MICROFINANCE AND DIVERSIFICATION*

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Abstract

The bulk of the world's extreme poor live in rural areas and work in subsistence agriculture. Diversification out of this activity is often seen as the *sine qua non* of economic development. We evaluate whether the randomized roll-out of a mainstay development intervention - microfinance - into poor, agricultural and largely unbanked populations in rural Uganda exerts any influence on diversification into non-agricultural labor market activities. The new microfinance product differs from existing sources of formal and informal credit in that it allows households to borrow larger amounts but has inflexible repayment dates and the use of funds is monitored. We find that the arrival of microfinance enables women to diversify out of agricultural production and into non-agricultural labor market activities such as small-scale trading. This low-level structural change, however, is not transformative in that it does not lead - at least after two years - to significant uplifts in earnings, consumption, savings, investment and overall wealth. *JEL: G51, O16.*

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1 Introduction

If we look across the world we see that the bulk of the extreme poor (those living on less than $1.90 a day) are in the rural areas Africa and South Asia and work mainly in subsistence agriculture (World Bank 2021). Their poverty belies both a lack of both physical and human capital and a low return to their labor. In addition they suffer from a host of idiosyncratic and aggregate shocks stemming from climate, pests and health of persons and livestock.

In this setting the focus of policy falls naturally on how to encourage diversification out of subsistence agriculture into higher return and more stable labor market activities. Indeed when viewed through the lens of macroeconomic outcomes this is the *sine qua non* of the economic development process (Buera *et al.* 2021).

But how to encourage this process is less than clear. One key observation is that the extreme poor engaged in subsistence agriculture are typically rationed out of formal credit markets and tend to rely on informal transfers and credit, that while flexible, are small scale and essentially focused on insurance purposes (Udry 1994). These are useful for smoothing consumption but may have limited leverage in terms of changing employment and production activities (Balboni *et al.* 2021). Part of the problem here is that the low, variable and infrequent returns that characterize subsistence agriculture are not attractive to formal lenders. Therefore it is the agriculturally engaged extreme poor who are most in need of diversification yet are also the least able to avail themselves of formal finance.

It is in this context that the promise of microfinance shines through. It has become a cornerstone of development interventions from NGOs and government precisely because it is seen as capable of reaching and providing finance to the poorest, offering them large enough loans with the aim of pushing forward productive investments that can help them diversify out of subsistence agriculture and pull them out of poverty (Banerjee and Duflo 2011, Banerjee *et al.* 2015a). As Buera *et al.* (2020) report, between 1997 and 2013, access to microfinance grew by 19% a year, with the Microcredit Summit Campaign reporting over 3000 microfinance institutions serving over 200 million borrowers as of 2016.

Has microfinance fulfilled this promise? We contribute to this question by evaluating the randomized roll-out of a microfinance product across Ugandan villages where close to 50% of our study population is below the $1.90 extreme poverty cut-off and over 80% are engaged in subsistence agriculture. It is also a setting where there has been limited penetration of formal financial institutions. It is thus fairly archetypal of rural settings across Africa where the remaining extreme poor in the world are becoming concentrated (Page and Pande 2018).

Given that these low structural change settings are amongst the most difficult for microfinance institutions to penetrate it is an interesting and important question to discover whether these products can engender diversification out of agriculture and improve welfare.

To answer this question we evaluate the entry of a new group-based microfinance product into

rural villages in Western Uganda, by the NGO BRAC. This product was innovated in Bangladesh (where BRAC is one of the top three providers of microfinance as measured by number of borrowers) and has been adapted for use in Uganda. Between BRAC's entry in 2006 and our endline in 2014 BRAC became the largest provider of microfinace not just in Uganda but in Sub-Saharan Africa as a whole. BRAC microfinance groups comprise women-only borrowers. We measure impacts on labor activities, earnings, consumption, savings, investment and a proxy for overall welfare in a sample tracking 4000 women over a two-year period, using a randomized control trial where half the villages are randomized to receive the new microfinance product.

The BRAC microfinance product, which now forms the backbone of BRAC operations across Africa, was designed to encourage diversification. The loan sizes are large relative to other available credit sources in rural Uganda and are intended to enable women micro-entrepreneurs to begin or expand non-agricultural labor market activities. To qualify for loans borrowers are supposed to demonstrate that the proposed investment is viable and will generate weekly repayments. There is also some monitoring of the use of the loan after it is granted. Thus though the BRAC microfinance product shares many features of other products in terms of targeting women micro-entrepreneurs, group lending, absence of collateral requirements and frequent and inflexible repayment schedules, what sets it apart are the magnitude of the loans, the screening requirements and the monitoring of loan use (see Table A1).

Our first stage of analysis considers households engagement in credit transactions pre-intervention, and the pre-existing credit sources available to households. Unsurprisingly we find that informal borrowing is far more prevalent as expected: 24% of households report having borrowed from some informal source. Households are as likely to borrow from family/friends and they are to borrow from local savings cooperatives. In contrast, 5% of households report ever having borrowed from some formal source – such as a bank, another microfinance institution or NGO. At the same time we find households have potential access to a wide variety of informal and formal sources, each with differing contractual structures. Multiple sources of credit can coexist in the same village economy if households vary in their demand for credit in terms of the amounts demanded, flexibility of repayments etc. Microfinance – with its inflexible repayment structures – is not well suited for those solely engaged in agriculture given earnings streams tend to be volatile and bunched at certain times of the year. Hence the focus of BRAC and other MFIs is on credit provision targeting microentrepreneurship.

This has two implications for our analysis. First, the entry of BRAC into these credit markets represents evaluating the impact of increased access to microcredit, not the impact of introducing microcredit altogether. To the extent to which BRAC microcredit simply causes households to substitute away from pre-existing credit sources that offer similar terms, this reduces the *net* economic impacts of BRAC microloans between treated and control villages. Second, comparing credit product characteristics, we should expect non-random selection into BRAC microfinance groups and the take-up of the offer of credit. More precisely we expect those women who choose

to borrow from BRAC rather than other sources to be positively selected in that they demand more credit, but are willing to take on such loans despite the inflexible timing of repayment and higher interest rates.

We present intent-to-treat estimates on women in treated villages, and treatment-on-the-treated estimates for BRAC borrowers (suitably caveated given the potential existence of within village spillovers from the entry of BRAC, and the potential for heterogeneous treatment effects).

On diversification in labor activities, we document ITT and TOT effects showing women diversify away from self-employment in agriculture towards self-employment in non-agricultural work. On the extensive margin there is a greater propensity of women borrowers to be engaged in non-agricultural labor market activities showing that the program was successful in encouraging micro-entrepreneurship. This increase in non-agricultural labor market activity is accompanied by a decrease in agricultural labor market activity. On the intensive margin we also find that people spend significantly more hours working in non-agricultural activities. This is accompanied by a reduction in hours working in agriculture so that the combined labor supply estimates across both activities suggest total labor supply of borrowers remains unchanged. The is in contrast to findings of studies of large scale asset transfer interventions (Bandiera *et al.* 2017) – where it is found that asset transfers lead to a reallocation of labor activities from agriculture to non-agricultural work but that the poor are also willing to supply more labor overall if given productive opportunities to do so.

Pre-intervention, around 20% of women engaged in some non-agricultural work, 45% are engaged in small-scale trading, and 17% own and run a shop or restaurant. Small-scale trading covers a whole range of activities such as door-to-door selling and selling food and beverages, textiles and clothing, agricultural inputs and other products in local markets. These are business activities that typically do not involve any physical structure nor employees. Shops and restaurants, in contrast, require a physical structure and may involve employees. We find BRAC borrowers tend to shift into exactly such small trade forms of non-agricultural employment, thus emulating activities that were already taking place in the village.

We document very imprecise (and statistically insignificant) treatment effects on women's earnings, either in aggregate or by labor activity, although BRAC borrowers are significantly more likely to generate positive earnings in non-agricultural work as they switch into such activities. The fact that earnings impacts even for non-agricultural labor activities remain imprecise might also be partly due to the concentration of women in non-agricultural activities in just a few types of work.

On credit transactions with non-BRAC sources, we find relatively precise null impacts on borrowing from these alternative sources. Hence BRAC microloans thus appear to be neither complements nor substitutes for other credit sources. This implies that perhaps women no longer remain credit constrained after having access to BRAC microloans, consistent with the scale of loans on offer being far larger than available from other credit sources. Reassuringly, the result

is also consistent with households not entering debt traps because they need to engage in further borrowing in order to pay off existing loans.

Our final set of outcomes consider how the patterns of economic diversification into non-agricultural labor activities translate into other economic aggregates related to consumption, savings, asset accumulation and welfare. We find null impacts on total and food consumption, although the point estimate on the value of food expenditure (including implicitly valuation of home produced food) is positive and large. Breaking down consumption into various components, we also find no precise impacts on discretionary spending, spending on durables, or spending on health or education. Nor do we find precise impacts on savings, asset accumulation or the overall wealth score of households, proxying their permanent income.

Our finding of effects on diversification but with no effects on welfare place the results of this study somewhere between the bulk of the microcredit literature (see Table A1 where we review 14 randomized evaluations) which finds effects on neither, and the big push asset and cash transfer programs that involve larger transfers and find effects on both (Blattman et. al. *et al.* 2017, Jack *et al.* 2016, Bandiera *et al.* 2017, Bari *et al.* 2021).

Our finding on diversification towards non-agricultural labor market activities runs counter to the main body of research on microfinance (Table A1). Of the fourteen papers we review in Table A1, only two find diversification into self employment (Attanasio *et al.* (2015) and Crépon *et al.* (2020)). Both studies, like ours study microfinance in a rural context, but in countries, Mongolia and Egypt, which are both approximately five times richer than Uganda in terms of GDP per capita. The Mongolia project also had a had much more developed credit market at baseline as evidenced by the large share of people borrowing from rural banks.

The small and null effects we find on welfare, however, are consistent with the main body of research focused on randomized evaluations of microfinance programs (see Table A1), that are also consistent with earlier non-randomized evaluations of microcredit (Morduch 1999). An established body of evidence of microfinance research reviewed in Table A1 finds small or marginal average treatment effects on business outcomes, the most common of which is the expansion of existing businesses. However these studies find that effects of microfinance rarely feed through into higher consumption, investment or permanently drawing households out of poverty (Banerjee 2013, Banerjee *et al.* 2015a). We show in Table A1 that even for papers which find improvements in welfare the results are not present across the full range of indicators. There is a consensus that, at least for the average borrower, these effects are not transformative, with meta analysis such as Meager (2019) concluding that for household business and consumption variables the effect of microfinance may be negligible. Explanations of why the intent-to-treat estimates in this literature have wide confidence intervals (that cannot rule out economically meaningful improvements in economic well being) – that also apply to our study – include low take up rates, heterogeneous treatment effects and the fact that monetary outcomes are often difficult to measure without error.

The remainder of the paper is organized as follows. Section 2 describes the microfinance

program, our data, design and empirical approach, and presents evidence on credit markets in these rural economies. Section 3 present our results on take-up, labor activities, earnings, credit, and economic aggregates. Section 4 concludes. The Appendix discusses research ethics.

2 Intervention, Data and Design

2.1 Context

The majority of developing countries rely on the agricultural sector as their chief source of labor market earnings. However, agricultural productivity remains low in many developing regions, especially in Sub Saharan Africa. Some persistent causes are low adoption rates of improved and high yielding seed varieties, and limited use of modern agricultural techniques (Evenson and Gollin 2003, World Bank 2008). Microfinance is likely to have limited impacts on easing such constraints related to market innovation and farmers' information sets. However, credit can aid households' movement out of poverty by enabling them to change labor activities on the extensive margin, switching effort and resources away from low return and volatile earnings streams in agriculture, towards forms of self-employment that are more capital intensive and potentially offer higher and more stable returns. This is the inherent process of structural change that lies at the core of the literature at the nexus of entrepreneurship, credit markets and economic development (Banerjee and Newman 1993, Buera *et al.* 2015, Bandiera *et al.* 2017).

Our study context – rural Uganda – remains largely unbanked and households have low rates of access to financial services, as in most other countries of Sub-Saharan Africa. According to a nationally representative survey conducted by FinScope-Uganda (2009), 71% of the population lacked access to bank or formal services in 2009. The same survey reported 43% of households met their financial needs from informal sources such as friends and relatives.

The rural credit market intervention we evaluate is implemented by BRAC, one of the largest microfinance and development organizations in the world. BRAC first started its operations in Bangladesh, and has now become established within East Africa and Uganda in particular, as a major provider of credit to rural households. BRAC initiated its microcredit program in Uganda in 2006, with a rapid within-country scale up to reach over $100,000$ households across more than 40 districts by 2010, just prior to our intervention (Sulaiman 2011). BRAC's credit market intervention is designed to facilitate micro-entrepreneurship among women, and thus targets women that are engaged in some form of income generating activity to begin with. The intervention purposefully aims to shift them away from subsistence agriculture by enabling them to either upscale agricultural production or to switch to more productive forms of income generation labor activity altogether. We examine the take up and economic impacts of the roll out of this program into rural villages in two districts in Western Uganda: Kabale and Rukungiri.

2.2 The Microfinance Program

The intervention is implemented at the village level and offers individual women large scale microloans, and then monitors their use to ensure they foster entrepreneurship and enable borrowers to diversity their earning sources. The program is implemented by BRAC loan officers, who were recruited specifically for the expansion of the microfinance product into these two districts in Western Uganda. Loan officers are tasked to form microfinance groups in villages within their program territory, discuss business ideas with clients and help them formulate business plans at the point of loan application. Post disbursement, their role involves periodically monitoring the actual use of funds, collecting weekly payments and following up clients who have not made repayments. Loan officers are paid a fixed monthly salary with a small bonus if they meet their disbursement and collection targets.

To select borrowers, BRAC uses a mix of survey and local consultations. After selection of a site, a census is conducted in all the villages located within the 4 km radius of the proposed BRAC branch location. In the household census, information about household assets and economic activities are gathered. This list of household of a village is presented to the Local Council Chairperson (an elected government representative present in each village) to categorize households into poor and non-poor using a variety of criteria such as holding of land and other assets using their deep local knowledge. Concurrently BRAC makes an assessment as to whether a particular village is a viable proposition for forming a microfinance group based on the depth of business activity, cash economy and connection to markets. Based on this categorization and the asset and business activity information, both villages and particular households within them are marked as target clients. Any household already participating in a credit program of other MFIs are considered ineligible.

Once the set of eligible households are identified, the BRAC staff convene a meeting of the female members of these households aged roughly between 20 and 50 years of age in the village, where she explains the credit programme. At this point BRAC encourages women involved in non-farm businesses to join the groups. If about 10 to 15 women express interest, they form a microcredit group in that village and these are then split into five member subgroups which meet on a weekly basis with the loan officer.

New members can join once a group is formed. The initial eligibility assessment is not strictly followed afterwards, meaning the non-eligible members can join if they want to and the existing members are willing to accept these new members. It is also possible that women residing in neighboring villages of treatment clusters could join groups, including those from control villages in our evaluation sample. Members are added in groups of five which means that microfinance groups end up comprising 15 to 25 members.

Loan sizes can range from $100 to over $1000: the average loan disbursed is $550. GDP per capita was around $800 in 2012, when we collected our baseline data. As we document later, the

available loan sizes from BRAC, however benchmarked, represent a potentially far larger big push injection of credit to households than is available from other sources in these village economies.

Group members can begin to apply for loans after having been to three consecutive weekly group meetings, conditional on having received support from everyone else in the five-member subgroup. Following application, the loan officer and BRAC branch manager conduct an enterprise visit when they physically observe the enterprise for which credit is being sought. They conduct a feasibility assessment of the loan amounts by collecting information on pre-loan sales and profitability of the existing business as well as other income sources. Loans then begin to be disbursed after four weeks of regular attendance in weekly group meetings. A BRAC loan officer will typically visit borrowers multiple times to check how businesses are running and whether the repayment schedule can be met. These issues are also discussed in the weekly meetings.

Loans are provided on either 20 or 40 week cycles, with large majority opting for the 40-week loans. Repayment schedules are frequent: repayments occur weekly (at weekly meetings of members), beginning the fortnight after the loan is disbursed.[1] Borrowers receive 90% of the approved loan and the remaining 10% is kept as a security deposit that they can withdraw at completion of repayment or adjust as security deposit of their subsequent loans. The annual effective interest rate is around 40%: while these are high relative to other sources of finance, the marginal returns to microenterprise expansion has also been documented to be very high in similar contexts in the literature on capital-drops to small and medium sized enterprises (McKenzie and Woodruff 2008, Fafchamps *et al.* 2014) although other studies find far more limited returns on the margin (Karlan and Zinman 2012, Berge *et al.* 2015). Finally, BRAC microcredit groups did not provide any savings service during the evaluation period.[2]

The loans offered are provided to individuals but group liability is enforced among five member subgroups. In practice, group liability tends to be primarily used as a mechanism through which to provide security and exert peer pressure to ensure repayment, and avoid social and political incentives distorting the allocation of credit (Maitra *et al.* 2017, 2021, Bandiera *et al.* 2021, Vera-Cossio 2021).[3]

[1]High repayment frequencies are usually explained by inducing fiscal discipline among borrowers, to overcome costs of monitoring borrowers actions (Jain and Mansuri 2003), or because borrowers have present-biased quasi-hyperbolic preferences (Fischer and Ghatak 2016). While we have no variation in contractual structures in our setting (beyond households taking loans for 20 or 40 weeks), a growing body of experimental work shows how variation in contractual structures can impact borrower behavior and outcomes. Feigenberg *et al.* (2013) show how increased frequency of repayment group meetings leads to a higher willingness of borrowers to pool risk with group members, and the returns to such social interactions can then provide an explanation for why group lending reduces default risk. Barboni and Agarwal (2018) show how added flexibility in terms of three-month blocks of repayment holidays chosen in advance attracts more financially disciplined borrowers, and leads to higher repayment rates and improved business outcomes. Battaglia *et al.* (2021) document how increased flexibility, in terms of providing borrowers the option to delay repayments for up to two months during any loan cycle – thus allowing them to more easily respond to shocks – leads to substantial improvements in borrower outcomes, driven by an increase in entrepreneurial risk taking.

[2]BRAC Uganda MFI was later converted into a microfinance bank allowing them to offer savings services.

[3]Ghatak and Guinnane (1999) provide a foundational review of the key mechanisms through which joint liability

Comparison to Other Studies To better understand where this microfinance product lies in the wider landscape of credit services evaluated in the literature, Table A1 compares various characteristics of our intervention and 14 others also mostly evaluated using randomized control trials. These include the 'first generation' RCTs before and including those discussed in Banerjee *et al.* (2015a) as well as a new group of evaluations from the last five years.

In Panel B we see overlap in the targeting of women micro-entrepreneurs and other eligibility criteria (such as minimum and maximum ages). In Panel C we see considerable overlap in other design features such as the use of group liability, high repayment frequencies, and inflexibly timed repayment structures. Some of these other interventions also require potential borrowers to formulate enterprise plans.

At the same time the BRAC model differs in several important ways. First, and as shown in Figure 1, loan sizes as a share of GDP per capita, are high: only those considered in Tarozzi *et al.* (2015) in Ethiopia are higher. Moreover, our context is one in which household incomes are low relative to the GDP per capita, so our sample is especially drawn from poorer households. This offers another potential reason to expect the BRAC microloans we evaluate to have the potential to enable women borrowers to diversity their economic activities.[4]

Second, loan officers monitor repayment performance and how loans are utilized and business investment increases. This might be important because close *ex post* monitoring makes the microcredit product more akin to forms of asset based microfinance and graduation programs, that have been documented to have larger impacts on economic outcomes than is typically found for microcredit interventions (Jack *et al.* 2016, Bandiera *et al.* 2017, Bari *et al.* 2021).

Third, in this agricultural setting where the focus in on finding non-agricultural businesses that can generate weekly repayments women who have prior experience in this area are more likely to be selected in. This might be important because microfinance has been documented to have larger impacts on women with prior business experience than those without businesses at baseline (Meager 2020).

2.3 Design

This study is part of a wider project on the determinants of household welfare and economic development in rural Uganda. As part of the project we evaluated two interventions across villages in

could improve repayment rates, and other work has highlighted the potential costs of joint liability (Banerjee *et al.* 1994, Besley and Coate 1995, Fischer 2013). More recently, de Quidt *et al.* (2016) develop and test of model on which lenders have lower transaction costs under group lending. Group lending constitutes the staple product offered by BRAC in other parts of Uganda: over 96% of the existing clients have such loans (Sulaiman 2011). The remaining clients are provided large scale business loans that require collateral.

[4]We can also derive a sense of where these products lie relative to the global microfinance market, not just where randomized control trials have taken place. Buera *et al.* (2020) use data from the MIX dataset, which provides comparable data from almost 3000 microfinance institutions in 123 countries (Microfinance Information Exchange 2017). The average loan per borrower is $768 in 2014, with the average loan corresponding to around 97% of GNI per capita.

rural Uganda: agricultural extension services and the provision of microfinance, using a 2×2 factorial design. The interventions are implemented entirely independently of each other. Microfinance is delivered by centrally located BRAC loan officers (while the agricultural extension program is implemented by locally recruited delivery agents in adjacent pairs of villages). For the purposes of this study, we do not utilize treatment arms involving the agricultural extension services. That intervention has been separately evaluated (Bandiera *et al.* 2021). Our current evaluation sample thus uses two of the four cells in the 2×2 factorial design. Random assignment takes place at the village level: 59 villages are randomly assigned as controls, and 62 villages are assigned the BRAC microcredit product.

Timeline Figure 2 shows the study timeline, indicating the agricultural cycle and timing of survey waves. We first conducted a census listing in all 121 villages in November/December 2011. Focusing on households where women were eligible to be part of a BRAC credit group, a sample of 4,092 households was drawn for our baseline survey fielded from May to July 2012 (corresponding to around 15% of households in each village). 2,076 households reside in treated villages, 2,016 reside in control. As the intervention targets women micro-entrepreneurs, we interview female heads of the household. The endline survey takes place two years later between April and May 2014. There are two six month cropping cycles per year in this region, and our baseline and endline surveys are timed to take place close to the end of the first cycle in each year.

Our research design and data collection are in line with the approach of earlier studies. For example, Panel D of Table A1 highlights that most studies use clustered randomized control trials (the exception being Augsburg *et al.* (2015) that exploited individual level randomization among marginal loan applicants), and the majority track a panel of households over time.

Balance and Attrition Table 1 shows balance on village characteristics. Villages are small, with around 215 households in each, thus magnifying any possible spillovers from borrowers to non-borrowers. In treated villages, the number of BRAC groups established is close to one (each with between 15 and 25 members). The average distance between treatment and control villages is just over one km. The two-way (time and monetary) cost of travelling this distance is not overly prohibitive. It is feasible for women micro-entrepreneurs to be willing to travel from control to treated villages in order to participate in BRAC credit groups, conditional on the gains from them so doing being sufficiently large. However, the cumulative costs of weekly travel to group meetings can be more severe and lead to a different selection into microcredit from those in treated and control villages.

On a continuous 0-100 household wealth score (where the index is constructed from ten underlying indicators, and 100 represents the highest possible level of wealth in this context), the average household wealth index is 54.

Table 2 shows balance on household characteristics: on the majority of dimensions the sam-

ples are well balanced (with any imbalances being of relatively small magnitude). Panel A shows that household heads are aged 42, with low levels of human capital: the majority did not complete primary school for example. Just under half the households are below the extreme poverty line, so residing on less than the equivalent of $1.90 per person per day. Hence even among this selected sample of potential microentrepreneurial borrowers, there are households residing in extreme economic hardship. Of course these factors mitigate against the offer of microfinance having transformative effects on the economic lives of eligible women: they might be risk averse due to residing close to subsistence and lack the skills necessary to start or expand a business.

Given microfinance is targeted to women, Panel B focuses on labor activities women engaged in the year prior to the baseline. As is common in village economies, they engage in multiple labor activities. In the split between agriculture and/or non-agricultural work, over 85% of women work in agriculture, with around 20% having some form of non-agricultural employment. Among women engaged in some form of work outside of agriculture, 45% are engaged in small-scale trading, and 17% own and run a shop or restaurant. In the split between self-employment and wage employment, again over 85% of women are self-employed (in either agriculture or non-agricultural work). Only 10% are wage workers, and these women are mostly engaged in non-agricultural work. Hence in terms of potential extensive margin impacts of the intervention, a key impact is whether women use credit to help finance a switch from agricultural work towards some form of non-agricultural employment. On the intensive margin, some borrowers might also use the credit to expand the scale of their current economic activities without changing sector.

In both cases, given frequent repayment rates, they would only be willing to do so if either the new investment financed by the microloan generated an immediate return, or they were willing to run down their stock of savings or reduce consumption in the transition before the returns to investment began to be realized. This is less likely to be the case for labour activities based on agriculture, where earning streams are often bunched at certain times of the year, and are volatile at those times of year, creating demand for short run liquidity for consumption smoothing (Casaburi and Willis 2018, Casaburi and Macchiavello 2019).

Panel C shows the relative importance of different economic activities in terms of actual earnings generated. Earnings are defined as the difference between revenues and input costs for self-employed women respondents, and so these can be negative. Total earnings are the sum of earnings from self employment and wages. Among those engaged in such activities, earnings from non-agricultural work are higher than those from agriculture. Across all income generating activities, total annual earnings for women are around $480. Hence the typical loan size taken of $550 is the equivalent of a one off injection of 115% of women's annual earnings, that is high in comparison to the figures for the global microfinance industry described in Buera *et al.* (2020).[5]

[5]Buera *et al.* (2020) report a comparison of loan sizes to household income (rather than recipient income). If we assume women in our context contribute half of household income, then the loan size is equivalent to 55% of household income. Buera *et al.* (2020) report that in 2014 the average loan size to income per capita had a median

To get a sense of the average returns to different labor activities, we note that in control villages, monthly hours devoted to agriculture are 94, while those devoted to non-agricultural work are 42. Hence the average hourly return is \$.18 for agriculture and more than twice as high at \$.48 for non-agricultural work. Of course women self-select into these activities so these average differentials do not reflect the counterfactual marginal return for new entrants. However, this comparison is consistent with the notion that returns to non-agricultural work are potentially higher than for agricultural work in this context, and at least some women would like to diversify labor activities into non-agricultural work given the opportunity to do so.

Finally, Panel D focuses on consumption and savings. In controls, annual consumption per capita (including the value of home production that mostly relates to own grown food) is $\$1,100$. Food consumption constitutes over 80% of the total value of consumption. The majority of households lack access to formal savings, with most retaining their in-kind and cash savings at home. The total stock of savings in controls is \$628, and total asset holdings are around $\$7,000$.[6]

Table A2 shows correlates of household attrition from baseline to the two-year endline. Attrition is relatively low over the study period (10%), but is weakly correlated to treatment: treated households are 3pp more likely to attrit than controls. However, we find no evidence of differential attrition by characteristics of households in treatment and control villages: the p-value on the joint significance of baseline household characteristics interacted with the treatment dummy is .718.

2.4 Credit Markets

To begin to understand how BRAC's entry could shape credit markets in these village economies, we describe: (i) the extent to which households already engage in credit transactions pre-intervention; (ii) the sources of credit available to households pre-BRAC entry.

On (i), Table 3 shows evidence on household engagement in credit markets. Panel A shows sources of borrowing, split between informal and formal sources. Informal borrowing is far more prevalent as expected: 24% of households report having borrowed from some informal source. Households are as likely to borrow from family/friends and they are to borrow from local savings cooperatives. In contrast, 5% of households report ever having borrowed from some formal source – including from another microfinance institution or NGO. Panel B shows that there is a small share of households that lend to others: credit is mostly provided to friends (13%), followed by family members (7%).

Along all dimensions of engagement in credit transactions, treatment and control households are well balanced.

of .27 and a 90/10 split of 1.51/0.06.

[6] Consumption expenditures are constructed from food consumed in the last seven days (including both purchased food and valuing home produced food), consumer non durables purchased in the last month, and consumer durables purchased in the last year (all converted into monthly expenditure amounts). Total asset value includes the value of all household assets which fall into the following categories: house, furniture, agricultural assets, business assets, transportation assets.

On (ii), Table 4 details various sources of credit in these village economics, split between semi-formal, informal and formal sources. For each source, the data comes from our baseline with the exception of details related to the BRAC microloan product. As that was introduced after the baseline survey, we use endline reports to characterize its product features. Given loan cycles are shorter than our two-year study period between baseline and endline, by endline around three quarters of borrowers are on their first or second loan cycle. The figures reported relate to their last loan from BRAC. At endline, the cumulative amount borrowed from BRAC amounts to just over $\$1,000$ for the average borrower.

The following key features of the BRAC product stand out relative to other credit sources.

First, the BRAC microloan enables households to borrow far larger amounts than are provided by other lenders (even formal ones that households obtain loans from): 6.5% of households in our sample report borrowing from BRAC at endline (from across treated and control villages), and the average amount borrowed is \$555. The next largest amounts borrowed are from other microfinance organizations (\$505, but from whom less than 0.6% of households report having borrowed from), formal banks (\$359, 0.8%) and private moneylenders (\$216, 1.5%). The amounts borrowed from friends and family are on average less than \$100.

To benchmark the amount available from the new BRAC product, we reiterate that it corresponds to 115% of the total annual earnings of women, six times the value of total monthly per capita consumption, or 88% of the stock of household savings at baseline. Moreover, there is wide variation in the amounts borrowed. Figure 3 shows the entire distribution of amounts borrowed from BRAC, and those for other major sources of credit. The two distributions have little common support. The amounts borrowed from BRAC range from \$200 to over $\$1,500$.

BRAC loans do not need require security: the group-based liability essentially takes the place of such requirements. On the other hand, repayment schedules are entirely inflexible with BRAC microloans, and the implied monthly interest rate reported by households is, at 2.27%, higher than those charged from a number of other sources. Unsurprisingly, private moneylenders charge the highest interest rate (5.41%). The extent to which these differences in monthly interest rates accumulate to differential annual interest rates is shown in the Column 9 of Table 4.[7]

Three points are of note.

First, these multiple sources of credit can coexist in the same village economy if households vary in their demand for credit in terms of the amounts demanded, flexibility of repayments, etc. Microfinance – with its inflexible repayment structures – is not well suited for those engaged in agriculture given earnings streams tend to be volatile and bunched at certain times of the year.

[7]These interest rates are derived from household reports of how much they would have to hypothetically repay if they were to borrow 250,000UGX (\$232) from BRAC. We back out the implied interest rate charged by each credit source, using the formula: $A = P(1+r)^t$, where A is the final amount repaid, P is the initial principal, r is the monthly interest rate, and t is the number of time periods (months) elapsed. Given monthly repayments, the implied monthly interest rate is $r = \left(\frac{A}{P}\right)^{\frac{1}{t}} - 1$.

Hence the focus of BRAC and other MFIs on credit provision targeting microentrepreneurship.[8]

Second, the entry of BRAC into these credit markets represents evaluating the impacts of increased access to microcredit, not the impacts of introducing microcredit altogether. To the extent to which BRAC microcredit simply causes households to substitute away from pre-existing credit sources that offer similar terms, will reduce the net economic impacts of BRAC microloans between treated and control villages.

Third, taking these comparisons of product characteristics together suggests we should expect non-random selection into BRAC microfinance groups and the take-up of the offer of credit. More precisely we expect those women who choose to borrow from BRAC rather than other sources to be positively selected in that they demand more credit, but are willing to take on such loans despite the inflexible timing of repayment and higher interest rates. Given the possibility of households travelling from control to treated villages and joining the groups established in treated villages, the nature of selection into BRAC groups might also be different between those resident in treated and control villages.

2.5 Estimation

Our empirical analysis proceeds as follows. First, we examine the correlates of women's take-up with the offer of credit from BRAC, namely whether they join a BRAC microfinance group and borrow from this source. Given that women in treated and control locations can potentially join these groups, we recognize that the nature of selection into microloans might differ between those in treated and control villages. We explore heterogenous effects of characteristics on compliance between women across villages using the following specification:

$$BRAC\_Borrower_{iv} = \alpha + \tau_0 T_v + \tau_1 \left(T_v \times X_{i0}\right) + \tau_2 X_{i0} + \lambda_s + u_{iv}. \tag{1}$$

$BRAC\_Borrower_{iv}$ is a dummy equal to one for woman i from village v reports having borrowed from BRAC at endline, T_v is a dummy measuring the treatment assignment of village v, and X_{i0} is the characteristic considered for the heterogeneous analysis (measured at baseline). We include village-level randomization strata, λ_s, that are dummies for BRAC branch, village size, the share of households primarily engaged in farming, and distance to the local market.

We then measure intent-to-treat (ITT) impacts two years post-intervention using the following ANCOVA specification for household i in village v:

$$y_{iv1} = \alpha + \beta^{ITT} T_v + \gamma y_{iv0} + \lambda_s + u_{iv}, \tag{2}$$

where y_{iv1} is the outcome of interest at endline ($t = 1$), and y_{iv0} is the outcome of interest at

[8]This evidence reaffirms the notion that MFIs can easily overestimate the demand for their product by not considering this range of alternative sources of credit available to borrowers.

baseline ($t = 0$), thus exploiting the panel structure of the data. We estimate standard errors clustered by village, and report Westfall-Young p-value corrections for multiple hypothesis testing (Young 2019).

The statistical power to detect treatment effects hinges critically on the degree of differential take-up between treatment and control villages. In our study setting, and in common with some other microfinance studies, we find both relatively low take-up in treated villages, and we observe a non-trivial (lower) level of compliance also in control villages. The reflects that fact that microfinance is targeted towards those with micro-entrepreneurial intent (so not *all* households are targeted), and there are often multiple pre-existing credit sources available to households in village economies.

Third, to dig deeper to understand economic impacts onto those that select into borrowing from BRAC, we estimate the following treatment-on-the-treated (TOT) specification:

$$y_{iv1} = \alpha + \beta^{TOT} BRAC\_Borrower_{iv} + \gamma y_{iv0} + \lambda_s + u_{iv}, \tag{3}$$

where we instrument $BRAC\_Borrower_{iv}$ using the offer of treatment (the village treatment dummy T_v). The effective scaling-up of ITT estimates into TOT estimates requires the additional assumption that there are no spillover effects of the offer of microfinance. These could plausibly occur through multiple channels such as the expectation of future credit access, business creation, higher labor demand, reduced precautionary savings, changes in informal lending or risk sharing arrangements (Kaboski and Townsend 2011, Banerjee *et al.* 2015b, Meager 2020, Breza and Kinnan 2021). Furthermore, there are likely concerns with treatment heterogeneity, wherein those who take-up have higher returns to capital than those who do not (Beaman *et al.* 2020, Crépon *et al.* 2020, Meager 2020, Bryan *et al.* 2021).

At a final stage, we also reflect on the fact that there is huge variation in the amounts borrowed from BRAC – as shown in Figure 3. Hence the intensity of treatment from the availability of microfinance varies across women. We use the following specification to estimate the intensity effect of treatment:

$$y_{iv1} = \alpha + \beta^{\epsilon} BRAC\_Amount_{iv} + \gamma y_{iv0} + \lambda_s + u_{iv}, \tag{4}$$

where $BRAC\_Amount_{iv}$ is the size of the last loan that woman i takes from BRAC. We instrument the loan size this with the village treatment dummy T_v. We focus on estimates where outcomes y_{iv1} are in logs and in monetary amounts, so β^{ϵ} captures the elasticity of the monetary outcome with regards to BRAC loans.

3 Results

3.1 Take-up

Table 5 shows estimates from (1). To begin with we only control for the village treatment assignment dummy. Column 1 shows take-up is 3.7pp higher among women in treated villages than in controls. At the foot of the table we report the take-up rate in control villages: this is 4.2%, so just under half the overall take-up rate in treated villages, that then corresponds to 7.9%. Overall, 6.5% of all women in our sample report having borrowed from BRAC by the two-year endline. Three points are of note.

First, the degree of take-up is small – this is as expected given that only a small share of households could possibly comply and borrow from BRAC across treated villages. Recall that BRAC groups are fixed to have between 15 and 25 members, most treated villages establish one group, and average village size is around 215 households. Hence with one group, the highest plausible take-up rate within treated villages is 12%.

Second, there are across-village spillovers of the microloan program onto control villages in the sense that some share of individuals in controls are willing to travel to treated villages in order to join a BRAC group. Hence there might be differential selection on gains into joining BRAC groups between those in treated villages and those in controls.

Two points are of note in comparison to the studies summarized in Banerjee *et al.* (2015a). First, take up rates in our study are among the lowest – this might go hand in hand with the fact that loan sizes are far larger than from other credit sources in these village economies. The primary determinant of statistical power – the difference in take up between treated and control subjects is also lower than other studies, at 3.7%. However, the fact that households in control villages also appear to take-up the offer of credit is a phenomena not restricted to our study context – other microfinance studies also find high take-up rates in controls, and in some cases take-up rates in controls are more than half those in actual treated villages.

The remaining Columns in Table 5 examine heterogeneous take-up. At the foot of each Column we report the levels coefficient on the interaction, interpreted as the regression coefficient on how the interacted characteristic correlates to take-up among women in control villages.

Column 2 shows that women who have borrowed money from any source in the last year are also more likely to borrow from BRAC. This applies to women in both control and treated villages, although those in treated villages are even more likely to do so (the difference is significant at the 10% level). This reinforces the notion of differential selection into borrowing from BRAC across treated and control women. It also suggests that women's access to credit from across sources is positively correlated over time. We come back to this point below, when we examine whether borrowing from BRAC acts as a complement or substitute for women's access to other sources of credit. The result also highlights another caveat to most microfinance studies, including this

one, that target micro-entrepreneurs: that we can say less on the impacts of new credit sources on inframarginal borrowers, rather than those with access to credit pre-intervention.[9]

Columns 3 and 4 examine heterogeneous take-up by the type of labor activity engaged in by the women at baseline. We see a positive association with engagement in self-employment (relative to wage employment), and for those engaged in non-agricultural work (relative to agricultural work). Neither effect differs between borrowers from treated and control villages, but both are again in line with the credit being targeted towards micro-entrepreneurs as intended.

Given the differential characteristics of credit sources emphasized in Table 4, where we emphasized that we expect BRAC borrowers to be positively selected in that they demand more credit, but are willing to take on such loans despite the inflexible timing of repayment and higher interest rates, Columns 5 to 7 focus on how baseline measures of respondent earnings and household wealth correlate to take-up. None of these predict take-up among controls, while in treated villages women at or above the 90th percentile of the earnings distribution are significantly more likely to become BRAC borrowers by endline. However, this applies to women in treated villages, but not those in controls – again suggesting a different process of selection into credit across the two. This is consistent with higher earning women having easier access to credit from other sources in both treatment and control villages, and therefore among those in controls, choosing not to incur the recurrent travel costs to treatment villages to attend weekly group meetings.

Across Columns we note the very low adjusted R-squared, highlighting the difficulty in predicting compliance based on observables. This is true both within the microfinance literature, and studies using information on enterprise business plans (as are formulated by potential BRAC borrowers) to predict future success (McKenzie 2015, 2018, Fafchamps and Woodruff 2017, McKenzie and Sansone 2019). An important and promising avenue of current research investigates further what drives the selection into microfinance and whether potential gains from take up are privately known to individuals, identifiable by community members or recoverable to the econometrician using machine learning approaches (Beaman *et al.* 2020, Bryan *et al.* 2021, Hussam *et al.* 2021).[10]

3.2 Labor Activities

We begin by considering labor market activities of women. We do so because a key target of microfinance programs is to foster micro-entrepreneurship. Given the nature of constraints on

[9] A notable exception is Augsburg *et al.* (2015) who study an individual lending program in Bosnia-Herzegovina (targeted irrespective of gender). The borrowers in the study were chosen to be marginal borrowers based on a scoring model used by the loan officers. Targeted such marginal applicants led to a 100% take-up rate.

[10] Beaman *et al.* (2020) find evidence from farmers in rural Mali of selection on gains from microfinance. Farmers with higher returns to capital are much more likely to select – or be selected – into borrowing. This implies that some of the variation in returns is predictable *ex ante*, and that farmers are aware of this heterogeneity in expected returns. Bryan *et al.* (2021) use machine learning using psychometric data to reveal this to be a key driver of heterogeneity in returns to loans to entrepreneurs in Egypt. Hussam *et al.* (2021) find that entrepreneurs in urban India, and their community members, are able to predict which will have the highest returns to capital in their microenterprises.

agricultural productivity in this context, enabling households to diversify economic activities and generate earnings streams from work in non-agricultural jobs seems a key intermediate step for microfinance to have any impact on economic welfare.

Panels A and B in Table 6 show ITT and TOT estimates using specifications (2) and (3). Given the dominance of self-employment activities in our context, Columns 1 and 2 focus on self-employment in agriculture and in non-agricultural work. The ITT estimates show a shifting on the extensive margin of women out of agriculture and into non-agriculture. The magnitude of the impacts is large: the 3.1pp reduction in agriculture corresponds to 3.7% reduction over the baseline mean in controls, and the 6.9pp increase into non-agriculture corresponds to a 53% increase over the baseline mean in controls. The TOT estimates in Panel B remain precise for the shifts into self-employed non-agricultural work. Indeed, we cannot reject $\widehat{\beta}^{TOT} = 1$ on this margin ($p = .577$), so that *all* BRAC borrowers make this transition into non-agricultural labor activities. This is entirely in line with the intent of the program: to foster micro-entrepreneurship among eligible women. The pattern of results is robust to p-value corrections for multiple hypothesis testing.

We next consider the intensive margin of monthly hours of labor supply in each activity. The same pattern of impact is found as on the extensive margin. The ITT estimates imply a significant reduction in labor supply in agriculture, and significant increases in labor supply in non-agricultural work, but both results are imprecisely estimated in the TOT impacts for actual borrowers (Panel B, Columns 3 and 4). Among borrowers, Panel B shows that the monthly labor supply reduction in agriculture of 267 hours is almost the same magnitude of the increase in non-agricultural activities increases by 239 hours per month (or around eight hours per day). The combined labor supply estimates across both activities suggest total labor supply of borrowers remains unchanged. The is in contrast to findings of studies of large scale asset transfer interventions (Bandiera *et al.* 2017) – where it is found that asset transfers lead to a reallocation of labor activities from agriculture to non-agricultural work but that the poor are also willing to supply more labor overall if given productive opportunities to do so.

Taken together the pattern of findings suggests women's use of BRAC credit to change economic activities into non-agricultural work, but perhaps not at the expense of giving up on agricultural work altogether. In Columns 5 to 8, when we examine in more detail impacts across outcomes specific to agriculture, the TOT estimates suggests no significant shifts down in the scale of agricultural production in terms of the number of crops grown, the share of output that is sold (rather than consumed). This reaffirms the notion that – at least over the two year horizon of our evaluation — households diversify economic activities (rather than altogether switching economic activities, or using the newly available source of credit to scale up expansion into existing non-agricultural businesses.)

Finally, Columns 9 and 10 consider the nature of non-agricultural work, focusing on the two most prevalent forms of non-agricultural work at baseline: small trade, and shop ownership. The

ITT and TOT estimates both imply that women are significantly more likely to start engaging in some small trade form of micro-entrepreneurship. Indeed, the TOT estimate in Panel B implies that the majority of borrowers expand activities on the extensive margin to set up in some small scale trade ($\widehat{\beta}^{TOT} = .847$), a finding robust to multiple hypothesis testing.

3.3 Individual Earnings

We next build on the patterns of economic diversification into non-agricultural labor activities to shed light on the earnings impact on women. When doing so we have the important caveat of there could be severe measurement error in any monetary outcome in this context (Karlan and Zinman 2012). In Table 7 we see that in line with much of the earlier literature, the ITT estimates on aggregates related to earnings are positive but very imprecise and hence, we cannot rule out a very wide range of estimates that include zero (Panel A) (Banerjee *et al.* 2015a). The low rate of take up means we lack power to detect effects at the right tail of the earnings distribution, yet that tail is likely to have disproportionate influence for village-wide outcomes (Meager 2020).

In Columns 4 and 5 we use cruder indicators of whether positive earnings are generated from each labor activity. We see some evidence of a higher likelihood of positive earnings being generated from non-agricultural work, the magnitude of the impact being 3.4pp. We also note that we find earnings from agriculture are more likely to be non-positive – this might reflect the relative low scale of production of such remaining activities given the switches on the extensive margin, or also capture some women moving out of agricultural work altogether as suggested by the earlier results on labor market activities.

The TOT estimates in Panel B give a very similar pattern of results – with estimates being imprecisely estimated and not ruling out potential increases. The fact that TOT earnings impacts remain imprecise even for non-agricultural labor activities might also be partly due to the concentration of women in non-agricultural activities in just a few types of work: recall that at baseline, among women engaged in some form of work outside of agriculture, 45% are engaged in small-scale trading, and 17% own and run a shop or restaurant.

3.4 Credit

We next examine the impacts on women's engagement in credit transactions, specifically, their ability to borrow from non-BRAC sources as well as lend to others. The entry of BRAC into these rural credit markets serves to provide women with an additional source of credit (rather than access to microfinance for the first time). In terms of deepening engagement in credit markets, it is thus important to understand whether BRAC credit acts as a complement or substitute for other credit sources.

Panels A and B in Table 8 show ITT and TOT estimates using specifications (2) and (3).

While in Panel A we see that the ITT impacts are imprecise, the TOT estimates reported in Panel B show that among those that actually borrow from BRAC, they are not more likely to report borrowing from other sources, nor do they significantly increase rates of lending to friends and family.

BRAC microloans thus appear to be neither complements nor substitutes for other credit sources. This implies that perhaps households no longer remain credit constrained after having access to BRAC microloans, consistent with the scale of loans on offer being far larger than available from other credit sources. Reassuringly, the result is also consistent with households not entering debt traps because they need to engage in further borrowing in order to pay off existing loans.

3.5 Consumption, Savings, Assets and Wealth

Our final set of outcomes consider how the patterns of economic diversification into non-agricultural labor activities translate into other economic aggregates related to consumption, savings, asset accumulation and welfare. As for earnings, we have the important caveat there is likely to be measurement error in these monetary outcomes, so that it is not straightforward to trace how credit affects how such credit is utilized (Karlan and Zinman 2012). As Banerjee *et al.* (2015b) describe, improved access to credit can affect consumption and/or investment. For example, credit allows households to make lumpy consumption purchases (say on durables), or it might allow for more investment without cutting back consumption and for higher consumption today at the cost of lowered future consumption.

To begin examining such impacts, Column 1 of Table 9 focuses on the value of consumption (including home produced food). Panel A shows null ITT impacts for consumption, and the same is found in the TOT estimate in Panel B for actual BRAC borrowers (although the point estimate is positive). Columns 2 to 5 break down types of consumption expenditure. We see there are very large (but imprecise) increases in the value of food consumption, while there are no precise impacts on discretionary spending, spending on durables, or spending on health or education.[11]

The remaining Columns in Table 9 show that we find no precise evidence of savings increases, asset accumulation or the overall wealth score of households, proxying their permanent income or

[11]The existing evidence on how microcredit impacts consumption is quite mixed. Our results are somewhat in line with the findings of the studies reported in Banerjee *et al.* (2015a) where four studies find null effects. Most other studies find reductions in discretionary spending. The null impacts on health and education spending are more in line with earlier evidence, although in common with other studies, these null impacts are imprecise. At the same time, other studies have documented how many borrowers use microfinance as a consumption loan (Devoto *et al.* 2012, Kaboski and Townsend 2012, Tarozzi *et al.* 2015, Ben-Yishay *et al.* 2017). Kaboski and Townsend (2011, 2012) use Thailand's Million Baht program as a natural experiment to examine the impacts of microcredit, and are able to probe dynamic responses to a far greater extent than many other studies (including our own). They find evidence that both consumption and incomes go up when the program is started but then converge back to trend, while asset growth slows down at first and then returns to trend. The magnitudes of the consumption increases they find are very large, and almost all take the form of durable consumption.

welfare (Column 8).

Finally, in Panel C for the subset of monetary outcomes shown, we report estimates from specification (4). This gives implied elasticities of these outcomes with respect to the size of the last loan from BRAC. We see that the elasticity of total consumption is .18 and the elasticity of the value of food consumption with respect to the borrowed amount is .42. These elasticities can be benchmarked against other interventions such as cash transfers.

4 Conclusion

Jobs and poverty are tightly linked and for the bulk of the world's extreme poor subsistence agriculture lies at the bottom of the job ladder. Occupational diversification is therefore seen as a key way of climbing out of poverty both for an individual (Bandiera *et al.* 2021) or a country (Buera *et al.* 2021).

The microfinance intervention we study is interesting precisely because it offers capital targeted at encouraging non-agricultural activities in a fairly typical rural African context where households are largely bereft of other sources of formal finance. It is in this type of poor, agricultural setting where the extreme poor are becoming increasingly concentrated even when other parts of the economy may be growing (Page and Pande 2018). It also where formal financial institutions find it most difficult to operate given low, infrequent and variable returns from agriculture.

Taking these two considerations together we want to know whether, in this context, microfinance – a core development intervention now reaching 140 million borrowers per year – can encourage diversification out of agriculture and improve welfare. We use a randomized roll-out of the internationally important BRAC microfinance product within households in rural Uganda to answer this question. At baseline close to 50% of these households are below the extreme poverty line of $1.90 a day and more than 80% are engaged in subsistence agriculture.

The key result of this paper is that a transfer of capital does encourage diversification into non-agricultural labor market activities but does not improve household welfare. On the extensive margin women borrowers are setting up non-agricultural business activities such as small-scale trading. On the intensive margin they putting more hours into these non-agricultural labor market activities. The arrival of formal capital to Ugandan villages appears to have enabled female borrowers to shift their labor effort into a range of non-agricultural labor market activities. In the total set of papers summarized in Table A1 we see that only Attanasio *et al.* (2015) and Crépon *et al.* (2020) find an effect of microfinance on movement into self-employment. Of these, neither occurs in a context which is directly comparable to rural Uganda. In fact the paper which is most akin to our project is Tarozzi *et al.* (2015) which takes place in rural Ethiopia with a similarly unbanked population but finds neither a welfare or diversification result.

This diversification however is not associated with improvements in welfare as measured by

earnings, consumption, savings, investment or overall wealth. The null effect on overall welfare seems consistent with much of the literature and is confirmed in Meager's (2019) meta-analysis (Table A1). The type of small-scale trade businesses such door-to-door selling and selling food and beverages, textiles and clothing, agricultural inputs and other products in local market which women borrowers into are not, however, transformative in terms of improving welfare. As is the case in the much of the studies covered in Table A1 this may be the types of businesses that have limited to scope to expand.

Our finding of effects on diversification but with no effects on welfare place the results of this study somewhere between the bulk of the microcredit literature where neither diversification or welfare effects tend to be observed (see Table A1) and the big push literature which finds that bigger capital transfers, sometimes paired with training, are generating effects both on diversification and on welfare (Blattman *et al.* 2014, Banerjee *et al.* 2015, Bandiera *et al.* 2017, Balboni *et al.* 2021).

Part of this may have to do with the size of the transfer – the transfer to GDP per capita ratio for Blattman *et al.* (2014) is 81% and that for Bandiera *et al.* (2017) is 54% both of which dwarf the 27% observed in this study which, nonetheless, is on the upper range of loan to GDP per capita values for microfinance interventions (see Figure 1 and Table A1). Another reason for this may be that in this rural African setting there is limited presence of banks and other formal lenders – in Table A1 we see that the proportion of households borrowing from banks is the very bottom of the range of the 15 studies covered there – there may be unmet demand for capital which BRAC part meets thus allowing women to start new non-agricultural activities. Additionally, the cost of starting a new self-employment activity may be low relative to richer rural or urban contexts.

Our data only allows us to examine two year impacts. It would be interesting to monitor how the situation unfolds in rural Uganda to see if the small businesses that have been started or expanded as a result of the arrival of microfinance develop into more significant entities that can affect household welfare over the longer term. Karlan and Zinman (2012) study a longer run horizon after many loan cycles have elapsed and perhaps that is when we might see effects on health and education. Also more recent works suggest the modest impacts of microfinance are persistent and grow over time especially for incumbent businesses (Banerjee *et al.* 2019, Beaman *et al.* 2019).

Both the low take-up rate for these loans and the null effect on welfare suggest that there is a limited set of business opportunities in these rural contexts. Apart for lack of access to capital this might also be to do with lack of supporting infrastructure (e.g. roads, electricity, internet) which might constrain the ability of businesses to grow.

Whether loans should be directed toward women borrowers (as they are in the bulk of studies in Table A1) is also an open question. A key feature of microfinance has been the targeting of women on the grounds that, compared to men, they perform better as clients of microfinance institutions and that their participation has more desirable development outcomes (Pitt and Khandker 1998). The actual evidence for such targeting remains thin. Indeed, a growing literature on micro-

entrepreneurship in developing countries has shown that male but not female-operated enterprises benefit from unconditional cash transfers. A number of explanations have been put forward for this: (i) women are subject to expropriation by husbands (de Mel *et al.* 2008, Jakiela and Ozier 2015); (ii) women are less committed to grow their enterprises or are more impatient (Fafchamps *et al.* 2014); (iii) women sort into less profitable sectors because of unequal labor market access or a preference for flexibility (Bernhardt *et al.* 2019).

There is a vast macro literature where movement out of agriculture is an essential component of economic development. But it remains unclear how policy can encourage diversification out of agriculture. Connecting that macro literature which studies structural change to program evaluation micro literature is an important endeavor.

Finally, an exciting research frontier in this area is to understand the general equilibrium effects of microfinance. As Buera *et al.* (2020) point out the effects of microfinance programs in the short run, which can be substantially positive if programs are expanded, are materially different from, and even opposite of, the aggregate and distributional effects microfinance will have in the long run, when scaled up to the entire economy. It important for both research and policy to understand the role microfinance plays as scale in the macro-economy, whether through aggregate demand, business investment, labor demand, labor diversification or other channels in general equilibrium. A recent literature suggests these effects are important (Breza and Kinnan 2021, Buera *et al.* 2021). These impacts, would, in theory be felt most acutely by the world's extreme poor, who are found in rural areas of Sub-Saharan Africa and South Asia, and work in subsistence agriculture (World Bank 2021).

A Appendix

A.1 Research Ethics

Following Asiedu *et al.* (2021) we detail key aspects of research ethics related to this study. On policy equipoise and scarcity, there was uncertainty regarding the net benefits from treatment for any given woman. The microfinance intervention under study did not pose any potential harm to participants and non-participants, although concerns over borrowers entering debt traps has been discussed in the literature. The program implementation was coordinated with the randomization protocol so that after the study was completed, the control group also received the treatment. As randomization was conducted at the village level, all eligible study participants in treated villages could potentially access the intervention. Accessing any of the intervention services were voluntary for study subjects.

The researchers coordinated throughout with the implementing organization, BRAC. The program rollout took place according to the evaluation protocol. The researchers did not have any influence in the way the program was implemented or how microfinance groups were formed. We

obtained informed consent from all participants prior to the study. The informed consent included an explanation of the microfinance program. The consent form also described the research team, and met IRB requirements of explaining the purpose of the study, the participants' risks and rights, confidentiality, and contact information. Research staff and enumerator teams were not subject to additional risks in the data collection process. None of the researchers have financial or reputational conflicts of interest with regard to the research results. No contractual restrictions were imposed on the researchers limiting their ability to report the study findings.

On potential harms to participants or nonparticipants, our data collection and research procedures adhered to protocols around privacy, confidentiality, risk-management, and informed consent. Regardless of their access to the interventions, participants were not considered vulnerable (beyond residing in poverty). Participants capacity to access future services or policies is not reduced by their participation in the study. Besides individual consent from study participants, consultations were conducted with local representatives at the district and community levels.

In the four study districts, separate Memorandum of Understanding were signed, and the Local Council Chairperson (LC1) in each village was consulted before any data collection took place. All the enumerators involved in data collection were recruited from the study districts to ensure they were aware of implicit social norms in these villages. Summary findings from the project have been presented to district level authorities and policy briefs were distributed to the national and district level stakeholders. However, no activity for sharing results to participants in each study village is planned due to resource constraints. We do not foresee risks of the misuse of research findings.

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Table 1: Balance on Village Characteristics

Means and standard deviation in parentheses

	(1) Control	(2) Treated	p-value
Number of villages	59	62	
Number of households	219.0	214.6	[.885]
	(73.86)	(93.23)	
Number of BRAC MF groups	-	1.097	-
		(1.238)	
Distance to nearest control/treated village (kms)	1.139	1.114	[.817]
	(.614)	(.602)	
Average household wealth score (0-100)	53.51	54.82	[.178]
	(4.095)	(5.482)	

Notes: Village-level summary statistics for control villages (Column 1) and treated villages (Column 2). The p-values are obtained from regressing each of the reported baseline variable on the dummy for treatment with robust standard errors and controlling for branch fixed effects. Shortest distance to a control/treated village (miles) is the distance from the control village to the closest treated village in Column 1 and the distance from the treated village to the closest control village in Column 2. The household wealth score is measured for all households in our baseline survey by aggregating ten poverty indicators into a score going from 0 to 100. Average HH wealth score (0-100) calculates the average of the wealth score in the village.

Table 2: Balance on Household Characteristics

Means and standard deviation in parentheses

	(1) Control	(2) Treated	p-value
Number of households	2,016	2,076	
A. Socio-economic background			
Number of household members	5.212	5.079	[.042]
	(2.283)	(2.215)	
Age of household lead	42.41	41.55	[.288]
	(16.85)	(16.45)	
Household head completed primary education	.441	.476	[.332]
	(.497)	(.500)	
In extreme poverty (less than $1.90 per day per person)	.459	.408	[.075]
	(.498)	(.491)	
B. Women's labor activities (last year)			
Number of labor activities	1.607	1.533	[.177]
	(.833)	(.826)	
Engaged in agriculture (self employment or wage activity)	.879	.841	[.195]
	(.326)	(.366)	
Engaged in non-agriculture (self employment or wage activity)	.196	.210	[.742]
	(.397)	(.407)	
Engaged in self employment (agriculture or non-agriculture)	.885	.866	[.526]
	(.319)	(.341)	
Engaged in wage labor (agriculture or non-agriculture)	.121	.104	[.521]
	(.326)	(.305)	
C. Women's earnings in the last year			
Non-agricultural business	243.20	394.40	[.196]
	(999.4)	(1417)	
Agricultural business	199.7	210.4	[.788]
	(2043)	(1768)	
Total earnings in last year	482.3	484.8	[.949]
	(1590)	(1420)	
D. Consumption and savings			
Annual consumption per capita (including home production)	1101	1038	[.551]
	(5757)	(1348)	
Annual food consumption per capita (including home production)	949.70	991.28	[.535]
	(846.6)	(840.6)	
Saved in home	.564	.579	[.516]
	(.496)	(.494)	
Saved in banks	.120	.156	[.099]
	(.325)	(.363)	
Savings, including zeroes	628.4	502.6	[.926]
	(14565)	(5962)	
Total assets value	6927	8557	[.052]
	(10822)	(14960)	

Notes: Household-level summary statistics for control households (Column 1) and treated households (Column 2). The p-values are obtained from regressing each of the reported baseline variable on the dummy for treatment with robust standard errors and controlling for branch fixed effects. Engaged in Agriculture is a dummy variable which =1 if the respondent is self employed in farming, self employed in animal husbandry or engaged in agricultural wage labor. Engaged in non-Agricultural business is a dummy variable which =1 if the respondent is engaged in non agricultural self employment or non-agricultural wage labor. Engaged in self employment is a dummy variable which =1 if the respondent is self employed in either agriculture or non-agriculture. Engaged in wage labor is a dummy variable which =1 if the respondent works for a wage. Earnings in non-agricultural business is the difference between revenues and input costs for respondents who are self employed in non agricultural business. Earnings in agricultural business is the difference between revenues and input costs for respondents who are self employed in agricultural business Total Earnings are the sum of profits from self employment, profits from agriculture sales, profits from animal husbandry and wages. Consumption is an annual variable constructed from food consumed in the last seven days, consumer non durables purchased in the last month, and consumer durables purchased in the last year. Saved in Home and Saved in Banks are dummy variables which equal one if the respondent reports savings held at home (at a bank). Total asset value includes the value of all household assets which fall into the following categories: house, furniture, agricultural assets, business assets, transportation assets. All monetary values are expressed in 2014 USD PPP.

Table 3: Engagement in Credit Transactions

Means and standard deviation in parentheses

	(1) Control	(2) Treated	p-value (1)=(2)
Number of households	2,016	2,076	
A. Borrowing			
Borrowed from informal sources	.242	.217	[.456]
	(.429)	(.412)	
Borrowed from family or friends	.231	.206	[.427]
	(.422)	(.405)	
Borrowed from local savings/cooperatives	.222	.226	[.967]
	(.416)	(.418)	
Borrowed from formal sources	.048	.055	[.603]
	(.214)	(.123)	
Borrowed from MFI	.014	.020	[.272]
	(.117)	(.139)	
Borrowed from NGOs	.002	.002	[.678]
	(.045)	(.049)	
B. Lending			
Lend to family	.068	.060	[.462]
	(.251)	(.237)	
Lend to friends	.137	.129	[.648]
	(.344)	(.335)	
Lend to other people	.003	.006	[.151]
	(.055)	(.076)	

Notes: Household-level summary statistics for control households (Column 1) and treated households (Column 2). The p-values are obtained from regressing each of the reported baseline variable on the dummy for treatment with robust standard errors and controlling for branch fixed effects. Each variable in Panel A and Panel B is a dummy which =1 if the respondent reports having borrowed/lent to/from each source**.** Borrowing from formal sources incudes MFIs, NGOs, and banks.

Table 4: Credit Markets

	Have you ever obtained a loan from [ ] ?	Is there a [ ] that lends money in your village?	How much did you borrow (2014 USD PPP)?	If you were to borrow now 250,000 Ushs (232.84 USD) from […], (based in who answered there is […] that lends money in the village)					
				Would the loan require any security?	Would the repayment date be flexible?	How many months later would you have to repay the loan?	How much would you have to pay back in total (2014 USD)?	Implied monthly interest rate	Implied annual interest rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
A. SEMI-FORMAL									
BRAC (endline survey data)	**.065**	**.**	**554.93**	**Not required**	**.000**	**9.748**	**289.7**	**2.27%**	**30.86%**
	(.247)	**.**	**(231.6)**		**-**	**(3.219)**	**(20.06)**		
Microfinance Institution	.006	.026	505.44	.778	.390	8.789	256.2	1.09%	13.90%
	(.078)	(.159)	(602.4)	(.420)	(.492)	(6.115)	(46.59)		
Cooperative	.034	.082	163.15	.604	.601	6.625	248.1	0.96%	12.19%
	(.181)	(.274)	(321.63)	(.490)	(.491)	(5.047)	(43.01)		
Village level association (SACCOS)	.211	.392	168.10	.551	.672	5.828	276.4	2.99%	42.35%
	(.408)	(.488)	(268.3)	(.498)	(.470)	(4.624)	(87.25)		
B. INFORMAL									
Relatives/Family	.266	.	98.54	.150	.808	6.542	237.9	0.33%	4.02%
	(.442)	.	(151.93)	(.357)	(.394)	(5.946)	(51.92)		
Friends	.304	.	91.56	.188	.781	6.330	243.9	0.74%	9.20%
	(.460)	.	(198.90)	(.391)	(.414)	(7.008)	(58.44)		
Private money lender	.015	.080	216.17	.652	.553	5.468	310.6	5.41%	88.20%
	(.122)	(.271)	(449.29)	(.478)	(.499)	(3.889)	(98.1)		
Other: Specify:	.072	.147	73.65	.401	.749	6.448	299.2	3.97%	59.47%
	(.258)	(.355)	(99.01)	(.491)	(.434)	(6.493)	(89.27)		
C. FORMAL									
Bank (commercial/development)	.008	.032	358.78	.743	.611	4.231	239.7	0.69%	8.58%
	(.090)	(.175)	(564.8)	(.440)	(.491)	(2.421)	(76.13)	.	
Other: Specify:	.016	.026	31.56	.351	.798	8.909	300.1	2.89%	40.75%
	(.127)	(.160)	(42.43)	(.480)	(.404)	(13.39)	(195.0)	.	

Notes: Household level summary statistics for access to credit markets at baseline. Standard deviations are shown in parentheses. The BRAC row is imputed from end-line data on the actual borrowing of respondents. Data on non-BRAC credit sources was collected in the baseline survey. 'Have you ever obtained a loan from [ ]', 'Is there a [ ] that lends in your village' are asked to all respondents and averaged over the whole sample. Column 3 'How much did you borrow' summarized the loan amounts among borrowers. Columns 4 to 7 summarize the loan conditions among respondents who reported borrowing from each source. In Column 8 the implied monthly interest rate is calculated using $A=P(1+r)t$ where A is the amount owed, P is the initial loan principle, r is the monthly interest rate and t is the repayment period in months. All monetary values are expressed in 2014 USD PPP.

Table 5: Take-up

Dependent Variable: Take-up (BRAC borrower at endline)
Standard errors clustered by village in parentheses

	Baseline	Credit Market	Labor Activities		Income and Wealth		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment [1]	0.037***	0.021*	0.035**	0.037***	0.040***	0.030**	0.038***
	(0.012)	(0.012)	(0.015)	(0.013)	(0.013)	(0.012)	(0.013)
Treatment [1] x Borrowed money in the last year		0.032*					
		(0.018)					
Treatment [1] x Self Employed			0.002				
			(0.019)				
Treatment [1] x Engaged in non-agricultural labour				-0.001			
				(0.021)			
Treatment [1] x Earnings					-0.000		
					(0.000)		
Treatment [1] x Above 90th Percentile Baseline Earnings						0.064**	
						(0.025)	
Treatment [1] x Above 90th Percentile Baseline Wealth							-0.002
							(0.020)
Level Coefficient		0.024**	0.041***	0.051***	0.000	-0.009	-0.02
		(0.010)	-0.008	(0.014)	(0.000)	(0.013)	(0.015)
Mean in controls	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
F-stat	8.94						
Stratification controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Omitted group			Wage	Agriculture			
Adjusted R-squared	0.016	0.023	0.017	0.022	0.016	0.018	0.016
Observations	3,389	3,389	3,389	3,389	3,389	3,389	3,389

Notes: ***denotes significance at the 1% level, ** at the 5% level, * at the 10% level. All regressions control for branch fixed effects and stratification variables. In parentheses, we report standard errors clustered at the village level. Treatment is a dummy variable which =1 if the respondent lives in a village which received the microfinance treatment. Borrowed money in the last year is a dummy variable which =1 if the respondent reported receiving any loans at baseline. Engaged in non-agricultural labor is a dummy variable which =1 if the respondent is engaged in non-agricultural self employment or non-agricultural wage labor at baseline. Income is the sum of profits from self employment, profits from agriculture sales, profits from animal husbandry and wages. The household wealth score is measured for all households in our baseline survey by aggregating ten poverty indicators into a score going from 0 to 100. Mean in Controls reports the average microfinance take-up rate across all villages at baseline. All monetary variables are reported as the 2014 USD PPP.

Table 6: Labor Activities and Diversification

Standard errors clustered by village in parentheses
p-values corrected for multiple hypothesis testing in braces

	A. Labor Activities		B. Labor Supply		C. Agricultural Outcomes			D. Non-agricultural Outcomes	
	Self-employed in agricultural business	Self-employed in non-agricultural business	Monthly hours in agriculture	Monthly hours in non-agriculture	Acres of land cultivated	Share of output sold	Number of crops grown	Small Trade	Shop Owner etc.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A: ITT Village Treatment									
Treatment Village=1	-0.031*	0.061***	-8.699*	10.832**	-0.016	0.026	-0.138	0.028**	0.008
	(0.018)	(0.022)	(4.661)	(5.231)	(0.068)	(0.018)	(0.118)	(0.013)	(0.009)
	{ .094}	{.008}	{.076}	{.076}	{.830}	{ .388}	{ .434}	{.052}	{.390}
Panel B: TOT Estimates (IV = village treatment assignment)									
BRAC borrower	-0.652	1.396**	-266.753	239.337	-1.312	0.488	-3.876	0.847**	0.056
	(0.534)	(0.710)	(212.195)	(161.033)	(1.766)	(0.507)	(3.409)	(0.424)	(0.231)
	{ .168}	{ .100}	{.204}	{.204}	{.502}	{.502}	{.484}	{.066}	{.806}
Control mean at baseline	.832	.129	93.7	41.72	.934	0.411	2.50	0.114	0.035
Control mean at baseline (non-zero)			112.3	171.6	1.10	0.411	2.96		
Baseline Level Included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,692	3,692	3,464	3,692	3,680	3,128	3,692	4092	4092

Notes: ***denotes significance at the 1% level, ** at the 5% level, * at the 10% level. Standard errors are clustered at the village level and shown in parentheses. Panel A show Intent to Treat (ITT) results regressing the variable of interest on a dummy variable for whether the respondent lives in a treatment village, the baseline level of the dependent variable, and a constant. Westfall-Young p-values for multiple hypothesis testing are shown in {}. Groups for multiple hypothesis testing are those in Columns (1)-(2), (3)-(4), (5)-(7) and (8)-(9). Panel B shows the Treatment on Treated (TOT) results by running Two Stage Least Squares with a dummy which =1 if the respondent lives in a treatment village as an instrument for borrowing from BRAC at follow-up. We control for the level of the outcome variable at baseline and randomization strata. Self employed in agricultural business is a dummy variable which = 1 if the respondent is engaged in agriculture or animal husbandry. Self employed in non-agricultural business is a dummy variable which = 1 if the respondent is engaged in non agricultural self employment. Monthly hours worked variables are the number of hours worked in a typical day multiplied by the number of days worked in the last year/12 for non agricultural work and last season/6 for agricultural work. Positive output is the monetary value of all household agricultural production. Small Trade and Shop Owner are dummy variables which =1 if the respondent reports either field as their primary occupation.

Table 7: Individual Earnings

Standard errors clustered by village in parentheses
p-values corrected for multiple hypothesis testing in braces

	Total Earnings	Earnings from Agricultural Labor	Earnings from Non-Agricultural Labor	Earnings from Agricultural Labor>0	Earnings from Non-Agricultural Labor>0
	(1)	(2)	(3)	(4)	(5)
Panel A: ITT Village Treatment					
Treatment Village=1	7.417	-9.379	14.905	-0.050**	0.034*
	(67.733)	(60.851)	(26.865)	(0.021)	(0.018)
	{.958}	{.958}	{.840}	{.034}	{.074}
Panel B: TOT Estimates (IV = village treatment assignment)					
BRAC borrower	-1,313.823	-1,157.260	-195.445	-0.890	0.899
	(1,902.444)	(1,694.174)	(755.228)	(0.642)	(0.623)
	{.770}	{.770}	{.812}	{.244}	{.244}
Control mean at baseline	482.31	370.61	111.70	0.667	0.133
Control mean (conditional on participation)		428.17	695.04		
Baseline Level Included	Yes	Yes	Yes	Yes	Yes
Observations	3,692	3,692	3,692	4,092	4,092

Notes: ***denotes significance at the 1% level, ** at the 5% level, * at the 10% level. Standard errors are clustered at the village level and shown in parentheses (). Panel A show Intent to Treat (ITT) results regressing the variable of interest on a dummy variable for whether the respondent lives in a treatment village and the baseline level of the dependent variablea constant. Westfall-Young p-values for multiple hypothesis testing are shown in {}. Groups for multiple hypothesis testing are those in Columns (1)-(3) and Columns (4)-(5). Panel B shows the Treatment on Treated (TOT) results by running Two Stage Least Squares with a dummy which =1 if the respondent lives in a treatment village as an instrument for borrowing from BRAC at follow-up. We control for the level of the outcome variable at baseline and randomization strata. Earnings from (non-)agriculture are the sum of profits from self employment in (non-)agriculture plus any earnings from wage labor in (non-)agriculture. All monetary values are expressed in 2014 USD PPP.

Table 8: Credit Markets

Standard errors clustered by village in parentheses
p-values corrected for multiple hypothesis testing in braces

	Borrowed from any Non-BRAC source in last year	Borrowed from any Non-BRAC formal source in last year	Borrowed from any informal source in last year	Lent to family and friends
	(1)	(2)	(3)	(4)
Panel A: ITT Village Treatment				
Treatment Village=1	0.000	0.002	0.013	0.029
	(0.025)	(0.005)	(0.022)	(0.019)
	{.986}	{.922}	{.882}	{.418}
Panel B: TOT Estimates (IV = village treatment assignment)				
BRAC borrower	0.209	-0.042	0.435	0.560
	(0.715)	(0.126)	(0.606)	(0.574)
	{.934}	{.934}	{.790}	{.684}
Control mean at baseline	.517	.048	.242	.202
Baseline Levels Included	Yes	Yes	Yes	Yes
Observations	3,692	4,092	3,655	3,692

Notes: ***denotes significance at the 1% level, ** at the 5% level, * at the 10% level. Standard errors are clustered at the village level and shown in parentheses (). Panel A show Intent to Treat (ITT) results regressing the variable of interest on a dummy variable for whether the respondent lives in a treatment village, the baseline level of the dependent variable and a constant. Westfall-Young p-values for multiple hypothesis testing are shown in {}. We group all variables in this table for the multiple hypothesis testing. Panel B shows the Treatment on Treated (TOT) results by running Two Stage Least Squares with a dummy which =1 if the respondent lives in a treatment village as an instrument for borrowing from BRAC at follow-up. We control for the level of the outcome variable at baseline and randomization strata. Credit market variables are a dummy which =1 if the respondent reports having borrowed from any of the sources.

Table 9: Consumption, Savings, Assets and Wealth

Standard errors clustered by village in parentheses
p-values corrected for multiple hypothesis testing in braces

	Consumption, Per Capita Equivalent (logs)	Value of Food (include home production), Per Capita Equivalent (logs)	Discretionary Spending, Per Capita Equivalent (logs)	Spending on Health and Education Per Capita Equivalent (logs)	Spending on Durables, Per Capita Equivalent (logs)	Savings (logs)	Total Assets (logs)	Wealth Score
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: ITT Village Treatment								
Treatment Village=1	0.046	0.086	0.085	0.056	0.097	0.203	0.002	-1.079
	(0.063)	(0.089)	(0.067)	(0.088)	(0.124)	(0.189)	(0.070)	(0.867)
	{.868}	{.808}	{.802}	{.868}	{.868}	{.802}	{.986}	{.802}
Panel B: TOT Estimates (IV = village treatment assignment)								
BRAC borrower	1.215	2.910	1.423	1.275	2.027	5.740	-0.571	16.197
	(1.844)	(2.841)	(1.948)	(2.490)	(3.522)	(5.522)	(1.964)	(15.519)
	{.926}	{.804}	{.926}	{.926}	{.926}	{.804}	{.926}	{.804}
Panel C: Elasticity								
Amount Borrowed from BRAC (logs)	0.177	0.420	0.206	0.181	0.290	0.818	-0.088	
	(0.264)	(0.405)	(0.278)	(0.358)	(0.507)	(0.788)	(0.283)	
	{.928}	{.822}	{.928}	{.928}	{.928}	{.822}	{.928}	
Control mean at baseline	6.57	6.51	.889	4.00	2.06	3.12	8.097	53.19
Control mean at baseline (non-zero)		6.59	2.48	4.43	2.17	4.32	8.097	
Baseline Level Included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,643	3,691	3,691	3,691	3,691	3,692	3,672	4,092

Notes: ***denotes significance at the 1% level, ** at the 5% level, * at the 10% level. Standard errors are clustered at the village level and shown in parentheses. Panel A show Intent to Treat (ITT) results regressing the variable of interest on a dummy variable for whether the respondent lives in a treatment village and a constant. Westfall-Young p-values for multiple hypothesis testing are shown in {}. We group all variables in this table for the multiple hypothesis testing. Panel B shows the Treatment on Treated (TOT) results by running Two Stage Least Squares with a dummy which =1 if the respondent lives in a treatment village as an instrument for borrowing from BRAC at follow-up. In Panel C the instrumented variable is log(Amount borrowed from BRAC +1). We control for the level of the outcome variable at baseline and randomization strata. Consumption is a monthly variable constructed from food consumed in the last seven days, consumer non durables purchased in the last month, and consumer durables purchased in the last year. Adult equivalent measures count each household member under age 18 as 0.5 adults. Savings is total household savings across all savings methods. Total asset value includes the value of all household assets which fall into the following categories: house, furniture, agricultural assets, business assets, transportation assets. All monetary values are expressed in 2014 USD PPP.

Figure 1: Loan Size Comparisons to Other Studies

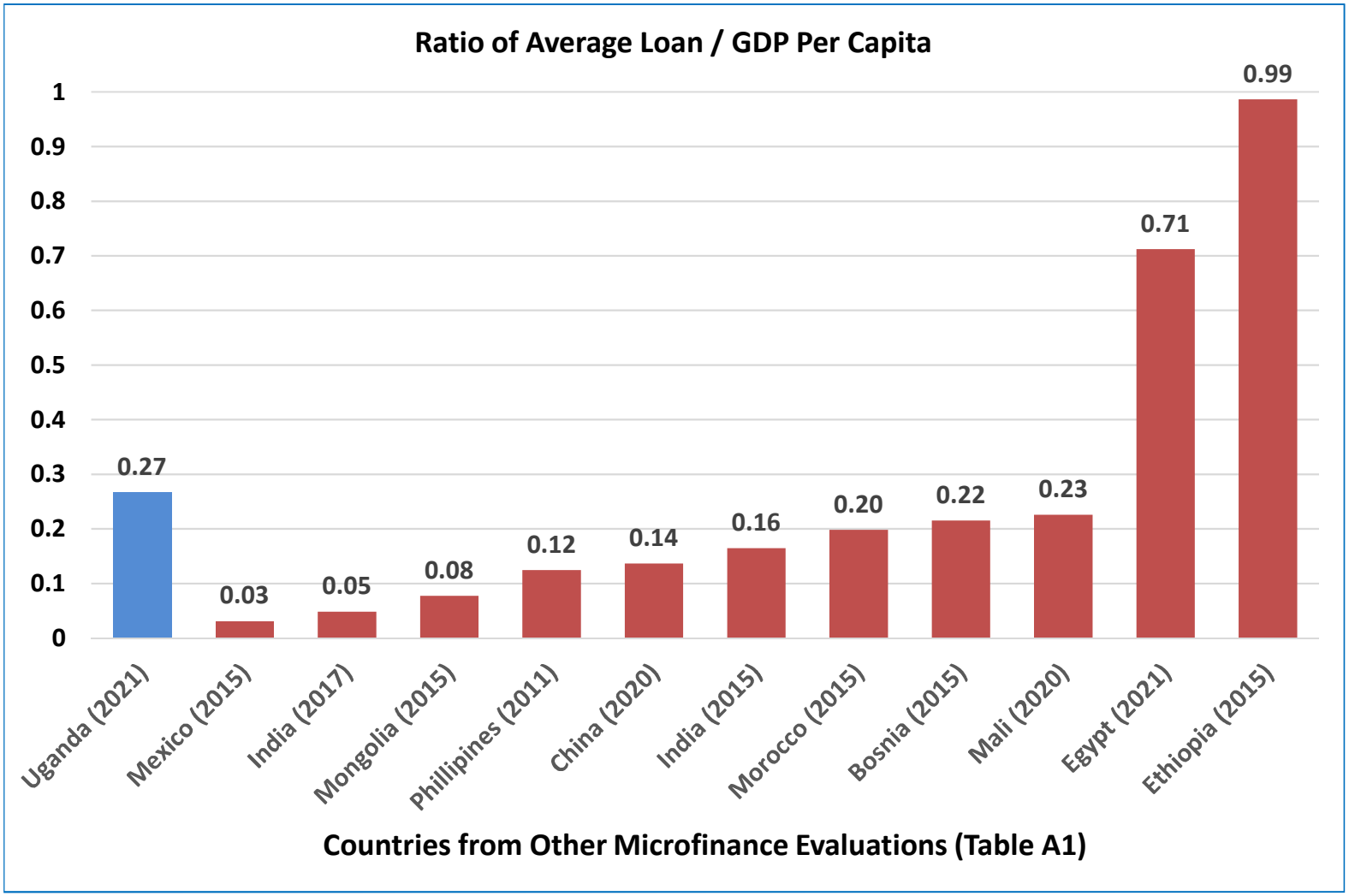


Figure 2: Study Timeline

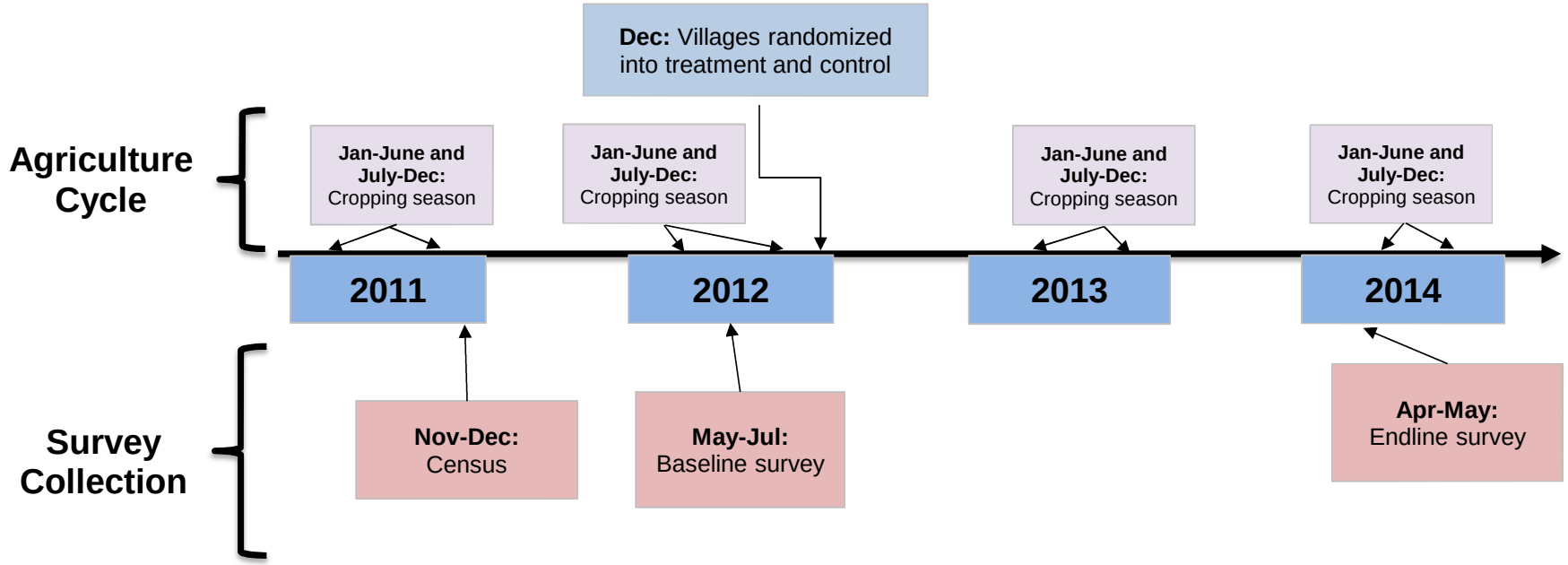
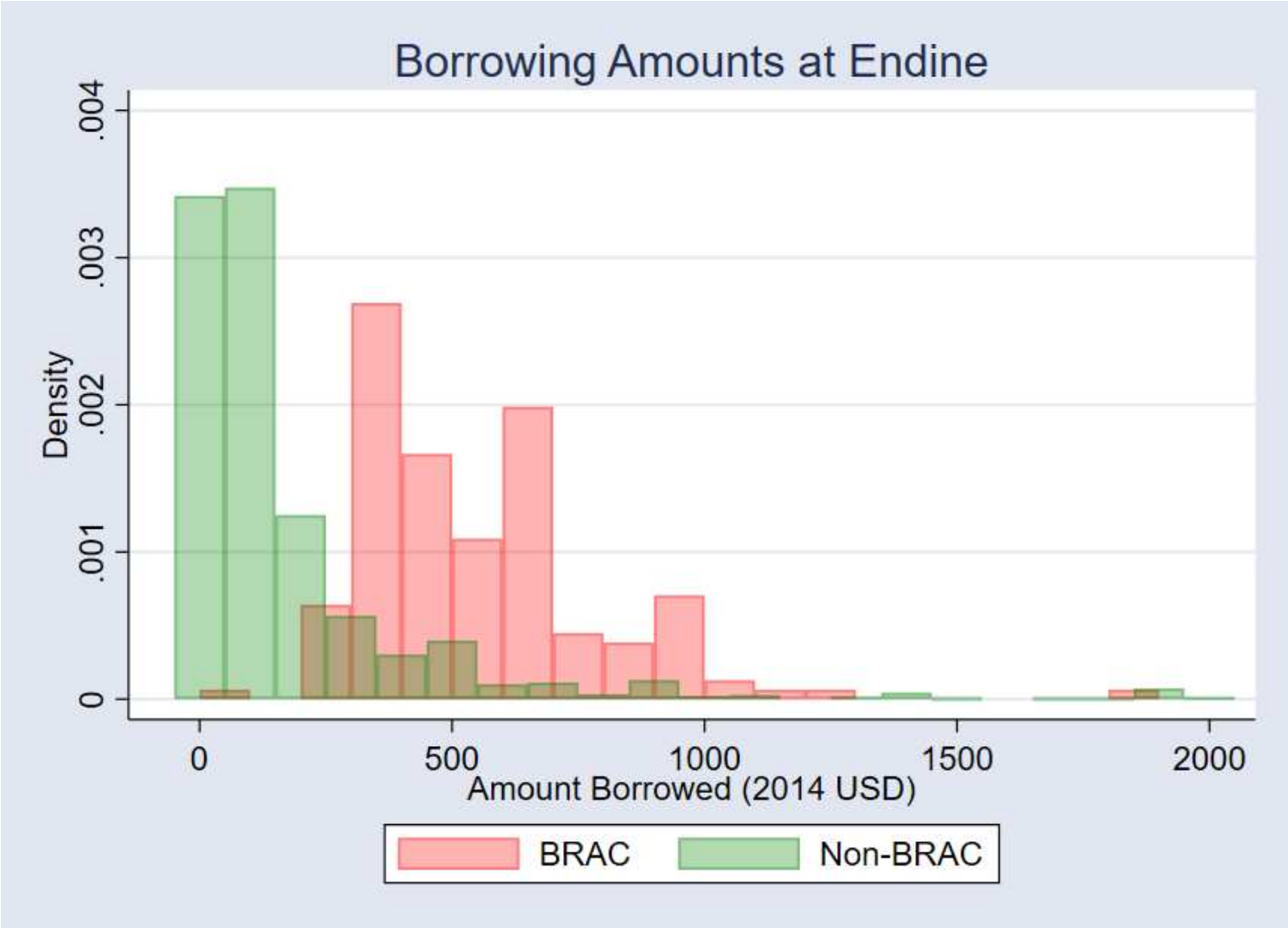


Figure 3: Loan Sizes from BRAC and Other Sources



Notes: Histogram of amounts borrowed from BRAC and non-BRAC borrowers in 2014 USD at endline survey, among those with non-zero borrowing. Rightmost bin includes upper tail of borrowers. 1073.7 UGX=1USD PPP. The rightmost bin includes borrowers over 2000USD.

Table A1, Part A: Overview of Microcredit Interventions and Evaluations

	(1) This Study	(2) Banerjee et al. (2015)	(3) Tarrozi et al. (2015)	(4) Angelucci et al. (2015)	(5) Attanasio et al. (2015)	(6) Crépon et al. (2015)	(7) Augsburg et al. (2015)
A. Context							
Region	Uganda	India	Ethiopia	Mexico	Mongolia	Morocco	Bosnia and Herzegovina
Year	2014	2007	2006	2010	2008	2007	2009
Rural or Urban?	Rural	Urban	Rural	Both	Rural	Rural	Both
Basline Borrowing from Banks	0.8%	3.6%	2.6%	28.8%	47.7%	2.0%	51.4%
B. Borrowers							
Gender of Borrowers	BRAC provides credit only to women	Women only	All	Women only	Women only	All	All
Targeted to microentrepreneurs?	Yes	No	Yes	Yes	Yes	Yes	Yes
Loan eligibility	Women aged between 20-50 years; only one member per household; must have lived in the area for three to five years (so not a recent incoming migrant); must not be a client of another microfinance institution; lives within 4km of the local BRAC branch office.	Women ages 18-59 who have resided in the same area for at least on year and have valid identification and residential proof (at least 80 percent of women in a group must own their home)	Poverty status, viable business plan, and other criteria	Women ages 18–60 with proof of address and valid identification	Women who own less than MNT 1 million ($869 exchange rate) in assets and earn less than MNT 200,000 ($174 exchange rate) in monthly profits from a business	Men and women ages 18–70 who hold a national ID card, have a residency certificate, and have had an economic activity other than livestock agriculture for at least 12 months	Sufficient collateral, repayment capacity, credit worthiness, business capacity, credit history, other (including characteristics)
C. Loans							
Liability	Group (joint liability)	Group (joint liability)	Group (joint liability)	Group (joint liability)	Group (joint liability) or individual	Group (joint liability)	Individual
Group size	15-30 members	6-10 people	No data	10-50 people	7-15 people	3-4 people	No Data
Loan term length	20 weeks or 40 weeks	12 months	12 months	4 months	6 month average for group loans, 8 month average for individual loans	16 month average	14 month average
Repayment frequency	Weekly, beginning the second week of loan disbursement	Weekly	Borrower were expected to make regular deposits and repayments	Weekly	Monthly	Weekly, Twice Weekly, or Monthly	Monthly
Interest rate	40-week loans: 40% APR	24% APR (12% non-declining)	12% APR	110% APR	26.8% APR	14.5% APR	22% APR
Loan size	554.93 (2014 USD PPP)	1031 (2014 USD PPP)	Median 624 (2014 USD PPP)	570 (2014 USD PPP)	854 group (per borrower); 1,258 individual (2014 USD PPP)	1,623 (2014 USD PPP)	2750 (2014 USD PPP)
Loan size/GDPc	0.267	0.165	0.986	0.031	0.077 (individual) 0.11 (joint)	0.198	0.215
D. Evaluations							
Sampling frame	Households with at least one woman ages 20-50 who either have a business or economic activity and have resided in the area for 3-5 years.	Households with at least one woman age 18-55 that have resided in the same area for at least three years	Random selection of households	Mexican women ages 18–60 who either have a business/economic activity, would start one if they had enough money, or would consider taking credit from an institution	Women who met eligibility criteria and signed up to declare interest in receiving loan from lender	(1) Households deemed likely borrowers, (2) random selection of households	Marginal loan applicants considered too risky and "unreliable" to be offered credit as regular borrowers under the terms above
Samples	4088 households, 121 villages	6863 households, 52 clusters	6412 households, 162 villages	16560, 238 clusters	1148, 40 villages	4465 households, 81 villages	1196 marginal loan applicants
Panel	Yes	No	No	Partial	Yes	Yes	Yes
Randomization	Across clusters	Across clusters	Across clusters	Across clusters	Across clusters	Across clusters	Across individuals
E. Results							
Diversification into self-employment	Yes	No	No	No	Yes	No	No
Welfare	No	No	No	Yes; for 2 out of 6 indices (depression and fire sales of assets)	Yes; Food consumption, per capita consumption	No	No

Table A1, Part B: Overview of Microcredit Interventions and Evaluations

	(1) This Study	(8) Karlan and Zinman (2011)	(9) Kaboski and Townsend (2012)	(10) Maitra et al (2017)	(11) Fiala (2018)	(12) Cai et al. (2020)	(13) Beaman et al (2020)	(14) Crépon et al. (2020)	(15) Bryan et al (2021)
A. Context									
Region	Uganda	Philippines	Thailand	India	Uganda	China	Mali	Egypt	Egypt
Year	2014	2007	2001	2007	2012	2010	2010	2016	2016
Rural or Urban?	Rural	Urban	Both	Rural	Semi-urban	Rural	Rural	Rural	No Data
Basline Borrowing from Banks	0.8%	No Data	No Data	5%	No Data	13%	No Data	No Data	No Data
B. Borrowers									
Gender of Borrowers	BRAC provides credit only to women	All	All	All	All	All	Female	All	All
Targeted to microentrepreneurs?	Yes	Yes	No	No	Yes	No	No - farmers	Yes	Yes
Loan eligibility	Women aged between 20-50 years; only one member per household; must have lived in the area for three to five years (so not a recent incoming migrant); must not be a client of another microfinance institution; lives within 4km of the local BRAC branch office.	18-60 years old; in business for at least one year; in residence for at least one year if owner, or at least three years if renter; and daily income of at least 750 pesos.	All villages eligible for the Million Baht Village Fund injected potential funds into 77,000 heterogeneous Thai villages. Each transfer used to form an independent village bank for lending within the village	Less than 1.5 acres of land TRAIL (Trader recommended borrowing arm): Trader recommended 30 borrowers, and 10 were randomly selected. GBL: Two 5-member groups formed out of those who were also successful in keeping a savings account with the MFI for previous 6 months.	Surveyed 4630 Central and North Uganda districts. Next, selected 1550 individuals who were willing to take a loan and interested in an ILO training. Further, divided these into 5 groups of Treatment and Control with combinations of grants, loans and training.	Collateral required for individual liability. Group liability (5-7 people) need not be with collateral. For eligibility: More than 18 years of age, and only one member of household can become a member. Need to fill an application and pay membership fees (refundable if no default). Poor households given priority.	Loan product designed for women farmers, who are organized into associations (JL groups). Loans are dispersed at the beginning of the season and collected in the end. Informal application process	(i) Be between the ages of 21-35 (ii) Submitting a basic business plan (iii) Screening by NGO and finally (iv) randomization. Also had a training component, that experienced businesspersons were allowed to exit	Existing clients of the partner MFI were shortlisted based on information with loan officer. This shortlist fills up a loan application that is used by a central credit committee to make final decisions (based on borrowers' repayment of least three prior loans)
C. Loans									
Liability	Group (joint liability)	Individual	NA	Individual vs Joint	Individual	Individual and Groups (joint liability)	Group (Joint liability) in practice	Individual	Individual or firm
Group size	15-30 members	No Data	NA	5 for GBL	NA	5-7 for Group	30	NA	NA
Loan term length	20 weeks or 40 weeks	No Data	NA	4 months	12 months	12 months	4-6 months	No data	12 months
Repayment frequency	Weekly, beginning the second week of loan disbursement	No Data	NA	Lump sum after 4 months	Monthly	Yearly	Lump sum at the end	No Data	Monthly
Interest rate	40-week loans: 40% APR	63% APR	NA	18% APR	20% APR	9.4% APR	25% APR	15-24%	14-17% APR
Loan size	554.93 (2014 USD PPP)	Median 711 (2014 USD PPP)	NA	206 (2014 USD PPP)	No Data	1266 (2014 USD PPP)	159 (2014 USD PPP)	No Data	7522 (2014 USD PPP)
Loan size/GDPc	0.267	0.124	NA	0.05	No Data	0.14	0.09	No Data	0.71
D. Evaluations									
Sampling frame	Households with at least one woman ages 20-50 who either have a business or economic activity and have resided in the area for 3-5 years.	Marginal loan applicants as being randomly assigned to eligible and ineligible by an algorithm	Townsend Thai Dataset	For both TRAIL and GBL villages, 50 households were surveyed. 10 in each were those who were given loans (treated). 10 others were Control 1 that were randomized out. Final 30 were Control 2 who were randomly chosen from the villages.	Random sample from a larger survey in North and Central Uganda	In each county, the Ministry listed 5 poor villages and the study assigned three to treatment and two to control	Stage 1: Villages are divided into loan and grant villages (because the larger aim is to study selection effect when giving loans). Further, the ones not given loans in loan villages are given grants (stage 2)	Those interested in taking a loan were randomly assigned to three treatment arms (in-kind, grant, loan) and a control, after fulfilment of basic criteria	From all the applicants that fit the screening criteria, some were given 2x their previous loan (control) and others 4x (treatment). This was stratified at the loan-officer level
Samples	4088 households, 121 villages	1601 marginal loan applicants	960 households in 64 rural + semi-urban areas	2070 households, 48 villages	1500 individuals	1222 households, 45 villages, 9 counties, 5 provinces	6807 individuals, 198 villages	3294 individuals	1004 borrowers
Panel	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Randomization	Across clusters	Across individuals	Not an RCT	Across clusters	Across individuals	Across clusters	Across clusters	Across clusters	Across clusters
E. Results									
Diversification into self-employment	Yes	No	No	No	No	No	No	Yes	No
Welfare	No	No	Yes, short term; Consumption, wages, income	Yes; Farm incomes (TRAIL only)	No	Yes; Income, well-being index; poverty reduction	No	Yes; Quality of life, profits	Yes; Household income

Table A2: Attrition

OLS estimates and standard errors parentheses (clustered by community)
Dependent variable =1 if respondent attrited at endline

	(1) No Covariates	(2) Covariates	(3) Covariates plus their interaction with treatment
Treated	.030*	.029*	0.034
	(.016)	(.016)	(.051)
Household head completed primary education		.018	.011
		(.011)	(.014)
Wealth score (0-100)		.001*	.001**
		(.001)	(.000)
Engaged in non-agricultural business		.026*	.036*
		(.016)	(.020)
Borrowed from informal sources		-.015	-.027**
		(.011)	(.013)
Total Consumption		.000	-.000
		(.000)	(.000)
Treated * Household head completed primary education			.013
			(.023)
Treated * Wealth score (0-100)			-.000
			(.001)
Treated * Engaged in non-agricultural business			-.020
			(.032)
Treated * Borrowed from informal sources			.026
			(.022)
Treated * Total Consumption			.008
			(.007)
Mean dependent variable	.098	.098	.098
p-value on interactions	-	-	[.718]
Observations	4,092	3,951	3,951

Notes: ***denotes significance at the 1% level, ** at the 5% level, * at the 10% level. OLS estimates are reported based on the sample of households observed at baseline. The dependent variable is a dummy equal to one if the household is observed in both the baseline and the follow-up survey, otherwise it is zero. All specifications control for branch level fixed effects. Standard errors are clustered at the village level.