

## **Emerging Micro Financing Model and its Impact on Business Performance**

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**Abstract:** *Even if no one disputes over the importance of microfinance schemes, several evidences revealed that the conventional microfinance scheme in Pakistan did not reach the poor and has not yet achieved the expected result. Alternatively, a new microfinance scheme was innovated in Pakistan and found to be more beneficial to the poor. Conversely, there are no sufficient empirical studies conducted to evaluate the impacts of the two alternative microfinance schemes in Pakistan. Therefore, the main objective of this study is to evaluate the real impact of Akhuwat microcredit intervention on the profitability of small business enterprises. The study was conducted based on Randomized experimental design through which experimental treatment of microcredit was considered as family enterprise loan. The loan was exclusively granted for running business activities. The samples under study consist of firms that are randomly assigned to treatment and control groups which entail as similar character as possible. Difference in Difference (DID) is the classic empirical approach used for analyzing the net impacts treatment effect on the treated. The method is highly instrumental to eliminate the effect of both observable & unobservable characteristics varying across firms and over time. According to the findings, Akhuwat microfinance intervention strongly impacted the firm capital stock and profitability. The estimated coefficient for capital stock by its exogenous treatment effect revealed that treated firms had been accumulating on average more than 9 percent excess monthly capital stock. Profits (direct and an indirect profits) significantly vary in between the treated and untreated firms. Due to Akhuwat microcredit service, firms could earn 3 percent additional monthly profit and 8-10 percent monthly returns to capital on average. The estimated monthly direct rate of return and Net rate of return comprises of 36 and 27 percent, which is higher than the market or bank interest rate, (35-40 percent) meaning that profitability of small firms by the effect of Akhuwat microcredit provision can exceedingly benefit Pakistan's economy to grow faster than any other large businesses.*

**Keywords:** *Akhuwat, Business Performance, DID approach, Micro Credit, Pakistan, pro poor, treatment effect*

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### **I. Introduction**

Pakistan is as one of the fastest growing country in the Asian region. According to the Global Monitoring Report (2006), the country achieved tremendous economic growth since 2004/5 to 2006/7, with an average real GDP growth rate of over 7.5 percent. Agriculture growth has historically played a major role in the development the economy. Recently, the economy on average grew at 2.94%, 4.4% and 3.6% for FY9, FY12 and FY 13 respectively. The average population size of the country is expected to be over 164.7 million with 1.8 percent growth rate (SBP, 2007). In spite of the tremendous economic growth record, Pakistan's economy has been recently constrained by several internal and external factors. Total investment has severely declined from 19.21 percent of GDP in 2007-08 to 14.22 percent of GDP in 2012-13 mainly attributed to the bleeding public sector enterprises, economic mismanagement and menace of informal economy hemorrhaged the system. The growth of the core sector of the economy, particularly agriculture has been rigorously degraded due to shortage of inputs, capital/credit and inadequate infrastructure. Non availability of adequate credit has been one of the major obstacles for the growth of agriculture, the backbone of Pakistan's economy.

In order to struggle the growing unemployment and constantly stimulate the growth of the economy, the presence of big companies and or public sector development is not adequate enough, vibrant micro and small scale enterprises are found to be the inevitable means of enhancing entrepreneurial acquaintance, savings, investment and combat unemployment at large. Virtually, enormous evidences demonstrate the potential to work in microfinance to fight against poverty and unemployment problem in the country.

Bearing the aforementioned critical roles in to consideration, Microfinance sector have been rapidly growing in Pakistan. However, the immense role of micro finance institutions is found to be the indisputable and reliable truth not only for Pakistan's economy but also for the rest of the developing world. More precisely, microfinance services directly contribute to the betterment of standard of living and poverty alleviation for the poor, especially for women to develop their own entrepreneurial ability, diversify and increase income sources and become more resilient to external shocks.

Though plenty scholars and researchers widely proclaimed that microcredit enhances pro poor growth and poverty reduction. The extent to which microfinance products and services directly impacts the poor (poverty alleviation, women empowerment, and eradication of unemployment) and the means through which this impact occurs have not yet been adequately researched. Jemal, (2008) reported that several theoretical presumptions and slanted justifications are made without adequate empirical data and precise evidence. Besides, Hermes and Lensilk, (2007) reported that most studies on the outreach and in-depth of microfinance services suffer from being subjective and case study driven. Thus, the overall aim of this journal article is to present the impact of micro-credit on firm performance particularly on firm profit, working capital, returns to capital and work effort (hours worked) in the case of Akhuwat in Pakistan.

## **II. Problem Statement, Relevance and Objectives**

Microfinance<sup>1</sup> is the provision of wide ranging financial products and services including loan deposits and payment services, transfer payment insurance. They are ultimately meant for extending markets, reducing poverty, empowering the poor and fostering social change (ADB 2008).

Microfinance institutions are classical instruments to empower the poorest of the poor. They are considered as the fundamental weapons for poverty reduction and sustainable economic growth (Karlan & Zinman 2009). The ultimate goal of these institutions is to expand credit provision to enhance the growth of small scale firms in so doing, improve the well-being of the poor. They provide wide range of financial and non-financial services including savings, borrowings, deposit and training on how to manage finance, record business transactions and deal with health provision. Now a day the latter services have been widely expanded and become very fundamental component of the microfinance sector. Recently, there are numerous counter arguments on the impact of microfinance institutions. According to the microfinance institutions (MFI) advocators (Littlefield et al 2003; Dun ford 2006 and others) the ultimate aim of microfinance institutions is to fight against poverty and Ensure long-lasting increase in income of the poor by means of getting own income generating activities and business investments.

Micro credit enhances livelihoods diversification and accumulation of assets out of the profits earned through small scale investments which are the fundamental guarantee against the vulnerable conditions of the poor and contribute to a better education, health and housing of the borrower (Hermes & Lensink 2007). Besides, proponents also argue that microfinance is a tool for empowering women by means of addressing their dual folds social and economic problems. According to Pitt and Khadker (1998), women constitute very crucial role in reducing poverty with in households as they invest substantial part of their income for health and education of their children. In this connection, it is highly stressed that MFIs are key the development of microenterprise operated by the poor as they allow the poor to become producer of marketable goods and earn a compensating profit out of it. Despite the predominant claims on the critical role of microfinance service towards impacting poverty reduction and sustainable pro poor growth, quite a lot of evidences also argue contrarily. There are several underlying factors that the conventional microfinance scheme is waning. Firstly, the service does not reach the core poor<sup>2</sup> (Scully 2004) as they are believed to be too risky (Hulme and Mosley 1996), or the poorest are implicitly excluded from the microfinance schemes (Simanowit 2002), often marginalized by other group members because they are seen as a bad credit risk (Hulme and Mosley 1996), the procedures and formalities required to grant the loan, for instance, saving requirement, stimulate exclusion of the core poor (Mosley 2001) and hence the core poor value the loans to be too risky (Ciravigna 2005) and vanish out. According to Munir (2012), there are two stranding impediments of the conventional microfinance scheme. On the one hand, most MFIs charge exorbitant interest rates, ranging between 30 to 50 percent and even more. On the other hand, there is strong momentum to grow quickly and thus attract large international donors/lenders and hence, the loan is granted irrespective of the due social return and costs a lot to the poor.

Virtually, pioneering and classical example of the recent microfinance journey towards alleviating poverty and promoting pro poor growth was developed by Akhuwat in Pakistan, a non-profit microfinance

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<sup>1</sup> There are several definitions of microfinance. The one adopted for the purpose of this baby paper is CGAP2 definition as follows: 'Microfinance is the supply of loans, savings, and other basic financial services to the poor'. According to Jemal, (2008) the term 'Microfinance' can be used interchangeably with 'Microcredit' in Pakistan, for the reason that microfinance services and products are far less developed than the provision of microcredit. As some evidence also noted out savings and insurance services have not yet been well flourished as far as their provision by microfinance institutions is concerned. Thus, both terms will be used synonymously in this baby paper.

<sup>2</sup> According to Hermes & Lensink, (2007), the core poor refer to 'the poorest of the poor'. In line with the contemporary economic thought, it might also refer as 'pro poor'.

organization based in the city of Lahore in Pakistan, which was established in 2001 exclusively based on an indigenous model of interest free microfinance scheme and has a blend of volunteerism with a start-up donation of Rs10, 000, targeting the poorest of the poor with an average loan size of \$147 for about 132,163 active borrowers.

Akuhwat is an evidence of the power of volunteerism and self-reliance to change the lives of thousands by the means of faithful social capital transformation ascribed to run self-regulated credit transaction regardless of incurring monitoring and follow-up costs which the ordinary microfinance institutions rely on. “It is a story which inspires and rekindles the faith in the strength of communities and populations to contribute to efforts at poverty alleviation (24th MF conference proceeding 2011)”.

Even if both microfinance mainstreams (conventional and Akhuwat) proclaimed that microcredit positively contributes to poverty reduction, evidences show that the extent to which microfinance services reaches the core poor in the two differing modalities substantially vary. Thus, this research paper may attempt to throw its own contribution towards filling the aforementioned gap through thoughtful empirically investigation on the impact of micro credit on firm performance particularly firm profits, working capital, returns to capital and work effort (hours worked) in the case of Akhuwat microfinance scheme.

### III. Research Question

Does access to Akhuwat’s microcredit services enhance firm performance particularly firm profit, working capital, returns to capital and work effort (hours worked)?

### IV. Empirical Evidences

Author	Empirical Strategy	Major findings	Remarks	Challenges and limitations
De Mel et al.(2008)	Randomized experimental design.	Profit increment 5% per month, or at least 60% per year Using different estimates of the marginal productivity of the owner’s additional work effort, we find returns of 4.6%-5.3% per month, 55%-63% per year. Returns are found to vary with entrepreneurial ability and with household wealth, but not to vary with measures of risk aversion or uncertainty. Treatment impacts are also significantly larger for enterprises owned by males. High variance of the marginal returns and well above the market interest rate. Found the Heterogeneity of treatment & returns	ATE among female-owned enterprises is not different from zero. No negative spillovers on firms in the neighborhood of the treated firms. Random allocation of grants is meant to control the effect of entrepreneurial ability, demand shocks of capital stock and found they are uncorrelated. Spillovers are not properly considered in the sample.	Baseline Sample restriction on individuals who do not run enterprise. The sample is limited to firms or entrepreneurs exposed to the shock. Capital stock is likely to depend on entrepreneurial ability, which is difficult to measure.
Karlan & Zinman (2009)	Field Experiment and follow-up survey	There is evidence that profits increase, but businesses shrink by shedding unproductive workers. Overall, borrowing households substitute away from labor (in both family and outside businesses), and into education. We also find substitution away from formal insurance, along with increases in access to informal risk-sharing mechanisms.	Our treatment effects are stronger for groups that are not typically targeted by micro-lenders: male and higher-income entrepreneurs. Microcredit works broadly through risk management and investment at the household level, rather than directly through the targeted businesses.	Spillovers are not properly considered in the sample. Very difficult to control the effect of time variant unobservable factors.
Jemal, (2008)	DID model Coleman(1999)	Microfinance intervention possibly helps in smoothing consumption, especially in urban areas and in generating income. The coefficient for Education and health do not appear statistically significant in both models. The positive sign indicates more spending on education and health by borrowers.	No evidence to conclude that MFI enhances empowerment. The Coleman model is slightly modified. To control for heterogeneity, the author introduced dummy variables for matured borrowers and pipeline clients and their matched neighbors.	All conditions of the DID model are not strictly met due to the problems of Sampling and data collection. Failure to take in to account externalities and spillover effects. The difficulty to get pipeline borrowers
SHIRAZI, (2012)	DID Approach (A counter-factual or Combined approach)	The impact on the poverty status was found to be positive but marginal. Only about 3 percent of the poor could cross the national poverty line. The income of the poor borrowers hardly could grow by 2 percent during the study period. The income of the non-poor borrowers grew at	The conventional microfinance funds are not reaching the poor masses rather the non-poor were the major beneficiaries. Only about 30 percent of the poor were the recipients of the	This approach combines the “with-without “and the “before-after approach”. Failure to take in to account externalities and spillover effects.

		about 6 percent. However, the consumption of the poor borrowers increased by 10 percent, which indicates that the poor primarily borrow for smoothing their consumption. A significant net effect of microfinance on the consumption (6.71 percent) and income (about 6 percent) of non-poor borrowers has been found. Results show that poor non-borrowers were better off in terms of change in most of their assets compared to the poor borrowers	microfinance facilities during the study period. Traditional microfinance is reaching and benefiting more to better off than the poor and unskilled.	Very difficult to control the effect of time variant unobservable factors.
Khandker (1998) & (2003)	DID Approach	Microcredit alleviated poverty up to 5 percent annually. A loan of 100 Taka to a female borrower, after it is repaid, allows a net consumption increase of 18 Taka. Microfinance helps to reduce extreme poverty much more than moderate poverty i.e. 18 percentage points as compared with 8.5 percentage points over seven years.	Welfare impact is also positive for all households, including non-participants, as there were spillover effects.	Double difference comparison between eligible and ineligible households and between program and control villages.

### V. Methodological Approaches

The experimental treatment of the microcredit grant amounts to Rs. 10,000 family enterprise loan. The loan is exclusively granted for running business activities. Loan has to be repaid in 10 equal monthly installments. The loan grant is about 123 percent of the firm’s median monthly income; 41 percent of the median working capital.

### VI. Data And Sampling

Impact evaluation process most often requires longitudinal panel data that help to explore both the cross sectional and time series dimension. Likewise, data for the purpose of this research article were generated in three successive waves. The baseline survey is a full scale survey, which was conducted prior to randomization in June 2010. The survey data comprises of detailed information on the characteristics of households, business activities and also on personality traits of the owners and are collected through Urdu version of a psychometric test developed by the National Institute of Psychology.

**Table 1:** Sample Size by Treatment and Firm Type

Firm Type	Treatment	Control	Total
Retail	75	76	151
Manufacturing	31	34	65
Service	82	76	158
Agriculture	2	0	2
Others	34	44	78
Total Firms	224	230	454

Source: Author’s own computation

The first follow up survey was conducted after 5 months from the disbursement of the loan (treatment) on the basis of mini survey of self-reported data on direct profits, working capital and number of hours worked. The second follow-up survey was done 10 months after the disbursement of the microcredit experiment with full scale survey variables. The main variables of interest comprises of self-reported profits, working capital and number of hours worked. *bincome* refers to direct profits obtained by asking direct question and *netincome* refers to the indirect profits calculated from revenue minus expenses approach. For the sake of meaningful interpretation of those variables, the leveled data were also converted in to logs.

As shown in the above table, the total sample size of this study consists of 454 enterprises that fulfilled Akhuwat’s eligibility conditions (monthly per capita income of less than Rs. 1000) which already applied for a loan. They were randomly allocated to treatment and control group on the basis of which 224 were assigned to treatment and 230 to control group. Besides, the target firms under study were assigned to the sample unit on the basis of proportional random sampling technique and are composed 151, 65, 158, 2, and 78 from the retail, manufacturing, service, agriculture and other sectors respectively.

### VII. Model Specification and Empirical Strategy

The baseline survey consists of information on the detailed characteristics of firms and owners and their household’s socio-economic profile. The main variables of interest in this impact evaluation model are firm profit, return to capital, and working hours. So as to thoroughly investigate the real impact of treatment effect on firm profitability, information regarding the status of firm owners and their households was gathered on the baseline survey. Through the help of Panel data, it would be easy to capture the cross sectional and time series dimensions of the effects of microcredit intervention on profit.

Basically, having panel data is not a sufficient condition to get unbiased estimates of the effects of microcredit intervention on firm profitability, as endogeneity problem might arise out of the non-random placement in the program and some self-selection bias related to the treatment effect. In order to eliminate this problem, randomized experimental design approach was applied. Thus, the samples under study consist of firms that are randomly assigned to treatment and control groups through which both of them entail as similar character as possible. This approach helps to get rid of the effect of differential observable and unobservable characteristics which are directly or indirectly related with the treatment effect. Thus, as firms are randomly assigned to the treatment and control group, the aggregate characteristics of the sample units are expected to be homogeneous in both groups. Afterwards, microcredit experiment was injected to the treatment group.

So as to capture the real (net) effects of an intervention, it has become mandatory to identify the counterfactual outcomes over the gross outcome. Counterfactual outcome refers to inevitable changes attributed to other factors even in the absence of an intervention. Thus, ‘Difference in Difference (DID)’ approach according to Bret Coleman (1999), is becoming the most crucial method of impact evaluation. Unlike the conventional single difference approach, the method enables us to easily segregate the net treatment effect from the effects of other factors affecting firm profit (return to capital), and work effort. The unobservable factors that differ across firms or entrepreneurs might include managerial talent, entrepreneurial ability, risk aversion, motivation, etc. In this regards, DID approach is highly instrumental to eliminate the effect of both observable and unobservable characteristics varying across firms and over time.

As treatment and control groups do not often have similar characteristics interims of their preexisting status, the randomized experimental design technique enables to eliminate the problem of sample heterogeneity effect. In other words, it would be possible to form two comparable groups with similar characteristics as possible so that the effect of preexisting difference is eliminated. In order to determine which panel data models (FE or RE) gives efficient and consistent estimates of the treatment effect, it is must to know the systematic difference between the coefficient estimates of the two models. So as to do so the Hausman test statistics is applied. DID approach arises out of the fundamental limitation of the Pipeline Approach (Single Difference) that can’t help more on capturing the effect arising due to the preexisting difference between the two groups. Thus, this approach is extensively used in this paper.

**7.1.1 Estimation of Treatment Effects**

Knowing that treatment positively affects both capital stock and profits on the one hand and capital stock determines firm profitability on the other hand, it is necessary to initially examine the effect of microcredit on capital stock. One of the possibilities to estimate profit directly by the effect of microcredit may be biased mainly due to the endogenous nature of capital stock. Capital stock becomes endogenous fundamentally due to its direct association with managerial talent, motivation and entrepreneurial ability of the firm owners. Thus, estimates would have been subject to twofold biases by the simultaneous effect of unobservable factors on capital stock and firm’s profitability.

One of the solutions to get rid of this problem is to find out an instrument for the endogenous variable-capital stock. In this regards, the randomized experimental design assures to have exogenous treatment effect and uncorrelated error term, i.e. the random allocation of microcredit. By mathematical assumption,  $Cov ( T_{i,t} , \epsilon_{it} ) = 0$ . Thus, the IV regression model is used to estimate the direct effect of the random microcredit treatment as an instrument on capital stock is specified following form:

**I. The Single Difference and DID Estimates of Treatment Effect**

$$Y_{it} = \alpha + \beta_i Treatment_{i,t} + \sum_{t=2}^3 \delta_t + \omega_i + \epsilon_{it}, \quad t=1, 2, 3$$

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Where:

- $Y_{it}$  = outcome of interest (Profit, working capital and number of hours worked)
- $T_{it}$  = treatment effect
- $\delta_t$  = Wave fixed effects
- $\omega_i$  = time invariant firm fixed effects
- $\epsilon_{it}$  = Random error term

### 7.2 Estimating Return to Capital

Under normal circumstances, it would be very difficult to reach at any sound conclusion about the effect of treatment on the business outcomes unless we make sure that control variables like capital stock is uncorrelated with other factors in the disturbance. In this case, randomized experimental design or random allocation of the treatment helps to get rid of the effect of unobservable qualities or characteristics such as owner's entrepreneurial ability, managerial talent and motivation, etc. that might in one way or in another affect firm performance indicators like working capital, profit, working hour and return to capital.

Numerous evidences pointed out that the change in capital stock is an endogenous variable. In other words, it is correlated with other factors in the error term which might also affect firm profitability. Treatment affects business profitability not only through its direct effect but also has an indirect effect through the change in capital stock. In this case, it would be very difficult to conclude that the firms' differential business performance is exclusively attributed to treatment effect.

There is a need to find a good instrument for capital stock to get rid of its correlation with the other factors affecting profitability of the business firms. Thus, as treatments is random allocated among the two target groups homogenized on the basis of randomization, treatment does not have any correlation with other factors affecting business outcomes. I.e. it is called as an exogenous indicator variable. Thus it can be used as a valid instrument to estimate the change in capital stock, and then the real marginal return on capital using the following IV regressions;

### II. The 1<sup>st</sup> Stage Regression (IV Estimation)

$$K_{i,t} = \alpha + \beta_i T_{i,t} + \sum_{t=2}^3 \delta_t + \lambda_i + \varepsilon_{it} \quad (t=1, 2, 3)$$

*Note:* For the random treatments to be valid instruments for changes in capital stock, they must affect capital stock alone, and not be associated with changes in either the levels or the marginal products of other factors affecting profitability like working hours and motivation, ability and talents.

### III.2<sup>nd</sup> Stage Regression...Estimating The Return To Capital

$$Profit_{it} = \alpha + \beta_c K_{i,t} + \sum_{t=2}^3 \delta_t + \lambda_i + \varepsilon_{it} \quad (t=1, 2, 3)$$

$$Cov ( K_i, \varepsilon_{it} ) \neq 0, Cov ( T_i, Profit_{it} ) = 0$$

Where:

Prof<sub>it</sub> = Return to capital (log of profit)

**K<sub>it</sub>** = capital stock instrumented by treatment (*T<sub>i</sub>*)

$\delta_t$  = Wave fixed effects,  $\lambda_i$  = firm fixed effects and  $\varepsilon_{it}$  = Random term

### VIII. Empirical Results and Discussions

The baseline survey gathered detailed information on the firm and characteristics of the firm owner. The main outcome variable of interest in this paper is the profitability of the firm. The randomization appears to have created groups that are comparable in terms of baseline characteristics, with no significant difference in means across all the variables of interest as shown in table II.

The baseline survey result indicates that there is no systematic difference between the control and treatment group across all the variables of interest. The f-statistics indicates insignificant result on the mean differences between the two groups. Most importantly, the result indicates that randomization works properly so as to maintain homogenous sample units. The p-values for all the variables indicate higher than 5%, even at 10% significance level, in other words the mean differences across all the variables are not statistically significant. Thus we fail to reject the null hypothesis stating that there is no systematic difference between the control and treatment groups before the intervention. Thus, we can conclude that the two groups are almost homogeneous in most of the characteristics affecting firm profitability.

**Table-II:** Descriptive Statistics and Verification of Randomization

Ho: Both groups have equal mean	Total Observation (N)	Full Sample Mean	Mean and Std. Dev by Treatment				t-test p-value
			Treatment		Control		
			Mean	SD	Mean	SD	
Education of the Entrepreneur	454	4.95815	5.044643	3.854735	4.721739	4.266346	0.3983
Age of the Entrepreneur	454	39.663	38.30804	10.11365	39.0087	10.32992	0.4657
Education of the Household head	454	4.623468	4.445283	2.502508	4.287644	2.888255	0.5350
Age of Household head in years	454	27.03777	25.85246	8.200573	26.51154	8.155734	0.3910
Household Size	454	5.590308	5.53125	1.924332	5.713043	2.080331	0.3346
Number of Chronic ill in the hhd	454	.2599119	.2544643	.6008049	.1956522	.4491411	0.2373
Number of children in the hhd	454	1.068282	1.205357	1.306338	1.186957	1.336359	0.8822
Household monthly income in rupee	454	13344.49	12891.12	5260.01	12344.43	4430.503	0.2312
Household monthly Assets in rupees	454	758138.8	792310	787486.8	727475.5	880780	0.4092
Household monthly Expenditure	454	13078.69	12838.17	5187.638	12646.91	4455.695	0.6734
Firm direct Monthly Profits in rupees	454	8690.903	8160.357	1395.586	8184.217	1336.25	0.8525
Indirect Monthly Profits in rupees	454	8264.758	7780.491	1574.955	7753.739	1473.717	0.8518
Working Capital	454	25114.78	24153.79	3998.081	23955	4366.684	0.6134
Working hour per day	454	9.848018	9.90625	2.179224	9.882609	1.995443	0.9041
Monthly Revenue	454	10429.34	24098.21	18331.75	23230.43	16494.64	0.5960
Neuroticism	454	2.485316	2.495908	.6600112	2.475	.6474744	0.7335
Extraversion	454	3.506608	3.490699	.6605711	3.522101	.6359558	0.6061
Openness	454	3.262298	3.290923	.7578684	3.234421	.8015584	0.4409
Agreeableness	454	3.612335	3.620535	.6293596	3.604348	.6916574	0.7945
Conscientiousness	454	3.851322	3.85119	.6884908	3.851449	.6852645	0.9968

*NB: The analysis was conducted on the basis of the unbalanced panel data collected in three waves (t=1, 2, 3). The baseline data (t=1) was gathered in June 2010 and a detailed follow up survey was conducted after 10 months (t=3). In between the two rounds, at t=2, a self-reported data was collected on three core variables of interest i.e. business profits, working capital and hours of daily work. Variable Direct Monthly Profits was measured by asking the respondents direct question on their monthly business profitability. Working Capital excludes value of land and buildings. Variable Indirect Monthly Profits was generated for only two periods i.e. t=1 and t=3 and was measured through revenues minus expenses approach.*

The result of the descriptive statistics is computed based on the data generated on the baseline line survey. Profits (direct and indirect), revenue, and capital stock data in Pakistan are given in rupees. The last column reports p-value for the t-test of the equivalence of means in the samples assigned to control and treatment group. The total sample size in the treatment and control group constitute 224 and 230 firms respectively. Direct Monthly Profits is measured on the basis of firm owner’s self-reported data on the profitability of their business.

Result of the descriptive statistics reported revealed that the total numbers of firms under study comprises of 454 firms. Out of which the treated and control sample comprises of 230 and 224 firms respectively. The mean indirect monthly profit, monthly working capital and working hour per day in the overall sample indicates 8,264.75 rupees, 25,114.78 rupees and 9.85 hours respectively. However, the mean values identified in accordance with the treatment and control sample group revealed some variation from the overall mean. For instance, the average indirect monthly profit for the treated and control group amounts 7780.491 and 7753.739 rupees respectively.

The mean working capital is 24,153.79 and 23,955 rupees for the treatment and control group respectively. However, there is no variation in the average working hour per day across the full, treated and control samples which is 9.9 hours. All the mean values across the three outcome variables in the treated group revealed positive and higher than the mean values of the control group but, the differences are not statistically significant.

### IX. Impact of Treatment on Business Outcomes

In the beginning, I have made use of the data to measure the effect of treatment on direct and indirect monthly profit, revenue and working hours per day. Table-2 presents the result of both the single and double difference estimates. The first and second column of the table presents the difference of the cross-sectional dimension (the difference in outcomes in between the treated and the non-treated households after the intervention) both at level and log specifications. The result of the double difference (DID) estimates both in the FE and RE model reported in column 3 to 6 indicates that treatment had the expected positive effect across all the variables of interest. However, the single difference estimate indicates negative coefficient for the working

hour per day.

The single difference estimate indicates that treatment brings statistically significant impact on the direct monthly profit and working capital only. The coefficient estimates for these variables are positive as expected and highly significant even at 1% significance level in both level and log specifications. On the contrary, treatment does not have significant impact on the indirect monthly profit and working hours both in levels and logs specification.

**Table III: Impact of Treatment on Business Outcomes**

Impact of treatment on:	Single difference (one tail t-test @ t=3)		Double Difference			
			Fixed effect		Random effect	
	Levels (1)	Logs (2)	Levels (3)	Logs (4)	Levels (5)	Logs (6)
Direct monthly profits	241.1* (124.3)	0.0273* (0.0148)	275.2*** (38.58)	0.0330*** (0.00499)	274.2*** (37.68)	0.0328*** (0.00468)
Indirect monthly profits	220.0 (139.5)	0.0258 (0.0171)	193.2* (107.7)	0.0254* (0.0137)	201.0** (98.26)	0.0255** (0.0119)
Working Capital	2,448*** (393.5)	0.100*** (0.0158)	2,305*** (163.1)	0.0912*** (0.00651)	2,319*** (160.3)	0.0920*** (0.00625)
Working hour per day	0.0268 (0.216)	-0.000175 (0.0231)	0.0271 (0.122)	0.00465 (0.0140)	0.0323 (0.128)	0.00424 (0.0150)
Number of Enterprises	454	454	454	454	454	454
Observations (N=n*t)	454	454	1361	1361	1361	1361

**NB:** Significance level (\*\*\*)  $p < 0.01$ , (\*\*)  $p < 0.05$ , (\*)  $p < 0.1$ . Robust standard errors are clustered at the microenterprise level and reported in parentheses.

The coefficient estimate of the working hour in logs specification is negative and is not statistically significant even at 10% significance level. The result is meaningless, beyond indicating that treatment doesn't have any effect on the variable. Most importantly, the f-statistics for the single difference estimate of direct monthly profit both in level and log specification indicate 0.0265 and 0.0324 respectively, which is lower than 5% significance level, reject the null hypothesis stating that the mean value for the treatment and control group is same. Thus, profitability significantly differs in between the two groups. The problem with the single difference is that it does not really help to know the counterfactual outcomes i.e. the inevitable changes even in the absence of the treatment. Thus, the coefficient estimates do not represent an accurate picture to draw any conclusion about the effect of the treatment.

The DID estimate of the impact of treatment on business profit and working capital indicates on average more than 3% and 9 % per month respectively and are statistically significant at 1% significance level. However, the impact of the treatment on the working hour per day do not appear statistically significant in both models (DID as well as Single-Difference). But, the positive signs of impact coefficient in the DID estimate however; indicate a general tendency of more working hour per day.

The Hausman test statistics result shows Prob>chi2 of higher than 0.9 for all the estimates (which is higher than 5 % significance level) verified no evidence to reject the null hypothesis stating that the difference in coefficients estimated in the FE and RE models are not systematic. The p-value for the four variable of interest indicates statistically insignificant-higher than the 5% significance level. Thus, we fail to reject the null hypothesis stating that there is no systematic difference between the FE and RE model estimates. Under this condition, the RE model is worthy enough to get efficient and consistent estimates. Thus the impact estimation is interpreted in line with the result of the RE model given as follows. Specifically, the impact coefficient associated with the direct monthly profit in the RE model of the DID approach verified that the net impact of the treatment on the treated amounts 274 rupees in level specification. In other words, every rupee additional micro credit enables business owner's to earn, on average 274 rupees additional monthly direct business profits. Similarly, the impact coefficient associated with the same variable in the log specification verified that every rupee credit grant generates 3.28 % monthly direct business profit.

The extent of the treatment effect on working capital is highly material and is also highly statistically



significant. I.e. the firm’s working capital increases by 2,319 rupees per month on average for each additional credit grant. The impact coefficient associated with an indirect monthly profit (net income) and working capital in logs indicated an increase of 2.6% and 9.2% respectively. Both results are statistically significant at even at 1 % significance level. Contrarily, treatment doesn’t not have any significant effect on the owner’s working hour per day.

**Note:** As we elaborated in the methodology part, the endogeneity nature of working capital (capital stock) seriously affects the true picture of the coefficient estimate of the treatment effect. Since treatment affects profitability in both sides (through its own direct effect and through the effect on working capital), the will be automatically biased and lead us an incorrect conclusion saying that it is the real impact of working capital on profitability.

Table III reported that although the treatments had a significant positive effect on business profitability and working capital; it does not have significant effect on the number of hours worked by the owner in the enterprise. Thus, this condition proves that treatment can be a valid instrument for capital stock to estimate its real effect on the profitability of the firms. Accordingly, the following section presents the IV estimate for capital stock and its real effect on firm profitability.

### X. Measuring Returns to Capital

The random allocation of the grants ensured that observable characteristics are almost same in between the control and treatment group and hence no evidence was found to have systematic difference across the mean values of all the variables affecting business outcomes. Hence, using treatment as an instrument for the changes in capital stock helps to get rid of the unnecessary correlation with unobservable factors in the error term such as risk averse behavior, entrepreneurial ability, managerial talent, motivation and other factors associated with the differences in the profitability of investments across firms. Thus, the aim of the randomized experimental design is to provide randomly selected firms with credit and see its effect on capital stock and then measure the impact of the additional capital on business profits. In this case, the effect of treatment on capital stock was estimated through the FE and RE models using in level and log specifications. Log specification helps a lot for the ease of interpretation of the outcome variables and controlling the effect of some outliers. The Hausman test statistics result verified that there is no systematic difference between the results of the two models (FE and RE models). In both cases, the result of the fixed effect and random effect models (both in levels and logs) indicate almost similar result and hence coefficient estimates are statistically different. For the sake of interpretation, we better use the estimates of the RE model as it will give us efficient and consistent estimate than the fixed effect model.

In the first stage regression, the first 4 columns display the result of IV regression used to estimate the exogenous treatment effect on capital stock as dependent variables. Particularly, the coefficient estimates of the dummy treatment in this model indicates the average treatment effect on the treated (ATT) in other words, households who accessed the Akhuwat credit grant (the treated group) have on average 2,318.23 rupees more monthly capital stock than the non-treated.

According to the log specification estimates reported in column 4, the average treatment effect on the treated households’ monthly capital stock according to the log estimates of the RE models indicate 9.2 % and is statistically significant at 1% significance level. In other words, the treated households were able to generate on average 9.2% higher monthly capital stock than the non-treated households. Both estimates are statistically significant at 1% significance level.

TABLE-IV: Measuring Returns to Capital

Impact of treatment on:	Two Stage Instrumental Variable Regression							
	Direct Monthly Profit (bincome)				Indirect Monthly Profit (netincome)			
	FE-Model		RE-Model		FE-Model		RE-Model	
	Levels (1)	Logs (2)	Levels (3)	Logs (4)	Levels (5)	Logs (6)	Levels (7)	Logs (8)
Capital Stock	0.119*** (0.0139)	0.361*** (0.044)	0.118*** (0.013)	0.355*** (0.041)	0.0859* (0.0489)	0.284* (0.156)	0.0877** (0.0420)	0.273** (0.132)
<b>First stage Regression</b>								
Coefficient on treatment Dummy	2304.637*** (131)	0.091*** (.0051)	2318.23*** (126.691)	0.092*** (0.0051)	2249*** (151.38)	.0894*** (0.006)	2332.941*** (268.37)	.094*** (0.011)
F-statistics	39.46	41.87	.....	.....	25.97	27.34	.....	.....
Enterprises N= n*t	454 1361	454 1361	454 1361	454 1361	454 908	454 908	454 908	454 908

**NB:** Significance level (\*\*\*)  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ ). Values in the parenthesis below the

*variable estimates refer to the robust standard errors. Direct Monthly Profits refers to the firm's profitability measured as per the respondents' self-report. The variable working Capital excludes value of land and buildings. The data for the variable indirect Monthly Profits refers to the indirect business profit measured by deducting expense over the revenues. In this case, the data for this variable is having only for two periods i.e. t=1 and t=3. Thus, the total number of observation reported as shown in the above table indicates only 908 microenterprise-periods.*

According to 2nd stage regression results reported in column 1 & 3, the estimates of the direct business profit earned per 1 rupee capital investment are estimated using level specifications, which I am calling afterwards as 'Direct return to capital'; And the log specification results are also reported in column 2 & 4, which I am calling afterwards as 'Direct rate of return'. Whereas, column 5 & 7 displays the result of the level specification of coefficient estimates of the indirect (net income) business profit per 1 rupee capital investment, which I am also calling afterwards as 'Net return to capital'.

In the case of the coefficient estimates of an indirect business profit using log specification are reported in column 6 & 8, for which 'Net rate of return to capital' is used as an appropriate term. The direct return to capital estimated using level specification in the random effect models indicates 0.118 rupees, meaning that the ratio of direct monthly profit per 1 rupee capital investment amounts to 0.118. The direct rate of return to capital estimated using logs specification are almost same in both cases i.e. 1 rupee capital shock is associated with a direct rate of return of 36% per month. Precisely speaking, the rate can be interpreted as direct profit increases on average by 36% for each rupee capital stock increments. Both results are statistically significant even at 1% significance level.

According to the Net return to capital estimates, the results of the RE model indicates the effect of each rupee additional capital stock on the indirect business profitability. I.e. households can earn a monthly net profit of 0.0859 rupee on average for each additional working capital invested in their business. While the log specification indicated in column 8 verified that each rupee capital shock is associated with the rate of an indirect monthly profit (net rate of return) of 27% per month, which is almost higher than the banks or market interest rate in Pakistan (MFIs charge an annual interest of about 35-40 percent). Hence, it would be more profitable for the economy to invest in small business firms through the help of Akhuwat micro finance scheme instead of putting money in the bank or invest in other big business.

## **XI. Concluding Remarks**

Even if no one disputes over the importance of microfinance schemes, several evidences revealed that the conventional microfinance scheme in Pakistan did not reach the poor and has not yet achieved the expected result. Alternatively, a new microfinance scheme was innovated in Pakistan and found to be more beneficial to the poor. Conversely, there are no sufficient empirical studies conducted to evaluate impacts of the two alternative microfinance schemes in Pakistan. Therefore, the main objective of this study is to evaluate the real impact of Akhuwat microcredit intervention on the profitability of small business enterprises.

A randomized experimental design technique was applied in order to get homogeneous control and treatment group as comparable as possible. After randomly assigning the two comparable groups, the F-statistics result verified no systematic difference between the control and treatment groups across the mean values of all the observable characteristics related to the firm's profitability. The impact evaluation has been done on the basis of the longitudinal panel data collected in three waves (t=1, 2, 3). The baseline data (t=1) was gathered in June 2010 and a detailed follow up survey was conducted after 10 months (t=3).

The fundamental challenge in the process impact evaluation is to identify the net impact of an intervention out of the effect of other programs or interventions or from the inevitable changes that may exist even in the absence of the program i.e. counterfactual outcomes. In this regards, both the conventional single difference (borrower v/s borrowers-to-be) and DID approaches have been used in order to explore the treatment effect on the treated in-depth.

The result of the two approaches revealed significant difference across all the variables of interest. Consequently, it was found that the conventional single difference approach has underestimated all the coefficient estimates due to its fundamental limitation to capture the counterfactual outcomes. Hence, the most popular impact evaluation tool in the recent development economic toolkit was formulated by Coleman (1999)'s DID approach, had been profoundly used to evaluate real treatment effect on the firm's capital stock and profitability as well.

By and large, empirical results based on the Difference in Difference approach firmly proved that Akhuwat microfinance intervention strongly impacted the level of capital stock and firm profitability. The

results revealed that both types of profits (direct and an indirect profits) significantly vary in between the treated and untreated firms.

Due to the endogeneity nature of capital stock, IV regression was estimated. By the very importance of the randomized experimental design, Treatment has been found to be exogenous and served as a valid instrument for capital stock. The estimated coefficient for capital stock by the exogenous treatment effect revealed that treated firms had been accumulating on average more than 9% excess monthly capital stock. The result is statistically significant even 1% significance level.

The effect of treatment revealed, on average 3% monthly profit increments and 8-10 % monthly returns to capital. Return to the estimated monthly direct rate of return and Net rate of return comprises of 36% and 27%, which is higher than the market or bank interest rate, (MFIs charge an annual interest of about 35-40 percent) meaning that the profitability of small firms by the effect of Akhuwat microcredit provision can exceedingly benefit Pakistan's economy to grow faster than any other large businesses. Generally, the estimated results revealed that Akhuwat microcredit seems to have very strong and statistically significant impact on the monthly profits and working capital. However, it does not have significant impact on the owners working hours per day.

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