

A Test of Portfolio Risk in Microfinance Institutions

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Abstract: *Microfinance institutions serve some of the world's most needy. A significant challenge facing these institutions is the battle for financial self-sufficiency. This includes controlling all the risks in the loan portfolio. In addition to adequate collection, timely payments provide for a greater extension of funds to other poor people, resulting in further outreach and development. This study uses a large international cross-sectional microfinance data set to test how lending methodology mitigates or contributes to loan portfolio risk. Group-lending is of particular importance to Christian organizations seeking to use microfinance as more than just assistance to the poor, but also to empower women and to increase outreach. The results show that group-lending methodologies reduce the risk in MFI portfolios compared to traditional individual loans. JEL Codes: G21, G32, E6.*

Currently there are over 7000 microfinance institutions (MFIs) serving over 25 million clients throughout the world. This method of serving the world's poor was popularized in the 1970s with the establishment of the Grameen Bank by Muhammad Yunus. Since then, many organizations have formed to raise funds in developed nations and lend those funds in developing countries. One Christian organization in this field is the Opportunity International Network (OI). OI's mission "is to provide opportunities for people in chronic poverty to transform their lives" (www.opportunity.org). This organization has been able to establish partner institutions that lend funds to impoverished people at a very low, but effective rate. To date, OI's partners have loaned more than \$127 million. However, for partner institutions to continue aiding clients the institutions must reach a level of self-sufficiency.

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In the effort to achieve self-sufficiency, many MFIs have become commercial institutions. If successful at this change, MFIs will no longer be reliant on government grants or below market-rate loans. But like all commercial lending institutions, commercial MFIs must manage risk. Microlending is inherently risky. This study examines portfolio risk in MFIs. The purpose of this paper is to identify the existing practices and factors that contribute to the widely reported low rate of payment default in MFI operations. The disaggregated nature of the data used for this study allows for a test of lending methodologies as a portfolio risk factor, while controlling for other micro- and macroeconomic variables.

Previous empirical work on microfinance institutions is limited primarily to case studies and small sample reviews of financial conditions. The data for our study comes from a large cross section of institutions, from many parts of the world, segregated by the types of loans made, and measured over a significant period of time. This panel data provides a unique opportunity to identify risk factors in microlending—knowledge of which is the key to efforts to provide for better management, and therefore sustainability, of microfinance lending portfolios. Our main findings are that group-lending *per se* does indeed reduce portfolio risk, while lending to women—which has desirable normative characteristics—may in and of itself increase portfolio risk. On balance, group lending, particularly to women, appears to be a key mechanism for making microlending sustainable.

The following section reviews key lending issues in microfinance. Section II reviews previous work on risks in the loan portfolios of microfinance institutions, section III presents an empirical model and describes the data, section IV presents the empirical findings, and section V concludes.

I. Review of Lending Issues

MFI Lending Methodologies

Though all MFIs work toward the same goal—poverty reduction and the promotion of economic growth—several different types of microfinance lending are employed throughout the world.

The first approach is individual lending. As the name suggests, this is “the provision of credit to individuals who are not members of a group that is jointly responsible for loan repayment” (Ledgerwood 1999, p. 83). Each loan is specifically tailored to the individual and business involved. This approach tends to work best when used with larger urban businesses or small rural farmers, since collateral is generally required. Also, the

personal nature of the relationship between the bank and the borrower often results in repeated transactions over a long period of time.

A second microfinance model is group lending—a strategy initially developed by the Grameen Bank of Bangladesh. It was designed to serve rural and landless women who wish to finance income-generating activities. The general approach is as follows. Small groups of four to seven unrelated individuals are formed. Before receiving any loans each member is required to contribute savings for one to two months, and is also required to continue saving throughout the duration of the loan. Additional requirements for loans include prompt repayment, mandatory weekly meetings, and pre-credit orientation and assistance. After these conditions are satisfied, the credit officer loans money to two individuals. No further lending occurs until the initial loans are repaid. The same process occurs for the remaining members of the group.

This model is especially effective at reaching out to women from low-income groups, since borrowers do not need collateral. Instead, the other members of the group guarantee and are responsible for the loans to all members of the group. In addition, the savings of the group is managed by the group and can be loaned. The empowerment that this aspect of microfinance achieves is of particular importance to Christians. Mugabi (2003) reports that Christian microenterprise development programs play a “pivotal role” in developing countries. Microfinance can serve the needs of poor, empower women, restore relationships, and transform lives. Thus, microfinance is the part of the “mission work of God.”

A third, but similar group approach, is village banking. Village banks are “community-managed credit and savings associations established to provide access to financial services in rural areas, build a community self-help group, and help members accumulate savings” (Ledgerwood 1999, p. 85). Village banks are made up of 25–40 women who cross-guarantee each other’s loans and self-manage the distribution and collection of funds. Village banks are primarily financed by loans from microfinance institutions, but forced and voluntary savings collected by the group may also be loaned to finance member and non-member activities. The amount of saving required is either a fixed amount or is based on the size of the loan. Bank members manage the lending of the collected savings and each member receives a proportional share of the interest earned. The deposited funds may also serve as last-resort collateral for the loan.

This brief review suggests that institutions have placed a heavy emphasis on the lending methodology in their operations. The success of the institution, its sustainability and low level of risk in the loan portfolio,

may be determined by the extent to which group lending methodologies are employed. This is the key question investigated in the present study; we control for lending methodology in order to determine its ability to mitigate risk.

Gender

An additional objective of many microfinance institutions is to “empower women by increasing their economic position in society” (Ledgerwood 1999, p. 37). Women in the poorest groups have special barriers that men do not face. They are the primary caregiver for children and the family. So they tend to be especially concerned about issues such as education, health, nutrition, and food preparation. In some countries, women do not have the same economic opportunities as men because of societal, cultural, and religious bias. Even in countries where women do have access to economic opportunities, there is discrimination. In most developing countries, women typically earn only 40 to 50 cents for every dollar men earn (UNDP 2003, pp. 314–317).

The United Nations’ *Human Development Report 2003* outlines the progress that has been made on the “millennium goals” set forth in the UN Millennium Declaration. The stated intention is to “eradicate poverty, promote human dignity and quality, and achieve peace, democracy and environmental sustainability” (UNDP 2002, p. 1). One of these goals is to promote gender equality. Some progress has been made, but not enough. While there is now more equality, the report states, “women in poor areas tend to be excluded from overall progress toward the goals” (UNDP 2003, p. 4).

For all these reasons, MFI lending is often targeted towards women rather than men. And many MFIs are on record with the hope that growth in microfinance will promote equality by giving women economic opportunities and freedom.

For the institutions in this study, we identify the extent to which funds are loaned to women. As in the Grameen model, group-lending is the approach most widely used when an MFI lends to women. If group lending is less risky than other kinds of lending it may be that more loans to women also reduces risk in the portfolio—a hypothesis we test.

Normative Values in Lending

One benefit of group lending is that the saving requirements can both lead to further economic growth and help protect the lending institution. This greater sustainability means that more funds can be loaned. And the

social dimension of the group yields additional benefits. It leads to higher repayment rates and further lending, both to the original borrowers and to others in the community. Extensive training is not needed. Because each credit officer deals with a group of borrowers instead of individuals, each officer can reach more people—an economy of scale in lending that reduces the costs of servicing the loan while still allowing each officer to maintain personal contact with borrowers.

This model is particularly relevant for Christian organizations because of the ability to link social services through group meetings. An important goal of many institutions is to improve the spiritual well-being of the people by preaching the Gospel. Microfinance enables this goal in two ways. First, improving economic status allows the poor to reduce their focus on the temporal and immediate and turn instead to the spiritual and eternal. Second, social services and personal contact allow for direct evangelism and witnessing. The weekly group meetings provide an avenue of contact through which relationships start, ultimately leading to a sharing of the Gospel. Mugabi (2003) provides such examples where the mission work of God is combined with development programs. The control for group lending in this study lends some guidance as to the extent institutions can achieve these goals.

II. Previous Work on Risks in Microfinance

There is a large literature on financial risks facing MFIs. Though there is little empirical work in this area, and a great diversity in views, over the last decade a consensus has emerged with regard to the major issues in microfinance.

Two comprehensive reviews of the available literature discuss how group-lending methodologies can mitigate risks in MFI loan portfolios. Morduch (1999) argues that group lending mitigates risk by reducing adverse selection and moral hazard problems, because group programs (i) provide dynamic incentives, (ii) regular repayment schedules, and (iii) collateral substitutes. Brau and Woller (2004) discuss an extensive literature showing that social collateral is important to successful microfinance programs. While the specific features of group lending covered in these reviews cannot be identified directly in our data, OI's group lending methodology—an approach very similar to village banking described above—incorporates all of the features typically found in group lending.

Morduch and Brau and Waller each suggest that much empirical work is needed. And, of special relevance for our study, Morduch points out that “empirical understandings of microfinance will also be aided by studies

that quantify the roles of the various mechanisms in driving microfinance performance...Well-designed experiments would help (e.g, individual-lending contracts to some of the sample, group-lending contracts to others...)."

Several further empirical findings are relevant to the model we test in this paper. Bhatt and Shui-Yan (2001) report on recent studies showing that the Grameen Bank has significantly helped to increase household incomes, productivity, labor force participation, and rural wages, and that the level of absolute poverty is 75 percent lower where it operates than in villages without it. The authors also point out that the Grameen Bank is not entirely financially self-sufficient. Therefore, despite success at reducing poverty through the employment of a group-lending methodology, MFIs may face some risks if they are to continue operations since they may not always be able to rely on government or donor assistance.

Wydick (1999) finds that repayment rates are improved when the ability to monitor participants and enforce group relationships is higher. We therefore include in our study a variable on the number of outstanding clients for each MFI, which may capture some of these effects. Zeller (1998) looked at the determinants of repayment performance for group lending in Madagascar using data from a random sample of 146 groups in six different lending programs. Consistent with Wydick, the study's key findings are that groups consisting of members facing homogenous risk exposure do not have higher repayment rates, but that repayment rates significantly improve when groups have some type of social cohesion, informal or not. This result suggests that group lending can significantly improve repayments and therefore reduce risks in loan portfolios.

Woller (2000) reviews the financial viability of village banking using data for nine institutions by studying the relationship between the return on the institution's loan portfolio and various operation cost measurements. Despite the difficulty of making conclusions from the small sample, the study found three strong indicators of financial health—portfolio yield (return), the interest spread, and number of borrowers. A clear implication of this result is that MFIs must charge a reasonable rate of interest on their loans to insure continuing operations and that scaling up operations will protect the institution in the long-term. A key finding in the study is that many efficiency variables were uncorrelated with the return on the portfolio.

Finally, a case study by Opportunity International shows that high or hyperinflation economic conditions severely reduce the ability of microenterprises to repay loans. Weele and Markowich (2001) study

the experience of two different microfinance institutions. In both cases, the loans to clients were indexed to the U.S. dollar and as the countries experienced high inflation and the resulting devaluation of their currencies, most clients were unable to make complete payments. This case study shows, not surprisingly, that macroeconomic conditions affect the risks in the portfolio. Accordingly, in our study we control for macroeconomic factors when looking at the determinants of risk in MFI loan portfolios.

III. Empirical Model and Data

The above review suggests that the level of risk in an MFI's loan portfolio is influenced by the choice of lending methodologies, borrowers' gender, other (microeconomic) institutional factors, and macroeconomic variables that affect the ability of the borrower to repay loans.

This study seeks to test the contribution to risk in MFI loan portfolios of two key factors, the lending methodology and the extent of lending to women. A general model to study these two issues takes the form

$$Y_{ijt} = \alpha + \beta_1 X_{1ijt} + \beta_2 X_{2ijt} + \gamma V_{ijt} + \varepsilon_{ijt} \quad (1)$$

where Y_{ijt} is a measure of the risk in the portfolio of MFI i in country j in period t . The first independent variable, X_{1ijt} is a measure of the lending methodology used for MFI i in country j in period t ; X_{2ijt} is a measure of the portion of the portfolio lent to women by MFI i in country j in period t ; and V_{ijt} is a vector of control variables for institution i in country j for period t .

The vector of control variables includes both microeconomic and macroeconomic factors affecting portfolio risk. First, at the micro, or institutional level, the size and number of loans made are known to impact risk in portfolios of microloans. The number of outstanding clients in the institution may proxy for the ability to monitor borrowers, and institutions that lack sufficient scale will have higher risks. Also, the rate of return on the portfolio is a factor—the lending rate on the portfolio is likely to affect the ability of the borrower to make repayment. MFIs that seek a high return should face a higher risk of loss.

At the macroeconomic level, this study controls for overall performance of the economy in each institution's country. Measures of real gross domestic product and the GDP deflator are included as independent variables. If the overall economy rises, the risk of the portfolio will decline. On the other hand, the direction of the effect from inflation is ambiguous. If the inflation rate rises, particularly to hyperinflation levels, the risk of

the portfolio rises. Conversely, higher inflation may help borrowers if they originally obtained fixed rate loans dominated in local currency. Using the case study evidence of microfinance institutions during inflationary times, and the fact that the countries represented in the data have experienced high rates of inflation, the coefficient on the inflation rate variable should be positive—higher inflation increases the risk of default in the loan portfolio.

Our two measures for the dependent variable are Portfolio in Arrears (PIA) and Portfolio at Risk (PAR). PIA measures the percent of the total loan portfolio overdue by more than 30 days, while PAR measures the percent of the total loan portfolio that has at least one payment overdue by more than 30 days. PIA is a measure of late payments, whereas PAR is a measure of the risk to the entire portfolio that those late payments indicate. PIA measures only the amounts of payments at risk, not the loan value or the institution's total risk. PAR may be a better measure of overall risk in the institution's loan portfolio.

Thus, the empirical model estimated in this study is

$$\begin{aligned}
 Y_{ijt} = & \alpha + \beta_1 X_{1ijt} + \beta_2 X_{2ijt} + \beta_3 X_{3ijt} + \beta_4 X_{4ijt} \\
 & + \beta_5 X_{5jt} + \beta_6 X_{6jt} + \beta_7 X_{7ijt} + \varepsilon_{ijt}
 \end{aligned}
 \tag{2}$$

where Y_{ijt} is portfolio in arrears or portfolio at risk for MFI i in country j in period t . X_{1ijt} is an indicator variable that takes the value of 1 if the portfolio contains loans made to individuals and 0 otherwise. If group-lending methodologies control risk the coefficient on X_{1ijt} will be positive—individual lending increases risk in the portfolio. The expected sign on X_{2ijt} is ambiguous. Lack of access to capital for women may suggest greater risk (positive sign); however, it is expected in many MFIs that lending to women, which is primarily done through group programs or village banking, will reduce risk (negative sign). X_{3ijt} is the number of outstanding clients by lending methodology for MFI i in country j in period t ; the expected sign is negative—when the institution increases its scale of operations, risks fall. X_{4ijt} average loan size by lending methodology for MFI i in country j in period t ; the expected sign is negative.

The macroeconomic variables are items five and six. X_{5jt} is the percent change in GDP for country j in year t ; the expected sign is negative. X_{6jt} is the percent change in the index value of the GDP deflator for country j in year t ; the expected sign is positive. The final variable is institutional. X_{7ijt} is the return on the overall loan portfolio for MFI i in country j in

period t ; the expected sign is positive—a higher return suggests higher risk clients.

The data for this study were provided by Opportunity International (OI). Each quarter OI reports the Year-to-date Income Statement, Balance Sheet, and Portfolio information for each of its member institutions. The OI institutions are located in developing countries throughout world—Eastern Europe, Africa, Asia, and Latin America. In total there are 37 different microfinance institutions studied over 12 quarters for individual, trust bank and other group lending, providing 935 total observations.

The data appendix describes each variable. All values are converted to U.S. dollars using market rates in each period. One key measurement problem is the lack of quarterly reports on gross domestic product and inflation. These macroeconomic variables are available for the developing countries in this study on an annual basis only. However, this is not expected to significantly bias the results since a great deal of cross-sectional variation exists.

IV. Results

Summary Statistics

Table 1 reports summary statistics for the sample used in this study. Approximately 68 percent of all observations involve group-lending loan portfolios. The wide range of values for three variables—average loan size, number of outstanding clients, and value of outstanding portfolio—suggest heteroskedasticity in the data. Tests of the dependent variables against these three variables (not reported) confirm this condition.

Table 1. Summary Statistics

N = 935. Quarterly data (2001–03) by lending methodology, from 37 microfinance institutions in the Opportunity International network, as described in text and the Data Appendix.

	Minimum	Maximum	Mean	Standard Deviation
Portfolio in Arrears > 30 Days (%)	0	100	9	13
Portfolio at Risk > 30 Days (%)	0	100	13	16
Percent of Loans to Women	0	100	67	28
Number of Outstanding Clients	1	69,320	4,502	8,185
Average Loan Size (US \$)	0	25,659	706	1,522
GDP Growth (%)	-10	7	3	3
Inflation (%)	-2	365	15	44
Return on Portfolio (%)	-4,970	115	-23	197
Value of Outstanding Portfolio (US\$)	29	7,318,205	600,708	942,509

To correct for heteroskedasticity the estimates of the model that follow use weighted least squares regression. Table 2 presents correlation coefficients for all variables with significant values in bold. The dependent variables portfolio at risk and portfolio in arrears are positively and significantly correlated. The other correlations in Table 2 reflect multicollinearity in the data, but variance inflation factors (not reported) suggest this is not severe.

Table 2. Correlations

Variables	1	2	3	4	5	6	7	8	9	10
1 Portfolio in Arrears > 30 days (%)	1.00									
2 Portfolio at Risk >30 days (%)	0.91	1.00								
3 Individual Dummy	0.04	0.11	1.00							
4 Loans to Women (%)	-0.13	-0.16	-0.37	1.00						
5 Number of Clients Outstanding	-0.11	-0.15	-0.25	0.35	1.00					
6 Average Loan Size	-0.14	-0.09	0.22	-0.36	-0.17	1.00				
7 GDP Growth (%)	0.03	-0.01	0.04	-0.09	0.05	0.01	1.00			
8 Inflation (%)	-0.07	-0.04	-0.04	0.10	-0.00	-0.07	-0.69	1.00		
9 Portfolio Return (%)	0.02	0.04	0.06	-0.00	0.05	0.02	-0.00	0.03	1.00	
10 Value of Outstanding Portfolio (US\$)	-0.20	-0.20	0.11	-0.08	0.46	0.36	0.01	-0.05	0.08	1.00

Correlations in bold are significant at standard levels.

Estimation of the Model

Table 3 presents estimates of the model in equation (2) for 37 microfinance institutions from the first quarter of 2001 through the last quarter of 2003. The dependent variable is portfolio in arrears. The key independent variables have the expected sign and the model is significant as shown by the F-test. The indicator variable for lending methodology, however, is not significant—suggesting that an individual lending portfolio does not have consistently higher risk than one using a group lending methodology. This result changes when we use the alternative measure of risk in the portfolio.

Table 4 presents estimates of the model in equation (2) for the same microfinance institutions over the same period. The dependent variable in this regression is portfolio at risk. Again, most independent variables have

the expected sign and the model is significant as shown by the F-test. The indicator variable for lending methodology is now significant—suggesting that an individual lending portfolio has consistently higher risk than one with a group lending methodology. In our view, the difference between the two dependent variables is significant. As we prefer the PAR measure on principal grounds, we use it in the remaining estimations.

Table 3. Determinants of Risk in MFI Portfolios—Dependent Variable: Portfolio In Arrears

Estimation of equation (2)

Dependent Variables	Coefficient	Standard Error	p-value
Constant	0.032033	0.009913	0.001
Individual	0.006844	0.005180	0.187
Percent of loans to women	0.066861	0.010983	0.000
Number of clients outstanding	-0.000001	0.000000	0.000
Average loan size	-0.000003	0.000001	0.001
GDP growth	-0.385260	0.082384	0.000
Inflation	-0.033466	0.006970	0.000
Return on portfolio	-0.006464	0.004220	0.126
F-statistic	19.071		
p-value	0.000		
Number of observations	934		

Weighted Least Squares Regression, weighted by value of outstanding portfolio. Standard errors are corrected for heteroskedasticity.

Table 4. Determinants of Risk in MFI Portfolios—Dependent Variable: Portfolio At Risk

Estimation of equation (2)

Dependent Variables	Coefficient	Standard Error	p-value
Constant	0.086896	0.013797	0.000
Individual	0.024018	0.007209	0.001
Percent of loans to women	0.068242	0.015285	0.000
Number of clients outstanding	-0.000002	0.000000	0.000
Average loan size	-0.000002	0.000001	0.205
GDP growth	-1.000705	0.114657	0.000
Inflation	-0.051083	0.009700	0.000
Return on portfolio	-0.004816	0.005873	0.412
F-statistic	27.073		
p-value	0.000		
Number of observations	934		

Weighted Least Squares Regression, weighted by value of outstanding portfolio. Standard errors are corrected for heteroskedasticity.

In both Table 3 and Table 4 the sign of the coefficient on the percent of loans in the portfolio made to women is positive and significant. To explore the expectation that lending to women might reduce portfolio risk under group lending methodologies, equation (2) is estimated separately (using PAR as the dependent variable) on individual and group lending observations. The results are reported in Table 5. For individual lending the coefficient on the percent of loans to women remains positive and significant, but it is insignificantly different from zero in the group lending case. These results suggest that any additional risk associated with lending to women is mitigated by group lending programs.

Table 5. By Lending Methodology—Determinants of Risk in MFI Portfolios

Dependent Variable: Portfolio At Risk

A. Individual Lending

Dependent Variables	Coefficient	Standard Error	p-value
Constant	0.018463	0.014607	0.207
Percent of loans to women	0.246943	0.023493	0.000
Number of clients outstanding	-0.000008	0.000001	0.000
Average loan size	-0.000005	0.000002	0.008
GDP growth	-0.652116	0.137995	0.000
Inflation	-0.064484	0.016320	0.000
Return on portfolio	-0.028677	0.015660	0.068
F-statistic	26.731		
p-value	0.000		
Number of observations	386		

Estimation of equation (2) Weighted Least Squares Regression, weighted by value of outstanding portfolio. Standard errors are corrected for heteroskedasticity.

B. Group Lending

Dependent Variables	Coefficient	Standard Error	p-value
Constant	0.173538	0.017717	0.000
Percent of loans to women	-0.032594	0.019543	0.096
Number of clients outstanding	-0.000001	0.000000	0.000
Average loan size	-0.000007	0.000002	0.001
GDP growth	-1.262720	0.188998	0.000
Inflation	-0.059920	0.012631	0.000
Return on portfolio	-0.009727	0.006067	0.109
F-statistic	18.011		
p-value	0.000		
Number of observations	537		

Estimation of equation (2) Weighted Least Squares Regression, weighted by value of outstanding portfolio. Standard errors are corrected for heteroskedasticity.

For this sample the key contributors to risk aside from the lending methodology (as measured by the coefficient estimates) are the percent of loans made to women and the macroeconomic factors. The unexpected negative sign of the inflation variable in all regressions may be due to the alternative hypothesis suggested above, or simply to errors introduced by our limited data. The significance of the macroeconomic variables suggests that a key part of the risk in the portfolio is uncontrollable at the institutional level. Therefore it is possible that MFIs would benefit by organizing in such a way as to diversify their risks across many countries and regions.

Weighted Least Squares is used for all estimates to correct for bias due to the significant size differences across the institutions. One of the four regions accounts for the majority of the size difference. The institutions in Eastern Europe have an average loan size many times that of the MFIs in Africa and the Latin America—it takes a much more capital to start and operate a small business in the former region than in the latter regions. To test the significance of this difference the model in Table 4 was estimated excluding the observation from Eastern Europe. The results (not reported) are qualitatively similar.

V. Conclusions and Suggestions for Further Research

Much of the previous empirical work on microfinance institutions includes only case studies and small sample reviews of their financial conditions. This study used a large cross-section of institutions, from many parts of the world, segregated by the types of loans made, and measured over a significant period of time. The results identified key risk factors in loan portfolios, including institutional size and macroeconomic factors. Most importantly however, the group lending methodology used by most MFIs, long thought to be a major ingredient to their success for both positive and normative reasons, reduces loan portfolio risk. While greater lending to women consistently raises portfolio risk, this effect is mitigated by group lending, and is in many ways why the institution exists. In total, this evidence suggests that if MFIs are to continue with their stated missions of meeting the needs of the most impoverished and disenfranchised they should continue to explore both individual and group lending, scale up their operations, and diversify to mitigate the effects of changes in the economy. The first result is of particular interest to Christian organizations because they seek to empower women through microenterprise programs.

In the future, empirical studies will of course benefit from more refined theoretical models on the development and operations of MFIs. More

sophisticated econometric procedures are also necessary—the significant number of zero values and negative values in the data complicates testing for nonlinear relationships and suggests the need for other econometric methods. Additionally, further empirical research should look at more disaggregated data to closely examine risk factors. For example, this study does not directly control for the extent of savings by the borrowers. While group-lending generally includes a savings component, more tests using the actual level of savings on the part of the borrowers for each MFI may show any contribution to lower risk that exists. Controlling for savings on the part of the borrower may also help with the normative benefits of teaching financial stewardship. Finally, further research should be conducted on how MFIs can coordinate their activities, including their financial operations, to control the significant economic factors affecting their success and how to benefit from economies of scale.

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Data Appendix

Opportunity International provided quarterly data for the following variables, by lending methodology.

Variable Name	Description
Number of Clients Outstanding	The total number of clients with loans outstanding, by methodology.
Value of Outstanding Portfolio	The total value of loans outstanding, by methodology.
Portfolio in Arrears	The percent of the total loan portfolio that is overdue by more than 30 days, by methodology.
Portfolio at Risk	The percent of the total loan portfolio that has at least one payment overdue by more than 30 days, by methodology.
Average Loan Size	The average loan size made to clients, by methodology.
Percent of Loans to Women	The percent of the total number of loans made that were made to women, by methodology.
Return on Portfolio	The rate of return on the gross loan portfolio, calculated as the ratio of net income from lending to the period average gross loan portfolio.

The following data for each country is from the International Monetary Fund, World Economic Outlook Database, April 2004.

Variable Name	Description
GDP Growth	Gross domestic product, constant prices, annual percent change
Inflation	Annual percent change in GDP Deflator