Microfinance has been a topic of much interest recently, in particular the question of whether microfinance institutions can help poor clients while remaining financially sustainable. Recent research has fed hope that they can, suggesting that microfinance institutions are financially resilient to downturns in the domestic marketplace. Not only does this suggest that microfinance institutions may be good investments for reducing portfolio volatility, but that they may also be able to weather financial storms to effectively serve poor clients in unstable areas of the world. Looking at financial performance, however, is only half the story of microfinance institutions’ overall performance. They also seek to maximize help to the poor, or “outreach.” This thesis looks at how both the financial and the outreach performance of microfinance institutions varies with domestic GDP growth. Using panel data from the Microfinance Information Exchange (MIX), and OLS regressions controlling for year and country fixed effects, the analysis finds no significant correlation between domestic GDP growth and microfinance performance. This result suggests that microfinance may be an effective means of addressing poverty even in environments of low GDP growth.

Keywords: Microfinance, GDP Growth, Outreach, Financial Performance

I would like to thank my advisor Professor Seema Jayachandran for all of the help she has given me in writing this thesis. I would also like to thank Professor Geoffrey Rothwell, Dave Hansen and Dr. Mary Sprague. Finally, I would like to thank my parents for their support, moral and monetary, as well as my beautiful wife Ashley.
1. Introduction

In recent years, microfinance has received increasing attention in discussions about reducing poverty and promoting growth. With an innovative approach, entrepreneurial roots, and tremendous outreach and growth, it both strikes public attention and offers a novel way of alleviating poverty. It is seen as an alternative to formal credit, which has been cited as a major factor in helping people escape poverty traps. However, poor people face a difficult problem when seeking credit. They have little collateral, posing large risks, and small loans made to poor people often have high fixed costs, making lending to the poor an unprofitable venture (Ray 1998).

Microfinance seeks to solve this problem. It attempts to effectively provide credit to the poor by using various methods to ensure repayment in spite of little or no collateral. One common method of ensuring repayment is the use of “social capital” to help solve asymmetric information and moral hazard problems. This can come in the form of group lending, using local people in the loan approval process, or in other ways. Another method which microfinance institutions commonly use is increasing loan sizes with continued repayment. This helps provide a dynamic incentive for borrowers to repay their loans despite not having committed any collateral (Morduch 1999a).

Most captivating about microfinance are many institutions’ claims of extremely high repayment rates. Many of the major microfinance institutions claim astounding repayment rates of over 95%, (Morduch 1999a). By comparison, before the development of the lending techniques unique to microfinance today, many state-owned development banks faced extremely low repayment rates and were not able to operate for very long (Armendáriz de Aghion and Morduch 2005). The current amazing repayment rates, though arguably often not accurately
measured, are one of the most promising aspects of microfinance as a means of poverty alleviation because they suggest that institutions can make loans to poor individuals without sacrificing financial viability.

Also impressive is that fact that microfinance institutions have shown high resiliency financially in the face of stressful or slow economic conditions. Past research indicates that microfinance, as opposed to commercial banks, have been able to whether economic storms with little or no negative effects (Krauss and Walter, 2006; Jansson 2001). In fact, financial indicators of a large number of microfinance institutions actually show little or no correlation with domestic GDP changes. This means that they may actually be safer places for investors than commercial banks and can reduce portfolio volatility.

These studies, however, are not fully complete, since they only look at one aspect of microfinance success. Unlike typical firms, who seek to maximize financial returns, microfinance institutions also try to maximize poverty assistance, or outreach to poor. Indeed, the added goal of poverty relief may be what defines microfinance as separate from commercial banking. Because microfinance straddles worlds of commercial banking and poverty relief, when measuring performance, it is important to look at both financial success and outreach to the poor.

Recent trends are for institutions to become more and more like commercial banks, attempting to leave behind the subsidies that once supported them and to seek capital at competitive rates on world markets. However, as the institutions become more and more like commercial banking, demands for competitive returns lead many ask whether institutions that commercialize are also sacrificing their outreach to the “poorest of the poor” (Morduch 1999b).
This sacrifice of outreach in order to perform financially is referred to as “mission drift.” (Christen 2000).

One way in which institutions may sacrifice outreach to the poor is in by cutting back outreach in order to support higher financial returns in times of economic stress. While institutions have shown little correlation financially with domestic GDP growth, if a correlation existed between outreach variables and domestic GDP growth, it might indicate this form of mission drift. On the contrary, if no correlation between outreach and domestic GDP growth exists, it suggests that microfinance can be effective in helping the poor regardless of domestic macroeconomic conditions. There may exist something intrinsic about the way institutions are funded, how they operate, or who their clients are that allows them to do this.

This thesis looks at how performance, both financially and in terms of outreach of microfinance institutions, varies with changes in the domestic economy of an institution. First I review the literature about GDP effects on financial performance and ways to measure microfinance outreach. Second, I provide an overview of the data I use. Third, I set up my analytical framework, explaining each variable and the statistical model used to estimate correlations. Fourth, I analyze the results and discuss their implications. I conclude by suggesting further avenues of research.

2. Literature Review

In this section, I review the existing literature surrounding financial performance of microfinance institutions in light of changes in domestic economies, and some of the explanations offered for microfinance’s observed resilience. I then look at different ways in which academics have measured the outreach of microfinance institutions.

2.1 Financial Performance and the Domestic Economy
There have been three methods used to analyze the effect of the domestic economy on the financial performance of microfinance institutions. The first studies looking at microfinance financial performance and the domestic economy did so by simply looking at percentage changes or simply levels of financial indicators over periods of economic crisis. McGuire and Conroy (1998) used survey data to observe the effects of the Asian financial crisis on microfinance institutions in nine countries by looking at percentage changes in loans, savings, total assets, and capital stocks of microfinance institutions over six-month periods from 1996 to 1998. Interestingly, they found that microfinance institutions were able to maintain relatively strong financial success, especially among those institutions that serviced poor clients. Specifically, they found: one, that the crisis had the least impact on microfinance institutions operating in the poorest countries, two, that institutions with poorer borrowers were better off, and three, that while commercial banks had to substantially raise interest rates, village microfinance institutions were able to maintain low interest rates.

Rather than looking at the changes in financial indicators, other studies have observed the levels of these indicators and compared them to commercial banks in the same countries. Tor Jansson (2001) observed the financial performance of fourteen microfinance institutions against that of commercial banks in Columbia, Bolivia and Peru each year from 1997 to 2000 when these countries were affected by the Asian financial crisis. He observed growth, as measured by growth in total loan portfolios; profits, as measured by return on assets; and portfolio quality as measured by percentage loan delinquency greater than 30 days. He found that microfinance institutions were extremely resilient in all three aspects when compared with commercial banks.

Marconi and Moseley (2005) also look at levels of yearly financial indicators and compare them to commercial banks in Bolivia from 1998 to 2004, observing the total portfolio
value and the percentage amount of the portfolio in arrears. They also look at the different microfinance institutions individually to determine what characterized institutions that were heavily impacted financially by the economic downturn vs. those that fared relatively well. They found that institutions serving primarily poor women and using village, or group, lending styles, and those that provided additional services such as savings, training, and quasi-insurance schemes, maintained high repayment rates, while other types of institutions faced heavy losses on bad debt, forcing many of them to close.

The last method of looking at microfinance financial performance is regression analysis. Krauss and Walter (2006) use regression analysis to see how microfinance institutions compare in financial indicators to commercial banks in response to world and domestic economic systemic risk. They do several analyses, looking at both world and domestic economic movements. To measure domestic systemic risk they use domestic GDP as the independent variable. As dependent variables, they use several financial indicators: percentage change in net operating income, level of return on equity, level of profit margin, percentage change in total assets, percentage change in gross loan portfolio, and the level of portfolio at risk. With these variables they use OLS regression, controlling for institution-specific fixed effects for both microfinance institutions and commercial banks. They then use data from both types of institutions using an interaction between a dummy for the commercial bank and domestic GDP. They find that for only two of the six variables is the financial performance of microfinance institutions correlated, and only weakly, with domestic GDP, while for commercial banks all six indicators are strongly correlated. They furthermore test the effect of domestic GDP on net operating income in “times of macroeconomic distress” where GDP growth is less than 1%. 
While lacking many data points, they find that microfinance institutions fare much better than commercial banks.

Theories explaining the financial resilience of microfinance institutions and the lack of correlation of their financial indicators with domestic GDP suggest that microfinance, as opposed to commercial banking, has several unique characteristics. These characteristics can be grouped into three categories: the atypical ways they are funded, the unique ways in which they operate, and the unusual client profile they serve.

First, microfinance financial success may not be connected to domestic GDP because of the unique way institutions are funded. McGuire and Conroy (1998) find that the less institutions were connected with the formal financial system, not surprisingly, the better they weathered the Asian financial crisis. While recent trends have shown institutions more and more seeking capital from world markets, many institutions still receive subsidies in the form of low-interest government loans, or direct donations from various sources (Armendáriz de Aghion and Morduch 2005). These subsidized funds may allow institutions to perform well financially while commercial firms must face rising interest rates caused by a financial crisis or poor economic conditions. Another explanation is that village banks with little contact with the outside world were better protected from exchange rate risk than the commercial banks (Reille and Gallmann 1998). Jansson (2001) additionally suggests that owners of microfinance institutions, as opposed to commercial banks, are willing and able to step in to provide extra financial assistance if necessary. Finally, Krauss and Walter (2006) suggest that microfinance institutions have access to both international funds and investors that are interested in the long run and won’t react negatively to a short-term downturn in the domestic economy. Moreover, they add,
microfinance institutions tend to operate with less leverage than normal financial institutions, making their returns less volatile.

The second category of explanations proposed by scholars for why microfinance institutions’ financial performance is less affected by the domestic economy has to do with a variety of operational methods unique to microfinance. Jansson (2001) argues that microfinance institutions, unlike commercial banks, operate very close to the community and thus are able to have better information about and close ties to their borrowers. Additionally, they use screening mechanisms such as group lending and dynamic incentives to ensure clients will repay. Observing the case in Bolivia, Marconi and Moseley (2005) found that the institutions that maintained small loans characteristic of microfinance actually had an advantage in the wake of demanded debt forgiveness because it decreased the amount of leverage each client had. Many other institutions that were more like commercial banks and gave larger loan amounts were pressured into forgiving debts, making them ultimately insolvent. Marconi and Moseley (2005) also found that Bolivian institutions that followed a more traditional microfinance pattern by establishing an internal emergency account to help deal with difficult economic times were able to maintain financial success, while other firms who more resembled commercial banks and did not have such an account went under. They also note that institutions that provided training, savings, and quasi-insurance schemes were better off financially because clients were more loyal in repayments. Apart from savings programs, these types of programs are largely unique to microfinance institutions. Lastly, Krauss and Walter (2006) suggest that because of smaller loan sizes and shorter maturities, microfinance institutions can be more flexible in adapting to economic conditions. All of these unique methods of operating may explain why financial returns of microfinance institutions are not connected with the domestic economy.
The last category for explaining why institutions’ financial success is not connected with the domestic economy is that microfinance serves a unique set of clients. Krauss and Walter (2006) suggest that clients of microfinance are, by definition, less integrated into financial markets. Because of this, they are less affected by changes in the domestic economy than other borrowers in the country. Robinson (2001) actually notes that the goods that microentrepreneurs sell generally see an increased demand when domestic economic conditions deteriorate, as consumers shift away from more expensive imported goods. She also notes that, fundamentally, microentrepreneurs have stronger repayment ethics because of a desire to prove themselves or because they do not have access to other sources of credit. In addition to microentrepreneur characteristics, Marconi and Moseley (2005) find that institutions who lent primarily to women had higher repayment rates. They suggest this is because women are less risk averse. Hence microfinance institutions, which traditionally have focused on lending to women, may reap financial benefits from their clients’ risk profiles.

While all of three of these categories of explanations may contribute to the financial resilience of microfinance institutions, there are two interesting points about them. First, for any of these reasons, as microfinance institutions became more like commercial banks, they would lose financial resiliency to the domestic economy. Second, while McGuire and Conroy (1998) do find anecdotal evidence of institutions reducing outreach to deal with the effects of the Asian financial crisis, none of the explanations proffered suggest that institutions may be sacrificing outreach in order to maintain high financial success. On the contrary, they suggest that the institutions with the most outreach are best able weather economic downturns.

2.2 Outreach and the Domestic Economy
Outreach to the poor has been defined in several ways in empirical literature, though not much research had been performed measuring the effect of the domestic economy on it. There are several methods of measuring outreach that have been proposed. Yaron (1992) suggests measuring outreach by loan portfolio value, average loan size, amount of savings in an institution, variety of financial services offered, number of branches, percentage of target population served, growth rate, and number of women served.

Building on these measures of outreach, Christen, Rhyne, and Vogel (1995) categorize measures of outreach in their study of the effects of sustainability on outreach by defining outreach along three dimensions: quality of service, scale of outreach, and depth of outreach to the poor. Quality of service is measured qualitatively by the number of services offered, the quality of the available savings options, and the type of lending. In addition, the authors measure quality through evidence of client acceptance such as low delinquency and willingness to pay high interest rates. Scale is measured by number of borrowers and branches, and percentage of the target population serviced. Perhaps most pertinent to their proposal is their measurement of depth of outreach. They measure outreach through number of women reached, qualitative descriptions of clients, average loan size, and average loan size as a percentage of GNP per capita of the host country. Average loan size, they argue, while only a proxy for client poverty, provides a good quantitative measure because, by and large, poorer borrowers can service smaller debt, and hence tend to take out smaller loans.

Variables for measuring outreach have not been measured directly in relationship to the domestic economy of a microfinance institution, but McGuire and Conroy (1998) provide some anecdotal evidence. They found that in the wake of the Asian financial crisis, many microfinance institutions were being more cautious in extending new loans, and that they also had to raise
average loan sizes, giving larger new loans, to preserve their financial situations. Some institutions reported that they were only giving loans to already established customers with good records to prevent defaults.

3. Data Description

The data set used in this paper was made available through the Microfinance Information Exchange (MIX), a non-profit institution whose purpose is to provide data on microfinance institutions. The subset of the data set which I will use ranges over six years, 2000 to 2006, and includes 3,258 observations. Each observation represents one microfinance organization in a given year. In this section I will first briefly describe MIX and how I obtained the data. Second, I will give general information about the data set I will use. Then, I will provide a more specific look at the descriptive statistics of variables I will be using in my model. Last, I will explain several of the potential statistical problems associated with my data set.

3.1 The Microfinance Information Exchange (MIX)

MIX was incorporated as a non-profit in 2002 as a project between the Consultative Group to Assist the Poorest (CGAP) which is housed at the World Bank and several private foundations. The purpose of the organization is “to help build the microfinance market infrastructure by offering data sourcing, benchmarking and monitoring tools, as well as specialized information services” (MIX Market). To do this the MIX collects data from microfinance institutions who voluntarily submit information to be compiled and then used for industry benchmarks. The microfinance institution-specific data I use was downloaded off of the MIX website using their “comparative analysis” feature which allows users to see metrics for all of the participating institutions for a given year at once. National GDP figures were likewise
downloaded from the MIX website but through the “environment” section of the site that gives metrics from the IMF International Financial Statistics Database.

3.2 General Description of Data

In total I was able to compile a list of data ranging from years 1999 to 2006 with 25 financial and outreach variables, including profit margin, operational self-sufficiency, average loan size, gross loan portfolio size, and number of active borrowers, as well as GDP statistics for each year for a total of 629 firms in 2006. This yielded a total of 3,258 separate observations. Data came from a total of 77 countries, spread throughout the world. On average, each country contributed 42 observations; however they ranged from 207 to just 3 observations. The top ten represented countries and the numbers of observations associated with them are found in Table 1.

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>207</td>
</tr>
<tr>
<td>Peru</td>
<td>173</td>
</tr>
<tr>
<td>Philippines</td>
<td>151</td>
</tr>
<tr>
<td>Ecuador</td>
<td>127</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>114</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>105</td>
</tr>
<tr>
<td>Indonesia</td>
<td>97</td>
</tr>
<tr>
<td>Uganda</td>
<td>90</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>84</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>83</td>
</tr>
</tbody>
</table>

These countries represent each of the seven regions that MIX uses to categorize firms by geography. Table 2 shows the summary statistics for the six variables separated by region: operational self sufficiency, profit margin, gross loan portfolio, average loan size, number of borrowers and write-off ratio. Operational self sufficiency is defined as financial revenues divided by costs associated with regular business such as operating expenses, financial expenses,
and loan loss provisions to cover defunct loans. Profit margin is defined as net operating income, or all income associated with the operation of the business (not including donations) minus the same expenses mentioned above for operational self-sufficiency, all divided by total revenues brought in by the firm. Gross loan portfolio is the value of loans the institution had outstanding. Number of borrowers is the number of people with loans from the institution.

Average loan size is just the gross loan portfolio divided by the number of borrowers. Finally, the portfolio in default >30 days is the amount of loans in with one or more payments due that are later than 30 days divided by the gross loan portfolio.

Table 2: Summary Statistics by Region

<table>
<thead>
<tr>
<th>Region:</th>
<th>Africa</th>
<th>East Asia and Pacific</th>
<th>Eastern Europe and Central Asia</th>
<th>Latin America and the Caribbean</th>
<th>Middle East and North Africa</th>
<th>South Asia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Observations</td>
<td>842</td>
<td>334</td>
<td>571</td>
<td>923</td>
<td>169</td>
<td>419</td>
</tr>
<tr>
<td>Gross Loan Portfolio (US 1000's)</td>
<td>6,120</td>
<td>42,700</td>
<td>4,794</td>
<td>23,800</td>
<td>8,530</td>
<td>16,200</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>(15,200)</td>
<td>(275,000)</td>
<td>(8,663)</td>
<td>(65,400)</td>
<td>(20,700)</td>
<td>(54,700)</td>
</tr>
<tr>
<td>Profit Margin (%)</td>
<td>-0.38</td>
<td>-0.02</td>
<td>-0.33</td>
<td>-0.54</td>
<td>-0.18</td>
<td>-0.49</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>(2.17)</td>
<td>(0.98)</td>
<td>(6.46)</td>
<td>(13.97)</td>
<td>(1.16)</td>
<td>(2.33)</td>
</tr>
<tr>
<td>Operational Self Sufficiency (%)</td>
<td>1.02</td>
<td>1.18</td>
<td>1.31</td>
<td>1.16</td>
<td>1.14</td>
<td>1.05</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>(0.48)</td>
<td>(0.37)</td>
<td>(0.89)</td>
<td>(0.33)</td>
<td>(0.44)</td>
<td>(0.45)</td>
</tr>
<tr>
<td>Portfolio in Default &gt; 30 Days (%)</td>
<td>0.09</td>
<td>0.08</td>
<td>0.03</td>
<td>0.06</td>
<td>0.04</td>
<td>0.04</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>(.13)</td>
<td>(.10)</td>
<td>(.05)</td>
<td>(.06)</td>
<td>(.08)</td>
<td>(.08)</td>
</tr>
<tr>
<td>Number of Borrowers¹</td>
<td>21,028</td>
<td>96,598</td>
<td>4,778</td>
<td>27,147</td>
<td>25,762</td>
<td>210,249</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>(49,948)</td>
<td>(471,688)</td>
<td>(7,375)</td>
<td>(63,091)</td>
<td>(52,384)</td>
<td>(756,863)</td>
</tr>
<tr>
<td>Average Loan Size ($US)</td>
<td>436</td>
<td>388</td>
<td>1,552</td>
<td>890</td>
<td>562</td>
<td>149</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>(1,007)</td>
<td>(605)</td>
<td>(1,808)</td>
<td>(1,266)</td>
<td>(720)</td>
<td>(253)</td>
</tr>
</tbody>
</table>

Summary statistics yield interesting information, both about microfinance trends throughout the world as well as across countries. First, as a general trend, while on average firms across regions are operationally self-sufficient as shown by levels above 100%, they are not, on average, profitable, shown by negative profit margins. By definition the major difference

¹ The number of firms who contributed numbers for number of borrowers, average loan size and write off ratio was actually less than the total number of observations since some firms did contribute this information.
between these two variables is that operational self-sufficiency includes donations made to the firm in the revenue, or numerator of the variable, while profit margin uses net operating income, which excludes revenue from donations, as a numerator. The exclusion of revenues from donations in profit margin but not in operational self-sufficiency accounts for why, on average, these firms are self-sufficient, but not profitable. This suggests that while firms are generally able to cover their expenses from year to year, they are only able to do it with the aid of continued donations.

Separated by region of the world, the summary statistics also offer some interesting conclusions about the state of microfinance in different parts of the world. First, while firms across regions yield similar profit margins on average, the variance in Latin America and the Caribbean is much larger than in any other region. This seems to suggest that Latin America has a large number of firms with profit margins well above the average, and far above the average, or both. This interpretation confirms popular sentiment that profitability as a model for microfinance has been adopted more in Latin America than in other parts of the world. Second, in terms of loan portfolios, firms are larger on average in Latin America and the Caribbean and in East Asia and the Pacific, though in terms of number of borrowers firms are larger in South Asia. Third, and not surprisingly, the highest average loan balances are found in Eastern Europe and Central Asia and in Latin America and the Caribbean. Average loan size is often used for a proxy for client wealth in microfinance; hence it is not surprising that the highest average loan sizes are found in parts of the world where wealth levels are generally higher. Last, it is interesting to note that in Eastern Europe and Central Asia, generally considered areas where microfinance is relatively younger, the firms are smaller, but there is also less default.

3.3 Description of Variables Used in Model
In this thesis I use the year to year percentage change in five performance variables to test whether microfinance performance is linked to domestic GDP growth. These are: profit margin, operational self sufficiency, % of portfolio in default >30 days, number of borrowers, and average loan size for the various years and countries represented in the data set. The summary statistics for these variables can be seen in Table 3.

Table 3: Year over Year Percentage Changes in Microfinance Performance Variables 2001-2006

<table>
<thead>
<tr>
<th>Year Over Year Percentage Changes in Variable:</th>
<th>Number of Observations</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit Margin</td>
<td>2,356</td>
<td>-70.90</td>
<td>-0.36</td>
<td>140.61</td>
<td>78.31</td>
<td>-95.47</td>
<td>-29.80</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>844.86</td>
<td>423.38</td>
<td>2654.38</td>
<td>1872.89</td>
<td>829.15</td>
<td>1776.38</td>
<td></td>
</tr>
<tr>
<td>Operational Self Sufficiency</td>
<td>2,358</td>
<td>42.03</td>
<td>26.76</td>
<td>16.20</td>
<td>15.34</td>
<td>11.59</td>
<td>42.13</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>282.83</td>
<td>124.37</td>
<td>67.17</td>
<td>54.22</td>
<td>65.20</td>
<td>738.47</td>
<td></td>
</tr>
<tr>
<td>% Portfolio at Risk &gt; 30 Days</td>
<td>1,795</td>
<td>76.37</td>
<td>82.68</td>
<td>60.14</td>
<td>75.18</td>
<td>76.43</td>
<td>79.21</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>289.88</td>
<td>486.04</td>
<td>298.90</td>
<td>436.00</td>
<td>481.97</td>
<td>389.40</td>
<td></td>
</tr>
<tr>
<td>Number of Borrowers</td>
<td>2,502</td>
<td>16.86</td>
<td>74.87</td>
<td>50.83</td>
<td>43.26</td>
<td>19.53</td>
<td>21.71</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>66.91</td>
<td>539.75</td>
<td>236.68</td>
<td>452.26</td>
<td>111.45</td>
<td>40.56</td>
<td></td>
</tr>
<tr>
<td>Average Loan Size</td>
<td>2,453</td>
<td>94.07</td>
<td>81.18</td>
<td>69.91</td>
<td>74.47</td>
<td>78.48</td>
<td>66.56</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>322.71</td>
<td>545.22</td>
<td>273.48</td>
<td>624.42</td>
<td>702.05</td>
<td>294.87</td>
<td></td>
</tr>
</tbody>
</table>

Several interesting features can be seen by examining this data by year. First, high standard deviations evidence that there is a good amount of variation for all variables, making them more useful in regression analysis. Second, all of the variables except profit margin have seen year over year increases in each year. This has several implications: one, institutions are becoming more self-sufficient, two, there is more and more default in portfolio, and three, even though institutions are reaching more and more clients, average loan sizes are also increasing. All of these observations reflect the current trend of commercialization, which is especially prevalent among institutions contributing to the MIX. Firms are becoming more and more like commercial banks through greater self-sufficiency, riskier portfolios, more borrowers and higher average loan amounts.

3.4 Problems with the data set
Although the data set contains a large number of observations, one problematic characteristic of it is that the information was submitted voluntarily by institutions, rather than gathered systematically from a diverse set of microfinance institutions. This may be of concern because it means possible sample selection bias, both in terms of which firms participate in the sample and the difference in participating firms from year to year. First, since firms were not chosen randomly, there is likely to be selection bias. If the variables represented in the data set are correlated with being willing to submit data to MIX, it would mean that these variables would be biased. For example, one can imagine the case where only the most successful firms, financially or in terms or outreach metrics, are either willing or even able to submit information to be put into the data set. This would mean that the data would tell a story in which microfinance seems more successful than it really is. Another example might be that only firms that are relatively large are able to spend resources on keeping records on the number of variables required, or to have an independent auditor review their financial statements. This would mean that smaller firms, and variable values associated with smaller firm size, would not have a representation in the data set. In these or other possible scenarios, it is clear that the MIX data does not provide a perfectly representative sample.

Second, because the information is submitted voluntarily, the number of participating firms has grown year over year. Table 4 shows the number of institutions contributing data each year.

Table 4: Number of Institutions Submitting Data to MIX 1999-2006

<table>
<thead>
<tr>
<th>Year</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Microfinance Institutions</td>
<td>130</td>
<td>187</td>
<td>248</td>
<td>349</td>
<td>493</td>
<td>583</td>
<td>639</td>
<td>629</td>
</tr>
</tbody>
</table>
Since 1999, the number of microfinance institutions included in the data set has increased almost six fold. In most years it has gone up by close to 100 firms, except in 2006 when the number of firms included actually dropped by ten firms. While the number of observations gets conveniently larger and larger each year, this growth of the sample can be problematic because it means that the sample being analyzed is different from year to year. This could bias the sample in a number of ways. First, suppose firms that are more profitable in one year are more likely to report their number that year, while firms that have poorer performance refuse to participate. However, this concern is not paramount, since the firms that enter the sample tend to stay in the sample once they enter. Second, it means some variation associated with years, as opposed to changes in microfinance institutions, will be introduced into the sample.

While sample bias caused both by the selection of firms and the increasing number of firms each year in the sample may limit the universality of implications discovered using the data, it does not, however completely discredit what we can learn from these observations, especially in the absence of better data. Moreover, because the data one of the only data sets of its kind, a number of studies have used the same data set, including Krauss and Walter (2006).

4. Methodology

In order to measure effects of domestic economic growth on the performance of microfinance institutions, I use variables measuring both financial performance and outreach as dependent variables. As an independent variable I use domestic GDP growth. Using an OLS regression model and controlling for year and country fixed effects I measure what impact, if any, domestic GDP growth has on the various performance variables.

4.1 Variables
In order to measure institution performance, I use three variables for financial performance and two for outreach. For financial performance I use year over year percentage changes in profit margin (PM), like Krauss and Walter (2006), operational self sufficiency (OSS) and percentage of loan portfolio in default > 30 days (Portfolio Default), also similar to Krauss and Walter (2006), McGuire and Conroy (1998) and Jansson (2001).

Profit margin is defined as:

\[ PM = \frac{Net \ Operating \ Income}{Financial \ Revenue} \]

where net operating income is financial revenue less all expenses related to the microfinance institutions’ core financial services but not including donations or revenues and expenses from non-financial services, and financial revenue is all revenue associated with financial activities, including all donations.

Operational self sufficiency is defined as:

\[ OSS = \frac{Financial \ Revenue}{Financial \ Expense + Operational \ Expense + Loan \ Loss \ Provision} \]

where financial expense is expenses such as interest on borrowed monies, operational expense is any expenses associated with the operation of the institution, and loan loss provision is the amount dedicated in the institutions accounting for that year to cover bad loans.

Percentage of loan portfolio in default is defined as:

\[ Portfolio \ Default = \frac{Amount \ of \ Loans \ in \ Default > 30 \ days}{Gross \ Loan \ Portfolio} \]

where the amount of loans in default >30 days is equal to the value of all loans outstanding that have one or more installments of principal past due more than 30 days, including all the unpaid principal amount, but not accrued interest. It also does not include loans that have been
restructured or rescheduled. The gross loan portfolio is the total value of the principal of all outstanding loans, whether delinquent or not.

These variables are relevant for several reasons. First, they represent the financial performance of an institution including and not including donations made to the institution. While operational self sufficiency includes the donations made to an organization, profit margin uses net operating income, which does not include donations; hence, by including both I am able to observe any differences due to donations. Second, they are the financial indicators most represented in the data. Other variables, such as return on assets or return on equity, have fewer associated data points. Third, they are coordinated chronologically with GDP growth, unlike write-off ratio, which may include defaulted debt from a period that does not match the GDP growth measured.

For outreach performance I will use percentage change in variables from two of the categories, scale and depth, defined by Christen, Rhyne and Vogel (1995). To measure scale of outreach I will use the number of active borrowers. To measure depth of outreach I will use average loan size. These two variables are appropriate because, like the financial success variables, they are the most represented in the data set. Moreover, they offer a clear and simple measurement these two aspects of outreach to poor clients. Unfortunately, no suitable variable could be found to measure quality of outreach, the third category of outreach defined by Christen, Rhyne and Vogel (1995).

For my dependent variable I will use year over year percentage domestic GDP growth. I use GDP growth, as opposed to GDP level, in order to observe the effects of changes in the domestic economy rather than observe differences associated with higher- or lower-income countries. On potential problem that remains with using GDP growth is the fact that with
growing GDP, we would expect to see average loans balances rise due to increased GDP per capita, rather from solely a movement away from lending to poor individuals. While this correlation may be a factor, we will assume for this model that the change in average loan size due to increased GDP per capita as opposed to the institution lending to less poor clients is negligible.

4.2 Statistical Model

Like Krauss and Walter (2006), I use an OLS model to measure the effect of changes in the domestic economy on the performance of microfinance institutions. The simple model is as follows:

$$DV_{it} = \beta_0 + \beta_1 GDPgrowth_t + \varepsilon_i$$

Where $DV_{it}$ is the year over year percentage growth in financial or outreach variable $i$ ending in year $t$, $GDPgrowth_t$ is the year over year percentage growth in domestic GDP ending in year $t$, and $\varepsilon_i$ is an error term that captures all other variation.

In order to control for any other trends which might be going on in the country, I use the previous year’s GDP growth. Also, as mentioned in the data description section, there is concern for sample bias, both for which firms participate and which years they decide to submit their data to MIX. In order to help mitigate this bias, I introduce a dummy variable for each of the years of data in order to capture any variation that is year specific. Using these two controls gives the following model:

$$DV_{it} = \beta_0 + \beta_1 GDPgrowth_t + \beta_2 GDPgrowth_{t-1} + \sum \beta_i * year_t + \varepsilon_i$$

where $GDPgrowth_{t-1}$ represents the percentage change in GDP growth last year and $\sum \beta_i * year_t$ represents dummy variables for all of the years in the sample except one. Since I use GDP growth from the previous year one year of data does not have this variable and I can only use
data from years 2001 to 2006. Dummy variables are used for years 2002 to 2006 since the variation due to 2001 will be included in the constant $\beta_0$.

Finally, I use a country fixed effect dummy to control for any variation specific to different countries, for instance, if smaller countries have smaller economies and this makes microfinance performance more likely to be correlated with GDP growth there. This gives the final model:

$DV_{it} = \beta_{0i} + \beta_1 * GDPgrowth_t + \beta_2 * GDPgrowth_{t-1} + \sum \beta_{ji} * year_{ji} + \sum \beta_x * country_x + \epsilon_i$

where $\sum \beta_x * country_x$ represents dummy variables for all but one of the 78 countries represented in the sample. As with the year dummy, variation of the final country will be included in the constant $\beta_0$.

In these two models, if the coefficient $\beta_1$ is significant, it means that that domestic GDP growth has a significant effect on the growth of performance variable $i$. If $\beta_1$ is positive, it suggests that growth in the microfinance performance in variable $i$ tends to move together with the domestic economy. If $\beta_1$ is negative suggests that growth in the variable moves against the domestic economy. And if $\beta_1$ is not significant it suggests that growth in the variable does not correlate with the domestic GDP growth.

The arguments that suggest that financial performance variables will move significantly with GDP growth derive from an assumption that with a worsening domestic economy, creditors will default in greater numbers and capital will become more expensive for institutions to use, and that during times of high economic growth creditors will not default and institutions will have access to cheaper capital. However, Krauss and Walter (2006), McGuire and Conroy (1998), and Jansson (2001) all suggest that microfinance institutions, and in particular those that have the greatest outreach, are financially resilient to downturns in the markets. Additionally the
lack of correlation of financial outcomes with domestic GDP across geographical areas and over several years as opposed to just in times of financial downturns suggests that microfinance institutions are not affected by an improving domestic economy either.

Given microfinance institutions’ observed financial resilience to market downturns and lack of correlation in upturns, the question becomes whether or not microfinance institutions will show the same resilience in terms of their outreach. If institutions are reducing outreach in order to boost financial performance we should see a significant correlation with outreach variables and domestic GDP growth, while financial variables would remain uncorrelated. As mentioned earlier, McGuire and Conroy (1998) found some anecdotal evidence for this type of behavior during the Asian financial crisis. If outreach variables do not, however, turn out to be correlated with domestic GDP growth, it suggests that microfinance institutions are not reducing outreach to boost financial performance in response to the domestic economy. Similarly, it would suggest that institutions’ performance both financially and in terms of outreach is not affected by the domestic economy. Moreover, it would strengthen the case for the theory that microfinance institutions are unique for the reasons mentioned above – financing, operations, and clients – and that as they become more like commercial banks they may lose some of this performance resiliency.

In summary, I perform OLS regressions, correcting for year and country specific fixed effects to measure whether three financial variables and two outreach variables are significantly correlated with domestic GDP growth. Past research suggests that financial variables will not be correlated. If outreach variables are correlated it suggests that institutions are reducing outreach in order to maintain high financial performance. If not, it suggests that the performance of
microfinance institutions, both financially and in terms of outreach, is not significantly affected by the domestic economy.

5. Results

This section discusses the results of the analyses mentioned above. I find that there is no significant correlation with changes in any of the microfinance performance indicators and domestic GDP growth. I examine possible reasons for this outcome and suggest implications of the finding. Table 5 describes the result of the five analyses mentioned in the previous section both excluding country fixed effects (equation (1)) and excluding them (equation (2)).

Table 5: Microfinance Performance and GDP Growth

<table>
<thead>
<tr>
<th></th>
<th>Operational Self Sufficiency % Growth</th>
<th>Financial Variables</th>
<th>Outreach Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Profit Margin % Growth</td>
<td>Portfolio at Risk &gt; 30 Days % Growth</td>
</tr>
<tr>
<td>Number of Observations</td>
<td>2,358</td>
<td>2,356</td>
<td>1,795</td>
</tr>
<tr>
<td>(1) GDPgrowth, (excluding country fixed effects)</td>
<td>.248 (7.69)</td>
<td>1.255 (3.399)</td>
<td>-.871 (.976)</td>
</tr>
<tr>
<td>(1) R Squared</td>
<td>.0019</td>
<td>.0028</td>
<td>.0499</td>
</tr>
<tr>
<td>(2) GDPgrowth, (including country fixed effects)</td>
<td>-.073 (.930)</td>
<td>-.2059 (4.081)</td>
<td>-.644 (1.186)</td>
</tr>
<tr>
<td>(2) R Squared</td>
<td>.0384</td>
<td>.0528</td>
<td>.0499</td>
</tr>
</tbody>
</table>

* represents significance at 5% confidence level

While the coefficients of the variables tell a somewhat mixed story about the effect of domestic GDP growth on microfinance institutions’ performance, none of them are statistically significant. Similarly, the R Squared on each regression suggests a very low level of explanatory value in the model. This suggests that microfinance institutions’ performance is likely not tied significantly to the domestic GDP growth.

This result has several possible explanations. First, there may actually be significant correlations in the real world, but because of statistical problems they do not appear in the data.
For instance, two possible causes for the lack of a significant correlation may be lack of sufficient data, and the presence of sample bias, as discussed earlier. Both of these, however, are unlikely causes for the lack of a significant result. To begin, the number of data points was actually quite high, ranging from 1,795 to 2,358. Moreover, even without adding the additional country dummy variables there is still no significant result. This also accounts for the possibility that there may not have been enough variations in GDP growth within a certain country. Given the high number of observations, it may still be the case that the results are skewed by sample bias. For instance, because the institutions who submit data are generally considered to be high performing institutions, they may be more resilient to changes in the domestic economy. While this is important to consider, the existence of institutions whose performance does not correlate with domestic GDP growth still evidences the possibility that such institutions can exist, and that firms do not necessarily have to be affected by the domestic economy.

Assuming no such statistical problems, and that the results do reflect the reality of the microfinance institution population, this would suggest that overall microfinance institution performance is not connected with the domestic economy. If the explanations suggested earlier for financial resiliency are correct, they would also suggest this result for outreach. This would have several implications: First, it suggests that microfinance may be effective even in areas and times of economic turbulence, furthering the case that microfinance is a promising solution to poverty. Furthermore, it suggests that the financial resilience of microfinance institutions may come from some of the unique characteristics of microfinance such as how they are financed, their unique operational techniques, and their unique set of clients, as opposed to sacrificing outreach for financial success in response to economic conditions.
6. Conclusion

In this thesis I have looked at whether the performance of microfinance institutions, both financially and in terms of outreach, is correlated with domestic GDP growth. Microfinance has been a topic of much interest recently, especially due to the hope that it can outreach to help poor clients while still remaining financially successful. It has shown evidence of impressively low default rates and even profitable returns from clients deemed by other institutions as too risky or unprofitable. Adding to the prospect of helping the poor while still maintaining financial success, past research has suggested that microfinance is financially resilient to downturns in the domestic marketplace. Most research has focused on financial performance variables in times of economic downturn. McGuire and Conroy (1998) look at Asian institutions immediately following the Asian financial crisis in 1997. Similarly, Jansson (2001) and Marconi and Moseley (2005) look at the financial performance of South America institutions over slow economic periods. These all find that microfinance institutions, compared to commercial banks, are remarkably resilient financially.

Krauss and Walter (2006) take this further, using regression analysis to correlate domestic GDP levels and various financial indicators of microfinance institutions worldwide. They find that only two of five of the financial indicators were significantly correlated with domestic GDP levels, and these were only weakly correlated. Building on the past research, they suggest three types of explanations for the resiliency of microfinance institutions: financing that allows independence from the domestic economy, unique operations that ensure stability such as group lending, and clients that are less affected by downturns in the domestic economy than the client of commercial banks.
This paper adds to their work by looking at both financial and outreach variables. Using six years of data from the Microfinance Information Exchange (MIX), I look at correlations between three financial variables and two outreach variables with domestic GDP growth. I find that none of these variables and domestic GDP growth are significantly correlated. While this may be the result of a biased sample, it still suggests that some institutions are able to perform financially and in terms of outreach without being affected by domestic GDP growth. This result suggests that institutions can operate successfully in situations of low GDP growth, that they don’t necessarily maintain high financial success at the expense of outreach and that perhaps there are some intrinsic characteristics of microfinance institutions that make them so resilient.

This result also opens several avenues for future research. First, while it shows that institutions’ performances do not correlate with domestic GDP growth, it does not explain the exact reason why. Second, further investigation could be done to determine whether institutions are resilient primarily in slow economic conditions, or if they also demonstrate little correlation in economic conditions of high growth. Lastly, further studies could be performed examining how firms of different legal structures perform. For instance, fully for-profit institutions may have a greater incentive to decrease outreach in times of economic stress in order to maintain a high return. This study would have especially interesting implications for the recent trends of commercialization within microfinance.
References


