrative records. In particular, we test if the repayment rates of eligible clients and their demand for BRAC loans are affected by the introduction of the flexible loan contract.[32]

Table 5 reports the effects on client retention and default for the eligible Dabi borrowers in our sample. Column 1 shows that eligible clients in treated branches are 6.8 percentage points less likely to have left BRAC by August 2017, 2 years following the start of the experiment.[33] Column 2 presents the treatment effect on default defined as the likelihood of not having repaid the loan by the end of their loan cycle. We find that the provision of repayment flexibility leads to a significant reduction in default rates for eligible Dabi borrowers (RI p-value=0.09). In treatment branches, they are 1.7 percentage points (or 35% at a mean of 4.8%) less likely to default.[34] Columns 3–5 report the effects on the probability of not having repaid the full loan within 8, 24, and 52 weeks (columns 3, 4, and 5) from the end of the loan cycle.[35] Column 4 shows that eligible Dabi clients are 2 percentage points

[31] Tables A.10-A.12 present the ITT and LATE estimates on Progoti clients' outcomes, and Table A.14 shows that the effects are similar at mid- and endline.

[32] We have information on repayment behavior for a subset of eligible clients, but the rate is balanced across treatment status – see footnote 29 above.

[33] We define leaving BRAC as a dummy equal to one if the borrower repaid her loan(s) and had not taken a new one by August 2017; and equal to zero if the borrower has a current loan or remain in default by August 2017. As the rate of default decreased, columns 2-5 in Table 5, the probability of remaining with BRAC is driven by a higher likelihood of taking up a new loan.

[34] The default indicator in column 2 is based on a classification entered into the system by BRAC's credit officers. While the officers were instructed to account for the possibility of extending the loan cycle (up to 2 months) for borrowers with flexible loans, it is possible that they may not have implemented this 100% correctly. That is why we use an alternative classification in columns 3-5, which yields similar results.

[35] In columns 3-5, the end of the loan cycle is computed starting two months after the expected last col-

less likely not to have repaid the full loan within six months after the end of the loan cycle. When we examine the corresponding outcomes among Progoti borrowers, we do not find any significant effects (see Table A.13 in the Appendix).

The results provide further evidence in support of risk over credit constraints. To the extent that vouchers are used as state-contingent insurance, we expect default rates to remain the same or decrease as the vouchers counteract the use of riskier inputs or riskier business activities. The fact that we see a decrease in default broadly confirms that uninsured risk is a key concern.[36]

## 4.4 Credit or Insurance Constraints?

We now explore the mechanisms through which the flexible loan may have enabled Dabi clients to expand their business activities. As described in Section 2, credit constraints and uninsured risk can both be at play. By delaying initial payments, flexibility allows for larger investments and bigger loans (as shown in Section 4.2) which could promote the use of costlier and bulkier inputs. Through the provision of insurance, flexibility also facilitates greater risk taking. Sections 4.2 and 4.3 demonstrate that treated clients experienced higher sales volatility without an increase in default rates, indicative of the flexible contract being used as insurance. Next, we penetrate these questions further, first by examining the timing of voucher use and the type of assets treated clients invest in. Then we test for the importance of liquidity constraints and risk taking.

### 4.4.1 Voucher Use

According to the conceptual framework, treated clients constrained mainly by liquidity needs will exhaust both of their vouchers in periods 1 and 2 to boost investment and loan size. The dotted line denoted "Credit" in Figure 3 shows this prediction. The hypothesis is that all borrowers will have taken out their vouchers at the end of period 2. By contrast, if incomplete insurance is the key constraint, clients will use the vouchers throughout the loan cycle to shield against unexpected fluctuations. To depict this and to make the difference from the credit channel distinct, we assume that clients face an independent and identically distributed shock in each of the loan cycle's 12 months and only spend the vouchers if a bad outcome is realized. As treated borrowers have exactly two vouchers, this yields a downward-sloping curve. The slope depends on the likelihood of a shock

lection date for eligible borrowers in treatment branches to take into account that they can extend the loan cycle by using the vouchers; in control branches, the end of the loan cycle corresponds to the expected last collection date. As the loan cycle lasted one year, the full loan needed to be repaid by month 14 (12) in the treatment (control) branches.

[36] A complementary reason for the lower default rate could be that treated clients wanted to maintain a good credit standing to secure similar, flexible loans from BRAC in the future (though it was made clear that the product was part of a pilot and that there was no guarantee it would be available in the future).

occurring in a given month. Figure 3 illustrates two different shock distributions, with the probability of a bad realization, $\theta$, being either $1/12$ or $1/4$. A higher $\theta$ produces a steeper slope as a larger share of the borrowers will have used both of their vouchers early on. However, in both scenarios some clients still remain with unused vouchers at the end of the cycle. With $\theta = 1/12$, about 35 percent will not have spent any voucher.

Treated Dabi clients' actual voucher use is depicted by the dashed line where the line shows the proportion of borrowers using a voucher in a given month (and its associated confidence interval). Among eligible clients who borrowed under the flexible loan contract, about $3/5$ employed at least one voucher. Figure 3 shows that usage is skewed toward the first 7 months, with actual use more closely trailing the insurance distribution(s) as opposed to the path predicted by the credit channel. Likewise, the fact that about 40% of the borrowers did not spend any voucher aligns with the insurance mechanism.[37] At the same time, the latter months exhibit lower use than pure insurance would predict although strictly above zero (except for month 12 where the confidence interval intercepts the x-axis).

To shed more light on the exact channel, we examine individual voucher use in Table 6. Conditional on spending a voucher, about 40% employed the first one with the remaining 60% using both. Clients that employed both vouchers were much more likely to use them some months apart. Only 12% spent the two vouchers consecutively, with the mean time elapsed between using vouchers 1 and 2 being 3.3 months (std. dev.=1.78). Also, 3.5 months pass on average before the first voucher is spent (std. dev.=2.01). Finally, among those using both vouchers, 1.6% spend them consecutively in periods 1 and 2. Overall this suggests that treated clients' voucher use behavior resembles the idea of insurance, with vouchers employed at distinctly different points during the loan cycle and with a substantial proportion of borrowers not using any vouchers at all.

#### 4.4.2 Types of Business Assets and their Values

Next, we examine if access to the flexible contract translates into different types of investments. According to Table 2, treatment increased the business assets' value by over 50% relative to control. We begin by breaking down this effect into 6 different categories: tools and utensils, furniture, machines, vehicles, inventories, and buildings. While Panel A of Table 7 shows that treatment and control are as likely to own an asset within each group, Panel B reveals that the aggregate value increased across the majority of categories. Specifically, treatment increased the ownership of tools and utensils by 73 USD PPP (column 1),

[37] A complementary explanation for borrowers not using the vouchers (in addition to not experiencing a negative shock) could be that they wanted to appear risk free to obtain a better standing with BRAC. This is not very likely, however, as BRAC encouraged the active use of the vouchers.

furniture by 57 USD PPP (column 2), machinery by 148 USD PPP (column 3), and inventories by 1,105 USD PPP (column 5). These effects correspond to a 63% increase in tools and utensils (RI p-value=0.039), a 45% increase in furniture (RI p-value=0.028), a 154% increase in machines (RI p-value=0.17), and a 41% increase in inventories (RI p-value=0.028) relative to the mean in the control group. The point estimates for vehicles and buildings are negative but imprecisely estimated.

Panel C explores the variety of business assets held by the respondents by counting the number of the different asset types within tools and utensils, furniture, machines, and vehicles.[38] The results show that eligible borrowers in treated branches increased the variety of tools and furniture they own by about 13% compared to the control group (RI p-values=0.070-0.082). Finally, Panel D of Table 7 reports differences in terms of the unit value of the business assets held in each category.[39] We find that the unit value of tools and utensils goes up by 25 USD PPP (43%) and that of furniture by 9 USD PPP (14%), but these effects are somewhat imprecisely estimated as the RI p-values are above 10%.

In sum, the results in this subsection provide evidence supporting both the importance of liquidity and risk constraints. Clients accessing flexible credit contracts use a wider variety of inputs, indicative of more risk taking if it captures increased experimentation with the production process. Also, to the extent that some of the assets are more illiquid (for example, machinery or furniture tailored to the specific needs of the business), this further increases risk. The final result is more in line with credit constraints being at work, as treated clients are investing in bulkier assets that cost more per unit.

### 4.4.3 Risk Taking

By alleviating the need for insurance, the flexible loan contract should help borrowers undertake riskier investments. The implication is that some firms will flourish while others, if unsuccessful, may fail. The finding that treatment increases sales volatility (Table 2) is supportive of this. To probe the idea further, we first examine heterogeneity using a quantile treatment effect model and then investigate the riskiness of the investment in relation to demand uncertainty.

Average treatment effects in terms of business growth and household economic wellbeing may mask considerable heterogeneity that can tell us something more about how the flexible contract induces risk taking, resulting in success as well as failure. To explore this, we

[38] Asset type was not recorded for the inventory and building categories.

[39] The unit value is obtained by dividing the total value of each asset type by the total number of assets of that type and then taking the average across all types within a category. The sample size shrinks, as the value per unit is undefined for respondents who do not own any assets of a given category. While Panel A of Table 7 shows that there is no selection into a specific asset category, it is still possible that the results in Panel D are partly driven by selection into a particular asset type. As we lack data on the number or types of inventories and buildings, we omit these categories.

estimate the following quantile treatment effect (QTE) specification:

$$Quant_{\tau}\left(\Delta y_{it}\right) = \beta_{\tau} T_i + \phi_{\tau} E_t + \sum_{s=1}^{15} \psi_{s\tau} \gamma_s, \tag{2}$$

where $\Delta y_{it}$ is the change in the outcome of interest for individual $i$ at survey $t$ (mid- or endline) relative to the baseline and the rest of the parameters are defined as in specification (1) above. The model is estimated for the group of eligible Dabi clients. One caveat to bear in mind is that, due to the small sample size, we lack the power to estimate precise treatment effects across the distribution.

Figure 4 displays the results. The QTE estimates reveal substantial heterogeneity in the effects of the flexible contract. While we observe a positive impact on business asset value at any centile above the median (Figure 4a), the treatment effect at the lowest centile is negative (although insignificant). The pattern is even more striking when we study the QTE's on business revenues and household (labor) income (Figures 4b and 4c). While most treated clients raise their revenue and household income, those at the lower end of the distribution do worse relative to the control group. As an alternative way of exploring the effects throughout the distribution, we also plot the cumulative distribution function (CDF) of log household income in Figure 4d.[40] The CDF of log income for the control group lies to the right of the treatment group until the income level reaches about 9 log-points, but after that the CDF's of the two samples reverse position. This is consistent with repayment flexibility leading to greater risk taking among treated clients, causing some households in the treatment group to lose out (relative to control) while others do better.

According to our conceptual framework, the flexible contract enables investments that are more sensitive to demand uncertainty. To assess this empirically, we first explore the heterogeneity of the treatment effect by the uncertainty of the local business environment. As an indicator for business uncertainty, we rely on the baseline data from the SME sample.[41] Every firm-owner in this sample was asked about the subjective probability distribution of future demand for their product(s), similar in spirit to the method used by Guiso and Parigi (1999).[42] Using this information, we calculate the average coefficient of variation (CV) of expected demand growth among SME-owners within a cluster (BRAC branch office) and divide the clusters into two groups: those where the average CV of expected demand

[40] We use the log transformation in order to smooth outliers and make the pattern clearer and add 1 to household (labor) income as some households (about 17% of the sample) report zero labor income.

[41] As this is a representative sample, it provides a sense of the business uncertainty facing the typical small firm in the local markets at baseline.

[42] In particular, SME-owners were asked to report the probabilities that they assign to the following events occurring in the next 2 years: (i) their sales will grow by at least 20%, (ii) their sales will grow by 0-20%, (iii) their sales will remain unchanged, (iv) their sales will be lower by 0-20%, (v) their sales will decrease by more than 20% in the next two years. Based on this, we calculate the coefficient of variation of expected demand growth for each SME-owner. For (i) and (iv), we impute the expected growth rate to be $\pm 40\%$.

growth is high (above median) or low (below median) at baseline.[43] If the flexible contract helps eligible Dabi borrowers undertake riskier investments, we expect the effects to be larger in clusters with greater demand uncertainty. Table 8 shows that this is the case. In branches with higher volatility in expected demand growth, the ITT-estimates on business revenues and costs increase: the interaction effect on revenues is 42,986 USD PPP (RI p-value=0.03). Moreover, the impact on profits seems to be concentrated among borrowers located in clusters with higher demand growth uncertainty (the interaction terms in columns 4 and 5 are large and positive though somewhat imprecise). This implies that repayment flexibility helped borrowers improve their business performance, particularly in markets with high demand uncertainty at baseline.

In addition to expectations about future demand, the realization of actual shocks should be particularly important for Dabi borrowers that take on more risk. To test this, we explore variation in local demand shocks caused by changes in agricultural productivity. In Bangladesh, agriculture is the key economic sector, accounting for 20 percent of GDP and 65 percent of the labor force, with rice subsuming 90 percent of total agricultural production (World Bank, 2008; Yu et al., 2010). In addition, Bangladesh is one of the most climate-vulnerable countries in the world, with droughts and heavy floods having a strong negative effect on rice yields and subsequent income (Khandker, 2012; Bandyopadhyay and Skoufias, 2015; Rahman et al., 2017). To capture sharp changes to rice productivity and thus to the local economy, we explore the occurrence of floods during the growing season (December to May) of the most important rice variety, Boro. As Boro contributes to over 50 percent of total rice production, and as extreme flooding or drought during this period causes fatal damage to crop yields, the flooding constitutes an important downturn in local economic activity (Sarker et al., 2012; Bangladesh Bureau of Statistics, 2016; Ara et al., 2017).[44] While the firms in our sample operate in non-agricultural sectors, large agricultural productivity shocks that lower aggregate income are likely to lower demand for their products and services (Santangelo, 2016).

To construct the shocks, we compute the rainfall distribution for a 25 km radius from the centroid of each branch separately over the period 1983-2017. A negative shock is proxied by a one standard deviation increase in rainfall within the 25 km buffer zone. To match our mid- and endline survey, collected in May through August of 2016 and 2017, we measure shocks in December to May in 2016 and in 2017 relative their historical distribution. Importantly, this implies that the extreme floods occur unexpectedly after the announcement of the flexible credit contract offer in September 2015. Moreover, the closeness in time to each of our survey rounds minimizes concerns of recall bias when measuring the shocks'

[43] Tables A.1 and A.2 in the Appendix show that demand uncertainty is balanced by treatment status at baseline among the eligible Dabi and Progoti clients respectively.

[44] While normal floods may increase productivity and income, heavy floods have devastating effects on households (Bandyopadhyay and Skoufias, 2015).

effect on business outcomes.

In Table 9, we study the riskiness of the business activity by interacting the rain shock with the treatment indicator as well as adding an independent shock variable. A negative coefficient on the interaction term implies that activities undertaken with access to vouchers were more sensitive to demand shocks (as captured by the undesirable rainfall shock). The effect of the shock itself should also be negative as it lowers overall demand.[45] Columns 2-5 support the idea that excessive rainfall in the growing season constitutes a negative shock to the business, especially in treatment branches. We have a negative and significant interaction term for business revenues, costs, and profits. Specifically, the treatment effect on revenues is 38,886 USD PPP in the absence of the negative rainfall shock, while the impact is only 7,200 USD PPP and imprecisely estimated for borrowers exposed to the shock. The difference between the two effects is statistically significant at -31,685 USD PPP (RI p-value=0.03). When we look at the impact of the negative rainfall realization alone, we see that in control branches the effect is -31,982 USD PPP and marginally significant. This is in line with the shock lowering sales in general. In treatment branches, the effect of the rainfall shock almost doubles. The impact in the treatment group is -63,667 USD PPP. Similarly, the responsiveness is also sizable in terms of costs and profits. Annual profits are up by 1,454 USD PPP (or over 30% at a mean of 4,276 USD PPP) in treated businesses who did not experience the rainfall shock, while in those who did, the treatment effect is indistinguishable from zero. A similar pattern is observed for monthly profits, but the interaction term (of treatment with the rainfall shock) is imprecisely estimated at conventional levels.

Overall, the interaction effect with the negative rainfall shock entirely removes the positive impact of treatment on revenues, costs, and profits which in absence of floods is significantly greater in the treatment group relative to control. We also see a negative effect on the extensive margin, as fewer individuals are business owners in treated branches who experienced the negative rainfall realization. Together these findings imply that clients with access to the flexible contract shift their activities to take on more demand-related risk.[46]

[45] To account for the possibility that climate change affects the probability of rainfall, and that this change is correlated with changes in investment behavior, we include district-by-survey year fixed effects in the regressions. To further ensure that we exploit weather variation across branches with similar baseline likelihoods of flooding, we also control flexibly for rainfall by including dummy variables corresponding to the quartiles in the rain probability distribution of the two most recent years prior to baseline.

[46] There can be alternative mechanisms through which local rain shocks affect non-agricultural firms. For example, Bustos et al. (2017) show that agricultural productivity may influence the supply of capital available to firms in the non-agricultural sector. If this was the relevant mechanism, then the pattern in Table 9 could be interpreted as treated firms being more exposed to capital shocks (caused by the flooding). Alternatively, treated firms may have invested in inputs, such as machines, that are more dependent on infrastructure (e.g. electricity or roads) that becomes less accessible during heavy rains. Both of these channels are in line with the interpretation that treated firms are more exposed to aggregate risk (relative to firms in the control group).

### 4.4.4 Credit Constraints

As a final test of the importance of credit constraints we examine whether respondents' economic status helps explain our findings. If the credit market is a key imperfection, the option of delaying the initial payments to boost investment and loan size should be particularly valuable to less wealthy clients. To assess this, we estimate the heterogeneity of the treatment effect on business outcomes with respect to two different indicators of baseline economic status: land ownership and household income (see Appendix Table A.6). Both measures show consistently that the treatment effects are not significantly different for respondents who had a lower economic status at baseline. If anything, the point estimates imply that better-off borrowers (who owned land or had higher household income) benefitted *more*, not less, from the flexible loan in terms of business profits.[47] These findings have two implications. First, to the extent that the measures mainly capture wealth and not some other omitted variable, this speaks against the credit mechanism. Second, as vouchers were provided at zero nominal cost, the flexible contract implicitly lowered the effective interest rate, stacking the deck in favor of the credit market channel. Again, this price effect would be especially valuable for poor clients, but the results rule this out as well.[48]

In summary, while some of the evidence such as costlier and bulkier assets support the presence of credit constraints, most of the findings in Section 4.4 including vouchers used at distinctly different points in time or not at all; experimentation via a greater variety of assets; the existence of both failing and successful borrowers; and a shift toward activities more sensitive to demand uncertainty suggest that incomplete insurance is the main mechanism at work.

## 4.5 Selection Effects

Next, we consider how the flexible credit contract affected the selection of individuals into borrowing. If the contract primarily caters to microentrepreneurs interested in expanding their businesses, we expect less risk averse and more entrepreneurial-minded clients, willing to undertake riskier projects, entering the borrower pool. By contrast, if the contract is used for consumption-smoothing purposes it may instead draw borrowers with higher risk aversion. We test the predictions in two complementary ways: first, by examining the correlates of take up of the flexible contract among the eligible clients; and second, by studying the characteristics of borrowers across treatment and control branches that

[47] Credit constraints could still be a driver if wealth and ability matter together in the sense that effects are stronger for people with high ability and low existing wealth. However, Appendix Table A.7 shows no consistent and significant impact of ability (as proxied by schooling) when controlling for baseline wealth.

[48] In addition, in order to maximize the value of the price effect the vouchers should be spent in the first two months. However, as Section 4.4.1 shows, vouchers are rarely used consecutively in months 1 and 2 but instead employed throughout the loan cycle or not at all.

became BRAC clients after the introduction of the flexible contract.

### 4.5.1 Take Up among Eligible Clients

Among the eligible clients offered the new loan product, 55% of them accepted the offer. The take-up rate was slightly higher for Dabi (57%) relative to Progoti clients (53%), but the difference is not significant at conventional levels (p-value=0.123). Table 10 examines the correlates of demand among the eligible Dabi clients that received the flexible contract offer. To test our main hypotheses, we gradually add the indicators of interest controlling for key correlates of risk throughout the analysis, including business ownership, size of landholdings, age, and education (as measured at baseline).[49]

Three findings are of note. First, borrowers who are less risk averse at baseline are more likely to take up the flexible loan contract. Second, eligible borrowers scoring higher on the standardized entrepreneurship index that aggregates over profit per worker, risk aversion, wanting to start a new business, and wants to hire a new worker are more attracted by flexibility. Third, the value of the transfers provided at baseline is negatively correlated with take up.[50] The first and second finding is in line with the idea that clients that are more likely to undertake risky but potentially profitable investments (as captured by the aggregate index) are drawn in by flexibility. The third result could be suggestive evidence that flexibility opens up for involuntary insurance through the extended family network via kinship taxes.[51,52]

### 4.5.2 Market-Wide Effects

To test whether the introduction of the flexible loan attracted different types of borrowers in treated branches relative to control, we rely on the representative sample of SMEs.

[49] Another dimension of selection is related to the decision to remain as a BRAC borrower. As discussed in Section 4.3, eligible Dabi clients in treated branches were 6.8 percentage points less likely to have left BRAC by the end of the study period relative to those in the control branches. When we test for differential selection along this margin, using the same set of correlates, we find no significant differences.

[50] We also test for the correlation between time preferences and the take-up decision and find no significant relation between take up and having time-inconsistent preferences (results available on request).

[51] To the extent that the flexible loan works as insurance, the voucher could also be exploited by the extended family, on a reciprocal basis or in the form of kinship taxation. In the latter case, demands from social networks to shelter shocks and/or share output may lower eligible clients' incentives to invest in high-return projects (see e.g., Baland et al., 2011, 2016; Jakiela and Ozier, 2016; Squires, 2017). In addition, if the extended network's ability to (negatively) influence investment decisions increases with the flexibility that the vouchers offer, this could lower firm growth. Together this may explain why borrowers vulnerable to kinship taxes are less likely to apply for a flexible loan.

[52] The correlates of take up of the flexible contract among eligible Progoti clients are reported in Table A.15. We do not observe a significant correlation between take up and risk aversion or the entrepreneurship index for these clients. There is a marginally significant negative correlation between transfers/loans given at baseline and take up, in line with kinship taxes. In addition, borrowers' age and schooling level also seem to matter.

Specifically, we examine if the launch of the flexible contract in treated branches affected the pool of microentrepreneurs that become BRAC borrowers by the follow-up surveys. We estimate the following model:

$$y_{it} = \beta \cdot T_i + \theta \cdot x_{i0} + \sigma \cdot T_i \cdot x_{i0} + \lambda \cdot y_{i0} + E_t + \sum_{s=1}^{15} \gamma_s + \epsilon_{it}, \tag{3}$$

where $y_{it}$ is an indicator for having taken a loan from BRAC for business purposes by mid- or endline, $x_{i0}$ is some characteristic of respondent $i$ as measured at baseline, and the other parameters are defined as in specification (1) above. In equation (3), $\sigma$ identifies the heterogeneity of the treatment effect with respect to $x_{i0}$. It tests the null hypothesis that treatment induced differential selection of microentrepreneurs along the dimension captured by $x_{i0}$. In particular, we evaluate if SME-owners who borrow from BRAC for their businesses are different in terms of risk aversion and entrepreneurial skills. To proxy for the latter, we use the baseline productivity of the entrepreneurs' business (profit per worker), the willingness to start a new business, and the willingness to expand the existing business (by hiring more workers). Finally, we test for the importance of the respondent's wealth via the size of the landholdings.

Table 11, columns 2-9 show the main results on selection, whereas column 1 examines average take up. Although take up increases, the estimate is noisy suggesting that the introduction of the flexible contract and the information campaign about the new loan made it no more likely that SME-owners in treated branches joined BRAC relative to the control group.[53] However, most of the remaining columns indicate substantial evidence of selection among those drawn in. While column 2 shows that profits per worker measured at baseline was unimportant, risk averse business owners were less likely to become BRAC clients in the treatment branches (column 3). In particular, take up of BRAC loans increased by 3.5 percentage points (or over 30% at a mean of 10.8%) for SME-owners with low risk aversion (RI p-value=0.03). In column 4, we find that respondents who expressed an interest in opening up a new business were 8.8 percentage points more likely to have become BRAC clients by the follow-up surveys (RI p-value=0.018). The next column shows that business owners who were interested in hiring new workers are 4 percentage points more likely to become BRAC clients in treatment branches, but this effect is imprecisely estimated at conventional levels. Column 6 presents additional evidence on the differential impact on take up using the aggregated entrepreneurship index (which combines the indicators in columns 2-5). Finally, column 7 suggests that wealthier SME-owners with higher

[53]The lack of a significant average effect is perhaps not that surprising. During the information campaign, the SME-owners were explicitly told that BRAC was only piloting the flexible loan product, that there was no guarantee that it was to be adopted by BRAC in the future, and that in order to obtain a flexible loan, they first needed to borrow under the standard credit contract and build a good credit history with BRAC.

land ownership were more likely to borrow from BRAC in treatment branches. Importantly, the last two columns show that the effects on risk aversion and the entrepreneurship index are insensitive to the inclusion of land size as a proxy for respondent wealth.

In the Appendix, we assess the robustness of these findings. We show that the observable characteristics $x_{i0}$ in specification (3) do not predict differential demand for BRAC loans across treatment and control branches at baseline (Table A.18); that the results are insensitive to the inclusion of respondent characteristics such as age and education (Table A.19); and that the findings are similar for SME-owners who had taken a loan from BRAC in the past, ruling out concerns that the information campaign had the additional effect of informing about the existence of BRAC as opposed to the new product alone or that the extra contact by the enumerators signaled that they were particularly desirable candidates for BRAC loans (Table A.20).[54]

Overall the findings in Tables 10 and 11 confirm the idea that the flexible repayment contract is particularly attractive to microentrepreneurs willing to take risks in order to expand their businesses. This holds true for those actually offered the flexible contract as well as for the larger pool of prospective borrowers. In addition, the fact that the contract appealed more to wealthier borrowers is further evidence against the credit-market channel.

# 5 Discussion

In this section, we address potential spillover effects that the flexible loan offer may have had on borrowers not eligible to receive the contract. We then consider possible reasons for why repayment flexibility had less of an impact on the larger (Progoti) loans. Finally, we discuss the potential policy implications of our findings.

## 5.1 Spillover Effects on Other Clients' Repayment Behavior

Since the flexible contract was offered to borrowers with good credit histories, this could affect the incentives of other clients: for existing ineligible borrowers as well as for borrowers arriving after the experiment was initiated. In particular, if ineligible clients also value access to flexible loans, they may improve their efforts to meet their repayment obligations. Alternatively, they may resent not having been selected and quit BRAC or default on their loans.

To test for spillover effects on ineligible borrowers' repayment behavior, we acquired the identifiers for all clients who were borrowing at baseline, but deemed ineligible to receive the flexible loan offer.[55] When we examine the impact on their repayment behavior, we

[54] We find it unlikely that the SME-borrowers were unaware of BRAC before the information campaign, as the NGO is a major player in Bangladesh, not only in microfinance, but also as a provider of programs in multiple sectors such as education, health, and youth empowerment. Moreover, this would still not explain why we have differential take up.

[55] We were able to identify 88% of the borrowers ineligible at baseline (69,801 Dabi clients) using BRAC's

do not find any significant effects. Panel A of Table A.8 shows that ineligible Dabi clients in treated branches were 4 percentage points less likely to leave BRAC, but this effect is imprecisely estimated. As for default rates, all effects are close to zero. We also have administrative information for borrowers who became BRAC clients after the launch of the experiment. Panel B of Table A.8 shows that the introduction of the flexible contract in the treatment branches did not have any impact on the repayment behavior of these borrowers. Similarly, we do not find any significant differences for newly arrived Progoti clients' (reported in Table A.13 in the Appendix.)

Together the findings imply that the flexible loan pilot did not have significant spillover effects on the repayment behavior of other clients.

## 5.2 Larger Progoti Loans

Our results show that the flexible contract enabled traditional microfinance (Dabi) clients to improve their business outcomes and their socioeconomic status. A large share of loans provided by microfinance institutions, such as BRAC, both in Bangladesh and elsewhere resemble the Dabi product and are targeted to poor, female borrowers. Therefore, in terms of policy implications for the microfinance sector, this is encouraging. The findings for the larger Progoti loans are less striking. While the 42% increase in employment is an important improvement, particularly as the evidence on successful job-creation policies in developing countries is scant (see e.g., McKenzie, 2017), overall there is little impact. An open question is why we do not observe comparable effects for the Progoti clients, who experienced a similar change in their repayment structure.

Section 4.4 indicates that the key mechanism at work for Dabi borrowers was the relaxed insurance constraint which permitted more risk taking, leading to greater business growth. When we explore the same measures for Progoti clients, we find some evidence supporting more risk taking among them as well. In particular, results presented in the Appendix (Table A.16 and Figure B.1) display that the pattern of voucher use (in treated branches) is in line with Progoti clients benefitting from the insurance aspect of repayment flexibility. Similar to the Dabi borrowers, vouchers are spent across the loan cycle rather than the first two months, with a large proportion of Progoti clients not employing any voucher despite taking up the flexible contract.

Moreover, we find that the average treatment effects hide important heterogeneity across the borrowers' skill level. Table A.17 shows that treatment leads to significantly lower revenues and profits among Progoti clients with low (below-median) schooling at baseline, while the effect is positive (albeit marginally insignificant) among the high-skilled (above-median schooling) entrepreneurs. The lower panels of Table A.17 suggest that this

administrative records as of August 2017.

heterogeneity is not simply driven by highly-educated clients being wealthier (as proxied by the size of land owned at baseline) or by them being less liquidity constrained (as proxied by a higher household income at baseline) – if anything, once we control for these indicators, the treatment heterogeneity with respect to schooling is more precisely estimated. This is consistent with the importance of entrepreneurial skills for firm growth and transformational entrepreneurship (see e.g., Lazear, 2004; Djankov et al., 2005; Schoar, 2010).

In sum, these findings show that business growth in larger enterprises not only requires repayment flexibility which enables greater risk taking, but also the skills to identify the right projects to invest in. Interestingly, we do not observe a similar heterogeneity with respect to skills among the Dabi clients (Table A.7), possibly because they have less education to begin with (the median schooling level at baseline is 5 years for Dabi versus 8 years for the Progoti clients) or because they have smaller and simpler businesses. As firms grow, it is likely that identifying high-return projects becomes increasingly difficult and therefore entrepreneurial skills start to matter more.[56]

## 5.3 Policy Implications

Given the sizable and positive impact of the flexible contract on traditional microfinance clients, it is important to consider whether the new loan product is viable more generally. To do so, we compare the magnitude of the benefits for Dabi borrowers relative to the costs of the pilot and estimate its internal rate of return. The results are presented in Appendix Table A.9. We initially set the social discount rate at 5%, in line with World Bank guidelines (column 1), and then report two alternative rates: 10% (column 2) and 22% (column 3), with the last one corresponding to the interest rate charged by BRAC. The average cost of the pilot per eligible Dabi client in the treatment branches was 58.65 USD PPP.[57] This is the result of an initial cost (at year 0) corresponding to 51.10 USD PPP per beneficiary and the cost of foregone interest payments per client during each year of 1.13 USD PPP. As a measure of benefits, we use changes in household income at mid- (year 1) and endline (year 2). The "total benefits" sum up the changes in household income to compute the net present value of benefits, corresponding to 2,606 USD PPP.[58] This is divided by the

[56]There can of course be other, complementary explanations. While the pattern of voucher use suggests that Progoti clients used their vouchers as state-contingent insurance, it is possible that the degree of risk taking was lower as compared to the Dabi borrowers. One explanation for this is the onerous collateral requirement, equal in value to the loan (unlike the collateral-free Dabi loan). This feature of the contract discourages risk taking and even with greater flexibility, it is not unlikely that Progoti borrowers would avoid riskier investments if they stood to lose their collateral. It is also possible that the effects are less immediate for larger enterprises. Both of these explanations are interesting open questions for future research.

[57]This cost is calculated as if there were no Progoti clients in the experiment. That is, we assume that the fixed cost of setting up the experiment would have been the same if we had done it only with the Dabi borrowers. As such, it is likely an upper bound of the true cost per Dabi client.

[58]The underlying assumption is that the effect of increased business assets is fully incorporated in household income changes. If capital accumulation as of year 2 leads to even greater increases in household

program cost to obtain the benefit/cost ratio. The estimates show that the average benefit of the pilot was 44, 39, or 30 times larger than the cost, depending on the social discount rate we apply. The average internal rate of return in our baseline specification is 26, positive, and clearly above the discount rate.

If the costs of introducing a flexible loan product are so small compared to the benefits, why do most microfinance institutions still prefer to offer traditional loans with a strict repayment structure? One reason could be related to the selection effects discussed in Section 4.5. We observe that even the pilot of a loan product with repayment flexibility attracted less risk averse borrowers, with a greater desire to invest in riskier projects. This is in line with concerns reported by many practitioners and credit officers in the microfinance industry that moving away from the traditional microfinance model may cause default rates to increase in the long run. However, since our findings show that the repayment behavior remained the same (or even improved) for clients that were offered the flexible contract, the industry's view may be overly pessimistic. In fact, an underlying rationale for repayment flexibility is precisely to provide state-contingent insurance to avoid difficulties in meeting payments on time. This is an important distinction compared to earlier work assessing features of the typical credit contract. For example, Field et al. (2013) find that the provision of a grace period increased default rates. Unlike a grace period, repayment flexibility caters to unexpected shocks throughout the loan cycle (allowing for greater risk taking without jeopardizing the repayment obligation).[59] At the same time, our results are based on the short-term effects of a pilot where the terms of the traditional microfinance product were altered. It is important to be careful when extrapolating beyond our population of borrowers who had built good credit histories under the standard credit contract. If BRAC, or other lenders, were to offer loans with flexible repayment plans to first-time borrowers, the effects may be different. More work on the long-run impact of flexible loan products on lenders' portfolio is necessary to shed light on this.

# 6 Conclusion

Based on the extensive evidence of credit rationing and aggregate and idiosyncratic risk holding back small firm growth, our conjecture was that a financial instrument that could address imperfections in the credit and insurance market would improve the outcomes of poor microentrepreneurs. Together with the NGO BRAC we designed an intervention

income in the future, we will underestimate the benefits of the program. The "change in household income in year 1" and "year 2" report, respectively, the ITT estimates of the program on household income, for the mid- and endline surveys. As the impact on household income is insignificant in year 1 and significant at the 10% level in year 2, an alternative would be to assume that the effect in year 1 is zero. In this case, the cost-benefit ratio is 15 and the internal rate of return is equal to 4 for the case of a social discount rate of 22%.

[59] See Section 2 for a further discussion of the difference between a grace period and repayment flexibility. Also, in contrast to Field et al. (2013), the flexible contract was optional whereas the grace period was mandatory for all treated borrowers. It is possible that default rates would have been higher (or lower) in our setting if repayment flexibility had been made a compulsory feature of the contract.

aimed at relaxing both of these constraints via the provision of repayment flexibility. We followed existing and potential microfinance clients across 50 branch offices and local markets in Bangladesh over a two-year period to examine the relative benefit of flexible versus standard credit contracts, the importance of credit and insurance constraints, and the selection into borrowing.

We document substantial improvements in business outcomes and socioeconomic status of traditional microfinance clients offered the flexible as opposed to the standard credit contract and find that uninsured risk helps explain these results. The effects are less transformative for clients with larger loans, with the exception of a significant increase in employment creation, with entrepreneurial skill offering an explanation for why some borrowers succeed and others fail. In line with insurance, repayment behavior for both smaller and larger loans weakly improve, suggesting that the intervention is fairly cost-effective, at least for traditional microfinance clients. We also show that repayment flexibility attracts less risk-averse borrowers interested in growing their businesses. This last finding, together with the increased risk taking that we observe among borrowers offered the contract, indicates that repayment flexibility provides a simple but novel way to spur innovation and entrepreneurship among the poor. From a policy perspective, the contract is a cost-effective financial product that promotes business outcomes by insuring against entrepreneurial risks. However, the flexible contract is not a cure-all. The less than universal take-up rates suggest that the product may not appeal to all potential borrowers.

There are several interesting avenues for future research. While the evidence in this paper indicates that the flexible loan promotes business activities, it could also allow for increased consumption smoothing. To fully capture consumption behavior, one would need diaries that track households regularly over longer periods of time. Richer high-frequency data on borrowers' social networks and their transfers would further enable an analysis of how the insurance provided by the vouchers extend through the network. The repayment flexibility could also be expanded to include additional vouchers up to paying everything at the end of the loan cycle. Such a contract would probably have to balance the optimal amount of insurance and/or liquidity against potential concerns of opportunistic behavior. Future research should also address long-term effects, in particular for larger loans, to trace the investment returns to increased employment and to further identify how entrepreneurial skills and risk taking interact as businesses grow.

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TABLE 1: BASELINE DESCRIPTIVES AND BALANCE TESTS

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | | | *Baseline balance tests* | | |
| | Treatment group | Control group | Basic difference | R.I. p-value | Normalized difference |
| Respondent's age (years) | 38.172 | 39.072 | -0.950 | 0.266 | -0.064 |
| | (10.043) | (9.993) | (0.673) | | |
| Respondent's schooling (years) | 4.668 | 4.479 | 0.179 | 0.488 | 0.036 |
| | (3.829) | (3.524) | (0.208) | | |
| Household size | 4.887 | 4.963 | -0.054 | 0.640 | -0.029 |
| | (1.854) | (1.856) | (0.100) | | |
| Land owner (Yes=1) | 0.509 | 0.459 | 0.039 | 0.321 | 0.072 |
| | (0.500) | (0.499) | (0.032) | | |
| Size of land owned (decimals) | 53.108 | 47.510 | 5.453 | 0.422 | 0.034 |
| | (108.496) | (125.789) | (5.412) | | |
| Household income ($ PPP) | 7,367.477 | 6,612.345 | 850.744 | 0.475 | 0.040 |
| | (14,712.623) | (11,738.333) | (947.075) | | |
| Household consumption per capita ($ PPP) | 1,763.617 | 1,602.624 | 164.808 | 0.434 | 0.035 |
| | (3,926.820) | (2,357.382) | (170.799) | | |
| Business owner (Yes=1) | 0.453 | 0.451 | 0.006 | 0.895 | 0.002 |
| | (0.498) | (0.498) | (0.035) | | |
| Business assets ($ PPP) | 4,297.422 | 4,287.708 | -174.528 | 0.864 | 0.000 |
| | (14,740.318) | (20,630.973) | (790.288) | | |
| Number of Workers | 0.692 | 0.453 | 0.266 | 0.177 | 0.058 |
| | (3.161) | (2.654) | (0.171) | | |
| Business hours | 1,581.789 | 1,644.411 | -46.176 | 0.775 | -0.022 |
| | (1,996.573) | (1,961.233) | (123.652) | | |
| Owner's business hours | 1,496.525 | 1,550.826 | -42.547 | 0.779 | -0.020 |
| | (1,911.295) | (1,891.693) | (118.814) | | |
| Monthly profits ($ PPP) | 365.039 | 282.240 | 86.149 | 0.223 | 0.067 |
| | (1,096.682) | (578.630) | (55.488) | | |
| Annual profits ($ PPP) | 4,505.895 | 3,890.152 | 649.273 | 0.459 | 0.036 |
| | (12,861.632) | (11,323.915) | (746.466) | | |
| Annual revenues ($ PPP) | 39,413.473 | 32,484.365 | 7,633.284 | 0.460 | 0.033 |
| | (173403.844) | (121854.297) | (8,678.426) | | |
| Costs ($ PPP) | 33,997.918 | 22,934.883 | 11,527.271 | 0.203 | 0.057 |
| | (173206.672) | (87,447.234) | (7,348.327) | | |
| Range of monthly revenues ($ PPP) | 4,648.295 | 4,259.537 | 520.881 | 0.684 | 0.014 |
| | (17,822.785) | (20,625.916) | (1,040.705) | | |
| BRAC loan value ($ PPP) | 2,177.828 | 1,909.913 | 248.965 | 0.036 | 0.122 |
| | (1,769.061) | (1,293.009) | (96.738)** | | |
| Non-BRAC loan (Yes=1) | 0.089 | 0.106 | -0.020 | 0.312 | -0.042 |
| | (0.285) | (0.309) | (0.017) | | |
| Non-BRAC loan value ($ PPP) | 164.602 | 205.375 | -45.014 | 0.409 | -0.033 |
| | (777.383) | (951.971) | (47.326) | | |
| Observations | 530 | 545 | 1075 | 1075 | 1075 |

**Notes:** The sample includes eligible Dabi clients; it is limited to baseline observations who were resurveyed at the midline or the endline survey. Columns 1-2 give the mean and the standard deviation of observations in treatment and control groups respectively; column 3 reports the coefficient of "Treatment" indicator in a regression controlling for district (strata) fixed effects with the standard errors clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Column 4 reports the randomization inference $p$-values for the null hypothesis of no difference between treatment and controls groups. Column 5 reports the normalized difference between treatment and control groups, computed as the difference in means in treatment and control observations divided by the square root of the sum of the variances. Variables are described in Appendix C

## TABLE 2: EFFECTS ON BUSINESS OUTCOMES

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Business owner | Business assets | Number of workers | Business hours | Owner's hours worked | Revenues (annual) | Costs (annual) | Profits (annual) | Profits (month) | Range of revenues | Aggregate index |
| **Panel A: ITT** | | | | | | | | | | | |
| Treatment | 0.026 | 1881.254** | 0.172 | 127.789 | 71.219 | 28153.189*** | 24392.605*** | 1087.586 | 96.576* | 3764.797*** | 0.178** |
| | (0.025) | (926.570) | (0.326) | (83.059) | (69.523) | (8716.036) | (8099.027) | (651.456) | (56.069) | (1315.668) | (0.073) |
| | [0.364] | [0.054] | [0.663] | [0.197] | [0.387] | [0.002] | [0.006] | [0.169] | [0.143] | [0.026] | [0.038] |
| Observations | 2087 | 2086 | 2087 | 2087 | 2087 | 2087 | 2087 | 2087 | 2087 | 2168 | 2168 |
| Mean in control | 0.549 | 3685.413 | 1.091 | 1577.286 | 1474.800 | 32561.844 | 26870.630 | 4275.948 | 358.718 | 4725.491 | 0.000 |
| **Panel B: LATE** | | | | | | | | | | | |
| Flexible loan | 0.045 | 3240.034** | 0.295 | 220.284 | 122.777 | 48535.437*** | 42032.160*** | 1876.073* | 166.875* | 6791.746*** | 0.331*** |
| | (0.042) | (1558.594) | (0.555) | (143.300) | (118.486) | (15186.905) | (14020.783) | (1108.267) | (95.015) | (2402.568) | (0.128) |
| Observations | 2087 | 2086 | 2087 | 2087 | 2087 | 2087 | 2087 | 2087 | 2087 | 2147 | 2147 |
| Mean in control | 0.549 | 3685.413 | 1.091 | 1577.286 | 1474.800 | 32561.844 | 26870.630 | 4275.948 | 358.718 | 4725.491 | 0.000 |

**Notes:** The table presents the treatment effects on business outcomes of eligible Dabi borrowers. Data comes from the midline (2016) and endline (2017) surveys. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey and district (strata) fixed effects. "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. "Flexible loan" is a dummy variable equal to 1 if the respondent borrowed under the new, flexible loan contract and 0 otherwise. The regressions in Panel A are OLS regressions based on specification (1); while regressions in Panel B are 2SLS regressions where the "Flexible loan" is instrumented by "Treatment". Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. *Business Owner* is a dummy variable equal to one if the respondent owns a business. *Business Assets* is the monetary value (in USD PPP) of business assets (tools, machinery, furniture, vehicle, site and inventories) at the time of the survey. *Number of Workers* is the number of workers (other than household members) who work in the business on a typical working day. *Business Hours* is the number of hours that the enterprise was in operation over the last twelve months. *Owner's Business Hours* is the number of hours that the business-owner worked in the business over the last twelve months. *Revenues* is the monetary value (in USD PPP) of sold products or delivered services of the business over the last twelve months. *Costs* is the monetary value (in USD PPP) of the total amount the enterprise spent on personnel expenses, machines, tools, equipment, space, transportation, electricity, fuel for machines, and total purchase of stock over the last twelve months. *Profits (annual)* is profit (in USD PPP) of the business over the last twelve months. *Profits (month)* is profit (in USD PPP) of the business over the month preceding the survey. *Range of Revenues* is the difference between the level of revenues during the worst month in terms of sales and the level of revenues during the best month in terms of sales during the past year. If the respondent reported that revenues did not fluctuate throughout the year, the range of revenues is set equal to zero. "Aggregate index" is constructed by first standardizing all outcome variables in columns (1)-(10) with respect to the control group in the relevant survey wave (subtracting the mean in control and dividing by the standard deviation of the control group), then taking their average and standardizing again with respect to the control group.

TABLE 3: EFFECTS ON CREDIT MARKET OUTCOMES

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | BRAC loan value | Non-BRAC loan value | Transfers received | Transfers or loans given | Net borrowing or transfers | Aggregate index |
| | | | | **Panel A: ITT** | | |
| Treatment | 305.453*** | -28.041 | 336.187 | 122.002*** | 486.811 | 0.182*** |
| | (91.711) | (95.669) | (283.589) | (42.091) | (314.582) | (0.062) |
| | [0.007] | [0.809] | [0.332] | [0.005] | [0.219] | [0.014] |
| Observations | 1619 | 2168 | 2168 | 2168 | 1619 | 2168 |
| Mean in control | 2067.173 | 543.632 | 1449.935 | 165.716 | 3950.253 | 0.000 |
| | | | | **Panel B: LATE** | | |
| Flexible loan | 484.024*** | -36.809 | 637.950 | 218.969*** | 787.889* | 0.337*** |
| | (141.793) | (165.252) | (496.926) | (72.673) | (476.227) | (0.111) |
| Observations | 1612 | 2147 | 2147 | 2147 | 1612 | 2147 |
| Mean in control | 2067.173 | 543.632 | 1449.935 | 165.716 | 3950.253 | 0.000 |

**Notes:** The table presents the treatment effects on credit market outcomes of eligible Dabi borrowers. Data comes from the midline (2016) and endline (2017) surveys. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey and district (randomization strata) fixed effects. "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. "Flexible loan" is a dummy variable equal to 1 if the respondent borrowed under the new, flexible loan contract and 0 otherwise. The regressions in Panel A are OLS regressions based on specification (1); while regressions in Panel B are 2SLS regressions where the "Flexible loan" is instrumented by "Treatment". Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. *BRAC Loan Value* is principal amount (in USD PPP) of the loan taken from BRAC, as recorded in BRAC's administrative records. *Non-BRAC Loan Value* is the monetary value (in USD PPP) of all formal and informal loans taken from other lenders (banks, MFIs other than BRAC, informal money-lenders or relatives and friends) during the past 12 months. *Transfers Received* is the monetary value (in USD PPP) of any cash or in-kind informal transfers that the respondent's household received over the last 12 months. *Transfers or Loans Given* is the total monetary value (in USD PPP) any cash or in-kind informal transfers and any loans that the respondent's household gave to others over the last 12 months. *Net Borrowing or Transfers* is the monetary value (in USD PPP) of net borrowing (loans borrowed minus loans lent) and net tranfers (tranfers received minus transfers given) combined. "Aggregate index" is constructed by first standardizing all outcome variables in columns (1)-(5) with respect to the control group in the relevant survey wave (subtracting the mean in control and dividing by the standard deviation of the control group), then taking their average and standardizing again with respect to the control group.

TABLE 4: EFFECTS ON HOUSEHOLD SOCIOECONOMIC STATUS

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Household income | Consumption per capita | Non-business assets value | Land owner (Yes=1) | Size of land owned | Aggregate index |
| | | | **Panel A: ITT** | | | |
| Treatment | 1309.195* | 12.417 | 301.073*** | 0.076*** | 10.366*** | 0.192*** |
| | (774.989) | (82.422) | (96.510) | (0.022) | (3.319) | (0.059) |
| | [0.174] | [0.895] | [0.010] | [0.005] | [0.020] | [0.011] |
| Observations | 2168 | 2085 | 2168 | 2087 | 2168 | 2168 |
| Mean in control | 7820.156 | 1613.159 | 1191.887 | 0.472 | 37.953 | -0.000 |
| | | | **Panel B: LATE** | | | |
| Flexible loan | 2576.424* | 21.408 | 581.389*** | 0.131*** | 19.661*** | 0.377*** |
| | (1342.381) | (139.954) | (168.034) | (0.038) | (6.022) | (0.102) |
| Observations | 2147 | 2085 | 2147 | 2087 | 2147 | 2147 |
| Mean in control | 7820.156 | 1613.159 | 1191.887 | 0.472 | 37.953 | -0.000 |

**Notes:** The table presents the treatment effects on indicators of household socioeconomic status outcomes for the eligible Dabi borrowers. Data comes from the midline (2016) and endline (2017) surveys. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey and district (randomization strata) fixed effects. "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. "Flexible loan" is a dummy variable equal to 1 if the respondent borrowed under the new, flexible loan contract and 0 otherwise. The regressions in Panel A are OLS regressions based on specification (1); while regressions in Panel B are 2SLS regressions where the "Flexible loan" is instrumented by "Treatment". Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. *Household Income* the monetary value (in USD PPP) of the household members' total earnings from wage-employment over the past 12 months and the profit(s) of any household business(es) operated by the household. *Consumption per capita* is the monetary value (in USD PPP) of the total household expenditure per capita (in PPP USD) over the last twelve months divided by the household size on consumption measures). *Non-Business Assets Value* the monetary value (in USD PPP) of durable non-business assets owned by the respondent's household at the time of the survey. *Land Owner* is a dummy variable =1 if the household owns any land (excluding the homestead). *Size of Land Owned* is the amount (in decimals) of land owned by the household (excluding the homestead). "Aggregate index" is constructed by first standardizing all outcome variables in columns (1)-(5) with respect to the control group in the relevant survey wave (subtracting the mean in control and dividing by the standard deviation of the control group), then taking their average and standardizing again with respect to the control group.

TABLE 5: EFFECTS ON REPAYMENT BEHAVIOR

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Borrower no longer with BRAC | Classified as "Default" | Full loan not repaid within 8 weeks | 24 weeks | 52 weeks |
| Treatment | -0.068* | -0.017** | -0.023 | -0.023* | -0.020 |
| | (0.036) | (0.008) | (0.015) | (0.013) | (0.014) |
| | [0.152] | [0.095] | [0.212] | [0.163] | [0.243] |
| Observations | 945 | 945 | 840 | 840 | 840 |
| Mean in control | 0.371 | 0.048 | 0.055 | 0.048 | 0.043 |

**Notes:** The table presents the treatment effects on retention and loan repayment of eligible Dabi borrowers. Data comes from BRAC's administrative records collected at endline (2017). "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. *Borrower No Longer with BRAC* is a dummy variable taking the value of one if the client has repaid the loan and not taken out a new one (as opposed to having a current loan or having defaulted). *Default* is a dummy variable=1 if the borrower was categorized by the credit officer as having not repaid the loan by the end of the loan cycle. *Full Loan Not Repaid Within 8 (24) [52] Weeks* are dummy variables taking the value of one if the borrower did not repay the full loan by the second (sixth) [twelfth] month after the end of the loan cycle. For eligible clients in treatment branches, the end of the loan cycle is computed starting two months after the expected last collection date; in control branches from the expected last collection date (see Appendix C for further details). Robust standard errors clustered at the branch level in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets.

TABLE 6: DESCRIPTIVES ON VOUCHER USE

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Mean | Std. dev. | Min | Max | Obs. |
| Use any voucher | 0.585 | 0.493 | 0 | 1 | 383 |
| *Conditional on using at least one voucher:* | | | | | |
| Use first voucher only | 0.424 | 0.495 | 0 | 1 | 224 |
| Use first and second voucher | 0.575 | 0.495 | 0 | 1 | 224 |
| Month of first voucher use | 3.478 | 2.014 | 1 | 12 | 224 |
| *Conditional on using both vouchers:* | | | | | |
| Use vouchers consecutively | 0.116 | 0.322 | 0 | 1 | 129 |
| Months between first and second voucher use | 3.326 | 1.790 | 1 | 10 | 129 |
| Use vouchers in months 1 and 2 | 0.016 | 0.124 | 0 | 1 | 129 |
| Month of second voucher use | 6.140 | 2.182 | 2 | 11 | 129 |

**Notes:** The table presents summary statistics on the use of the repayment vouchers among the Dabi clients. The sample includes Dabi clients in treatment branches who accepted the offer to borrow under the flexible contract. Data comes from BRAC's administrative records collected at endline (2017).

TABLE 7: EFFECTS ON BUSINESS ASSETS

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Tools | Furniture | Machines | Vehicles | Inventories | Buildings |
| **Panel A: Likelihood of Having Assets** | | | | | | |
| Treatment | 0.029 | 0.022 | 0.005 | -0.004 | 0.019 | 0.025 |
| | (0.021) | (0.014) | (0.011) | (0.009) | (0.020) | (0.017) |
| | [0.223] | [0.177] | [0.641] | [0.776] | [0.409] | [0.220] |
| Observations | 2087 | 2087 | 2087 | 2087 | 2085 | 2087 |
| Mean in control | 0.436 | 0.294 | 0.102 | 0.084 | 0.414 | 0.150 |
| **Panel B: Value of Assets** | | | | | | |
| Treatment | 72.957** | 57.567** | 148.011* | -259.199 | 1105.186** | -1892.675 |
| | (31.429) | (25.784) | (86.854) | (208.002) | (444.002) | (1614.798) |
| | [0.039] | [0.028] | [0.177] | [0.247] | [0.028] | [0.294] |
| Observations | 2087 | 2087 | 2087 | 2087 | 2085 | 2087 |
| Mean in control | 112.677 | 124.653 | 96.139 | 697.062 | 2642.783 | 6899.173 |
| **Panel C: Types of Assets** | | | | | | |
| Treatment | 0.116** | 0.109** | 0.009 | -0.004 | | |
| | (0.054) | (0.049) | (0.019) | (0.010) | | |
| | [0.082] | [0.070] | [0.680] | [0.751] | | |
| Observations | 2168 | 2168 | 2168 | 2168 | | |
| Mean in control | 0.897 | 0.852 | 0.137 | 0.083 | | |
| **Panel D: Unit Value of Assets** | | | | | | |
| Treatment | 24.675* | 8.831* | 677.479 | -1739.745 | | |
| | (12.496) | (4.718) | (562.900) | (1092.355) | | |
| | [0.143] | [0.113] | [0.386] | [0.192] | | |
| Observations | 975 | 698 | 252 | 202 | | |
| Mean in control | 57.688 | 50.691 | 497.587 | 5010.280 | | |

**Notes:** The table presents the treatment effects on business assets of eligible Dabi borrowers. Data comes from the midline (2016) and endline (2017) surveys. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey and district (randomization strata) fixed effects. "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. Panel A reports estimates of the extensive margin (likelihood of owning assets of each type), Panel B on the intensive margin (monetary value of assets owned of each type). In Panel C, the dependent variable is the number of distinct types of assets owned within each asset category, in Panel D the outcome is the average of the per unit value of assets of each type owned by the firm. Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets.

TABLE 8: HETEROGENEITY W.R.T. EXPECTED DEMAND GROWTH UNCERTAINTY

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Business owner | Revenues (annual) | Costs (annual) | Profits (annual) | Profits (month) |
| Treatment | 0.01 | 3860.08 | -1957.58 | 44.02 | 11.06 |
| | (0.03) | (12064.47) | (9969.81) | (1016.88) | (106.32) |
| | [0.81] | [0.75] | [0.85] | [0.96] | [0.92] |
| High expected demand uncertainty | -0.09 | -3497.83 | -2876.41 | -618.39 | -50.12 |
| | (0.06) | (18192.53) | (15049.16) | (1231.53) | (124.35) |
| Treatment × High exp. demand uncertainty | 0.05 | 42985.55** | 46482.92*** | 1927.03 | 157.90 |
| | (0.05) | (17607.55) | (15114.98) | (1406.95) | (138.89) |
| | [0.36] | [0.03] | [0.01] | [0.17] | [0.23] |
| Observations | 2087 | 2087 | 2087 | 2087 | 2087 |
| Mean in control | 0.55 | 32561.84 | 26870.63 | 4275.95 | 358.72 |
| Treatment effect under high uncertainty | 0.06 | 46845.62*** | 44525.34*** | 1971.05** | 168.96** |
| | (0.04) | (11045.76) | (9968.73) | (872.49) | (71.80) |

**Notes:** The table presents the heterogeneity of the treatment effects on key business outcomes of eligible Dabi borrowers with respect to uncertainty of demand growth at baseline among local businesses. "High expected demand uncertainty" is a dummy variable = 1 if the respondent is located in a branch where the average coefficient of variation (CV) of expected sales growth among a representative sample of SMEs at baseline was high (above the sample median). All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey and district (randomization strata) fixed effects. "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. "Treatment effect under high uncertainty" corresponds to the sum of the coefficients of "Treatment" and "Treatment × High exp. demand uncertainty". *Business Owner* is a dummy variable equal to one if the respondent owns a business. *Revenues* is the monetary value (in USD PPP) of sold products or delivered services of the business over the last twelve months. *Costs* is the monetary value (in USD PPP) of the total amount the enterprise spent on personnel expenses, machines, tools, equipment, space, transportation, electricity, fuel for machines, and total purchase of stock over the last twelve months. *Profits (annual)* is profit (in USD PPP) of the business over the last twelve months. *Profits (month)* is profit (in USD PPP) of the business over the month preceding the survey.

TABLE 9: HETEROGENEITY W.R.T. RAIN SHOCKS

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Business owner | Revenues (annual) | Costs (annual) | Profits (annual) | Profits (month) |
| Treatment | 0.03 | 38886.00*** | 33632.15*** | 1453.54* | 125.21** |
| | (0.02) | (10087.61) | (9070.40) | (760.79) | (59.75) |
| | [0.30] | [0.00] | [0.00] | [0.10] | [0.09] |
| Rain shock | -0.01 | -31981.57* | -30197.79** | -2976.85* | -277.95* |
| | (0.06) | (18275.70) | (13993.84) | (1483.50) | (157.51) |
| Treatment × Rain shock | -0.10** | -31685.31** | -21644.12** | -1471.06* | -107.77 |
| | (0.05) | (12751.50) | (8399.06) | (778.66) | (82.14) |
| | [0.16] | [0.03] | [0.05] | [0.12] | [0.25] |
| Observations | 2087 | 2087 | 2087 | 2087 | 2087 |
| Mean in control | 0.55 | 32561.84 | 26870.63 | 4275.95 | 358.72 |
| Treatment effect with Rain shock | -0.06 | 7200.69 | 11988.03 | -17.52 | 17.45 |
| | (0.05) | (13767.09) | (10114.93) | (857.76) | (85.91) |
| Rain shock effect in Treatment | -0.10** | -63666.88*** | -51841.91*** | -4447.91*** | -385.72*** |
| | (0.05) | (18751.91) | (14319.25) | (1399.19) | (150.15) |

**Notes:** The table presents the heterogeneity of the treatment effects on key business outcomes of eligible Dabi borrowers with respect to the likelihood of having experienced an excessive rainfall shock. Data comes from the midline (2016) and endline (2017) surveys. "Rain shock" is a dummy variable = 1 if the amount of rainfall in the months of December to May preceding the survey (2016 or 2017) was one standard deviation above rainfall in December to May over the period 1983-2015. The geographical area over which the rainfall amount was calculated corresponds to a 25 km radius around the branch where the firm is located. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey, district-by-survey year fixed effects, and flexible controls for the probability of rain. "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. "Treatment effect with Rain shock" corresponds to the sum of the coefficients of "Treatment" and "Treatment × Rain shock". "Rain shock effect in Treatment" corresponds to the sum of the coefficients of "Rain shock" and "Treatment × Rain shock". *Business Owner* is a dummy variable equal to one if the respondent owns a business. *Revenues* is the monetary value (in USD PPP) of sold products or delivered services of the business over the last twelve months. *Costs* is the monetary value (in USD PPP) of the total amount the enterprise spent on personnel expenses, machines, tools, equipment, space, transportation, electricity, fuel for machines, and total purchase of stock over the last twelve months. *Profits (annual)* is profit (in USD PPP) of the business over the last twelve months. *Profits (month)* is profit (in USD PPP) of the business over the month preceding the survey.

## TABLE 10: CORRELATES OF TAKE UP

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Profit per worker | 0.046 | | | | | | 0.040 | |
| | (0.042) | | | | | | (0.041) | |
| Risk averse | | -0.192*** | | | | | -0.199*** | |
| | | (0.070) | | | | | (0.070) | |
| Wants to start new business | | | 0.158 | | | | 0.171 | |
| | | | (0.124) | | | | (0.122) | |
| Wants to hire new worker | | | | 0.021 | | | -0.008 | |
| | | | | (0.205) | | | (0.202) | |
| Entrepreneurship Index | | | | | 0.091** | | | 0.093** |
| | | | | | (0.037) | | | (0.037) |
| Value of transfers or loans given | | | | | | -0.271* | -0.269* | -0.277* |
| | | | | | | (0.146) | (0.144) | (0.144) |
| Has a business | -0.106 | -0.092 | -0.050 | -0.054 | -0.095 | -0.056 | -0.140* | -0.099 |
| | (0.081) | (0.066) | (0.065) | (0.067) | (0.066) | (0.065) | (0.082) | (0.066) |
| Size of land owned | 0.030 | 0.041 | 0.029 | 0.032 | 0.033 | 0.034 | 0.038 | 0.035 |
| | (0.042) | (0.041) | (0.042) | (0.042) | (0.041) | (0.042) | (0.041) | (0.041) |
| High schooling | 0.048 | 0.045 | 0.059 | 0.051 | 0.055 | 0.050 | 0.047 | 0.052 |
| | (0.065) | (0.064) | (0.065) | (0.065) | (0.064) | (0.065) | (0.064) | (0.064) |
| Age | 0.037 | 0.043 | 0.042 | 0.037 | 0.051 | 0.038 | 0.050 | 0.052 |
| | (0.036) | (0.035) | (0.036) | (0.036) | (0.036) | (0.036) | (0.036) | (0.036) |
| Age-squared | -0.041* | -0.039 | -0.040 | -0.038 | -0.045* | -0.039 | -0.046* | -0.047* |
| | (0.024) | (0.024) | (0.024) | (0.024) | (0.024) | (0.024) | (0.024) | (0.024) |
| Observations | 530 | 530 | 530 | 530 | 530 | 530 | 530 | 530 |

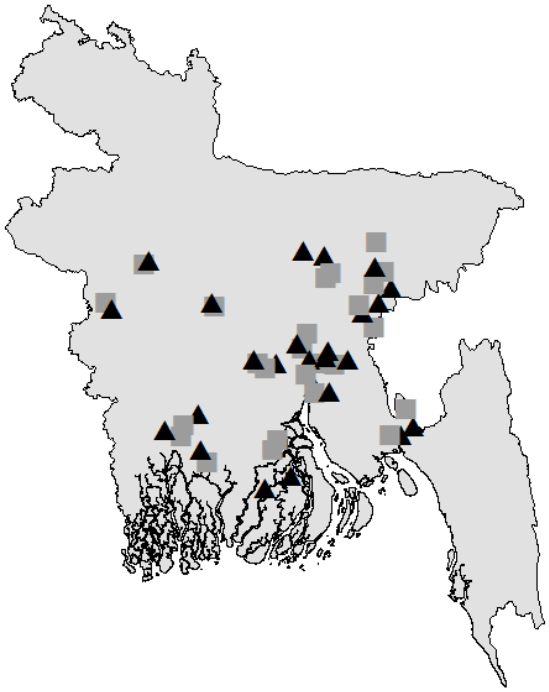
**Notes:** The sample is restricted to eligible Dabi clients in treatment branches who were offered the flexible loan contract. The dependent variable is a dummy equal to 1 if the respondent borrowed under the new, flexible loan contract and 0 otherwise. All regressions control for BRAC branch fixed effects. Bootstrapped standard errors are clustered at BRAC branch office level following Imbens and Kolesár (2016) (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). *Profit per Worker* is the baseline level of the profit of the business over the last twelve months divided by the number of workers, including the business owner, at baseline. The variable is then standardized by subtracting the sample mean and dividing by the sample standard deviation. *Risk Averse* is a dummy variable taking the value of one if the respondent's risk aversion score is greater than or equal to the sample median (see Appendix C for further details on the risk aversion score). *Wants to Start a New Business* is a dummy variable =1 if at baseline the respondent reported that s/he or someone in the household wants to start a new business in the following twelve months. *Wants to Hire New Workers* is a dummy variable =1 if at baseline the respondent reported that s/he or someone in the household wants to hire new workers for a household business in the following twelve months. *Entrepreneurship Index* is the first principal component of the variables *Profit per Worker*, *Risk Averse*, *Wants to Start a New Business*, and *Wants to Hire New Workers*. *Transfers or Loans Given* is the total monetary value (in USD PPP) of any cash or in-kind informal transfers and any loans that the respondent's household gave to others over the 12 months preceding the survey, standardized by subtracting the sample mean and dividing by the sample standard deviation. All control variables are defined at baseline; for further details on their construction see Appendix C.

## TABLE 11: SELECTION EFFECTS

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Treatment | 0.013 | 0.012 | 0.031** | 0.007 | 0.009 | 0.012 | 0.013 | 0.020 | 0.013 |
| | (0.011) | (0.011) | (0.014) | (0.012) | (0.012) | (0.011) | (0.011) | (0.015) | (0.011) |
| | [0.356] | [0.385] | [0.071] | [0.640] | [0.510] | [0.364] | [0.341] | [0.266] | [0.356] |
| Treatment × Profit per worker | | 0.003 | | | | | | 0.001 | |
| | | (0.007) | | | | | | (0.007) | |
| | | [0.615] | | | | | | [0.893] | |
| Treatment × Risk averse | | | -0.035** | | | | | -0.031** | |
| | | | (0.015) | | | | | (0.015) | |
| | | | [0.033] | | | | | [0.058] | |
| Treatment × Wants to start a new business | | | | 0.088*** | | | | 0.079*** | |
| | | | | (0.029) | | | | (0.029) | |
| | | | | [0.018] | | | | [0.027] | |
| Treatment × Wants to hire new workers | | | | | 0.040 | | | 0.032 | |
| | | | | | (0.033) | | | (0.033) | |
| | | | | | [0.241] | | | [0.381] | |
| Treatment × Entrepreneurship Index | | | | | | 0.026*** | | | 0.025*** |
| | | | | | | (0.008) | | | (0.008) |
| | | | | | | [0.001] | | | [0.002] |
| Treatment × Size of land owned | | | | | | | 0.025*** | 0.022** | 0.022** |
| | | | | | | | (0.008) | (0.008) | (0.008) |
| | | | | | | | [0.006] | [0.019] | [0.013] |
| Observations | 6580 | 6580 | 6580 | 6580 | 6580 | 6580 | 6580 | 6580 | 6580 |
| Mean in control | 0.108 | 0.108 | 0.108 | 0.108 | 0.108 | 0.108 | 0.108 | 0.108 | 0.108 |

**Notes:** The table shows the results of estimating specification (3) where the dependent variable is an indicator for having taken any BRAC loan in the last 12 months for the business. Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. *Profit per Worker* is the baseline level of the profit of the business over the last twelve months divided by the number of workers, including the business owner, at baseline. The variable is then standardized by subtracting the sample mean and dividing by the sample standard deviation. *Risk Averse* is a dummy variable taking the value of one if the respondent's risk aversion score is greater than or equal to the sample median (see Appendix C for further details on the risk aversion score). *Wants to Start a New Business* is a dummy variable =1 if at baseline the respondent reported that s/he or someone in the household wants to start a new business in the following twelve months. *Wants to Hire New Workers* is a dummy variable =1 if at baseline the respondent reported that s/he or someone in the household wants to hire new workers for a household business in the following twelve months. *Entrepreneurship Index* is the first principal component of the variables *Profit per Worker*, *Risk Averse*, *Wants to Start a New Business*, and *Wants to Hire New Workers*. *Size of Land Owned* is the amount of land owned by the household (excluding the homestead) at baseline, standardized by subtracting the sample mean and dividing by the sample standard deviation.

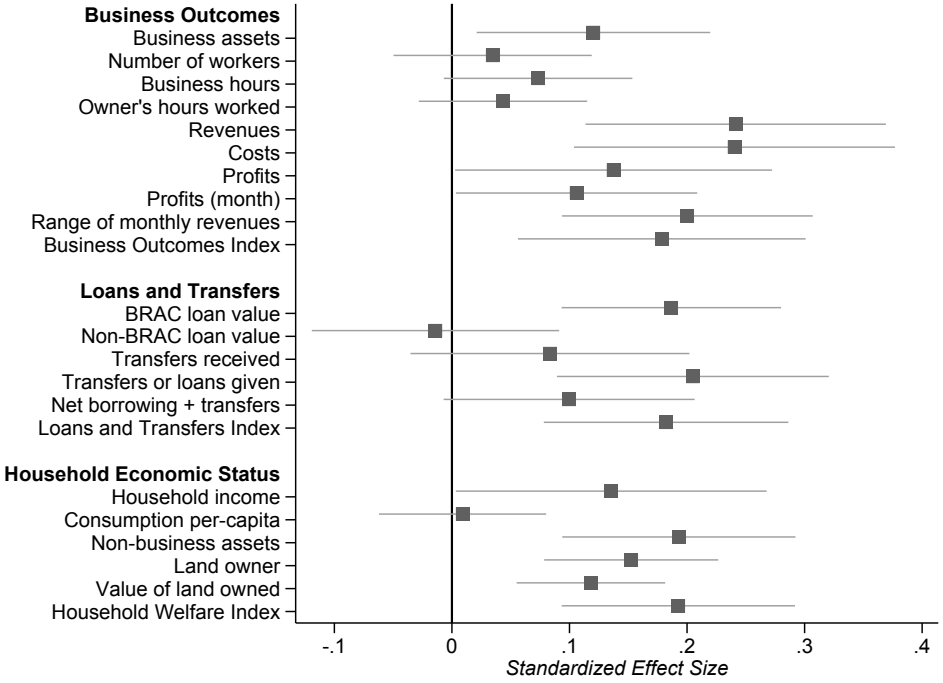
FIGURE 1: LOCATIONS



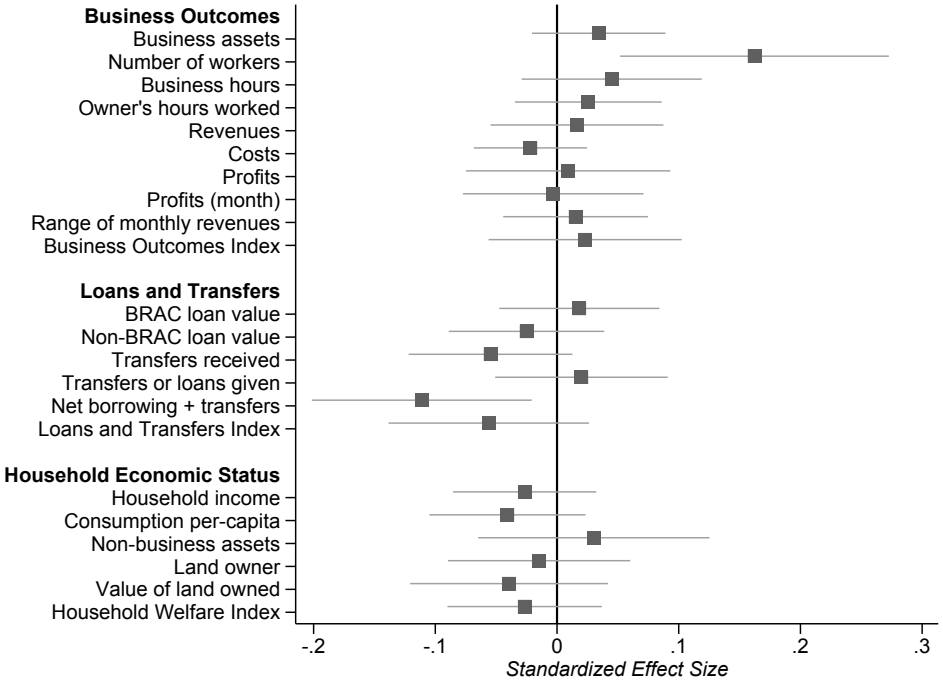
*Notes:* The map shows the locations of the BRAC branch offices that were part of the study. The treatment branches are represented with black triangles while the control branches are denoted with gray squares.

## FIGURE 2: ITT EFFECTS

### (A) EFFECTS ON DABI BORROWERS

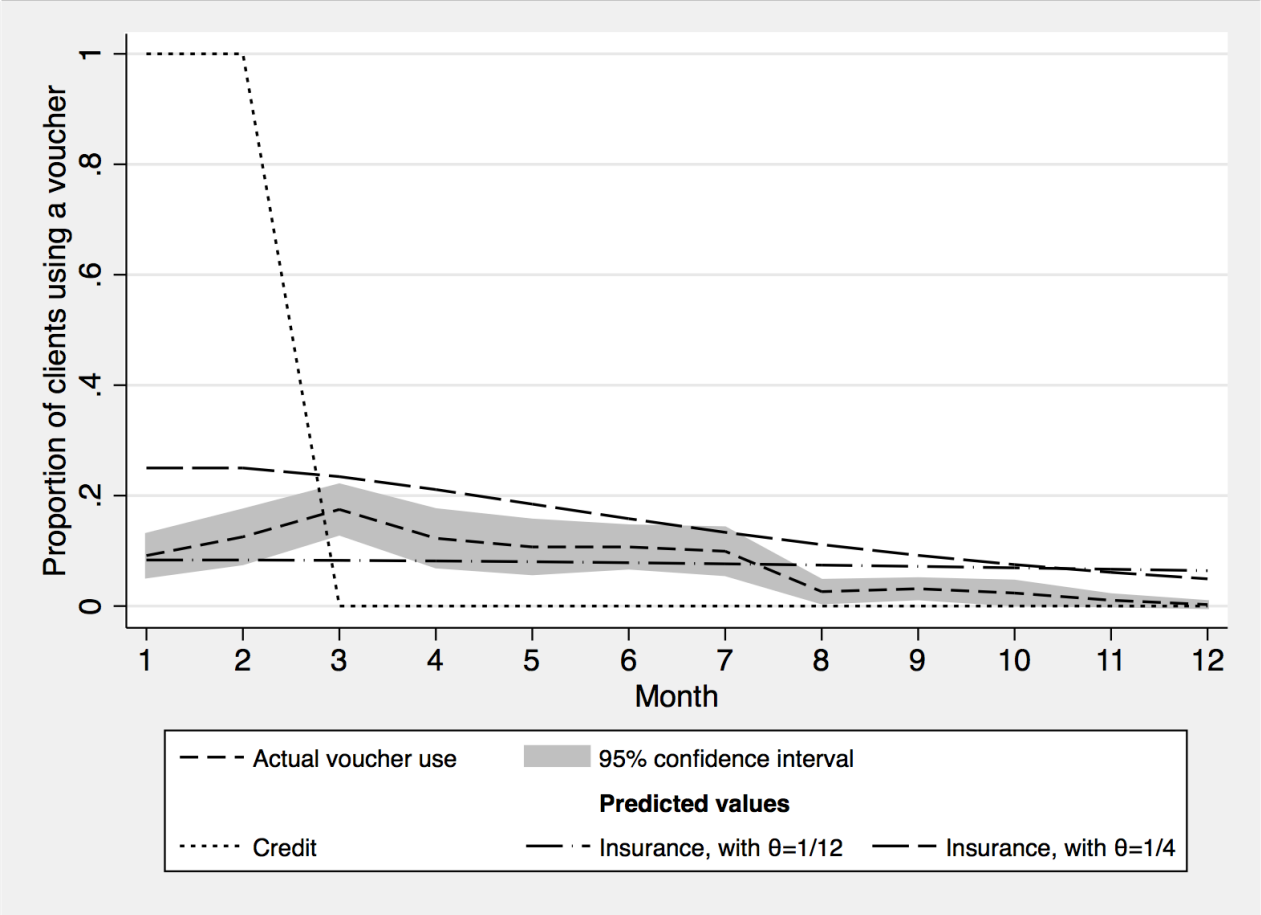



### (B) EFFECTS ON PROGOTI BORROWERS




*Notes:* The figures plot the standardized effect sizes and 90% confidence intervals around the treatment effects estimated using ordinary least square estimates based on specification (1). The sample includes eligible Dabi borrowers in Panel A; and eligible Progoti clients in Panel B. Data comes from the midline (2016) and endline (2017) surveys. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey and district (randomization strata) fixed effects. Standard errors are clustered at the BRAC branch office level.

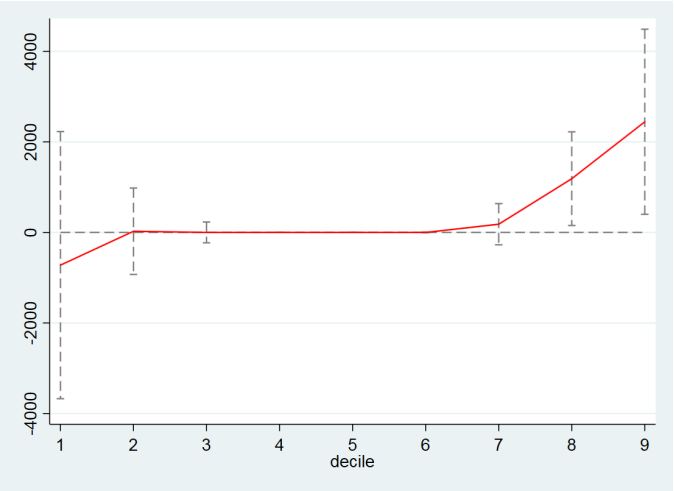
FIGURE 3: VOUCHER USE



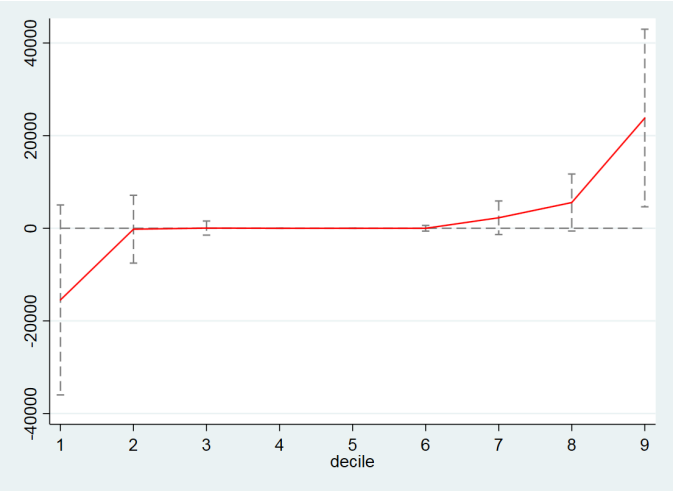

*Notes:* The figure plots the timing of actual and predicted repayment voucher use for Dabi clients. The sample includes Dabi clients in treatment branches who accepted the offer to borrow under the flexible contract. The 95% confidence interval around the actual voucher use is constructed using bootstrapped standard errors clustered at the BRAC branch office level following Imbens and Kolesár (2016). Data comes from BRAC's administrative records collected at endline (2017).

## FIGURE 4: HETEROGENEITY OF TREATMENT EFFECTS

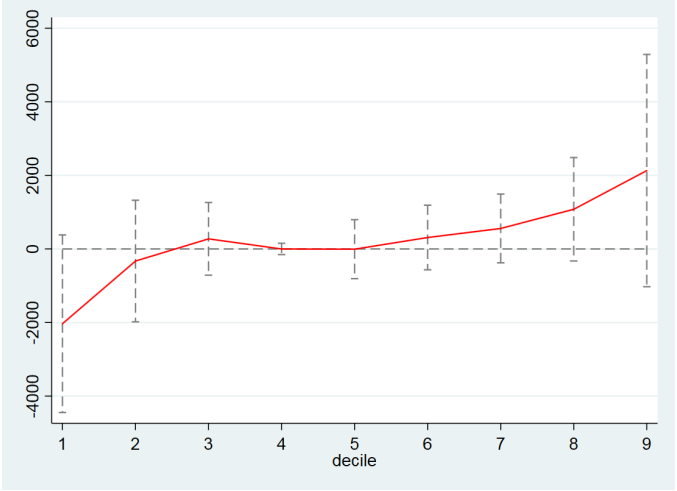
(A) BUSINESS ASSETS VALUE



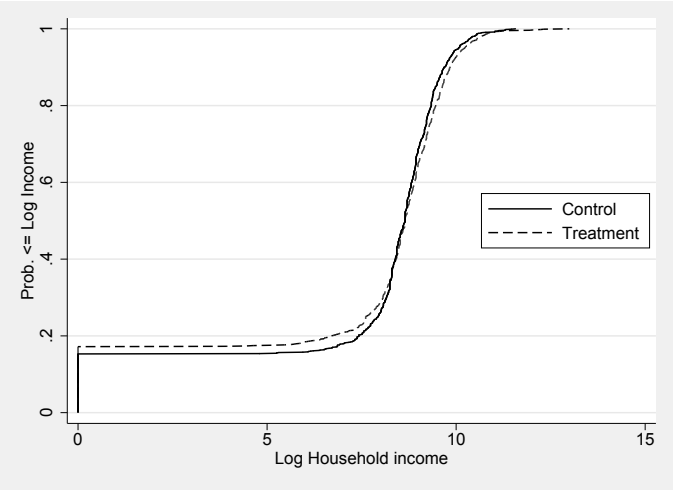

(B) BUSINESS REVENUES (ANNUAL)




(C) HOUSEHOLD INCOME (ANNUAL)




(D) CDF OF LOG HOUSEHOLD INCOME




*Notes:* The sample includes eligible Dabi borrowers. Data comes from the midline (2016) and endline (2017) surveys. Figures (a)-(c) plot quantile treatment effects estimated according to specification (2). 90% confidence intervals are based on bootstrapped (with 500 replications) standard errors clustered at the BRAC branch office level (unit of randomization). Each specification controls for the survey wave. Values are in PPP USD. Figure (d) plots the cumulative distribution function of log household income (plus 1) in treatment and control samples.

**ONLINE APPENDIX: MATERIAL NOT INTENDED FOR PUBLICATION**

# A Appendix Tables

TABLE A.1: ADDITIONAL DESCRIPTIVES AND BALANCE TESTS

| | | | *Baseline balance tests* | | |
|---|---|---|---|---|---|
| | Treatment group | Control group | Basic difference | R.I. p-value | Normalized difference |
| Transfers received | 2,214.264 | 1,815.397 | 339.136 | 0.523 | 0.048 |
| | (5,904.317) | (5,783.917) | (440.272) | | |
| Loans and transfers given | 207.735 | 71.180 | 150.143 | 0.049 | 0.070 |
| | (1,896.242) | (410.110) | (83.020)* | | |
| Net borrowing and transfers | 4,353.063 | 3,859.505 | 395.070 | 0.487 | 0.054 |
| | (6,711.427) | (6,143.992) | (472.735) | | |
| Non-business assets value | 1,293.144 | 1,264.860 | 43.745 | 0.843 | 0.007 |
| | (2,768.514) | (3,336.025) | (179.558) | | |
| Risk aversion | 3.506 | 3.582 | -0.051 | 0.749 | -0.029 |
| | (2.004) | (1.759) | (0.139) | | |
| Patience | 2.504 | 2.618 | -0.133 | 0.343 | -0.042 |
| | (1.935) | (1.915) | (0.118) | | |
| Identified in BRAC administrative records | 0.845 | 0.857 | -0.011 | 0.735 | -0.023 |
| | (0.362) | (0.351) | (0.027) | | |
| Classified as default | 0.009 | 0.019 | -0.011 | 0.248 | -0.062 |
| | (0.094) | (0.138) | (0.007) | | |
| High expected demand uncertainty (Yes=1) | 0.574 | 0.442 | 0.102 | 0.339 | 0.187 |
| | (0.495) | (0.497) | (0.097) | | |
| Rain shock | 0.216 | 0.219 | 0.000 | 0.979 | -.005 |
| | (0.412) | (0.414) | (0.223) | | |
| Observations | 530 | 545 | 1075 | 1075 | 1075 |

**Notes:** The sample includes eligible Dabi clients; it is limited to baseline observations who were resurveyed at the midline or the endline survey – with the exception of "Rain shock" for which the sample consists of midline and endline observations. Columns 1-2 give the mean and the standard deviation of observations in treatment and control groups respectively; column 3 reports the coefficient of "Treatment" indicator in a regression controlling for district (strata) fixed effects with the standard errors clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Column 4 reports the randomization inference $p$-values for the null hypothesis of no difference between treatment and controls groups. Columns 5 reports the normalized difference between treatment and control groups, computed as the difference in means in treatment and control observations divided by the square root of the sum of the variances. "Rain shock" is a dummy variable = 1 if the amount of rainfall in the months of December to May preceding the survey (2016 or 2017) was one standard deviation above rainfall in December to May over the period 1983-2015. Variables are described in Appendix C.

## TABLE A.2: BASELINE DESCRIPTIVES AND BALANCE TESTS FOR PROGOTI CLIENTS

| | | | *Baseline balance tests* | | |
|---|---|---|---|---|---|
| | Treatment group | Control group | Basic difference | R.I. p-value | Normalized difference |
| Respondent's age (years) | 43.563 | 44.082 | -0.620 | 0.395 | -0.033 |
| | (10.511) | (11.616) | (0.583) | | |
| Respondent's schooling (years) | 7.485 | 7.470 | 0.017 | 0.954 | 0.003 |
| | (3.965) | (4.033) | (0.196) | | |
| Household size | 5.628 | 5.823 | -0.203 | 0.199 | -0.057 |
| | (2.263) | (2.565) | (0.140) | | |
| Land owner (Yes=1) | 0.828 | 0.835 | -0.009 | 0.758 | -0.014 |
| | (0.378) | (0.371) | (0.022) | | |
| Size of land owned | 1,850.157 | 205.951 | 1,998.341 | 0.261 | 0.037 |
| | (44,533.188) | (354.066) | (1,763.918) | | |
| Household income ($ PPP) | 22,382.643 | 20,497.238 | 1,847.360 | 0.684 | 0.030 |
| | (56,550.324) | (29,037.510) | (3,067.776) | | |
| Household consumption per capita ($ PPP) | 2,327.093 | 2,256.000 | 37.221 | 0.874 | 0.018 |
| | (3,355.874) | (1,964.298) | (161.283) | | |
| Business owner (Yes=1) | 0.871 | 0.879 | -0.005 | 0.891 | -0.018 |
| | (0.336) | (0.326) | (0.025) | | |
| Business assets ($ PPP) | 25,382.990 | 27,314.578 | -1,686.298 | 0.631 | -0.020 |
| | (55,288.418) | (76,851.063) | (3,158.019) | | |
| Number of Workers | 1.882 | 1.947 | -0.025 | 0.961 | -0.009 |
| | (6.332) | (4.221) | (0.358) | | |
| Business hours | 3,476.416 | 3,474.084 | 1.334 | 0.995 | 0.001 |
| | (1,737.542) | (1,701.972) | (133.578) | | |
| Owner's business hours | 3,119.832 | 3,139.336 | -16.389 | 0.917 | -0.009 |
| | (1,627.194) | (1,617.191) | (118.428) | | |
| Monthly profits ($ PPP) | 1,476.584 | 1,179.643 | 281.274 | 0.458 | 0.057 |
| | (4,877.159) | (1,924.295) | (253.255) | | |
| Annual profits ($ PPP) | 17,741.604 | 15,590.364 | 2,077.285 | 0.669 | 0.039 |
| | (50,169.313) | (22,321.520) | (2,763.875) | | |
| Annual revenues ($ PPP) | 198747.938 | 177980.969 | 21,863.986 | 0.544 | 0.029 |
| | (565427.938) | (431943.563) | (28,886.484) | | |
| Costs ($ PPP) | 184111.047 | 158301.625 | 25,627.602 | 0.507 | 0.034 |
| | (605984.688) | (446243.344) | (30,080.332) | | |
| Range of monthly revenues ($ PPP) | 54,334.555 | 24,605.168 | 28,544.273 | 0.230 | 0.067 |
| | (438874.500) | (58,863.500) | (16,541.371)* | | |
| BRAC loan value ($ PPP) | 7,801.506 | 8,340.279 | -469.894 | 0.328 | -0.069 |
| | (5,077.235) | (5,909.375) | (400.477) | | |
| Non-BRAC loan (Yes=1) | 0.084 | 0.077 | 0.004 | 0.795 | 0.017 |
| | (0.278) | (0.267) | (0.014) | | |
| Non-BRAC loan value ($ PPP) | 5,608.620 | 330.810 | 6,361.217 | 0.019 | 0.040 |
| | (132148.172) | (1,518.435) | (5,231.907) | | |
| Transfers received | 3,526.029 | 4,171.873 | -848.448 | 0.332 | -0.043 |
| | (9,408.028) | (11,800.642) | (740.371) | | |
| Loans and transfers given | 452.810 | 331.220 | 133.092 | 0.278 | 0.034 |
| | (3,226.721) | (1,536.460) | (94.769) | | |
| Net borrowing and transfers | 16,483.346 | 12,490.634 | 4,935.632 | 0.404 | 0.030 |
| | (132048.531) | (13,835.655) | (5,207.234) | | |
| Non-business assets value | 4,325.276 | 2,854.011 | 1,396.092 | 0.473 | 0.039 |
| | (34,571.906) | (14,183.953) | (1,245.555) | | |
| Risk aversion | 2.876 | 2.927 | -0.025 | 0.896 | -0.017 |
| | (2.095) | (2.052) | (0.150) | | |
| Patience | 2.609 | 2.661 | -0.102 | 0.499 | -0.018 |
| | (2.037) | (2.005) | (0.126) | | |
| Identified in BRAC administrative records | 0.934 | 0.911 | 0.028 | 0.302 | 0.060 |
| | (0.249) | (0.285) | (0.023) | | |
| Classified as default | 0.010 | 0.010 | 0.001 | 0.799 | 0.003 |
| | (0.101) | (0.099) | (0.004) | | |
| High expected demand uncertainty (Yes=1) | 0.536 | 0.432 | 0.109 | 0.401 | 0.148 |
| | (0.499) | (0.496) | (0.104) | | |
| Rain shock | 0.211 | 0.246 | -0.004 | 0.771 | -.060 |
| | (0.408) | (0.431) | (0.023) | | |
| Observations | 726 | 776 | 1502 | 1502 | 1502 |

**Notes:** The sample includes eligible Progoti clients; it is limited to baseline observations who were resurveyed at the midline or the endline survey. Columns 1-2 give the mean and the standard deviation of observations in treatment and control groups respectively; column 3 reports the coefficient of "Treatment" indicator in a regression controlling for district (strata) fixed effects with the standard errors clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Column 4 reports the randomization inference $p$-values for the null hypothesis of no difference between treatment and controls groups. Columns 5 reports the normalized difference between treatment and control groups, computed as the difference in means in treatment and control observations divided by the square root of the sum of the variances. Variables are described in Appendix C

TABLE A.3: ATTRITION

| *Sample:* | Dabi | Progoti | SMEs |
|---|---|---|---|
| | (1) | (2) | (3) |
| **Panel A: Attrition at Midline Survey** | | | |
| Treatment | 0.009 | -0.003 | 0.002 |
| | (0.012) | (0.013) | (0.011) |
| | [0.562] | [0.858] | [0.860] |
| Observations | 1115 | 1602 | 3504 |
| Average attrition in control | 0.048 | 0.085 | 0.114 |
| **Panel B: Attrition at Endline Survey** | | | |
| Treatment | -0.015 | -0.019 | -0.024 |
| | (0.013) | (0.017) | (0.019) |
| | [0.360] | [0.350] | [0.335] |
| Observations | 1115 | 1602 | 3504 |
| Average attrition in control | 0.080 | 0.146 | 0.171 |

**Notes:** The dependent variable in all regressions in Panel A (B) is a dummy =1 if the respondent was surveyed at baseline but not at midline (endline). In column 1, the sample includes all eligible Dabi clients surveyed at baseline; in column 2 the sample includes all eligible Progoti clients surveyed at baseline, in column 3 the sample includes all SME's surveyed as part of the SME sample at baseline. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey and district (randomization strata) fixed effects. "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets.

## A.1 Additional Results on Dabi Clients

TABLE A.4: UTILIZATION OF LAND OWNED

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Cultivated by the household | Share-cropping | Rented out | Mortgaged out | Other use | Rent received |
| Treatment | -0.956 | 2.249 | 6.780*** | 1.273 | 1.030*** | 47.363*** |
| | (2.521) | (2.809) | (1.393) | (0.876) | (0.292) | (14.401) |
| | [0.771] | [0.527] | [0.000] | [0.185] | [0.002] | [0.011] |
| Observations | 2087 | 2087 | 2087 | 2087 | 2087 | 2087 |
| Mean in control | 26.315 | 7.812 | 1.675 | 2.842 | 0.893 | 49.262 |

**Notes:** The table presents the treatment effects on size of land owned, disaggregated by use of the land, for eligible Dabi borrowers. Data comes from the midline (2016) and endline (2017) surveys. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey and district (randomization strata) fixed effects. "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. The dependent variable in column 1 is the size (in decimals) of land owned that is cultivated by the household, in column 2 it is the size (in decimals) of land owned that is given to another household under a share-cropping arrangement, in column 3 it is the size (in decimals) of land owned that is rented to another household – under a fixed-rent contract, in column 4 it is the size (in decimals) of land owned that is mortgaged (i.e. use rights of the land are given to another household in exchange of a loan) and in column 5 the dependent variable is the size (in decimals) of land owned that is under "other use". The dependent variable in column 6 is the monetary value (in USD PPP) of the rent received from land that is rented out (either under share-cropping or fixed-rent contract) to other households.

## TABLE A.5: EFFECTS BY SURVEY WAVE: MIDLINE V.S. ENDLINE

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Panel A: ITT on Business Outcomes** | | | | | | | | | | | |
| | Business owner | Business assets | Number of workers | Business hours | Owner's hours worked | Revenues (annual) | Costs (annual) | Profits (annual) | Profits (month) | Range of revenues | Aggregate index |
| Treatment | 0.02 | 646.76 | 0.26 | 159.64* | 101.00 | 38588.60*** | 33184.50*** | 1068.37 | 93.54 | 6188.32** | 0.19** |
| | (0.03) | (899.46) | (0.31) | (93.69) | (75.02) | (12222.80) | (11073.04) | (938.90) | (80.38) | (2791.75) | (0.09) |
| | [0.51] | [0.48] | [0.34] | [0.11] | [0.21] | [0.01] | [0.01] | [0.38] | [0.33] | [0.07] | [0.05] |
| Treatment × Endline | 0.02 | 2494.42 | -0.18 | -64.39 | -60.20 | -21099.36* | -17777.26* | 38.85 | 6.15 | -4722.51 | -0.03 |
| | (0.04) | (2225.15) | (0.67) | (109.48) | (102.84) | (11868.35) | (10103.53) | (805.57) | (79.69) | (3395.76) | (0.07) |
| | [0.68] | [0.31] | [0.81] | [0.53] | [0.58] | [0.10] | [0.09] | [0.97] | [0.93] | [0.21] | [0.65] |
| Observations | 2087 | 2086 | 2087 | 2087 | 2087 | 2087 | 2087 | 2087 | 2087 | 2168 | 2168 |
| Mean in control | 0.55 | 3685.41 | 1.09 | 1577.29 | 1474.80 | 32561.84 | 26870.63 | 4275.95 | 358.72 | 4725.49 | 0.00 |
| **Panel B: ITT on Credit Market Outcomes** | | | | | | | | | | | |
| | BRAC loan value | Non-BRAC loan value | Transfers received | Transfers or loans given | Net Borrowing or transfer | Aggregate index | | | | | |
| Treatment | 396.520*** | -95.257 | 168.942 | 164.467** | 335.335 | 0.227*** | | | | | |
| | (115.689) | (121.565) | (312.711) | (63.550) | (405.392) | (0.078) | | | | | |
| | [0.001] | [0.470] | [0.630] | [0.002] | [0.466] | [0.005] | | | | | |
| Treatment × Endline | -186.375 | 130.977 | 325.861 | -82.751 | 310.276 | -0.077 | | | | | |
| | (128.399) | (173.331) | (451.815) | (89.922) | (626.839) | (0.104) | | | | | |
| | [0.130] | [0.457] | [0.523] | [0.307] | [0.645] | [0.453] | | | | | |
| Observations | 1619 | 2168 | 2168 | 2168 | 1619 | 2168 | | | | | |
| Mean in control | 2067.173 | 543.632 | 1449.935 | 165.716 | 3950.253 | -0.000 | | | | | |
| **Panel C: ITT on Household Socio-economic Status** | | | | | | | | | | | |
| | Household income | PCE | Non-business assets value | Land owner (Yes=1) | Size of land owned | Aggregate index | | | | | |
| Treatment | 1286.963 | -13.685 | 228.755* | 0.076** | 11.558** | 0.189** | | | | | |
| | (1062.978) | (127.029) | (123.316) | (0.030) | (5.136) | (0.071) | | | | | |
| | [0.308] | [0.929] | [0.026] | [0.020] | [0.047] | [0.026] | | | | | |
| Treatment × Endline | 43.324 | 52.725 | 140.911 | -0.001 | -2.321 | 0.006 | | | | | |
| | (974.739) | (161.403) | (215.598) | (0.035) | (6.167) | (0.069) | | | | | |
| | [0.963] | [0.705] | [0.356] | [0.979] | [0.693] | [0.933] | | | | | |
| Observations | 2168 | 2085 | 2168 | 2087 | 2168 | 2168 | | | | | |
| Mean in control | 7820.156 | 1613.159 | 1191.887 | 0.472 | 37.953 | -0.000 | | | | | |

**Notes:** The table presents the treatment effects on business outcomes of eligible Dabi borrowers. Data comes from the midline (2016) and endline (2017) surveys. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey and district (randomization strata) fixed effects. "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. "Aggregate index" is constructed by first standardizing all outcome variables in the previous columns with respect to the control group in the relevant survey wave (subtracting the mean in control and dividing by the standard deviation of the control group), then taking their average and standardizing again with respect to the control group. Description of the dependent variables are provided in Appendix C.

TABLE A.6: HETEROGENEITY W.R.T. BASELINE SOCIOECONOMIC STATUS

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Business owner | Revenues (annual) | Costs (annual) | Profits (annual) | Profits (month) |
| **Panel A: Land ownership** | | | | | |
| Treatment | 0.00 | 21787.66** | 15968.68* | 24.41 | 82.61 |
| | (0.03) | (8916.70) | (9277.36) | (461.79) | (52.96) |
| | [0.94] | [0.02]** | [0.11] | [0.94] | [0.09]* |
| Treatment × Land owner | 0.05 | 11680.13 | 15925.06 | 2103.35* | 21.74 |
| | (0.05) | (17017.73) | (18601.05) | (1231.71) | (132.18) |
| | [0.34] | [0.61] | [0.53] | [0.14] | [0.89] |
| Observations | 2087 | 2087 | 2087 | 2087 | 2087 |
| Mean in control | 0.55 | 32561.84 | 26870.63 | 4275.95 | 358.72 |
| Treatment effect for land owners | 0.05 | 33467.79 | 31893.74 | 2127.76 | 104.36 |
| | (0.04) | (14746.78) | (14666.53) | (1173.12) | (111.22) |
| **Panel B: Household income** | | | | | |
| Treatment | 0.03 | 14111.45 | 13179.58* | 794.70 | 36.79 |
| | (0.03) | (9075.40) | (7853.02) | (651.07) | (73.40) |
| | [0.39] | [0.14] | [0.07]* | [0.22] | [0.68] |
| Treatment × High household income | -0.01 | 28978.00 | 23614.38 | 657.06 | 125.27 |
| | (0.05) | (20126.29) | (19167.32) | (1295.90) | (116.65) |
| | [0.77] | [0.17] | [0.21] | [0.66] | [0.34] |
| Observations | 2087 | 2087 | 2087 | 2087 | 2087 |
| Mean in control | 0.55 | 32561.84 | 26870.63 | 4275.95 | 358.72 |
| Treatment effect for high-income earners | 0.02 | 43089.45 | 36793.96 | 1451.76 | 162.06 |
| | (0.03) | (16583.65) | (15988.82) | (1132.39) | (89.18) |

**Notes:** The table presents the heterogeneity of the treatment effects on key business outcomes of eligible Dabi borrowers. Data comes from the midline (2016) and endline (2017) surveys. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey, district (randomization strata) fixed effects and the relevant covariate (that is interacted with the treatment indicator in each panel). "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. "Land owner" is a dummy variable =1 if the respondent's household owned any land at baseline (note that for the eligible Dabi borrower sample, the median household owned no land so this corresponds to the sample median). "High household income" is a dummy variable =1 if the total labor incomed earne by members of the respondent's household at baseline was above the sample median. Description of the dependent variables are provided in Appendix C.

## TABLE A.7: HETEROGENEITY W.R.T. SCHOOLING

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Business owner | Revenues (annual) | Costs (annual) | Profits (annual) | Profits (month) |
| **Panel A: Baseline specification** | | | | | |
| Treatment | 0.04 | 29458.21*** | 21918.29* | 926.65 | 95.92 |
| | (0.03) | (10970.20) | (11164.56) | (655.18) | (67.14) |
| | [0.19] | [0.01]** | [0.07]* | [0.21] | [0.19] |
| Treatment × High schooling | -0.03 | -2509.00 | 4526.06 | 283.19 | 0.73 |
| | (0.03) | (21893.17) | (19582.20) | (1187.99) | (125.36) |
| | [0.35] | [0.92] | [0.83] | [0.84] | [1.00] |
| Observations | 2087 | 2087 | 2087 | 2087 | 2087 |
| Mean in control | 0.55 | 32561.84 | 26870.63 | 4275.95 | 358.72 |
| Treatment effect with high schooling | 0.01 | 26949.21 | 26444.35 | 1209.84 | 96.66 |
| | (0.03) | (16031.27) | (13787.95) | (1032.07) | (96.03) |
| **Panel B: Controlling for Land ownership** | | | | | |
| Treatment | 0.02 | 24788.51* | 15671.26 | 89.63 | 89.11 |
| | (0.03) | (13347.30) | (13998.01) | (693.20) | (86.93) |
| | [0.60] | [0.08]* | [0.29] | [0.91] | [0.28] |
| Treatment × High schooling | -0.03 | -5951.32 | 648.75 | -77.88 | -11.84 |
| | (0.03) | (21028.24) | (18624.62) | (1130.87) | (116.84) |
| | [0.27] | [0.80] | [0.98] | [0.94] | [0.94] |
| Treatment × Land owner | 0.05 | 12085.62 | 15813.60 | 2048.86* | 21.36 |
| | (0.05) | (15753.71) | (17634.86) | (1176.92) | (125.37) |
| | [0.32] | [0.54] | [0.49] | [0.13] | [0.88] |
| Observations | 2087 | 2087 | 2087 | 2087 | 2087 |
| Mean in control | 0.55 | 32561.84 | 26870.63 | 4275.95 | 358.72 |
| Treatment effect with high schooling | -0.01 | 18837.20 | 16320.01 | 11.75 | 77.27 |
| | (0.04) | (14201.72) | (12123.16) | (766.37) | (68.99) |
| **Panel C: Controlling for Household income** | | | | | |
| Treatment | 0.05 | 16526.89 | 12000.15 | 696.78 | 41.29 |
| | (0.04) | (12753.12) | (10766.21) | (854.62) | (78.32) |
| | [0.24] | [0.23] | [0.29] | [0.34] | [0.57] |
| Treatment × High schooling | -0.03 | -4490.65 | 2321.47 | 210.27 | -7.84 |
| | (0.03) | (21379.63) | (19284.83) | (1146.01) | (123.86) |
| | [0.35] | [0.85] | [0.90] | [0.88] | [0.96] |
| Treatment × High household income | -0.01 | 28914.40 | 23420.55 | 609.65 | 124.28 |
| | (0.05) | (19995.47) | (19280.89) | (1258.25) | (115.72) |
| | [0.78] | [0.17] | [0.21] | [0.67] | [0.35] |
| Observations | 2087 | 2087 | 2087 | 2087 | 2087 |
| Mean in control | 0.55 | 32561.84 | 26870.63 | 4275.95 | 358.72 |
| Treatment effect with high schooling | 0.02 | 12036.24 | 14321.62 | 907.05 | 33.45 |
| | (0.04) | (15084.06) | (13835.76) | (877.21) | (109.42) |

**Notes:** The table presents the heterogeneity of the treatment effects on key business outcomes of eligible Dabi borrowers. Data comes from the midline (2016) and endline (2017) surveys. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey, district (randomization strata) fixed effects and the relevant covariate (that is interacted with the treatment indicator in each panel). "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. "High schooling" is a dummy variable =1 if the respondent's years of schooling at baseline was above the sample median. "Land owner" is a dummy variable =1 if the respondent's household owned any land at baseline (note that for the eligible Dabi borrower sample, the median household owned no land so this corresponds to the sample median). "High household income" is a dummy variable =1 if the total labor incomed earne by members of the respondent's household at baseline was above the sample median. Description of the dependent variables are provided in Appendix C.

TABLE A.8: SPILLOVER EFFECTS ON DABI CLIENTS' REPAYMENT BEHAVIOR

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Borrower no longer with BRAC | Classified as "Default" | Full loan not repaid within 8 weeks | 24 weeks | 52 weeks |
| Panel A: Ineligible borrowers | | | | | |
| Treatment | -0.041 | 0.002 | -0.001 | -0.001 | -0.001 |
| | (0.031) | (0.002) | (0.007) | (0.007) | (0.006) |
| | [0.314] | [0.439] | [0.909] | [0.898] | [0.877] |
| Observations | 69801 | 69801 | 66285 | 66285 | 66285 |
| Mean in control | 0.545 | 0.039 | 0.049 | 0.043 | 0.039 |
| Panel B: New-comers | | | | | |
| Treatment | - | 0.002 | 0.002 | 0.002 | 0.003 |
| | - | (0.003) | (0.006) | (0.005) | (0.005) |
| | | [0.523] | [0.831] | [0.820] | [0.726] |
| Observations | - | 52943 | 58337 | 58337 | 58337 |
| Mean in control | - | 0.011 | 0.036 | 0.032 | 0.030 |

**Notes:** The table presents the spillover effects on retention and loan repayment of ineligible Dabi borrowers (Panel A) and Dabi borrowers who joined BRAC after baseline in study branches (Panel B). Data comes from BRAC's administrative records collected at endline (2017). "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. *Borrower No Longer with BRAC* is a dummy variable taking the value of one if the client has repaid the loan and not taken out a new one (as opposed to having a current loan or having defaulted). *Default* is a dummy variable=1 if the borrower was categorized by the credit officer as having not repaid the loan by the end of the loan cycle. *Full Loan Not Repaid Within 8 (24) [52] Weeks* are dummy variables taking the value of one if the borrower did not repay the full loan by the second (sixth) [twelfth] month after the end of the loan cycle. Robust standard errors clustered at the branch level in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets.

TABLE A.9: COST-BENEFIT ANALYSIS FOR DABI CLIENTS

| | (1) | (2) | (3) |
|---|---|---|---|
| Social discount rate | 5% | 10% | 22% |
| Cost per eligible client at year 0 | 51.10 | 51.10 | 51.10 |
| Cost of foregone interest payments per client during year 1 | 1.13 | 2.26 | 4.97 |
| Cost of foregone interest payments per client during year 2 | 1.13 | 2.26 | 4.97 |
| Total cost per eligible client discounted at year 2 | 58.65 | 66.57 | 87.08 |
| Change in household income in year 1 | 1329 | 1329 | 1329 |
| Change in household income in year 2 | 1277 | 1277 | 1277 |
| Total benefits | 2606 | 2606 | 2606 |
| Benefits/cost ratio | 44 | 39 | 30 |
| IRR | 26.0 | 25.9 | 25.9 |

**Notes:** The table shows the results for the cost-benefit analysis for pilot for the eligible Dabi clients. The cost per eligible client in year 0 is based on the total cost of the pilot (including the Progoti clients) divided by the number of eligible Dabi clients.

## A.2 Results on Progoti Clients

TABLE A.10: EFFECTS ON PROGOTI CLIENTS: BUSINESS OUTCOMES

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Business owner | Business assets | Number of workers | Business hours | Owner's hours worked | Revenues (annual) | Costs (annual) | Profits (annual) | Profits (month) | Range of revenues | Aggregate index |
| | | | | | | **Panel A: ITT** | | | | | |
| Treatment | -0.004 | 1740.773 | 1.068** | 74.965 | 38.695 | 6851.723 | -13286.76 | 145.652 | -6.950 | -5950.976 | 0.023 |
| | (0.013) | (1653.815) | (0.438) | (73.042) | (55.291) | (18148.570) | (15979.711) | (880.334) | (77.065) | (5827.813) | (0.047) |
| | [0.879] | [0.389] | [0.044] | [0.374] | [0.582] | [0.771] | [0.478] | [0.887] | [0.936] | [0.602] | [0.652] |
| Observations | 2854 | 2854 | 2854 | 2854 | 2854 | 2854 | 2854 | 2854 | 2854 | 3066 | 3066 |
| Mean in control | 0.893 | 20936.624 | 2.428 | 2923.813 | 2615.572 | 167910.5 | 168519.4 | 13521.567 | 1101.980 | 32263.455 | 0.000 |
| | | | | | | **Panel B: LATE** | | | | | |
| Flexible loan | -0.01 | 3238.83 | 1.99** | 139.56 | 72.03 | 12761.37 | -24741.32 | 271.27 | -12.94 | -10246.83 | 0.08 |
| | (0.02) | (3066.20) | (0.81) | (136.01) | (102.29) | (33407.10) | (29381.57) | (1619.99) | (141.51) | (10925.14) | (0.09) |
| Observations | 2854 | 2854 | 2854 | 2854 | 2854 | 2854 | 2854 | 2854 | 2854 | 3022 | 3022 |
| Mean in control | 0.89 | 20936.62 | 2.43 | 2923.81 | 2615.57 | 167910.51 | 168519.40 | 13521.57 | 1101.98 | 32263.46 | 0.00 |

**Notes:** The table presents the treatment effects on business outcomes of eligible Progoti borrowers. Data comes from the midline (2016) and endline (2017) surveys. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey and district (randomization strata) fixed effects. "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. "Flexible loan" is a dummy variable equal to 1 if the respondent borrowed under the new, flexible loan contract and 0 otherwise. The regressions in Panel A are OLS regressions based on specification (1); while regressions in Panel B are 2SLS regressions where the "Flexible loan" is instrumented by "Treatment". Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. "Aggregate index" is constructed by first standardizing all outcome variables in columns (1)-(8) with respect to the control group in the relevant survey wave (subtracting the mean in control and dividing by the standard deviation of the control group), then taking their average and standardizing again with respect to the control group. Description of the dependent variables are provided in Appendix C.

TABLE A.11: EFFECTS ON PROGOTI CLIENTS: CREDIT MARKET OUTCOMES

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | BRAC loan value | Non-BRAC loan value | Transfers received | Transfers or loans given | Net Borrowing or transfer | Aggregate index |
| | | | | **Panel A: ITT** | | |
| Treatment | 122.654 | -306.144 | -558.212 | 13.723 | -2248.710** | -0.039 |
| | (263.736) | (509.519) | (388.486) | (56.182) | (1092.207) | (0.051) |
| | [0.714] | [0.649] | [0.290] | [0.837] | [0.085] | [0.522] |
| Observations | 1903 | 3066 | 3066 | 3066 | 1903 | 3066 |
| Mean in control | 8470.323 | 2681.145 | 3277.109 | 391.655 | 13946.683 | -0.000 |
| | | | | **Panel B: LATE** | | |
| Flexible loan | 198.358 | -431.170 | -935.187 | 43.124 | -3180.346** | -0.046 |
| | (376.788) | (950.140) | (717.561) | (105.885) | (1605.693) | (0.096) |
| Observations | 1886 | 3022 | 3022 | 3022 | 1886 | 3022 |
| Mean in control | 8470.323 | 2681.145 | 3277.109 | 391.655 | 13946.683 | -0.000 |

**Notes:** The table presents the treatment effects on credit market outcomes of eligible Progoti borrowers. Data comes from the midline (2016) and endline (2017) surveys. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey and district (randomization strata) fixed effects. "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. "Flexible loan" is a dummy variable equal to 1 if the respondent borrowed under the new, flexible loan contract and 0 otherwise. The regressions in Panel A are OLS regressions based on specification (1); while regressions in Panel B are 2SLS regressions where the "Flexible loan" is instrumented by "Treatment". Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. "Aggregate index" is constructed by first standardizing all outcome variables in columns (1)-(7) with respect to the control group in the relevant survey wave (subtracting the mean in control and dividing by the standard deviation of the control group), then taking their average and standardizing again with respect to the control group. Description of the dependent variables are provided in Appendix C.

TABLE A.12: EFFECTS ON PROGOTI CLIENTS: HOUSEHOLD SOCIOECONOMIC STATUS

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| | Household income | Consumption per-capita (PCE) | Non-business assets value | Land owner (Yes=1) | Size of land owned | Aggregate index |
| | | | **Panel A: ITT** | | | |
| Treatment | -667.980 | -119.154 | 121.619 | -0.005 | -13.853 | -0.027 |
| | (918.048) | (118.311) | (213.107) | (0.017) | (14.714) | (0.038) |
| | [0.588] | [0.371] | [0.770] | [0.803] | [0.436] | [0.590] |
| Observations | 3066 | 2853 | 3066 | 2854 | 3066 | 3066 |
| Mean in control | 18641.784 | 2296.669 | 2495.981 | 0.820 | 168.575 | -0.000 |
| | | | **Panel B: LATE** | | | |
| Flexible loan | -342.239 | -221.984 | 381.907 | -0.010 | -17.569 | 0.014 |
| | (1728.381) | (216.528) | (401.111) | (0.032) | (28.066) | (0.071) |
| Observations | 3022 | 2853 | 3022 | 2854 | 3022 | 3022 |
| Mean in control | 18641.784 | 2296.669 | 2495.981 | 0.820 | 168.575 | -0.000 |

**Notes:** The table presents the treatment effects on indicators of household socioeconomic status outcomes for the eligible Progoti borrowers. Data comes from the midline (2016) and endline (2017) surveys. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey and district (randomization strata) fixed effects. "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. "Flexible loan" is a dummy variable equal to 1 if the respondent borrowed under the new, flexible loan contract and 0 otherwise. The regressions in Panel A are OLS regressions based on specification (1); while regressions in Panel B are 2SLS regressions where the "Flexible loan" is instrumented by "Treatment". Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. "Aggregate index" is constructed by first standardizing all outcome variables in columns (1)-(5) with respect to the control group in the relevant survey wave (subtracting the mean in control and dividing by the standard deviation of the control group), then taking their average and standardizing again with respect to the control group. Description of the dependent variables are provided in Appendix C.

TABLE A.13: EFFECTS ON PROGOTI CLIENTS' REPAYMENT BEHAVIOR

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Borrower no longer with BRAC | Classified as "Default" | Full loan not repaid within 8 weeks | 24 weeks | 52 weeks |
| Panel A: Eligible borrowers | | | | | |
| Treatment | -0.025 | -0.003 | 0.004 | 0.008 | 0.007 |
| | (0.028) | (0.007) | (0.011) | (0.010) | (0.008) |
| | [0.478] | [0.712] | [0.716] | [0.464] | [0.415] |
| Mean in control | 0.48 | 0.03 | 0.040 | 0.034 | 0.029 |
| Observations | 1467 | 1467 | 1093 | 1093 | 1093 |
| Panel B: Ineligible borrowers | | | | | |
| Treatment | 0.005 | 0.001 | 0.007 | 0.005 | 0.007 |
| | (0.015) | (0.002) | (0.008) | (0.007) | (0.007) |
| | [0.791] | [0.644] | [0.494] | [0.542] | [0.418] |
| Mean in control | 0.706 | 0.024 | 0.033 | 0.029 | 0.025 |
| Observations | 9601 | 9601 | 7964 | 7964 | 7964 |
| Panel C: New-comers | | | | | |
| Treatment | - | -0.003 | 0.000 | 0.001 | 0.000 |
| | - | (0.002) | (0.004) | (0.004) | (0.004) |
| | | [0.342] | [0.957] | [0.895] | [0.951] |
| Mean in control | - | 0.008 | 0.036 | 0.032 | 0.030 |
| Observations | 14601 | 14601 | 9853 | 9853 | 9853 |

**Notes:** The table presents the treatment effects on retention and loan repayment of eligible Progoti borrowers in Panel A, spillover effects on retention and loan repayment of ineligible Progoti borrowers in Panel B and on Progoti borrowers who joined BRAC after baseline in study branches in Panel C. Data comes from BRAC's administrative records collected at endline (2017). "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. *Borrower No Longer with BRAC* is a dummy variable taking the value of one if the client has repaid the loan and not taken out a new one (as opposed to having a current loan or having defaulted). *Default* is a dummy variable=1 if the borrower was categorized by the credit officer as having not repaid the loan by the end of the loan cycle. *Full Loan Not Repaid Within 8 (24) [52] Weeks* are dummy variables taking the value of one if the borrower did not repay the full loan by the second (sixth) [twelfth] month after the end of the loan cycle. Robust standard errors clustered at the branch level in parentheses (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets.

## TABLE A.14: EFFECTS ON PROGOTI CLIENTS BY SURVEY WAVE: MIDLINE V.S. ENDLINE

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Panel A: ITT on Business Outcomes** | | | | | | | | | | | |
| | Business owner | Business assets | Number of workers | Business hours | Owner's hours worked | Revenues (annual) | Costs (annual) | Profits (annual) | Profits (month) | Range of revenues | Aggregate index |
| Treatment | 0.004 | 1395.636 | 0.834 | 42.613 | 33.780 | 7724.394 | -2.32e+04 | 779.507 | 59.386 | -1.65e+04 | 0.016 |
| | (0.014) | (2299.377) | (0.551) | (87.179) | (67.180) | (27751.950) | (28409.115) | (1310.688) | (119.801) | (13544.581) | (0.066) |
| | [0.775] | [0.593] | [0.114] | [0.657] | [0.646] | [0.834] | [0.482] | [0.584] | [0.667] | [0.515] | [0.848] |
| Treatment × Endline | -0.016 | 711.144 | 0.483 | 66.655 | 10.128 | -1797.980 | 20494.283 | -1306.133 | -136.704 | 20189.790 | 0.014 |
| | (0.021) | (3871.983) | (1.056) | (105.012) | (93.664) | (36120.445) | (41858.791) | (1606.117) | (147.317) | (18561.360) | (0.073) |
| | [0.408] | [0.879] | [0.706] | [0.544] | [0.913] | [0.964] | [0.633] | [0.424] | [0.307] | [0.409] | [0.851] |
| Observations | 2854 | 2854 | 2854 | 2854 | 2854 | 2854 | 2854 | 2854 | 2854 | 3066 | 3066 |
| Mean in control | 0.893 | 20936.624 | 2.428 | 2923.813 | 2615.572 | 1.68e+05 | 1.69e+05 | 13521.567 | 1101.980 | 32263.455 | 0.000 |
| **Panel B: ITT on Credit Market Outcomes** | | | | | | | | | | | |
| | BRAC loan value | Non-BRAC loan value | Transfers received | Transfers or loans given | Net Borrowing or transfer | Aggregate index | | | | | |
| Treatment | 182.847 | 315.564 | -1085.442** | -27.110 | -2325.822* | -0.063 | | | | | |
| | (251.871) | (846.543) | (459.539) | (96.904) | (1207.848) | (0.056) | | | | | |
| | [0.539] | [0.782] | [0.044] | [0.788] | [0.108] | [0.326] | | | | | |
| Treatment × Endline | -126.528 | -1192.190 | 1011.060* | 78.300 | 161.978 | 0.046 | | | | | |
| | (311.985) | (874.979) | (556.965) | (131.398) | (1114.710) | (0.060) | | | | | |
| | [0.705] | [0.116] | [0.046] | [0.515] | [0.891] | [0.392] | | | | | |
| Observations | 1903 | 3066 | 3066 | 3066 | 1903 | 3066 | | | | | |
| Mean in control | 8470.323 | 2681.145 | 3277.109 | 391.655 | 13946.683 | -0.000 | | | | | |
| **Panel C: ITT on Household Socio-economic Status** | | | | | | | | | | | |
| | Household income | PCE | Non-business assets value | Land owner (Yes=1) | Size of land owned | Aggregate index | | | | | |
| Treatment | -15.630 | -53.025 | 244.875 | -0.011 | -31.257* | -0.032 | | | | | |
| | (1561.751) | (176.790) | (468.100) | (0.018) | (16.312) | (0.064) | | | | | |
| | [0.992] | [0.743] | [0.926] | [0.577] | [0.073] | [0.611] | | | | | |
| Treatment × Endline | -1251.033 | -136.201 | -236.371 | 0.011 | 33.374 | 0.010 | | | | | |
| | (2100.279) | (228.772) | (668.083) | (0.029) | (22.621) | (0.102) | | | | | |
| | [0.542] | [0.518] | [0.854] | [0.684] | [0.128] | [0.917] | | | | | |
| Observations | 3066 | 2853 | 3066 | 2854 | 3066 | 3066 | | | | | |
| Mean in control | 18641.784 | 2296.669 | 2495.981 | 0.820 | 168.575 | -0.000 | | | | | |

**Notes:** The table presents the treatment effects on business outcomes of eligible Dabi borrowers. Data comes from the midline (2016) and endline (2017) surveys. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey and district (randomization strata) fixed effects. "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. "Aggregate index" is constructed by first standardizing all outcome variables in the previous columns with respect to the control group in the relevant survey wave (subtracting the mean in control and dividing by the standard deviation of the control group), then taking their average and standardizing again with respect to the control group. Description of the dependent variables are provided in Appendix C.

## TABLE A.15: CORRELATES OF TAKE UP AMONG PROGOTI CLIENTS

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| Profit per worker | -0.013 | | | | | | -0.013 | |
| | (0.013) | | | | | | (0.013) | |
| Risk averse | | 0.011 | | | | | 0.005 | |
| | | (0.039) | | | | | (0.040) | |
| Wants to start new business | | | -0.079 | | | | -0.079 | |
| | | | (0.061) | | | | (0.061) | |
| Wants to hire new worker | | | | 0.010 | | | 0.019 | |
| | | | | (0.066) | | | (0.066) | |
| Entrepreneurship Index | | | | | -0.018 | | | -0.016 |
| | | | | | (0.017) | | | (0.017) |
| Value of transfers or loans given | | | | | | -0.025* | -0.025* | -0.025* |
| | | | | | | (0.015) | (0.015) | (0.015) |
| Size of land owned | 0.009 | 0.009 | 0.009 | 0.009 | 0.009 | 0.009 | 0.009 | 0.009 |
| | (0.012) | (0.012) | (0.012) | (0.012) | (0.012) | (0.012) | (0.012) | (0.012) |
| Age | 0.020 | 0.020 | 0.019 | 0.020 | 0.019 | 0.019 | 0.019 | 0.018 |
| | (0.021) | (0.021) | (0.021) | (0.021) | (0.021) | (0.021) | (0.021) | (0.021) |
| Age-squared | -0.034** | -0.034** | -0.034** | -0.034** | -0.034** | -0.034** | -0.035** | -0.035** |
| | (0.017) | (0.017) | (0.017) | (0.017) | (0.017) | (0.017) | (0.017) | (0.017) |
| High schooling | 0.079** | 0.081** | 0.080** | 0.081** | 0.082** | 0.078** | 0.074* | 0.078** |
| | (0.038) | (0.038) | (0.038) | (0.038) | (0.038) | (0.038) | (0.038) | (0.038) |
| Observations | 725 | 725 | 725 | 725 | 725 | 725 | 725 | 725 |

**Notes:** The sample is restricted to eligible Progoti clients in treatment branches who were offered the flexible loan contract. The dependent variable is a dummy equal to 1 if the respondent borrowed under the new, flexible loan contract and 0 otherwise. All regressions control for BRAC branch fixed effects. Bootstrapped standard errors are clustered at BRAC branch office level following Imbens and Kolesár (2016). (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). *Profit per Worker* is the baseline level of the profit of the business over the last twelve months divided by the number of workers (regular, casual and unpaid), including the business owner, at baseline. The variable is then standardized by subtracting the sample mean and dividing by the sample standard deviation. *Risk Averse* is a dummy variable taking the value of one if the respondent's risk aversion score is greater than or equal to the sample median (see Appendix C for further details on the risk aversion score). *Wants to Start a New Business* is a dummy variable =1 if at baseline the respondent reported that s/he or someone in the household wants to start a new business in the following twelve months. *Wants to Hire New Workers* is a dummy variable =1 if at baseline the respondent reported that s/he or someone in the household wants to hire new workers for a household business in the following twelve months. *Entrepreneurship Index* is the first principal component of the variables *Profit per Worker*, *Risk Averse*, *Wants to Start a New Business*, and *Wants to Hire New Workers*. *Transfers or Loans Given* is the total monetary value (in USD PPP) of any cash or in-kind informal transfers and any loans that the respondent's household gave to others over the 12 months preceding the survey, standardized by subtracting the sample mean and dividing by the sample standard deviation. All control variables are defined at baseline; for further details on their construction see Appendix C.

TABLE A.16: DESCRIPTIVES ON VOUCHER USE (PROGOTI)

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Mean | Std. dev. | Min | Max | Obs. |
| Use any voucher | 0.694 | 0.461 | 0 | 1 | 432 |
| *Conditional on using at least one voucher:* | | | | | |
| Use first voucher only | 0.260 | 0.439 | 0 | 1 | 300 |
| Use first and second voucher | 0.740 | 0.439 | 0 | 1 | 300 |
| Month of first voucher use | 3.537 | 2.081 | 1 | 12 | 300 |
| *Conditional on using both vouchers:* | | | | | |
| Use vouchers consecutively | 0.212 | 0.409 | 0 | 1 | 222 |
| Months between first and second voucher use | 2.766 | 1.680 | 1 | 9 | 222 |
| Use vouchers in months 1 and 2 | 0.036 | 0.187 | 0 | 1 | 222 |
| Month of second voucher use | 5.851 | 2.251 | 2 | 12 | 222 |

**Notes:** The table presents summary statistics on the use of the repayment vouchers among the Progoti clients. The sample includes Progoti clients in treatment branches who accepted the offer to borrow under the flexible contract. Data comes from BRAC's administrative records collected at endline (2017).

## TABLE A.17: HETEROGENEITY W.R.T. EDUCATION, PROGOTI

| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| | Business owner | Revenues (annual) | Costs (annual) | Profits (annual) | Profits (month) |
| **Panel A: Baseline specification** | | | | | |
| Treatment | 0.00 | -37143.69 | -48099.82* | -1379.79 | -138.31 |
| | (0.02) | (27568.88) | (24678.66) | (1179.78) | (97.25) |
| | [0.93] | [0.26] | [0.08]* | [0.32] | [0.20] |
| Treatment × High schooling | -0.01 | 77929.20** | 61937.31 | 2717.09* | 234.65 |
| | (0.02) | (38384.17) | (37925.80) | (1605.33) | (142.86) |
| | [0.69] | [0.05]* | [0.10]* | [0.14] | [0.13] |
| Observations | 2854 | 2854 | 2854 | 2854 | 2854 |
| Mean in control | 0.89 | 167910.51 | 168519.40 | 13521.57 | 1101.98 |
| Treatment effect with high schooling | -0.01 | 40785.51 | 13837.48 | 1337.30 | 96.34 |
| | (0.02) | (25636.03) | (24750.67) | (1183.15) | (108.49) |
| **Panel B: Controlling for Land ownership** | | | | | |
| Treatment | 0.01 | -32569.84 | -41409.23 | -1342.72 | -139.67 |
| | (0.02) | (32701.51) | (27977.14) | (1398.65) | (114.91) |
| | [0.69] | [0.40] | [0.15] | [0.41] | [0.27] |
| Treatment × High schooling | -0.01 | 79998.73** | 64297.83* | 2774.84* | 234.08 |
| | (0.02) | (36799.80) | (37261.22) | (1561.77) | (140.23) |
| | [0.74] | [0.05]** | [0.09]* | [0.11] | [0.12] |
| Treatment × Large land owner | -0.02 | -12272.71 | -16442.66 | -190.68 | 3.53 |
| | (0.02) | (37015.43) | (42476.40) | (1402.06) | (153.53) |
| | [0.47] | [0.75] | [0.71] | [0.92] | [0.98] |
| Observations | 2854 | 2854 | 2854 | 2854 | 2854 |
| Mean in control | 0.89 | 167910.51 | 168519.40 | 13521.57 | 1101.98 |
| Treatment effect with high schooling | 0.00 | 47428.89* | 22888.60 | 1432.12 | 94.42 |
| | (0.02) | (27044.73) | (32004.64) | (1231.92) | (105.65) |
| **Panel C: Controlling for Household income** | | | | | |
| Treatment | 0.00 | -32549.62 | -33870.68 | -2440.65* | -199.97* |
| | (0.03) | (34216.48) | (32573.13) | (1231.84) | (112.17) |
| | [0.91] | [0.44] | [0.33] | [0.03]** | [0.04]** |
| Treatment × High schooling | -0.01 | 83509.22** | 68736.13* | 2713.43* | 253.90* |
| | (0.02) | (39000.45) | (39504.99) | (1446.70) | (126.98) |
| | [0.74] | [0.04]** | [0.07]* | [0.07]* | [0.05]* |
| Treatment × High household income | -0.01 | -16978.01 | -37169.77 | 1956.38 | 90.93 |
| | (0.02) | (40020.21) | (43601.58) | (1729.96) | (166.72) |
| | [0.82] | [0.69] | [0.43] | [0.23] | [0.57] |
| Observations | 2854 | 2854 | 2854 | 2854 | 2854 |
| Mean in control | 0.89 | 167910.51 | 168519.40 | 13521.57 | 1101.98 |
| Treatment effect with high schooling | -0.00 | 50959.60** | 34865.45 | 272.78 | 53.93 |
| | (0.02) | (21376.30) | (22863.67) | (938.00) | (85.27) |

**Notes:** The table presents the heterogeneity of the treatment effects on key business outcomes of eligible Progoti borrowers. Data comes from the midline (2016) and endline (2017) surveys. All regressions control for the baseline (2015) value of the outcome, an indicator variable for the endline survey, district (randomization strata) fixed effects and the relevant covariate (that is interacted with the treatment indicator in each panel). "Treatment" is a dummy variable equal to 1 if the respondent was based in one of the treatment branches where BRAC introduced the flexible loan contract and offered it to the eligible clients. Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. "High schooling" is a dummy variable =1 if the respondent's years of schooling at baseline was above the sample median. "Large land owner" is a dummy variable =1 if the size of land owned by the respondent's household at baseline was greater than the sample median. "High household income" is a dummy variable =1 if the total labor incomed earne by members of the respondent's household at baseline was above the sample median. Description of the dependent variables are provided in Appendix C.

## A.3 Additional Results on Selection

TABLE A.18: BASELINE BALANCE TEST FOR SELECTION EFFECTS

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Treatment | 0.013 | 0.012 | 0.015 | 0.016 | 0.014 | 0.014 | 0.013 | 0.018 | 0.014 |
| | (0.014) | (0.014) | (0.021) | (0.015) | (0.014) | (0.014) | (0.014) | (0.022) | (0.014) |
| | [0.484] | [0.510] | [0.635] | [0.408] | [0.470] | [0.468] | [0.488] | [0.576] | [0.472] |
| Treatment × profit per worker | | -0.012 | | | | | | -0.014 | |
| | | (0.010) | | | | | | (0.010) | |
| | | [0.248] | | | | | | [0.168] | |
| Treatment × Risk averse | | | -0.003 | | | | | -0.004 | |
| | | | (0.028) | | | | | (0.028) | |
| | | | [0.942] | | | | | [0.903] | |
| Treatment × Wants to start a new business | | | | -0.045 | | | | -0.047 | |
| | | | | (0.044) | | | | (0.046) | |
| | | | | [0.371] | | | | [0.369] | |
| Treatment × Wants to hire new workers | | | | | -0.007 | | | -0.001 | |
| | | | | | (0.033) | | | (0.033) | |
| | | | | | [0.825] | | | [0.970] | |
| Treatment × Entrepreneurship Index | | | | | | -0.007 | | | -0.008 |
| | | | | | | (0.010) | | | (0.010) |
| | | | | | | [0.499] | | | [0.452] |
| Treatment × Size of land owned | | | | | | | 0.011 | 0.013 | 0.011 |
| | | | | | | | (0.017) | (0.017) | (0.017) |
| | | | | | | | [0.436] | [0.305] | [0.439] |
| Observations | 3504 | 3504 | 3504 | 3504 | 3504 | 3504 | 3504 | 3504 | 3504 |
| Mean in control | 0.098 | 0.098 | 0.098 | 0.098 | 0.098 | 0.098 | 0.098 | 0.098 | 0.098 |

**Notes:** The table shows the results of estimating specification (3) where the dependent variable is having taken any BRAC loan in the last 12 months for the business. The sample is limited to baseline observations. Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. *Profit per Worker* is the baseline level of the profit of the business over the last twelve months divided by the number of workers (regular, casual and unpaid), including the business owner, at baseline. The variable is then standardized by subtracting the sample mean and dividing by the sample standard deviation. *Risk Averse* is a dummy variable taking the value of one if the respondent's risk aversion score is greater than or equal to the sample median (see Appendix C for further details on the risk aversion score). *Wants to Start a New Business* is a dummy variable =1 if at baseline the respondent reported that s/he or someone in the household wants to start a new business in the following twelve months. *Wants to Hire New Workers* is a dummy variable =1 if at baseline the respondent reported that s/he or someone in the household wants to hire new workers for a household business in the following twelve months. *Entrepreneurship Index* is the first principal component of the variables *Profit per Worker*, *Risk Averse*, *Wants to Start a New Business*, and *Wants to Hire New Workers*. *Size of Land Owned* is the amount of land owned by the household (excluding the homestead) at baseline, standardized by subtracting the sample mean and dividing by the sample standard deviation.

## TABLE A.19: SELECTION EFFECTS, CONTROLLING FOR AGE AND SCHOOLING

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Treatment | 0.003 | 0.003 | 0.023* | -0.003 | -0.001 | 0.002 | 0.004 | 0.008 | 0.003 |
| | (0.010) | (0.010) | (0.012) | (0.010) | (0.010) | (0.010) | (0.010) | (0.022) | (0.011) |
| | [0.735] | [0.773] | [0.098]* | [0.787] | [0.915] | [0.793] | [0.662] | [0.721] | [0.797] |
| Treatment × profit per worker | | 0.004 | | | | | | 0.028** | |
| | | (0.007) | | | | | | (0.013) | |
| | | [0.598] | | | | | | [0.000] | |
| Treatment × Risk averse | | | -0.039*** | | | | | -0.026 | |
| | | | (0.014) | | | | | (0.028) | |
| | | | [0.014] | | | | | [0.350] | |
| Treatment × Wants to start a new business | | | | 0.091*** | | | | 0.102* | |
| | | | | (0.029) | | | | (0.052) | |
| | | | | [0.013] | | | | [0.072] | |
| Treatment × Wants to hire new workers | | | | | 0.047 | | | 0.029 | |
| | | | | | (0.034) | | | (0.060) | |
| | | | | | [0.160] | | | [0.658] | |
| Treatment × Entrepreneurship Index | | | | | | 0.029*** | | | 0.029** |
| | | | | | | (0.008) | | | (0.013) |
| | | | | | | [0.000] | | | [0.056] |
| Treatment × Size of land owned | | | | | | | 0.028*** | 0.003 | 0.005 |
| | | | | | | | (0.008) | (0.012) | (0.012) |
| | | | | | | | [0.004] | [0.828] | [0.741] |
| Treatment × age | 0.003 | 0.003 | 0.005 | 0.004 | 0.004 | 0.006 | 0.003 | 0.016 | 0.018 |
| | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) | (0.011) | (0.012) |
| | [0.746] | [0.763] | [0.648] | [0.714] | [0.670] | [0.586] | [0.779] | [0.238] | [0.184] |
| Treatment × age-squared | 0.009 | 0.009 | 0.009 | 0.009 | 0.009 | 0.010 | 0.008 | 0.001 | 0.000 |
| | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.007) | (0.008) |
| | [0.242] | [0.239] | [0.224] | [0.236] | [0.234] | [0.212] | [0.268] | [0.906] | [0.978] |
| Treatment × years of schooling | -0.006 | -0.006 | -0.006 | -0.007 | -0.006 | -0.008 | -0.009 | -0.033** | -0.030** |
| | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.009) | (0.014) | (0.014) |
| | [0.588] | [0.556] | [0.546] | [0.514] | [0.557] | [0.437] | [0.396] | [0.030] | [0.037] |
| Observations | 6580 | 6580 | 6580 | 6580 | 6580 | 6580 | 6580 | 2103 | 2103 |
| Mean in control | 0.108 | 0.108 | 0.108 | 0.108 | 0.108 | 0.108 | 0.108 | 0.056 | 0.056 |

**Notes:** The table shows the results of estimating specification (3) where the dependent variable is having taken any BRAC loan in the last 12 months for the business. Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. *Profit per Worker* is the baseline level of the profit of the business over the last twelve months divided by the number of workers (regular, casual and unpaid), including the business owner, at baseline. The variable is then standardized by subtracting the sample mean and dividing by the sample standard deviation. *Risk Averse* is a dummy variable taking the value of one if the respondent's risk aversion score is greater than or equal to the sample median (see Appendix C for further details on the risk aversion score). *Wants to Start a New Business* is a dummy variable =1 if at baseline the respondent reported that s/he or someone in the household wants to start a new business in the following twelve months. *Wants to Hire New Workers* is a dummy variable =1 if at baseline the respondent reported that s/he or someone in the household wants to hire new workers for a household business in the following twelve months. *Entrepreneurship Index* is the first principal component of the variables *Profit per Worker*, *Risk Averse*, *Wants to Start a New Business*, and *Wants to Hire New Workers*. *Size of Land Owned* is the amount of land owned by the household (excluding the homestead) at baseline, standardized by subtracting the sample mean and dividing by the sample standard deviation. All control variables are defined at baseline; for further details on their construction see Appendix C.

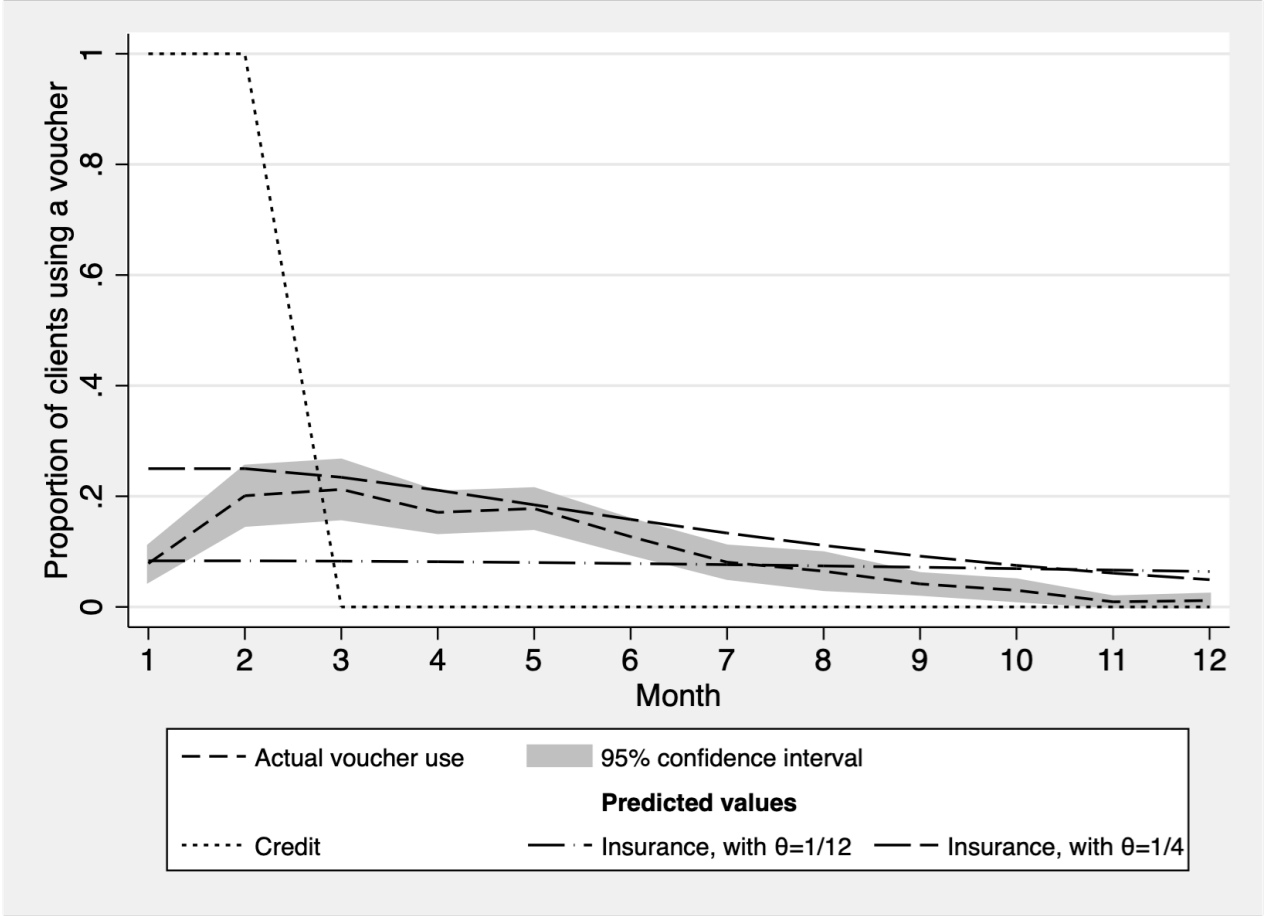
## TABLE A.20: SELECTION EFFECTS, BY PAST BORROWING STATUS

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| **Panel A: Past Borrowers** | | | | | | | | | |
| Treatment | 0.013 | 0.018 | 0.038** | 0.013 | 0.015 | 0.017 | 0.019 | 0.026 | 0.018 |
| | (0.011) | (0.013) | (0.016) | (0.014) | (0.015) | (0.013) | (0.013) | (0.018) | (0.013) |
| Treatment × profit per worker | | 0.000 | | | | | | -0.004 | |
| | | (0.009) | | | | | | (0.009) | |
| Treatment × Risk averse | | | -0.038** | | | | | -0.033* | |
| | | | (0.018) | | | | | (0.018) | |
| Treatment × Wants to start a new business | | | | 0.081** | | | | 0.073* | |
| | | | | (0.038) | | | | (0.039) | |
| Treatment × Wants to hire new workers | | | | | 0.044 | | | 0.038 | |
| | | | | | (0.040) | | | (0.040) | |
| Treatment × Entrepreneurship Index | | | | | | 0.026*** | | | 0.024*** |
| | | | | | | (0.009) | | | (0.009) |
| Treatment × Size of land owned | | | | | | | 0.031*** | 0.029*** | 0.028*** |
| | | | | | | | (0.008) | (0.009) | (0.009) |
| Observations | 6580 | 4477 | 4477 | 4477 | 4477 | 4477 | 4477 | 4477 | 4477 |
| Mean in control | 0.108 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 |
| **Panel B: Never Borrowed** | | | | | | | | | |
| Treatment | 0.013 | -0.001 | 0.012 | -0.008 | -0.004 | 0.000 | -0.002 | 0.005 | 0.000 |
| | (0.011) | (0.012) | (0.023) | (0.013) | (0.011) | (0.012) | (0.012) | (0.023) | (0.012) |
| | [0.356] | [0.947] | [0.636] | [0.632] | [0.766] | [0.978] | [0.891] | [0.851] | [0.979] |
| Treatment × profit per worker | | 0.023* | | | | | | 0.024* | |
| | | (0.014) | | | | | | (0.014) | |
| | | [0.000] | | | | | | [0.000] | |
| Treatment × Risk averse | | | -0.024 | | | | | -0.022 | |
| | | | (0.028) | | | | | (0.028) | |
| | | | [0.390] | | | | | [0.439] | |
| Treatment × Wants to start a new business | | | | 0.098* | | | | 0.095* | |
| | | | | (0.052) | | | | (0.052) | |
| | | | | [0.079] | | | | [0.090] | |
| Treatment × Wants to hire new workers | | | | | 0.029 | | | 0.018 | |
| | | | | | (0.059) | | | (0.062) | |
| | | | | | [0.659] | | | [0.794] | |
| Treatment × Entrepreneurship Index | | | | | | 0.025* | | | 0.025* |
| | | | | | | (0.013) | | | (0.013) |
| | | | | | | [0.096] | | | [0.093] |
| Treatment × Size of land owned | | | | | | | 0.001 | -0.003 | -0.001 |
| | | | | | | | (0.013) | (0.013) | (0.013) |
| | | | | | | | [0.968] | [0.864] | [0.969] |
| Observations | 6580 | 2103 | 2103 | 2103 | 2103 | 2103 | 2103 | 2103 | 2103 |
| Mean in control | 0.108 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 | 0.056 |

**Notes:** The table shows the results of estimating specification (3) where the dependent variable is having taken any BRAC loan in the last 12 months for the business. In Panel A, the sample is restricted to SME-owners with past borrowing experience; while in Panel B the sample is restricted to SME-owners who never borrowed before. Standard errors are clustered at the BRAC branch office level (* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$). Randomization inference $p$-values of the null hypothesis of no effect are provided in square brackets. *Profit per Worker* is the baseline level of the profit of the business over the last twelve months divided by the number of workers (regular, casual and unpaid), including the business owner, at baseline. The variable is then standardized by subtracting the sample mean and dividing by the sample standard deviation. *Risk Averse* is a dummy variable taking the value of one if the respondent's risk aversion score is greater than or equal to the sample median (see Appendix C for further details on the risk aversion score). *Wants to Start a New Business* is a dummy variable =1 if at baseline the respondent reported that s/he or someone in the household wants to start a new business in the following twelve months. *Wants to Hire New Workers* is a dummy variable =1 if at baseline the respondent reported that s/he or someone in the household wants to hire new workers for a household business in the following twelve months. *Entrepreneurship Index* is the first principal component of the variables *Profit per Worker*, *Risk Averse*, *Wants to Start a New Business*, and *Wants to Hire New Workers*. *Size of Land Owned* is the amount of land owned by the household (excluding the homestead) at baseline, standardized by subtracting the sample mean and dividing by the sample standard deviation.

# B Appendix Figures

FIGURE B.1: VOUCHER USE (PROGOTI)




*Notes:* The figure plots the timing of actual and predicted repayment voucher use for Progoti clients. The sample includes Progoti clients in treatment branches who accepted the offer to borrow under the flexible contract. The 95% confidence interval around the actual voucher use is constructed using bootstrapped standard errors clustered at the BRAC branch office level following Imbens and Kolesár (2016). Data comes from BRAC's administrative records collected at endline (2017).

# C List of variables

- *Age* – A continuous variable corresponding to the respondent's age in years.
- *Borrower No Longer with BRAC* – A dummy variable taking the value of one if the client has repaid the loan and not taken out a new one (as opposed to having a current loan or having defaulted).
- *BRAC Loan Value* – It is a continuous variable corresponding to the amount (in USD PPP) of the loan taken from BRAC, as recorded in BRAC's administrative records.
- *Business Assets* – The monetary value (in USD PPP) of business assets (tools, machinery, furniture, vehicle, site and inventories) at the time of the survey.
- *Business Hours* – Respondents were asked to report how many hours on a typical day the enterprise operates, how many days in a typical month the enterprise operates and how many months over the last twelve months the enterprise operates. The variable combines these three pieces of information to calculate the number of hours that the enterprise worked over the last twelve months.
- *Business Owner* – A dummy variable equal to one if the respondent owns a business.
- *Consumption per capita* – The monetary value (in USD PPP) of the total household expenditure per capita (in PPP USD) over the last twelve months divided by the household size. Expenditure is the sum of the household's yearly consumption on food and on non-food items. Household per capita yearly food consumption is imputed from previous week's recall. The household's non-food expenditure includes the following items: (a) imputed from previous month's recall: liquid fuel, electricity, transportation costs, cosmetics/toiletries, salary of

maid, entertainment costs; (b) imputed from previous year's recall: clothes, shoes, household utensils, furniture, materials for ritual ceremonies, dowry, education costs.

- *Costs* – The monetary value (in USD PPP) of the total amount the enterprise spent on personnel expenses, machines, tools, equipment, space, transportation, electricity, fuel for machines, and total purchase of stock over the last twelve months.

- *Default* – A dummy variable taking the value of one if the client is categorized as not having repaid the loan by the end of the loan cycle.

- *Entrepreneurship Index* – It is the first principal component of the variables *Profit per Worker*, *Risk Averse*, *Wants to Start a New Business*, and *Wants to Hire New Workers*.

- *Full Loan Not Repaid Within 8 (24) [52] Weeks* – A dummy variable taking the value of one if the borrower did not repay the full loan by the second (sixth) [twelfth] month after the end of the loan cycle. For eligible clients in treatment branches, the end of the loan cycle is computed starting two months after the expected last collection date; in control branches from the expected last collection date. For example, if the loan cycle lasted one year, in treatment branches the full loan cycle needed to be repaid by the 14th month, while in control branches by the 12th month. The variable is created by looking at the difference between the last collection date and the expected last collection date, computed using the duration of the loan and the disbursement date.

- *High expected demand uncertainty* – A dummy variable taking the value of one if the respondent is located in a BRAC branch where the average coefficient of variation (CV) of expected sales growth among the representative sample of SMEs at baseline was high (above the sample median). Respondents in the SME sample were asked to report the probabilities that they assign to the following events occurring in the

next 2 years: (i) their sales will grow by at least 20%, (ii) their sales will grow by 0-20%, (iii) their sales will remain unchanged, (iv) their sales will be lower by 0-20%, (v) their sales will decrease by more than 20% in the next two years. For (i) and (iv), we impute the expected growth rate to be $\pm 40\%$. Based on this informaton, we calculate the CV of expected sales growth for each individual SME-owner as the ratio of the standard deviation divided by the mean expected demand growth rate. We then take the average CV within a branch at baseline. Branches with above-median average CV are classified as *high expected demand uncertainty* branches.

- *Household Income* – The monetary value (in USD PPP) of the household members' total earnings from wage-employment over the past 12 months and the profit(s) of any household business(es) operated by the household.

- *Household Size* – It is a continuous variable corresponding to the number of respondent's household members.

- *Identified in BRAC Administrative Records* – A dummy variable taking the value of one if the survey respondent is also identified in BRAC administrative records.

- *Land Owner* – A dummy variable taking the value of one if the household owns any land (excluding the homestead).

- *Net Borrowing or Transfers* – The monetary value (in USD PPP) of net borrowing (loans borrowed minus loans lent) and net tranfers (tranfers received minus transfers given) combined.

- *Non-BRAC Loan* – A dummy variable taking the value of one if the respondent or anyone in the household has ever taken out any loans from other MFIs than BRAC, informal money-lenders or relatives and friends over the last twelve months.

- *Non-BRAC Loan Value* – The monetary value (in USD PPP) of all formal and informal loans taken from other lenders (banks, MFIs other than BRAC, informal money-lenders or relatives and friends) during the past 12 months.
- *Non-Business Assets Value* – The monetary value (in USD PPP) of durable non-business assets owned by the respondent's household at the time of the survey.
- *Number of Workers* – Number of workers (other than household members) who work in the business on a typical working day.
- *Owner's Business Hours* – Respondents were asked to report how many hours they worked for the business in a typical day, how many days they worked in a typical month, and how many months they worked over the last twelve months. The variable combines these three pieces of information to calculate the number of hours that the respondent said she worked in the business over the last twelve months.
- *Patience* – Respondents were asked to make hyothetical choices about timing of receiving different sums of money. Example of this are "Would you rather choose to receive 500 TAKAs tomorrow or [equal or higher values] TAKAs in one month?". *Patience* ranges between 1 and 7 with 1 indicating low patience (i.e. high discount rate) and 7 indicating high patience (low discount rate).
- *Profits (annual)* – Respondents were asked what was the total profit of the business over the last twelve months.
- *Profits (month)* – Respondents were asked what was the total profit of the business over the last month.
- *Profit per Worker (at baseline)* – the baseline level of the profit of the business over the last twelve months divided by the number of workers,

including the business owner, at baseline. The variable is then standardized by subtracting the sample mean and dividing by the sample standard deviation.

- *Rain shock* – A dummy variable taking the value of one if the amount of rainfall in the months of December to May preceding the midline or endline survey (2016 or 2017) was one standard deviation above rainfall in December to May over the period 1983-2015. The geographical area over which the rainfall amount was calculated corresponds to a 25 km radius around the branch where the firm is located.

- *Range of Revenues* – Respondents were asked if their sales varied throughout the year. If they said 'Yes', they were asked to report the worst month in terms of sales and their level of revenues during this month; and which was the best month and their level of revenues during that month. Based on this information, we calculate the range of revenues as the value of sales in the highest month minus the value of sales in the lowest month. If they said 'No', the range of revenues is set equal to zero.

- *Risk Averse* – A dummy variable taking the value of one if the respondent's risk aversion is greater than or equal to the sample median at baseline. For the eligible Dabi borrower sample, this corresponds to the highest risk aversion score so *Risk Averse* is equal to 1 if the respondent always prefers the safe option, no matter how high the expected value of the lottery is.

- *Risk Aversion* – Respondents were asked to make a hypothetical choice about getting a sure amount of money (500 TAKAs) or enter a lottery where with 50% probability they get 0 and with 50% probability they get an amount $y \geq 1000$ TAKAs. This is repeated six times: each time the amount won in the lottery increases by 500 TAKAs. *Risk Aversion* ranges between 0 and 6. It is equal to 0 for respondents who choose the

lottery in the first choice (when expected value of the safe option and the lottery are equal), 1 for respondents who choose the lottery in the second choice but not in the first choice, 2 for respondents who choose the lottery in the third but not in the second or first choice etc.

- *Revenues* – The monetary value (in USD PPP) of sold products or delivered services of the business over the last twelve months.
- *Schooling* – It is a continuous variable corresponding to the number of years of schooling completed by the respondent.
- *Size of Land Owned* – The size of land owned by the respondent's household (in decimals) summing over amount of owned land that is cultivated by the household, used as pond, mortgaged out, rented out, or given for production sharing.
- *Transfers or Loans Given* – The monetary value (in USD PPP) of any cash or in-kind informal transfers and any loans that the respondent's household gave to others over the last 12 months.
- *Transfers Received* – The monetary value (in USD PPP) of any cash or in-kind informal transfers that the respondent's household received over the last 12 months.
- *Wants to Hire New Workers* – A dummy variable taking the value of one if the respondent or someone in the household wants to hire new workers in the following twelve months.
- *Wants to Start a New Business* – A dummy variable taking the value of one if the respondent or someone in the household wants to start a new business in the following twelve months.