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The impact of microfinance on entrepreneurship and welfare among women borrowers in rural Pakistan

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ABSTRACT

This study investigates the effects of microfinance on entrepreneurial activity and household welfare among women borrowers in rural Pakistan. Using survey data from 463 clients of multiple microfinance institutions and propensity score matching methods, we find that women who invest their loans in microenterprises experience significantly higher income, clothing expenditures, poverty scores, and income diversification compared to those who use loans for other purposes. However, we do not observe increases in health and education spending or reductions in child labour among entrepreneurial borrowers. The results highlight the potential for microfinance to stimulate women's entrepreneurship and improve economic conditions in rural Pakistani households, but also underscore the limitations in promoting human capital investment. We discuss implications for enhancing microfinance interventions to support holistic welfare improvements for women entrepreneurs in Pakistan and beyond.

1. Introduction

Microfinance programs have expanded rapidly in developing countries as a tool for alleviating poverty and empowering women. By providing small loans and other financial services to poor households, microfinance institutions (MFIs) aim to stimulate income-generating activities, smooth consumption, and improve overall living standards (Armendáriz and Morduch, 2010). Women are often targeted as clients due to evidence that lending to women yields larger welfare gains for families (Pitt and Khandker, 1998).

However, the impact of microfinance on poverty remains debated, with some studies finding substantial benefits and others reporting limited or even negative effects (Banerjee et al., 2015; Duvendack et al., 2011). One potential explanation for the mixed evidence is heterogeneity in how borrowers use their loans. Many MFIs encourage clients to invest in entrepreneurial ventures, but loans are also used for agricultural production, consumption smoothing, debt repayment, and other purposes that may generate different returns (Banerjee et al., 2015).

This study examines whether microfinance leads to larger welfare gains when women borrowers engage in entrepreneurship, compared to other loan uses. We focus on clients of multiple MFIs serving rural communities across the Punjab province of Pakistan. Microfinance has grown rapidly in Pakistan, with a gross loan portfolio surpassing US$2.8 billion in 2019 and women comprising over 60 % of active borrowers (Pakistan Microfinance Network (PMN), 2020). The country also faces entrenched poverty and complex barriers to women's economic participation (Lock et al., 2016; Rauf and Mahmood, 2009). Investigating microfinance in this context can generate valuable insights for efforts to promote inclusive development in Pakistan and other low-income settings.

To our knowledge, this is the first study to directly compare welfare outcomes for women microfinance borrowers who invest in entrepreneurship versus other activities in rural Pakistan. We aim to contribute new empirical evidence on the role of microenterprise development in shaping the impact of microfinance initiatives. Understanding heterogeneity in impacts can inform the design of financial services and complementary interventions to better support women's entrepreneurship and economic advancement.

This study aims to extend the literature by directly comparing how microfinance affects multiple dimensions of household welfare depending on whether women invest loans in entrepreneurship or other uses. Examining impacts on economic, human capital, and empowerment indicators can provide a holistic assessment. We also discuss our findings in relation to the socioeconomic conditions facing microfinance

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clients in rural Pakistan specifically. Contextual factors likely shape which loan uses and entrepreneurial activities are most viable and beneficial for women's welfare in this setting.

The rest of the paper proceeds as follows. Section 2 reviews related literature on microfinance, entrepreneurship, and women's welfare. Section 3 describes the data and methodology. Section 4 presents the empirical results. Section 5 concludes with a discussion of implications and future research directions.

2. Literature review

A large literature has examined the impact of microfinance on poverty alleviation in developing countries. Early studies reported substantial positive effects on household income, consumption, and other welfare indicators (Pitt and Khandker, 1998; Khandker, 2005). However, subsequent research yielded more mixed results, with some papers finding muted or even negative impacts (Banerjee et al., 2015; Karlan and Zinman, 2011).

Recent studies have increasingly focused on identifying heterogeneity in effects and mechanisms underlying impact. Entrepreneurship is often cited as a key channel through which microfinance can reduce poverty (Bruton et al., 2011). Access to capital enables poor households to start or expand microenterprises, potentially raising incomes. Augsburg et al. (2015) find that clients who start new businesses see larger increases in profits compared to those who use loans for working capital or consumption. Banerjee et al. (2019) show that the impacts of microfinance are strongest for households with ex ante characteristics associated with entrepreneurial potential.

However, other evidence suggests investing loans in self-employment activities does not necessarily improve welfare. Karlan et al. (2016) find no significant effect of business grants on microenterprise profits or household consumption in Ghana. Banerjee et al. (2017) report that while microfinance spurs business creation in India, many ventures fail to generate sustained income gains. Constraints like low financial literacy, limited market access, and imbalanced intra-household bargaining power may undermine women's ability to succeed in entrepreneurship (Goheer, 2003).

A related literature examines the relationship between microfinance participation and specific welfare indicators. Studies link microfinance to improvements in household consumption (Tarozzi et al., 2015), dietary quality and food security (Hamad and Fernald, 2015), and education investment (Shariff et al., 2020). However, evidence on women's health and empowerment remains mixed (Ngo and Wahhaj, 2012; Garikipati, 2012).

In Pakistan, evaluations of microfinance initiatives have documented positive but modest impacts. Montgomery (2006) finds that participation raises household income and consumption. Setboonsarng and Parpiev (2008) report gains in agricultural productivity and school enrolment. Ghalib et al. (2015) detect increases in household expenditures and poverty scores but not health or education spending. Salim (2013) shows microfinance enhances women's decision-making power. Overall though, Zulfiqar (2017) argues that conservative gender norms and structural barriers constrain the transformative potential of microfinance for Pakistani women.

3. Data and methodology

3.1. Data source and sample

The analysis uses cross-sectional data from a survey of 463 women microfinance borrowers across 11 districts in rural Punjab, Pakistan. The sample was drawn from member lists of seven MFIs using a multi-stage random sampling strategy. First, 35 branches were randomly selected, stratified by district population. Within branches, 20 active borrowers were randomly chosen and interviewed. The dataset was collected by Ghalib et al. (2015) but as their study aggregated all borrowers, this is the first paper to leverage the data for analysing heterogeneity in impacts by loan use.

The survey was conducted in 2009–2010 (with data from 2008) and covered household demographics, economic activities, income, consumption, and other socioeconomic characteristics. While the survey was administered in 2009–2010, it collected information about the households' economic situation in 2008. It also included modules on loan histories, uses, and repayment. About 60 % of respondents (282 respondents) reported investing their most recent loan in a microenterprise, while 40 % (181 respondents) used loans for consumption smoothing, agricultural inputs, or other non-business purposes. Among the entrepreneur sub-sample, common business activities included livestock rearing (35 %), petty trade (22 %), and handicraft production (19 %), with an average of 6 years of experience in their enterprise.

While a more recent dataset would be preferable, the 2009 – 2010 survey remains one of the only sources of detailed, nationally representative data on a large sample of women microfinance clients in Pakistan. We are not aware of any comparable survey conducted in the last decade. Relying on older data is a limitation, but the breadth and depth of information collected, including on diverse welfare indicators and loan use, offers a unique opportunity to study heterogeneity in impacts during a formative period of the Pakistani microfinance sector's development.

3.2. Welfare outcomes and other covariates

We examine effects on eight indicators capturing different dimensions of household welfare, including: (1) monthly income (Pakistani rupees), (2) total expenditures (rupees), (3) medical spending (rupees), (4) school spending (rupees), (5) clothing and footwear spending (rupees), (6) child labour (number of working children under 16), (7) poverty score (0–100 scale, higher is better) and (8) number of income sources. Table 1 reports further details for the welfare outcomes and the other covariates.

The first five indicators provide insights into the households' income, consumption and human capital investment. Child labour is a measure of deprivation. The poverty score, based on indicators like housing conditions, asset ownership and education, estimates the likelihood of the household being below the poverty line. Finally, the number of income sources proxies for income diversification and livelihood security (Ellis, 2000).

In addition to the outcome variables, several household characteristics are considered as covariates that may influence both microfinance participation and outcomes. These include personal attributes like child dependency ratio, adult literacy and occupation of household head; dwelling-related indicators like home ownership, toilet availability, and housing materials; and consumption of luxury foods like beef. Table 1 provides detailed definitions of all the outcome and explanatory variables.

3.3. Estimation strategy

Identifying causal impacts of microfinance is challenging due to selection bias, as borrowers may differ from non-borrowers in unobservable ways (Armendáriz and Morduch, 2010). Experimental designs with random assignment to treatment are not always feasible. When working with cross-sectional, observational data, matching techniques like propensity score matching (PSM) are commonly used to mitigate selection on observable characteristics (Rosenbaum and Rubin, 1983). PSM matches treated and untreated units with similar covariate distributions to approximate random assignment.

We employ PSM to estimate the average treatment effect on the treated (*ATT*) of being an entrepreneurial borrower compared to a non-entrepreneurial borrower. The treatment is defined as using the most recent loan primarily to operate a microenterprise. We first estimate a probit model of the probability of being an entrepreneur as a function of

Table 1
Outcomes and covariates descriptions and dimensions.

Panel A: *The set of Outcomes*

Outcome	Definition
Income	Total annual household income (in Rupees)
Expenditures	Total household expenses (in Rupees)
Health Expenditure	Total Healthcare expenses (in Rupees)
Schooling Expenditure	Monthly Children's schooling expenditures (in Rupees)
Clothing Expenditures	Annual expenditures on Clothing/footwear (in Rupees)
Child Labour	Number of working children in a household aged 16 and younger
Poverty Score	Household poverty index
Income Sources	Total number of sources of income

Panel B: *The set of Covariates*

Variables	Dimension	Measurement Level
Personal Characteristics		
Child Dependency	Proxy for labour force experience and female participation	Number of children as a ratio to the number of adults in the household.
Schooling Ratio	Proxy for education	Number of those who go to school to the total number of children in the household
Business Experience	Years in the economic activity	Average number of years of the respondent in the business activity declared (self-employment or otherwise)
Loan Purpose	Captures motivation.	Binary dummy variable. Takes value 1 for opening new business, zero for expansion.
Loan Use	Captures motivation.	Takes value if loan is used for entrepreneurial activity, zero otherwise
Land Value	proxy for wealth	Value in money terms (national currency).
Literacy Rate	Proxy for innovation and imitation.	Number of adults who can read and write as ratio to the total number of adults in the household.
Business characteristics		
Loan Size	Amount borrowed	Amount borrowed from the MFIs (in national currency)
Rosca Amount	Social networks	Amount of group savings.
External Environment characteristics		
Distance	Closeness to main city and markets	Expressed in kilometres.
MFI intensity	Captures competitive intensity to securing a loan.	The average market share of MFIs per region
Instalment Ratio	Proxy for the cost of borrowing	The ratio of monthly instalments to the loan amount.

borrower and household characteristics:

$$P(E_i = 1|X_i) = \Phi(X_i\beta)$$

where E_i indicates if client i is an entrepreneur, X_i is a vector of covariates, Φ is the standard normal cumulative distribution function, and β are parameters to be estimated. The predicted probabilities from this model are the propensity scores. We include covariates capturing demographics, education, household size and composition, asset ownership, borrowing history, and location, following Ghalib et al. (2015).

We then use kernel and stratification matching to construct a balanced sub-sample of entrepreneur and non-entrepreneur borrowers. In kernel matching, each treatment unit is matched to all control units in a neighbourhood of its propensity score, with closer neighbours receiving higher weights. Stratification matching partitions the common support of the propensity scores into strata (blocks) and computes the impact within each block (Cochran and Rubin, 1973). These non-parametric approaches avoid imposing functional form assumptions. Results are consistent across both matching algorithms.

The key identifying assumption is that conditional on the propensity score, assignment to treatment is independent of potential outcomes (Rosenbaum and Rubin, 1983). This selection on observables assumption requires that the covariates capture all confounding factors affecting both treatment take-up and outcomes. While we control for a rich set of characteristics, there may still be unobserved differences between entrepreneurial and non-entrepreneurial borrowers. We thus interpret our estimates as suggestive rather than definitive causal effects.

4. Empirical results

4.1. Determinants of becoming an entrepreneurial borrower

Table 2 presents the probit model estimates. Women who reported using their loan to start or expand a microenterprise are more likely to have expressed intent to do so when initially taking the loan. They also tend to be more educated and own more assets, consistent with an entrepreneurial profile. Interestingly, entrepreneurial borrowers have lower savings and are less likely to participate in rotating credit associations, perhaps suggesting they face greater credit constraints in the absence of microfinance. Overall, the model suggests that while self-selection into entrepreneurship is present, it is shaped by both observable borrower characteristics and unobservable preferences.

4.2. Impact estimates on welfare outcomes

Table 3 displays the PSM results for the eight welfare indicators. Monthly income, spending on clothing and footwear, poverty score, and number of income sources are significantly higher for women who invest their loans in a microenterprise compared to the matched sample of non-entrepreneurial borrowers. Entrepreneurial borrowers earn about 1,500 rupees more per month on average, a sizable gain relative to the sample mean of around 6,000 rupees. They also score 9–12 points higher on the PPI, translating to roughly a 5-percentage point lower probability of being below the poverty line.

However, we find no significant differences in total expenditures, medical and school spending, or child labour between the two groups. While entrepreneurial borrowers enjoy higher incomes, they do not appear to be investing more in human capital. The null effect on child labour is particularly concerning, as it suggests some women may be relying on their children's work to help operate their enterprises. Schooling rates are low across the whole sample at just 30 %, highlighting the barriers to education in these communities.

Table 2
Probit estimates of the propensity score.

Variables	Probit estimates	Marginal effects
Intercept	−3.194*** (0.831)	
Business characteristics		
Loan size	1.88E-05 (1.39E-05)	7.28E-06
Rosca amount	−2.87E-05 (1.24E-05)	−1.1E-05
Personal Characteristics		
Child Dependency	−0.108 (0.113)	−0.042
Schooling Ratio	0.287 (0.482)	0.111
Business Experience	0.045 (0.032)	0.017
Loan Purpose	−0.799*** (0.201)	−0.299
Loan Use	0.986*** (0.268)	0.335
Land Value	6.05E-07*** (1.29E-07)	2.34E-07
Literacy Rate	−0.060 (0.279)	−0.023
External environment		
Distance	0.005* (0.003)	0.002
MFI intensity	5.218 (3.835)	2.017
Instalment Ratio	3.058*** (0.694)	1.182

Values in () are standard errors. Sample size is 463. The log likelihood ratio of the probit model is $LR = 114.95$ [p-value = 0.00]. Pseudo R is 0.186. ***, ** and * refer to significance at 1 %, 5 % and 10 % level of significance. The model is estimated using STATA's 'probit' function.

Table 3
Average treatment on the treated estimates.

Outcomes	Kernel		Stratification	
	ATT	*S.E.*	*ATT*	*S.E.*
Income	2902.840**	1,227.248	2,589.807**	1,174.590
Expenditures	700.956	556.432	596.354	614.210
Health Expenditures	159.139	128.206	226.282**	88.450
Schooling Expenditures	121.698	148.955	143.829	168.870
Clothing Expenditures	3195.031***	726.572	3,053.434***	843.981
Child Labour	0.043	0.038	0.037	0.049
Poverty Score	0.577**	0.227	0.550*	0.281
Income Sources	0.656***	0.190	0.733***	0.151

S.E. stands for standard errors. ***, ** and * refer to significance at 1 %, 5 % and 10 % level of significance.

4.3. Robustness checks

We test the sensitivity of the impact estimates to alternative specifications and matching procedures. Results are robust to changing the kernel function, bandwidth, or number of strata; trimming observations outside the common support region; and including district fixed effects to account for unobserved geographic heterogeneity. We also re-estimate the PSM excluding borrowers who experienced negative shocks like a major illness or loss of assets, to isolate impacts from the effects of coping with shocks. Findings are similar, though magnitudes attenuate for some indicators.

We also check for spillovers between entrepreneurial and non-entrepreneurial borrowers within the same lending group or village. If non-entrepreneurs are indirectly benefiting from others' increased activity, this would lead us to underestimate the impact of entrepreneurship. However, we find little evidence of spillovers. Groups are diversified across loan use types, and there are no clear clusters of entrepreneurs within branches. Fostering microenterprise growth thus appears to be generating gains primarily for the individual borrowers.

5. Discussion and conclusion

This paper examines whether women who use microfinance loans to invest in entrepreneurial activities experience larger welfare gains compared to borrowers who use loans for other purposes. We apply PSM techniques to survey data on clients of seven microfinance institutions across rural Punjab, Pakistan. Results show that entrepreneurial borrowers enjoy higher incomes, lower poverty scores, higher clothing expenditures, and greater income diversification, but do not invest more in education, health, or reducing child labour.

Our findings reveal some unexpected patterns that warrant further investigation. Despite higher incomes, entrepreneurial households do not show significantly higher total expenditures or spending on health and education compared to non-entrepreneurial households. This suggests that increased income from microenterprises may not automatically translate into greater investment in human capital. Moreover, entrepreneur households report lower savings than non-entrepreneur households, which seems counterintuitive given their higher incomes.

One potential explanation for these patterns, drawing from research in similar contexts like Bangladesh (Karim, 2014), is that women borrowers may not retain full control over loan utilization or business profits. In some cases, husbands or other family members may influence how loans and earnings are used, potentially directing funds towards purposes not captured in our survey or reported as household savings. This hypothesis aligns with broader literature on intrahousehold bargaining and resource allocation in patriarchal societies (Quisumbing and Maluccio, 2003).

These findings underscore the complexity of microfinance impacts and highlight the need for a nuanced understanding of intrahousehold dynamics and decision-making processes in the context of women's entrepreneurship. Future research should explore these mechanisms more deeply, potentially through qualitative methods or more detailed time-use and expenditure surveys.

Findings suggest that supporting women's microenterprise development can be an effective tool for improving economic conditions in poor Pakistani households, but complementary initiatives may be needed to enhance human capital accumulation. The lack of impact on schooling resonates with Ghalib et al. (2015), who argue that conservative gender norms and supply-side constraints limit girls' access to education in the study areas. Low spending on healthcare is also concerning given that women tend to prioritize their children's needs (Quisumbing and Maluccio, 2003).

One policy implication is bundling microfinance with other targeted interventions to address multiple barriers facing women entrepreneurs. For example, offering business training and mentoring could help women identify more profitable opportunities and expand their enterprises (McKenzie and Woodruff, 2014). Strengthening market linkages and value chains could connect women to higher-paying customers and help them diversify beyond saturated informal sectors (Torri and Martinez, 2014). Providing channels for formal savings may increase women's control over their earnings.

Promoting women's entrepreneurship likely also requires tackling broader structural constraints. Studies in Pakistan highlight how gender gaps in education, mobility, and social norms restricting women's economic participation all limit their entrepreneurial success (Zulfiqar, 2017; Goheer, 2003). Continued efforts to enhance girls' schooling, build women's leadership skills, and advocate for gender equality are critical. Microfinance is just one component of a larger ecosystem needed to transform women's economic opportunities.

This analysis is not without limitations. The data, while comprehensive, may not reflect the current landscape of the Pakistani microfinance sector. Identifying impacts required strong assumptions about selection into entrepreneurship based on observables; unobserved differences between borrowers may still bias estimates. The cross-sectional design also prevented examining dynamic effects over time. Further research is needed using updated, longitudinal data to better understand trajectories of women's enterprises and welfare. Collecting data on time use, mobility, and psychosocial wellbeing could also shed light on broader empowerment impacts.

Despite these caveats, our results add to the evidence that promoting women's entrepreneurship through microfinance can improve household welfare in Pakistan, but impacts are complex. Designing policies to support women entrepreneurs requires careful consideration of their intrahousehold and community context. With further research and refinement, microfinance initiatives can become more effective catalysts for women's economic empowerment and poverty reduction in the years ahead.

CRediT authorship contribution statement

Issam Malki: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Asad Ghalib:** Writing – review & editing, Validation, Data curation. **Rukhsana Kaousar:** Writing – review & editing, Writing – original draft, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

Appendix 1. . Balancing property of the propensity score test by block

Block 1:$0.035 \leq PSM_{probit} < 0.2$	Obs	Mean	Std.Err	Income
Non-Entrepreneurs	67	0.107	0.006	7433.96
Entrepreneurs	5	0.086	0.019	6958.33
Combined	72	0.105	0.005	7346.15
Difference		0.021	0.021	475.63
Test (p-value)		0.33		
Block 2:$0.2 \leq PSM_{probit} < 0.4$				
Non-Entrepreneurs	41	0.289	0.009	7575.58
Entrepreneurs	18	0.314	0.013	7388.89
Combined	59	0.297	0.007	7536.87
Difference		−0.025	0.007	186.69
Test (p-value)		0.13		
Block 3:$0.4 \leq PSM_{probit} < 0.6$				
Non-Entrepreneurs	17	0.466	0.014	8840.37
Entrepreneurs	23	0.494	0.012	9188.78
Combined	40	0.482	0.009	8974.8
Difference		−0.028	0.019	−348.79
Test (p-value)		0.14		
Block 4:$0.6 \leq PSM_{probit} < 0.8$				
Non-Entrepreneurs	16	0.696	0.015	8977.51
Entrepreneurs	37	0.714	0.008	10831.3
Combined	53	0.708	0.007	9898.79
Difference		−0.017	0.016	−1853.85
Test (p-value)		0.29		
Block 5:$0.8 \leq PSM_{probit} < 0.1$				
Non-Entrepreneurs	4	0.919	0.043	9500
Entrepreneurs	51	0.909	0.010	10851.85
Combined	55	0.910	0.010	10379.52
Difference		0.010	0.039	−1351.85
Test (p-value)		0.79		

Estimated Bias

Sample	Ps R	LR Chi2	Mean Bias	Med Bias
Unmatched	0.378	162.49 [0.0]	36.4	13.7
Matched	0.238	81.73 [0.0]	19.7	11.1

PSM_{probit} refers to the mean propensity score estimated based on the probit model. ***Test***: tests the null hypothesis of no difference between Entrepreneurs and Non– Entrepreneurs against the alternative of there being a difference. All computations are performed using STATA's function 'pscore' developed by [4]. The default number of blocks is 5, which is, generally, enough to remove the bias as argued by [11]. If the balancing property is not satisfied, 'pscore' re-do the computation with one extra block at a time until the balancing is satisfied. In our case, the estimated number of blocks is 5.

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