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Impact of Microcredit on Performance of Women-Owned Non-Farm Microenterprises

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ABSTRACT

This study evaluates microcredit outcomes in Uganda, where non-farm enterprises are critical for complementing farming incomes and diversifying livelihoods. It investigates the effects of microcredit on the performance of non-farm microenterprises (MEs) run by female small-holder farmers, using quasi-experimental cross-sectional and panel designs. The average loan amount was \$278, while the monetary worth of MEs for old borrowers (OBs) and new borrowers (NBs) were \$280 and \$184, respectively. Propensity score matching (PSM) revealed a 24% and 47% increase in funds used to restock and in ME monetary value, respectively, but no differences in ME profits. Difference-in-difference analysis (DiD) over 1 year showed improvements in ME monetary value and employee numbers but no effect on profits, trade expenses, or restocking. Across both methods, no improvement in ME profit levels was observed. However, the increase in monetary worth suggests potential profit growth over time. The borrowing context, repayment terms, and the type and size of MEs appeared to limit profitability. This study highlights the importance of understanding microcredit impacts in contexts where non-farm enterprises are pivotal to rural livelihoods.

1 | Introduction

Microfinance is a popular global strategy that supplies microcredit and other financial services to poor people that are usually excluded from financial markets (Hansen et al. 2021; Tria et al. 2022). It offers capital to micro-enterprises (MEs), leading to business expansion and increased profitability (Annim and Alnaa 2013). Many microfinance institutions (MFIs) target poor women (Banerjee et al. 2015), partly because women generally lack access to credit and because they are more reliable as MFI clients (Fletschner 2009). Microcredit granted to them has been observed to lead to better household outcomes than that given to men (Pitt et al. 2003).

While provision of microcredit is enthusiastically regarded as a tool for poverty alleviation in low-income communities (Tria et al. 2022), the impact of microcredit is still a subject of debate, with studies showing mixed results (Crépon et al. 2015; Merroun and Hamiche 2023), partly because microcredit outcomes are influenced by a number of factors, including context, characteristics of the lending program, socio-demographic and personality characteristics of the borrowers, as well as the type of enterprises engaged in (Kabeer 2005; Snodgrass and Sebstad 2002). Microcredit program provisions such as amounts loaned (Panjaitan-Drioadisuryo and Cloud 1999), interest rate, repayment requirements (Snodgrass and Sebstad 2002; Kabeer 2005), length of borrowing time (Hulme 2000) and non-credit services

may also influence attained outcomes. The type of microenterprise may also determine the probability of successful outcomes (Van Rooyen et al. 2012).

Since microcredit outcomes depends on the context within which a program is implemented (Banerjee et al. 2013; Chliova et al. 2015) there is a need to obtain more evidence on credit-attributable changes in various contexts. Additionally, most studies on impact of microcredit focus on MFI performance (Muhumuza 2005), beneficiary households livelihoods or empowerment of loan recipients (Barasa et al. 2023) benefiary entrepreneurship (Olajide et al. 2016). Studies on outcomes of microcredit on ME performance and their relationship to borrower's characteristics are limited. To our knowledge, there are no studies on the outcomes of microcredit on ME performance in Uganda that take into account borrower's characteristics. This study considered BRAC, the largest MFI operating in Uganda and globally. BRAC operations in Uganda commenced in 2006 and beneficiaries of BRAC loans in Uganda are estimated at 7.8 million (https://bracinternational.org/uganda/). The study area considered (Buikwe and Mukono districts) constitutes rural and peri-urban areas and is close to Uganda's largest city (Kampala), giving its population diverse opportunities for farming and non-farm enterprises. Our earlier study (Namayengo et al. 2018) reported on the microcredit outcomes for farming enterprises and revealed that microcredit did not lead to improvement in agricultural production. In this study, we consider microcredit outcomes on non-farm enterprises. This is important because non-farm enterprises complement income from farming businesses and enable the poor diversify livelihood sources and cope better with uncertainties associated with farming (Alabi et al. 2022; Barasa et al. 2023).

2 | Theoretical Framework

According to UN WOMEN (2018), globally 330 million women and girls live on less than US$1.90 a day, which is 4.4 million more than men. Low levels of education and skills restrict women's access to formal employment opportunities. Consequently, many women turn to self-employment, establishing small-scale microenterprises as a means of empowerment (Henderson 2012). However, these ventures often operate with limited financial and human capital, resulting in low returns. Despite these constraints, microenterprises remain a crucial source of livelihood for women and their households (Khan and Morrissey 2023; Schreiner and Woller 2003).

Proponents of microfinance argue that credit access will lead to increase in the income of households by increasing investment in income-generating activities, including diversification of income sources (Armendáriz and Labie 2011; Armendáriz and Morduch 2010; Khandker and Koolwal 2016), hence contributing to food security. Microcredit access enables to invest in a new business, expand an existing one or increase their labor supply (Banerjee et al. 2015), potentially resulting in ME expansion, increased business outputs, profits and income, and asset accumulation (Gobezie 2004; Karlan and Goldberg 2011). Additionally, non-credit services such as training, business sharing and group support, offered by MFIs contribute to developing of human capital of borrowers, contributing to improvement in

business and self-employment skills (McKernan 2002). On the other hand, diversion of microloans to non-ME expenditures deprives MEs of capital and negatively affects ME profitability or expansion (Gifford 2004; Rutherford 2011).

The nature and state of the business (Crépon et al. 2015; Van Rooyen et al. 2012), socio-demographic attributes, such as level of schooling (Crook et al. 2011), gender (De Mel et al. 2009), age, marital status (Feroze et al. 2011; Van Rooyen et al. 2012), a number of social (Attanasio et al. 2015; Cheston and Kuhn 2002; Fletschner 2009; Gifford 2004) and personality traits (Frederick et al. 2002), may affect the impact of microcredit on enterprise performance.

This study sought to investigate extent to which microcredit contributed to improvements in the performance of women-run microenterprises, using restocking amounts, primary ME value, number of employees, and ME profits as enterprise performance indicators.

3 | Data

3.1 | Study Design

The study used a combination of panel design and a quasi-experimental cross-sectional design in which data were collected from three categories of respondents. The first category was the old borrowers (OB) group who had running loans with BRAC. The second category consisted of in-coming new borrowers into BRAC (NB), before they received their first loan. The third group consisted of a group of women from the same villages as NBs, with a non-farm ME, but who never borrowed from BRAC or other MFI (CG).

During the baseline study, a quasi-experimental cross-sectional design was used to compare non-farm ME performance parameters for OB and NB borrowers based on the USAID/AIMS comparative cross-sectional analysis design (Nelson et al. 2004). The basis of this methodology in the assessment of the effect of microcredit is that, since both groups had already self-selected to participate in microcredit, and one had just not received the loan, the difference between outcome measures for the two may be taken as the effect of the intervention. Furthermore, two waves of data collection were carried out for the NB and the CG groups. The quasi-experimental study considered 467 respondents (203 for NB group and 264 for OB group), while the panel study considered 327 respondents (211 NB and 116 CG).

3.2 | Sampling Procedure

The study enrolled clients from BRAC, which is one of the largest micro-lenders in the world and in Uganda. It operates in many districts of Uganda and had an ongoing expansion plan (BRAC 2013). The BRAC microcredit program uses the Grameen-like group lending model (Armendáriz and Morduch 2010), relying on joint liability of members for loan repayments at weekly group meetings. If a member fails to make her payment, the group chairperson and credit officer urge members to cover the payment in the spirit of solidarity by pooling funds together.

Joint liability helps overcome problems of information asymmetry before lending and moral hazard after lending. Microloans (USD 50–700) are given in cash to individual women who are serviced in 15–20 person Village Organizations (VOs). Loans are repayable in either 20 or 40 equal weekly installments.

Respondents were selected from 138 VOs, from 6 BRAC branches from Buikwe and Mukono districts were selected for the study. All BRAC branches that had been operational for at least 2 years and had expansion plans (pre-requisite for recruitment of new borrowers) were included in the study. The OB group included 30 respondents who had dropped out of the loan program. These were traced and interviewed to reduce drop out bias (Karlan 2001).

BRAC branch managers and loan officers used loan sheets to select VOs with typically agrarian borrowers. All women in a selected VO who had non-farm businesses were eligible as respondents except NBs who previously borrowed from other MFIs. To balance out the effect of loan period and loan cycles, VOs that had existed for more than 2 years were also sampled. The NBs included women who had applied for a BRAC loan but had not yet received it. They were enrolled in the study in the mandatory one-month orientation period before they accessed their first loan. OBs, on the other hand, were women with a running loan with BRAC. VOs for NBs consisted of newly formed VOs and those with new borrowers. The VOs of OBs were those in the same or neighboring village as pre-selected NB groups. The comparison group consisted of women who had never borrowed from BRAC or any other MFIs. Researchers worked with the chairperson of the Local Council in each village to identify women in the CG. These women had to have a microenterprise or engage in agriculture as a source of income. The FGDs comprised of women groups that were selected in the study.

3.3 | Data Collection and Measures

Data collection was conducted by a team of seven enumerators, all whom had degree level training and were proficient in Luganda, the local language used in the study area. Enumerators were trained to ensure accurate data entry and adherence to standardized protocols during data collection. During the training, enumerators translated and back-translated the questionnaire, complementing the work of professional translators from the Institute of Languages of Makerere University. After training, a pilot study was conducted with 25 respondents. The data collected was analyzed to ensure its usefulness for meaningful results, especially for the open parts of the questionnaire. A few modifications were made to the questionnaire following this activity.

Data collection was undertaken between September 2013 and March 2014. It entailed both a questionnaire-based survey and qualitative focus group discussions (FGDs). The questionnaire elicited information on socio-demographic characteristics of respondents and their households nature of enterprise, loan information, enterprise-related expenditure and income, as well as several personality variables.

Three time preference items were adapted from Petrocelli (2003) (see Table 1): "I only focus on the short term," "I live more for the present than for the future," and "The future will take care of itself." Using principal component analysis, all items were found

TABLE 1 | Summary of quantitative data.

Data category	Variables of interest
Respondent socio-demographic characteristics	Respondent age, marital status, education and religion and savings
Household information	Numbers, age, and sex composition of household members. Dependency ratio, defined as the ratio of dependents (aged 0–14 years and those over 65 years) to the household productive members (15–64 years)
Microcredit-related information	Loan amount, loan cycles, loan allocation and expenditure and loan-repayment
Time preference items	1. I only focus on the short term. 2. I live more for the present than for the future; 3. The future will take care of itself.
Achievement motivation items	1. I get restless and annoyed when I feel I am wasting time; 2. I have always worked hard to be among the best; 3. I am an ambitious person; 4. Improving my life is important to me.
Risk preference items.	1. I enjoy taking part in decisions with un-known outcomes; 2. I avoid activities whose outcomes are uncertain (reverse scored); 3. to gain high profits in business one should take decisions even when uncertain of the outcomes; 4. I would invest all my monthly profit in a new business venture.
Non-farm ME data	Type and monetary value of ME
Recurrent ME	Summation of expenditures for paid labor, rent, electricity, tax and license, loan repayment, telephone costs and repairs

Note: Personality characteristics scale (1 = agree strongly; 2 = agree to some extent; 3 = disagree to some extent; 4 = disagree strongly).

to load on a single component. The average score on the different items was used to construct a time preference score for different respondents, ensuring that responses to all the questions were taken into account.

Four items for need for achievement were adopted from Keinan and Kivetz (2011) (see Table 1): "I get restless and annoyed when I feel I am wasting time," "I have always worked hard to be among the best," "I am an ambitious person," and "Improving my life is important to me." Principal component analysis showed that these items were not explained from common factors, so the individual item scores were used in this procedure. Similarly, four items for risk preference were adopted from Bali's and Weber's (2006) (see Table 1): "I enjoy taking part in decisions with unknown outcomes," "I avoid activities whose outcomes are uncertain" (reverse scored), "To gain high profits in business one should take decisions even when uncertain of the outcomes," and "I would invest all my monthly profit in a new business venture." These items were also analyzed individually as they did not load on a single factor in principal component analysis. Descriptions of the other variables derived from the questionnaire interviews are provided in Tables 1 and 2.

Several rigorous steps also undertaken to ensure quality and reliability of the quantitative data collected. To ensure data completeness and detect errors, the lead researcher reviewed filled questionnaires on the day of the interviews and where necessary respondents re-interviewed to fill gaps or correct errors in the data. Data cleaning was done by cross-verifying all entries for consistence and logical coherence. Outlier management included imputation. Z-scores were computed to identify extreme values, and observations with values exceeding ±2 standard deviations were truncated to the 2-standard-deviation threshold. This helped to ensure a balance between data accuracy and robustness.

FGDs were used to explore respondents' reasons for borrowing, loan allocation and use, and perceived benefits of borrowing to MEs, sources of funds for loan repayment and challenges related to the loans. Six FGD sessions were held for OB groups and two sessions for NBs. Each focus group comprised 8–10 participants and comprised all members of the selected group. The FGDs were moderated by the research leader and two trained assistants independently documented participants' responses on paper. In addition, the interviews were audio recorded, with participants' consent. Triangulation of the interview written and transcriptions of audio recordings helped ensure accuracy of the qualitative data collected. The discussions were held in quiet environments, at venues used for meetings of borrower groups with BRAC. Each FGD lasted approximately 90 min.

3.4 | Empirical Strategy and Data Analysis

To determine the outcomes of loans given by BRAC on MEs owned by women in Mukono and Buikwe district, Uganda, we employed a strategy reported in Namayengo et al. (2018), which uses a combination of quasi-experimental and panel data methodologies. The combination of quasi-experimental and panel data methodologies have been used in several microcredit impact studies (Copestake et al. 2001; Kandie and Islam 2022; Ruslan et al. 2020) to assess outcomes of

TABLE 2 | Description of calculated/derived study variables.

Variable	Derivation method
ME profit calculation	Profit proxy described by Daniels (2001) was used; It involved summation of the total value of products consumed by the household, money from the ME used by the household and any money left over after restocking the ME
Loan-taking initiative score	A loan-taking initiative score was a measure of borrower initiative to take a loan. It was based on responses to the question inquiring whose initiative it was to take the loan (0 = Spouse and others, 1 = Self and spouse, 2 = Self)
Repayment dependency ratio	Repayment dependency score was a measure of borrower autonomy in loan repayment. It was based on responses to the question about who was/would be responsible for the repayment of the loan (0 = Others/Spouse, 1 = Self and spouse, 2 = Self)
ME loan–repayment score	The ME loan-repayment score was a measure of ME importance in loan repayment. It was based on responses to the question identifying source of funds for the last loan repayment (0 = Spouse and others, e.g., VO members and family, 1 = Sale of agriculture produce, 2 = Proceeds from loan funded MEs)
Asset index	The first component of principle components analysis (PCA) of respondent household asset ownership included seven count variables (number of tables, chairs, beds, mattresses, cell phones, hoes, and radios) used to calculate the assets index as the average number for the seven variables.
Quality of housing index	The second component of PCA included variables related to quality of housing. Scores were assigned based on whether floor finish was with cement or not (1 = Yes; 0 = No), wall material made of cement (1-Yes, 0 = No); availability of electricity (1 = Yes, 0 = No). The scores were averaged to derive the quality of housing index.

microcredit programs. This approach recognizes the methodological challenges of estimating the counterfactual, that is, what would have happened to loan recipients had they not received loans, as it is not possible for one to be both a loan recipient and a non-recipient at the same time. Since the decision to join a credit program may also be endogenous, as those who decide to join the program, may be different from those who do not join the program (Morduch 2000; Armendáriz and Morduch 2010), there is need to address self-selection bias, which may result. In this study, baseline data were used to construct a quasi-experiment, in which characteristics of old borrowers (OB) and new borrowers (NB) were subjected to comparative cross-sectional analysis design (Nelson et al. 2004). The basis of this methodology in the assessment of the effect of microcredit is that, since both groups have already self-selected to participate in microcredit and one has just not received the loan, the difference between outcome measures for the two may be taken as the effect the intervention. Propensity Score Matching (PSM) was used to cross-check and ensure comparability of OB and NB groups. PSM is well-suited to mitigate selection bias in observational studies by balancing observable characteristics between treated (old borrowers) and control (new borrowers) groups, ensuring comparability of outcome measures for the two groups. Factors which could influence self-selection into microcredit and those which could influence microcredit outcomes were used as control variables in the PSM procedure, with weighted Kernel matching (Luellen et al. 2005). These factors included respondent background characteristics namely religion, marital status, age, years of education, time preference, and risk preference and achievement motivation. In order to compare with the incoming borrowers, all age-related variables of existing borrowers were converted to the age basis at the time of their first loan, indicated as "corrected age," "corrected family size," and "corrected dependency ratio" hereafter. The use of weighted kernel matching is a robust choice, as it improves the precision of matching compared to simple nearest-neighbor matching while utilizing more data points (Khandker et al. 2010). The control variables were used to construct propensity scores estimating the probability of being in the comparison or treatment group. The PSM procedure was also used to estimate the effect of receiving microcredit. The rationale of this procedure is to match the participants in the treatment group to those in the comparison group based on propensity scores. Therefore, any remaining differences observed can be attributed to the treatment. The average treatment effect on the treated (r_{ATT}) was defined as per the equation.

$$\tau_{ATT} = E(\tau \mid D = 1) = E[Y(1) \mid D = 1] - E[Y(0) \mid D = 1]$$

where $D = 1$ if a participant received microcredit and $D = 0$ otherwise. $Y(D)$ is the outcome variable of each participant while $[Y(0) \mid D = 1]$ is counterfactual and unobservable. According to Rosenbaum and Rubin (1983) τ_{ATT} can be expressed as:

$$\tau_{ATT} = E_{P(X) \mid D = 1} \left[E[Y(1) \mid D = 1, P(X)] - E[Y(0) \mid D = 0, P(X)] \right]$$

where $P(X)$ is the propensity score, that is, the probability of an individual to participate in the microcredit program given the observed characteristics X.

Rosenbaum sensitivity analysis was conducted to assess the robustness of our matching procedure against potential hidden bias (DiPrete and Gangl 2004; Rosenbaum 2002), specifically, bias from unobserved respondent characteristics that might influence self-selection into the microcredit program. We used Wilcoxon signed-rank tests to obtain p-values for varying levels of gamma (Γ), which represents the odds ratio of differential treatment assignment due to unobservable attributes. The analysis evaluated each Γ at the critical p-value of 0.05, representing the threshold for significance in the treatment effect due to endogenous selection into treatment.

For monetary value of microenterprises (MEs) and funds used for restocking, results showed that unobservable covariates would need to increase the odds of treatment assignment by factors greater than 3 for the observed treatment effects to lose significance. This indicates that the treatment effects derived from propensity score matching are robust to non-random assignment, even under substantial potential bias from unobserved factors.

For the panel data approach, two waves of data collection were conducted for both the new borrowers (NB) and the comparison group (CG) comprised of women who never received a loan. The baseline and follow-up data collection were 1 year apart. This data was analyzed using the difference-in-difference (DID) to estimate the effect of microcredit by comparing microenterprise (ME) performance indicators for NB with those for the CG. Propensity score matching (PSM) was applied to reduce selection bias between the two groups, ensuring comparability. Time-invariant unobserved characteristics, which could introduce bias, were accounted for and differenced out using the DID approach (Armendáriz and Morduch 2010; Glennerster and Takavarasha 2013; Hulme 2000).

The DID method calculates the difference in outcome variables over two periods, baseline ($T_1 = 0$) and follow-up ($T_1 = 1$), for both the treated group (new borrowers) and the comparison group. Specifically, the method measures the average treatment effect of microcredit as:

$$\text{DID} = E\left(Y_t^T - Y_0^T \mid T_1 = 1\right) - E\left(Y_t^C - Y_0^C \mid T_1 = 0\right)$$

$T_1 = 1$ denotes respondents accessing credit, whereas $T_1 = 0$ denotes the comparision group that never received or applied for microcredit. The DID estimator has the advantage of allowing for unobserved heterogeneity (the unobserved difference in mean counterfactual outcomes between treated and untreated units) that could lead to selection bias.

The DID methodology was improved by combining it with Kernel matching (Khandker et al. 2010) to ensure comparability of the two groups based on observable variables including two wealth indices (housing index and asset index), demographic and personality characteristics that would influence the decision to take credit. Once Kernel matching was performed, and data outside the common support region was excluded, the panel showed strongly balanced treatment and comparision groups with respect to the selected variables, none of them being significantly different across the two groups.

4 | Results

4.1 | Cross-Sectional OB/NB Comparison Results

Descriptive characteristics of the respondents in the cross-sectional study before and after matching on factors that would influence microcredit participation are shown in Table 3.

4.2 | Propensity Score Matching

The probit regression analysis of treatment and control group membership, before matching, indicated no differences in education level, dependency ratio (defined as the ratio of dependents, aged 0–14 years, and those over 65 years, to the household productive members, 15–64 years), time preference, achievement motivation, and religion, between the treatment and control groups. Older women were more likely to be part of the OB group. Respondents in both groups had limited formal education, regardless of the group to which they belonged (OB or NB). The average length of schooling was 7.2 years for both groups. The dependency ratio was similar for both groups. The majority of women in both groups were married. Both groups had respondents with a moderate future time preference on the 4-point time preference scale. After matching, the two groups became about equal for all control variables in the study (Table 3).

4.3 | Borrowing Information for Respondents in the Cross-Sectional Comparison

Table 4 shows borrowing information including loan-taking initiative, loan amount and the loan–investment ratio for OB and NB respondents. The average scores of loan-taking initiatives for the NB and OB respondents were 1.02 and 1.24, respectively.

TABLE 3 | *T*-tests for equality of means for different variables before and after matching.

Characteristic	Unmatched sample means			Matched sample means			% Bias	% Bias reduction
	OB	NB	*T*	OB	NB	*t*		
Dependency ratio	1.56	1.44	1.03	1.56	1.59	0.26	−2.60	74.50
Age at first loan (years)	34.76	32.82	2.00*	34.76	34.56	0.21	2.10	89.70
Education (years)	7.24	7.42	0.57	7.24	7.27	0.10	−0.10	83.70
Time preference	3.45	3.42	0.38	3.45	3.44	0.14	1.30	65.00
Achievement motivation	1.07	1.05	0.93	1.07	1.06	0.45	4.50	51.60
Risk preference	2.27	2.26	0.14	2.27	2.25	0.28	2.70	−96.00
Anglican (%)	0.31	0.25	1.39	0.31	0.29	0.51	5.00	64.00
Pentecostal (%)	0.12	0.16	1.23	0.12	0.13	0.34	−3.20	74.10
Muslim (%)	0.26	0.19	1.55	0.19	0.26	0.05	0.50	97.00
Marital status (%)	0.69	0.71	0.44	0.69	0.71	0.50	−4.80	−10.20
Household asset index	2.13	2.07	0.81	2.13	2.15	0.15	−1.40	82.30
Quality of housing index	0.44	0.45	0.39	0.44	0.45	0.49	−4.60	−20.60

*$p < 0.05$.

TABLE 4 | Borrowing information for OB and NB respondents.

Variables	NB				OB			
	Max	Min	Mean	SD	Max	Min	Mean	SD
Loan-taking initiative index[a]	2	0	1.02	0.92	2	0	1.24	0.91
Repayment dependency score[b]	2	0	1.46	0.89	2	0	1.54	0.83
Fraction of loan to be and/or actually invested into ME[c]	1	0	0.87	0.30	1	0	0.73	0.32
ME-repayment score[d]	2	0	1.90	0.38	2	0	1.82	0.55
Financial burden score[e]	1	0	0.60	0.49	1	0	0.60	0.49

[a]Level of initiative to take last loan.
[b]Autonomy of borrower during loan repayment.
[c]Anticipated or actual percentage of loan invested in ME.
[d]Score of ME as source of funds to repay the loan.
[e]Level of burden on woman for household financial expenditures.

This means that the decisions to take loans were mainly taken by women together with spouse.

About loan repayment, one-third of the respondents hoped others would be in charge of paying back the received loans. The calculated loan repayment dependency score (measure of how much women were in charge of loan repayment) was between 1 and 2 (see Table 4) (1.46 and 1.56 for NB and OB, respectively). This implied that a few borrowers expected others rather than themselves to be in charge of loan repayment.

For both NBs and OBs, ME-loan repayment scores close to 2 (see Table 4) were obtained, the maximum possible score for the ME as a source of funds for loan repayment. This implied that MEs were considered the major source of funds for loan repayment for both OBs and NBs.

Contrary to the expectation that microloans would be invested entirely in productive activities, both qualitative and quantitative results revealed that loan recipients only invested part of the loans in their non-farm MEs, using the rest of the borrowed money for lump-sum non-business expenditures (usually school fees and building expenses). Quantitative results revealed that even before accessing loans, NBs anticipated allocating most of the received funds (87%) into MEs, with the remaining percentage being allocated to other household expenditures. The OB category reported investing 73% of the loans into MEs. On average NBs anticipated investing 10% of received loans into the education of children. The OBs reported a similar percentage. The NBs had not received loans by the time of the study, but the average amount of running loans for OBs was UGX 725,000 ($278) and the average number of loan cycles was 3. The average self-reported monetary worth of the primary MEs for the OB and NB categories was about $280 and $184, respectively.

In the FGDs the following reasons for borrowing, in order of frequency of occurrence, were mentioned: (1) paying children's school fees; (2) recapitalise non-farm microenterprises; (3) personal development; (4) household welfare and improvement; (6) crop farming; (7) animal husbandry; (8) starting a new business. This shows that several non-business expenses were among the motives for acquiring credit.

4.4 | Microenterprise Information for Current Borrowers (OB) and In-Coming Borrowers (NB)

Table 5 provides the distribution of respondents in the cross-sectional comparison of OB and NB by ME category and by type of main non-farm ME.

For both OBs and NBs more than half of respondents with non-farm microenterprises had both farm and non-farm MEs. The majority of respondents were small-shop and market retailers of farm produce from their gardens and from other farmers. They also dealt in basic household consumer goods such as sugar, salt, and paraffin. About one-tenth of both NBs and OBs were involved in production-related activities, including making crafts, liquid soap, and bread. Common natural-resource-extraction activities included brick making, charcoal burning as well as hand stone quarrying.

TABLE 5 | Percentage of respondents with different ME categories and activities.

Type of microenterprise (ME)	OB ($n = 264$)	NB ($n = 203$)
ME category		
Non-farm ME only	48.86	40.89
Both agricultural and non-farm ME	51.14	59.11
Total	100.00	100.00
Type of main non-farm ME activity		
Petty trade (small shop and market retailers)	60.84	72.28
Services	15.97	10.40
Natural resource extraction	9.51	3.47
Production	12.17	11.39
Other	1.51	2.46
Total	100.00	100.00

4.5 | Effect of Microcredit on Performance of Women-Run Non-Farm MEs

The respondents used in the assessment of effect size were not significantly different across control and treatment groups on all weighted control variables of the study after matching. Also, the balancing condition was met, indicating similar distributions of the control variables independent of treatment status. Since the PSM procedure indicated that potential bias between the treatment and control groups was removed, differences in outcomes could then be attributed to the effect of microcredit.

Results of the PSM analysis (Table 6) of baseline OB and NB data revealed positive effects of microcredit on recurrent business input expenditures (expenditures other than restocking), the self-reported monetary worth of the MEs, and the funds used for restocking the businesses, transformed into logarithms. The OBs spent on average 33% more than NBs on recurrent business expenditures (other than business stock). Money invested in restocking was found to be 24% higher in OBs than NBs. Additionally, self-reported monetary worth of non-farm MEs for OBs was 47% larger than for NBs. There was, however, no significant difference between ME profits for OBs and NBs.

In the FGDs respondents were asked for opinions on the general performance of their MEs after microcredit access. Results were mixed. Some women reported that their businesses had expanded and had become more profitable. Others indicated that the businesses could not grow since they regularly got money out of them for weekly loan repayment. Results of both the qualitative and quantitative survey show that women operated small auxiliary businesses rather than the main business, to provide funds for loan repayment. Some of these comments and observations from the FGDs throw doubt as to whether the MEs were actually profitable.

4.6 | Panel Results

During baseline, a total of 116 CG respondents had some form of non-farm ME, with the majority (56.90%) having non-farm MEs only, without farming enterprise. In the case of the NB category the number was 211, the majority of which (56.87%) had both agriculture and non-farm MEs only (see Table 7). The monetary value of women's MEs and amounts borrowed were found to be quite low. Hence microcredit's contribution to capitalization of MEs remains low.

During the follow-up study, a total of 84 CG respondents had some form of non-farm ME, with the majority (59%) having non-farm MEs only. The number for the NB category was 140 respondents having some form of non-farm ME, with the majority (58%) having non-farm MEs only.

4.7 | Effects of Microcredit on Performance of Women-Run Non-Farm MEs

DID analysis of non-farm ME performance showed a slightly larger increase in self-reported monetary value of the MEs for the NB than CG ($p < 0.10$). However, the number of employees showed a larger increase for NB than CG. DID analysis did not reveal changes in profits, trade expenses, and restocking amounts between NB and CG (see Table 8).

Both PSM and DID revealed no significant change in the profit variable was not significant in either method. In addition, the effect on the number of employees was not significant from the PSM analysis, but was significantly negative in the DID calculation, contrary to expectation. This means that microcredit did not lead to increase in number of employees for

TABLE 6 | Type of microenterprises run by women in comparison group (CG) and in-coming (NB) borrowers (%).

Type of microenterprise	CG	NB
Non-farm ME only	56.90	39.80
Both agricultural and non-farm ME	30.17	56.87
Petty trade	61.39	72.41
Services	20.79	10.34
Natural resource extraction	0.99	3.45
Production	13.86	11.33
Other	0.99	1.64
N	116	211

TABLE 7 | Effects of microcredit on non-farm ME performance (PSM with Kernel matching).

Outcome variable	N	ATT (OB)	N	ATT (NB)	Difference	T
Ln (profit)	217	11.95	185	11.79	0.16	1.31
Ln (monthly expenses for trade)	217	11.37	185	11.04	0.33	2.68**
Ln (total ME value)	217	12.96	191	12.49	0.47	4.24***
Ln (restocking amount)	213	11.78	193	11.54	0.24	2.32*
Number of employees	148	0.15	193	0.14	0.00	0.11

Note: **$p < 0.05$, *$p < 0.10$; standard errors in parentheses. Monetary value of profits, monthly expenses for trade, total ME value, restocking amount (in natural logarithms).

TABLE 8 | DID with Kernel matching result for different performance parameters for trade MEs of NB and CG groups.

Variable	Cat	N	T_1 means	T_1 diff. ($T_1 - C_1$)	N	T_2 means	T_2 diff. ($T_2 - C_2$)	Diff-in-diff	T
Ln (restocking amount)	CG	77	10.99	0.61 (0.13)**	54	11.20	0.45 (0.16)**	−0.16 (0.21)	−0.79
	NB	193	11.60		114	11.64			
Ln (monthly trade expenses)	CG	74	10.61	0.43 (0.15)**	48	11.01	0.37 (0.19)**	−0.06 (0.24)	−0.27
	NB	48	11.04		117	11.38			
Number employees	CG	97	0.01	0.10 (0.03)**	95	0.05	0.01 (0.03)	−0.08 (0.04)	−2.07**
	NB	199	0.13		196	0.05			
Ln (ME profits)	CG	73	11.67	0.14 (0.15)	49	11.80	−0.06 (0.191)	−0.20 (0.24)	−0.87
	NB	177	11.81		108	11.73			
Ln (ME value)	CG	81	11.91	0.68 (0.15)**	56	11.96	1.01 (0.18)**	0.39 (0.24)	1.65*
	NB	190	12.54		120	12.97			

Note: **$p < 0.05$, *$p < 0.10$; standard errors in parentheses. Monetary value of profits, monthly expenses for trade, total ME value, restocking amount (in natural logarithms).

non-farm MEs. The monthly recurrent business expenditures as well as funds for restocking MEs were significant in PSM but not DID analysis. Microcredit had a positive effect on primary ME value for both PSM and DID albeit at different levels of significance.

5 | Discussion

This study assessed the effects of borrowing on the performance of women-run non-farm microenterprises. Hypothesis H_0: Participation in the microcredit program does not lead to improvements in the performance of women-run microenterprises was partly confirmed and partially rejected for different ME performance indicators, as outcomes differed between PSM and DID analysis.

Just like the finding of Dunn and Arbuckle (2001), borrowing was associated with higher ME monetary worth in both PSM and DID analysis. For other variables the results were mixed. However, for both comparisons, evidence of improvement in the level of profit from the MEs among borrowers was not found within the time frame of the study. Given the increase in ME monetary worth, it is possible that the profits of MEs in which loans were invested would increase over time. It therefore seems that microcredit does not have potential to improve ME profitability, even though a positive effect on profit was not recorded in the current study.

One of the major advantages of borrowing is the provision of physical capital to MEs (Feder et al. 1990). Evidence of borrowing providing capital for MEs was found, as evidenced by increment in the monetary worth and restocking amount of the borrowers' MEs. The positive contribution of borrowing on ME monetary worth seems a direct result of investment of borrowed funds in MEs. An average loan–investment ratio of about 73% for borrowers was found in the study. The observed loan investment ratio seemed adequate to bring up the monetary worth of the MEs. The ME stock may serve as a store of wealth. ME stock may be consumed by the household or cash from sale of stock may be used for future consumption. The use of part of the loan for other household needs, usually education and building, also has positive implications for non-food consumption smoothing. In addition, investment in education is a human capital investment.

Loan diversion and loan fragmentation between different household consumption expenditures was reported by Attanasio et al. (2015) who observed loan usage levels similar to ours from a study on borrowers in Mongolia. Fractionation and diversion of the already small loans reduces funds available for ME expansion, and may impair profitability. However, fractionation may not be avoidable as the poor usually have relatively high demand for consumption credit. Since consumption credit is rarely offered, the poor revert to business loans and use them for consumption (Mahajan and Ramola 1996). The diversion of loan funds by poor borrowers from business to competing household needs has been discussed by Matin et al. (2002), and Rutherford (2011). UBOS (2010) reported that the three most important motives for people to borrow in Uganda were to get working capital for small businesses,

to buy consumption goods, and to pay school fees. Of these reasons, borrowing for investment was the reason most cited during loan application.

Unlike studies that found improvement in ME profits after borrowing (Dunn and Arbuckle 2001; Eton et al. 2017), the current study did not record any improvement in profits. High borrowing costs is one factor that has been suggested to impede outcomes of microcredit on ME performance (Eton et al. 2017). At the time of the study BRAC charged flat interest rates of 12% and 25%, for 20 weeks and 40 weeks, respectively. This translates into annual interest rates of 32.5% and 32.0%, respectively. Women in our study decried these interest rates as being rather high. They engaged in a variety of activities to meet the demands of loan repayment, to the extent that defaulting was very low. Many lenders justify the high rates with arguments that it is expensive to lend to the poor because they live in hard-to-reach areas and demand only small loan amounts (Marek 2011). High interest rates enable lenders to attain financial sustainability, though it may compromise the much-acclaimed social objectives of lending. Recipients may be unable to benefit from the loans or have very little money left after loan repayment (Copestake 2007; Roxin and Fiege 2010). Our study shows that the MEs were an important source of loan repayment funds for the borrowers in the study. The requirement for loan repayment to commence right away may discourage risk-taking and innovation (Banerjee et al. 2013).

The lack of improvement in profits from MEs has been reported elsewhere. Banerjee et al. (2015) observed no improvement in profits in an experimental study of small MEs of microcredit recipients in India. Copestake et al. (2001), using a combination of PSM and qualitative FGDs, found improvement in profits and household income for borrowers on the second loan cycle. These results may suggest that time is needed to translate borrowed funds injected into MEs into profits. Borrowers on the first loan cycle seemed to become worse off due to rigid loan repayment protocols that neglected the risks and uncertainties in business (Mosley and Hulme 1998).

Borrowing is supposed to lead to improvement in input and output management of borrowers, leading to improved performance (Sebstad et al. 1995). This may not be realized among very poor borrowers given their small MEs meant mainly to fund subsistence. Matin et al. (2002) observed that poor borrowers did not hire more labor or utilize improved technology, after borrowing. Coleman (1999) in a quasi-experimental design study, with pipeline borrowers as comparison group, observed negligible impact of microcredit on productive expenses. Studies in Ghana by Fafchamps et al. (2011) found women-run MEs to yield lower returns even when they got the same financial support as men.

Our results show some positive outcomes of microcredit including increase in monetary value of businesses and higher investment in stocking of goods. However, no difference in profits was recorded. Since profit is the major goal why most people invest, it can be concluded that microcredit to women owners of non-farm enterprises in this study did not result in improved returns and is therefore unlikely to contribute to poverty alleviation. Despite borrower's businesses not recording increase in profits,

amount of money invested in stocking and business's monetary value businesses increased. This is a positive trend and may be indicative of progress towards increased profits.

Given the observations that microcredit did not increase profits, there is need for studies, specifically to further investigate reasons why profits did not increase even when monetary value stocking expenditures of the businesses increased. There is also need to explore options for improving the entrepreneurial capacity of borrowers. This could be done through training in different aspects of business. Another intervention worth exploring is improving loan screening, with a view of minimizing approval of loans for enterprises that are unlikely to be profitable.

6 | Conclusion

In conclusion, microcredit increased investments and enterprise value but did not immediately enhance profitability for non-farm microenterprises.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that supports the findings of this study are openly available in DANS Data Station Social Sciences and Humanities database at https://doi.org/10.17026/dans-xxw-aybn. Reference number [SE – 2020-05-07 00:00:00.0].

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