MICROFINANCE AS A POVERTY ALLEVIANT: Have we given it too Much Credit?

An Analysis of Variance in Welfare Outcomes

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Abstract

Evaluating the effectiveness of initiatives aimed at alleviating poverty is a top priority for research in development economics. One increasingly newsworthy innovation is the concept of "microfinance"– extending small, short-term loans to poor entrepreneurs ordinarily excluded from formal financial institutions. As the logic goes, the "micro" businesses financed through this extension of credit to the poorest will generate income and catalyze growth in developing communities.

This paper investigates the microfinance movement with a focus on better understanding the determinates of variance in the welfare outcomes of borrowers. Anecdotal evidence suggests that positive effects might not be universal. I utilize an in-depth survey of participants in a microfinance program based in Bangladesh to determine first what influences welfare outcomes, and second, which specific factors are linked to high variances in welfare outcomes. I find that for this particular population, initial wealth-level significantly predicts wealth growth rate, and that although inequality decreases on average, there is higher variance in the outcomes of those poorest at the baseline.

1 Introduction

Over three billion people – more than half of humanity – live on less than 2 dollars a day (Daley-Harris 2009). How and why poverty persists in a world of growth and increasing wealth remains a question widely debated in politics, business, academia, and popular discussion. Efforts to pinpoint the root causes of poverty have motivated myriad approaches to eliminating it. Evaluating the effectiveness of these initiatives is a top priority for research in development economics.

Private market-based social innovations have received much attention in recent decades. One such innovation is the concept of "microfinance"– extending small, short-term loans to poor entrepreneurs ordinarily excluded from formal financial institutions. As the logic goes, the "micro" businesses financed through this extension of credit to the poorest will generate income and catalyze growth in developing communities.

Heartwarming anecdotes of success have inspired visions that microfinance could be the panacea to eliminating poverty worldwide. The United Nations Economic and Social Council deemed 2005 the International Year of Microcredit "to raise global awareness of the *pivotal* role that more inclusive finance can play in achieving the Millennium Development Goals" (United Nations Department for Economic and Social Affairs 2006)[1]. Growing enthusiasm has been paralleled by a significant expansion of the sector. In 2009 over 150 million borrowed from a Microfinance Institution (MFI) – a gross loan portfolio of almost 70 billion US dollars (Daley-Harris 2009; Microfinance Information Exchange).

However, as the sector grows, many have begun to question the efficacy of microfinance in alleviating poverty and stimulating long run growth. News of innovative business models and borrower successes is increasingly accompanied by reports of scandal, profiteering, and hardship. Recent empirical analyses have generated a slew of "second generation puzzles"– seemingly strange market outcomes and borrower behaviors for which explanations are often varied.[2]

Understanding the dynamics and consequences of programs like microfinance is important when designing policies to improve the welfare of the poor. This paper investigates the microfinance movement with a focus on better understanding what determines variance in welfare outcomes. If microfinance truly delivers what it promises – a chance to break free from a cycle of indebtedness to informal creditors – it would seem a priori that expanding access to microfinance would improve the well-being of most, if not all, borrowers. Rather, the continued existence of high variance in the welfare outcomes of the most poor suggests that positive affects might not be universal.

This paper is organized as follows. Section II provides a brief history of the microfinance movement. Section III outlines the first generation of theory, which justifies the notion that microfinance may improve the welfare of the poor. Section IV and V present new evidence and ideas that challenge the made in

[1] Emphasis added.
[2] For an overview, see Ananthet al. 2007.

the original theoretical models. Section VI describes the dataset and specifies an empirical model. Section VII proposes a theoretical model to explain one particularly anomalous empirical result. Section VIII concludes.

2 Origins: Muhammad Yunus and Grameen Bank

It began with twenty-seven dollars and one unusual idea. As Muhammad Yunus, recipient of the 2006 Nobel Peace Prize for his work in establishing Grameen Bank, the flagship model of microfinance lending, recalls:

> Bangladesh had a terrible famine in 1974. I was teaching economics in a Bangladesh University at the time. You can guess how difficult it is to teach elegant theories of economics when people are dying of hunger all around you. Those theories appeared like cruel jokes. I then dropped out of formal economics. I wanted to learn economics from the poor in the village next door to the university campus. (Yunus 1995).

He did. The scene Yunus encountered at the village next door surprised him. In "Creating a World without Poverty," he writes:

> Everywhere I went in the village, I saw people working hard to try to help themselves– growing crops in their tiny yards, making baskets, stools, and other craft items to sell, and offering their services for practically any kind of labor. Somehow all these efforts had failed to secure a path out of poverty for most... I eventually came face to face with poor peoples helplessness in finding the tiniest amounts of money to support their efforts to eke out a living (Yunus and Weber 2007).

The villagers Yunus came upon, like most in the less-developed world, lacked access to the sorts of formalized financial services provided to their better-off neighbors. Why these villagers were customarily considered "unbankable" by formal creditors is no mystery. The poor lack physical assets to offer as collateral and have no recognized history of creditworthiness. Furthermore, rural areas of developing countries often lack the legal infrastructure to make repayment formally enforceable, and the high transaction cost per-loan of lending small amounts to borrowers in remote areas renders microlending unprofitable for most traditional commercial banks.(Karlan and Mordoch 2009; Armendriz and Mordoch2010; Kono 2010).

Yunus discovered that in the absence of formal credit institutions, the villagers relied on local moneylenders for cash to purchase supplies for their tiny household businesses. The welfare implications of this arrangement were dramatic – informal moneylenders routinely charge 10 to 15 percent interest per 12-hour loan and sometimes resort to ruthless measures of enforcing repayment (Davis 2005). It was no wonder that most of the villagers were living on just a few cents per day. Many had fallen dangerously deep into debt. Upon befriending a villager named Sufiya, Yunus concluded, "once a woman like Sufiya borrowed any amount [from a moneylender], no matter how small... it was virtually impossible for her to work her way out of poverty."

Surveys from the Bangladesh Bureau of Statistics confirm the existence of perpetuating debt. From the 1960's to the early 70's, the percent of the rural population living in poverty remained between 60 and 80 percent (Hossain 1992; Islam 2004). Historic efforts to reverse this trend had been largely unsuccessful. In earlier decades, several governments subsidized large-scale programs to provide the poor with credit at below-market rates (Kono 2010). These programs were intended to increase the income of farmers and to promote the type of technological innovation that would stimulate economic growth in their communities (Yaron and McDonald 2002). Empirical evidence suggests, however, that these projects often resulted in inefficient outcomes and political turmoil (Fan et al. 2000; Zeller et al. 2002).

Yunus success depended fundamentally on avoiding mistakes made in the past. In the wake of these large-scale public failures, he turned to the private sector to find a solution. He began experimenting, providing credit out of his own pocket to the poor. It started small. 856 taka – at the time less than 27 dollars in loans– was enough to meet the borrowing needs of 42 poor villagers for a week. He returned to the village just days later and found that the money had been profitably invested in small household businesses. Whats more, the villagers were reliable; even in the absence of collateral and means of legal enforcement, they repaid on time. Contrary to conventional belief, these villagers seemed to be credit-worthy.

Yunus believed he had stumbled upon a market failure. Realizing he could only lend so much using his own finances, he collaborated with the Central Bank of Bangladesh and created a new branch that would lend exclusively to the poor. The result surprised many; the impoverished borrowers consistently repaid. Villagers across the countryside were gaining access to formal credit. Convinced that "good" credit would enable the poor to lift themselves out of indebtedness to moneylenders, Yunus once again decided to expand. Under a law passed in 1983, he opened Grameen Bank – Bangla for "village bank."

Reports from major newspapers across the globe typify the hype that characterized the microfinance movement's early years. Headlines convey widespread enthusiasm: "Dancing with Debts" (NewsWeek), "Create a World without Poverty" (Christian Science Monitor), and "Helping the Poor Help Themselves" (Los Angeles Times) chronicle stories of women like Sufiya for whom access to microcredit had proven to be life changing (Grameen Bank, Press Clippings). ACCION International, a leader in international economic development since the 1960's, features the following typical success story on their website:

> In the small town of Mango at the foot of Mt. Kilimanjaro, Anna works tirelessly selling rice, oil, sugar and other food products out of her tiny storefront. Before owning her store, 'life was miserable,' Anna explains. There was no work, and she resorted to asking for

> money in the street to take care of her parents and her daughter, Irene. With a small loan from a relative, Anna began selling mangos and vegetables at the local market, but she struggled to support her family. Desperation was never far from reality– until she heard about ACCION's partner in Tanzania, Akiba Commercial Bank.
>
> After forming a solidarity group with several other women, Anna received her first loan of 25 dollars and used it to buy sweets and other small retail items, quickly making a 10-dollar profit. With three more loans, Anna was able to buy four pigs. She now has 8 piglets and has added meat to her array of products. She is also buying in bulk at wholesale prices, and with a consistent supply of products, she is able to maintain a loyal client base.
>
> The familys living conditions have improved dramatically. No one is hungry and Irene goes to school. Anna laughs as she says, 'the store is now so full that its hard to walk in it.' She looks ahead full of hope, with plans of further education for her daughter, and continued growth of her business.

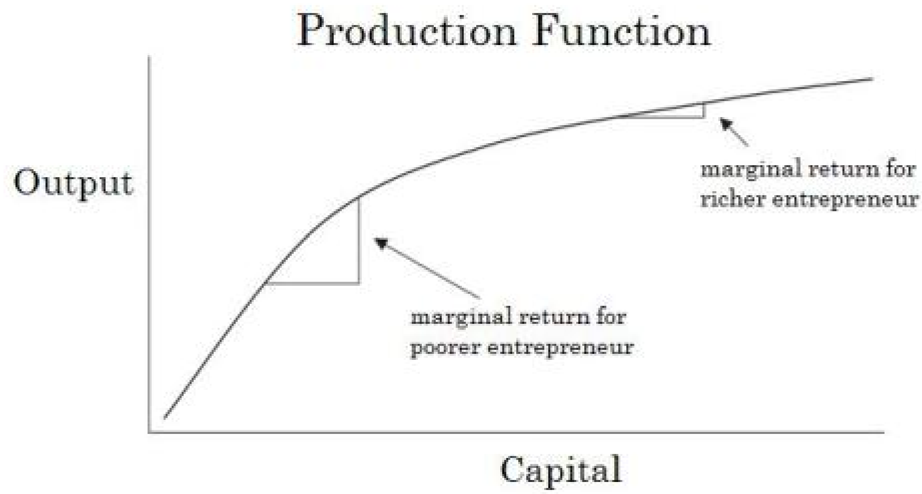
Anna's story provides a snapshot of Grameens original village banking model at work. Integral to its design are the concepts of hands-on partnership, community solidarity, and the idea that small investments add up over time. By overcoming longstanding doubts about the creditworthiness of the poor, Grameen Bank became the harbinger of a new generation of microlending.

3 The Microfinance Mechanism

3.1 How does access to credit benefit the poor?

In the absence of a private, formalized credit market, many poor such as Anna rely on informal moneylending or state-subsidized loan programs when in need of credit. I now explain why, in theory, microfinance offers a better alternative.

We begin with the benefits of credit. The figure on the following page illustrates a basic concave production function (source: Morduch and Armendariz 2010).



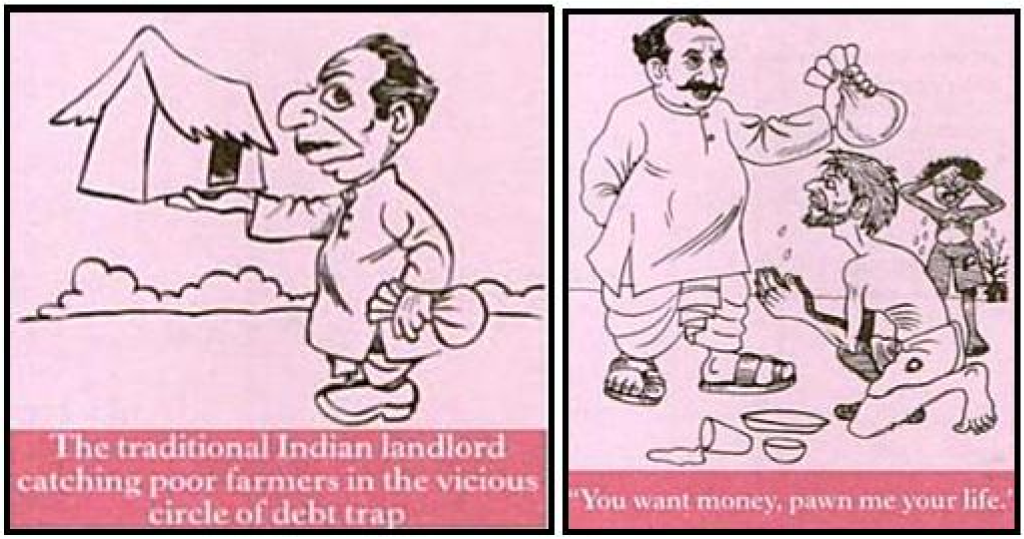
We see that small capital inputs at low levels of production generate high returns on the margin. However, there are barriers to entry – start-up costs – and the poor usually hold few collateralizable assets and little savings, if any at all. Without the means to achieve an initial level of scale in a small enterprise, the extreme poor are arguably unable to lift themselves out of poverty. For example, although a potential entrepreneur might be able to cover the cost of a milk cow after one month of selling its milk, a minimum level of startup capital, the cost of the cow, is needed to exploit the market opportunity. Channeling small amounts of financial capital into poor markets to overcome these barriers should thus result in welfare gains for both borrowers and lenders as latent productive potential can be unlocked.

However, the market for credit in developing countries is inherently one of asymmetric information. As mentioned before, in the absence of a screening mechanism such as a credit bureau, lenders have little means of predicting the risk level of a given borrower. Because borrowers often have minimal assets to offer as physical collateral, lending is extremely risky. Small loans to the rural poor also carry a steep transaction cost, and formal creditors are unlikely to take large risks for small returns. These market imperfections produce a void: a missing market for formal credit, which is traditionally filled by the two alternatives mentioned above: informal moneylenders and government-subsidized lending programs.

3.1.1 Informal Moneylending

Informal moneylending can be broadly categorized into two types: informal noncommercial and informal commercial (Bell 1989). The former refers to loans made between friends and family, the later to the infamous moneylender. Although both play central roles in the rural financial landscape, informal commercial loans come at a high cost. Interest rates can top 10 percent per day, and lenders are notorious for employing ruthless tactics to enforce repayment (Nisbet 1967; Davis 2005).

The following cartoons from an Indian economics textbook sum up this sentiment well (Jain 2009).



3.1.2 Public-Sector Formal Credit

Empirical analyses of borrower welfare in the market for high interest loans are relatively few, but some argue that formalizing credit – even at the market rate – could improve welfare outcomes (CGAP 2009; Karlan and Zinman 2009).

Formalizing credit through public works projects, however, introduces a fresh set of potential complications. Though some studies support the idea that state-funded credit programs can have positive effects on welfare (see Burgess and Pande 2005, and Binswanger and Khandker 1995 for evidence from Indias state bank program), a body of empirical work suggests that in the absence of private market forces like interest rates and competitive incentives, credit rationing mechanisms break down and capital does not flow to its most productive purposes (Kane 1977; Zeller 2002; Laeven 2004).

An ideal scheme would combine the advantages of informal moneylending – the efficiency gains produced through utilizing the private market – with those of a state-run program – securer deal making and more affordable rates. In theory, microfinance does just this. How so? It leverages what the poor possess perhaps most richly: social solidarity.

3.2 Group Lending

A hallmark of the microfinance movement is its creatively designed lending model: the joint liability group loan.

In theory, several simple mechanisms underlie even the most diverse group lending models: peer group selection (see Ghatak 1999 and Armendariz and Gollier1997), joint liability and monitoring (Stiglitz 1990, Besley and Coate 1995, Varian 1990, and Mordoch 1999), and dynamic incentives (Ghosh and Ray 1999, Besley 1995, Bolton and Scharfstein 1990, and Armendariz and Morduch 1998).

In short, holding groups jointly liable for repayment induces borrowers to select themselves into groups of similar risk level and hold each other accountable. This diminishes adverse selection. The ongoing promise of future loans provides a further incentive for borrowers to repay on time, thus also mitigating moral hazard. How these mechanisms combine formally to explain the success of early microfinance programs is outlined here.[3]

3.2.1 Peer Selection

Envision a market with two types of potential borrowers. Both types are risk averse, but each type has a different probability of success. If successful, the borrower can repay; if not, the borrower cannot (there is no strategic default). Each type is thus expected to repay with different probability. The probability with which a borrower will repay in a given period is the rate at which they repay over time. Define *risk level* as the probability that a borrower will repay. Call one type*risky* and the other, *safe*.

The risky type is less successful on average, but enjoys higher returns when successful. Risky types repay with probability p_R and have net returns of NR_R. Safe types repay with probability p_S and have net returns NR_S. Failure implies a net return of zero. Accordingly, $p_R < p_S$ and $NR_S < NR_R$.

Both types plan to invest in a small enterprise, the outcome of which is unknown. Assume outcomes are statistically independent. Both types have equal expected net returns: $p_R NR_R = p_S NR_S = \bar{NR}$. Ventures are worthwhile from a welfare standpoint; expected net return less the cost of capital is greater than potential earnings from outside wage labor: -$\rho > w$.

Borrowers know their own risk type, but lenders have no means of distinguishing between types before contracting a loan. We assume, however, that borrowers are perfectly knowledgeable about the risk levels of other borrowers from the outset. It is realistic to make this generalization in the context of developing countries, as close-knit communities with high levels of interdependence and strong social ties are the norm. Borrowers can thus make accurate judgments about their neighbors' probability of success based on observations of their work habits and knowledge of their inherent abilities.

The lender wants to contract loans for a given population of borrowers without knowing their risk levels. We assume that neither type of borrower has

[3]This section follows Jonathan Morduch's "The Microfinance Promise" closely.

physical capital that could be seized as collateral in the event of default, a characteristic of many poor in the less-developed world. This means the lender receives nothing if an enterprise fails. How then can a lender determine how much to charge for the use of credit?

Assume the lender can estimate the proportion of each type in the community of potential borrowers. However, the lender cannot determine the risk level of any given individual, so all face the same interest rate. To be profitable, the lender must set an interest rate high enough to cover the capital cost per-loan, ρ. If both types of borrowers decide to take out a loan and we assume the credit market is perfectly competitive, the equilibrium interest rate r will be set such that $r = \bar{p}$, where $\bar{p}$ is the mean repayment rate amongst borrowers.

When both borrower types decide to invest, safe types expect lower returns than risky types since -$rp_S < -rp_R$. Safe types only choose to invest if -$rp_S > w$, the expected return from investing in an enterprise is greater than the wage from outside labor. If this holds, - $rp_R > w$ since - $rp_S < -rp_R$, and so the risky types find it profitable to borrow. In this case, both safe types and risky types decide to invest. However, safe types are aware that they are paying the same price as their riskier neighbors. This is not an efficient equilibrium since safe types pay more and for credit than they would under perfect information, and risky types benefit at their expense.

Knowledge of this suboptimal condition might dissuade safe types from seeking formal credit. In the case that - $rp_S < w < -rp_R$, safe types find it more profitable to hold a wage-paying job and only risky types enter. Facing a market of risky borrowers, lenders only find it profitable to loan if they raise the interest rate to the new break-even point: $rp_R = \rho$. However, this is inefficient since at this rate, safe types, who have social welfare-enhancing business potential as well, will not seek access to the credit needed to fund them. The market for providing credit to the most creditworthy borrowers disappears.

The socially optimal equilibrium results if both types of borrowers enter the market, but safe types pay less for credit than risky types. To achieve this, lenders must be able to charge different effective prices to different types of borrowers. By appropriately pricing how much a borrower must pay if successful and in the event that their partners fail, an MFI can price discriminate between types. In theory, since borrowers have knowledge of each others relative risk levels, the only equilibrium is one in which borrowers select themselves into groups of similar risk-type.

3.2.2 Joint Liability

Borrowers voluntarily form groups. For simplicity, limit the group size to two. Assume the partners go about their productive activities independently. Borrowers have perfect knowledge about the risk level of their partner, and choose carefully as they will be held jointly liable for repayment of the loan. We assume that borrowers are the poorest of the poor– in the event of failure, they have no assets to sell to finance loan repayment. In most contracts, borrowers are held responsible for covering costs for defaulted partners. Consider a contract where, in lieu of a traditional fixed interest rate, a successful borrower pays s^* and the partner of an unsuccessful borrower pays a joint-liability payment, f^*. Borrowers themselves pay nothing if they fail.

Think of the amount a borrower can expect to pay, s^*p_I + f*(1-p_P), as the effective interest rate charged on the use of investment funds, where p_I and p_P are either p_R or p_S, depending on that individual and their partner's risk level, respectively. We can see that a borrower teamed up a very safe partner, a risk of p=1, pays only s^*, while a borrower with an extremely risky partner, a p=0, will pay s^*+ f^*.

Since $s^* <$ s^*+ f^*, borrowers pay less for credit if they team up a safe type. This makes sense; safe types have higher probabilities of success and are thus more likely to be able to repay their portion of the loan. Plugging [s^* + f^*(1-p)] in for r (where p represents the risk level of a borrowers partner), we use our expected net returns equation to derive expected earnings for each possible combination of borrower type. A safe type partnered with another safe type expects returns of -p_S[s^* + f^*(1-p_S)]; a risky type partnered with a risky type expects - p_R[s^* + f^*(1-p_R)]; a safe type partnered with a risky type expects returns - p_S[s^* + f^*(1-p_R)]; a risky type partnered with a safe type expects returns - p_R[s^* + f^*(1-p_S)]. Again, each type prefers a safe partner as it is less costly: $p_S > p_R$ implies[s^* + f^*(1-p_S)] $<$ [s^* + f^*(1-p_R)].

A borrower will only be indifferent about their partners risk level if expected returns are the same. If we take -p_S[s^* + f^*(1-p_S)] - p_S[s^* + f^*(1-p_R)], we see that a safe type can expect $p_S(p_S - p_R)f^*$ more if they avoid a risky partner. Likewise, a risky type can expect $p_R(p_S - p_R)f^*$ more if they select a safe partner. Since we assume perfect knowledge of risk level among borrowers, risky types must compensate for the higher likelihood that they may defaulta transfer payment of $p_S(p_S - p_R)f^*$to make safe types willing partners. With this, it becomes questionable whether risky types will still find it more profitable to join with safe types.

For a heterogeneous group to be socially optimal, the benefit a risky type receives from having a safe partner, $p_R(p_S - p_R)f^*$, must be greater than the cost of the transfer payment, $p_S(p_S - p_R)f^*$. However, $p_R < p_S$ implies that $p_R(p_S - p_R)f^* < p_S(p_S - p_R)f^*$, and so risky types end up better off forming a group with other risky types. Likewise, safe types expect higher net profits when they partner with other safe types. The group-lending scheme thus induces borrowers with perfect information about each others risk level to select themselves into homogenous groups.

Assortative matching enables lenders to effectively price discriminate between types even though all groups face the same contractual terms. How is this possible? If the lender sets s^* and f^* appropriately, risky types expect lower returns than safe types: - p_R[s^* + f^*(1-p_R)] $< -p_S$[s^* + f^*(1-p_S)]). This results because risky types are more frequently charged f^*, the joint-liability payment. For example, consider a market wherein p_S= .9 and p_R= .6. Borrowers in a risky group expect returns of [- .6s^*-.24f^*], while borrowers in a safe group expect [- .9s^* - .09f^*]. If f^*>2s^*. Then [- .9s^* - .09f^*]> [- .6s^*-.24f^*] and the safe group can expect higher returns. With this lending scheme, safe types can profitably to enter the credit market. The problem of adverse selection is thus solved: both borrowers and lenders can profitably engage in the credit market.

Peer selection and group homogeneity thus generate an efficient equilibriumex-ante. But what about moral hazard? As it turns out, this potential danger is also mitigated by characteristics of the group loan.

3.2.3 Peer Monitoring

In theory, after receiving a loan borrowers are faced with a choice: they can either invest in a safe activity with a certain payout R_S or chance a more risky venture with potentially higher returns R_R. We consider two risk averse borrowers with utility U(x). Borrowers have expected utility $p_S[\mathrm{U}(R_S - r)]$ or $p_R[\mathrm{U}(R_R - r)]$depending on whether they do the safe or risky activity, and U=0 when ventures fail. Monitoring the activities of borrowers is costly, and although lenders prefer borrowers to select the safe activity there is no mechanism to enforce this preference once the loan is disbursed.

If all borrowers took the safe choice and lenders could know this, the break-even interest rate would be $r = \rho\ /p_S$. However, if borrowers were faced with an $r{=}\ \rho/p_S$, they might deviate and decide to engage in the riskier enterprise and hope for a greater payoff. Then, E[U(R_R)]=p_R[U(R_R- ρ/p_S)]. If this happens, the bank loses money because $\rho/p_S < \rho/p_S$; if the bank knew that borrowers were taking risky actions, they would need to charge more to compensate for the added risk.

Upon realizing that borrowers *are* taking risky actions, the lender will raise interest rates to $r{=}\ \rho/p_R$, whereafter borrowers have lower expected utility: E[U(R_R)]=p_R[U(R_R- ρ/p_R)]. Although E[U(R_S)] > E[U(R_R)], borrowers cannot credibly commit to taking the safe action and so lenders will always charge the higher interest rate.

Group lending, however, gives borrowers the incentive to choose the safe activity. For simplicity, think again of groups of two borrowers. Borrowers can monitor each other and so enforce behavioral rules on which productive activities they will undertake. They must choose whether to both do the safe activity, for which expected utility for each borrower is p_S^2[U(R_S - r^*)] + p_S(1−p_S)U(R_S - $r^* - c^*$), or the risky activity with expected utility p_R^2[U(R_R - r^*)] + p_R(1-p_R)U(R_R - $r^* - c^*$). If c^*, the joint-liability payment, is set high enough, borrowers always prefer the safer activity. Since lenders know that borrowers are always better off with the safe choice, they can afford to offer lower rates. Peer monitoring thus enables lenders to price discriminate and offer *safe* types lower rates than *risky* types.

3.2.4 Dynamic Incentives

Since the lending relationship is not a finite game, borrowers have an incentive to uphold the favor of their fellow group members in order to receive loans later on. Many MFIs also maintain a ”progressive lending” scheme wherein good behavior in early stages of the game gives borrowers access to increasingly large loans down the road. Hence borrowers who value the continued favor of their group partners and access to MFI credit in the future will take responsible business actions and repay their loans on time.

These four mechanisms: peer selection, joint-liability, group monitoring, and dynamic incentives thus explain the success of the microfinance model in lending to the poor in markets with asymmetric information. Could the "microfinance revolution" truly could be the panacea to economic development? Do real world outcomes vindicate theory-based enthusiasm?

4 Surprise? New Evidence

Empirical analyses of the extent to which microfinance improves borrower welfare vary in their conclusions. Early studies are enthusiastic though concessionary – short run welfare improved in many cases, but longer-term effects had yet to be measured. McNelly and Dunford (1996) find that the income of over two thirds of CRECER (Bolivia) clients increased soon after receiving microloans and that consumption smoothing became possible as borrowers gained the means to purchase food and goods in bulk. Evidence from projects across the globe, including Muhammad Yunus' native Bangladesh, suggests that in addition to raising average household incomes (Hossain 1988; Mustafa et al. 1996; Khandker 1997; Burgess and Pande 2005), credit programs often have positive spillover effects on other areas of welfare including child education (Jacoby 1994; Pitt and Khandker 1996; Barnes et al. 2001), womens empowerment (Panjaitan-Drioadisuryo, Rositan, and Cloud 1999; Zaman and World Bank 1999), and health (MkNelly and Dunford 1999; Barnes 2001).

However, a growing body of evidence suggests considerable reason for skepticism. While some argue that microfinance systematically caters to the "rich poor" rather than those truly in need (Chowdhury 2009), others point to less successful programs to substantiate claims that microcredit may not always increase borrower incomes (Wood and Sharif 1997; Mordoch 1998), improve the social standing of women (Hashemi et al. 1996), or address the root causes of poverty (Milgram 2001). Reports that microfinance generates emotional strain and stress, particularly amongst the poorest of female clients, raises additional concerns over its net impact on borrower well-being (Ahmed and Chowdhury 2001).

Their arguments join a mounting global discussion of what the future of microfinance should entail. The sector founded on innovation has been characterized by change ever since – once comprised of primarily small-scale, subsidy-driven nonprofits, it is now dotted with an array of business models. The year 2007 marked a paradigm shift on the supply-end: Compartamos, a prominent Mexican non-government organization (NGO), became the first MFI to tap into capital markets for funds. Its initial public offering was oversubscribed thirteen times and generated over 450 million dollars in shareholder profits (Rosenberg 2007). Amid quarrels over the ethical purpose of the business, the market retains its diversity (Mordoch 2000); value propositions still range from "eliminating poverty" to exploiting the "fortune at the bottom of the pyramid" (Prahalad 2010).

As Mordoch outlines in "The Microfinance Schism," the current debate is one over how to balance the tradeoffs involved with maintaining a "double bottom line:" securing sustainability through scaling up and generating profits, while remaining true to the social mission that was once the lifeblood of the movement. While some argue that these goals are one in the same – that "by eventually eschewing subsidies and achieving financial sustainability, microfinance institutions will be able to grow without the constraints imposed by donor budgets... and in the process will be able to better serve the poor," others worry that the drive to generate revenue will lead to "mission drift" – an eventual eclipse of social intent in favor of making money, especially amongst for-profit MFIs. (Copestake 2007; Mersland 2010; Yunus 2011).

Recent events amplify the significance of this debate. In October 2010, news of over 54 suicides presumed to be microfinance-related (though still under investigation) made headlines worldwide (Microfinance Focus India). A month later, a report of over 100 cases of supposed client harassment by some of the most prominent MFIs in Andhra Pradesh, India was released by the society for the Elimination of Rural Poverty (Microfinance Focus India). In January 2011, Grameen Bank was accused of "siphoning off aid," and "pulling 'tricks' to avoid taxes" (Alam 2011). This gave way to a string of government investigations and a frenzy of media activity.

It was not long before debates turned political. Muhammad Yunus himself was summoned to federal court on charges of defamation after disagreeing with the country's Prime Minister, Sheikh Hasina (Alam 2011). He was later asked to resign from his position as chairman of the bank. In the for-profit sphere, SKS Microfinance in Hyderabad, Andhra Pradesh threatened to exit the market after the Indian government, amid concerns that a bubble of "subprime lending" and "over-indebted" borrowers was about to burst, ordered borrowers to stop repaying loans (Business Standard Mumbai). With nearly 2 billion dollars worth of unpaid loans outstanding, the industry crawled to a standstill.

New legislation was passed to regulate how loans are disbursed and payments collected, but strong opinions still exist on both sides. While industry leaders like Vikram Akula, chairperson of SKS, claim that "destroying microfinance would result in nothing less than financial apartheid," state officials accuse SKS and others of "making hyper profits off the poor," and allowing the most vulnerable and impoverished clients to fall into "debt traps" (Polgreen 2010).

Their concerns, however, are warranted by recent history. The Bolivian microfinance crisis of 1999, a predicament of borrower over-indebtedness, is in many ways similar to the crisis in Andhra Pradesh today. Competition between MFIs generated a push to offer larger loans to inexperienced clients, and a sudden influx of consumer lenders presented borrowers with the opportunity to take out multiple lines of credit. Too much spending led to inability to keep up on payments. Mushrooming debt led to borrower arrears, and pressure to repay was met by debt protests, hunger strikes, street marches (Rhyne 2004). This caught the attention of political radicals and contributed to the wave of popular unrest that ultimately subverted the Bolivian government.

Will the case of South Asia be similar? A major difference is that this time the opposition stems from government officials rather than independent protestors. Though perhaps a more stable arrangement, this may frustrate attempts by regulatory agencies like the Reserve Bank of India to negotiate a politically neutral resolution (Rhyne 2010).

No matter what the outcome, the fact that history repeats itself, that a large number of borrowers would become irreconcilably indebt at the same place and time, seems suggestive. Theoretically, microfinance restrains behaviors such as excessive risk taking and borrowing beyond sustainable means – behaviors that, when left unchecked, lead to over-indebtedness. Why then have large groups of microfinance borrowers in South Asia become over-indebted? Perhaps we should be skeptical of the degree to which the first generation of microfinance theory explains real world outcomes. Are there additional difficulties involved with lending to the poor – complications beyond the more prosaic obstacles such as asymmetric information and high transaction costs – that microfinance fails to address? Can the debt crisis be explained by a failure to deal with new challenges that have arisen?

Before we attempt to address these questions, we ask a simpler one: what accounts for differences in welfare outcomes amongst microfinance borrowers? This requires a second look at the first generation of theory

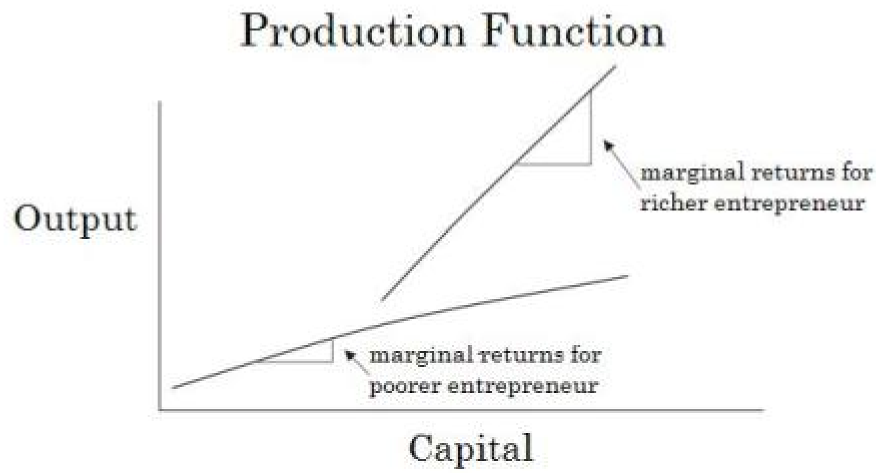
5 A Nuanced Model
The *Second* Generation of Theory

There are several strong assumptions made in the most basic theoretical explanations of why microfinance should lift the poor out of poverty. Most significant among those are the ideas that loaned funds will generate high returns and that clients have perfect knowledge of the financial standing and productive activities of their fellow group members. A second look at the viability of these assumptions grants a better understanding of outcomes that might seem puzzling at first glance.

5.1 High Returns for All?

At the core of the microfinance lending model stands the beliefs that investments made at low initial levels of capital will have high returns. However, several studies find that increasing interest rates drives poor clients out of the market (Woller 2002; Dehejia et al. 2005; Karlan and Zinman 2008). This suggests that borrower demand might be more elastic to changes in interest rate than what was once thought. An explanation for this phenomenon is based on the concept of returns to scale. If the production function is not actually perfectly convex, a relatively richer microentrepreneur could enjoy higher returns on investments.

The following figure illustrates what such a production function might look like (source: Morduch and Armendariz 2010).



Why might this be more realistic? Perhaps having more resources allows for investments that actually increase the returns on all previous investments (Mullainathan and Hanna). For example, a farmer that already owns land can invest in irrigation and better seeds or fertilizer, whereas a tenant farmer may use most of their loan on the land rental itself. Because equilibrium loan size is based on a social learning process – lenders increase the sizes of loans so long as borrowers repay – the very poor might never become profitable enough at low levels to reach the scale necessary to exploit the greater returns at higher levels. Those with more initial wealth might also have more of an opportunity to build a diversified stock of resources and investments (Mullainathan and Hanna). If this were true, we would expect the value of a borrowers assets at the time of a first loan to influence the outcome of their venture. Perhaps differences in initial condition account for divergence in outcomes.

5.2 "Microenterprise" or "Microconsumption?"

Another reason why borrower outcomes may differ is that oftentimes microloans are *not* used toward productive purposes. Those without private sector occupations are forced to generate their own odd jobs to make a living. They are entrepreneurs by default. However, using loaned funds for income smoothing or consumption implies betting on the future rather than borrowing against an ensured profit stream.

Because the life of the poor is inherently volatile, this sometimes means, as one Grameen borrower put it, "beshi takar beshi jala korn takar kam jala" (more trouble with more money and less trouble with less) (Sinha and Matin 1998). Although loans specified as for consumption purposes have been known to increase welfare outcomes in some cases, unless accompanied by savings and smart financial decision-making this arguably involves a much greater level of risk (Zeller 1999; Armendriz de Aghion and Morduch 2000; Karlan and Zinman 2009).

5.3 Perfect Information?

Another assumption – the idea that borrowers have perfect (or at least a high level of) information about the financial standing of their fellow group members – provides grounds for the peer-monitoring hypothesis. The theory seems reasonably applicable to a market with a single, monopolistic lender in which all borrowers are arranged in groups of similar "type." However, microfinance markets both at the aggregate and village level have grown astronomically over the past decade. The charts below provide statistics on the top five MFIs in Bangladesh in 1999 and 2009 (MIX Marketplace). We see that the gross loan portfolio of the top five MFIs grew 640 percent from 1999 to 2009 and the number of active borrowers increased 274 percent.

Growth in 5 Largest MFIs (1999-2009)

NAME	Gross Loan Portfolio	Number of Active Borrowers
YEAR: 1999		
BRAC	137,282,502	2,582,016
ASA	72,225,806	1,084,318
Proshika	56,383,187	981,056
Buro Bangladesh	3,329,208	49,282
MIDAS	2,181,623	237
Total:	271,402,326	4,696,909
YEAR: 2009		
Grameen	817,389,833	6,430,000
BRAC	636,298,086	6,241,328
ASA	456,298,852	4,000,401
Buro Bangladesh	58,761,326	577,057
ICF	40,864,900	317,068
Total:	2,009,613,197	17,565,854

source: MIX Market Database

Such high growth implies changing market dynamics. More often do MFIs "overlap," or work within the same geographical area, and more often are clients presented with a menu of options that includes different lenders and different contracts (Matin, CGAP Notebook). Through diversity and competition in the market might encourage efficiency and innovation, an increase in credit providers in the absence of a better information system such as a credit bureau generates even more asymmetric information (Mahmoud et al. 2009). Because the microfinance model continges on being able to overcome information barriers, market growth sometimes undermines the very mechanisms that made it viable in the first place.

As Mcintosh and Wydick (2002) and McIntosh et al. (2005) find, rising competition can lead to multiple-loan taking, which often results in a decline in repayment behavior over time. Because a decline in repayment over time implies a buildup of debt, the question of how to overcome increases in asymmetric information is pertinent when thinking about how to expand microlending programs.

6 Empirical Analysis

Although classic theory suggests that microfinance should improve welfare in general, a more critical examination of the assumptions suggests that outcomes might be more varied. If welfare outcomes do vary across different types of borrowers, what are the determinants of such variance?

6.1 Dataset

In 1994, the International Food Policy Research Center conducted an in-depth survey of 120 villages located across four districts in rural Bangladesh. Amongst those villages that had credit groups formed by the NGOs ASA, BRAC, and RDRS, 350 households were drawn randomly. In 2006-2007, the Chronic Poverty Research Center sponsored a follow-up survey of all 350 households. Data was collected on individual characteristics such as age, landholdings, and borrowing habits, and on regional attributes like weather and number of credit providers in each village. The stated goal was to analyze, among other things, "the effects of participation in credit programs on household resource allocation, income generation, and consumption."

Our objectives are to determine, in the context of this particular microfinance program, what factors affect welfare outcomes for participants, and, more specifically, what factors generate variance in outcomes (if significant variance exists).

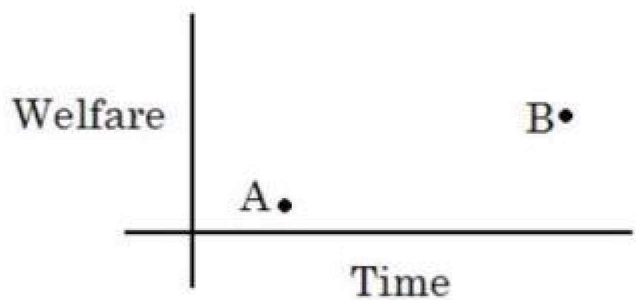
These objectives are motivated by questions of the viability of microlending theory. While some contend that the poorest borrowers have the greatest potential for growing their wealth – that inequality should decrease in time because of microlending programs others point to variance in outcomes as evidence of unsustainable borrowing and "debt traps" (Morduch 2010; Quisumbing and Baluch 2009). To compare outcomes across borrowers, we must first develop a parameter for measuring "welfare."

6.2 Measuring Welfare

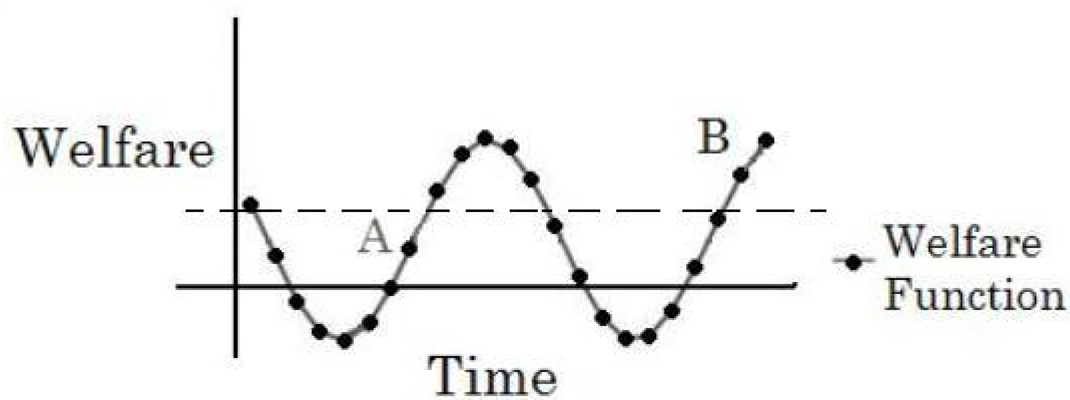
The notion of "welfare" may be difficult to quantify. Consider a very simple economic welfare function such as:

$$W_T = nonlandassets_T + landholdings_T + consumption_T + savings_T - debts_T$$

Given an individual's welfare at two points in time, say at point A and point B, a graph might look something like:



However, simply comparing points A and B by calculating the difference between the above welfare measure at each point might be misleading if we want to measure *true* changes in well-being. This is because our measure of welfare includes factors such as savings, debts, and consumption – stochastic flows that may fluctuate over time without any structural change in the underlying welfare function. Because the poor live in an environment that is inherently volatile, they may appear "richer" in one period without truly being better off. If a borrower's underlying welfare stream appears something like that in the following figure, we would like a way to measure how the borrower's underlying welfare changes over time. That is, measure changes in the slope of the dashed line.



To do this, we follow Baluch 2009 and take land accumulation over time as a signal of structural changes in borrower wealth. Why is this realistic proxy for an individual's *underlying* welfare? Land is a long-term investment. It is relatively expensive, transaction costs are high, returns may not come for months or years, and it is not easily sold. An increase in a persons landholdings over, say, a ten-year period, is thus a good indication of a rise in their general well-being. We now specify an empirical model to quantify this idea.

6.3 What determines welfare outcomes?

Given a detailed profile of borrower well-being at two points in time for a group of survey participants, we specify a model similar to that in Quisumbing and Baluch (2009):

$$\ln(L_{iT}) - \ln(L_{iB}) = \beta_0 + \beta_1 L_i + \beta_2 Li^2 + \beta_3 L_i^3 + \beta_4 L_i^4 + \Omega_i(L_i, K_i, I_i) \\ + \Phi_i(L_i, K_i, I_i) + \Lambda_i H_i + +\Gamma_i C_i + \varepsilon_{it}$$

Where the dependent variable is percent change in landholdings (the logged difference in landholdings from period 1 to period 2), L_{iB} represents landholdings at the baseline (1994), L_{iT} represents landholdings in the second observation period (2007), Ω_i is a vector of negative shocks such as illness, death, and flood damage, Φ_i is a vector of positive shocks including gift and remittance receipts, and Λ_i and Γ_i control for time invariant differences in household and community characteristics. In this survey, land is measured in decibels.[4]

More specifically, the continuous independent variables include: value of assets at the baseline[5], the proportion of people in the individual's village affected by floods (estimated), household age distribution, household size, and age of the household head. Discrete variables include dummies for whether received dowries or remittances, whether paid for a dowry or put on a wedding, and whether there was a death or serious illness in the family. I also include dummies for four out of the five thanas in the survey[6].

Regression results are found on the next page.

[4]To put this in perspective, 100 decibels is roughly equivalent to 1 acre

[5]Asset valuations are taken in taka, Bangladeshi currency. Note that 1 US dollar is roughly equivalent to 70 taka

[6]Bangladesh consists of seven administrative divisions which are divided into 64 districts, each of which is further subdivided into subdistricts called *thana*. The thanas included in this survey are Bahubal, Habigani; Trishal, Mymesingh; Saturia, Manikgan; Rajarhat, Kurigram; and Ulipur, Kurigram. In the regression I omit the dummy for Ulipur.

DETERMINANTS OF WELFARE OUTCOMES

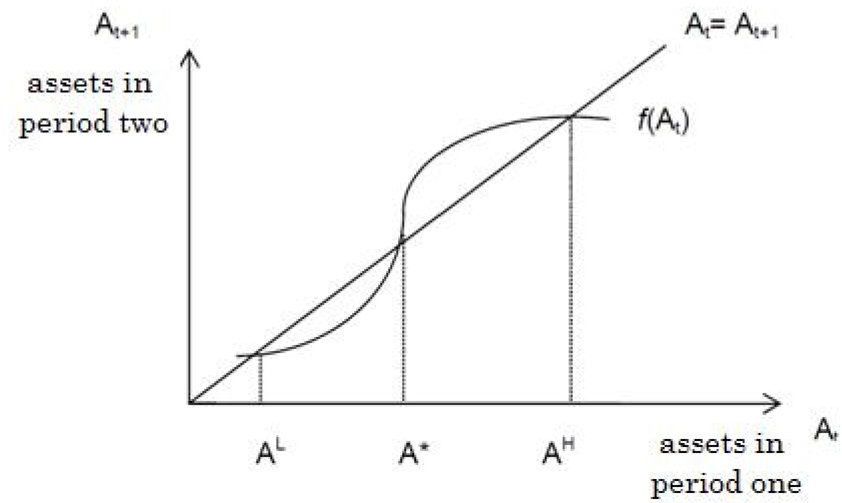
	Perc. Change in Landholdings	Std. Err.
LAND AND ASSETS		
Landholdings 1994	-0.159***	0.011
(Landholdings 1994)^2	0.00001***	0.0001
(Landholdings 1994)^3	-2.04e–06***	2.72e–07
(Landholdings 1994)^4	2.9659***	0.9307
Assets at baseline	0.007***	.0005
IDIOSYNCRATIC SHOCKS		
Received dowry or remittances?	0.4709	0.8904
Wedding or dowry expenses?	0.7956	0.1786
Any death or serious illness	-0.3426	0.9307
COVARIATE SHOCKS		
Porp affected by floods (1998)	-0.3506	0.2504
Porp affected by floods (2004)	0.7956	0.1786
HOUSEHOLD CHARACTERISTICS		
Porp males age 0-4	-1.004*	1.1388
Porp males age 5-15	-0.8047	1.691
Porp females age 0-4	-1.3139	1.6916
Porp females age 5-15	0.074	0.2019
Household size	0.2109***	0.0805
Age of household head	0.139**	0.0831
(Age of household head)^2	-0.0012**	0.0089
THANA DUMMIES		
Bahubal, Habigani	0.1298	0.6046
Trishal, Mymesingh	0.8781	0.6017
Saturia, Manikgan	0.3352	0.5864
Rajarhat, Kurigram	0.497	0.0831
Constant	-1.093	2.0026
Adjusted R^2	.43	
Number of observations	349	

*significant at 90% level, **significant at 95% level, *** significant at 99% level.

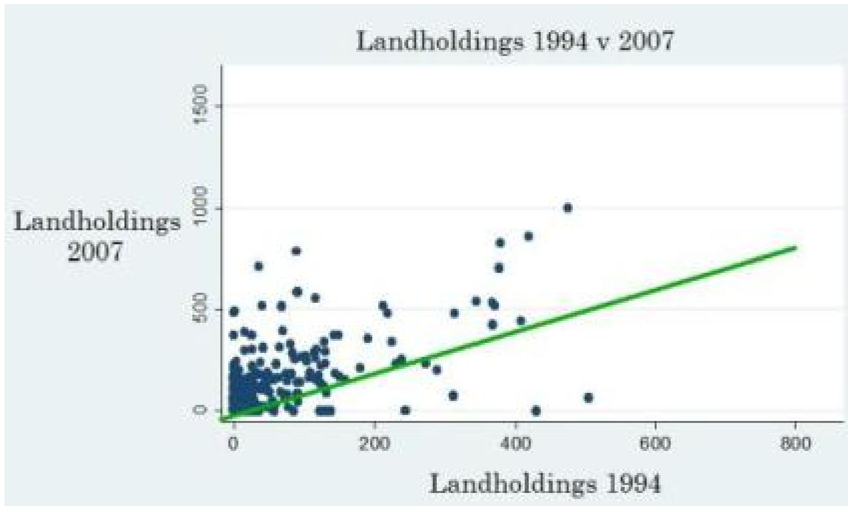
We see that land and assets held at the baseline, among other factors, are significant predictors of how fast an individuals wealth grows over time. It appears that *on average*, those participants who own less at the baseline are able to grow their landholdings at a faster rate than those who initially had more. This is suggestive of convergence in welfare.

To formally check whether inequality increased or decreased from 1994–2007, we must look at the coefficients on the baseline landholdings terms. If there were convergence, we would reject $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$ in favor of -2 $\leq \beta_1 \leq 0$ and $\beta_2 = \beta_3 = \beta_4 = 0$. This would imply that the less wealthy households landholdings grow fastest, but that this effect slows down at a certain threshold of wealth. This appears to be true in our sample – on *average*, inequality does seem to decrease.

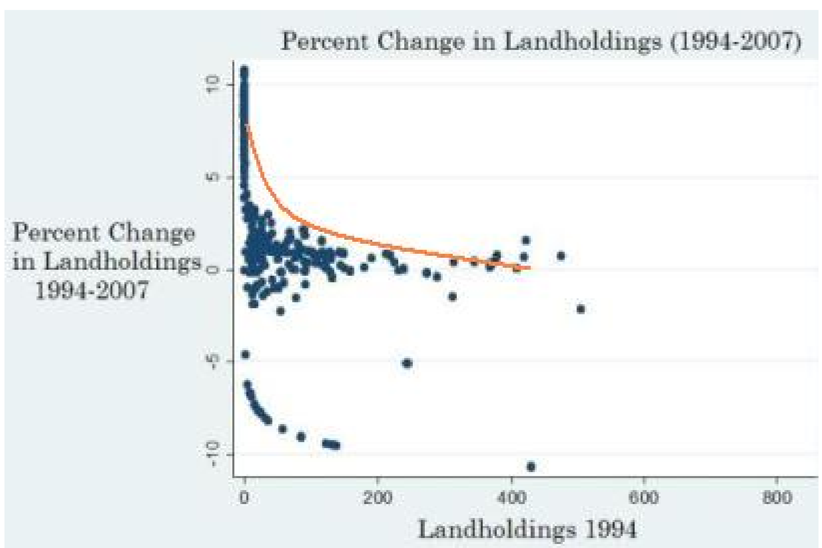
We now verify this graphically. If there were a "poverty trap" – that is, if the very poor tend to become poorer over time while the less poor are better able to grow their wealth, some argue that a plot of landholdings at the baseline verses landholdings later on might look something like the following figure (source: Carter and Barrett 2006). Here, individuals with initial landholdings below the threshold, A*, lose land over time, while those initially above A* gain land.



Comparing our data (plotted on the following page) to the figure to this theory seems to suggest that there is no "poverty trap" present in our sample.

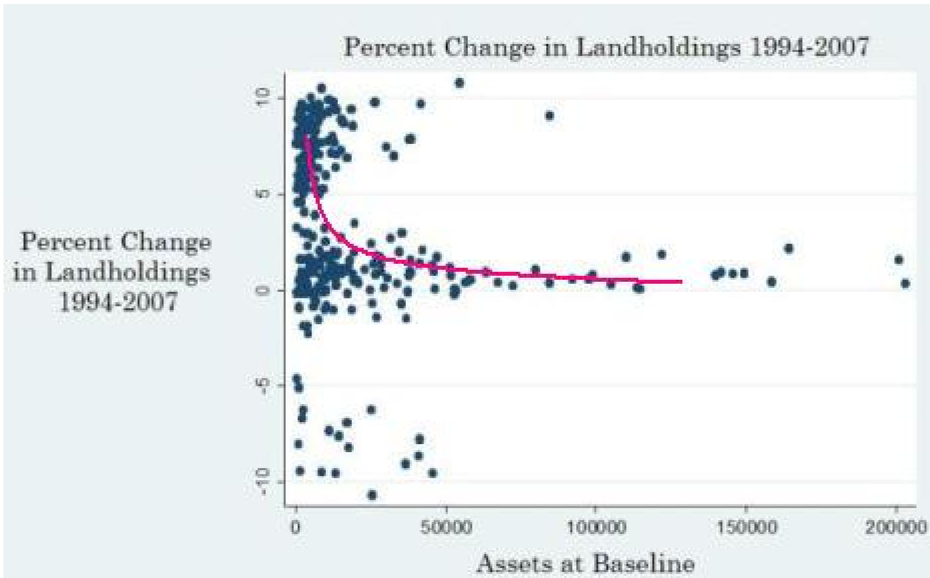


We observe that most participants *gain* land over the course of the 13 years accounted for in the survey; most points lie above the 45 degree line. However, there is a good deal of noise in our scatter plot at lower levels of landholding. To get a better picture of how participants at these levels fared, I include another plot: percent change in landholdings (the dependent variable) vs. landholdings at the baseline.



It appears that even though *on average* poorer participants grew their landholdings at a faster rate, there is more variance in the welfare outcomes of those initially at lower levels of wealth.

We see that the same effect holds when we plot: percent change in landholdings (the dependent variable) vs. value of assets at the baseline.



This relationship seems curious. If we look at average rate of growth in wealth (proxied by percent change in landholdings), represented by a best-fit line, it appears that the initially poor (had less land and assets at the baseline) are able to grow their wealth at a faster rate than their more affluent counterparts are. However, simply taking averages masks the risk factor: the initially poor are also far more likely to experience a *decline* in wealth. When comparing welfare outcomes between different groups, variance of welfare growth rates is also a significant factor to consider.

6.4 What determines variance in welfare outcomes?

If certain factors make some borrowers more prone to variable welfare outcomes, this may have significant implications for a social planner. I now specify another model to determine what accounts for variance in outcomes.

Similar to the previous model, we have:

$$\begin{aligned} Variance \;=\; &\beta_0 \;+\; \beta_1 L_i \;+\; \beta_2 Li^2 \;+\; \beta_3 L_i^3 \;+\; \beta_4 L_i^4 \;+\; \Omega_i(L_i, K_i, I_i) \\ &+\; \Phi_i(L_i, K_i, I_i) \;+\; \Lambda_i H_i \;+\; +\Gamma_i C_i \;+\; \varepsilon_{it} \end{aligned}$$

Where *Variance* is a measure of deviation from the mean percentage change in landholdings. Iindependent variables are the same as those in the previous regression except for one: number of non-NGO credit suppliers.

$$Variance \;=\; \sqrt{([ln(L_{iT}) - ln(L_{iB})] - mean[ln(L_{iT}) - ln(L_{iB})])^2}$$

DETERMINANTS OF VARIANCE: PERCENT CHANGE IN LANDHOLDINGS (1994-2007)

	Variance in Perc. Change	Std. Err.	Variance in Perc. Change	Std. Err.
LAND AND ASSETS				
Landholdings 1994	-0.0291***	0.0074	-0.0299***	0.0075
$(\text{Landholdings 1994})^2$	0.0002***	0.0001	0.0002***	0.0001
$(\text{Landholdings 1994})^3$	-5.09e–07**	1.80e–07	-4.18e–07**	1.79e–07
$(\text{Landholdings 1994})^4$	3.24e–10**	1.28e–10	2.55e–10**	1.27e–10
Assets at baseline	-7.21e–06***	3.73e–06	-7.44e–06***	3.68e–06
IDIOSYNCRATIC SHOCKS				
Received dowry or remittances?	-0.1842	0.6081	-0.1745	0.6501
Wedding or dowry expenses?	0.0654	0.1188	0.0635	0.1117
Any death or serious illness	-0.1582	0.2366	-0.3086	0.3061
COVARIATE SHOCKS				
Porp affected by floods (1998)	0.2121	0.8874	0.1687	0.8783
Porp affected by floods (2004)	0.3446	0.9987	0.3449	0.9888
Number of non-NGO creditors	–	–	0.04567**	0.0129
HOUSEHOLD CHARACTERISTICS				
Porp males age 0-4	0.2761	0.3432	0.2709	0.3376
Porp males age 5-15	0.126	0.1397	0.0019	0.7419
Porp females age 0-4	1.2342	1.1559	1.2449	1.1464
Porp females age 5-15	0.1261	0.1397	0.1258	0.1383
Age of household head	-0.0056	0.0094	-0.0057	0.0093
Household size	.00457	.0538	.00895	.0531
THANA DUMMIES				
Bahubal, Habigani	(Omitted)	–	–	–
Trishal, Mymesingh	-.0767	.3335	–	–
Saturia, Manikgan	-.2359	.3115	–	–
Rajarhat, Kurigram	-.0547	.3108	–	
Constant	4.2478***	0.4821	4.2394	0.4455***
Adjusted R^2	.0361		.0437	
Number of observations	326	326	326	326

*significant at 90% level, **significant at 95% level, *** significant at 99% level.

Looking at the results, we observe that initial wealth-level significantly predicts *variance* in outcome. Although the R^2 is very small, the coefficients are still significant. We see that the *more* land and assets a participant owns at the baseline, the *less* likely it is that their wealth will fluctuate wildly in *either* direction.

Another perhaps surprising result is the effect that the number of non-NGO credit suppliers has on variance[7]. We see that an increase in non-NGO credit suppliers *increases* the average amount of variance in outcomes. We revisit this result in a subsequent section. First, we discuss the relationship between microfinance and variance in welfare outcomes.

A Concessionary Note
Interpreting what a difference in percent change in landholdings means with respect to an individual's well-being may well be a matter of opinion. For example, the loss of 50 decibels of land might be more detrimental to a person who had 50, rather than 200, to begin with. This greater significance will be reflected in a measure such as percent change. On the other hand, if the same two individuals gain 100 decibels of land, does the one who was initially poorer benefit 150% more? The individual may have gained more, relatively speaking, but in this case *tota*l change might influence welfare more than *percent* change. Because our measure of comparative wealth gain only accounts for percentage change, it is imperfect (though still informative).

6.5 Microfinance and Variance

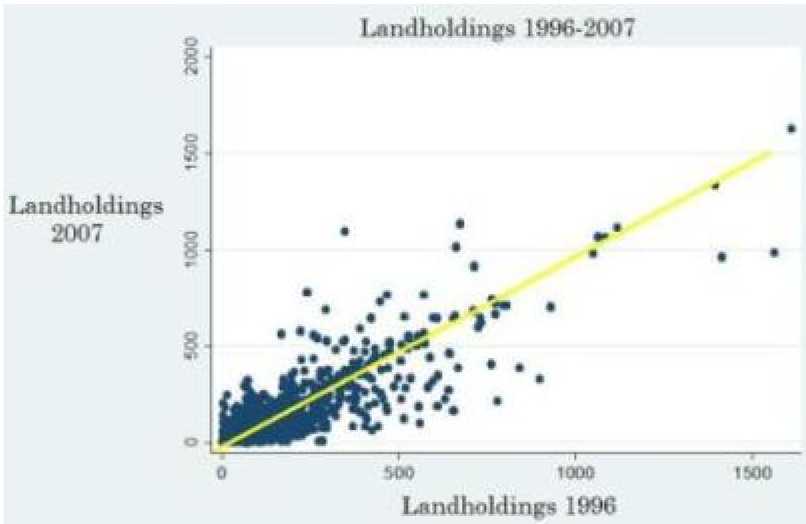
Microfinance is acclaimed for its supposed ability to improve economic well-being by providing a cushion for handling negative shocks and exploiting market opportunities. We found that amongst participants in a microfinance program, initial wealth-level significantly predicts wealth growth rate, and that although inequality decreased on average, there was higher variance in the outcomes of those poorest at the baseline.

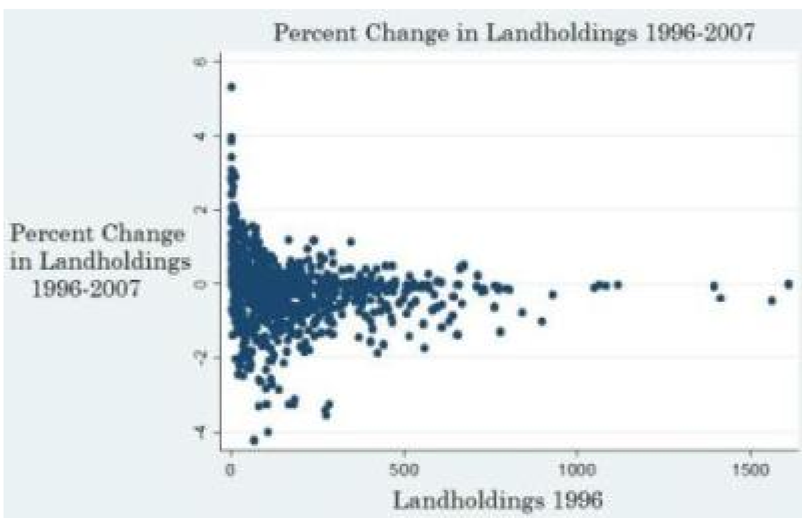
These results, however do not speak to the affect that the microfinance program *itself* had on variance in welfare. Ideally, we could measure the direct affect of microfinance on welfare by selecting two populations that are otherwise identical, giving only one the program, and comparing the result. The author of this paper, however, could not obtain a microloan to fund such a study and thus must be content to observe a program in its natural (and hence more complicated) state. This introduces additional concerns. Perhaps individuals who would grow their wealth regardless of their participation in a formal program are also those more likely to get involved with one. Perhaps variance in welfare outcomes would have been even greater had the microfinance program not existed.

For the sake of comparison, however, I plot the same data for a similar population – individuals living in neighboring villages who took part in the same

[7]The term *non-NGO* credit supplier in this context refers to *informal* creditors such as village moneylenders, shopkeepers, and relatives, etc

survey (conducted by the Chronic Poverty Research Center), but were instead part of a "Cash for Education" program that went on from 1996-2007.





It seems that general welfare increased by a *smaller* margin for these individuals in comparison to those who participated in the microfinance program. We also see that, again, there is higher variance in the outcomes of those poorest at the baseline.

This general result is not surprising. Living on the edge makes life inherently more variable as there is less room to cushion unfortunate events. Since the poor simply have less to begin with, small income or asset shocks will be more detrimental to their financial well-being, and will be reflected as having greater magnitude when using a measure such as percentage change.

Coventionally it is assumed that making credit more available to the extreme poor will ameliorate some of the affects of living in such a volatile environment. As outlined earlier, the benefits to having formal credit include greater reliability, lower interest rates, and more opportunities to gain the tools needed to unleash latent productive capabilities. However, the fact that variance in welfare outcomes still exists begs the question: why have participants in a *long term* program not yet lifted themselves out of their initial precarious position? Is there something inherent to the microfinance model inhibiting it from living up to its "potential" as a possible "solution" to poverty?

7 Variance and Indebtedness: A Signaling Model

In the second regression we saw that increasing the number of credit suppliers generates *more* variance in welfare outcomes. To some, this is was expected.

Sinha and Matin (1998) suggest that the rapid expansion in rural credit markets may undermine the mechanisms that made it viable in the first place. When growth in the number of clients served outpaces growth in capacity, an MFIs ability to screen loan applicants and the group member's ability to monitor borrowers is reduced.

Sinha and Matin point out that "there is no built-in mechanism in the present state of the lending technology that distinguishes between borrowers who continuously cross-finance to manage repayment and those borrowing across sectors to manage short-term liquidity problems." In many cases, "repayment of the previous loan is the only criterion for assessing both the ability and the willingness of the borrower to repay." This implies that clients who take on extra debt at an unsustainable rate to repay past loans are observationally equivalent to those who borrow in moderation to smooth their income: in the end, both repay.

However, this information problem could arguably lead to debt traps and increasing delinquency over time. I now outline a possible situations in which this may be true.

7.1 Equilibrium? Signaling Amongst Borrowers, Group Members, and Lenders

We saw previously how the group-lending model can generate a socially efficient equilibrium. In any period, some group members will be prosperous and others, struggling, but homogeneity within groups implies that members are similarly risky and thus will run into hardship at equal rates over the long run. In equilibrium, cross-compensations even out over time and borrowers share repayment duties with the expectation that favors will be returned. Due to the aggregating effect of joint liability, the groups total income is smooth.

However, even if the self-selection process guarantees homogeneity in borrower risk type at the groups inception, unforeseen events may shift this equilibrium. Group members likely believe that small fluctuations in a borrowers ability to repay are simply by-products of living in poverty – not an indication of a change in the borrowers *underlying* risk level. Equilibrium holds as long as group members believe they are of homogenous risk levels – it is only then that borrowers are willing to partner with and cover for each other over the long term [8]

But even if we assume group members are perfectly knowledgeable of each other's risk levels, exogenous factors such as civic unrest, natural disaster, famine, and disease could wholly change the probability that a borrower is able to repay. These factors are largely unpredictable, even for a person familiar with the environment. For this reason, assuming that a borrower's risk level remains relatively constant throughout the course of a loan contract might be unreasonable. Until now, we have assumed that borrower type is a static characteristic. We have allowed for small fluctuations in ability to repay, but assumed that once a borrower is selected into a *safe* group, they remain *safe* throughout the course of the loan.

It may instead be more realistic to assume that borrower predictions will likely be less than perfect over the long run. What happens when the unpredictable occurs? We now extend our analysis to allow for changes in borrower type.

Imagine that a borrower has just been struck by an income shock. Although group members initially attribute the shock to normal noise in the borrowers income stream, there is some uncertainty about their ability to repay in the future. When deciding whether to partner with the individual in future loan cycles, group members look for a signal that the shock was not detrimental – that the borrower will be a *safe* type in future periods.

If a borrower expects to recover quickly, they might simply rely on joint-liability to cover in the short run. If, however, the individual is uncertain about their financial future, they have a decision to make: find a means of repaying in the meantime or default. Regardless of what a borrower forsees to be their financial future, the group interprets immediate repayment as a signal that the borrower expects to be a *safe* bet in the future.

[8]The group only wants to keep a struggling borrower around when they receive the next loan if they believe that borrower will continue to be a safe risk (i.e. maintain a certain repayment rate over the long run). This is because in a progressive lending scheme, loan size increases over time. If a partner defaults at a higher dollar amount, the group must pay a larger price to cover for them. It is thus more costly to be paired with a risky type as time goes on.

There are thus four possible cases for an individual who cannot repay without taking on additional debt.[9]

1. An individual who is now truly a *risky* type defaults (signals *risky*).
   Their net benefit function is: $NB_R(R) = B(R) - C_R(R)$
(Net benefit to *risky* type of signaling *risky* equals the benefit of signaling *risky* minus the cost – specific to a *risky* type – of signaling *risky*).

2. An individual who is now truly a *risky* type repays (signals *safe*).
   $NB_R(s) = B(S) - C_R(S)$

3. An individual who is still truly a *safe* type defaults (signals *risky*).
   $NB_S(R) = B(R) - C_S(R)$

4. An individual who is still truly a *safe* type defaults (signals *safe*).
   $NB_S(S) = B(S) - C_S(S)$

In order for a separating equilibrium to be disrupted, *risky* types must be better off signaling *safe* (or vice versa). The first generation of theory concludes that in a group lending model, a separating equilibrium will always hold. A changing market dynamic, however, may be the cause of perpetuating *disequilibrium*.

First, imitation may be seen as desirable. The social ties that hold group members jointly accountable might also prevent them from abandoning each other in a credit agreement. Borrowers report that social pressure to repay is one of their greatest stressors (Sinha and Matin 1998). Perhaps as microfinance is expanded, enlarged, and commercialized, these stakes are raised. As more money flows into the sector, there is more pressure for borrowers to take on larger loans – loans perhaps too large for them to handle – but social pressure necessitates that they still repay, even by means unfavorable to longer run well-being. Additionally, expanding the market to the poorest borrowers means picking up the least financially literate segments of the population. Perhaps behavioral biases such as "hyperbolic discounting" also exacerbate this effect (Mullainathan 2010).

Second, imitation is becoming more and more possible. As more lenders enter the market for credit, it becomes more difficult to distinguish between borrowers who are "cross-financing," getting loans to repay loans and thus borrowing at an unsustainable rate, from those who are truly credible.

[9]Note that the conditions I outline here are identical to those which characterize Spence's 1973 job market signaling model.
1) $C_R(R_S) > C_S(R_S)$: It is more costly for a *risky* type signal *safe* (maintain a high enough repayment rate that their group believe so) because they are likely to have to rely more heavily on outside funds to supplement their income.
2) As the threshold level of "good enough" repayment behavior (to be considered *safe*) rises, it becomes more costly for *all borrowers* to signal *safe*. This is because a higher rate of repayment necessitates a higher level of financial stability (or more outside loans).
3) Equilibrium will be disrupted if $B(R) - C_R(R) < B(S) - C_R(S)$; *risky* types find it more beneficial to signal *safe*.

7.2 Signaling and Variance

The idea of imitation, or false signaling, is one explanation for why an increase in credit suppliers might increase variance in welfare outcomes. More credit providers means additional opportunities available for the *truly credible* to obtain credit, but the additional layers of asymmetric information this also adds implies more opportunities for the *truly risky* to take on unsustainable debt. If imitation is feasible and a state of disequilibrium perpetuates, this may become evident over time: truly *safe* individuals will reap the benefits of their long term investments, while those who borrowed beyond their means will suffer the repercussions of actions that might have only a time-delayed affect on welfare.

If these effects dominate – if *risky* types *do* often signal *safe*, then it is not surprising that we find higher variances in the long run welfare outcomes of the very poor, even amongst those exposed to the supposed benefits of microfinance for many years.

8 Conclusion

This paper utilized an in-depth survey of participants in a microfinance program based in Bangladesh to first analyze the determinants of welfare outcomes, and then to determine which specific factors are linked with high variances in welfare outcomes. I found that for this particular population, initial wealth-level significantly predicts wealth growth rate, and that although inequality decreased on average, there was higher variance in the outcomes of those poorest at the baseline. This implies that first generation of microfinance theory does well to explain the movement in its early years, but that the sector in its present state is better described by more nuanced models.

We now return to the original question. Does microfinance live up to the hype that characterized its early years? Does it hold the potential to alleviate poverty, or have enthusiasts simply given it *too much credit*? The answer is now quite obvious: *it varies.*

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