The Impact of Education on Successful Micro-lending in Sri Lanka: Evidence from a Field Experiment

by

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Abstract

Microfinance provides crucial access to credit for the poor, and is expected to help poverty and reduce income inequality in low-income regions across the world. The paper draws on a field experiment initiated in 2005 which used randomized grants to generate capital shocks to a coastally representative group of Sri Lankan microenterprises. Using a panel data set of over 400 Sri Lankan microenterprises we run multiple fixed-effects regressions to perform an impact assessment on the microcredit initiative. First, we find that microlending has a clear positive impact on microenterprise recipients' real earnings. Second, higher returns were observed with entrepreneurs who possessed higher levels of education, implying that human capital may affect the successful use of microlending. The paper demonstrates the value of impact assessment on microfinance initiatives and contributes to a growing body of literature which draws on the increasingly important role human capital plays in executing successful microfinance initiatives.

Keywords:

Microcredit, Sri Lanka, education, impact assessment, rural poverty

I. INTRODUCTION

Since the 1980s microcredit has received increasing attention as a tool for combating poverty in developing nations. Its basic aim is to provide the poor with access to credit by use of small-scale loans. It is hoped that these credit injections enhance opportunities for self-employment, productivity, expansion of economic activity, and the opening up of other beneficial avenues to help increase incomes. In this paper we examine the impact microcredit has on the real returns of microenterprises, with a particular focus on the importance of education levels as a determinant these results.

Nestled like a pearl in the Indian Ocean, our focus turns to the island nation of Sri Lanka. Home to over 20 million people, 85% of Sri Lanka's population lives in rural areas. 90% of the poor in Sri Lanka reside in these rural areas (Attapattu, 2009). While de Mel et al., (2008) state that over 50% of the labor force in South Asia is employed by small and medium enterprises (SMEs), the figure for Sri Lanka is well over 65%. Given these characteristics, the Sri Lankan context becomes an appropriate area for this study, one conducive to a successful impact assessment of microfinance initiatives.

Thereby, this paper examines two main questions:

(i) Does receiving a microcredit grant impact enterprise returns?
(ii) If so, do differences in education levels affect the successful use of such microcredit grants?

We operationally define the measure for "successful" use of micro-credit as the real profit/returns of the enterprises. Microenterprise data to probe these two hypotheses have been collected from the Sri Lanka Microenterprise Project which is made publicly available online by the University of Warwick's Depart of Economics website. The experiment was initially run as a *simulation* to replicate a typical microfinance lending initiative. This paper builds off of the original findings and research of de Mel et al., (2008) with a specialized interest on the impact of education levels on enterprise returns.

The microeconomic research interest of this paper enters a larger body of scholarly works that execute impact assessments in microfinance. Impact assessments of microfinance are crucial, as Fritz (2012) identifies, they identify the efficiency of these programs, illuminate best practices, and reveal if intended program aims are met. While worldwide success of microfinance initiatives has been mixed, many studies have assessed the long term impacts of microcredit and found positive results, and others such as Roodman (2011) have reassessed these findings to reevaluate such claims. Considering the aforementioned attributes of Sri Lanka's context, Develtere (2005) notes that the South Asian region in particular, which includes the pioneering work done in Bangladesh by Muhammad Yunus' Grameen Bank network, have been of particular interest to researchers in the last decade.

Education and its relationship to micro-finance has become a topic of rising interest. Holland (2011) identifies that recipients of microloans face entrepreneurial challenges in accessing education given socio-economic constraints, this is reaffirmed by Moldonado (2008). Others find

that the magnitude of income boosting potential rests prominently on the level of human capital (Berge et al., 2011 and Fritz and Lang, 2012).

The succeeding sections of this research paper to test our questions of interest are organized as follows: Section II provides a conceptual framework detailing the theoretical underpinnings of the research and how this paper enters the larger body of economic literature written on microfinance. Section III and IV describe the panel dataset utilized for this study alongside the empirical methodological approach used to test the relevant hypotheses of the paper. Section V provides the econometric results of our fixed-effect regression analyses, detailing the interpretative framework of the statistical tests. The last section discusses conclusions and provides policy implications of the paper's findings to better serve effective micro-financing initiatives, in addition to outlining possible future directions for our research.

II. CONCEPTUAL FRAMEWORK

This section explores the theoretical underpinnings of the importance of education levels for the successful use of microcredit. Initially, we would assume that possessing higher levels of education, associated with higher financial literacy and entrepreneurial capacity, will affect the level of return on microcredit as obtained by households and microenterprises.

Attaining higher levels of education and its importance for economic development, both on the macro and micro level, has been propounded for relentlessly over the last century. Education as an engine for economic growth is observed in various macroeconomic and microeconomic models. The Cobb-Douglas production function, for instance, details that output per capita growth can be a function of the rate of growth of human capital (Abbas 2001). Romer (1990) further proposed models explaining the endogenous growth process as depending on research and development as a means for generating ideas channeled by education. Common to these models is that human capital affects economic growth. Look at education's impact on microenterprises and microfinance, we arrive at a range of experiments and research initiatives executed in the last decade that assess the role educations plays for microlending.

Particular attention on the effectiveness of microfinance has been explored by conducting experiments on returns to microcredit (de Mel et al., 2008, Roodman 2011, Develtere and Huybrechts 2005) and results have been mixed. While empirical evidence exists for and against the case of microfinance, in particular what begs to be explored are the *factors* which contribute towards the different outcomes. This paper proposes to examine the impact education levels possess determining the success and use of micro-lending by microenterprises. As small enterprises in developing nations amount large portion the labor force, these small enterprises become ideal markets for micro-finance.

Sebstad (2003) identifies that the complementary relationship between microfinance and financial education is clear for multiple reasons. Higher levels of education among low-income groups provide for increased financial literacy, enhance entrepreneurial activity, and also lead to the effective use of credit and savings by microenterprises (Bendig and Arun, 2011). Similarly, (Banerjee et al., 2009) identify the importance of the growth effect as hinging on entrepreneurial experience, educational background and business acumen. Furthermore, demographic and

background factors of microcredit recipients over the lifecycle of the household also play large roles in determining the association of successful use of credit and savings (Shaw, 2004) and may even play a crucial role in determining if micro-recipients fall prey to poverty traps.

Microenterprise studies such as Berge et al., (2011) done in Tanzania found the magnitude of the income boosting effect of the cash infusion hinged on the level of education of the borrower. Uneven distributions of levels of human capital tended to increase income inequality levels of individuals of the micro financing scheme. In a similar study depicting the importance of education for microfinance, Fritz and Lang (2012) combined their field experiment in Cairo with a lab experiment of incentivized choices to show the importance of human capital. Their findings revealed that a "substantial" increase in profits of male entrepreneurs, although financial capital intervention had no noticeable impact on business performance. Researchers were able to isolate the importance of human capital accounting for a 20-30% increase in microenterprise profits alone. This alludes to the importance of human capital as a complementary inducer of success relative to cash infusions.

In assessing the Sri Lankan context of micro-finance the literature identify problems of access to credit to rural poor. Interest rates in rural Sri Lanka can be as high as 20-30% (Attapattu, 2009), requiring collateral in the form of jewelry, land or a wealthy guarantor's signature. While there are information gaps on credit defaults (Batra 2006), and only one credit rating agency (Fitch Ratings) is used for formal institutions (Neelakandan 2006), only a handful of microfinance institutions (MFIs) are active in rural areas of the island.

While some studies, as done by Shaw (2006), find that micro-lending doesn't help the extreme poor in Sri Lanka (only helping the near-poor and non-poor enterprises), other studies find that returns are mixed (de Mel et al., 2008). Much of the literature seems focuses on impact assessments judging the efficacy of micro financing as a development program while fewer studies look deeply at the *factors* which lead to such mixed results. Variables such as age, gender and education for instance prove important in giving insight into the use of micro-credit both on the individual national level and cross-country levels. As seen in Holland (2011), education in relation to micro-finance has become a topic of much interest, and trying to understand the impact of education levels on the effective use of micro-credit provides a good avenue for further exploring the factors which lead to successful microfinance programs.

It is from this vantage point that this paper seeks to enter the current conversation. It aims to contribute to the larger body of economic literature on the functioning of education and its role for microfinance, particularly in Sri Lanka. In doing so, we examine the following testable hypotheses:

$H_{1:}$ Returns to microenterprises are higher when recipients receive financial grants

$H_{2:}$ Returns to microcredit on average are higher among those with higher levels of education

III. DATA

As stated earlier, the ultimate objective of this paper is to explore the relationship between education levels and the use of microcredit by microenterprises. In doing so, in a Sri Lankan context, we test if: education levels of a recipient of a micro-loan affect the success of micro-credit use, as measured by the impact on real profits.

Micro-enterprise data to test these hypotheses have been collected from the Sri Lanka Microenterprise Project, made publicly available by the University of Warwick's Depart of Economics website. The panel data set was originally collected by the Neilson Lanka team (de Mel et al., 2008) in Sri Lanka. It consists of a periodic survey of over 9 waves (and later a follow up of 4 more waves by 2010), first administered in April 2005 followed by eight more rounds ending in 2007. Initially, a screening survey was conducted for 3, 361 potential microenterprise owning households, of which less than 1% agreed to be listed. The baseline survey was then administered to 659 microenterprises.

Sampling Structure:

The survey collects data from 3 of the 25 provincial districts in the tropical island: Matara, Kalutara and Galle. All these districts were severely affected during the devastating December 2004 Tsunami. Initially, the data was collected to gauge the level of recovery of small enterprises after the natural disaster as well as to perform other studies on the functioning of micro-level enterprises. This present dataset is representative of the southern coastal population of Sri Lanka.

The survey was administered on a quarterly basis, during April 2005 and April 2007, and again in October 2007 and April 2008 by use of stratified random sampling methods. The sample draws equally from 3 population groups: i) directly affected by the tsunami ii) indirectly affected and iii) unaffected enterprises. As this was a field experiment, the data consists of a control and experimental group, defined as those who received a treatment(s) or not. The experimental group received either capital shocks in two forms—in-kind and/or cash grants of USD 100 or USD 200. Firms were operationally defined as "micro" with investment capital being lower than LKR 100,000 (approximately USD 1, 000).

From the 659 surveyed enterprises, 618 enterprises met the criteria set for the operational definition of "micro" and this constitutes the baselines sample. Excluding the directly affected enterprises by the tsunami (given that it is a different population as a result of sudden devastation) 409 firms meet the criteria for this analysis. Of these, 204 firms are in retail sales and the remaining 205 are in manufacturing.

The baseline survey gathered detailed information on individual firms and the characteristics of its owners, both background and personal. This data set proves to be invaluable to this research exercise as it possesses suitable data points which allow other researchers great freedom in pursuing multiple research projects related to microenterprises and microcredit, in the context of this paper—the role of education. The broad range of descriptive variables available in the dataset, in conjunction with the multiple economic variables that quantify profitability, revenue,

expenditure, and asset ownership, among other economic indicators, make this a suitable dataset for our research initiative.

The paper posits the question: *does varying levels of education affect the successful use of micro-loans as measured through profit/income generation?*

Consisting of initially 327 variables and 7,167 total observations, the primary variable of interest is the level of *real profits* earned by the firm in addition *years of education*. Multiple other fixed effects variables of importance have also been included for this analysis. The final number of observations for the fixed-effects regressions are 3,308, accounting for 407 microenterprises.

For the purposes of this paper, from the 407 firms only 391entities completed the survey questions that allow us to measure descriptive variables from round 1 to 3.The baseline descriptive statistics will consider the whole 391 respondents.

Descriptive Statistics:

Table 1A (refer Appendix) provides information on the summary of the baseline characteristics of the owners of these micro-enterprises and their firms. This information is also compared with the first wave of treatment administered in 2005. Treatment is defined as receiving *some* form of microcredit. The selected variables in the table consist of the dependent variable—real profits, and a variety of other independent variables. The independent variables have been selected as descriptive variables that reveal the population's general characteristics. Controls for the Ordinary Least Square (OLS) fixed-effects regression, to be performed later on in the analysis, will be determined accordingly.

To test the educational impact, the number of years pursued in education by the entrepreneur has been chosen as the key independent/explanatory variable, with reasonable other controls that can affect profit levels—gender, riskiness, age of firm, experience of entrepreneur, hours worked etc… As mentioned before, given this is a field experiment there were two groups within the 391 respondents that meet our criteria, the control and the experimental group which broke down into 226 that received treatment and 165 that remained in the control group.

As evident from Table 1A, the average owner is almost equally divided between male and female, while the median age of the owner is approximately 41 years. Owners in general possess approximately 9 years of education (0 being the lowest and 16 years the highest), with a household size of 5 individuals, and have run their firms for approximately 10 years. In terms of ownership of durable assets, the household asset index provides the primary indicator for this kind of ownership. The coefficient of relative risk aversion (CRRA) was obtained from the survey team by providing a lottery opportunity in the form of a lottery game (de Mel 2008) which was performed in round 2 of the survey. The respondents seem to be equally divided between risk averse and risk seeking decision making, reflecting a coefficient of .16 from a range of -1.48 to 2.47, where 2.47 is most risky. Roughly 3% of speakers are English speaking. The average monthly revenue is LKR 12,325 (approx. USD 120) with profits reported as LKR 3,850 (approx. USD 30) with high standard deviations these figures possess a lot of variation from the mean.

More importantly, in considering the experiment's randomization of the sample, to know if it is a proper counterfactual, we look towards a comparison of the means of the two groups—

experimental and control. In doing so, we test if the means are statistically different from one another by running t-tests for each of the variables from both control and experimental groups. The results of these t-tests are indicated the p-value column of Table 1A. It is evident that the household asset index variable is the only variable that appears to be different, given its significant p-value of .04. Upon review we note that the control group has a higher mean of baselines assets than the experimental group, with a net difference of .35. Most of the other variables however have large p-values which leave us unable to reject the null hypothesis that the difference between the tests of means is 0. This implies that these two groups are two significantly similar populations.

Randomization was done by statistical software and any differences between these two groups arise primarily as a result of chance. Overall, the randomization process performed for the above samples appears to have created a reasonable counterfactual, given that the two groups can be compared through baselines characteristics and possess minimal significant differences. This in turn allows us greater confidence for the methods we wish to use to test our hypotheses.

IV. METHOD

The testable hypotheses sought after from the above data are:

$H_{1:}$ Returns to microenterprises are higher when recipients receive financial grants

$H_{2:}$ Returns to microcredit on average are higher among those with higher levels of education

While the above descriptive statistics provide us with the key independent (real profit) and dependent variables (education, gender, age etc…), in linking the data to testing the hypothesis we look towards key econometric approaches that allow us to test these research inquiries.

The empirical approach, then, involves the use of an OLS fixed-effects regression analysis that allows us to model on the key variables used for this assessment; control for time effects as this is panel data, and analyze the relationship between the dependent and independent variables (Stock 2011). OLS fixed-effects regression thereby allows us to consider several variables at once to zone in on the varied impacts on the dependent variables. It allows one to gauge the marginal value of how a per unit change of the independent variable affects the change of the dependent variable, while the other controls remain fixed.

The dependent variable here is the economic success, or return on capital/investment, achieved from the use of the micro-loan. We measure by use of the *profits after treatment* variable. The primary independent variable which describe education is the *years of education of entrepreneur*, a categorical variable from 0-16 years.

In estimating the real marginal impact on profits using this fixed-effects regression it is necessary to examine the impact of treatment on the outcomes of the dependent variables. As we are interested in the effect of the treatment on education levels on enterprise's profits, we estimate the following form:

$$Y_{it} = \beta_0 + \beta_1 \text{ treatment} + \beta_2 \text{ treatment*education} + \beta_3 \text{ education} + \sum_t \sigma_t + \theta_{1\text{-}z} + \varepsilon_{it}$$

The above form is run with two specifications:

(1) Treatment dummy – all groups
(2) Separate dummies – four treatment groups {USD 100 (cash or in-kind) or USD 200 (cash or in-kind)}

- where Y represents the outcome of interest (real profits), $_t$ represents time and $_i$ represents microenterprises
- β_0: is an intercept component of the model representing the models value for Y when X=0
- $\beta 1$: indicates if the enterprise owners received a treatment or not in the form of a microfinance loan; this will be a dummy variable (0 = no treatment, 1= received treatment)
- β_2: is the treatment variable as multiplied by the education level of the entrepreneur. This is an *interaction term* that we create to gauge the marginal impact of varying levels of education on those who received microfinance loans and those who didn't
- β_3: is the education variable which is required to gauge the marginal impact separate from the interaction term
- $\sum_t$: accounts for a time control since this is a panel data set administered in timed waves
- $\theta_{1\text{-}z}$: fixed effects, are representative of other time control variables in the model such as age, gender, riskiness, experience which may account for profitability $_z$ being the last control variable. These are variable which we believe remain fixed through the waves
- and ε_i: represents the error term (residual/remainder) which accounts for the empirical differences between the real world Y and the model's Y as influenced by factors not taken into account by the model

The model also necessitates the removal of outliers at the top of the sample, trimming the top 0.5% of both the absolute and percentage changes in profits measured from one period to the next (de Mel et al., 2008). Accounting for fixed wave effects has been omitted from the model since education is a key independent variable and it is assumed to be generally fixed throughout the time period of the survey.

While the model proposes to identify if education levels have an impact on profits, in running this model outlined above we might expect 4 main outcomes which will in turn create different empirical issues to assess, interpret and conclude. The OLS multiple regression coefficient measures the marginal effects of the explanatory variable on the dependent variable (by order of holding various influential variables constant). In this model, it is the level of education of the

individual who received a treatment, and how that may impact the level of profit generation. The options for the potential results could be as follows:

- $\beta 1$ and β_2 are significant
- $\beta 1$ is not significant and β_2 is significant
- $\beta 1$ is significant β_2 is not significant
- $\beta 1$ and β_2 are both not significant

In considering the model it is also evident that the directions of the results is equally exposed to 4 different options stated above where there could be positive and negative associations for either, neither, and/or both coefficients.

This model allows one to conduct an impact assessment of a program such as micro-finance on two distinct levels: (1) gauging the level of impact treatment has on profits (2) assessing the level of impact education has on profits. Looking at these results will also allow us to reach differently intuitive conclusions as aided by the disparate literature available on education and effective use of micro-credit. The econometric method aims to test both if treatment had any impact on profits, and if education affected these profits. In addition, we also look to see if the type of treatments and the magnitude of the treatment have corresponding effects.

V. RESULTS

Given the aforementioned methodological framework, the primary testable hypothesis of this paper is:

$H_{x:}$ *Returns to microenterprises are higher when recipients receive financial grants*

$$(\beta 1 \neq 0)$$

$H_{y:}$ *Returns to microcredit on average are higher among those with higher levels of education*

$$(\beta 3 \neq 0)$$

In testing the above hypothesis we used a fixed effects regression model that uses linear production functions to test the impact of education on the level of profits obtained by microcredit recipients. As outlined in the previous section, the level of *real profits* is the key dependent variable that is used to operationally define the "successful" use of a micro-credit loan.

The model also uses an interaction term that creates a variable by stitching education levels and those who received treatment together to form a single variable for analysis. This permits one to gauge the marginal effects on those who received treatment and those who received treatments and had higher levels of education.

The analysis of results takes a two way approach. The method first it tests if receiving a microcredit treatment, and having higher levels of education impacts the rate of profits. Secondly, it tests if the type of treatment received, either an in-kind (equipment) grant or a cash grant of either LKR 10,000 (approx. USD 100) or 20,000 (approx. USD 200) received by those who have higher education levels impact the level of profits obtained from the enterprises business

activities. Keeping in mind that this is a panel dataset, the model uses fixed effects to control for variables that do not change over the short period of time, education included (hence the creation of the interaction term with treatment), in which this data was collected across 9 waves.

As evident from the results in Table 1 and Table 2 we are able to identify, through weakly significant results, that firstly treatment through a microfinance loan does have a positive impact on the level of profits. Table 1 indicates that an individual who received a treatment was able to increase his/her profits by LKR 1, 276, significant at the 0.10 level. The same direction is also evident in Table 2 which shows the analysis using logged results. Logs allow the advantage of mitigating the effects from outliers while also being more intuitive for a percentage based analysis. Table 2 reflects the same positive direction of profits increasing by 20% although it just misses the .10 cutoff level of statistical significance.

Table 2 also indicates that those recipients of microcredit, who also had higher levels of education, were able to increase their profits by 2.3% more than those with relatively lower levels of education. While this may seem small, a 2.3% increase for an additional year does indicate that human capital does impact the potential for entrepreneurial activity. Though the magnitude may seem small, its positive impact should not be dismissed. This confirms the findings of Fritz and Lang, (2012) which also found positive increases as result of human capital, though their study indicated an increase of over 20%. While the interaction term in Table 1 did not prove to be significant, quantifying that 2.3% in Table 2 generally amounts to a figure that is above LKR 100. This result also compliments the original paper which this builds off, finding that an additional year of education increased the level of profit by a recipient who received a 10,000 LKR treatment by 158 LKR (de Mel et al., 2008), indicating that treatment has a larger effect on the more educated entrepreneurs.

Table 3 allows us to probe deeper into the different impacts by looking at varying treatment types and its relationship to education levels. Once again we notice that microcredit treatments do have a positive impact on real profits. Though 3 treatments did not prove significant, the positive impact of an increase of 3,661 LKR in real profits on the 10,000LKR cash grant was observable, significant the 0.05 level. Similarly, individuals with higher education who received the 20,000LKR grant were able to raise 228LKR more in profits than those individuals with lower levels of education, once again significant at the 0.05 level.

However, while these results do compliment the findings of other papers done on microfinance on similar projects, such as Berge et al., 2011, de Mel et al., (2012) and Sebstad (2003), these results must be approached cautiously given that the other results appeared to be insignificant at the 0.10 cutoffs. By this we mean that the observation reflects on the role of chance being above 10% in the interplay of causes for these rising profit levels for those with higher levels of education. As Abbas (2001) explains, the effect of education levels on growth levels is more acute in rising into higher education to secondary as compared to secondary to primary levels of education, especially with Sri Lanka's increased emphasis on varying higher educational institutions. Given that most of the individuals possessed less than 11 years of education, this analysis is important to consider.

And yet, given the above analysis what should be noted is that the recipients of these microfinance loans are barely above subsistence earnings with mean education rates of 9 years. Given that the sample is symptomatic of lower education levels that are broadly unchanging

across the time the survey was administered, other factors such as risk management (Bendig, 2011), the experience of the entrepreneur, the brand image of the SME locally in the town, alongside cultural factors such as race, ethnicity, language, as well as social factors such social networks, opportunities, social capital and other variables also need to be considered and controlled for a comprehensive analysis.

Given the importance of education and its relevance to economic development, one would initially assume that those recipients with higher levels of education would use their microcredit grants more effectively and thus yield higher profit levels than recipients with relatively lower levels of education. Nevertheless, in considering such an analysis it is crucial to account for various other factors apart from education that may also affect the successful use of microcredit loans. The success of small and medium enterprises (SMEs) in Sri Lanka's rural areas hinge on knowing the local culture's social network extremely well (Shaw, 2004). Therefore, it is necessary to understand that apart from years of education, other personal, cultural and social factors are key to influencing the success of an SME in a rural area in Sri Lanka.

While we are able to reject the null hypotheses that (i) treatment does have an impact on returns, and (ii) higher levels of education do have an impact on the level of profits, it is done so with sensitivity to a myriad of other exogenous factors: local, contextual, cultural and social, that may also affect these Sri Lankan SMEs. The paper is harmonious with other papers, finding that increasing education levels do in fact impact the level of economic prosperity, yet using this as a cross comparative study for other microenterprises in different geographies, territories, and countries should be done with caution and sensitivity to locally determinant factors. Evidently, impact assessments done on microfinance wary widely across the literature. Therefore, in interpreting the results of this paper, one should pursue it in conjunction with the ever evolving body of scholarly literature of microfinance.

VI. CONCLUSIONS AND POLICY IMPLICATIONS

We began with a research inquiries that questioned the impact micro lending has on microenterprise profits, while paying particular attention to if education levels affect these results. The original field project acted as a simulation, allowing us to experiment with a control and treatment group to assess the extent these financial injections impact these poverty stricken microenterprise's profits. Using the study's data we empirically test through econometrical methods our own key hypotheses on profits and education. This paper identifies that (1) microlending does have an impact on the return of profits, and (2) different education levels to have an impact in determining the level of profits. However, it should be noted that these results were mildly significant. This indicates that more research may need to be done for more robust conclusions. These findings suggest that different levels of human capital are crucial determinants microenterprise success, and reaffirms the economic theory elaborated on the Tanzanian study by Berge et al., (2011), the Cairo field experiment by Fritz and Lang (2012), in addition to the original work run in Sri Lanka by de Mel et al., (2008).

We find that an individual who received a treatment was able to increase his/her profits by LKR 1, 276.00 (USD 12), a 20% increase, and an increase of 3,661 LKR in real profits on the 10,000LKR cash grant. Those with higher levels of education were able to raise 228LKR more

in profits, a marginal increase of 2.3% higher profits for those who possessed additional years of education. This is quite a noticeable magnitude; however, sensitivity to the Sri Lankan context is crucial for drawing conclusions and interpretations. Other controls not accounted for such as local, cultural, social and political factors also affect our interpretation of the real picture. Yet, it is safe to say, drawing from the information of the paper, education does have an impact on affecting the level of profits of these Sri Lankan microenterprises.

Multiple policy implications arise from our research. The root implication is that microfinance does prove to be a suitable stimulant for rural economic growth, particularly in countries such as Sri Lanka with high rural populations whose majority of labor is employed in SMEs. Secondly, education initiatives prove to be important in spurring efficient use of the microfinance injections. For a country such as Sri Lanka which possesses a higher literacy rate, and universal education, initiatives should be tailored accordingly with more emphasis on *microfinance plus services* which act as a complimentary wedge between financial and human capital. Such initiatives should focus on heightening education efforts on financial literacy, credit management, awareness of availability of financial services and resources, alongside best business practices that emphasizing the use of funds efficiently for the microenterprise.

It should be noted that while surveying over 400 microenterprises is indeed a large task, statistically speaking, we recognize the constrains on our analyses given the small sample size of this research project. Ideally, we look towards more enterprises that would yield us results that could be extrapolated to a nationally representative sample of Sri Lanka's SMEs. A larger sample size may also work well towards ensuring stronger results relative to the mildly significant results yielded through our research.

We also recognize the importance of basing our findings on other heterogeneous treatment effects, specifically in terms of gender. As de Mel., (2008) identifies, increases in profits were not observed across female entrepreneurs. Future research interests of this project direct us towards questioning the role education may in explaining the clear gender differential. Given that our sample had almost 50% of female entrepreneurs, why microlending spurs different results based on entrepreneurs who are women or men alludes to critical gender based issues that are left unresolved. Muhammed Yunnus, the father of microfinance's Grameen Bank's policies clearly focus on female empowerment by credit lending exclusively to the female. As Berge et al., (2011) emphasize, probing the deeper factors that constrain female entrepreneurial success is key to resolving the gender trap. While we have findings on the importance of education of the use of successful microlending, we see an attractive venture in bridging the gender gap by better understanding how education affects the success of female entrepreneurial activity. A better understanding of how education may affect such a key group in the rural regions of Sri Lanka, and the world, is indeed a lush are of research that waits to be reaped.

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Appendix

Table 1A

Descriptive Statistics and Verification of Randomization						
Baseline Characteristic	Observations (N)	Full sample		Means by treatment		p-value
		Mean	SD	Treatment group	Control group	
Profits March 2005 (LKR)	391	3,850.81	3,288.81	3,919.07	3,757.30	0.63
Revenues March 2005 (LKR)	391	12,325.01	14,978.44	11,970.02	12,811.24	0.58
Working hours per week	391	52.42	22.27	51.49	53.70	0.33
Age of entrepreneur	391	41.75	11.43	41.56	42.01	0.70
Age of firm (years)	390	10.14	10.39	10.39	9.80	0.58
Propotion male	391	0.52	0.50	0.55	0.47	0.14
Married (dummy)	391	0.79	0.41	0.81	0.76	0.18
Highest level of education of entrepreneur	391	9.02	3.15	8.89	9.19	0.35
Household size	391	5.02	1.77	5.04	4.99	0.78
English speaker (dummy)	391	0.03	0.17	0.02	0.04	0.25
Household asset index	391	0.25	1.63	0.11	0.46	0.04
Risk aversion, coefficient from lottery game	387	0.16	1.58	0.23	0.06	0.29

Table 1: Fixed Effects Linear Regression Results

Effect of Treatment (Dummy) on Real Profits	
Variables	**Coefficients**
Microfinance treatment (Yes=1, No = 0)	1,276*
	(754)
Treatment recipient with higher education	108.9
	(76.83)
Constant	4,570***
	(117.3)
Number of observations : 3,308 Number of enterprises: 407 Note: robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1	

Table 2 Fixed Effects Log Linear Regression Results

Effect of Treatment (Dummy) on Log Real Profits	
Variables	**Coefficients**
Microfinance treatment (Yes=1, No = 0)	0.206
	(0.129)
Treatment recipient with higher education	0.0231*
	(0.0138)
Constant	8.014***
	(0.0201)
Number of observations : 3,308 Number of enterprises: 407 Note: robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1	

Table 3 Fixed Effects Regression Results for Individual Treatments

Effect of Treatments on Real Profits	
Impact of treatment amount on:	**Coefficients**
10,000 LKR cash	3,661**
	(1,632)
20,000 LKR cash	317.7
	(653.7)
10,000 LKR in-kind	696.6
	(1,688)
20,000 LKR in-kind	543
	(2,316)
10,000 LKR cash with higher education	-61.27
	(158.6)
20,000 LKR cash with higher education	228.6**
	(109.8)
10,000 LKR in-kind with higher education	88.47
	(167.9)
20,000 LKR in-kind with higher education	196.4
	(228.2)
Constant	4,558***
	(116.1)
Number of observations : 3,308 Number of enterprises: 407 Note: robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1	