Micro-Credit and Income: A Literature Review and Meta-analysis

by

Maia Yang

T.D. Stanley*

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Abstract:

We review and meta-analyze the research literature of the income effect from participating in an micro-credit program, such as the Grameen Bank. Two recent systematic reviews of microfinance have failed to find positive impacts from micro-lending (Duvendack et al., 2011; Stewart et al., 2012). Our meta-analysis begins with all studies identified by either of these two systematic review. From these, we identified eighteen comparable estimates of the income effect of micro-credit on participant income. To calculate a comparable measure of effect (a partial correlation coefficient), the study needed to report the t-value of the income effect (or equivalent) and the sample size used to calculate it. When converted to partial correlation coefficients, none of these individual effects are sufficiently large to be regarded as practically significant or meaningful. Although the average partial correlation coefficient is statistically positive (p<.001), we identify likely publication selection bias for positive effects (p<.05). When this potential publication selection bias is accommodated, no evidence of an income effect remains. We find no defensible evidence of a meaningfully positive, policy-relevant, income effect arising from micro-lending. As a result, our meta-analysis echoes the conclusions of recent systematic reviews of microfinance.

*Department of Economics and Business, Hendrix College, Conway, AR 72032, USA

Stanley@hendrix.edu

I. Introduction

The modern concept of microfinance started in the 70's when Muhammad Yunus began Grameen Bank, an institution that has both been the spark and the model for many other institutions. Yet, since its inception, many have begun to criticize whether or not microfinance is actually succeeding in accomplishing the goals it has said it would achieve. Micro-finance institutions (MFIs) claim to give the poor a way to help raise themselves out of poverty by simply providing them with capital they may otherwise have not been able to procure. In addition, many institutions claim to be a powerful tool for empowering women. This goal has also been brought into question.

The following paper seeks to assess microfinance through a small literature review and meta-analysis of fourteen papers. The meta-analysis specifically looks at whether or not there have been any positive effects on income from micro-credit. It also looks at whether there are any positive effects from MFIs providing, in addition to microfinance, business education classes with the thought that such classes may assist in helping borrowers use their loans for income increasing ventures. The structure of the paper is as follows: section II provides a history of microfinance, section III gives a background on current lending methodologies, section IV gives the methodology for the articles chosen for the literature review and small meta-analysis, section V provides criticisms of microfinance, section VI explains the meta-analysis and its results, section VII provides policy implications, and section VIII concludes.

II. History of Microfinance

The concept of micro-lending has been around for quite some time. Brandt, Epifanova, and Klepikova claim that documentation of loans being made out to the poor have been cited in Europe since the 18th century (Brandt et al., 2012). They highlight several examples. For one, Jonathan Swift created a fund to provide "poor industrious tradesmen" money "in small sums of five, and ten pounds, to be repaid weekly, at two or four shillings, without interest" (Brandt et al., 2012, p. 1). Another was the Irish Reproductive Loan Fund Institution that began in 1822 to assist the poor by providing them with small loans under 10 Euros in modern terms. In addition, 19th century German credit cooperatives highlight

another example of historical microfinance. These cooperatives acted as the modern micro-credit self-help group in which the whole cooperative was provided a loan, and they were communally responsible for its repayment (Brandt, et al., 2012, pp. 1-2). Lastly, Wolcott (2009, pp. 1-2) also discusses an early example of microfinance in which very small loans were made to people in need without the requirement of collateral in colonial India. Indeed, micro-credit is not a new trend.

It was in the 70s that microfinance became a "modern" phenomenon. The modern concept of microfinance is often championed by Muhammad Yunus, a native Bangladeshi educated in the United States who later became a professor at Chittagong University in Bangladesh. In 1974, the beginnings of the now famous Grameen Bank occurred when Yunus lent a small amount of money from his own pocket to a crafts woman he trusted to repay him. Since then, Grameen Bank has garnered a lot of international attention, winning Yunus a Nobel Peace Prize in 2006 (Yunus, 2003). Grameen and the many institutions that have modeled its system claim to not only be a powerful source for alleviating poverty, but many MFIs also claim to empower women, even in traditionally patriarchal societies such as Bangladesh. These institutions assert that they are providing individuals with useful capital at interest rates that are not exorbitant, unlike the informal lenders within these developing nations.

> The poor tend to have limited access to services from formal financial institutions in less developed countries due to, for example (i) the lack of physical collateral; (ii) the cumbersome procedure to start transactions with formal banks, which would discourage those without education from approaching the banks; and (iii) lack of supply of credit in the rural areas related to urban biased banking networks and credit allocations (Imai and Azam, 2010, p.2).

There seems to be a lack of access to capital for poor individuals in developing nations, and microfinance claims to be assisting in reversing this problem. However, "while anecdotes and other inspiring stories… purported to show that microfinance can make a real difference in the lives of those served, rigorous quantitative evidence on the nature, magnitude and balance of microfinance impact is still scarce and inconclusive" (Duvendack et al., 2011, p.2).

It is also important to note that microfinance began by giving only micro-credit to individuals. Since then, the financial toolbox of microfinance institutions has expanded. A 2012 systematic review, funded by UK's Department for International Development (DFID), analyzed these expansions by not only studying micro-credit, but micro-savings and micro-leasing (Stewart et al., 2012). In addition to these microfinance instruments, some institutions also provide micro-insurance, and non-financial programs that assist in social development such as business and financial literacy training (Duvendack et al., 2011).

III. Current Lending Programs

Although microfinance is widely considered to be a great success, it has garnered some criticisms. To place these criticisms in context, MFIs (microfinance institutions) can be divided into individual lending programs and group lending programs (Brandt et al., 2012, p.2).

Individual lending programs are normally offered by commercial institutions. After a thorough check of the client's financial status is conducted, a borrower is either given a loan or declined. Collateral and co-signers are required from the borrower. This model seems to work better for those who are not considered the poorest of the poor and has been most successful for MFIs working in urban populations (Brandt et al., 2012, p.2).

The second broad type of loaning model is the group lending model in which loans are dispersed to a group of borrowers who then guarantee each other's loan. Group borrowing can be further divided into two types of programs: solidarity groups and community-based organizations (CBOs). The difference lies within the future relationship between the lending institution and the group. "CBO approaches have as a primary goal the eventual independence of the borrower group from the lending body. To this end, the lending body encourages the development of the internal financial management capacity of the group, so that the group can act as its own mini-bank" (Brandt et al., 2012, p.5). In contrast, solidarity groups are "those programs that do not anticipate the eventual graduation of the borrower group from the lending institution" (Brandt et al., 2012, p.5).

Another structure that many MFIs operate under is the goal of empowering women by targeting female borrowers. In many places, this is in direct opposition to the patriarchal culture that resides in these countries. In Bangladesh, according to religious law, women are not allowed to handle money, yet this was one of the exact reasons Yunus (2003) decided that his institution should set the goal of having at least half of its borrowers be female.

In many countries, women still face high levels of discrimination. This means they tend to suffer more when environmental or economic downturns hit. To illustrate this discrimination, two examples within Bangladesh and Africa are relevant. Yunus (2003) cites many examples of Bangladesh's patriarchal culture causing the suffering of poor women to be more severe. When food sources are scarce, women and children tend to be those that have less to eat. And, there are many examples of women being left behind to fend for themselves and take care of their children after their husbands have run off. Financially, women are often seen as burdens in Bangladesh because the practice of dowry forces families to pay for their female offspring to get married. To counter this notion that women are a financial drain, the Grameen Bank borrowers must agree to abolish the practice of dowry before receiving a loan (Yunus, 2003).

Another example of why MFIs often target women can be seen in sub-saharan Africa. Africa highlights yet another dimension in which women struggle: HIV related issues. "(I)n sub-Saharan Africa, young people aged 15-24 carry the burden of HIV infections with half of all new infections among this age group. Young women are particularly affected; … girls aged 15-24 are more than three times as likely to be infected compared to their male peers" (Erulkar and Chong, 2005, p.1). Erulkar and Chong (2005) further suggest reasons for this rate of HIV infections among females. "In the 1998 Demographic and Health Survey for Kenya (KDHS), 21 percent of Kenyan girls reported that they had traded sex for money or gifts in the last year" (Erulkar and Chong, 2005, p.1). In countries where women are more financially vulnerable, economic incentives to trade sex in order to survive have been cited

as a likely cause for such high HIV rates among young girls, providing yet another reason why the empowerment of women is one of MFIs main social goals.

IV. Methodology for Articles Chosen For Literature Review and Meta-analysis

The articles chosen for this paper were selected based off of two separate systematic reviews, one published in 2011 (Duvendack et al., 2011) and the other in 2012 (Stewart et al., 2012). Both claim to have evaluated all relevant research on microfinance up to that date. The systematic reviews use "a replicable, rigorous, and structured approach to identifying, selecting and synthesizing good quality relevant evidence on any given topic" (Stewart et al., 2012). These two systematic reviews conducted their own search to identify every article or paper published on microfinance and then analyzed them according to the comprehensiveness and quality of the research. We believe the articles chosen for this paper to be the best, most-comprehensive research to date given they have already been selected by these systematic reviews. For our research, we have chosen to focus on the impact of micro-credit on income. Not only does income seem the most rational way to measure MFIs' impact on their clients, but also the largest number of studies use income as an outcome measure.

The 2011 systematic review not only measured how accurate and valid the current literature on microfinance is, but it also measured the outcomes of the institutions published in the literature. Duvendack et al. (2011) followed rigorous methods for both identifying and summarizing relevant studies. Each study was evaluated on relevancy and comprehensiveness.

> We search eleven academic databases, four microfinance aggregator and eight non-governmental (NGO) or aid organization websites. We also consult bibliographies of reviewed books, journal articles, PhDs, and grey literature.... We screen articles in two further stages, reducing 2,643 items to 58, which we examine in detail. In addition, we classify the research designs used in microfinance impact evaluations into five broad categories; in descending order of internal validity- randomized control trials (RCTs), pipeline designs, with/without comparisons (in panel or cross-section form), natural experiments and general purpose surveys. These five categories of statistical methods of analysis, which in descending order of internal validity are two-stage instrumental variables methods (IV) and propensity score matching (PSM),

multivariate (control function) and tabulation methods. (Duvendack et al., 2011, p.2-3).

To narrow down these 2,643 items to 58, the review adopted a heuristic screening approach, scoring papers based on their research design and then developing a cut off number in which those that were assessed as not rigorous enough were thrown out (Duvendack et al, 2011, p.35)

The following are the reviews results. They conclude that the vast majority of articles on microfinance to date are methodologically weak and have insufficient data. Because of this, it is difficult to truly assess the reliability of the impact estimates. The review did conclude, however, that there was no evidence for a beneficial impact on women and the studies that did find such positive impacts were weak in their research design (Duvendack et al., 2011, pg. 3-4).

The 2012 systematic review, also reviewed articles for their robustness and measured impacts on clients specifically regarding micro-leasing, micro-credit, and micro-savings. Stewart et al. (2012) attempted to identify whether or not clients engaged in economic opportunities and whether there were impacts on the clients in terms of returns to capital, effects on capital stock, effects on profit, effects on fixed asset investment, effects on income, expenditure and accumulation of assets (Stewart et al., 2012, pg. 1-2).

Stewart et al. (2012) found over 14,000 citations on microfinance that were assessed for inclusion or exclusion for the review. From these, based on relevancy, the citations were narrowed down to 84 studies and then further narrowed down to only 17. These 17 were chosen to be included in the review as they were identified as robust enough by the review's criteria, which championed randomized control trials (RCTs) as the most rigorous, hence valid, experimental design.

Overall, this survey does not find any evidence that suggests microfinance has a large impact on either poverty or women's empowerment. Stewart et al. (2012) suggests that

micro-credit makes some clients richer, while others poorer. This 2012 systematic review concludes, "There is less risk if services are targeted at those who already have some financial security, such as savings… which will allow them to make loan repayments even if their businesses do not generate a profit immediately" (Stewart et al., 2012, p.105). The only positive result that these reviewers found was that micro-savings had a relatively positive result on clients without causing greater harm to them. In terms of whether or not there are benefits for women in microfinance, there was no evidence found that concluded whether institutions solely targeting women was beneficial or not. This review also concluded that more research of the effects of microfinance should be conducted.

From those studies included in either of these two systematic reviews, which passed these reviewers' quality criteria, I identified 15 that claimed to identify impacts of micro-credit on income. From these 15, one fell out as it looked at the impact of micro-savings on income instead of micro-credit.

V. Criticisms of Microfinance

Despite the abundance of success stories, MFIs have also received much criticism. In response, these institutions and other national organizations have rather recently funded field research to see whether microfinance institutions are meeting their goals. Nonetheless, three broad criticisms remain.

First, one general claim is that no acceptable way has been found to measure or evaluate whether or not MFIs meet their social goals. As a result, MFIs may focus on easily measured financial outcomes. Many institutions operate under a sort of double bottom line in which financial goals for sustainability must be achieved before the MFI can even begin to investigate whether their social goals are being met. This double bottom line is suggested to lead to trade-offs between the social and financial goals of each institution (Copestake et al., 2005). This tension between financial goals and social goals also has other negative effects. Institutions that measure the "success" of loans by repayment rates are ignoring the important issues of whether these loans are socially of financially benefitting women.

In particular, it has been argued that the poorest of the poor use their loans to meet their basic needs first instead of investing in a business or other self-employment that may increase their income and bring them out of poverty. Even if these loans are being repaid, this does not guarantee that the loan has been used in a manner that reduces poverty. In fact, they may repay one loan by going further into debt with another. When the poorest of the poor are still hungry, it is less likely that they will use their loans for productive purposes such as investing in a business. As a result, giving loans to the poorest of the poor could cause more harm than good as the accumulated debt that must be repaid would lead this already poor individual into further destitution and creating a possible cycle of debt. Stewart et al. (2012) conclude their systematic review with the sentiment that caution must be taken in regards to micro-credit, stating, "As with all credit products, there is a need for caution given the potential for both good and harm to clients. In particular, because micro-credit makes some people poorer and not richer, there is an imperative to be particularly cautious when serving the poorest of the poor" (Stewart et al., 2012, p.105). Indeed, the absence of a clear monitoring system for MFIs' social goals has been one common source of microfinance criticism.

To fill this gap, dozens of studies have attempted to test if there have been any social benefits from MFIs. Several papers highlight the way in which loans were utilized by borrowers. For example, Banerjee et al. (2010) investigated the propensity for an individual to start a business with their loan. This particular report found the distribution of loans from Spandana clients to be: 30% to start a business, 22% to buy a durable for household consumption, 30% to repay an existing loan, 15% were used on durable consumption, and 15% to buy non-durables for household consumption. Banerjee et al. (2009) identify two important loan use dimensions for further study: spending on durables vs. non-durables and investing in income generating opportunities. Such spending on items that will only be consumed points to the same problem of loaning to borrowers who are already poor. If borrowers are still attempting to meet their basic needs, the probability of the borrowers spending on a business and thereby increasing their future income is less likely. Consuming instead of investing leads to a reduced ability to repay loans. Another interesting aspect of this data is that while 30% of loans were used to start a business,

another 30% were used to repay an existing loan, further leading to the implication that loans not used in income generating activities could lead to a cycle of borrowing and greater debt.

Secondly, most research on the effectiveness of microfinance also seeks to study whether or not the loans are reaching the target population. Many criticize that microfinance does not succeed in reaching the poorest of the poor. Cuong (2007) investigates the Vietnam Bank for Social Policies (VBSP) to see whether or not the institution is actually targeting the poor. This study concludes,

> Only 12% of the poor households in rural areas participated in the program in 2004. Meanwhile, the program covered 6.4% of the nonpoor households. The nonpoor households accounted for a larger proportion of the population, and up to 67.1% of the participants were nonpoor households. The poor households also received smaller amounts of credit than the nonpoor (Cuong, 2007, p.171).

Unfortunately, such findings are typical.

The reasons for this lack of successful targeting are many. For one, it is much riskier to lend to the poorest of the poor. As explained above, those individuals that are still attempting to meet their basic needs will more than likely buy items that will be consumed and not invested in a venture that could be profit inducing. Those whose basic needs are being met, therefore, tend to have a greater ability (higher disposable income) to invest in profit increasing ventures, which makes them attractive candidates for the Vietnam Bank for Social Policies. In addition, each country may have its own system of ranking individuals as poor or nonpoor. The Vietnamese government is required to classify potential clients; yet, the number they classify as being poor tend to be much lower than the World Bank's classification of the poverty in Vietnam (Cuong, 2007, pg. 159). The Vietnamese government requires that those who wish to join a loan group with VBSP first be classified as poor. Therefore, if the Vietnamese government is under-classifying those that are poor, then the real number of poor people who should be receiving these loans are not. One reason for this under classification is that if there are a large number of outstanding loans to be repaid, the government may decrease the amount of funding that VBSP receives. This

makes it even more likely that VBSP will target those individuals more likely to repay their loans instead of the truly needy.

Thirdly, microfinance may lead to polarization between the poor. James Copestake conducted research in the Zambian Copperbelt to study this stratification because one of the aims of MFIs is to reduce income inequality. While in some areas MFIs may be reducing this income inequality between the very rich and the very poor, Copestake (2002) concludes that they could be leading to greater inequality between the poor, "The overall picture that emerges is of a minority of generally richer clients doing well and remaining loyal to CETZAM (The Christian Enterprise Trust in Zambia), while the majority left after one or more cycles, wiser perhaps, but financially poorer" (Copestake, 2002, p.753). This study further indicates that microfinance may be harmful for the poorest of the poor. One reason for this stratification is an unintended consequence of how many institutions require group to guarantee their full amount of the loans. For example, TRY, a program for women in Nairobi, requires clients to save 50 Kenyan Shillings (KSH) a week (Erulkar and Chong, 2005, pg.4). After each loan cycle is completed, the group can then apply for bigger and bigger loans. For the poorest of the poor, as the loan size gets bigger, it may be harder and harder to repay the loans. In addition, during this time, the borrowing groups are sometimes allowed to drop or pick up a new member. As a result, a polarization between the richer of the poor and the poorer of the poor may occur in which the poorer clients, who find it harder to repay their loans, get dropped by the rest of the group. "With respect to micro-credit we should be asking whether its inequality-increasing effects are likely to strengthen or weaken long-run capacity for poverty reduction" (Copestake, 2002, pg.753).

Copestake sums up the political implications of such stratification very nicely by citing Hirschman's (1973) article,

> "Imagine… that you are in a tunnel and both lanes of traffic are blocked. The other lane then becomes free. If you believe this is an indicator that your lane will soon become free as well then you are likely to be quite tolerant of the fact that some people are now moving much faster than you. But if this expectation is not fulfilled

then you will become even more angry and frustrated" (Copestake, 2002, pg. 753-754).

VI. A Meta-Analysis of Micro-credit

The purpose of this meta-analysis is largely a 'proof of concept.' We examine whether it is practically useful to base a meta-analysis on existing systematic reviews and what might be gained as the result. In the process, we hope to find some relevant feature or pattern in the micro-credit research literature that the systematic reviews were not able to identify. At a minimum, we expect that meta-analyses that begin with a systematic review will give a more quantitative and objective summary of the research studied surveyed.

Before turning to our statistical meta-analysis findings, our methods must first be qualified and put into their proper context. The fourteen studies identified as evaluating the income effect of micro-credit are very diverse, involving many different countries, programs and ways of measuring this income effect. Thus, one might question whether there is really any common income effect that is shared across these studies. Without forgetting this important limitation, we can, nonetheless, assume provisionally that there is some overall income effect, perhaps one that varies randomly from study to study. Doing so allows us to: combine these effects, gage how large they are and to identify what else might influence them. We grant that this research literature might actually add up to something less than the meager meta-regression results that we report below.

From these 14 papers, 10 survey-based studies report 18 micro-credit income effects with sufficient information that a partial correlation coefficient could be calculated. A partial correlation coefficient measures the strength of the association between two dimensions (in this case, income and micro-credit) holding other factors constant. Like any correlation coefficient, it has no units of measurement and must be between -1 and 1. This absence of units of measurements allows effects that are measured in different currencies and by

different regression models and tests to be meaningfully combined into one comparable summary measure. We use equation (1), below, to convert different regression coefficients and tests using different currencies to partial correlation coefficients.

$$r = \frac{t}{\sqrt{t^2 + df}} \qquad (1)$$

(Stanley and Doucouliagos, 2012, p. 25). Where r is the partial correlation coefficient, t is the calculated t-value of the reported income effect and df is its degrees of freedom. Because sufficient information to calculate df was often missing, we substitute its close proxy, the sample size.

First, we display these partial correlation coefficients in a funnel graph, Figure 1. A funnel graph is a plot of an estimated effect (the partial correlation coefficient, r) and its precision (the inverse of the estimate's standard error). It is called a 'funnel' graph because it should look roughly like an inverted funnel, in the absence of publication selection. Estimates on the bottom typically come from smaller samples and are thereby less reliable, hence widely spread out. Those on the top should be tightly dispersed because they have small standard errors and hence are more reliable. Known heteroskedasticity determines the funnel's shape.

Figure 1: Funnel Graph of the Partial Correlation of Micro-credit and Income (n=18)
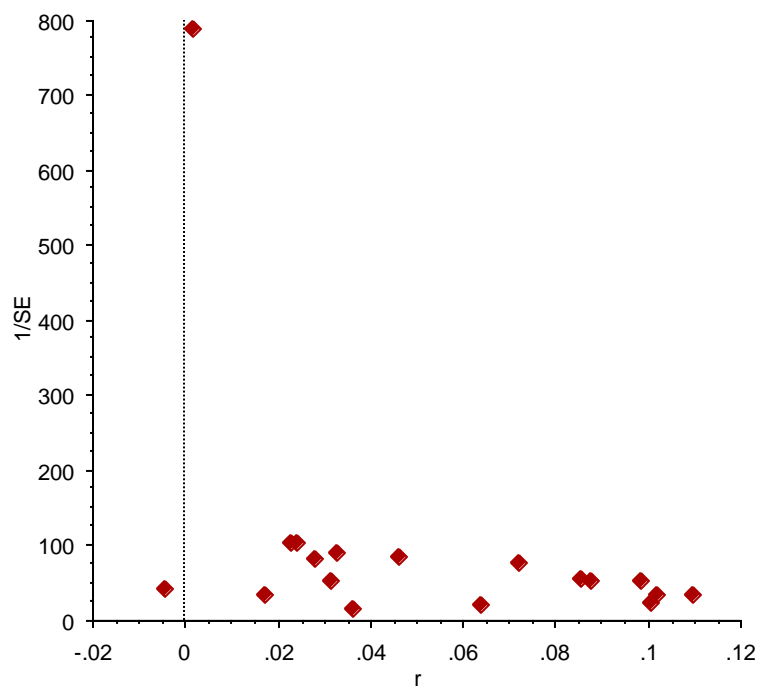
Clearly, there is one study at the top, Kondo (2007), that is much more precise than any of the others. This study reports descriptive statistics for 618, 906 micro-credit clients but does not report another sample size for its income effect test. If we keep this single point in our meta-analysis, our findings become much sharper with clear statistical significance for business education *Training* (see below). However, after further reflection and careful reading, we do not believe that Kondo (2007) actually based his statistical test on 618, 906 micro-credit surveys. Thus, Kondo (2007) is dropped from all of the below meta-analysis.

Conventional meta-analysis reports simple weighted averages, called 'fixed-effects' and 'random-effects'—see Table 1. These simple weighted averages reveal two general findings. There is an overall positive income effect due to micro-credit (p<.001). Secondly, this effect is practically negligible and policy irrelevant. Take, for example the random-effect estimate, 0.052. It gives the largest effect size and allows for random heterogeneity among these reported income effects and is therefore the preferred estimate by traditional meta-analysis considerations. According to the widely followed Cohen guidelines, anything smaller than 0.1 or 0.2 is deemed practically negligible (Cohen, 1988). A partial

correlation of 0.052 means that micro-credit can explain only about one-fourth of one percent (r^2) of the remaining variation among client incomes. In such cases, statistical significance is irrelevant, and practical import is all that matters.

Table 1: Conventional Meta-analysis

Method	Pooled Est	95% CI Lower	Upper	Asymptotic z_value	p_value
Fixed	0.044	0.036	0.051	10.931	0.000
Random	0.052	0.036	0.067	6.649	0.000

Looking at all of the individual effects does little to help. Among these 17 partial correlation coefficients , the largest is 0.11, which is also practically insignificant. Although twelve of seventeen reported income effects are statistically positive (or 71%), their statistical significance is meager compared with the sample sizes employed.

Nonetheless, we further investigate whether there is publication selection bias or if any genuinely positive income effect remains after publication selection is accommodated. The funnel graph (see Figures 1 and 2) is clearly skewed to the right, which is indicative of publication selection bias. The Egger meta-regression is the conventional model of publication selection bias widely used in medical and psychological research,

$$r_i = \beta_0 + \beta_1 SE_i + \varepsilon_i \tag{2}$$

(Egger et al., 1997; Stanley, 2008; Stanley and Doucouliagos, 2012). Where r_i is an individual partial correlation estimate, and SE_i is its standard error. $\beta_1 SE_i$ represents the publication selection bias, and β_0 estimates the overall average effect corrected for publication bias. "With publication selection, researchers who have small samples and low precision will be forced to search more intensely across model specifications, data, and econometric techniques until they find larger estimates" hence "such considerations suggest that the magnitude of the reported estimate will depend on its standard error…" (Stanley and

Doucouliagos., 2012, p. 60).   Because we know that the variance of r_i varies from estimate to estimate, meta-regression model (2) will have heteroskedasticity and must therefore be estimated by weight least squares. Table 2 reports this WLS-MRA (weighted least squares meta-regression analysis).

Table 2: WLS Meta-Regression Model (2)		
Variables	Column 1	Column 2
$\hat{\beta}_0$ {PET}	0.020*	0.028*
	(1.46)	(1.24)
SE_i: $\hat{\beta}_1$ {FAT}	1.60	0.757
	(1.90)	(0.70)
$Training_i$: $\hat{\beta}_2$	---	0.019
		(1.08)
n	17	12

Notes: Cells report coefficient estimates for Equation 2. The dependent variable is the partial correlation. The t-values are reported in parenthesis. FAT is a test for publication selection bias. PET is a test for the existence of a genuine income effect corrected for selection bias. n is the number of observations.

Testing β_1 is a test for funnel asymmetry (FAT) and reveals selection for positive income effects (one tail p< .05). This test shows that there is significant asymmetry in Figure 2.   It is not surprising that some researchers might be reluctant to show that micro-credit has a negative effect or no effect on poverty.   Who doesn't wish to find ways to help the poor?

Figure 2: Funnel Graph of the Partial Correlation of Micro-credit and Income (n=17)
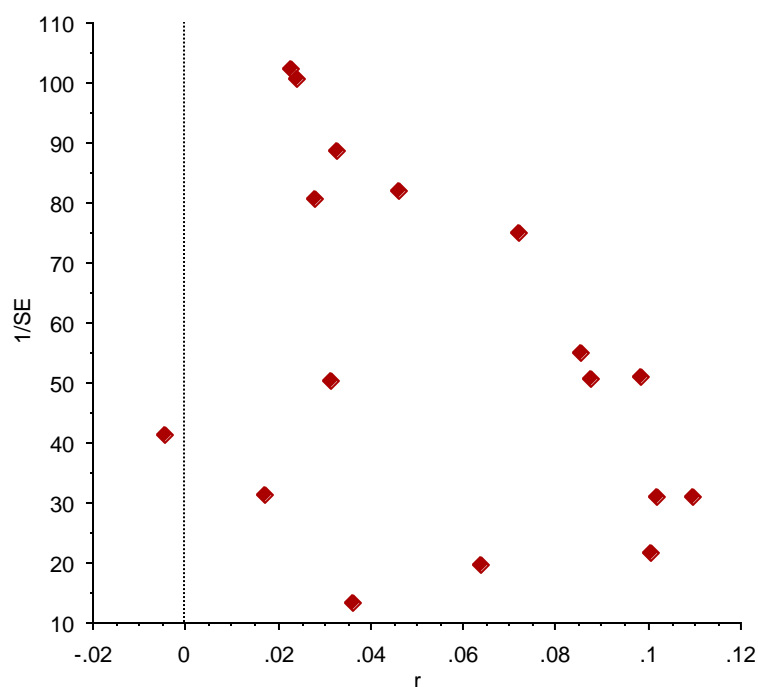
In contrast, the precision-effect test (PET) on β_0 shows no sign of a genuinely positive income effect from micro-credit programs (p>.05). Although it might be fair to attribute this lack of evidence to our small sample, the size of the sample does not explain the small size of the corrected income effect (0.020). The size of the corrected effect is half the practically negligible overall effect size discussed above. Although calls for more studies with tighter research and better program designs are warranted, the current research base gives no indication that micro-credit reduces poverty or that further research will reveal anything dramatically different.

In spite of this small sample of comparable income effects, we decided to investigate one additional program dimension that might induce a positive outcome—*Training*. We also coded whether the surveyed microfinance programs contained some business education program or training for those receiving the loans (*Training* =1), or not (*Training* =0). Unfortunately, including *Training* reduces our small sample even further to 12, because two studies have insufficient information to identify accompanying support services. Column 2 of table reports the MRA results after β_2 *Training* term is added to meta-

regression model (2). Now, nothing is statistically significant, although all effects have the expected signs. Regardless, all of the income effects reported in this literature are practically very small whether or not they can be show to be statistically significant.

VII. Conclusions

Our modest meta-analysis confirms the developing consensus that there are little or no positive effects from microfinance. Our meta-analysis reveals publication bias for positive income effects (p<.05) but no overall income effect once publication selection is accommodated. However, even without correcting for publication selection bias, existing research contains no evidence that micro-credit programs have any meaningful effect on the incomes of their participants, whether one looks at the individual study or across all studies that meet the criteria set by recent systematic reviews (Duvendack et al., 2011; Stewart et al., 2012).

We believe that there are two reasonable conclusions that may be drawn from our meta-analysis and the two recent systematic reviews of existing evidence on the effectiveness of micro-credit.

- Existing programs and/or the research that evaluates them have been poorly designed.
- Current micro-credit programs have very small or no effects on the income of their participants.

Needless to say, some combination of the above may also be true.

It is obligatory in these cases to call for more research. Researchers can always justify the need for more research. However, we see little practical value that might be added from such an exercise unless the research or the micro-credit program design is remarkably different. Although this area of research is insufficiently conclusive to support firm policy recommendations, we speculate that microfinance programs will remain ineffective unless accompanied by significant training, support or empowerment components. A marginal

increase in the availability of small loans, by itself, is unlikely to cause a notable reduction in poverty.

Lastly, we recommend that if further research is conducted that either randomized experiments or a regression-discontinuity design be implemented (Shadish et al., 2001). The regression discontinuity (RD) design is especially attractive for evaluating micro-credit programs because the 'poorest of the poor' could be identified, separated and placed into the program while the lesser poor could serve as a natural control group. In this way, the program implementation that used a RD design would also address a number of recent criticisms of microfinance, especially the issue of targeting. RD is considered a very strong quasi-experimental design, sometimes rivaling the clinical 'gold standard' of randomized controlled experiments (Shadish et al., 2001).

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Appendix

Synopses of Literature used in Review and Meta-Analysis

Evaluation of a Savings and Micro-credit Program for Vulnerable Young Women in Nairobi
(Annabel S. Erulkar and Erica Chong)

Erulkar and Chong, in their paper entitled "Evaluation of a Savings and Micro-credit Program for Vulnerable Young Women in Nairobi" seek to study the impact of TRY, a program started by the Population council and K-Rep Development Agency (KDA) in Nairobi. TRY's program involved utilizing both micro-savings and micro-credit, and in addition acted as a place for young women to seek social support. TRY participants were required to form groups of 15-25 members ages 16 to 22. The program combined "savings, micro-credit, training in business and life skills, reproductive health education, and mentoring by adults from the community" (4). After six days of training, participants are required to place 50 kenyan shillings (US$0.65) per week into their savings account (in order to act as collateral against later loan) and meet once a week with their KDA credit officer. According to Erulkar and Chong, "For many girls, the group meetings also became an occasion to share intimate experiences of their lives and troubles, sometimes involving their relationships with partners or parents" (5).

The study attempts to find the impact of this program on three different variables: Whether or not TRY has contributed to increases in income per capita, savings, and household assets, whether or not attitudes regarding gender have changed after participation in the program, and whether TRY increases knowledge of HIV, reproductive health, and their ability to negotiate sex. The study's methods were to compare baseline and endline results between matched samples. Girls who participated in the program were matched very closely to control girls living in the same neighborhood who had the same age, education, marital status, parenthood status, and employment status. The results of the study, overall, were very positive. In terms of income levels, household assets, and savings, girls who participated in TRY had a very significant increase compared to the control girls. There were also significant results in participants holding more progressive gender attitudes and having more knowledge of reproductive health.

Is a Government Micro-credit Program For the Poor Really Pro-Poor? Evidence from
Vietnam (Nguyen Viet Cuong)

Cuong in his paper entitled, "Is a Governmental Micro-credit Program For the Poor Really
Pro-Poor? Evidence from Vietnam, seeks to study whether or not the Vietnam Bank for
Social Policies (VBSP), an institution started by the Vietnam government, really
accomplishes its attempt to reach the poor and whether or not their program has any effect
on reducing poverty. According the Cuong, the Vietnam government has spent large
amounts of money on VBSP's programs, therefore the study was conducted as a way of
suggesting policies for improvement or termination if these programs are not really
creating the desired results specified.

The Vietnam Bank for the Poor does not require collateral from recipients of loans and the
loaning system is based off of clients forming groups of between 5 and 50 members from
the same village. Those who wish to join the group must be classified as poor by the
government commune authority beforehand. Once a list of possible participants is put
together, it is then sent to the People's Committee who must approve it before the process
can proceed. According to Cuong, VBSP tries to keep its overdue loan rates as low as
possible as the government will issue them less funds if they have a large amount of
overdue outstanding loans. Cuong also states that VBSP tends to exclude individuals who
are really poor as they are less likely to repay their loans.

To test for these effects (whether or not this institution is really targeting the poor and
whether or not this program has any impact on poverty reduction) data was collected from
the Vietnam Household Living Standard Surveys (VHLSS) from 2002 and 2004. The study
resulted in showing that VBSP does not target the really poor. "75.9% of the program
participants were nonpoor households" (159) and "only 12% of the poor households in
rural areas participated in the program in 2004" (170-171). However, there were positive
and statistically significant results in regards to consumption expenditure per capita and
income per capita.

The Short-Term Poverty Impact of Small-Scale, Collateral-Free Microcredit in Indonesia: A Matching Estimator Approach

(Kazushi Takahashi, Takayuki Higashikata, and Kazunari Tsukada).

Takahashi, Higashikata, and Tsukada study the impact of a new NGO, offering collateral free loans, on poverty alleviation one year after the program began distributing loans. According to Takahashi et al., the majority of institutions set up in Indonesia have been for profit institutions, while Yayasan Bina Swadaya Bank Perkreditan Rakyat (BPR-YBS) is a rarity in that it is a nongovernmental organization. Takahashi claims that for profit institutions in Indonesia have the propensity to make profitability their primary goal and have therefore not been as successful at targeting the poor population. BPR-YBS was chosen by this study as the organization to collect data from as BPR-YBS does not require collateral and may therefore be seen as more pro-poor. In addition, the researchers for this paper found out that BPR-YBS was opening a new branch and decided that, in order to better control for endogeneity, this was a perfect opportunity for a study on the impact of microfinance.

BPR-YBS requires individuals to join groups of around ten to thirty women. This institution also requires clients to attend weekly group meetings and to deposit mandatory savings per week at these meetings. They must attend four of these meetings before they can begin borrowing. The required deposits into savings act as collateral against future loans to be made.

This study utilizes the difference-in-difference approach as well as propensity score matching to illustrate the impact of "micro-credit on household income, profits and sales (revenues) of self-employed businesses, savings and investment in assets such as durables and livestock, and schooling and medical expenses as well as expenditure on female clothing" (132). Pre-treatment and post-treatment data was collected from "participants in treated villages, nonparticipants in the same treated villages, and nonparticipants in control villages where BPR-YBS did not provide any service during the observation periods" (137). The study found that BPR-YBS did not have an immediate effect on poverty alleviation after one year.

Inequality and the Polarizing Impact of Microcredit: Evidence from Zambia's Copperbelt

(James Copestake)

James Copestake seeks to specifically examine the impact of micro-credit on inequality by using data from a microfinance project created by the Christian Enterprise Trust of Zambia (CETZAM). The specific factors and reasons cited for such polarizing effects include two possibilities: First, that microfinance institutions tend to favor richer clients as they are more likely to repay their loans, leading to more stratification between rich and poor. Secondly, most institutions require credit groups to be formed, in order to lessen the risk of default for the institution, before loans can be accessed. These groups, with each successful repayment, are allowed to access greater amounts of funds, making it harder for those who were already struggling to repay, to pay their loans back, eventually leading to these individuals getting dropped from the group.

The data utilized for this study involved finding "the poverty status of CETZAM clients, based on secondary data, the first year impact of loans on income and other variables, based on data from a sample survey of 'one-year-old' clients with a comparison group of 'pipeline' clients, reasons for exit based on a survey of 131 leavers, and impact beyond the first year of borrowing through repeat interviews with random subsamples of one-year-old borrowers first interviewed as part of the sample survey" (745). In terms of poverty status, the study shows an decrease in poverty for those involved with CETZAM. Copestake reports results from a sample survey showing that 65% of borrowers were living under the poverty line and 50% were within the standards of extreme poverty when they joined CETZAM. However these rates at the time of the study were shown to be 59% and 39% respectively, suggesting CETZAM had an impact in reaching the poor population. All in all, however, this paper does conclude that CETZAM has possibly lead to greater income inequality. Copestake states, summing things up, "… the evidence presented here suggests that while micro-credit can make a positive contribution to short-term poverty reduction it may do this at the cost of increasing inequality, particularly during periods of wider economic stagnation or decline" (753).

Monitoring the Diversity of the Poverty Outreach and Impact of Microfinance: A
Comparison of Methods Using Data from Peru
(J. Copestake, P. Dawson, J.-P. Fanning, A. McKay, and K. Wright-Revolledo)

Copestake, Dawson, Fanning, McKay, and Wright-Revolledo study the effects of microfinance in Peru through utilizing Promuc in Peru, a combination for NGO and not for profit institutions formed in 1994 to advance microfinance to reduce poverty and empower women. In their paper, they highlight the "double bottom line" standard many microfinance institutions have adopted in which they are both concerned about financial performance as well as social performance, arguing that the two are often hard to keep in balance when both are present. They claim that the financial aspect of evaluating MFIs is widely agreed upon, yet analyzing the social performance is not as easy. Their methodology is as follows: "On poverty outreach, we favour monitoring of proxy indicators for clients against national household survey data, and on impact we recommend making more use of individual in-depth interviews" (703). The article seeks to study two methods of monitoring social performance: poverty outreach and impact.

Poverty was assessed by using the CGAP poverty assessment tool in which the first stage of this assessment involves matching new clients with others living nearby. The second stage involved comparing poverty rates in areas that were selected for operation with national poverty rates. The CGAP tool determined, "that Promuc clients were generally worse-off than other people living in the same locality" (706). On a national level however Promuc clients were found to be below the poverty and extreme poverty lines.

To study the impact of Promuc, sample surveys were utilized. The authors then use the survey data to identify correlations between the data and per capita income. Overall, "the results suggest that the programme had a significant effect on individual and household income but no effect on business sales or profits" (714).

Evaluating the Impact of Egyptian Social Fund for Development Programs
(Hala Abou-Ali, Hesham El-Azony, Heba El-Laithy, Jonathan Haughton, Shahidur R. Khandker)

In their paper "Evaluating the Impact of Egyptian Social Fund for Development Programs," the authors seek answer to three questions: "How large is the impact of the SFD interventions? Have the benefits been commensurate with the costs? And have the programs been targeted successfully to the poor?" (33). The authors utilize data from the Egyptian Social Fund for Development (SFD), which is a semi-autonomous agency reporting to the office of the prime minister. The mandate of SFD is "to reduce poverty by supporting community-level initiatives, to increase employment opportunities, and to encourage small-enterprise development" (2). Social funds are distinguished from microfinance institutions in that they do not lend directly to borrowers, instead they support small projects that have the goal of benefitting those in poverty. The analysis of this paper rests on the assumption that if micro-credit has an impact, then the Egyptian Social Fund for Development's support for micro-credit has an impact.

In terms of the impact of micro-credit, the paper concludes that microlending does seem to lead to higher income per capita in urban areas, excluding farm income per capita. There was also a significant difference between more metropolitan areas and the rest of the country with metropolitan areas having larger levels of expenditure, food expenditure, and income, and lower poverty levels. This was not the case for the rest of Egypt, in fact, it was the exact opposite with lower expenditure and income and higher poverty.

The paper also conducted a test to see if SFD successfully targeted those in poverty they had set out to. The paper concludes, "The SFD interventions that we have analyzed go to areas that have a higher headcount poverty rate than the national average (21.6% vs 19.6%) and a lower level of average per capita annual household expenditure (LE 2,292 vs. LE 2,556). In this broad sense, SFD interventions are pro-poor, although at first sight only modestly so" (35).

Assessing the Impact of Microcredit on Poverty: A Zambian Case Study

(James Copestake, Sonia Bhalotra, Susan Johnson)

This study by Copestake, Bhalotra, and Johnson targeted an organization by the name of PULSE (Peri-urban Lusaka Small Enterprise Project), a group based micro-credit institution that targets borrowers who own a business that is as least 6 months old and is the main source of family income. PULSE members were required to form groups of 25-35 people and attend a weekly training session for 8 weeks. Acting as collateral for loans, PULSE also had a loan insurance fund (LIF) in which mandatory deposits, equal to 10% of the loan amount, were made by each member.

The authors of this study had three aims for their analysis. The first was "to identify characteristics of loan recipients such as gender relative poverty and age of business and to estimate the programme's depth of outreach, the second research goal was to identify and estimate direct impacts of loans on borrowers, their businesses and their households, and to identify indirect effects of the programme" (10-11). In order to accomplish these goals, the following sources of data were used: "a questionnaire-based sample survey of PULSE participants, secondary survey data drawn from the wider population of businesses and households, and a cascading set of qualitative focus group discussions and key informant interviews" (10). The data was analyzed using both regression analysis and an analysis of variance.

The results are as follows. No significant effects on profit growth for borrowers was noticed after receiving their first loan, however, a clearer relationship between profit growth and the second loan was found. "This indicated that monthly profits were raised by 4.5% for every Kw. 100,000 (33 euros) received as a second loan" (15). There were also strong correlations drawn between profit growth and the business training that PULSE provided. The analysis also found that the program did not successfully target the poorest of the poor, however, they did achieve in targeting 1/3 of clients who were below the poverty line. The borrowers that were made worse off by joining the program were those that dropped out after their first loan cycle, which, in one period was 52%.

Economic and Social Impacts of Self-help Groups in India

(Klaus Deininger and Yanyan Liu)

This particular paper seeks to study the impact of self-help groups (SHG) by utilizing data from Indhira Kranthi Patham (IKP), a program in Andra Pradesh. The SHG for IKP consists of a group of 10-15 people who come together to discuss social issues, make deposits into a joint account, and decide on issues pertaining to loans. The outcome variables this paper chose to study were whether or not there were changes in female empowerment, nutritional status, and per capita income, consumption, and assets.

In terms of changes within female empowerment, the study found positive results. "About 21% of groups implemented specific activities in the social sphere to counter discriminatory practices and enhance female empowerment" (8). In addition, social capital and economic empowerment increased to the same extent for both borrowers and non-borrowers in the same area, insinuating positive externalities. In terms of changes in nutritional status, there were also positive results. Results showed that there was increased knowledge among participants towards nutrition and there were gains in consumption for participants in new groups. Lastly, results for income, consumption, and assets were not so positive. There were no results that showed increases in income or assets. The authors provide several possible reasons for this outcome. They speculate that borrowers could have spent their loan money in a non-productive manner. There was also an intense drought during this period that may have lead to an inability to realize loan potential. Lastly, the authors speculate that income effects may occur later as one of the main goals of the project was to smooth consumption for borrowers.

Microfinance and Household Poverty Reduction: New Evidence from India
(Katsushi Imai, Thankom Arun, Samuel Kobina Annim)

This particular study used SIDBI (Small Industries Development Bank of India) for survey data in order to study whether or not microfinance institutions have poverty-reducing effects. They utilized IBR indicators to indicate levels of poverty to test and see if MFI loans were raising people out of poverty. The IBR indicators take into account agriculture, employment (this includes income and type of employment), animal husbandry, transport and household assets, house ownership and housing type, and sanitation. These different indicators that group people into five categories: very poor, poor, moderately poor or borderline, self-sufficient, and surplus. The study also has two definitions of microfinance to analyze impact. One is whether a household is a client of any MFI or not and another is whether a household has taken a loan from an MFI for a productive activity.

The results display a difference between female borrowing and male borrowing. Households with female heads are more likely to be clients, yet males were found more likely to use the loans they procured for productive purposes. Household that had a larger amount of educated people were also more likely to take out a loan for productive purposes. In terms of the effects of the loans on poverty, there was a correlation between loans and poverty reduction. It was also noted that the larger the loan amount, the greater poverty reduction in urban and rural areas. Overall the authors declare that microfinance plays a significant role in the reduction of poverty.

Does Microfinance Reduce Poverty in Bangladesh? New Evidence from Household Panel
Data
(Katsushi S. Imai and Md. Shafiul Azam)

This study published in 2010 seeks to analyze the effects of microfinance institutions in poverty reduction by using nationally representative household panel data from years 1997 to 2004. Panel data was drawn from 13 Bangladesh Rural Employment Support Foundation (PKSF) partner organizations, which consisted of more than 3000 households for each round, throughout Bangladesh in an attempt to get a representative data set. Control villages were also selected from nearby villages. This research was funded by the World Bank and states of its data, "This is the largest and the most comprehensive data of its kind so far in Bangladesh collected with detailed information on a number of socio economic variables, including household demographics, consumption, assets anc income, health and education and participation in microcredit programs" (8). Microfinance's effects on women's body mass indices were also measured.

Averages of the panel data are as follows. The average size of each household is around 6 people and classifications for education level and occupation were divided into "illiterate, completing primary education, secondary education, higher education… farmers, agricultural wage laborers, non-agricultural wage laborers, small business, professionals, and other" (9). It was found that income per capita was higher for the people who did not participate in MFI programs or pull of loans from MFIs.

The results after using fixed effects models are that there is a positive and significant effect of the MFI loans for household income and food consumption, "but this is due to the positive effect of the productive component for income, and the non-productive component for food consumption" (18). It was also found that non-productive loans reduce BMI. The DID-PSM analyses found that those who accessed loans from MFIs in 2004-2005 had a higher food consumption growth than those who did not take out loans.

Expanding Microenterprise Credit Access: Using Randomized Supply Decisions to Estimate the Impacts of Manila

(Dean Karlan and Jonathan Zinman)

This study looks spefically at Manila in the Philippines by conducting a field experiment in addition to surveys in order to attempt to find the impact of microfinance institutions. The authors use First Macro Bank (FMB), a for-profit institution in order to conduct their experiment. FMB came into being in the 1960s, charges an interest rate of 63% for first time borrowers and is a relatively small institution compares to other MFIs in the Asian area. The study finds that with the development of microfinance institutions that formal borrowing increases while informal borrowing decreases.

In terms of the effects of credit expansion to those in Manila, according to the authors, the results are "varied, diffuse, and surprising in many respects" (2). The results concluded that the size of businesses, as a result from receiving a loan, decrease mostly from laying off unproductive workers. The results also conclude that profit increases for male borrowers. Borrowers are also less likely to use formal insurance, as trust in neighborhoods and emergency credit from family and friends increases. Overall, there were no increases found in subjective well-being and the authors states, "if anything, the results point to a small overall decrease" (2). Results also suggest that loans benefit males with higher incomes the most, while not so much for female micro entrepreneurs. Men are also seen to utilize their profits to send a child to school.

<u>The Impact of Three Microfinance Programs in Uganda</u>
(Carolyn Barnes, Gary Gaile, and Richard Kibombo)

Carolyn Barnes, Gary Gaile, and Richard Kibombo's paper studied three separate microfinance insitutions, attempting to find results on the impact of each program as well as who the programs are reaching. The study is focused on FINCA (Foundation for International Community Assistance), FOCCAS (Foundation for Credit and Community Assistance), and PRIDE (Promotion of Rural Initiatives and Development Enterprises) with these three institutions lying within the following cities: Kampala, Masaka, and rural Mbale. All three institutions require that a certain percentage of the loan be used for purposes within the clients business. The study was conducted by selecting clients from these institutions and then matching them with non-clients with similar characteristics. These clients were surveyed both for the baseline and the follow on survey. The baseline survey participants were then relocated for the follow on survey.

Results in terms of what clientele base these institutions are reaching overall were positive. According to the baseline survey, these programs were reaching micro-entrepreneurs that were neither extremely poor nor wealthy, displaying a possible self-selection bias. However, FOCCAS reached some of the poorest households with its services. There were positive and negative results from the feedback within the survey. Many cited the weekly meetings they must attend as too long and feelings of frustration towards having to assist in the repayment of another members loan. However, only 10% of clients claimed that they had gained no benefits from participation. In terms of increases in financial well being, All three microfinance institutions had clients with increases in profit. Overall, "the study found that program participation is strongly associated with specific types of diversification of income sources," (90) showing that clients now multiple ways of spreading out risk.

Access to Credit and Its Impact on Welfare in Malawi

(Aliou Diagne and Manfred Zeller)

This study analyzes the effects of microfinance in Malawi, a country in which the majority of the poor engage in farming for income. In their research, the author focused on four main institutions: Malawi Rural Finance Company (MRFC), Malawi Mudzi Fund (MMF), Malawi Union of Savings and Credit Cooperatives (MUSCCO), and Promotion of Microenterprises for Rural Women (PMERW) Credit Program. The rural Malawi Finance Company is funded by the World Bank and was started by the Government of Malawi. MRFC's target population are smallholder farmers who are required to join groups of 5 to 10 people to access seasonal loans for things like fertilizer and longer term loans for farm equipment. The Malawi Mudzi Fund, funded by the International Fund for Agricultural Development is an institution that lends to people requiring nonfarm income-generating loans. Members were organized into groups of five and were individually and cumulatively responsible for the repayment of loans. Most loans were given for small-scale trading activities. MUSCCO began in 1980 as a "federation of locally based savings and credit cooperatives" (13). Its financial services are mostly directed towards farmers. PMERW is a program that began in 1986 by the Ministry of Women and Children's Affairs and Community Services with financial support from the German Agency for Technical Cooperation. It provides business training and loans to female micro-entrepreneurs.

Overall, the target of the report was to "study the determinants of access to and participation in existing formal and informal credit and savings systems, and to analyze the effects of household access to credit on agricultural productivity, income generation, and food security" (1). For collection of data, surveys were conducted. "... Half of the sample members were selected from participants in the four credit programs. The second half of he sample was equally divided between past participants and households who had never participated in any formal credit program" (16). The results of the report are as follows. In terms of access to and participation in formal and inform credit/savings systems, 59% were granted access to informal credit while 41% were granted access to formal credit. 56% were rejected for informal loans, while 44% were rejected for formal loans. In terms of effects of credit, the following results were found. Overall, in terms of impacts for

farming loans, there was a negative correlation between the loans and crop income. In terms of food expenditure/security, food expenditure per capita was lower for members than it was for non-members.