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ABSTRACT

Returns to Islamic Microfinance: Evidence from a Randomized Experiment in Pakistan

The global microfinance movement is driven by the claim that once poor micro-entrepreneurs are provided access to capital, they will be able to generate high returns. The existing evidence on returns to capital is mixed and too limited to substantiate this claim. This paper reports on a field experiment conducted in Pakistan, in co-operation with Akhuwat microfinance, in which interest free loans were randomly provided to microenterprises. We find that treatment leads to a significant increase in working capital and in business profits. Using randomized treatment as an instrument for capital, we find average monthly returns to capital of 8.6 to 11.9 a month. These returns are substantially higher than the interest rates charged by microfinance institutions in Pakistan.

JEL Classification: O17, O16, C93

Keywords: returns to capital, microfinance, microenterprises, randomized experiment, Akhuwat microfinance

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1. Introduction

In developing countries, a large share of the labor force is employed by microenterprises operating in the informal sector. Microfinance has played an important role in providing much needed capital to these microenterprises. It is axiomatically believed that small firms have the potential, in terms of returns to capital, to repay loans with high interest rates – a fundamental claim which is at the core of the global microfinance movement.

However, credible and well-identified studies, which have established the impact of microfinance on business returns, are limited (Armendariz and Morduch 2010, Morduch 1999). At the start of the microfinance revolution, the emphasis was mainly on uptake and repayment, however, as microfinance has matured and become a well-funded innovation, the emphasis has gradually shifted to the impact of the intervention. For long, many scholars and policy makers have considered microfinance a 'development success' – a narrative which has become part of a widely accepted discourse. However, three recent randomized studies which did not find an impact of microfinance on various outcomes, have challenged this popular narrative and generated mixed reactions among researchers and policy makers (Bauchet et al. 2011).[3]

In addition to this empirical evidence, news reports of suicides committed and hardships faced by microfinance borrowers in India and elsewhere, has also

[3] Banerjee et al. (2015); Karlan and Zinman (2011); and Crépon et al. (2015)

raised questions on the effectiveness of microfinance.[4] As a consequence of suicides in Andhra Pradesh, India, the state government introduced tough legislation seeking stringent regulation of microfinance activities. The microfinance industry suffered a further setback when the state politicians encouraged borrowers to stop repayment of their loans. Nine distinguished professors, in their reaction to this crisis, criticized the Andhra Pradesh's government for enacting a law which in essence encouraged borrowers to 'default en masse'.[5] In an article, these academics maintained that lending to the poor itself is not the main innovation of microfinance, rather its main innovation is lending to the poor at 'lower interest rates' than informal money lenders.

While MFIs do tend to charge lower interest rates as compared to money lenders, a relevant concern is whether these interest rates are affordable. Or in other words, is the so called 'lower interest rate' low enough compared to a borrower's repayment capacity? The debate about repayment capacity essentially boils down to returns on marginal capital – an estimate which may be used to benchmark the pricing of microfinance products. Estimates of returns to capital provide an upper bound of interest rates that micro-entrepreneurs may be able to afford without

[4] On 16 December 2010, the BBC reported that microcredit had turned out to be a 'big curse' for many poor borrowers in the State of Andhra Pradesh. According to the State government, more than 80 people committed suicide after defaulting on their mounting debt. The media reports blamed multiple lending, over-indebtedness, coercive recovery methods, exorbitant interest rates and MFI's grow-at-any-cost strategy as reasons for this crisis. In Andhra Pradesh, households spend more than 60% of their annual income on debt repayments. More than one third of total microcredit borrowers live in Andhra Pradesh with an exposure of more than $4 billion. The problem was dubbed to be of comparable magnitude to the subprime debacle. Sources: http://www.bbc.co.uk/news/world-south-asia-11997571 [Last accessed: June 22, 2016] http://www.nytimes.com/2010/11/18/world/asia/18micro.html?_r=1&pagewanted=all [Last accessed: June 22, 2016].

[5] Source: Microcredit is not the enemy – published on December 13, 2010 in Financial Times http://www.ft.com/intl/cms/s/0/53e4724c-06f3-11e0-8c29-00144feabdc0.html#axzz20z2pMDKl] [Last accessed: April 22, 2012].

harming themselves. However, credible estimates of the returns to microfinance are limited.

This paper adds to the existing body of work, which is reviewed in the next section, by estimating the effect of a randomized increase in the capital stock of microenterprises on their profitability and their rate of return to capital. The experiment was conducted in Pakistan in collaboration with Akhuwat, a microfinance organization.

While estimating returns to microfinance, using a randomized approach is by itself of interest, it is not particularly novel. Indeed, while the paper is similar to other papers in this genre, it is unique mainly due to the contrast between traditional microfinance and Akhuwat's approach. First, consistent with Islamic banking practices, Akhuwat provides loans on an interest-free basis instead of grants (De Mel et al. 2008, McKenzie and Woodruff 2008) or interest-bearing loans (e.g. Banerjee et al. 2015, Crépon et al. 2015, Karlan and Zinman 2011). Loans are offered to individuals rather than to a group, and collateral is provided not by the group but through community pressure and religious sanctity as loans are publicly distributed in mosques and churches. While the loans are interest free, borrowers are expected to make voluntary contributions at the time of repaying their loan instalments. Islamic microfinance, as exemplified by Akhuwat's model, clearly offers a lower repayment burden, and payment of interest even if it is in the form of voluntary contributions, offers greater flexibility. At the same time, such an approach may encourage riskier investments. However, little is known about returns to Islamic microfinance. As pointed out by Mahmud (2015), "Islamic microfinance is still in its nascent stages and rigorous evaluation of Islamic MFIs or of the interest free lending model is scant", and it this gap which the current paper attempts to address.

Furthermore, it is the first study which estimates returns to capital through a randomized experiment in Pakistan, a country where microfinance has made significant progress over the years but where this is still a large untapped market.[6] The findings may be expected to provide useful feedback to policy debates around the pricing of microcredit products in Pakistan.[7]

The rest of the paper is organized as follows. Section 2 provides a brief literature review on returns to capital in microenterprises. Section 3 describes the context of the experiment. Section 4 discusses the experiment, the data, and date related issues. Section 5 outlines the empirical framework. Section 6 discusses the results while Section 7 contains concluding remarks.

2. Literature Review

There is a small but growing body of empirical and theoretical literature which establishes the importance of access to capital in business creation and survival (Giné and Mansuri 2011). Entrepreneurs normally require minimum initial investment to meet start-up costs. In imperfect credit markets, these costs serve as an entry barrier and as a result different theoretical models predict a long term low-growth poverty trap (Banerjee and Newman 1993).[8] Market imperfections have severe implications for the poor in particular because it systematically rations them out from credit markets. Due to lack of access to credit, poor households may not be able to put

[6] Despite this growth, microfinance sector in Pakistan has reached only 7% of the potential market Source: State Bank of Pakistan second quarterly report for year 2006, http://www.sbp.org.pk/reports/quarterly/FY06/second/microfinance.pdf [Last accessed on January 8, 2010].

[7] Pricing of microcredit is a contentious issue. One school of thought –the institutionalists– favors charging high interest rates with a view to make microfinance institutions self-sustainable. The other school of the thought –welfarists– considers charging high interest rates tantamount to 'mission drift'. In support of high interest rates, the usual argument is that the poor primarily look for access to credit and not necessarily 'cheap credit'. The hidden assumption in this argument is that small firms have enough potential in terms of returns on capital to repay loans with high interest rates.

[8] Banerjee (2003) provides a good survey of these models

their skills into practice and as a result they remain in perpetual poverty (Yunus and Weber 2007). To address the problem of systematic exclusion, microfinance institutions have played an important role in providing access to capital for the unbanked poor.

However, how much difference does microfinance make? It is generally believed that once poor entrepreneurs, who are more likely to face binding credit constraints as compared to relatively wealthy entrepreneurs, are given access to capital, they will generate high returns to capital (De Mel et al. 2008, Rodrik and Rosenzweig 2009). A number of non-experimental studies support this claim. For instance, based on their study in Mexico, McKenzie and Woodruff (2006) found an annual return of 180% for smaller firms and 40 to 60% for larger firms. In Ghana, annual returns to capital were 50% on traditional crops and 250% on non-traditional crops (Udry and Anagol 2006).

Although non-experimental studies find large impacts of access to capital on business returns, they yield potentially contaminated estimates. McKenzie and Woodruff (2006) identify two sources of potential bias in non-randomized studies which estimate returns to marginal capital. First, the investment decision of entrepreneurs is influenced by market specific profitability. As a result, returns to capital are not only driven by marginal investment but also by market gains. Firms tend to invest more in profitable markets, and therefore, it is difficult to separate the effect of marginal investment from the initial market conditions. The second source of bias arises from self-selection as it is likely that relatively able entrepreneurs are more likely to participate in microcredit programs. Besides determining participation, entrepreneurial ability is also a key determinant of business performance and hence it is difficult to isolate returns to capital from returns to entrepreneurial ability.

In order to tackle these biases a set of recent studies uses randomized designs to examine the impact of microcredit on business returns. Following-up on their earlier non-randomized study, McKenzie and Woodruff (2008) conduct a randomized experiment in Mexico which included 198 male-owned (aged 22-55), firms operating in the retail sector with a capital stock of less than 10,000 pesos. Firms in the treatment group received a grant of 1,500 pesos either in cash or in kind (that is, capital in the form of equipment or inventories). Considering the size of the firms, 1,500 pesos was a substantial shock amounting to about 25% of average capital stock and 50% of median monthly profits. These grants were given as compensation for participating in the survey. The analysis showed that in treated firms monthly profits rose by 608 to 685 pesos or a 46% monthly return on capital. Effects were higher for the in kind treatment.

In a similar experiment in Sri Lanka, De Mel et al. (2008) worked with a sample of 408 firms who were allocated to a control group and to different treatment groups. The treated group received one of the four treatments – Lanka Rupees (LKR) 10,000 worth of equipment/inventories, LKR 10,000 in cash, LKR, 20,000 worth of equipment/inventories, or LKR 20,000 in cash. The LKR 10,000 treatment was equivalent to approximately three months of median profits reported by the firms participating in the experiment. The cash treatments were unrestricted. Although cash recipients were free to spend the treatment money for any purpose; on average, 58% of the amount was invested in business. The paper finds that LKR 10,000 in kind increases capital stock by 40% and the same amount in cash increases capital stock only by 23%. Similarly, capital stock increases by 71% in the case of the LKR 20,000 in-kind treatment and by 53% in the case of the same amount in in cash. In kind versus cash treatments created differential effects on business profits. The

treatment of LKR 10,000 in-kind did not lead to a significant increase in monthly profits while the same amount in cash led to a 15% monthly increase in profits. Both treatments of LKR 20,000 led to a 21% increase in monthly profits. Using randomized treatment as an instrument for capital stock, the paper finds an average annual real return to capital of 55 to 63%.

In another experiment in Sri Lanka, De Mel et al. (2014) randomized two types of treatment among two groups of 628 randomly sampled women in each group. The first group consisted of existing business owners. The second group consisted of potential owners who were out of the labor market but were interested in starting a business. 400 women from each group were randomly treated with business training only (N=200) and a combination of business training and a cash grant of LKR 15,000 (N=200). The treatment and control groups were tracked for two years in four follow-up surveys. For existing business owners, the paper found no impact of the only-training treatment on business profits, sales and capital stock. On the other hand, the combination of training and the cash grant led to a significant increase in business profitability in the first eight months. The impact was, however, short lived and disappeared in the second year. For potential owners, the only-training had a significant impact on business profits, however, training and the cash grant had no impact on business profits.

Unlike, the papers by McKenzie and Woodruff (2008) and the De Mel et al. (2008, 2014) where researchers provided grants to micro-entrepreneurs, a related strand of the literature works with microfinance companies to estimate the impact of access to credit on business returns. Banerjee et al. (2015) worked with Spandana, a firm which offers group-based microcredit to identify the impact of (potential) access to credit on various outcome indicators. The researchers exploited Spandana's

expansion plans of setting up branches in unbanked villages. After conducting a baseline survey, half of the 104 selected villages were randomly selected and Spandana branches were opened in these villages. A follow-up survey was conducted 12 to 18 months after the baseline. Credit uptake was about 19 percent and the intention-to-treat (ITT) estimates showed that households in the treated areas were 1.7 percentage points more likely to have opened new businesses as compared to non-treated areas, however, there was no effect on business profits in the treated areas. Crépon et al. (2015) carried out a similar study in rural Morocco. The researchers partnered with Al Amana microfinance which was planning to expand its business. Within a year, starting from 2006, Al Amana, which mainly offers joint-liability loans, opened new branches in 60 villages randomly selected from 81 matched pairs – each pair composed of two or more villages. As was the case in India, about two years later, credit uptake was only about 16 percent. The ITT estimates showed that treatment significantly reduced credit constraints. Households in treatment areas were able to upscale their activities involving non-livestock agriculture and livestock; and income earned from agriculture by households residing in the treatment areas recorded a statistically significant increase of 976 Moroccan Dirhams (MAD). However, income from livestock and other businesses did not respond to increased access to credit. Karlan and Zinman (2011) worked with First Macro Bank, a for-profit lender offering small, short-term, uncollateralized credit with fixed repayment schedules to microentrepreneurs in Manila. The authors worked with a sample of 1,600 marginally credit-worthy applicants who were randomly provided access to credit worth about US$ 220. Eleven to 22 months after the intervention the authors founds that those who were allocated credit did not

increase investment in their businesses and in fact they reduced their overall number of business activities.

The estimates of the effect on business expansion, profits and returns to capital based on papers where researchers have provided grants to micro-entrepreneurs is in marked contrast to the outcomes in papers where researchers have worked with microfinance organizations. While the former strand of literature finds very large effects, the latter finds little or no effects. In part this may be explained by the different approaches, Banerjee et al. (2015) and Crepon et al. (2015) examine the effect of access to credit and not actual uptake of credit. This is likely to underestimate the effect of credit on business success. While Karlan and Zinman (2011) estimate the effect of credit uptake and not just access, they work with an unusual sample of borrowers who were deemed unworthy of credit. The results reported in their paper maybe attributed to the nature of their sample rather than microcredit, per se, and may not be generalized to other credit worthy micro-entrepreneurs.

This paper contributes to the literature on the impact of microcredit by offering estimates of the rate of return to Islamic microfinance (interest-free loans) in the case of Pakistan. The paper falls in the second strand of the literature in the sense that we work with a microfinance company that offers loans to micro-enterprises as opposed to researchers providing grants which is perhaps a more artificial setting. At the same time, similar to the first strand of the literature we work with firms that actually receive credit as opposed to potential access to credit and we can thus estimate the average treatment effect on the treated as opposed to the ITT.

3. Akhuwat and its lending approach

Akhuwat Microfinance was established in 2001 in Lahore, Punjab, by a group of volunteers, spearheaded by Dr. Amjad Saqib, with a view to extending interest free loans to poor households.[9] The word Akhuwat is derived from *'mua-khaat'* which means fraternity in Arabic.[10] With the motto of "microfinance with a difference" Akhuwat bases its microfinance model on mobilizing communities for self-reliance, mutual support and the sharing of financial and intellectual resources with the needy. In its work Akhuwat follows four guiding principles.[11] The first principle forbids charging of interest on loans. This principle is derived from Islamic teachings on interest.[12] Besides prohibition of interest, Quran encourages those who have money to give interest free loans to the needy.[13] Apart from ideological reasons, the founders of Akhuwat are of the opinion that charging high interest rates, as is done by most conventional MFIs for various reasons, is not judicious as it adds to the predicament of the poor. The second principle recognizes the role of religious centres in economic development. Each branch of Akhuwat is linked with a religious centre,

[9] Besides microfinance products, Akhuwat has recently announced establishment of Akhuwat University and Akhuwat telemedicine clinics.

[10] Mua-khaat refers to an event in Islamic history in which citizens of Madina shared their wealth with needy immigrants from Makkah. According to the founding chief executive, Akhuwat was established to revitalize the same spirit in society.

[11] These principles were mentioned during an interview with the Berkley Center for Religion, Peace & World Affairs on November 1, 2010, http://berkleycenter.georgetown.edu/interviews/a-discussion-with-dr-amjad-saqib-executive-director-akhuwat [Last accessed: June 22, 2016]

[12] There are injunctions in Quran, the holy book of Islam, which strictly prohibits charging of interest. In Quran Surah Al Baqarah verse 2:278-9 says "O those who believe; fear Allah and give up what still remains of the Riba if you are believers. But if you do not do so, then be warned of war from Allah and His Messenger. If you repent even now, you have the right of the return of your principal; neither will you do wrong nor will you be wronged." Further in the same chapter, verse 2:275 says "[…]Allah has permitted trade and has forbidden interest[…]. While interest is prohibited there are numerous permissible market based asset and liability products for profit seeking investors. Obaidullah (2005) is a good reference for understanding the system of Islamic financial services and its implications for poverty alleviation strategies.

[13]In Quran, interest free loans are referred to as Qarz-e-Hasana literally meaning the beautiful loan. Surah Al-Baqarah (2:245) says "Who is it that would loan Allah a goodly loan so Him (Allah) may multiply it for him many times over? And it is Allah who withholds and grants abundance, and to Him (Allah) you will be returned." Surah At-Taghābun (64:17) says "If you loan Allah a goodly loan, He (Allah) will multiply it for you and forgive you. And Allah is most appreciative and forbearing."

that is, a mosque or a church. The third guiding principle is volunteerism which encourages flow of capital from rich to the poor and sharing of knowledge, skills and time for social emancipation in general and poverty alleviation in particular. The fourth principle is self-reliance. Although Akhuwat does not charge any interest, it encourages its borrowers to donate towards Akhuwat's cause. These donations are voluntary and are expected to instil the value of helping others in its borrowers.

Akhuwat started its business with an initial donation of Rs.10,000 (USD 96) and since then it has registered remarkable growth. As of February 2015, Akhuwat had 343 branches in 210 cities and towns and had disbursed more than Rs.13.6 billion in revolving credit to about 0.8 million families (see Table 1).

Akhuwat offers a range of products tailored to the different needs of low-income households. Table 2 provides a summary. The family enterprise loan, which is Akhuwat's flagship loan, is targeted at poor micro-entrepreneurs. To determine loan eligibility, Akhuwat's lending is based on a poverty based eligibility criteria.[14] That is, the monthly per-capita income of borrowing households should not exceed Rs.1,000.[15] Consistent with the principles discussed above, Akhuwat uses mosques and churches for marketing and implementation of its program.[16] Each branch of Akhuwat is attached with at least one mosque in its area of operations and most of the times the branch is physically located inside or just outside the mosque.

[14]Akhuwat's average loan size of Rs. 11,300 (approximately USD 120 US) is very small compared to Rs. 20,238 for all other MFIs in Pakistan (Pakistan Microfinance Network Jul-Sep 2011). Coleman (2006) argues that offering smaller loans raises the cost of participation for wealthy individuals and as a result only lower-income households participate.

[15] In practice there are variations, as our sample shows that this condition is not strictly followed. The per capita monthly household income in our sample is Rs. 2,341.

[16] Mosques play a key role in Pakistani society where people congregate five times in a day for 15-20 minutes to offer collective prayers. In essence a mosque is a community centre and provides a focal point for community outreach.

Eligible applicants may approach Akhuwat's offices and in the first stage of the application process, the micro-entrepreneurs fill out a two page application form. This application contains basic personal and business information, references and the intended purpose of the loan. In addition to the borrower, at least one family member, spouse in case of married applicants, signs the application form and that is why it is called a family enterprise loan.[17] If a borrower meets the initial criteria, the applications enter the second stage. In this stage, the branch managers conduct a rigorous economic and social appraisal. In the appraisal phase, personal and family information, income and expenditure of the household, viability of the business plan, assessment of credit needs and the credentials of the guarantors are verified. The appraisal process may also include interviews with the applicants and guarantors. For first-time applicants, the normal loan amount is Rs. 10,000. After passing through the second stage, successful applications are submitted to a credit committee for final approval.

The appraisal process takes approximately three weeks. Once a loan is approved, the actual disbursement takes place in a mosque in front of at least one guarantor, the Imam and community members. This creates community pressure on the borrower for effective utilization and timely repayment of loans. In each mosque, loan disbursements take place twice a month and normally 100-150 loans are given out. Borrowers are required to repay their loans in 10 equal monthly instalments. As per their operational manual, Akhuwat staff regularly visits residences/work places of the borrowers. If an instalment is not paid on time, borrowers are reminded of their

[17] Although the loan is offered to an individual, it derives its name from its peculiar design as Akhuwat requires that the application for the loan also carries the signature of one other family member. Akhuwat is of the view that the design of the product will strengthen family cohesion because the business as result of this loan becomes a family enterprise instead of being perceived as individual initiative.

duty. If this effort does not result in successful recovery, then Akhuwat's management contacts guarantors for collection.

Since its inception in 2001, Akhuwat Microfinance has substantially departed from conventional MFIs in many ways (see Table 3).[18] First, Akhuwat does not charge any interest on loans, second it uses an individual instead of a group lending approach, third it involves religious institutions in the lending process, and fourth, it raises financial resources from the community and its own borrowers through voluntary contributions. [19]

To elaborate, the conventional microfinance model is based on group lending. There is ample evidence in the literature that group lending is superior to individual lending in terms of repayment rates.[20] Akhuwat's model though has challenged this conventional wisdom. Despite individual lending, Akhuwat has consistently maintained higher repayment rates than conventional MFIs. Akhuwat has a very low default rate of 0.15% compared to 2.29% for other MFIs[21] in Pakistan. The success of microfinance institutions is attributed mainly to their innovative group lending technology in which credit discipline is enforced through a joint liability contract (Morduch 1999). The incentive structure under group liability mitigates the problem of adverse selection and moral hazard in credit markets. In joint liability contracts, the group members share the burden of adverse selection and moral hazard.

[18]Conventional MFIs refer to those institutions which follow standard group lending approaches like Grameen Bank.

[19] While Akhuwat's focus remains on individual lending, in some of its branches it has recently introduced group lending.

[20]For detail review please refer to Morduch (1999) and Armendariz de Aghion and Morduch (2005)

[21]http://www.sbp.org.pk/SME/pdf/DFG-Mar.pdf: [Last accessed on September 26, 2009]

In the absence of collateral, adverse selection is one of the main problems faced by lenders. Adverse selection arises from MFIs' lack of information on repayment capacity of the borrowers. Group lending, which creates joint liability for group members, provides a good low-cost solution. Instead of gathering information directly on borrowers, MFIs leave this aspect to group members who are expected to utilize their local information networks to separate good risks from bad ones. In group lending, potential borrowers form groups and jointly assume the responsibility of repaying loans. Using an adverse selection framework, Varian (1991) argues that group members know each other's characteristics more than the MFI. To lower the expected joint liability, each member likes to have safe partners in the group. In equilibrium, the same *type* of members will partner to form a group and in this process the bad risks are screened out. The second benefit of joint liability contract is its ability to address the issue of *moral hazard*. The problem of moral hazard mainly refers to borrowers' unwillingness to repay, underutilization of loan and excessive risk taking. In joint liability contracts, group members equally share the cost of others' failures and thus group members have an incentive to exert peer pressure on each other for observing credit discipline.

Akhuwat tackles the issue of adverse selection and moral hazard in a different way. Akhuwat has apparently overcome the problem of adverse selection and moral hazard with the help of embedded incentives in its unique microfinance model. Akhuwat has made the involvement of religious centres as an integral part of their lending model. Involvement of religious centers discourages wilful defaults because borrowers supposedly attach religious sanctity to the loans which are disbursed in the places of worship. In essence, Akhuwat uses religious sanctity as collateral. Besides religious sanctity, there is also pressure from the family member (who signs the

application) and the guarantor(s). Involvement of religious centers and guarantors may explain Akhuwat's high repayment rates.

Conventional MFIs follow a standard market based approach to sustainability. To achieve this end, MFIs normally charge high interest rates. There are two main reasons for this. First, due to small loan sizes, the transaction costs of MFIs are generally high. In order to cover these costs, MFIs charge high interest rates. Second, in the absence of physical collateral, lending to the poor is considered more risky. MFIs price their microfinance loans commensurate with the risk and therefore charge high interest rates. In contrast to conventional MFIs, Akhuwat approaches sustainability in a different way. It uses the physical network of mosques and churches as a cost reduction strategy and spirituality or religiosity as collateral. For sustainability, Akhuwat's model of microfinance relies on volunteerism and religious traditions, which encourages flow of capital from rich to the poor and sharing of knowledge, skills and time for social emancipation. Although, Akhuwat was mainly founded on ideological grounds, its operations are secular. It partners with mosques and other places of worship such as churches. Akhuwat uses the infrastructure of these centres which helps it to reduce delivery cost. Further, virtues and rewards of munificence and volunteerism are preached at the loan distribution ceremonies held in these places of worship which helps Akhuwat mobilize donation from the local communities.

Conventional MFIs generally rely on savings/deposits, equity, loans and grants to finance their operations. Akhuwat has two main sources of funding, one is charity from community members and the other one is voluntary donations from borrowers. Despite troubled economic situation, in 2010, people in Pakistan contributed approximately Rs. 140 billion to charity of which 58% was contributed

by individuals.[22] A major chunk of financial resources for Akhuwat comes from these avenues. As per its audited accounts for the period ending June 2015, Akhuwat received Rs. 405 million in donations.[23] In addition to donations, initially Akhuwat used to charge a one-time administration fee of 5% of the loan amount. This fee was abolished in 2009 and instead Akhuwat asked its borrowers to make voluntary contributions to Akhuwat. As per Akhuwat's practice, at the time of credit disbursal, each borrower is given a donation box to be displayed at their business location. Borrowers and other community members deposit their voluntary contributions in these boxes which are then handed over to Akhuwat at the time of monthly instalment payment. This practice has turned borrowers into donors. Therefore, apart from the lender-borrower relationship, this step has defined a new relationship of donee-donor between Akhuwat and its borrowers. In an interview with the first author, the CEO of Akhuwat stated that besides interest-free lending, through the practice of voluntary donations Akhuwat intended to create institutional ownership and feel-good-factor because it relieved borrowers from obligatory service fees and also gave them an institutionalized way of helping others.

4. The experiment and the data

4.1 The experiment

The experiment to identify the effect of an exogenous shock to the capital stock of microenterprises on business performance was designed in collaboration with Akhuwat. Based on discussions with Akhuwat staff it was agreed that we would work with four of their largest branches located in four different cities (Chiniot, Faisalabad,

[22]Source: http://tribune.com.pk/story/18318/philanthropy-doubles-to-rs140b published on June 3, 2010 [Last accessed on January 18, 2012]

[23] Source: http://www.akhuwat.org.pk/pdf/AuditReportfortheyearendedJune302015.pdf [Last accessed: June 22, 2016]

Rawalpindi and Lahore) of Pakistan's Punjab province and focus on applicants who had applied for their Family Enterprise Loan, a product which accounts for approximately 91% of Akhuwat's loan portfolio. Treatment consisted of a family enterprise loan of Rs. 10,000 randomly allocated to eligible applicants. This loan has to be used for business purposes and has to be repaid in ten equal monthly instalments.[24] Contractually, the borrowers are expected to spend the entire loan on business purposes. However, since the loan is disbursed in cash, ensuring compliance is difficult.[25]

It is Akhuwat's usual practice to allocate loans to eligible candidates on the basis of a first-come, first-served approach. However, to support the experimental design, Akhuwat agreed on a one-time exception to this rule and agreed to randomly allocate loans to eligible candidates.[26] It was also agreed that those who were refused a loan, due to the experiment, would be compensated by being offered a larger loan at the end of the experiment, that is, after 10 months. This arrangement was kept confidential so that the firms in the control group did not alter their behaviour in anticipation of getting larger loans in the future. At the time of submitting their applications, all applicants were informed about the random draw among the eligible applicants and the consequence of this random draw was explained to them.

As described in the previous section, all those interested in an Akhuwat loan need to go through a two-stage process and this was maintained for the experiment. Applications were first screened for eligibility, subsequently they were subjected to a

[24] These businesses are typically very small ranging from fruit and vegetable vending on carts, grocery stores, food stalls, carpeting, welding, masonry, tailoring, embroidery and selling clothes.

[25] Akhuwat staff tries to ensure compliance by regularly visiting the businesses. The post-experiment survey shows that, on average, 32% of the loan amount was spent on inventory, 54% on tools, and 8.5% on furniture/carts/display cases and the remainder on renting locations and other miscellaneous activities.

[26] This was decided in a meeting with the CEO of Akhuwat held on July 3, 2009 in Lahore, Pakistan

social and economic appraisal and this led to a group of 488 eligible applicants of which 243 were randomly assigned to treatment and 245 to control. Prior to embarking on field work, based on existing papers and power calculations we were aiming for a sample size of about 500 firms equally divided between treatment and control. While we fell short of this target, the sample size that we do have is comparable to other papers in this genre and allows us to detect a small to medium effect (see Table 4).[27]

4.2 The Data

This study relies on a three-period panel dataset. Prior to randomization, in June 2010, we conducted a baseline survey. The survey contained eight sections and gathered information on the composition of the household, socio-economic traits, information on the microenterprise such as the nature of the business, value of business assets, profits, hours worked by the entrepreneur, and number of employees. Information on profits was gathered by asking a direct question on the "usual" monthly profits of the business enterprise and by computing a measure of profits (indirect) based on revenue and expenditure information.[28] Working capital or current capital, that is, the value of liquid assets (cash and inventory) available to finance the day-to-day operations of the microenterprise was computed by excluding the value of items such as land and building from the firm's business assets. The final section of the survey contained a set of 60 questions designed to gather information on the personality of the entrepreneurs. We used the Urdu version of the NEO-FFI

[27] Due to sample attrition the sample size falls to 454 firms. We relied on Cohen (1988) to determine the adequacy of our sample size of 454. Cohen considers a standardized effect of 0.2 "small", 0.5 "medium" and 0.8 "large". With the available sample size, a significance level of 0.05 and power of 0.8 power, we should be able to detect a standardized effect of 0.22, which is quite small. Table 5.10 1 provides sensitivity analysis of sample size to different levels of standardized effect sizes and power.

[28] De Mel et al. (2009) argue that information on profits obtained on the basis of a direct question is a more reliable measure than the revenue minus expenditure approach.

instrument.[29] This is a local version of an internationally developed and widely used personality assessment tool which provides a measure of the five domains of personality (neuroticism, extraversion, openness to experience, agreeableness, conscientiousness) and has been adapted to suit the local environment. The 60 questions, 12 for each of the five personality traits are scored on a scale of 1 to 5. Five months after the disbursement of the loan we conducted a mini follow-up survey which gathered information only on the outcome variables while a comprehensive follow-up survey was undertaken after the loan has been repaid – that is, ten months after loan disbursement. The process of randomization and data collection is illustrated in Figures 1 and 2.

4.3 Sample attrition

While the baseline survey covered 488 observations, in the mini-follow-up survey we were able to gather information on 453 firms and in the final survey we were able to locate and survey 454 firms. The 7% attrition rate for microenterprises which are often peripatetic is quite low. There is no evidence that dropping out of the sample is systematic. At baseline, there are no statistically significant differences in the outcome variables for enterprises that remained in the sample and those that dropped out (Table 5). A probit regression of the probability of dropping out from the sample on the outcome variables is statistically insignificant (Table 6).

4.4 Descriptives

Our baseline data reveals that the average entrepreneur in our sample has about 5 years of education and is 38 years old. The majority of the entrepreneurs are men (76%). All the businesses are informal enterprises and only 2% have bank accounts in the name of their businesses. The bulk of the enterprises operate in

[29] Copyrights of the Urdu version of the NEO-FFI (Neuroticism, Extraversion, Openness to experience – Five Factor Inventory) were purchased from Pakistan's National Institute of Psychology.

either the retail sector (34%) or the services sector (35%) while 13% are engaged in manufacturing activities. About 47% of the entrepreneurs do not keep any written record of their business activities, while the remainder either keep informal notes or record them in a register. A majority of the firms have a fixed work location (82%). On average, the total value of the business assets is Rs. 30,026 while working or current capital amounts to an average of Rs. 24,048. The average, microentrepreneur works for 9.86 hours a day and based on the direct profit measures earns about Rs. 8,170 per month. Thus, the treatment of Rs. 10,000 is equivalent to 122% of the average income and 42% of average working capital.

One of the key variables in our analysis is profits and as mentioned earlier we have two measures of profit – obtained by asking a direct question on profits and using an indirect approach - that is, subtracting expenses from revenues. De Mel et al. (2009) argue that data on profits obtained using the direct approach is more reliable as compared to the indirect approach. In our baseline data the correlation between the two measures is 0.87 which may be compared with the correlation of 0.70 reported in De Mel et al. (2008).[30] While in our case there is a very high correlation between the direct and indirect this is not always the case.

Descriptive statistics conditional on treatment status are provided in Table 6. Across the board, there are no statistically significant differences in the outcome variables or other characteristics whether observed or typically unobserved such as the personality traits. The two groups are clearly balanced suggesting that

[30] While in our case there is a very high correlation between the direct and indirect this is not always the case. For instance, the correlation between profits derived from direct and revenue minus expenses approach was 0.26 in Côte d'Ivoire, negative and close to zero in Ghana (Vijverberg and Mead 2000) and 0.24 in Zimbabwe (Daniels 2001).

randomization has been successful in delivering a comparable treatment and control group.

5. The Empirical Approach

Our aim is to identify the effect of access to credit on the business performance of microenterprises. In particular we are interested in estimating the effect of a loan provided by Akhuwat on profits, on the capital stock of the enterprise and subsequently estimating the rate of return to capital. In response to the infusion of additional capital provided by the loan, which has to be spent for business purposes, we expect that firm profits and capital stock (post-experiment) will increase. It is also possible that profits increase not just due to credit access but also due to additional work effort generated due to the loan. While the experiment lasts for a short-time, given the nature of the businesses and of the loan product, we expect that the funds are used quickly and should translate into positive effects, if at all, within a short span of time.

Thus, in the first step of our empirical assessment we estimate the impact of treatment on profits, capital stock, and the number of hours worked. We use the following specification,

$$Y_{it} = \alpha + \beta_T Treatment_{it} + \sum_{t=2}^{3} \omega_t + \lambda_i + \varepsilon_{it}, \qquad (1)$$

where Y_{it} is the outcome of interest (either in level or log form), $Treatment_{it}$ indicates whether firm *i* received a loan or not; ω_t captures fixed wave effects; λ_i represents time-invariant firm fixed effects and ε_{it} is the idiosyncratic error term. Since access to treatment is exogenous and we have a comparable control group (see Table 7), there is no reason to expect that a firm's treatment status and the idiosyncratic error term are correlated. Consequently, the coefficient of interest, β_T, may be interpreted

as the causal effect of an Akhuwat loan on the outcomes of interest. We estimate (1) using OLS and provide estimates based on cross-section (single) and panel data.

In addition to (1) we are also interested in estimating the rate of return to capital. While this may be indirectly obtained from (1), for ease of exposition we use the following equation to estimate returns to capital.

$$profits_{it} = a + \beta_c Capital_{it} + \sum_{t=2}^{3} \omega_t + \lambda_i + \varepsilon_{it}. \qquad (2)$$

In (2) $profits_{it}$ represents the monthly profits of microenterprise i at time t. $Capital_{it}$ represents capital stock, as in (1) λ_i captures firm fixed effects and ε_{it} is the idiosyncratic error term. In (2) it is obvious that capital stock is endogenous. To obtain causal effects we estimate (2) using instrumental variables with randomized treatment serving as an instrument for capital.

6. Results

Cross-section and panel data estimates of (1) are provided in Table 8 and estimates of (2) are in Table 9. The cross-section estimates show that regardless of whether the direct or the indirect measure of profit is used, access to credit leads to an increase in monthly profits. The increase is Rs.241 or about 3% in the case of the direct measure and is statistically significant. Based on the indirect measure, the increase in profit (Rs. 220) is slightly smaller (2.6 percent) and is not as precise. Working capital increases by Rs. 2,448 or about 10% and is statistically significant. This is the increase in capital stock after the repayment of the interest free loans. There is no evidence that treatment leads to an increase in the number of hours worked.

The fixed and random effects reveal a similar story, although the effects are now more precisely estimated. Based on the fixed effect estimates, directly measured monthly profits increase by Rs.275 or 3.3% while the corresponding increases on the

basis of the random effect is Rs.193 or 2.5%. The increase in working capital is Rs. 2,305 or 9%. There is no effect of treatment on hours worked by the entrepreneur. The random effects are similar in magnitude and statistical significance.

To obtain unbiased estimates of returns to capital, we use random treatment as an instrument to obtain IV estimates of (2). De Mel et al. (2008) argue that such an instrument is only valid if it affects capital and not other factors of production such as entrepreneurial effort. As shown in the previous section, treatment increases capital stock, however, it has no effect on number of hours worked. As already shown in Table 8, treatment has a large effect on capital stock and since treatment is randomized there is no reason to expect that it is correlated with the error term in (2). Based on the fixed effects model we find a 11.9% monthly return to capital. Random effects model yields a similar result. The indirect measure of profits yields a smaller rate of return (8.6 to 8.8%) but it is still large. The log-log specification yields similar results. At baseline, with an average capital of Rs. 24,053, a microenterprise earns an average monthly profit of Rs. 8,172. The elasticity of 0.361 implies that the average monthly return is 12.3% $\left(i.e. \frac{8,172}{24,053} \times 0.361 \right)$.

7. Concluding remarks

Due to high-risk lending and transaction costs, microfinance institutions charge high interest rates from their borrowers. In part, this high rate of borrowing is based on the assumption that the rate of return to marginal capital is very high. However, this may not always be true. The high interest rate charged by micro-finance institutions and various reports in the popular press on the inability of microfinance borrowers to repay has generated intense debate about the pricing of micro-finance loans vis-à-vis the repayment capacity of borrowers. The repayment capacity of microenterprises

depends on their returns on marginal capital. A credible estimate of returns to capital in microenterprises is, therefore, of great interest to policy makers for developing a sustainable microfinance sector.

To generate evidence on returns to capital in micro-enterprises, we conducted a randomized experiment in Pakistan, in collaboration with Akhuwat microfinance. Each microenterprise in the treatment group was given an interest-free loan of Rs.10,000 which had to be repaid in 10 months. After 10 months, and post-repayment of their loan, we estimated the effect of this exogenous access to credit on their capital stock, profits and on returns to capital. Depending on the estimator we found that treatment led to a statistically significantly and large increase in the capital stock of treated microenterprises - estimates ranged between Rs. 2,305 to Rs. 2,448. Compared to the control group, the monthly profits of treatment group also increased. The effects were between Rs. 241 to Rs. 275. The estimated monthly returns to capital were 8.6 to 11.9% (annual returns of 103.2 to 142.8%) which are substantially higher than the market interest rates of 12.5% and the microfinance annual lending rate of 33.5% in Pakistan.[31]

Our results suggest large gains from access to capital. However, we hasten to add that these results are only valid for those microenterprises who are eligible for Akhuwat's microcredit. Furthermore, following the logic of the Akhuwat's loan product we stopped our analysis at the end of ten months. Whether such gains persist in the long-rum is still an open question. However, given the rapid growth and continued expansion of Akhuwat it does seem that Akhuwat's Islamic microfinance model is thriving and remains a valuable source of credit to perhaps some of the world's smallest micro-enterprises.

[31] Source: http://www.sbp.org.pk/reports/annual/arFY11/Urdu/Stats/eng/Chapter-1.pdf [Last accessed: June 22, 2016]

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Table 1: Akhuwat's – Basic Characteristics
(as of February, 2015)

INDICATOR	
Total Benefiting Families	797,148
Male	61%
Female	39%
Amount Disbursed	PKR 13,613,206,842
Percentage Recovery	99.89%
Active Loans	345,690
Outstanding Loan Portfolio	PKR 4,226,267,871
Number of Branches	343
Number of Cities and Towns	210

Note: PKR – Pakistani Rupees

Table 2: Products of Akhuwat Microfinance

Loan Product	Purpose	Amount in Rupees
Family Enterprise Loan	For starting or expanding business	10,000 - 30,000
Liberation Loan	To help repay loans taken from money lenders	Normally up to 50,000 but higher amounts also possible with approval of executive director.
Education Loan	Financing of education related expenses	Up to 25,000
Health Loan	Health related expenses	10,000 - 20,000
Emergency Loan	For meeting various emergencies	5,000 - 10,000
Housing Loan	Construction or renovation of house	30,000 - 70,000
Marriage Loan	Marriage related expenses	Up to 20,000
Silver Loan	Medium size loan for mature businesses who have completed 3 or more of Akhuwat's loan cycles.	Up to 50,000

Source: Adapted from http://www.akhuwat.org.pk/loan_products.asp [Last accessed: June 22, 2016]

Table 3: Akhuwat vs. Conventional MFIs

Akhuwat	Conventional MFIs
Individual Lending	Group Lending
Interest free lending	Normally charges more than 30% interest
Charity from community and voluntary donations from borrowers as a main source of funding	Deposits, loans and grants as a main source of funding
Marketing and implementation of program through mosques and churches	Program implementation through their own branch networks
Community, family pressure, religious sanctity	Mainly peer pressure
Depth of outreach	Breadth of outreach

Table 4: Sample Size for Different Level of Standardized Effects and Power

		Significance Level=0.05	
		Sample Size for Treatment, Control	
	Standardized Effect Size	**Power=0.8**	**Power=0.9**
Small	0.2	310, 310	429, 429
Medium	0.5	50, 50	69, 69
Large	0.8	20, 20	27, 27

Table 5: Comparison of Means of Attrited and Unattrited Microenterprises

H_0 **: Both Groups have Equal Means**	**Attrited**		**Unattrited**		***|t-stat|***
	Mean	S.D	Mean	S.D	
Monthly Profits (direct)	8,131	1,388	8,172	1,364	0.172
Monthly Profits (indirect)	7831	1,497	7,767	1,5234	0.236
Capital Stock	23,991	3,941	24,053	4,185	0.084
Number of Hours Worked	9.38	1.95	9.89	2.09	1.390
Significance levels (*=10%,**=5%, ***=1%)					

Table 6: Determinants of Attrition

Attrition	**Coefficients (S.E)**
Direct Monthly Profits	-0.000 (0.00)
Working Capital	0.000 (0.00)
Number of Hours Worked	-0.060 (0.04)
Number of Attrited Microenterprises	*34*
Number of Unattrited Microenterprises	*454*
LR Chi2(3)	*2.00*
Prob>Chi2	*0.5728*

Table 7: Descriptive Statistics and Verification of Randomization

H_0 : Both Groups have Equal Means	Treatment		Control		|*t-stat*|
	Mean	SD	Mean	SD	
Total number of the HH members	5.59	2	5.69	2.1	0.546
Household monthly income	12,855	5,148	12,427	4,485	0.978
Household assets	765,696	777,594	732,726	873,910	0.440
Household monthly expenditure	12,793	5,072	12,707	4,486	0.199
Number of school going children	1.49	1.58	1.64	1.75	0.976
Presence of Chronic ill in the Household	0.239	0.583	0.188	0.441	1.090
Years of education of borrower	5.06	3.87	4.72	4.35	0.910
Age	38.4	10.1	38.9	10.4	0.511
Monthly Profits	8,153	1,407	8,186	1,324	0.260
Revenues	9,834	3,149	9,861	2,581	0.105
Monthly sales	24,939	32,641	27,098	32,481	0.733
Business assets	30,121	49,589	29,932	43,030	0.045
Hours of work in a day	9.87	2.18	9.84	1.98	0.146
Capital Stock	24,125	3,999	23,973	4,330	0.404
Credit requirement	23,798	17,892	23,318	16,503	0.308
Neuroticism	2.49	0.654	2.48	0.65	0.212
Extraversion	3.49	0.655	3.52	0.642	0.528
Openness	3.31	0.75	3.23	0.802	1.110
Agreeableness	3.63	0.628	3.59	0.696	0.635
Conscientiousness	3.86	0.678	3.86	0.673	0.042
N	243		245		

Notes: Significance levels (*=10%,**=5%, ***=1%). The baseline data was collected in June 2010. The variable Monthly Profits was measured by asking a direct question from the respondents on their monthly business profitability. Capital stock excludes value of land and buildings.

Table 8: Impact of Treatment on Business Outcomes

Impact of Treatment on:	Cross-section/Single Difference (one tail t-test at t=3)		Panel			
			Fixed Effects		Random Effects	
	Levels	Logs	Levels	Logs	Levels	Logs
	(1)	(2)	(3)	(4)	(5)	(6)
Direct Monthly Profits	241*	0.0273*	275***	0.033***	274***	0.033***
	(124)	(0.0148)	(39)	(0.005)	(38)	(0.005)
Indirect Monthly Profits †	220*	0.0258*	193*	0.025*	201**	0.026**
	(139)	(0.0171)	(108)	(0.014)	(98)	(0.012)
Working Capital	2,448***	0.10***	2,305***	0.091***	2,319***	0.092***
	(394)	(0.0159)	(163)	(0.007)	(160)	(0.006)
Number of Hours worked in a Day	0.027	-0.0002	0.027	0.005	0.032	0.004
	(0.216)	(0.0231)	(0.122)	(0.014)	(0.128)	(0.015)
Number of microenterprises	454	454	454	454	454	454
Number of observations	454	454	1361	1361	1361	1361

Notes: Significance level (*** p<0.01, ** p<0.05, * p<0.1). Standard errors are clustered at the microenterprise level and reported in parentheses. The data was 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, we also collected a self-reported data 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 a direct question from the respondents on their monthly business profitability. Working Capital excludes value of land and buildings.

† Variable Indirect Monthly Profits was measured through revenues minus expenses approach. We have data for this variable for only two periods i.e. t=1 and t=3. For analysis involving this variable, we use 908 microenterprise-period observations instead of 1361 observations.

Table 9: Returns to Capital

	Two Stage Instrumental Variable Regression							
	Direct Monthly Profits				Indirect Monthly Profits †			
	Level FE (1)	Log FE (2)	Level RE (3)	Log RE (4)	Level FE (5)	Log FE (6)	Level RE (7)	Log RE (8)
Working Capital/Log of Working Capital	0.119*** (0.014)	0.361*** (0.044)	0.118*** (0.013)	0.355*** (0.041)	0.086* (0.049)	0.284* (0.156)	0.088** (0.042)	0.273** (0.132)
First-Stage Regression								
Coefficient on Treatment Dummy	2,305*** (131)	0.091*** (0.005)	2,318*** (127)	0.092*** (0.005)	2,249*** (151)	0.090*** (0.006)	2,333*** (268)	0.094*** (0.011)
Number of microenterprises	454	454	454	454	454	454	454	454
Number of observations	1361	1361	1361	1361	908	908	908	908

Notes: Significance level (*** p<0.01, ** p<0.05, * p<0.1). The data was 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, we also collected a self-reported data 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 a direct question from the respondents on their monthly business profitability. Working Capital excludes value of land and buildings.

† Variable Indirect Monthly Profits was measured through revenues minus expenses approach. We have data for this variable for only two periods i.e. t=1 and t=3. For analysis involving this variable, we use 908 microenterprise-period observations instead of 1361 observations.

Figure 1: Randomization and Data Collection Flowchart

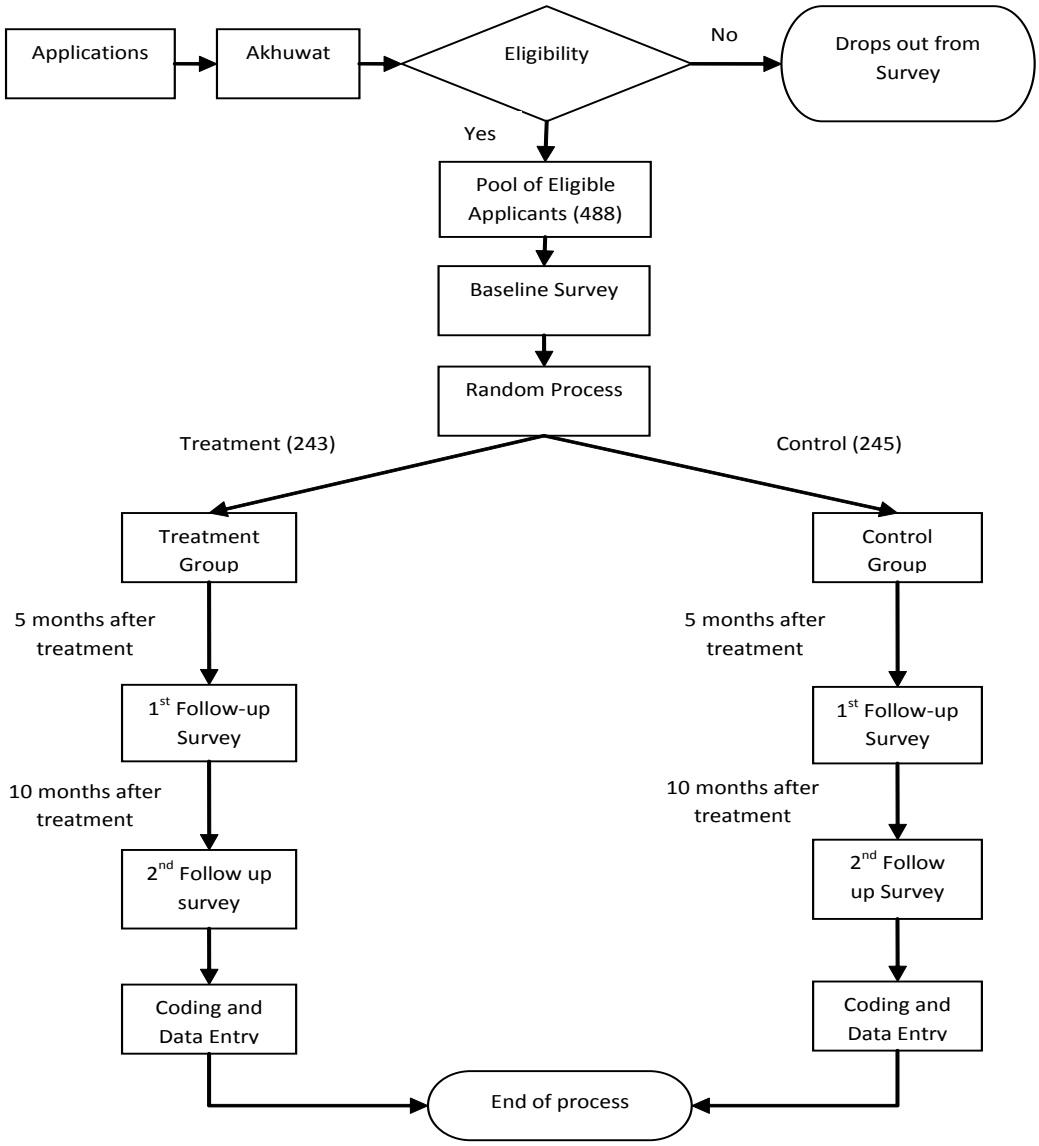

Figure 2: Timeline of Experiment and Data Collection