

THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

DEPARTMENT OF FINANCE

MODIFYING MICROCREDIT TO INCREASE OUTREACH

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SPRING 2017

A thesis
submitted in partial fulfillment
of the requirements
for baccalaureate degrees
in Finance and Economics
with honors in Finance

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ABSTRACT

Following the launch of microcredit in Bangladesh, economists have evaluated the progress made by microcredit organizations. This paper discusses measures of progress in terms of impact and outreach to those who lack financial access in developing countries. Literature shows mixed results on the impact of microcredit. Cases of entrepreneurial success and consumption smoothing benefits are not statistically relevant in poverty reduction measures. Furthermore, despite highlights of microcredit expansion from various microcredit providers, microcredit outreach still fails to reach over half of the world adult population. Based on an analysis of case studies and field experiments, this paper provides an overview of the factors of microcredit demand that could be incorporated into the conventional microcredit loan product to better serve the needs of the poor and to increase the demand of microcredit in developing countries. Connecting microcredit's factors of demand found in literature, this paper concludes with a proposal of an experiment that may illuminate a new approach to increase outreach through shorter loan maturity.

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ACKNOWLEDGEMENTS

I would like to thank Professor Bee-Yan Roberts and Professor Brian Davis for their time and patience as they supported me through this research project. I would also like to thank my family for encouraging me through the completion of my education at the Schreyer Honors College at Penn State.

Chapter 1

Introduction

1.1 Purpose

The purpose of this paper is to show how microcredit can improve outreach in developing countries. This paper provides a comprehensive perspective on the best practices that can maximize consumer demand of microcredit based on past studies on the use of microloan and demand elasticities.

1.2 Preface

Non-profit organizations, foundations, and governments all preach their goals of sustainable practices and empowerment of community members in areas they work to alleviate poverty. Education, taking forms of workshops and lectures, is a common practice by “givers of aid” who aim to teach and train the “receivers of aid” to continue best practices beyond the temporary period of their direct contact.

The case for sustainability through empowerment has permeated most common-sensed adults through the Chinese proverb: “Give a man a fish and you fed him for a day. Teach a man to fish and you feed him for life.” In less conceptual terms, between a simple money donation and a workshop teaching how to budget to prioritize necessities and durables or how to save, the latter provides a longer-term solution. Another example of an initiative that follows this motto is

microcredit. Sustainability and empowerment are the very pillars that originated microcredit, fueling entrepreneurs in developing economies.

Global Business Brigades, a student-run international development organization, provides microcredit to communities in which they operate. They gather student volunteers by describing the organization with flashy development words and a few remarkable success stories of microcredit clients. I, a college freshman at the time, sparkled with desire to save the world and without hesitation signed up to volunteer with a chapter of Global Business Chapter on campus.

Over that spring break, I traveled to Fray Lazaro in rural Honduras to participate in a weeklong project. Our task for the week was to consult the start-up process of a micro-enterprise funded through a micro-loan. Community members had already chosen bakery as their micro-enterprise. In fact, they had already built the outer shell of the building. Already having turned their microloan into an investment, their question was simple, “How do we start operating bakery?” One would imagine somebody knew a thing or two about baking before deciding to build the physical infrastructure for a bakery. However, nobody knew how to or knew of anyone in the community who knew how to bake. The group of Penn State volunteers worked every day during the entire week to deliver a launch plan. If what we delivered succeeded, microcredit may have flourished the local economy in Fray Lazaro with a new bakery to provide cheaper bread, jobs, and additional income for the owners.

Part of our final report included information on how the community members could learn to bake. We connected them to a baker in a neighboring community. Even with proper training resources, what happens if they never get good at baking? Would they end up in hole of debt with no means to pay back what they already borrowed and used? No matter how many times I try to bake the same chocolate chip cookie recipe, I will admit that they never turn out right. I am

not a baker. This brings me to a critical point posed by Dean Karlan, Professor of Economics at Yale University and Founder of Innovations for Poverty Action. Karlan (2013) refers to the teach-a-man-to-fish approach in *More than Good Intentions*:

For a natural-born fisherman, it can work. But the problem is that some people are bad at baiting the hooks; some can't cast worth a damn; some have arthritis and can't grip the reel to haul in a catch; and some don't live near a river with enough fish in it. Some people think fishing is just plain boring. Come dinner, all these folks are out of luck. They can't eat rods and reels and lessons about casting (p. 37).

Reading this statement, I question if this is even a criticism. The Chinese proverb permeates our common sense is challenged by another common sense – not everyone is an entrepreneur.

Flashy development words and a few remarkable success stories of microcredit clients that urged me to travel similarly led even the experts at the United Nations to believe microcredit would build inclusive financial sectors and vitalize all of the untapped entrepreneurial spirit in developing economies. The United Nations established 2005 as the International Year of Microcredit.

More than ten years since the International Year of Microcredit and almost 40 years passed since Muhammad Yunus introduced the modern application of microcredit. Economists have studied many microcredit programs around the world, revealing a more comprehensive view of microcredit clients – and not only the shining success. This paper synthesizes existing literature to determine the pros and cons of microcredit and their causes to determine the next steps that may propel financial inclusion efforts.

Chapter 2

Literature Review

2.1 What is Microfinance?

The Consultative Group to Assist the Poor (2010) defines microfinance as financial services for poor and low-income clients offered by different types of service providers. Microfinance institutions (MFI) provide access to a range of services, such as savings, credit, insurance, remittances, and payments, to those financially out of reach and lacking qualifications for traditional banks. Typical microfinance clients are poor and low-income people that do not have access to other formal financial institutions. Microfinance clients are often self-employed, household-based entrepreneurs. Their diverse “microenterprises” include small retail shops, street vending, artisanal manufacture, and service provision. In rural areas, microentrepreneurs often have small income-generating activities such as food processing and trade. Most MFIs are not-for-profit organizations like non-governmental organizations, credit unions, financial cooperatives, and savings banks (CGAP, 2010).

2.2 What is Microcredit?

Among many financial products offered by microfinance institutions, microcredit serves borrowers with small credit needs without a collateral acceptable for submission at a retail bank. Many microcredit borrowers have microenterprises, although they do not use all of the microloans to start or to finance microenterprises. Scattered research suggests that microcredit clients use only half or less than half of loan proceeds for business purposes. The remainder

supports a wide range of household cash management needs, including stabilizing consumption and spreading out large, lumpy cash needs like education fees, medical expenses, or lifecycle events such as weddings and funerals (“Microfinance FAQs,” n.d.). Microcredit tackles one of multiple dimensions of poverty associated with the lack of financial access.

While microcredit and other various forms of informal lending have existed for thousands of years, the modern application of microcredit in developing economies dates back to only the mid-1970s. Dr. Muhammad Yunus, Professor of Economics at the University of Chittagong, found a group of 42 women who made bamboo stools in a village, called Jorba. Their initial borrowings to purchase raw materials from the local traders put them in a cycle of debt and locked them in a contract that they would sell the products at a price barely higher than the cost. Reliance on informal lenders, despite the unfavorable terms of borrowing and trade, is without a choice for the poor who have no assets, have nothing to offer as collateral, have no credit history, and have little education (Sinha, 2012). All that the 42 women from Jorba needed to break out of the cycle of debt was \$27, or less than a dollar per person – amount too minute to appeal to large formal banks. Dr. Muhammad Yunus lent them the money without charging interest. Thereafter, Yunus went on to start The Grameen Bank Project in 1976 and the Grameen Bank in 1983, which expanded to work in over eighty-thousand villages with more than six million borrowers today and also inspired the rapid growth in new microcredit institutions around the world.

Nearly two decades after its rapid growth phase, funded by grants and subsidies from public and private sources, the microfinance industry began to seek new sources of investment from the commercial sector and to improve efficiencies and sustainability. As enthusiasm for microfinance as a tool for poverty alleviation grew, the funding pool grew (“About Microcredit,” n.d.). On July 28, 2010, SKS Microfinance Limited, an Indian microfinance institution with 5.8

million clients went public (Chen, et al., 2010). Since then, a handful of MFIs globally have gone public. By the end of 2008, microfinance institutions had channeled nearly \$15 billion of foreign investment; they broke free of the purview of donors with immense private and quasi-private sector capital flooding into microfinance institutions (Srinivasan, 2010).

The remainder of Chapter 2 outlines the unbankable characteristics of microcredit clients. Many conclusions about microcredit are drawn based on learnings from microfinance, which includes several services other than microcredit.

2.3 The World's Unbankables

Chowdhury, et al. (2005) defines microcredit as “the dispersion of small collateral-free loans to groups of jointly liable borrowers in order to foster income generation and poverty reduction through enhancing self-employment.” Micro-entrepreneurs are people who either run or work in small businesses that constitute the informal sector of the economy, ranging from agriculture, farming, fishing, transportation, small shops, or stalls, food production, or artisans. Many of the people in the informal sector belong to 2.5 billion adults among the global population, whom do not use formal financial services¹ to save and borrow. In other words, half the world is unbanked (Chaia, et al., 2009). 2.2 billion unserved adults live in Africa, Asia, Latin America, and the Middle East. A little more than 800 million live on less than five dollars per day. In the absence of formal financial services, the poor rely on village moneylenders, deposit

¹ Formal financial services: “Financial service providers are characterized based on their regulatory status. It is more broadly broken down into institutional providers and community-based providers. The most formal financial service providers are the “regulated institutions,” including deposit-taking MFIs, state banks, commercial microfinance banks. Next in the level of formalization are registered institutions, such as money transfer companies and NGO MFIs” (World Bank, 2013).

collectors, pawnbrokers, traders, shop owners, family, and friends for credit to make ends meet (World Bank, 2013).

The unbanked group does not have access to formal financial services because of three primary reasons. Firstly, commercial banks do not see lending out to those with low income as profit prospects (Vong & Song, 2015). Zero profit condition holds when the opportunity cost of funds for the moneylender is equal to the return of loan principal and interest:

$$p(1 + i)L = (1 + r)L$$

where p is the probability of loan repayment, i is the interest rate charged at zero profit equilibrium, r is the opportunity cost of funds for the lender, and L is the total amount of the loan. At the zero profit equilibrium, the interest rate is:

$$i = \frac{1+r}{p} - 1$$

The repayment rate of less than one and the lack of safety from the risk of default elevates the interest rates to an unreasonably high rate. The high interest rate becomes a determinant of repayment, instead of a market-clearing indicator (Ray, 1998). Secondly, the unbanked population with low income may not pass the formal know-your customer (KYC) process because they often lack proper identification papers and permanent residences. Thirdly, as most of the unbanked population live in rural areas, they are often distant from accesses to financial services, like a bank branch or ATM (Vong & Song, 2015). Even though at least the first two issues of the unbankables could be mitigated using a collateral, the poor do not possess assets that could be submitted as an acceptable form of collateral.

The lack of gender equality in social and cultural norms exacerbate the endogenous characteristics of the poor that inhibit financial access particularly for women. For this reason,

many microfinance institutions target women who comprise the largest share of the unbankables in poor countries. Social and cultural norms entrenched in legal and political infrastructure obstruct financial mobility for women. According to Demirguc-Kunt and Klapper (2012), six to nine percentage points of gender gap persists between the percentage of men and the percentage of women who have formal accounts. Most developing economies uphold a strongly patriarchal culture where the men assert roles as controllers of money and loans, regardless of their ability to support the household. Women lack access to banks and financial services in their own right. Limited prioritization to girls' education locks women into domestic workload and low-paid jobs. Financial institutions exclude women from their potential market because of their low return to labor. Furthermore, women often lack legal rights to jointly owned household assets, such as land (World Bank, 2013). Within communities that already fails to attract formal financial institutions, social and cultural norms further restrict women's financial access.

In order to resolve these endogenous characteristics of the unbankables, microcredit providers enable access to credit by instituting a group lending structure in place of a formal collateral. Lending groups, comprised of close friends and family, utilize social objectives to solidify repayment without any formal collateral. They accept the responsibility of a thorough and accurate know-your-customer process and are jointly liable in the case of any member's default. Group members may peer pressure to ensure repayment (Karim, 2008). Even with peer pressure and a thorough KYC process, additional motivator helps to ensure repayment in the absence of a personal collateral. Borrowers regularly make loan repayments at weekly meetings. This enforces punctuality and regularity of repayment. The success of this system shows in an impressive 98% repayment rate over time (Shonchoy, 2014). The pioneer of microcredit itself

practices this structure. The Grameen Bank requires close friends and neighbors to gather in five-person group (Karim, 2008).

While the transfer of responsibility and risk may appear to overburden the borrowers, most the origination process remains as the responsibility of the microcredit provider. The suppliers have to maintain registration, find donors and investors, and advertise the program – typically in remote rural areas. In order to finance loans to give out to lending groups, microfinance institutions first have to borrow from various sources or seek grants that they may on-lend to microcredit clients.

Additionally, microfinance institutions incur large operating costs, largely for staff and administration costs. This contrasts the almost negligible cost for microcredit clients, who repays at her doorstep every week (Najeeb, 2010). Returning to the potential concern about overburdening clients, although the joint liability group-lending structure puts some responsibility and financial risk upon the clients, microcredit providers incur the majority of responsibilities and costs.

Now nearly four decades after microcredit first started, microcredit's construction has resolved operational obstacles to providing credit access to the poor. The next chapter follows the breakdown of measuring progress used in *The New Microfinance Handbook* by the World Bank (2013).

Chapter 3

Outreach and Impact of Microcredit Institutions

This chapter evaluates progress made by microcredit-providing microfinance institutions based on impact and outreach, two of the three criteria established by *The New Microfinance Handbook*. Many microfinance institutions offer services that are beyond what can be sustainably funded with interest and investments to their microcredit clients. Therefore, many microfinance operations rely on subsidies to carry on activities, such as training, product development, and technical advice (World Bank, 2013). More importantly than the measurement of sustainability from the institution's perspective is the outreach and impact of microcredit programs. The following two subsections will each cover one criterion.

3.1 The Impact and Non-Impact of Microcredit Institutions

Economists have conducted randomized controlled trials (RCT) to evaluate the impact of microcredit on the poor. Before diving into the critical results of RCTs, I must first acknowledge success stories that have driven this microcredit movement. These stories that swept microcredit to its international accolade are still occurring every day in real life, and perhaps shared more prevalently than the critical RCT results. For example, Nanay Maria Andal with her husband owns a restaurant in the Philippines that serves 50 to 100 busloads of people daily and employs 24 people, which brings in about \$43,850 in annual income. Rewinding back only five years, Nanay Maria was selling food by the side of the road, when she took out an initial loan of 3,000 pesos, equivalent to \$73. This microloan allowed her to expand her menu. Nanay Maria built a repayment history with a series of small microloans, and finally applied for a 50,000 pesos or

\$1,215 loan, which she used to build her current restaurant. The earnings from her current restaurant will fund her children's education and future business expansion. She has improved the life for her family and created employment opportunities for 24 people, with the number growing in her plans to expand her business ("Sweet Taste of Success," n.d.). Nanay Maria's story highlights how microcredit can help realize the full potential of a business and make significant improvements to one's livelihood.

Success stories like that of Nanay Maria do not always translate into improved measures of poverty, which is based on household income, despite increases in consumption and business investments (O'Dell, 2010). However, evidence shows that consumption smoothing and increase in entrepreneurial activities improve household well-being (Attanasio, et al., 2015). Consumption smoothing, though undetected by measures of poverty, improves welfare by enabling sustainability of everyday life amidst minor shocks and more severe shocks due to seasonal or health factors. In words from *Portfolios of the Poor*, "One of the least remarked-on problems of living on two dollars a day is that you don't literally get that amount each day...you make more on some days, less on others, and often get no income at all" (Collins, et al., 2009). Having access to credit can allow one to tap into future income to smooth consumption, which is one of two general ways poor households can cope with risk (Gardeva, 2010). Another way households can cope with risk is to make conservative production or employment choices and diversifying economic activities. This is a preventative way to protect themselves from adverse income shocks, similar to savings and unlike borrowing scheme. Poor households, as they prefer not to sacrifice higher earnings potential, prefer this reactive approach of consumption smoothing (Morduch, 1995).

In addition to improved household welfare from consumption smoothing, Pitt and Khandker (1998) revealed increase in children's schooling and non-land ownership for users of microcredit for female borrowers. In their quasi-experimental survey on three group-based microcredit programs operating in 87 rural Bangladeshi villages, microcredit proved statistically significant for female borrowers as a determinant of labor supply, boys' and girls' schooling, per capita total expenditure, and non-land assets.

Banerjee, et al. (2015) refuted microcredit's ability to trigger a social revolution through its effect on education, child labor, and women's empowerment in the neighboring country of India. In a randomized controlled trial of a group-lending microcredit program in 52 randomly selected neighborhoods in Hyderabad, India, they reported no significant changes in health, education, or women's empowerment, suggesting that the importance of small businesses for the poor may have been greatly overestimated. Microcredit enabled the start or the expansion of small businesses without an escape from poverty for the clients. Using monthly consumption as the indicator of overall welfare, participants showed no improvement in welfare in the short run. Households' shift of labor to their businesses from wage labor may offer an explanation for lack of short-term increase in household consumption. Unfortunately, households did not show increase in consumption in the long term² either. Even though the cumulative spending amount did not change, the structure of household consumption altered to include more home durable goods and less temptation goods.

Mixed results as seen between results of Pitt and Khandker and Banerjee, et al. are common in discussions of microcredit's impact. Khan and Rahaman (2007) studied the living

² Banerjee, et al.'s study examines the impact of microcredit at the longest duration than any other previous study (Banerjee, et al., 2015).

standards of microcredit borrowers in Bangladesh. Based on 109 randomly selected borrowers, they found microcredit programs create a positive financial and social change to the borrowers' households and their communities. Access to microcredit allowed borrowers to create employment opportunities for themselves and the community. Studies as this one face issues of bias that question the reliability of these results. Pitt and Khandker (1998) decompose sources of potential biases into three categories. The first is self-selection bias, the possibility that micro-entrepreneurs who borrow may have unobservable traits that would make them more likely to have higher levels of impact even without access to credit. Furthermore, many MFIs require that borrowers propose a business idea, leaving credit more accessible to those already with pre-approved ideas. The second source of bias is the "undocumented village-level differences, such as prices, infrastructure, or cultural attributes, which may influence the demand for and use of credit" (Tedeschi, 2008). Thirdly, given the limited nature of microloan funds, communities selected by MFIs may not be completely random, creating another source of bias.

Learning from biased mistakes made by earlier studies, new studies conduct randomized controlled and replicable experiments to evaluate microcredit programs. Studies of microcredit programs around the world share similar, less-than-ideal conclusions. Crepon et al. (2014) reports on a randomized evaluation in rural Morocco that while the availability of micro-loans increased investments and entrepreneurial activities, the increase in profits were offset by a reduction in income from casual labor, resulting in no gain in measured income or consumption and no change in the severity of poverty. Augsburg et al. (2015) reported the same off-setting effect in households of Bosnia and Herzegovina from the reduction in wage work as the cause of the lack of increase in household income. Moving East to Mongolia, Attanasio et al. (2015) do not reject the social benefits of microcredit programs, but conclude the lack of lasting impact on

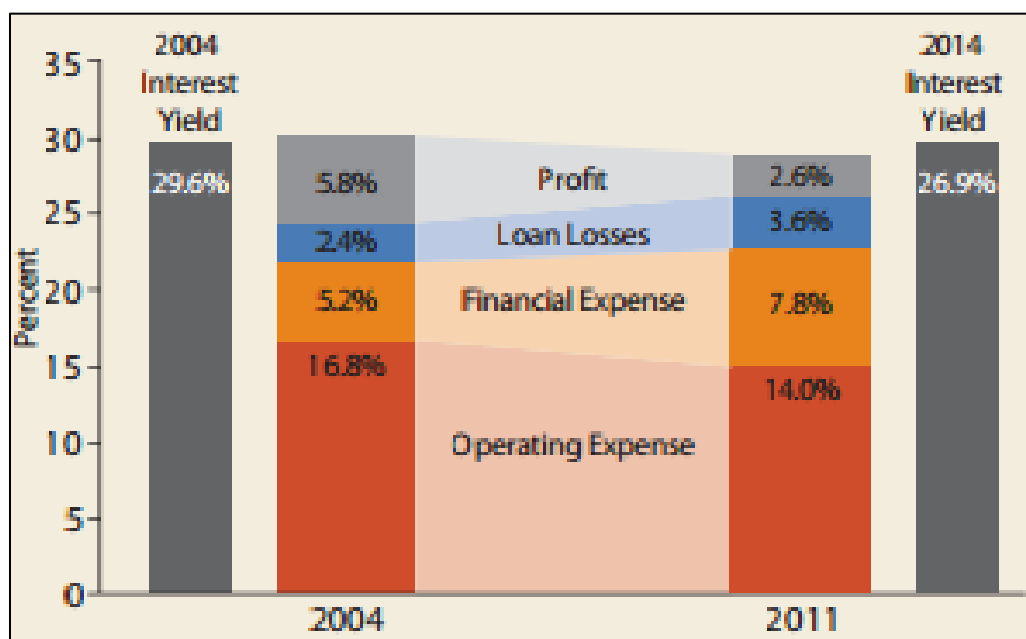
poverty. Rural Amhara and Oromiya of Ethiopia add to the list of communities in which scholars observed no significant, measurable effects on poverty (Tarozzi et al., 2013). Furthermore, Banerjee, et al. (2014) were not able to find higher rates of return on microenterprises; most households “do not have a project with a rate of return of at least 24%, the APR on a Spandana loan.” This lower rate of return on microenterprises and reduction in casual labor income are consequences of microcredit’s entrepreneurial focus that explains why microcredit does not reduce the rate of poverty

Effect of Interest Rates on Impact of Microcredit

Even though results of welfare improvements are encouraging, microcredit’s inability to change the severity of poverty is peculiar. High interest rate is one area of exploration in identifying the cause behind its inefficacy. Microfinance institutions charge interest rates varying from 17% to 80% per annum (CGAP, 2008). This can be compared to other sources of credit: the median estimated annual interest rate on loans from moneylenders is 214%, while the median interest rate on loans from family and friends is 43%. Within the wide range of interest rates charged on microcredit loans, the median interest rate lies at only 18% for microcredit loans given out by microfinance institutions, which is several times lower than the rates cited on informal loans (Pearlman, 2010)

As discussed earlier, the size of the loan is an important factor for lenders because it affects the size of the interest income that can lower the large fixed costs associated with each loan. The largest determinant of interest rate levels is the operating cost. The small average

microloan size do not support microlenders. Figure 1 below shows the percentage contributed by each component to total interest yield.



**Figure 1: Drivers of Interest Yields, as % of Yield, 2004-2011
(Rosenberg, et al., 2013)**

Albeit their disadvantages in terms of profitability due to smaller loan sizes, microcredit lenders record higher returns on assets average than commercial bank returns. Critics have scrutinized these high interest rates. Many countries have even attempted to legislate interest rate cap on microcredit. Moving beyond the ethics of making profits from those living in poverty, Figure 2 illustrates how much microcredit interest rates would drop if all lenders chose to forgo any return on their owner's investment. The contribution of profits on interest rates is not insignificant. Nevertheless, interest rates would still be very high even without the portion of interest rate charged above cost recovery.

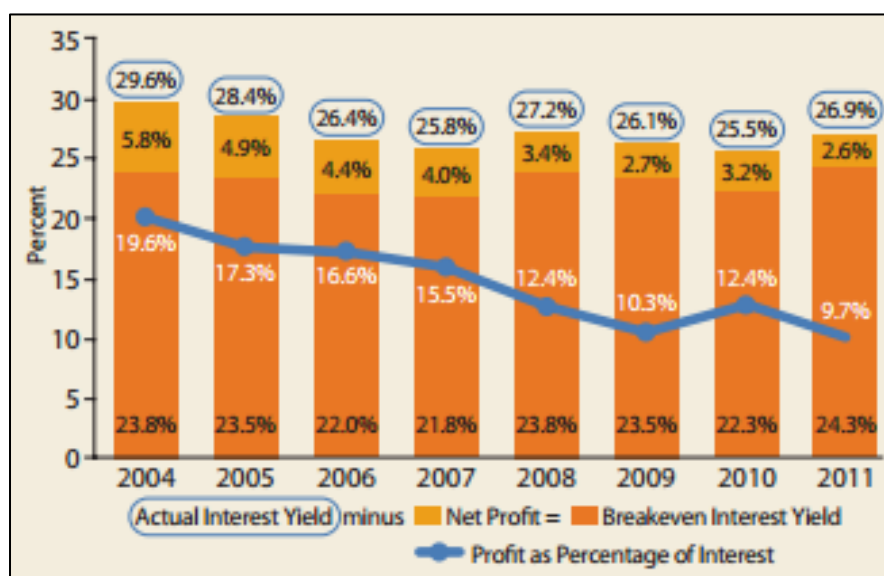


Figure 2: Impact of Profit on Global Interest Rates, 2004-2011
(Rosenberg, et al., 2013)

The extreme supposition of investors foregoing all profits is not the only way to cut interest rates. Self-help groups (SHG) in India, another form of increasing financial access and inclusion, charge a slightly lower interest rate than that charged by microfinance institutions. SHGs lend at interest rates between 15% and 24% – much lower than those charged by microcredit providers (Najeeb, 2010). They are able to achieve this lower direct interest rate for repayment, because the structure of the self-help group puts the burden of interacting with the source of capital directly on the borrowers. Unlike microcredit's on-lending practice, banks and investors do business directly with self-help groups. SHGs' initial appeal of lower interest rates vanishes when considering the total cost for the borrower, which far exceeds the sticker price. Najeeb (2010) comments on the cost structure of SHGs,

Our estimate shows that this function, along with time spent in loan repayment operations, effectively ends up costing the group members about 8 per cent of the loan amount of Rs. 50,000 that the group receives from the bank. This cost is incurred in the

form of wages foregone because of group meetings (5.4 per cent), visits to banks in terms of opportunity cost (0.45 per cent), and maintaining accounts (1 per cent), as well as the costs of travelling to the bank branch (1.15 per cent).

Beyond the quantifiable wage losses, this method is extremely inconvenient and hinders the ultimate goal of inclusion and active usage of financial services.

Application of technology in microcredit's operations has innovated cost cutting without shifting costs from the lender to the borrower, like in the case of self-help groups. Vong and Song (2015) developed a new cashless, branchless, wireless, and capital-less mobile micro-banking model to minimize operating costs. After an initial visit from mobile operators who visit the customers to collect personal details, the mobile banking system works completely over the mobile platform. Using a simple SMS messaging function, over 79% of the total developing world population can be covered and perhaps even greater proportion now since the paper's publication in 2015. They estimate non-profit microcredit institutions could lower rates to only one percent over the risk free rate.

Above all, the fact is some borrowers have succeeded despite high interest rates. Even with high interest rates, giving one the ability to jump-start their productivity is invaluable, especially when the borrower can reinvest to multiply profits. Take this example of a seamstress Lucia featured in *More than Good Intentions* by Dean Karlan and Jacob Appel (2013):

Lucia, a seamstress, makes her living sewing and mending clothes by hand. The \$5 profit she makes each day is just enough to feed her family and pay rent. With a \$100 electric sewing machine she could double her output (and her profits), but that's money she doesn't have -- until she pays a visit to a microlender. Lucia takes a six-month loan for \$100, buys the sewing machine, and starts earning \$10 per day. Even if the lender

charges 100 percent APR -- which, again, would be an unthinkable (and probably unlawfully) high interest rate in the United States, but is entirely realistic for a microloan – Lucia still comes out ahead, and by a wide margin. She has to set aside just under a dollar each day to make her monthly payment of \$21.85, leaving her with \$9 a day for her family instead of the \$5 she earned previously. Once the loan is paid off, she keeps that last dollar for herself and goes home each day with the full \$10 (p. 69).

Lucia is among many others massive success stories. An entrepreneur with a business idea or an existing business can use microcredit to launch their ideas and generate large business profits. Success stories, like one of Lucia, is very specific to the condition that the borrow be entrepreneurial. This leads to a key flaw in microcredit in terms of the second criterion in measuring progress of microcredit: outreach.

3.2 Outreach of Microcredit

Given the immense capital – both private and public – flowing into microcredit institutions, is it reaching the poor? This section aims to answer the question based on outreach of microfinance institutions due to limited available research on outreach of microcredit alone.

Today, more than 10,000 micro-finance institutions serve more than 150 million people worldwide. While different sources show varying estimates, a range between 500 million to 1.5 billion people lack access to financial services, of whom over 500 million entrepreneurs remain excluded from financial services (MicroWorld, n.d.). Dermirguc-Kunt and Klapper (2012) analyze the Global Financial Inclusion Database that measures how adults in 148 economies save, borrow, make payments, and manage risk. Their analysis showed only 41% of adults in

developing countries have an account at a formal financial institution. More than half the world's adult population does not use formal or semiformal financial services. Nearly all of them live in developing nations in Africa, Asia, and Latin America (Chaia et al., 2009). The 41% statistic shows the usage rate for all services provided by a financial institution. In Sub-Saharan Africa, only five percent of individuals aged 15 and older received a loan from a financial institution (Demirguc-Kunt & Klapper, 2012). Such low usage does not necessarily translate to weak demand or the lack of need for the offered services. Forty percent received a loan from family or friends in the past year. In South Asia figures are similar, with 11% saving with a financial institution in the last 12 months and nine percent receiving a loan from a financial institution. The popular Self-Help Group movement in India affected 97 million households by 2010. Even this indication of participation is weak when compared to the potential market of 900 million households in India who live on less than two dollars a day (Chen et al., 2010).

In an experiment conducted in collaboration with the Center for Microfinance (CMF) and the Institute for Financial Management Research (IFMR) in Spandana, an active microcredit program in India, Banerjee et al. (2014) accentuate potential clients' unwillingness to utilize micro-loans. In this experiment, they randomly selected neighborhoods to open a new branch of Spandana. After observing the null period and two years after microcredit program launched, they concluded that "only 38% of households borrow from a MFI, and this is among households selected based on their relatively high propensity to take up microcredit" (Banerjee et al., 2014). Low levels of usage even in areas covered by lenders, as well as, persistent barriers to inclusion negatively affect the broader effect of microfinance on poverty (Johnson & Arnold, 2011).

One of those barriers to inclusion is the eligibility standard that gives preference to entrepreneurs. Not only are entrepreneurs more eligible by many MFI standards, you have to be

an entrepreneur to benefit from microcredit. By focusing on micro-entrepreneurs who need to fund short-term working capital, microcredit providers have missed a large majority of the potential market (World Bank, 2015). Not everyone is an entrepreneur and not everyone can afford to be an entrepreneur. A majority of the world's poorest adults are not entrepreneurs. Most adults receive low and irregular income from farming, casual labor, fishing, and pastoral activities (Christen, 2011). These occupations and lifestyles, as seen in Figure 3, generate many varying financial needs. Funding working capital and start-up capital for a new business comprise only two facets of financial service needs of adults in developing economies.

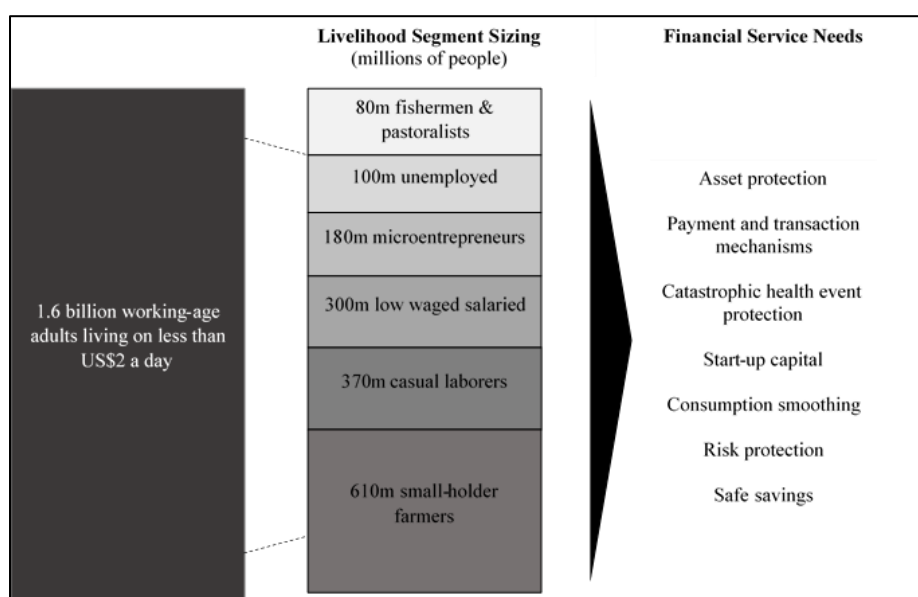


Figure 3. Financial Service Needs for Different Livelihood Segments (World Bank, 2013)

Sure enough when business investments are only a single facet of financial need, at least a portion of most microloans funds consumption. In South Africa for example, consumption accounts for 94% of microfinance use (Hickel, 2015). The use of financial services for personal use is universal in high-income economies, as well as in low-income economies. In high-income economies, 25% of adults report using an account for business purposes. In developing

economies, only 4% of adults and 11% of account holders report using their formal accounts for business purposes (Demirguc-Kunt & Klapper, 2012). The low likelihood of business use and the existence of many non-entrepreneurial occupations in developing countries leave much of the unbanked poor excluded.

Insufficient progress in outreach appears more severe when the low financial inclusion statistics are paired with low usage rate. For example, in Mzansi, South Africa, low-cost national bank accounts that extended banking to low-income earners and those living beyond the reach of banking services had reached over 1.5 million people by the end of August 2005. This appeared to be a huge success with a great majority of new accounts opened by never-been-banked-before clients, according to Colin Donian, the Banking Association South Africa's Mzansi Initiative director ("Mzansi: SA Banking Spreads Its Net," 2004). What appears to be a wildly successful outreach contains a surprising truth after closer examination. World Bank's *Microfinance Handbook* (2013) cite an email exchange from 2009 with Gerhard Coetzee and other members from the Bankable Frontiers Associates, "a global consulting firm specializing in the development of financial services for low income people around the world" ("Bankable Frontiers Associates," 2016). This growth in Mzansi accounts in South Africa disguised a large number of dormant accounts, which are accounts that are opened but often unused. The reasons for account dormancy were "better options for their needs or were too poor to utilize the account" (Gerhard Coetzee, e-mail exchange, April 4, 2012). Even within geographical areas covered by microfinance institutions, the poor are cash constrained, cannot afford to take even a day or two off to work on their business, to attend weekly repayment meetings, or other procedures associated with using a financial account.

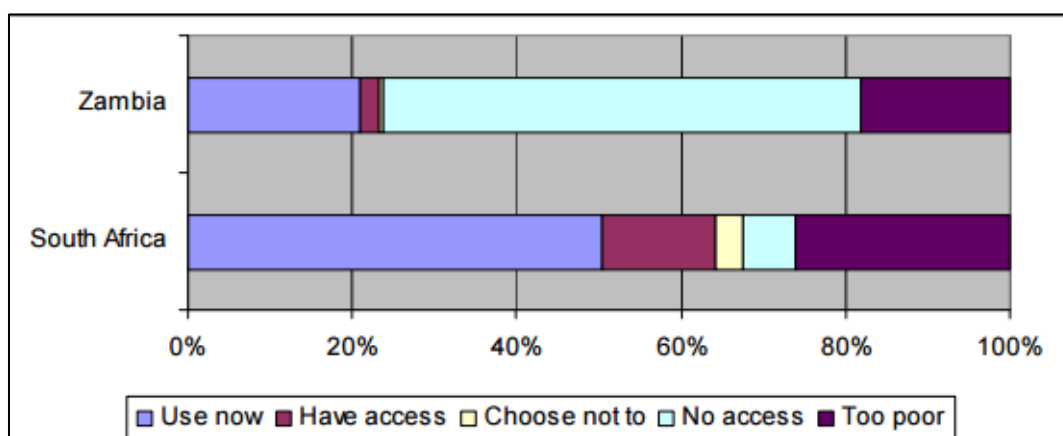


Figure 4: Access Frontier for Transactional Banking: South Africa and Zambia 2005-2006 (“Mzansi SA Banking Spreads Its Net,” 2004)

Figure 4, based on data in South Africa and in Zambia, highlights the incomplete reach, dormant accounts, those who are too poor for the program intended for low-income households, and a startling category called “choose not to.” These levels of financial account use below active usage reveal a more complex problem of financial access and inclusion than the 500 million to 1.5 billion people who do not have access to financial services (MicroWorld, n.d.).

High dropout rates faced by many microfinance institutions add to the complexity in understanding progress in financial inclusion. A surprising number of borrowers stay for one or two loan cycles and then exit the institution, making retention a significant problem (Meyer 2002, Rutherford 2004, 2010). For example, recent reports for sixteen of the largest microfinance institutions in Latin America estimate dropout rates that range from 19% to 54% (Pearlman, 2010)³. Curiously, high dropout rates do not match high default rates or migration to other lenders, suggesting that many dropouts exit formal credit markets (Urquizo, 2006, Pawlak &

³ “Dropout rates are measured as the percentage of clients who begin the year with a loan but do not have one by the end of the year. Information from the Social Performance Reports published by themix.org. Information as of 2008 or 2009, depending on the institution. Countries include Bolivia, Brasil, Ecuador, Colombia, Venezuela, Mexico, the Dominican Republic and Guatemala” (Pearlman, 2010).

Jahic, 2004). Clients' decision to exit is unexpected since maintain a long-term relationship with microlenders opens up many benefits, such as larger loan amounts, lower interest rates and collateral requirements and longer-term lengths (Diamond, Ongena and Smith, 2001, Petersen & Rajan 1994, Boderhorn, 2003). This suggests that microcredit clients weight the negative aspects of microcredit enough to forgo the benefits.

Collins, et. al. (2009) find that "poor households care about price, but they also care about convenience and flexibility and are willing to pay for those features." As a result, "sometimes [the poorest] deliberately choose a more expensive moneylender because the looser repayment schedule fits their needs better, or because the money must be found quickly after an emergency has struck or a not-to-be missed opportunity arises" (Collins, et al., 2009). This sentiment is mirrored in a survey of Ecuadorian microentrepreneurs who are asked about financing sources to manage household and enterprise level shocks (Pearlman, 2010). When asked the reasons why they use a particular source, 28.7% say it is the most agile and rapid and 11.1% say it is because they know the lender. Only 4.4% list low interest rates as the main reason. This suggests that credit from different sources play unique roles in the financial lives of poor households and can explain somewhat puzzling credit behavior of choosing more expensive options.

The informal sector offers the features important to consumers: access, flexibility, and service quality. Regardless of microcredit's ability to appeal to the poor, the poor's need for credit does not change. Instead, the poor resort to the informal sector, such as family, friends, and the village lender. Pearlman (2010)'s survey of Colombian microentrepreneurs showed that 70% of loans are from family and friends, 16% of loans from moneylenders, 75% of loans from suppliers and 61% of loans from pawnshops have no fixed term. In contrast, less than 5% report

no fixed term for formal loans. A similar pattern holds with maturity dates, with 47% of those who borrowed from family and friends, 11% for moneylenders, and 13% for suppliers reporting no fixed maturity length. In contrast, all borrowers report a fixed maturity length for formal loans. The poor show preference for the benefits of informal credit sources despite the higher costs, embarrassment, and depletion of the very social capital which they built (World Bank, 2013). In some cases, a dual credit market is created. Village money lenders and social circles complement microcredit loans. Surveys of poor households and entrepreneurs show a continued reliance on informal credit, even among long-standing microfinance borrowers (Collins, et. al 2009, Banerjee & Duflo, 2007). Because of the relative convenience of informal services, microcredit is failing to reach the depth of poverty needed to make an impact on the poor. Unfortunately, even a single transaction with a village lender or other informal services occurring where and when microcredit does not extend can put the borrowers in a cycle of debt and poverty

3.3 Summary of Microcredit Impact and Outreach

Even though microcredit clients in general fail to measure up to the highly advertised success stories, they gain unintended benefits, such as in consumption smoothing, through the use of microcredit. Consumption smoothing, which for the most cash constrained poor carries significance and marks consistently affording the necessities, is a benefit that should inarguably be spread to everyone. However, microcredit does not reach a huge portion of the adult population without financial access. The problem of low outreach becomes magnified when considering dormant accounts and dual credit markets. Given the variety of occupations and

backgrounds of most of the unbanked population, and the corresponding variability in credit usages and needs, the current microcredit product targeted towards entrepreneurship leaves a huge potential for improvement. The next two chapters of this paper focus on improvements to outreach, discussing both an existing attempt and suggestions for future attempts based on factors of microcredit demand.

Chapter 4

Improving Microcredit Outreach

People living in developed nations and many urban areas of developing nations use a variety of financial products to enhance their lifestyles. The poor, too, need multiple products to effectively fulfill all of their financial needs. The financial pressures of managing inconsistent income to cover daily expenses, unexpected emergencies, and life-cycle events weigh heavily on the poor. The need for and the ability to use and to benefit from financial services depend to a great extent on age, location, source of income, life cycle income levels, cultural context, and gender (Ehrbeck, et al., 2012). Microcredit's lack of consideration for the variability in the poor's borrowing needs explain its low outreach.

More recently, as literature continues to add that microcredit has made insufficient progress in outreach and impact, economists shifted their focus to identifying and addressing the factors limiting microcredit's progress. In order to converge the safety and reliability of formal credit and flexibility of informal credit, microcredit needs to adapt the flexibility aspect of informal credit.

Low use of formal credit and the existence of dual credit markets are thought to be due to the lack of flexibility in microcredit contracts. Magill and Meyer (2005) cite muted demand as the main obstacle to formal credit participation rather than limited supply. The flexibility in loan repayment is a key feature of informal loans highly attractive to low income borrowers in developing countries, allowing it to garner higher demand than microcredit. Microcredit loans are self-amortizing and have frequent repayment schedules, most of which start one week, two weeks or one month after the loan is granted. The short repayment schedules mean that

borrowers frequently have to start repaying the loan before a project has begun to payoff. While microcredit lenders could justify the rigid and frequent repayment schedules⁴, repayment flexibility is a quality valued by poor borrowers with income fluctuations and limited means to manage it (Pearlman, 2010). Field, et al. (2012) test out a similar hypothesis that poor households would benefit from repayment flexibility in a field experiment. They collaborated with a large microfinance organization called Village Financial Society (VFS) in Kokata, India. VFS follows the conventional rigid microcredit structure in their lending practices. Loans are distributed through five-member joint liability groups. The uncollateralized loans required periodic repayments beginning shortly after loan disbursement during group meetings. 213 clients participating in the study were randomly assigned to either a monthly repayment schedule or a weekly repayment schedule. To measure the outcome of the treatment group, surveys were administered at a 48-hour frequency. The survey asked about level of confidence in ability to repay loan, anxiety about loan repayment, argument with spouse about finances, and the amount of time spent about thinking about repayment. As hypothesized that a monthly repayment provides more flexibility, the monthly payment group yielded lower financial stress levels. Figure 6 highlights the difference in financial stress between the two groups based on the survey:

⁴ The short and frequent repayment schedule is practical from the lenders' perspective. First theory cited by Pearlman (2010) explain that as repayment begins early, any signs of difficulty in repayment will occur early, allowing the group or lender to increase monitoring and reduce default. Secondly, repayment of loan aligns with the income inflows, which can critically improve repayment for borrowers with difficulty saving up large sums to pay all at once (Armendariz & Morduch, 2010). Another theory is that frequent repayment forces borrowers to use the funds for productive rather than consumption purposes and, more specifically, to invest in short-term, liquid projects with quick payoffs (Field, Pande and Papp, 2010). By limiting borrowers' ability to use the funds for longer term, less liquid projects or short term consumption needs, microfinance institutions ensure that the funds are directed toward uses that have a higher probability of success, thereby reducing default without enacting expensive monitoring techniques.

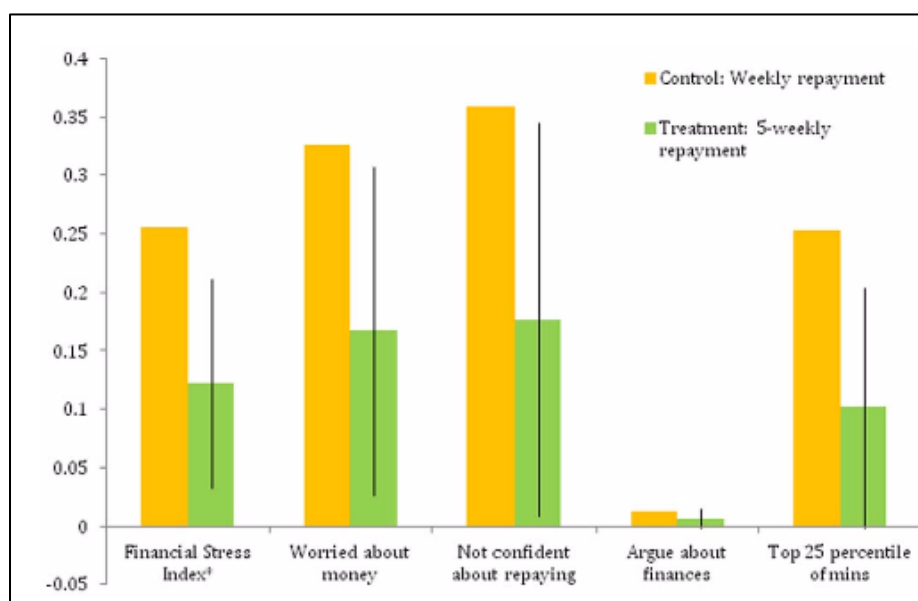


Figure 5: Impact of Less Frequent Repayment on Financial Stress (Fields, et al., 2012)

The yellow control bars represent means of weekly repayment group, while the green bars for treatment represent the monthly repayment group. Lines on green treatment bars represent plus or minus 1.96 times the standard error of the treatment coefficient. “Clients repaying monthly were 51 percent less likely to report feeling worried, tense, or anxious about repaying, 54 percent more likely to report feeling confident about repaying, and reported spending less time thinking about their loans compared to weekly clients” (Field, et al., 2012). The increased flexibility in the monthly repayment group and its effect of reduced mental stress can be explained by the higher business income and higher household expenditures. Because clients were less concerned about shorter-term business plans, such as inventory turnover rate, they invested in higher quality and more profitable business ventures. Clients were focusing on maximizing long-term profits rather than financing quicker yet less profitable investments. The initial spike in stress levels in the first few weeks are followed by the fall in financial stress towards the later weeks (Figure 7).

The later fall in financial stress illustrates the increase in income as investments begin to make returns.

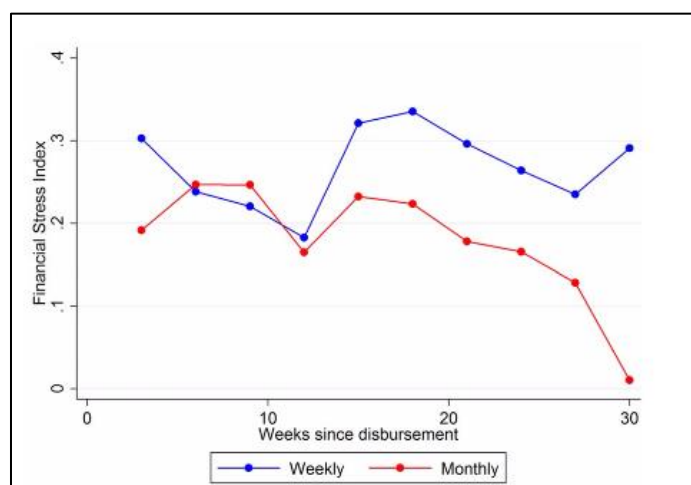


Figure 6: Time Path of Client Financial Stress (Fields, et al., 2012)

Furthermore, despite the increase in flexibility and income, households did not show increased susceptibility to temptation purchases, such as tobacco, alcohol, and ready-made foods. (Field, et al., 2012). Reduced mental stress, as well as improved economic outcomes, because of flexible repayment structure inches the structure of microcredit closer to converging the gap between the conveniences of informal credit.

Microcredit institutions have seen repayment flexibility improve microcredit outreach in practice. The Grameen Bank allowed for greater flexibility when it launched Grameen II and saw a decline in dropouts (Rutherford, 2010). In Uganda, changes enacted by FINCA Uganda allowed some borrowers to adopt a biweekly, modified from the weekly repayment schedule. This caused dropout to fall by 10% (Pearlman, 2010). The overwhelmingly positive client response to repayment flexibility indicate that other microcredit institutions should strongly consider catering to clients' preference for flexibility, replacing the rigid repayment schedule.

Applying repayment flexibility greatly improved the existing structure of microcredit. Nonetheless, repayment flexibility only addresses one of microloan's components. In the next chapter, other components of a loan – interest rate, maturity, use of proceeds, and characteristics of borrowers – and how they influence microcredit clients are examined to conceptualize an improved microcredit structure that may achieve greater outreach.

Chapter 5

Factors of Microcredit Demand

In the previous chapter, loan repayment flexibility exhibited capacity to increase microcredit outreach by reducing mental stress and increasing business income while upholding the same repayment rate. Taking a step back, however, there may be an easier solution: the inverse demand function. As price decreases, or interest rates in the context of loans, demand should increase. This means that with proper supply, low-interest rate microcredit loans should be the answer to achieving greater outreach. In practice, as mentioned in Chapter 3, microcredit loans charge interest rates varying from 17% to 80% per annum (CGAP, 2008). Given the small size of microloans, microcredit institutions are unable to recover costs, thus unable to lower interest rates to expand outreach. That was until technological innovations enabled cost cutting. These are ideas such as the branchless mobile-microbanking model presented by Vong and Song (2015). Before delving further into designing an implementation method based on the inverse demand theory, Karlan and Zinman (2006)'s study in South Africa uncovers an unexpected insight about microcredit clients' response to changes in interest rates.

5.1 Higher Participation at Lower Interest Rates: Case of South Africa

Karlan and Zinman (2006) conducted a field experiment with the help of a for-profit South African lender in a high-risk consumer loan market. Even though the study largely discusses results in terms of profits to fit the agenda of the partnering for-profit lenders, its

breakdown into borrower profiles by gender and income level provide understanding of consumer preferences applicable to microcredit clients. The experiment reached over 50,000 existing clients with a new loan offer at randomized interest rates and tracked the gross revenues and repayments to observe how interest rates affect offer acceptance and loan repayment.

Across interest rates from below the rates members received in prior loans to above those rates, the demand curves sloped downward. A price decrease from the maximum (11.75%) to the minimum (3.25%) rates offered would only increase take-up by 2.6%. The downward sloping demand curve contains a kink, in which below the prior rate shows very low elasticity of demand and then shows much higher sensitivity to interest rates once above prior rates. At or below the prior rates, 100 basis point increase in the monthly interest rate reduces take-up by 3/10 of a percentage point at or below the prior rates. At higher rates, 100 basis points increase led to 1.7 points fall in loan take-up. Because of the minimal change in demand from lowering interest rates, Karlan and Zinman state that the lender's case the cost of reducing interest rates slightly exceeded the benefits of increased gross revenue from higher borrowing and increased higher repayment rates. However, a microcredit lender with social objectives should implement the downward sloping demand curve by cutting rates and maximizing expansion, while sacrificing maximum potential profits.

Lowering interest rate is particularly influential in increasing access to the targeted groups, such as women and low-income clients. Take-up elasticity is calculated by multiplying the marginal effect by the ratio of the mean offer rate to mean take-up. Female and low-income clients exhibit higher elasticities of -0.33 and -0.32. These negative elasticities are of greater magnitude than that of the elasticity for full sample of -0.28. This stronger (higher) elasticities among female and poor implies that microcredit clients, the bulk of whom are not only poor but

are women, are more sensitive to lower interest rates. Therefore, lowering interest rates will have positive impacts on outreach.

In the same study, Karlan and Zinman make another discovery on how to increase microcredit demand through another component of microloans – the maturity length.

5.2 Increased Demand at Longer Loan Maturities: Case of South Africa

In the aforementioned experiment in South Africa, Karlan and Zinman (2006) added another component of a loan contract to test its effect on demand. They engineered the exogenous variation for maturity during the mailing of the lender's existing clients by randomly assigning clients to "maturity suggestion" groups. The "maturity suggestion" group received a single example of a loan with a 4, 6, or 12-month maturity. These examples were non-binding suggestions, allowing the take-up of the loans to serve as the signal of demand. The control group received no single example of a maturity in the mailing material, and instead received a larger table containing many loan maturity examples. The outcome of interest is the maturity elasticity of demand, which is the percentage increase in take up for every additional month in maturity. In the experiment, each additional month in maturity recorded 15.7% increase in loan demand. The high sensitivity to maturity was found for both low and high-income borrowers. Comparing this magnitude of change in demand from maturity increase to demand change from loan price, interest rate would have to fall by 436 basis points or 68% to have the same effect.

Liquidity constrained consumers in the car loan market exemplified similarly higher demand for longer maturities (Attanasio, et al., 2005). It follows the intuition that although longer maturities larger total financing cost, thus reducing lifetime consumption, they form

smaller monthly loan payments – a helpful feature for the liquidity-constrained consumers of car loans. Attanasio, et al. (2005) proved the maturity elasticity of demand at a higher significance for low-income borrowers – again, due to the needs of the most liquidity-constrained borrowers.

Implementing the learnings from the car loan market and the for-profit South African loan market, microcredit institutions can increase loan maturity lengths to yield large effects on demand. By lowering interest rates and increasing loan lengths, microcredit suppliers can alter their existing products to increase the number of clients. The next section further examines factors of demand for credit by evaluating microcredit's risk tolerance and how that translates to the use of their loans.

5.3 Consumption is Preferred: Case of Bolivia

Zeballos, et al. (2009) conducted a field experiment with 200 Bolivian microcredit borrowers where the borrowers were essentially divided into a range of risk levels. The two treatment groups compare safer versus riskier investment project treatment and consumption versus safer investment project. Borrowers are presented these projects with specified probabilities of success. The experiment reveals an interesting demand-side evidence, which contradicts the common perception that the poor face issues of moral hazard and take on risky projects. In the group that was presented consumption versus safer investment project, borrowers were significantly more likely to choose the certainty of “consuming” a unit of capital over the small risk involved with choosing a relatively safe investment. Preference for consumption over investment can also be gleaned from this low risk behavior. Zeballos et al. found that those with repayment problems were significantly more likely to use the loan funds for immediate

consumption, which is a further area of research prior to implementing a policy based on this microcredit borrow behavior.

Low risk tolerance drove individuals to prefer consumption over investment projects in the case of Bolivia. It highlights a potential factor which could be accounted for to increase outreach of microcredit. The next section supplements the observations on consumer risk aversion with the sudden spike in educated borrowers in Portugal after a financial crisis, suggesting individuals only resort to risky investments out of necessity from unemployment.

5.4 Formal Employment is Preferred: Case of Portugal

An analysis of the profile of microcredit borrowers in Portugal, a middle-income country, during periods from 1999 to 2007 and from 2008 to 2010 suggests that because of economic stagnation during the second period, the educational profile of microcredit borrowers changed. Barroso (n.d.) hypothesized that educational level of microcredit borrowers was lower before the crisis because unemployment rate was lower and educated people did not aspire to take out loans to start microenterprises when they had formal jobs. The data from Portuguese Microcredit Association (*Associação Nacional de Direito ao Crédito – ANDC*) confirms Barroso's hypothesis about the educational profile of borrowers. Table 1 shows the distribution of educational attainment in the period before and during the financial crisis.

Table 1: Distribution of Educational Attainment of Microcredit Borrowers in Portugal

		1999 - 2007	2008 - 2010
<i>0</i>	No education level	1.72%	0.89%
<i>1</i>	Primary level of education	17.59%	10.71%
<i>2</i>	Lower secondary level of education	40.47%	39.29%
<i>3</i>	Upper secondary level of education	26.45%	28.35%
<i>4</i>	Post-secondary, non-tertiary education	3.32%	1.34%
<i>5</i>	First stage of tertiary education	10.46%	19.42%

Among the overall difference in education levels in the two periods, the dramatic increase – almost doubling - in the highest level of education stands out. As well-educated people lost their jobs, they resorted to microcredit to create a source of income. Only after losing the source of steady income through formal employment, the educated population became a microcredit client.

In the context of developing countries, where most people do not attain the “First stage of tertiary education” or have formal employment opportunities at all, the choice between formal employment and self-employment does not exist. Nevertheless, the findings from Portugal add to evident risk aversion of borrowers from Bolivia. Microcredit organizations can reduce interest rates (Chapter 5.1) and increase loan maturity (Chapter 5.2) to raise demand for microcredit. Ultimately, this risk aversion as seen in preference for consumption (Chapter 5.3) and formal employment (Chapter 5.4) may pose an obstacle in implementation because risk is an intrinsic element of entrepreneurship, which microcredit organizations aim to promote.

Chapter 6

Conclusions

This paper discusses the progress of microcredit with a focus on its outreach. Collecting acclaims in the international aid community as an innovative and sustainable tool to alleviate poverty, microcredit rapidly expanded across developing regions across the world. Despite its initial praise, microcredit programs failed to show significant capacity to reach the poorest of the poor. The essence of microcredit that aims to empower micro-entrepreneurs by enabling the start-up and the expansion of their microenterprises incompletely targets the financial needs of the poor. The poor and unbanked population consists of many occupations, backgrounds, and characteristics, most of which are not entrepreneurial. This constitutes varying financial and credit needs. In microcredit's failure to accommodate these varying needs, consumers rely on informal credit.

In order to transition more informal credit users to microcredit and reach the half of the world that is unbanked, I examine consumers' responses to changes in components of microcredit loans. Repayment flexibility, as prominently used by Grameen Bank, is a recent modification to the conventional microcredit product that boosted demand and outreach of microcredit. Case studies from South Africa, Bolivia, and Portugal reviewed in Chapter 5 show that low interest rates, longer maturities, and low-risk consumption use are also factors that increase demand of microcredit. Clients preferred longer maturities because longer maturities divided each repayment amount into smaller sums. To end this paper, I propose an experiment

that examines how loan maturity affects demand, while keeping repayment sums constant across all maturity lengths. Details of proposed experiments follow in this chapter.

Proposed Experimental Design

Hypothesis

I anticipate that the provision of a short-term loan recommended for both consumption and investment will increase participation in microcredit, measured by take-up rates. Literature shows that the poor use at least a portion of their microcredit loan for consumption. I anticipate shorter maturities are more suitable for consumption. Therefore, by recommending the use of microcredit for both consumption and investment, potential clients who may have consumption needs will be encouraged to participate. Therefore, I hypothesize that short-term loans will increase participation in microcredit programs.

Repayment Flexibility Feature

Evolving the microcredit product to include the recorded success of Fields, et al. discussed in Chapter 4, flexible monthly repayment structure is incorporated into all loans offered to potential clients. The monthly repayment begins one month after loan issuance. This flexibility feature allows those using microcredit to fund consumption to save up their wages for repayment without the intense pressures of weekly repayments.

Loan Contract

Both the standard and new loan contracts will follow the conventional loan contract structure with fixed loan amounts, fixed interest rates, fixed payments, and fixed maturities. The annual loan interest rate will be the same for all loans and will be determined based on suggestion by the partnering microcredit institute. The interest rate is kept constant to control for changes in price (Karlan & Zinman, 2006). To test for the effect of variation in loan maturities, 6-month maturity is suggested to the standard loan group while 1-month maturity is suggested for the new loan group. Pre-set loan sizes, not by choice of the borrowers, will accompany both the standard and the new loans. Loan sizes are adjusted to keep monthly payment sizes for loans of both maturity lengths to remain the same. The consistency in monthly payment size eliminates bias towards longer maturities due to smaller monthly payments, as was seen in Karlan and Zinman (2006)'s study of demand elasticities in South Africa. Although the interest rate would ultimately be decided by the microcredit organization, if the monthly interest rate were 10%, a 1-month loan would be assigned a \$1,000 in loan size for a monthly repayment of \$1,100. At the same interest rate, a 6-month loan would be assigned \$4,125 as its loan size, which keeps the monthly repayment sum the same as that of the 1-month loan.

Experiment Implementation

The design of this experiment, particularly the “maturity suggestion” portion, is largely modeled after Karl and Zinman's (2006) experiment in South Africa. Collaborating with a microcredit institution operating in one country, this experiment reaches prospective clients in

new regions that was not previously covered by the microcredit institution. I propose two groups within the study to receive the maturity variations.

1) Control (C) = Group offered the standard six-month loan

2) Treatment (T) = Group offered the new one-month loan

The variation in the loan terms will be applied using the maturity suggestion method used by Karlan and Zinman (2006). These suggested maturities, one-month for the treatment group and six-months for the control group, are non-binding. The suggestions take the form of examples that stand out over other available terms (ranging from one to six months) on the promotional brochure. Residents in the regions new to microcredit will be randomly assigned to the control or the treatment groups, with 50% of the sample population in each group. Because this experiment is only interested in prospective clients' interest measured by take-up rate (one's decision to apply), eligibility and credit worthiness of client does not need to be taken into account.

Prospective microcredit clients will receive a brochure in the mail that informs them about the microcredit opportunity. The brochure will contain information on what microcredit is, a recommendation on the use of funds for investment and consumption, loan contract structure, the deadline by which to apply, and information on the application process. The loan contract information will be organized by interest rate, loan amount, loan term, and monthly repayment amounts only for the suggested maturity length. The brochure will state in a less visible and smaller text that loans are available in other maturities ranging from one to six-month maturities for the same monthly payment amount. The deadline will be a month after the brochure is mailed out. Those interested in applying for the loan are instructed to apply in person at village centers, where a representative from the microcredit institute will be set up to review loan

applications and in the process, collect data for the experiment. The only outcome of interest is the loan take-up: did the prospective client decide to apply for a loan or not?

Empirical Strategy

The effect of shorter maturity treatment on loan participation can be measured by a linear probability model with a binary dependent variable. The binary outcomes on the application status for a loan are {Yes – the prospective client applied for a loan, No – the prospective client did not apply for a loan}. These outcomes are represented with 1 for “Yes” and 0 for “No.” The equation below can be used to estimate the experimental impact:

$$Y = \beta_0 + \beta_1 \text{OneMonth} + \beta_2 \text{Income} + \beta_3 \text{AlternatePrice}$$

Income and alternate price (the price at which the borrower could obtain the same size and maturity loan) are included as the variables in the equation in order to estimate the marginal effect on the probability of loan application by the treatment variable. *OneMonth* is a dummy variable which equals 1 for the maturity suggestion group (T) of 1 month and equals 0 for the 6-month maturity suggestion group (C). We can interpret β_1 as the change in the probability that a potential client applies for a loan given that they received a 1-month loan suggestion, holding everything else constant. This can be compared to β_0 , which gives the same interpretation except for the 6-month maturity suggestion group, when *OneMonth* is 0. β_1 greater than β_0 will confirm my hypothesis that the provision of short-term loans will increase demand for microcredit.

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Sapphire Leadership Academic Program
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Bachelor of Science Degree in Finance
Bachelor of Science Degree in Economics
Minor in Violin Performance
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WORK EXPERIENCE

Investment Banking Summer Analyst
Bank of America Merrill Lynch
New York, NY
Summer 2016

Career Services Intern
Career and Corporate Connections
University Park, PA
Aug. 2014 – May 2017

Credit Research Summer Associate
Bloomberg L.P.
Princeton, NJ
Summer 2015

Research Assistant
Center for Global Business Studies
University Park, PA
Spring 2015

Marketing Intern
ArtistWorks, Inc.
Napa, CA
Jan. 2014 – Jul. 2014

GRANTS AND AWARDS RECEIVED

Helen Eakin Eisenhower Award (2017)
Schreyer Ambassador Travel Grants (2014-2016)
President's Freshman Award (2014)
Sam Wherry Honors of Smeal College of Business (2014-2017)
Robert W. "Bear" Koehler Award (2015)
Academic Excellence Scholarship (2014)
Alumni Association Scholarship (2013-2017)
McLaughlin Family Trustee Scholarship (2013-2017)
John K. Tsui Honors Scholarship (2015-2017)
Bayard & Ethel Kunkle Scholarship (2015-2017)