The Impact of Microfinance on Household Welfare in Botswana

Francis Nathan Okurut, Mangadi Kagiso, Njoku Ola Ama[·] and Margaret Leah Okurut.

Abstract

The study investigated the impact of microfinance on household welfare in Botswana using a nationally representative sample of 503 households and an econometric model adapted from Coleman (1999). The results suggested that microfinance had no significant effect on household welfare, which is consistent with Okurut and Bategeka (2006); Banerjee et al (2013); Coleman (1999). Household welfare is positively and significantly influenced by education level, household assets and being in paid employment in the public/private sectors. The policy implication is that government should continue to explore improvements in the quality of education and creation of employment opportunities in the public/private sectors to improve household welfare in Botswana.However, women's access to microfinance has led to their empowerment through participation in household expenditure decisions making; being respected by family members and the community; and participation in local leadership activities which addresses the strategic needs of women.

Key Words: Microfinance, Household Welfare, Botswana
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[·] Departments of Economics and Statistics respectively. Email of corresponding author: okurutf@mopipi.ub.bw

1. Background to the Study

Microfinance institutions, in the context of this study, are defined as non-bank financial institutions (such as money lenders, pawn shops, rotating savings and credit associations, specialized microfinance institutions, and finance houses) which provide credit to economic agents with constrained access to formal bank credit. Microfinance is postulated as an important tool for attainment of Millennium Development Goals of poverty reduction; economic and gender empowerment (African Development Bank, 2006). Microfinance became popular around 1970 when it was used and produced promising results in Grameen Bank of Bangladesh which targeted mainly women who were at the deep end of poverty (Yunus, 2004). The United Nations also recognized the important role that microfinance plays in improving the livelihood of the poor and set aside the year 2005 as the international year dedicated to microfinance.

Poverty is a development problem that Botswana also faces despite being classified as a middle income country. The proportion of persons living below a dollar a day rose from 19.9 percent in 1993/94 to 23.4 percent in 2002/03. The persons living below a dollar a day and located in rural areas accounted for 26.4 percent in 1993/94 and 36.1 percent in 2002/03 (Central Statistics Office [CSO], 2004). Factors that have been identified as causes of poverty in Botswana include lack of opportunities for self-employment to generate income and constrained access to formal credit markets by the poor (CSO, 2004). Microfinance has been suggested as one of the possible tools to curb the problem of poverty (Botlhale, 2010). The main microfinance institutions in Botswana include Women's Finance House; Letshego; BLUE Financial Services and other registered money lenders (Finmark, 2004; Okurut and Botlhole, 2009). Yunus (2004) argued that provision of microfinance to the poor (who have constrained access to formal bank credit) is central to development in terms of providing the needed capital for investment which in turn leads to an improvement in household income and welfare.

However, empirical literature is full of conflicting views on the impact of microfinance on household welfare. Evidence by some scholars suggests that microfinance has a positive and significant impact on household welfare (Yunus, 2004; Khandker, 1998; Magere, 2007; Okurut et al, 2013). Other scholars observed that microfinance has no significant impact on household welfare on account of the high interest rates charged by microfinance institutions, the small loan amounts and the short repayment periods. In some cases borrowers were reported to have been trapped in vicious cycle of debt (Coleman, 1999; Bateman and Chang, 2010; Adams and Pischke, 1992). Though Okurut et al (2013), using a small sample of 150 households (75 borrowers from Women's Finance House and 75 non-borrowers) from Kgatleng District, observed that microfinance had a positive and significant effect on household welfare, the current study sought to validate this result using a nationally representative larger sample and borrowers from across different microfinance institutions. The key objective of the current study was to estimate the impact of microfinance on household welfare using a nationally representative sample from all the districts and to derive policy recommendations for Botswana. An econometric model was estimated and the effect of microfinance on household welfare was measured by the coefficient of the microfinance access dummy.

2. The Microfinance Sector in Botswana

In Botswana, like in many other developing countries, there is a dual existence of formal financial sector (FFS) and informal financial sector (IFS). The FFS consists of financial institutions that are regulated which include commercial banks, National Development

Bank, Botswana Savings Bank and Botswana Building Society. The IFS institutions include money lenders, Rotating Saving and Credit Associations (ROSCAs), Cooperative Schemes, pawnshops, and professional microfinance institutions (Okurut and Botlhole, 2006).

Commercial banks have been the major supplier of banking services to households and firms but approximately 48% of the Botswana population do not have access to banking services (BoB Report, 2009). Botlhale (2010) argued that the financial products provided by the banking sector (loans, savings and transaction products) do not meet the needs of the poor people, but target the middle and upper income class mostly those with formal employment. The commercial banks charge prime interest rates of approximately 18% per annum. Finmark (2004) also noted that banks are reluctant to operate low balance accounts that would be for the relatively poor people due to high administration costs relative to potential income. For this reason, the poor have constrained access to commercial banking services.

Microfinance institutions therefore provide alternative financial services to the poor with constrained access to banking services. However the microfinance loan terms are generally characterized by small loan amounts, short repayment periods and high interest rates (15% - 25% per month) (Finmark, 2004). The main microfinance institutions in Botswana include Letshego, Penridge Employee Benefits, Peo Holdings, Blue Employee Benefits, First Funding, Capricorn, non-government organizations (Women's Finance House Botswana; Kgetse ya Tsie, Youth in Development Trust; Emang Basadi; and Kuru Development Trust). (Finmark, 2004; Okurut et al, 2013).

3. Literature Review on Impact of Microfinance on Household Welfare

'Impact' is defined as a change that occurs as a result of an intervention, while 'welfare' is a state of a person's well-being[1] (Schrieder and Sharma, 1999). Hulme (2000) postulated that microfinance beneficiary impact assessment should focus on analysis of outcomes[2] at individual, household, enterprise or community level.

There has been controversy in empirical literature on the impact of microfinance on the welfare of the beneficiaries. One school of thought suggests that microfinance has no significant impact on household welfare and gender empowerment, while the second school of thought suggests that it has a significant impact. Coleman (1999) argued that the conflicting empirical evidence on the impact of microfinance may be accounted for by differences in methodology, failure to control for selection bias and endogeneity, and differences in what actually constitute positive impact. Duvendack et al (2011) contended that microfinance impact evaluations suffer from weak methodological approaches and data inadequacy, hence the reliability of impact estimates are adversely affected which leads to misconceptions about the actual impact of microfinance. Kabeer (2001) pointed out that the conflicting impacts of microfinance on women empowerment is due to differences in understanding of intra-household power relations by the authors.

Hulme and Mosley (1997), based on the study of 13 microfinance institutions in seven developing countries, noted that microfinance has a positive and significant effect on household

[1] Well-being includes happiness, good fortune or prosperity

[2] The outcome indicators include: economic indicators (changes in the levels or patterns in income, expenditure, consumption, assets); social indicators (educational status, access to health care, nutritional levels); gender empowerment indicators (control over assets, involvement in household or community decision making, participation in community activities and social networks including political leadership)

income. Okurut et al (2013), in a study of 150 households in Kgatleng District in Botswana, also suggested that microfinance has a positive and significant effect on household welfare and gender empowerment. Binswanger and Khandker (1995) also argued that access to credit helps the poor people to smooth out their consumption over the lean periods of the year, hence credit plays an important role in improvement of household welfare. Other scholars also noted that access to credit enables the rural poor households to enhance their productive capacity with potential implications for increased household income and employment opportunities (Heidhues, 1995; Adugna and Heidhues, 2000; World Bank, 1989). Hossain (1988), in a study of Grameen Bank clients, suggested that the income of the microfinance borrowers was significantly higher as compared to non-borrowers, hence implying the positive impact of microfinance. Evidence by Hashemi and Morshed (1997) also suggested that household's participation in the Grameen Bank led to an improvement in their welfare and also enhanced the household's capacity to sustain their gains over time. Kamal (1996) also argued that microfinance had a positive impact on the welfare of the borrowers as evidenced by the fact that per capita income of the borrowers was higher than the non-borrowers.

Johanna (2013), using cross sectional data for Burma, noted that access to microfinance had a positive and significant impact on women empowerment at one percent significance level. Chowdhury et al. (1991), in their study in Bangladesh, concluded that women who participated in BRAC microfinance programme had more income and owned more assets than the non-participants. Mustafa et al. (1996) also observed that the BRAC microfinance clients had increased household expenditures, more assets and better coping mechanisms in lean periods as compared to non-clients.

On the contrary, Okurut and Bategeka (2006), using a panel data set for the Integrated Household Survey 1992/93 and Uganda National Household Survey 1999/00, observed that access to microfinance did not have any significant effect on household welfare[3] in Uganda. Coleman (1999), using a sample of 445 households in Northeast Thailand, noted that access to village bank credit did not have any significant impact on household income or household physical asset accumulation. The women beneficiaries were observed to be trapped in a vicious cycle of debt in that they used the village bank loans mainly for consumption expenditure. To keep in good books of the village bank, the women were conditioned to borrow from money lenders at higher interest rates to repay the village bank loans. The main conclusion of Coleman (1999) study was that credit is not an effective tool to enhance the capacity of the poor to improve their economic well-being. Diagne and Zeller (2001) also observed that microfinance did not have any significant impact on household income. Burger (1989) also pointed out that microfinance tends to stabilize rather than increase income, and tends to preserve rather than create new jobs.

Goetz and Gupta (1994) noted that access to microfinance had a negative effect on gender empowerment. This conclusion was based on the observation that while women were the ones who signed the loan contracts with microfinance institutions[4], the control over the utilization of loans was taken over by the men. However the primary responsibility of loan repayment lay with the women, who in most cases had to draw on their personal savings to repay the loans. This conflict over control of loans often led to domestic violence against the women.

[3] In the study, the movement out of poverty dummy (=1 if household was poor in 1992 but non-poor in 1999, and zero otherwise) was a proxy for improvement in household welfare

[4] Most microfinance institutions target women with their loan products based on the notion of gender empowerment

Montgomery (1996) also argued that access to microfinance did little to empower women as decision making on loan utilization was dominated by men. The same sentiments were expressed by Ackerly (1995) who argued that access to microfinance resulted in women being overworked and fatigued, but with no control over loans.

Banerjee et al (2013), using a randomized control evaluation method in Hyderabad India, observed that access to microfinance did not have any effect on average monthly expenditure per capita for the treatment group. Consumption in treatment areas was not different, and the average business was still not more profitable as compared to the control group.

In conclusion, empirical evidence on the impact of microfinance on the welfare of the beneficiaries is at best mixed.

4. Methodology of the Study

4.1 Sampling Design and Sample Size

The study covered all the districts in Botswana. The districts were stratified by sub-districts and one sub-district was randomly selected from each district. The households within the selected sub-districts constituted the sampling units for the study.

The Creative Research System (2003), a sample size calculator was used in determining the statistically acceptable sample of households for the study based on the 2011 projected populations (CSO, 2005). The system, at 95% confidence level, allowing an error margin of 5%, that the response from this sample will be the same as the population, gave the sample size as 410. However, 25% of this statistically determined sample size was added to take care of those who would be in the original sample but may be reluctant to participate or would not be available for the interview. This gave a total sample size of 503. This total sample was then allocated to districts using proportional allocation to size (PPS), where the size represented the district population based on the CSO 2011 population projections. These district sample sizes were drawn from the sampled sub-districts using the systematic random sampling method. Heads of households were identified as the respondents.

The questionnaire was used in the study to obtain from household heads data on household income, access to microfinance, demographic and other socio-economic characteristics. The questionnaire was administered by trained research assistant with strict adherence to ethical[5] conduct of research.

4.2 Econometric Model Specification

The econometric model that was used measure the impact of microfinance on household welfare was adapted from Coleman (1999) with some modifications:

$$Y_{ij} = \delta_0 + \alpha X_{ij} + \beta Z_{ij} + \lambda M_{ij} + \mu \quad \ldots\ldots (1)$$

Where:

Y_{ij} = Household income for household *i* in category *j*, which is the dependent variable used as a proxy for household welfare.

[5] The respondents were informed of the purpose of the study and that there would be no financial reward for participation. Those who accepted to participate were requested to sign a consent form before the administration of the questionnaire.

X_{ij} = vector of individual characteristics of the respondents (age, education level, paid employment status in private/public sector)

Z_{ij} = vector of household characteristics (household size, dependency ratio, value of household assets)

M_{ij} = microfinance dummy (1=beneficiaries and 0 = non-beneficiaries)
μ= error term (assumed to be normally distributed with mean=0 and variance=1)

δ, α, β, λ = vector of parameters.

The definitions of variables and expected signs are presented below:

(i) Household income: This was constructed as annual household income from different sources (employment income, business earnings, transfer earnings, remittances, farm income) in Pula. This was used as the dependent variable and was a proxy for household welfare.

(ii) Household size: This represented the total number of people in a household. The effect of household size on household income is ambiguous depending on the composition of household size. If a household has a high dependency ratio (i.e. high proportion of children and the elderly), then household size will have a negative effect on household income, otherwise the reverse is true.

(iii) Education level: This is the highest education level attained by the respondent and was captured as a continuous variable measured in years of schooling. Education level was expected to have a positive effect on household income. The rationale is that education is a form of human capital development which increases the productivity of labour and employment opportunities which result in higher incomes.

(iv) Household assets: This was measured as the value of household assets in Pula. Household assets are expected to have a positive effect on household income. Firstly, household assets increase the credit worthiness of households and hence are more likely to borrow more money from microfinance institutions for investment purposes, which could lead to an increase in business earnings. Secondly, business assets owned by households may be used for productive purposes to earn income.

(v) Age: The age of the respondent was measured in completed years. Age was expected to have a positive effect on household income because the older the person the higher the wealth of experience which can be used to generate more income.

(vi) Microfinance dummy: The microfinance dummy was constructed as follows: 1= if a beneficiary of microfinance and 0 = if a non-beneficiary of microfinance. The effect of microfinance on household income may either be positive or negative. The positive effect of microfinance may result if the microfinance loans are used for start-up or expansion of business, then business earnings will increase. Secondly, even if loans are used for smoothing household expenditure (such as education of children, improvement of housing conditions), intuitively this has the potential to improve household welfare. However in cases where microfinance leads to a vicious cycle of debt among the beneficiaries on account of the high interest rates charged, then this will have a negative effect on household welfare.

(vii) Paid Employment status: This was constructed as a categorical variable (=1 if in paid employment in the public or private sector, zero otherwise). The paid employment in the public or private sector was expected to have positive effect on household income.

The impact of microfinance on household income was measured by the coefficient of the microfinance dummy, after controlling for the effects of other factors. If the coefficient is positive and statistically significant, then it can be concluded that microfinance enhances household welfare. If the coefficient is negative and statistically significant, then microfinance reduces household welfare. But if the coefficient of the microfinance dummy is statistically insignificant (*irrespective of the sign of the coefficient*), then the conclusion will be that microfinance has no effect on household welfare.

5. Findings of the Study

5.1 Descriptive Statistics

The socio-economic characteristics of the sampled households in terms of gender, education level, employment status, and age are summarized in table 1.

Table 1: Socio-economic Characteristics of Sample

Variable	Frequency	Percent
Gender		
Male	226	44.9
Female	277	55.1
Total	503	100.0
Highest formal education level		
None	5	1.0
Primary	38	7.6
Junior certificate of secondary school (JCSE)	187	37.2
Senior secondary school (form five)	113	22.5
Tertiary (certificate/diploma)	102	20.3
University/postgraduate	58	11.5
Total	503	100.0
Main employment status		
Paid employment in public sector	106	21.1
Paid employment in private sector	131	26.0
Self employed	179	35.6
Retired	6	1.2
Unpaid labour	4	0.8
Unemployed	67	13.3
Internship	7	1.4
Parastatal	2	0.4
Total	502	100.0
Age (in completed years)		
20 and below	15	3.0
21-30	260	51.7
31-40	175	34.8
41-50	50	9.9
51-60	2	0.4
Above 60	1	0.2
Total	503	100.0

Over half of the respondents (55.1 percent) were female. In terms of highest educational level, most of the respondents had junior certificate or secondary education (37.2 percent), followed by senior secondary school certificate (22.5 percent) and tertiary (20.3 percent). This relatively high level of education is accounted for the by the Government of Botswana educational policy of free (or highly subsidized) education for all citizens. Approximately 35.6 percent of the respondents were self employed, 26 percent were in paid employment in the private sector, and 21.1 percent were in paid employment in the public sector. Most of the respondents (51.7 percent) were aged between 21 - 30 years, followed by those aged 31 - 40 years (34.8 percent) which is the economically active population. Of the 503 respondents, 277 (55.1 percent) were microfinance beneficiaries while 226 (44.9 percent) were non-beneficiaries.

The main sources of microfinance loans, the purposes to which the loans were put and the sources of funds for repayment are presented in table 2. The major sources of microfinance loans were Rotating Savings and Credit Associations [Metshelo] (33 percent), microfinance institutions (23.9 percent) and money lenders (19.9 percent). The main purposes for the most recent microfinance loans were to meet household expenditures such as school fees and funeral expenses (47.1 percent), start business (20.3 percent), expand the business (14.5 percent), and to service other loans (14.1 percent). What these results suggest is that microfinance is largely used for consumption smoothing. The majority of beneficiaries (92.5 percent) generally applied for very small microfinance loans of less than P10,000. The main sources of funds for microfinance loan repayment were salary (43.7 percent), business earnings (36.5 percent) and borrowing from friends and relatives (10.3 percent).

Table 2: Sources and Purpose of Microfinance Loans

Variable	Frequency	Percent
Source of microfinance loan		
Microfinance institutions (e.g. Women's Finance House; Blue)	66	23.9
Money lenders	55	19.9
Pawn shop	26	9.4
Rotating savings and credit associations (Metshelo)	91	33.0
Relatives/friends	36	13.0
Youth development fund	2	0.7
Total	276	100.0
Purpose of microfinance loan		
To start business	56	20.3
To expand the business	40	14.5
To service other loans	39	14.1
Household expenditures (e.g. funeral, school fees	130	47.1
Veterinary requisites	4	1.4
Buy cell phone	1	0.4
Buy a car	2	0.7
Transport	2	0.7
Buy furniture	1	0.4
Repair vehicle	1	0.4
Total	276	100.0

Source of funds for microfinance loan repayment		
Salary	115	43.7
Business earnings	96	36.5
Sale of household assets	7	2.7
Loans from other microfinance institutions	4	1.5
Borrowing from friends and relatives	27	10.3
Remittances from household members	12	4.6
Allowance	2	0.8
Total	263	100.0

The impact of microfinance on household welfare in terms of meals intake, employment creation and financing of children's education is shown in table 3.

Table 3: Impact of Microfinance on Household Welfare

Variable	Frequency	Percent
Impact on household meals intake		
No improvement at all	56	21.8
Improved somehow	155	60.3
Significant improvement	45	17.5
None	1	0.4
Total	257	100.0
Impact on household employment creation		
No effect at all	201	78.5
Created paid employment opportunity for household members	40	15.6
Created unpaid employment for household members	13	5.1
None	2	0.8
Total	256	100.0
Impact on household housing conditions		
No effect at all	211	82.1
Built a new house	11	4.3
Renovated existing house	34	13.2
None	1	0.4
Total	257	100.0
Impact on education of children		
No effect at all	86	33.5
Pay for educational requirements (uniforms, books)	120	46.7
Helped to pay school fees	38	14.8
Helped to pay for extra tuition for the children	13	5.1
Total	257	100.0

About 17.5 percent of microfinance beneficiaries revealed that their household meals intake had significantly improved as a result of access to microfinance, while 60.3 percent reported some improvement. For the majority of microfinance beneficiaries (78.5 percent), microfinance

had no effect at all on household employment creation. With regard to impact of microfinance on household housing conditions, the majority of microfinance beneficiaries (82.1 percent) reported microfinance had no effect at all on housing conditions. Approximately two thirds of microfinance beneficiaries reported improvement in capacity to meet the education needs of children that included paying for scholastic materials (such as uniforms and books), paying school fees and paying for extra tuition for the children.

In terms of impact of microfinance on gender empowerment, the majority of the beneficiaries revealed that women's access to microfinance has led to their empowerment through participation in household expenditure decisions making; being respected by family members and the community; and participation in local leadership activities. This addressed the strategic needs of women.

Table 4: Impact of Microfinance on Women Empowerment

Impact of microfinance	Percentage of women participation in household expenditure decisions making (N = 257)	Percentage of women being respected by family members and the community (N = 256)	Percentage of women participation in local leadership activities (N = 256)
not at all	16.7	19.9	33.6
helped somehow	41.2	42.6	35.5
Helped very much	42.0	37.5	30.9
Total	100.0	100.0	100.0

5.2 Econometric Model Results

The impact of microfinance on household welfare was estimated using equation 1 and the results are presented in Table 5. The F-statistic which measures the overall significance of the estimated parameters is statistically significant (Prob>F = 0.0000), which implies that the estimated parameters are not jointly equal to zero, hence it is a good model. The R-squared of 0.4002 and adjusted R-squared of 0.3649 are consistent with cross-sectional data.

As earlier stated, the main objective of the study was to determine the impact of microfinance on household welfare. Household income was used as a proxy for household welfare and was the dependent variable. Microfinance access was captured as a dummy (=1 for microfinance clients, 0 = non-clients). Empirical results suggest that microfinance has no significant effect on household welfare, which result is consistent with Okurut and Bategeka (2006); Banerjee et al (2013); Coleman (1999).

The partial correlation of household income and microfinance access adjusting for the effects respondent individual characteristics and household characteristics was estimated and the results suggest that it was statistically insignificant with p-value = 0.8669 (see Appendix A). The partial correlation results are consistent with the regression model results which suggest that microfinance has no significant effect on household welfare.

The insignificance of the coefficient of the microfinance dummy may be accounted for by the terms of microfinance in Botswana. As earlier pointed out, microfinance institutions charge very high interest rates ranging from 15% - 25% per month. The loan amounts are also small on average P10,000 and are used mainly for consumption smoothing as opposed to productive

investment that can lead to substantial increases in income flows to the households. These high interest rates on microfinance loans have the potential of creating a vicious cycle of debt among the borrowers, especially in the event that they are conditioned to borrow more loans to pay off loans, hence may lead to worsening of household welfare. This may call for a regulatory framework for interest rates charged by microfinance institutions so as to enhance household welfare.

These results are in sharp contrast to Okurut et al (2013), who in their study with a small sample from Kgatleng District[6], had reported that microfinance had a positive and significant effect on household welfare. The current study used a nationally representative sample of 503 households (262 borrowers and 241 non-borrowers) from the different microfinance institutions in Botswana (money lenders, ROSCAs, registered microfinance institutions).

Education level has a positive and significant effect on household welfare (at 1 percent level). This result is consistent with expectations because education enhances human capital development which increases its productivity, thereby increasing the income earning potential which increases household welfare. The current government policy initiatives of improving the quality of education will go a long way in enhancing household welfare. Being in paid employment in either the public or private sector has a positive and significant effect on household welfare (at 1 percent significance level). The policy implication of this result is that continuous creation of employment opportunities in the public and private sectors is very critical in improving household welfare. The current government policy initiatives of diversifying the economy away from the diamond sector and providing an enabling environment for private sector growth are in the right direction of creating more employment opportunities. Household assets have a positive and significant effect on household welfare (at 1 percent significance level). The intuition is that household assets can boost the productivity of the household, hence lead to increased household income. In addition, the creditworthiness of the household is enhanced by possession of assets which increases their likelihood to borrow more for productive investment.

Table 5: Econometric Results on Impact of Microfinance on Household Welfare

Dependent Variable: log of household income				
Explanatory Variables	Coefficient	t-value	p-value	Significance level
Log of household size	-0.0202	0.11	0.913	
Dependency ratio	-0.0829	0.56	0.576	
Log of education level, in years of schooling	0.7340	3.79	0.000	***
Log of household assets	0.0649	3.17	0.002	***
Log of age, in years	0.0414	0.09	0.927	
Microfinance: dummy	-0.0836	0.49	0.627	
Paid employment in public or private sector: dummy	0.6609	2.78	0.006	***
Constant	6.4547	3.5	0.002	***
Number of observations	127			
F(7, 119)	11.34			
Prob > F	0.0000			
R-squared	0.4002			
Adj R-squared	0.3649			

N.B. Significance levels: *** = *1%;* **= *5%;* *= *10%*

[6] The sample was comprised of 75 borrowers of Women's Finance House and 75 non-borrowers (used as the control group) from Kgatleng District

6. Summary of Findings and Policy Recommendation

Microfinance has no significant effect on household welfare in Botswana. Household welfare is positively and significantly influenced by education level, household assets and being in paid employment in the public/private sectors. The policy implication is that government should continue to explore improvements in the quality of education and creation of employment opportunities in the public/private sectors to improve household welfare in Botswana. However, women's access to microfinance has led to their empowerment through participation in household expenditure decisions making; being respected by family members and the community; and participation in local leadership activities which addresses the strategic needs of women.

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Appendix A: Partial Correlation of Household Income and Microfinance Access

The partial correlation of **Y** (household income) and **M** (microfinance access) adjusting for the effects **X** (respondent individual characteristics) and **Z** (household characteristics) was estimated and the results are in table below. The partial correlation of household income and access to microfinance adjusting for the effects of other explanatory variables is 0.0138 and is not statistically significant (p-value = 0.8669). This result is consistent with the regression model results which suggest that microfinance has no significant effect on household welfare.

Partial Correlation of Total Household Income and Access to Microfinance

Variable	Partial correlation	Semi-partial correlation	Partial correlation squared	Semi-partial correlation squared	p-value
Household size	0.0527	0.0491	0.0028	0.0024	0.5221
Microfinance access	0.0138	0.0128	0.0002	0.0002	0.8669
Dependency ratio	-0.0990	-0.0927	0.0098	0.0086	0.2280
Education level	0.0676	0.0631	0.0046	0.0040	0.4111
Married	0.0709	0.0662	0.0050	0.0044	0.3884
Cohabiting	-0.1464	-0.1378	0.0214	0.0190	0.0738
Separated	-0.0189	-0.0176	0.0004	0.0003	0.8183
Widowed	-0.0289	-0.0270	0.0008	0.0007	0.7252
Household assets	0.1920	0.1822	0.0369	0.0332	0.0186
Age	-0.1027	-0.0961	0.0105	0.0092	0.2110
Paid employment	0.1045	0.0979	0.0109	0.0096	0.2029
Female household head	-0.0077	-0.0071	0.0001	0.0001	0.9259