

Microcredits increase income levels and subjective wellbeing in rural Uganda

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The impact and merits of microcredits remains the subject of wide-spread debate. This paper describes the impact of microcredits on both income and subjective wellbeing of women in rural Uganda. We use longitudinal data of clients who took out more than one loan from the same Grameen model MFI in Central Uganda over a period of three years, and find that there is a notable increase in income and subjective happiness and life satisfaction levels after every loan. We find that the microcredits are subject to diminish returns – the impact becomes smaller with each subsequent loan, and clients who start off poorer and with lower education levels enjoy a larger benefit. Older clients and clients engaging in certain business categories can expect a larger increase in income levels.

Introduction

Microfinance impact studies – When the field of microfinance first came to prominence, many people believed that it had the potential to become a poverty panacea. However, over time, while the world has seen many microfinance success stories, it has also witnessed less than positive accounts of its impact. While some pundits have taken such information to support declarations of the complete failure of microfinance, many scholars and practitioners agree that impact and efficacy must be further researched (Bauchet, Marshall and Starita 2011).

Banerjee, Duflo, Glennerster, and Kinnan found in their 2010 work that microfinance urban group lending does in fact result in overall gains but disproved claims that it provides either “revolutionary or deleterious” gains/losses. In their work, comparing treatment and control areas they found that probability of starting a business increased by 1.7%, and household spending shifted towards durable goods and away from temptation goods (e.g. alcohol, tobacco, snacks). While not dramatic, microfinance was shown to provide a positive impact. In a similar study however, Crepon, Devoto, Duflo, and Pariente in 2011 found that microfinance rural group lending showed no increase in consumption, business starts, or noticeable welfare improvements compared to those in the control group without the same access to microfinance. Karlan and Zinman in a 2011 study found no increase investment in businesses, reduction in overall number of business activities, and even a slight decline in

subjective wellbeing. They did however conclude that the access to credit helped borrowers deal with risk and built community unity. In a different study in 2010 however Karlan and Zinman found that expanding consumer credit to low-income South Africans increased borrower well-being, allowed for more job security, food consumption, and stronger credit history for future loans. Clearly results have been mixed and arguably inconclusive above any level higher than “slightly beneficial”.

It has been suggested that microfinance may indeed have a large impact, but only for certain clients. One could imagine that clients of specific age groups, level of education or those investing in certain business categories would benefit more from microfinance than others. Literature provides few conclusive answers surrounding which ‘profile’ of clients would benefit most. Other than showing that group lending involving ‘social collateral’ (i.e. mutual liability groups) results in lower delinquency than individual lending, microfinance practitioners have not been able to determine if lending should be targeted towards any specific group of clients (Collins, Morduch, Rutherford, and Ruthven 2009). Establishing which clients would enjoy the largest beneficial impact from microfinance would provide valuable guidance to practitioners trying to maximize social return – they could target their efforts to specific client groups, and redesign products for the client profiles that today do not seem to benefit from their services. Intuitive possible examples would be the decision to target more efforts towards poorer clients if poor clients enjoy a larger benefit as a result of the loans, or to include grace periods for agriculture businesses that today are not helped by loans that demand repayments before the harvest is in.

SYPO project description – This impact assessment is based on 5,559 loans given out by SYPO Uganda Ltd. (“SYPO”), a microfinance company in Central Uganda started in April 2011. SYPO operates in the two districts Mukono and Buikwe, and gives out microcredits to women in rural areas, following the Grameen model. Loans are given out to groups of five women, each with individual business plans. Repayments are weekly, for a period of one year, at 35% declining and amortizing interest. No collateral is required, but the women are mutually responsible for group member repayments. Early repayments are allowed and not penalized. The group formation is voluntary, and typically based on prior social relations. SYPO was started to serve women who previously had no access to financial services, and operates exclusively in rural areas, with a minimum distance to the nearest conventional bank branch of 20 minutes driving. The loans are for business purposes only, and are the only product that SYPO offers. Client recruitment, training, loan appraisal, disbursement and collection are all the responsibility of a loan officer, with one loan officer per zone and up to 800 loans per zone. They receive their loans in cash (local currency) and make cash weekly repayments. Clients can take only have one loan outstanding at any moment, but can take out new loans in subsequent ‘loan cycles’. The maximum loan in cycle 1 is USD 225, maximum in cycle 2 USD 340, and maximum in cycle 3 is USD 530. Each member of the

group is required to be physically present during repayments¹. Client retention rate from cycle to cycle is 82%². At the start of each loan, ‘impact scores’ are collected, describing the clients income levels, happiness, life satisfaction and freedom of choice (see Method for more detail on impact scores).

Objective and research questions – The objective of this study was to assess whether microcredits have an impact on income and subjective wellbeing levels of women in Uganda, and if so, which women benefit most from microcredits. The following research questions use longitudinal data to approximate this objective:

“Are subsequent microcredits correlated with an increase in clients’ subjective wellbeing and income?”

and

“What are the characteristics of clients who can benefit most / least from microcredits?”

Method

Impact scores registration – SYPO tracks four ‘impact scores’ at the start of each loan: Income, Happiness, Life satisfaction, and Freedom of choice. Income is measured with the 2009 Uganda PPI® (Progress out of Poverty Index), developed with support of the Grameen Foundation. The PPI correlates answers to a set of 10 simple, observable questions (e.g. “What is the major construction material of the roof?”) to the chance that a person lives under the national poverty line³. Happiness, Life satisfaction and Freedom of choice were measured by asking the following questions: “Looking back at the last month and on a scale from 1 to 10, how happy would you score yourself”; “Looking back at the last year and on a scale from 1 to 10, how satisfied would you score yourself with your life”; “Looking back at the last year and on a scale from 1 to 10, to what extent have you been able to make the choices in life that you like to make”. The four impact scores are registered at the start of each new loan, providing longitudinal data for the 1,884 women who have taken out more than one loan over time. All impact score interviews are conducted by the loan officers in local language and subsequently registered in a proprietary online Oracle Apex® database system.

¹ For a more detailed description of SYPO Uganda Ltd., including financial statements, see <https://www.microbanker.com/>

² Retention was calculated by taking looking at how many of the clients who took out the first 250 loans(August 2011 until June 2012) later went on to take out at least one more loan.

³ <http://www.progressoutofpoverty.org/country/uganda>

Correcting for regional growth – One challenge of our study design is the lack of a control group, and the resulting necessity to correct for general growth of the region. Uganda is a fast growing economy, and an increase of PPI and perhaps wellbeing scores over time is to be expected in the absence of a microfinance intervention. We included time in our regression to incorporate the impact of year over year regional growth into our findings; by including time as a secondary independent variable, we increased our explanatory power by correcting for the non-intervention related impact.

Impact of microcredits – our first analysis to consider is the overall impact of microfinance. We needed to determine if microfinance has a positive impact overall on income levels, happiness, freedom of choice, and life satisfaction, as our primary metrics of study. In our regression models, we compare clients only to themselves, avoiding any selection bias of clients from one cycle to the next.

Heterogeneity of impact – To assess whether clients with certain characteristics benefit more from microcredits than others, or for whom the microcredits can in fact be detrimental, we computed the daily increase of income and wellbeing scores since the first loan for each client. Using a multivariate regression analysis, this allows us to determine which client characteristics predict a big ‘jump’ in income and wellbeing, and which predict a decrease. As predictive variables we chose client age, education level, literacy, access to mobile phone, number of children, average education level of children, and business category in which the microcredit was employed. Each loan is registered under one of the following 14 business categories: Cosmetics (service), Education (service), Farming (animal rearing), Farming (crop), Farming (forestry), Hospitality (service), Manufacturing (carpentry, brick making, etc), Medical (service), Processing (farming), Retail (market-focused), Retail (shop-focused), Trade (farming), Trade (non-farming), Other (service).

Results

Study demographics – All clients of SYPO Uganda are female. SYPO targets the poor, resulting in an average PPI score of incoming clients of 54.82 (translating in 78.1% chance of living under the international poverty line of \$2.50/day⁴. Table 1 indicates that there are no significant differences between demographics of clients in different loan cycles, suggesting that there is no material selection bias of loan officers graduating only high quality clients to subsequent loan cycles. This is underlined further by the 82% retention rate from cycle to cycle.

⁴ For conversion tables see <http://www.progressoutofpoverty.org/country/uganda>

	All clients	Loan cycle			
		1	2	3	4
Age	37.9	37.4	38.8	39.1	37.6
Education level (years)	7.4	7.2	7.6	7.8	8.9
Literate (%)	84.0%	81.4%	87.7%	91.2%	98.4%
Access to phone (%)	81.9%	79.6%	82.5%	92.5%	95.9%
Single	5.2%	5.6%	4.8%	2.4%	4.7%
Married	70.8%	70.6%	71.3%	71.1%	71.9%
Divorced	15.5%	15.6%	14.6%	17.0%	15.6%
Widowed	8.6%	8.3%	9.3%	9.4%	7.8%
# children	3.5	3.4	3.6	3.8	3.3
Average age children	13.9	13.6	14.5	14.6	14.1
Average loan size (UGX)	608,428	525,673	709,039	887,862	962,025

Table 1 – Demographics, overall and by loan cycle. A new client starts with SYPO in loan cycle 1, and can apply for a 2nd cycle loan after repaying the first cycle loan successfully. Client can take out larger loans with each subsequent cycle.

67.1% of all clients engage their microcredits in either agricultural or retail business activities (Figure 1).

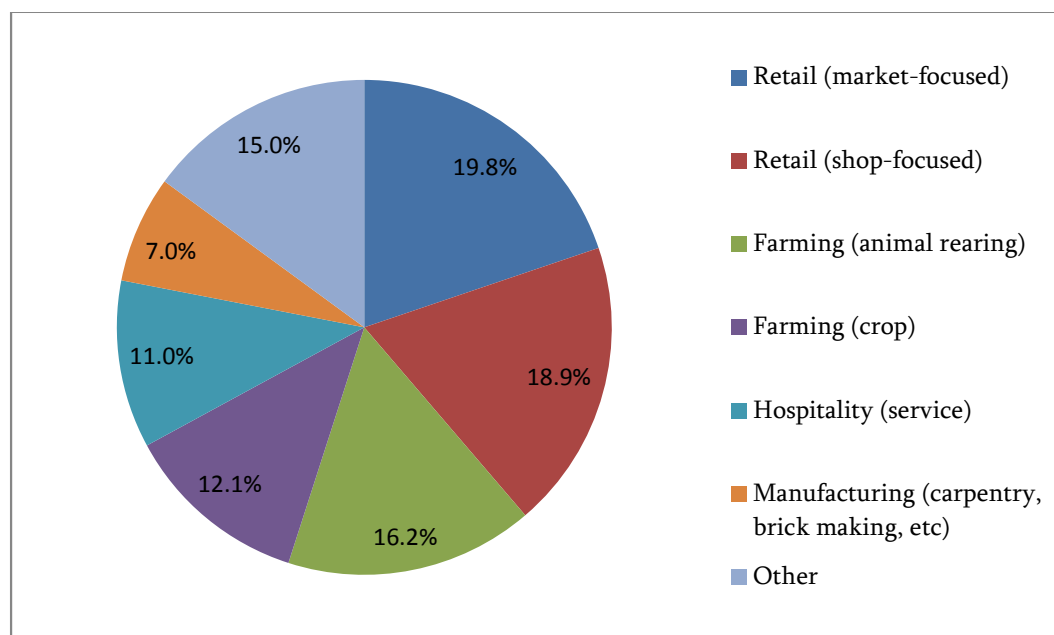


Figure 1 - Business plans by category in SYPO (others include Trade, Cosmetics, Education, Medical, Forestry)

Wellbeing predictors – In our sample of 3,402 observations with wellbeing scores, we conclude that clients score themselves happier with increasing income ($p < 0.001$). We do not find that clients with more education have higher happiness scores. Consistent with wellbeing literature, we find that ‘young clients’ defined as clients under 40 are less happy each year they are older, and ‘older clients’ defined as clients over 40 are happier each year

they get older ($p < 0.05$), resulting in a parabolic lifetime happiness curve with a low at around 40 years old. Children do seem to have a strong and negative effect on subjective wellbeing – clients score themselves 0.2 point lower on a 10 point happiness scale for each additional child they have ($p < 0.05$). We find that of the 14 business categories, clients investing in Farming (animal rearing), Farming (crop), Medical (service) and Other (service) are likely to report lower happiness levels ($p \approx 0.05$, coefficients of around -3.0 compared to the business category Cosmetics (service)).

Linear regression
 Number of observations = 3402
 F(5, 479) = 4.52
 Prob > F = 0.0005
 R-squared = 0.9029
 Adj R-squared = 0.3108

Happiness +	Coefficient.	Std. Err.	t	P> t	[95% CI]	
PPI	.0425789	.010804	3.94	0.000	.0213497	.063808
Client age1*	-17.1182	8.534136	-2.01	0.045	-33.88717	-.3492316
Clientage2**	.2925194	.1427009	2.05	0.041	.0121223	.5729166
Years of education	.0732224	.1197349	0.61	0.541	-.1620481	.3084929
Number of children	-.2127571	.1058286	-2.01	0.045	-.4207028	-.0048114
Constant	196.2218	102.7818	1.91	0.057	-5.737112	398.1808

Table 2 – Multivariate linear regression of happiness (10 point scale self-assessed happiness) on PPI (income level), client age 1 (every year a client is older under 40 years old), client age 2 (every year a client is older over 40 years old), years of education of the client, and number of children the client has

General microcredit impact – In a regression analysis (Table 3) comparing clients only with themselves, we find that income levels (PPI scores) of clients increase significantly with each loan cycle ($p < 0.05$).

PPI		
Loan cycle	1 to 2	1 to 3
PPI increase	0.946*	1.267***
P value	(0.012)	(0.000)
Constant	53.65***	57.14***
P value	(0.000)	(0.000)
Number of observations	1320	539
adj. R-sq	0.656	0.682

Table 3 - Regression to assess PPI increase from loan cycle to subsequent loan cycles, comparing clients only with themselves

The increase of Happiness score with each loan cycle is larger than the increase in income levels. Clients go up in happiness with 0.5-0.7 points on a 10 point scale with each subsequent loan (Table 4).

Happiness			
Loan cycle	1 to 2	2 to 3	1 to 3
Happiness score increase	0.717***	0.643***	0.483***
P value	(0.000)	(0.000)	(0.000)
Constant	5.243***	5.136***	5.579***
P value	(0.000)	(0.000)	(0.000)
Number of observations	1320	539	627
adj. R-sq	0.422	0.342	0.335

Table 4 - Regression to assess Happiness increase from loan cycle to subsequent loan cycles, comparing clients only with themselves

Each loan cycle is associated with an increase in Life satisfaction score of between 0.4 and 0.5, again on a 10 point scale ($p < 0.001$) (Table 5).

Life satisfaction			
Loan cycle	1 to 2	2 to 3	1 to 3
Life satisfaction score increase	0.384***	0.514***	0.399***
P value	(0.000)	(0.000)	(0.000)
Constant	5.202***	4.907***	5.214***
P value	(0.000)	(0.000)	(0.000)
Number of observations	1320	539	627
adj. R-sq	0.432	0.311	0.269

Table 5 - Regression to assess Life satisfaction increase from loan cycle to subsequent loan cycles, comparing clients only with themselves

Increases of Freedom of choice scores were not significant and not included in the results.

We include an overview of average scores per loan cycle (Table 6), unadjusted for time (macroeconomic growth). We observe that in each of the impact score categories, subsequent loan cycles are associated with better scores.

Loan cycle	Number of observations	Average of PPI	Average of Happiness	Average of Life satisfaction	Average of Freedom of choice
1	3675	55.71	5.98	5.94	6.09
2	1322	56.65	6.36	6.24	6.32
3	449	57.91	6.74	6.73	6.47
4	79	59.60	6.63	6.82	6.53

Table 6 - Uncorrected overview of impact scores by loan cycle

Heterogeneity of microcredit impact – Certain client characteristics predict the magnitude of the increase in income level with each subsequent loan. We found (Table 7) being young (as defined as under 40 years of age), and having a higher number of years of education lower the increase of income levels. Consequently, clients over 40 and with a lower number of years of education enjoy a larger increase in their income levels with each loan they take out.

Linear regression
 Number of obs = 1058
 F(3, 325) = 10.73
 Prob > F = 0.0000
 R-squared = 0.8999
 Adj R-squared = 0.6745
 Root MSE = 4.6835

PPI +	Coefficient	Std. Err.	t	P> t	[95% Conf. Interval]
Loan cycle	5.514678	.9732095	5.67	0.000	3.600092 7.429263
Loan identifier x being young	-1.197266	.7705258	-1.55	0.121	-2.713114 .3185814
Loan identifier x year of education	-.5282856	.1199287	-4.40	0.000	-.7642203 -.292351
Constant	53.37433	.6142023	86.90	0.000	52.16601 54.58264

Table 7 – Multivariate regression to show that clients with more years of education and clients who are young (<40 years) enjoy a smaller increase in income levels (PPI) with each microcredit they take out

Similarly, we find that the type of business that the client chooses to engage in (and invest her microcredit in) predicts the magnitude of the increase of the clients' income levels with each loan. Clients engaging in Hospitality (mostly small restaurants), Retail (market stalls) and Medical (service) can expect a larger increase of income level with each loan. Increases in income levels also vary widely amongst clients engaging in other business categories, but none of these results are statistically significant (Table 8), perhaps due to the smaller number of observations in these categories.

Linear regression
 Number of observations = 1284
 F(21, 294) = 1.41
 Prob > F = 0.1101
 R-squared = 0.9223
 Adj R-squared = 0.6611
 Root MSE = 4.8213

PPI +	Coefficient	Std. Err.	t	P> t	[95% Conf. Interval]
Loan cycle	-2.204571	1.968274	-1.12	0.264	-6.078263 1.669122
Education	1.776807	7.096713	0.25	0.802	-12.18999 15.74361
Farming animals	2.74612	2.176816	1.26	0.208	-1.537996 7.030237
Farming crop	3.450424	2.326861	1.48	0.139	-1.12899 8.029839

Hospitality	7.091529	2.429575	2.92	0.004	2.309965	11.87309
Manufacture	2.071495	2.418178	0.86	0.392	-2.687637	6.830627
Medical	6.406664	3.936548	1.63	0.105	-1.340721	14.15405
Other	.2891739	4.821267	0.06	0.952	-9.199397	9.777745
Retail market	4.471986	2.237841	2.00	0.047	.0677686	8.876204
Retail shop	1.979323	2.136044	0.93	0.355	-2.224552	6.183198
Trade farming	2.833324	2.871264	0.99	0.325	-2.817512	8.48416
Trade nonfarm	1.849333	4.037081	0.46	0.647	-6.095907	9.794574
Constant	55.68248	7.81312	7.13	0.000	40.30575	71.05921

Table 8 – Multivariate regression to show that the business category a client chooses to engage in predicts the magnitude of the increase in income level (PPI) of the client with each subsequent loan (loan cycle). All business category coefficients are relative to that of the category Cosmetics (coefficient of 0), and both the categories Farming (forestry) and Processing (agriculture) were omitted for reasons of colinearity.

Conclusions and implications

We conclude that taking out microcredit loans in rural Uganda is associated with an increase in income and subjective wellbeing levels. We find that the increase in income levels is most notable during the first loan a client takes out – the effect of a subsequent microcredit seems to be lower. This seems to indicate that the clients businesses have a rapidly diminishing return on investment – where the clients know how to generate higher profits with their initial investment, the businesses may be unable to productively absorb subsequent investments. The subjective wellbeing of the clients does not seem to show the same diminishing returns – each subsequent loan a client takes out is associated with an increase in happiness and life satisfaction.

Interestingly, we find that the impact of the loans seems to be vastly different for clients with different characteristics. Older clients seem to be able to translate their loan investment into higher income levels much better than younger clients (<40 yrs old). Clients investing in certain business categories (e.g. Hospitality (mostly small restaurants), Retail (market stalls) and Medical (service)) enjoy larger increases in their income levels increasing more than clients who chose to invest in other categories (e.g. Farming, Manufacturing, Brick and mortar retail). We see a larger increase in the income levels of clients who start off poorer and with lower levels of education, again pointing in the direction of a strongly diminishing return of microcredits. We conclude that having children does not predict the magnitude of the impact of the microcredits (although in general we see that having more children results in lower levels of happiness).

These results may be interpreted as extremely encouraging for microfinance practitioners. Not only do we conclude that perhaps taking out a microcredit is associated with perhaps the most important impact metric of all – happiness, we also show that clients' income levels increase, and that microfinance can the largest difference for those at the absolute base of the

pyramid. Practitioners seeking to maximize their social impact should focus on the poorest of the poor, with low levels of education. Efforts may also be targeted towards women who are slightly older, or more experienced in their business, as they may be better at judging how to invest their credit. Finally, loan products in the categories of agriculture and brick and mortar retail may have to be adjusted to realize their full impact potential, perhaps recognizing the long investment horizon or cyclical nature of agricultural loans, and larger capital requirements of brick and mortar retail.

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