*UNDERGRADUATE RESEARCH*

# THE ENVIRONMENT OF MICROFINANCE INSTITUTIONS: THE ROLE OF ECONOMIC FREEDOM[1]

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## Introduction

Microfinance provides saving and lending services to the poor. It is not conceptually different from banking in the USA. People are able to save money at and borrow money from microfinance institutions. They are compensated for saving and charged for borrowing by an interest rate that compounds on savings or loans. It is different primarily in the magnitude of the financial transactions. Loans to the poor are much smaller on average than loans traditionally given by banks; these loans can be as small as $71. Also, because of their poverty, borrowers tend to have little or no collateral to secure loans (Murdoch, Dec. 1999).

The Grameen bank of Bangladesh, founded by Mohammad Yunus, was one of the first microfinancing institutions. He came upon a group of villagers that were unable to pay off their debt to a money collector and found that he was able to lend them what they needed out of pocket. Moved by this situation, he started a lending service that avoided the high interest rates that the traditional moneylenders charged. The moneylenders charge rates as high as 100% per month on the loans they give; the current average rate for the Grameen bank is around 79% annually. Lending to the poor usually means that a lender will not be able to get any collateral to secure the loan.

The Grameen bank was able to solve the collateral problem by lending to "solidarity groups". Solidarity groups are groups of five people that take loans out together where the groups are held responsible for each individual's portion of the loan. It seems that the factor that makes solidarity groups work to keep repayment rates high is the social element of the solidarity group, rather than the enforcement of group repayment (Pankaj, 1996). Furthermore, the Grameen bank has been able to help poverty stricken women in a country that is traditionally male dominated. The bank serves 95% women and maintains a high repayment rate around 98%. The resulting lower bad debt expense helps to keep interest rates down. The model of the Grameen Bank has been copied numerous times with high levels of success (Hassan, 2002).

Microfinance has been hailed as having the means to end poverty in the world, but this is not a consensus in the literature. One important criticism of microfinance is that there is no empirical evidence to support the claims that microfinance actually improves the condition of the poverty stricken. Unfortunately, the data are not sufficient to analyze effects of microfinancing institutions on their customers (Hulme, 2000). Another criticism of microfinance is the high interest rate charged. Since each account is small in relation to the expenses incurred for maintenance of these accounts, costs are relatively higher for microfinancing, and higher interest rates must be charged to offset the higher costs. Entrapment of very poor borrowers may also

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occur. Once a borrower takes a loan from a microfinance institution, the borrower may use all of his available income to pay off the loan, then needs to borrow again to survive. This can create a debt trap that keeps borrowers permanently indebted to their microfinance bank (Murdoch, 1999b).

Despite the numerous criticisms of microfinance, it seems that it is a worthwhile subsidy for governments to undertake (Schreiner 2003). Most microfinance institutions, including the Grameen Bank, are government subsidized. There is some controversy surrounding the necessity of these subsidies. Some state that microfinance cannot exist without governmental subsidy, while others claim that it is possible for a non-subsidized version of these banks to exist. If governments are committed to subsidizing microfinance, understanding the correlates to its prevalence would allow governments to make more informed decisions about policy affecting microfinance (Morduch, 1999a)

In the literature, individual microfinance banks have been shown to be stable even in cases where their respective country's economy is not (Rhyne, 2001), but the influence of instability and lack of freedom on the operation of these banks is not examined. We examine political indices that are commonly considered to have an effect on economic institutions, such as indices that measure levels of freedom and stability. We expect economic freedom and stability to positively correlate with the prevalence of microfinance institutions.

**Analysis**

Data from eighty countries across five continents were gathered to predict the prevalence of microfinancing institutions by measures of freedom and instability. We used cross-sectional data for 2006. Variable names, means and standard deviations are given in Table 1.

The number of microfinance institutions is normalized by population for each the country then logged (lnMFIPOP). The indices for freedom are given on a scale from zero to 100. Higher ratings are correlated with higher levels of freedom, but the data should not necessarily be interpreted as ratio data. Efscore is the overall score of a particular country; PropRights is the measure of individual property rights. A more thorough discussion of these indices can be found at http://www.heritage.org/index/PDF/Index09_Methodology.pdf. PchEF is the percent change of the economic freedom score from 2005 to 2006, and serves as a rudimentary measure of stability. GDP is measured in purchasing price parity (PPP) per capita to capture the overall level of poverty in each country. The percent change variables are an attempt to capture instability in each country. POP is the population of the country, and POPdens is the population divided by the

**Table 1**

Summary Statistics

| Variable | Max | Min | Mean | Median | Mode | Std. Dev. |
|---|---|---|---|---|---|---|
| Efscore | 79.3 | 40 | 57.4114 | 57.1 | 57.2 | 6.882549 |
| PropRights | 90 | 10 | 36.5823 | 30 | 30 | 15.598 |
| PchEF | 0.13801 | -0.0936 | 0.01009 | 0.00759 | 0.04266 | 0.043727 |
| POP | 1.3E+09 | 279912 | 5.9E+07 | 1.2E+07 | - | 1.92E+08 |
| POPdens | 2650.55 | 4.68985 | 294.183 | 173.218 | - | 392.5583 |
| GDP | 17300 | 731 | 5351.11 | 4521 | - | 4238.055 |
| lnMFIPOP | 2.28448 | -4.7829 | -0.1275 | 0.07595 | - | 1.353186 |

land area of the country in square miles. The dependent variable, lnMFIPOP, is the natural logarithm of the number of microfinancing institutions divided by the population of that country.

Ordinary Least Squares regression analysis is used to analyze correlations between groups of independent variables and the dependent variable. All of the freedom indices are included ex ante; the model is pared using a stepwise algorithm in R.

**Table 2**
Regression Output

| Variable | Estimate | Std. Error | Pr(>\|t\|) |
|---|---|---|---|
| (Intercept) | -5.750 | 1.240 | 1.48E-05 |
| Efscore | 0.127 | 0.026 | 7.53E-06 |
| PropRights | -0.030 | 0.012 | 0.012 |
| PchEF | -4.170 | 2.950 | 0.162 |
| POP | -2.87E-09 | 6.37E-10 | 2.54E-05 |
| POPdens | 6.27E-04 | 3.14E-04 | 0.049 |
| GDP | -1.00E-04 | 3.24E-05 | 0.003 |

$R^2$=.4622, n=79

The model is tested for endogeneity using the Hausman test. The variables being tested for a feedback relationship are lnMFIPOP and GDP. If there is endogeneity, the parameter estimates and the standard errors will be incorrect. GDP is estimated using an OLS linear regression, and the residuals from this regression are used in the restricted model. If the residuals are statistically significant, the Hausman test shows that GDP is endogenous. The p-value for the residuals is .69, indicating that GDP is not endogenous and that no correction is needed for GDP in the restricted model.

The model is tested for multicollinearity using Variance Inflation Factors (VIFs).[3] If there is multicollinearity, it is possible that the standard errors are biased and may lead to the inclusion of variables that should be excluded from the model.

**Table 3**
VIF Test

| Variable | VIF Score |
|---|---|
| Efscore | 2.394 |
| PropRights | 2.423 |
| PchEF | 1.219 |
| POP | 1.095 |
| POPdens | 1.109 |
| GDP | 1.380 |

[3] The Variance Inflation Index (VIF) is calculated by regressing each of the independent variables by the other independent variables. It is a statistic without a distribution; a VIF score of 10 or higher indicates that there is multicollinearity.

The VIF scores show that there is no multicollinearity in the model. The standard errors are not biased, so no correction for multicollinearity is necessary.

The model was tested for heteroskedasticity using a LaGrange Multiplier test. If there is heteroskedasticity, it is possible that the standard errors are incorrect, which could lead to the inclusion of variables that should be excluded from the model. The null hypothesis for this test is that there is no heteroskedasticity. We find the p-value for this test is 0.0056969, indicating that the model has heteroskedasticity. To correct for this, robust standard errors are calculated.[4]

**Table 4**

Robust Standard Errors

| Variable | t-value |
|---|---|
| (Intercept) | 6.75E-05 |
| Efscore | 5.90E-05 |
| PropRights | 0.051 |
| PchEF | 0.348 |
| POP | 0.053 |
| POPdens | 0.055 |
| GDP | 0.002 |

PchEF is not significant when heteroscedasticity is corrected. This variable is removed from the restricted model.

The model is tested for spatial autocorrelation using Moran's I test.[5] If there is spatial autocorrelation, it is possible that necessary variables are being left out of the model. It can also cause the standard errors and the p-values to be incorrect. The p-value for the spatial autocorrelation test is 0.00000000133, indicating that there is spatial autocorrelation. To correct for the autocorrelation, a maximum likelihood estimation technique that accounts for spatial autocorrelation is used.

**Table 5**

Spatial Autoregressive Model

| Variable | Estimate | Log likelihood | LR statistic | Pr(>\|z\|) |
|---|---|---|---|---|
| (Intercept) | 4.899 | - | - | - |
| Efscore | 0.108 | -117.430 | 20.060 | 7.52E-06 |
| PropRights | -0.025 | -110.400 | 6.000 | 0.014 |
| POP | -2.60E-09 | -116.780 | 18.760 | 1.48E-05 |
| POPdens | 0.001 | -110.010 | 5.205 | 0.023 |
| GDP | -1.00E-04 | -112.970 | 11.141 | 0.001 |

Rho= 0.46072, LR test value=9.3278, p-value: 0.0022571, Log likelihood: -107.4035, ML residual variance (sigma squared): 0.86578, (sigma: 0.93048)

[4] A full discussion of the use of robust standards errors can be found in "Using Heteroscedasticity Consistent Standard Errors in the Linear Regression Model" (Long and Ervin, 2000).

[5] Spatial autocorrelation exists when the residuals of a regression are spatially correlated. Spatial autocorrelation gives statistical problems similar to temporal autocorrelation. The Moran's I test finds spatial autocorrelation using a spatial proximity matrix; the null hypothesis is that there is no spatial autocorrelation.

**Discussion**

In the final model, general economic freedom has a positive effect on microfinance activity. PropRights has a counterintuitive negative sign. Free market economic theory suggests that economic freedom encourages economic activity. There might be some correlation between the nature of public subsidization of many microfinance institutions and the negative correlation of property rights to microfinancing. If, for example, a country raises money to pay for the subsidy by property seizure, there would be some correlation in the amount of subsidy and the property rights index. Population is negatively related to microfinance. Because the number of microfinance institutions is used, the size of the microfinance institution cannot be considered in this analysis. It is possible that microfinance institutions expand rather than multiply to meet the needs of the poor so that population does not discourage microfinancing institutions from operating. Countries with higher population densities have higher levels of microfinance activity. Higher population density lowers transaction costs for microfinance activities and makes it more attractive to operate in densely populated areas. GDP is negatively correlated with microfinance: poorer countries attract microfinancing institutions. The instability indices did not prove to be statistically significant, so the annual changes in market freedom did not affect the prevalence of microfinance in the data.

The scope of this research is limited heavily by the availability of reliable data. Only data on number of borrowers and number of microfinance institutions were available for analysis. Having the amount of microfinance activity measured in the size of savings and loans made would be more desirable.

This data is self reported; it is subject to any bias that self reporting may cause among microfinance institutions. Another problem with the data for this project is the bias for the countries that had to be excluded due to lack of data. Afghanistan and Sudan had to be excluded, for example, which would seem to bias our analysis against countries that were engaged in war in 2006. Six out of nine countries that were excluded due to lack of data were African countries, which would also bias the data against Africa.

As more data are made available from microfinance institutions, more thorough analyses can be conducted. Certainly time series analysis would be useful in determining the positive and negative effects that microfinance institutions have on the countries in which they operate. Being able to support or refute the claims on microfinance's ability to end poverty would be useful. Determining the extent of the benefits of microfinance may enhance policymakers' ability to alleviate poverty.

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The microfinancing institution data were gathered from http://www.themix.org/publications.aspx?level1=002-REG.

Freedom Indices were gathered from The Heritage Foundation's website Index of Economic Freedom at http://www.heritage.org/research/features/index/downloads.cfm.

For this project, indices were created to measure political instability from the Political Instability Task Force's datasets at http://globalpolicy.gmu.edu/pitf/pitfdata.htm.

Data for GDP and government spending were gathered from the UN's data website http://data.un.org.