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Abstract

Under the continued effects of global financial crisis where the donor's investment in microfinance sectors has become shrunk, how the macroeconomic factors or the crisis or the macro-institutional factors would affect the performance of microfinance institutions (MFIs) have become one of the key debates among the policy makers and practitioners. The present paper has investigated the effect of both institutional factors and the macro economy on the financial performance of MFIs drawing upon the Microfinance Information Exchange (MIX) data as well as cross-country data of macro economy, finance and institutions drawing upon three stage least squares (3SLS) and fixed effects vector decomposition (FEVD) to take account of the endogeneity of key explanatory variables. In contrast to Ahlin et al.'s (2010), we generally find that institutional factors affect MFIs' financial performance, in particular, profitability, operating expense, and portfolio quality. It is also found that the macro-economic and financial factors, such as GDP and share of domestic credit to GDP, have positive impacts on MFIs' financial performance, such as profitability, operating expense ratio and portfolio quality. It is thus concluded that while macroeconomic factors are important, improving macro-institutional factors, policies to raise country-level institutional qualities are required for making the activities of MFIs more sustainable under the global recession.

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1. Introduction

The financial crisis that started as early as September 2007, with the global money markets threatening to bring down Northern Rock-the fifth largest mortgage lender in Britain, has put the strength of the financial markets across the world to a serious test. Sophisticated financial instruments and lack of regulation have undermined the stability of not just corporations but entire nations. The meltdown that came to the surface nearly three years ago has still not run its course- evidenced by the recent debt default crises in major European economies like Greece, Spain, Portugal, Italy and Ireland. Under the world with a high degree of financial integration, the events of September 2008, where Lehman Brothers filed for bankruptcy and Merrill Lynch was sold to Bank of America, not only changed the shape of American finance but the world economy at large.

While academics continue to grapple with the finance-macro economy nexus, some policy makers and practitioners would argue that institutional factors and government regulation play a bigger and more proactive role than the fundamentals of macro economies in determining the operations and performances of the financial market as well as financial institutions. Also, the relationship between the financial operations and the macro economy will depend on characteristics of financial sub-sectors (bank-like, stock and microfinance) under consideration. This paper focuses on the effects of institutional factors as well as the fundamentals of macro-economy on microfinance sector in view of the recent evidence on the role of microfinance in reducing poverty at both the household and national level (Imai et al. 2010a and Imai et al 2010b). In view of the rippling effect of the crisis, it is imperative to investigate the effect of both institutional factors and the macro economy on the financial

performance of microfinance institutions (MFIs). The empirical literature on the relationship between financial performance of MFIs and the macro-economy can be viewed from a bi-causal perspective, that is, the financial performance of MFIs influences the macro economy (Krauss and Walter 2009; Imai et al 2010b[1]) or the latter affects the former (Ahlin and Lin 2006, Ahlin et al. 2010, Thapa 2008). While either strands of the literature points to a pro-cyclical relationship between microfinance performance and that of the macro economy, the potential bi-causal relationship requires a careful treatment of endogeneity.

Krauss and Walter (2009) explored microfinance as a means of reducing portfolio volatility, regressing key fundamental parameters and ratios of the leading MFIs against the S&P 500, MSCI Global and MSCI Emerging Markets indexes (as proxies for global market risk) as well as against domestic GDP (as a proxy for domestic market risk). They consider the relative market risk, comparing MFIs to other potential emerging market investments – equities of listed emerging market institutions (EMIs) and equities of listed emerging market commercial banks (EMCBs). Their results show highly significant differences between MFIs and EMIs / EMCBs regarding asset sensitivity against all three global performance measures. A 10% drop in the S&P 500 for example, is expected to lead to no impact on MFIs in terms of the asset measure, whereas EMIs and EMCBs are expected to lose approx. 4%-5% of their asset value. Furthermore, both profitability and loan portfolio quality of MFIs seems to be less sensitive to global market movements than in the case of EMCBs.

However the findings from the Microfinance Banana skins survey conducted by CFI and CGAP in April 2009 reveal quite a diverging picture from the field. The economic crisis has completely transformed perceptions of the MF risk landscape: risks that were thought minor

[1] Imai et al (2010b) uses the FGT class of poverty measures to examine the effect of microfinance on the macro economy.

in a similar survey in 2008 have been propelled to the top of the rankings, edging out risks that were previously seen as crucial to the prospects of microfinance. The biggest risers in this survey compared to the previous one highlight the worsening business environment and threats to funding and liquidity. Many respondents fear a vicious cycle here: the recession creating a worse business environment leading to mounting delinquencies and shrinking markets, leading to declining profitability, leading to loss of investor confidence, leading to cutbacks in funding and so on.

Ahlin et al. (2010) examines the determinants of performances of MFIs where the variable, such as self-sufficiency, borrower growth, or loan-size growth, is estimated by macroeconomic variables as well as macro-institutional factors, such as, corruption control drawing upon the Microfinance Information Exchange (MIX) data. One of their main conclusions include that MFIs's performance is not necessarily good or sometimes worse in the country where institutions are more advanced. However, one of the limitations in Ahlin et al. (2010) is that they do not take account of endogeneity of key explanatory variables, including the variables on macro-institutional factors.

To overcome the limitations in Ahlin et al. (2010), the present study uses three stage least squares (3SLS) fixed effects vector decomposition (FEVD) to take account of the endogeneity of key explanatory variables, including institutional factors. We find that income, share of domestic credit to GDP and institutional factors, namely, control of corruption, rule of law, voice and accountability and political stability improve MFIs' financial performance. In three of the four perspectives (profitability; asset/liability management; efficiency and portfolio quality) of MFIs financial performance, most of the institutional factors show a positive impact (either maximizing or minimizing) on the financial performance indicator in question.

The rest of the paper is structured as follows. The next section discusses the data and the variables to be used for the present study. Sections 3 and 4 provide econometric specifications and the main results. Conclusion is offered in the final section.

2. Data and Variables

This study uses the secondary data from multiple sources. These are (i) the Microfinance Information Exchange (MIX) market; (ii) the World Bank's World Development and Governance Indicators; (iii) Chinn and Ito (2006) index of capital account openness as a measure of financial openness and (iv) European settler's mortality rate based on Acemoglu, Johnson, and Robinson (2001, 2002, and 2005). Chin-Ito index and European settler's mortality rate are used as instruments for the core explanatory variables, namely, log of GDP per capita; share of domestic credit to GDP; institutional factors and log of MFIs gross loan portfolio. Other instruments include log of the lag of agricultural value added per worker and its square and an index of MFIs' gross loan portfolio, number of MFIs and number of active borrowers.

The explanatory variables have been divided into three blocks, macro, institutional and time determinants of MFIs' financial performance. These are log of GDP per capita; share of domestic credit provided by banking sector to GDP; institutional factors (political stability, rule of law, voice and accountability, control of corruption and their average) and log of MFIs' gross loan portfolio; and year dummies.

The choice of dependent variables is consistent with four broad perspectives of assessing financial performance of MFIs which the Annual Micro Banking Bulletin published by the MIX market focuses on, namely (i) Profitability, (ii) Asset Management, (iii) Loan Portfolio quality and (iv) Efficiency. Amidst several indicators available for each component, we select

the ratio with the highest observations for each component with the exception of '(iii) Loan Portfolio Quality' where two ratios, that is, 'portfolio at risk' and 'write-off ratio' are used.[2] 'Return on Assets', 'debt-to-equity ratio' and 'operating expense ratio' are respectively used to capture (i) Profitability, (ii) Asset Management (or leverage) and (iv) Efficiency of MFIs. Appendix 2 provides a summary of the measure of each of the ratios.

MFIs' base data accessed from the MIX market website for the analysis spans from 2005 to 2009 on 5,740 MFIs (pooled) in 106 countries (Appendix 3). The data points however, reduce to about 3,126 MFIs, in 97 countries (see Appendix 4) for the period 2005 to 2008 country level variables are matched onto the MFI datasets. This again varies given the different data requirements of our two econometric specifications discussed below as well as the type of dependent variable under consideration.

Microfinance Financial Performance Variables

A myriad of financial ratios are available for assessing the performance of microfinance institutions (CGAP 2003; The SEEP Network and Alternative Credit Technologies 2005). Albeit the complexity in synchronising the different interpretations of all the ratios, they provide alternative perspectives in assessing the performance of MFIs for each of the four domains namely profitability, efficiency leverage and risk. In essence, in interpreting the determinants of MFIs' financial performance, due cognisance should be attached to the precise focus of each ratio. Based on the forgoing, this sub section provides an interpretation of the five dependent variables used in this study and describes their patterns across regions

[2] This is because, although Portfolio at risk (30-days) is mostly reported, it is merely an accounting provision and could be recovered. Write off ratio on the other hand is actual default.

and over the period 2005 to 2009. As mentioned earlier, the selection of these indicators was based on their wide usage and frequency of data points available from the MIX market.

Return on assets (ROA) falls within the domain of profitability measures and tracks MFIs' ability to generate income based on its assets. As shown in Appendix 2, the ratio excludes non-operating income and donations. ROA provides a broader perspective compared to other measures as it transcends the core activity of MFIs, namely providing loans, and tracks income from all operating activities including investment, and also assesses profitability regardless of the MFIs' funding structure. ROA is expected to be positive as a reflection of the profit margin of the MFI, otherwise it reflects non-profit or losses. In this study, we observe that some firms are making gains on the value of their assets, while others are making losses (see Table 1). Figure 1 reveals that with the exception of East Asia and the Pacific (EAP) and Middle East and North Africa (MENA), the other four regions have experienced a gradual drop in profitability levels over the years.

(Table 1 and Figure 1 to be inserted)

Efficiency of MFIs is measured by the share of operating expense to gross loan portfolio in most cases. The ratio provides a broad measure of efficiency as it assesses both administrative and personnel expense with lower values indicating more efficient operations. Table 1 shows that on the average personnel and administrative expenses constitute just under 0.3 per cent of MFIs gross loan portfolio. The average can be misleading in case the standard deviation of the ratio is large. In terms of the regional comparison, the increases over the period between 2005 and 2009 tend to mask the trend for the entire period. For instance, in Latin America and The Caribbean (LAC), a significant increase over the period 2007 and 2008 is observed.

The debt to equity ratio is a member of the asset/liability management ratios and specifically attempts to track MFIs' leverage. This measure provides information on the capital adequacy of MFIs and assesses their susceptibility to crisis. Microfinance investors mainly rely on this ratio as it helps predict the probability of an MFI honouring its debt obligations. As expected, Table 1 shows a wide range for debt to equity ratio as MFIs' ability to leverage its equity through borrowing is normally dependent on a host of exogenous factors.

As mentioned earlier, two ratios are used for MFIs risk namely, portfolio at risk (PAR) and write-off ratios. Higher values for both ratios which indicate low portfolio quality are not desirable since they imply lower profits and likelihood of non-sustainability of both the MFI and clients. The PAR values represent client loans that are outstanding and write-off indicates the declaration of default (strike-out from book of accounts). It is worth noting that portfolio quality of MFIs are driven by internal institutional accounting practices/norms, degree of regulation (in the case of formal MFIs) and maturity of the microfinance market where the MFI operates. Figure 1 shows that though SSA consistently had a relatively higher PAR value, trends in the other regions (between 2005 and 2009) inched up signalling a general pattern of increasing low portfolio quality.

3. Econometric Specifications

The present studies apply two economic models, Three Stage Least Squares (3SLS) and Fixed Effects Vector Decomposition (FEVD) to the unbalanced panel data. We attempt to use 3SLS for the pooled cross section data with year dummies to address the endogeneity of key explanatory variables explicitly where endogenous variables are instrumented by external

factors.[3] To supplement this, we have also applied FEVD to take advantage of the panel data. In estimating FEVD, with the exception of age and age squared, we treat all explanatory variables as endogenous and are instrumented within a system. In spite of the limitations, the use of unbalanced panel data for the entire sample will increase a number of observations. Across the two econometric models the sample size varies as our instruments used in the 3SLS cover only a subset of the entire sample.

Three Stage Least Squares (3SLS)

We use 3SLS primarily because some of our key explanatory variables (institutional factors, log of GDP per capita, log of gross loan portfolio and share of domestic credit provided by banking sector) are likely to be endogenous. MFI fixed effects are not incorporated in case of 3SLS. These will be picked up by the FEVD.

Following Imai et al. (2010c), the instruments used for institutional factors and share of domestic credit provided by banking sector are European settler's mortality rate and financial openness. The correlation matrix in Appendix 1 signals a higher association between the instruments and the potential endogenous variables. The coefficient of correlation between the instruments and dependent variables are much smaller in most of the cases, satisfying the exclusion restrictions.

Econometric specifications use one symbol ($\boldsymbol{FIN_p}$) to represent each of the five different dimensions of MFI Financial Performance. In the Equation (1) below represents the structure model where the effect of macro level factors, characteristics of MFIs; Institutional variables; and year dummies are estimated on the financial performance of MFIs.

[3] We have tried 3SLS where all MFI dummies are included as explanatory variables, which is equivalent to fixed-effects 3SLS. However, because of the huge sample size, we did not reach the convergence in that case and thus we report the case only with year dummies.

$$FIN_{p_{it}} = \beta_{10} + \beta_{11} M_{it} + \beta_{12} C_{it} + \beta_{13} I_{it} + \beta_{14} D_t + \varepsilon_{1i} \quad (1)$$

where β_{10} is a constant term, $\boldsymbol{FIN}_{p_{it}}$ is represents each of the five financial performance indicators for MFI *i* in time period *t*; $\boldsymbol{M}_{it}$ is the vector of macro level factors namely, log of GDP per capita and share of domestic credit to GDP; $\boldsymbol{C}_{it}$ represent a vector of MFI characteristics and size, namely, age of MFI and its squared to capture non-linearity; characterisation in terms of legal status that is Banks (our reference category), Credit Union and Cooperatives, Non-bank Financial Institutions, Non-governmental Financial Organisations and other categories; and regulation; $\boldsymbol{I}_{it}$ represents institutional factors specifically political stability, voice and accountability, control of corruption, the rule of law, as well as the average of these four indicators; $\boldsymbol{D}_t$ stands for year dummies with 2005 as a reference point and ε_{1i} is an *i.i.d.* error term.

As mentioned earlier, in view of potential endogeneity either from the perspective of bi-causality or measurement error, we estimate a set of four reduced form equations and plug the predicted values into the structural model (Equation (1)).

$$\boldsymbol{LGDP}_{pc_{it}} = \beta_{20} + \beta_{21} \boldsymbol{LlAg}_{it} + \beta_{22} \boldsymbol{LlAg}\text{^}2_{it} + \beta_{23} \boldsymbol{D}_t + \varepsilon_{2i} \quad (2)$$

Equation (2) estimates log of the lag of agricultural value added per worker ($\boldsymbol{LlAg}_{it}$) and its squared ($\boldsymbol{LlAg}\text{^}2_{it}$) to resolve potential endogeneity of the log of GDP per capita ($\boldsymbol{LGDP}_{pc_{it}}$). $\boldsymbol{D}_t$ controls for yearly variation, β_{20} is a constant term and ε_{2i} is an *i.i.d.* error term.

In addition to log of GDPpc, our second macro level variable is also likely to be endogenous and we thus resolve this by estimating Equation (3) below.

$$\boldsymbol{F}_{it} = \beta_{30} + \beta_{31}\boldsymbol{O}_{it} + \beta_{32}\boldsymbol{D}_{t} + \varepsilon_{3i} \qquad (3)$$

where $\boldsymbol{F}_{it}$ is share of domestic credit to GDP and $\boldsymbol{O}_{it}$ represent financial openness. All symbols have the same interpretation as above with β_{30} being a constant term.

Also, the possible endogeneity of institutional factors is instrumented by the log of European settlers' mortality rate, represented by E_i in Equation (4) below.

$$\boldsymbol{I}_{it} = \beta_{40} + \beta_{41}\boldsymbol{E}_{i} + \beta_{42}\boldsymbol{D}_{t} + \varepsilon_{4i} \qquad (4)$$

All symbols have the same interpretation as above with β_{40} representing a constant term.

Lastly, size of MFI measured by log of gross loan portfolio is instrumented by loan per borrower at the national level multiplied by the number of MFIs in the country.

$$\boldsymbol{LGLPMF}_{it} = \beta_{50} + \beta_{51}\boldsymbol{GLPNOABMF}_{jt} + \beta_{52}\boldsymbol{D}_{t} + \varepsilon_{5i} \qquad (5)$$

where $\boldsymbol{LGLPMF}_{it}$ represents the log of gross loan portfolio of MFI *i* in time *t* and $\boldsymbol{GLPNOABMF}_{jt}$ is the log of country level [gross loan portfolio * number of active borrowers]/[number of MFIs].

Fixed Effects Vector Decomposition

In addition to 3SLS estimation, we estimate the panel regression using the Fixed Effects Vector Decomposition (FEVD). The rationale is twofold- first to account for the effect of MFI specific characteristics and secondly to examine the effect of errors attributable to slow changing variables. The latter motivates the use FEVD instead of traditional panel estimates (Fixed effects and Hausman-Taylor) where institution specific characteristics are fixed over time.

Plümper and Troeger (2004) suggest an alternative procedure to Hausman-Taylor (HT) in view of the assumption that variables are either strictly time vary or time invariant. This undermines an exploration of the effect of slow changing variables such as institutional factors. The first stage estimation of the FEVD runs a fixed effects model on the time varying regressors only (Equation (6)). In the second stage, we generate residuals from the fixed effects estimation and regress them on the time invariant variables (Equation (7)). The rationale for the second stage estimation is to decompose the vector of residuals from the fixed effect into a part explained by the time invariant variables and an error component. Finally, the equation (8) controls for multicollinearity and degrees of freedom in the third stage where pooled least squares regression including all explanatory time variant variables, time invariant variables and the unexplained part of the fixed effects residual vector, is estimated (Arun and Annim, 2010).

We specify the first stage of the FEVD in the context of this paper as:

$$\boldsymbol{FIN}_{p\,it} = \xi \boldsymbol{X}_{it} + \boldsymbol{a}_i + \mu_{it} \qquad (6)$$

where $\boldsymbol{FIN}_{p\,it}$ represents each of the five financial performance indicators for MFI i in time period t; $\boldsymbol{X}_{it}$ stands for a vector of time varying explanatory variables. Here, with the exception of age and age squared, we treat all variables explained above as endogenous (that is, slow-changing time-variant variables). $\boldsymbol{a}_i$ and μ_{it} respectively symbolise MFI specific effect which is assumed to be constant over time and an *i.i.d* error term.

Equation (7) specifies the second stage that decomposes the residuals into observed time invariant factors and error component. In this case, λ_{it} represents a vector of log of gross loan portfolio, log of GDP per capita, institutional factors and share of domestic credit to GDP with gamma (γ) being the intercept and eta (η) the unexplained part.

$$\hat{\mu}_i = \gamma + \beta\lambda_{it} + \eta_i \tag{7}$$

With the same symbols as in the earlier equations, the third stage (pooled least squares regression) takes the form:

$$FIN_{p\,it} = \alpha + \xi X_{it} + \beta\lambda_{it} + \hat{\eta}_i + \varepsilon_{it} \tag{8}$$

where α is the intercept term.

4. Econometric Results and Discussion

Tables 2 to 6 present the econometric results with each of the five tables showing the determinants of the financial performance indicators used in this paper.[4] The central argument of this paper is that institutional factors are important for achieving successful microfinance financial performance indicators. In each of the five tables, the results based on two estimation techniques are presented. In the space of each of these estimation techniques, four results of four different institutional factors plus their average are reported.

(Tables 2, 3, 4, 5 and 6 to be inserted)

Table 2 shows that both macro level variables (log of GDP per capita and domestic credit) consistently prove to be significant determinants of MFIs' profitability irrespective of the

[4] For data accuracy check and comparison of our results with Ahlin et al. 's (2010) paper, we run the same set of regressions on a restricted sample of MFIs that have either four or five diamonds. It is noted that MIX awards diamonds to MFIs based on transparency, scope of data (financial and social) and audited accounts and that higher diamonds indicates better reliability of data from both financial and social data perspectives. With the exception of political stability, similar patterns of results are observed. In particular, we observe a positive relationship between return of assets and institutional factors, and negative relationship between the latter and operating expense and write-off ratio. In view of the almost consistent results for the different samples, we report the case for the full sample as extensive financial and social information disclosure and auditing of financial statements often correlates with the size of MFI and thus the results of Ahlin et al. (2010) may suffer from the sample selection bias. The full set of results based on four or five diamonds will be furnished on request.

estimation technique and type of institutional factor. The results show that countries with higher GDP per capita have a higher ROA. Based on the observation, a pro-cyclical relationship between the macro economy and the financial performance of MFIs can be inferred. Also, a higher share of domestic credit provided by the banking sector to GDP tends to crowd out profit of MFIs.

Two different models resulted in different sings in coefficient estimates of both log of gross loan portfolio and institutional factors for the two models. The signs of the coefficient estimates for the two models largely depend on the degree of variation between internal and external factors that influence the financial performance indicator in question and the manner in which endogeneity is resolved. In essence, what matters is the source of endogeneity and how each model resolves it differently. In case of log of MFIs' gross loan portfolio (GLP), the FEVD that uses internal instruments to resolve bias shows the right sign and statistical significance. Unlike the 3SLS, the observed positive coefficient estimates of MFIs' GLP on ROA. Higher GLP of MFIs is expected to affect positively ROA mainly as a result of economies of scale.

On institutional factors, their coefficient estimate is also supposed to be positive because a MFI in a country with better control of corruption (CC) (or voice and accountability, rule of law and political stability) is expected to operate more efficiently leading to a higher ROA. The results from the 3SLS show coefficient estimates consistent with our hypothesis. This is because 3SLS takes account of the endogeneity by using external instruments. Also, the 3SLS yields expected results for age, regulation and institutional characterisation. In the case of the latter, all other types of institutions with reference to banks are likely to have a lower ROA. Regulated institutions have a higher ROA and age of institution supports the expected non-linear relationship where ROA increases up to a certain turning point and then reduces.

In terms of MFIs' leverage, we observe that log GDP per capita leads to high leverage, in the case of control of corruption, rule of law and the average of the four institutional factors used in this study. This observation is found only for 3SLS estimation where endogeneity of log of GDP per capita is resolved using an external instrument. Also, improvement in institutional factors mostly leads to high MFIs leverage, indicating that MFIs are able to access the private market for on-lending funds in the space of an enabling atmosphere. While high leverage stands the risks of long-term sustainability given heavy reliance on debt, the opportunity to access borrowed funds can be harnessed for expansion of MFIs. In the case of the size of MFIs, log of GLP points to a lower leverage indicating a potential to minimize the potential to risk of over borrowing as firm size increases. Also, regulated firms are likely to access more funds for expansion in the case of an environment where corruption is controlled and rule of law is adhered.

Table 4 presents the results for MFIs efficiency which show that a better macro economy measured by log of GDP per capita and share of domestic credit provided by the banking sector leads to optimal use of resources. The positive relationship between the share of domestic credit provided by the banking sector and MFIs efficiency can be attributed to the potential competition that the latter brings into the financial sector. This invariably forces MFIs to operate efficiently to stay in the market. Like ROA varied signs are observed for the two estimators. The results of 3SLS show that increase in size reduces MFIs per unit cost of operation, whilst those of FEVD reveal that better institutional factors leads to efficient operations of MFIs. The results of 3SLS also show expected signs for age and regulation with the former indicating an increase in efficiency as MFIs age.

In Tables 5 and 6, the results for MFIs' portfolio quality are presented. With the exception of institutional factors, most of the results are comparable and consistent with *a priori* expectation. In particular, the pro-cyclical relationship between the macro economy and

better MFIs' performance, in this case lower default risk is observed. Both age and regulation are associated with better portfolio quality. Furthermore, MFI characterization indicates that other MFIs with reference to Banks have poorer portfolio quality.

Unlike write-off ratio, most of the institutional factors in the case of portfolio at risk tend to be statistically non-significant. This is consistent with the underlying reason for exploring the effect of two different measures of portfolio quality. Thus, while portfolio at risk is a widely used measure and subsumes write-off ratio, its handling varies across different MFIs and countries. Also, the determination of PAR via an accounting provision would require circumspection. The results of 3SLS of Table 6 show that with the exception of political stability, all other institutional factors including their average have a positive and statistical significant effect on MFIs' portfolio quality. Thus, the negative sign indicates that better institutional factors reduce MFIs' risk of default.

5. Conclusion

Under the continued effects of global financial crisis where the donor's investment in microfinance sectors has become shrunk, how the macroeconomic factors or the crisis or the macro-institutional factors would affect the performance of microfinance institutions (MFIs) have become one of the key debates among the policy makers and practitioners. The present paper has investigated the effect of both institutional factors and the macro economy on the financial performance of MFIs drawing upon the Microfinance Information Exchange (MIX) data as well as WDI 2010, World Governance Indicators, Chinn and Ito (2006) index of capital account openness and European settler's mortality rate. In defining a dependent variable, we highlight four broad categories of MFI's performance, namely (i) Profitability (proxied by 'Return on Assets'), (ii) Asset Management ('debt-to-equity ratio'), (iii) Loan Portfolio quality ('portfolio at risk' and 'write-off ratio') and (iv) Efficiency ('operating

expense ratio'). We examined the effects of institutional factors, namely, control of corruption, rule of law, voice and accountability and political stability on performance of MFIs. The present study uses three stage least squares (3SLS) fixed effects vector decomposition (FEVD) to take account of the endogeneity of key explanatory variables, including institutional factors.

In contrast to Ahlin et al.'s (2010) work which shows that macro-institutional factors have little effects on MFI's performances, we generally find that institutional factors, namely, affect MFIs' financial performance, in particular, profitability, operating expense, and portfolio quality. It is also found that the macro-economic and financial factors, such as GDP and share of domestic credit to GDP, have positive impacts on MFIs' financial performance, such as profitability, operating expense ratio and portfolio quality. In three of the four perspectives (profitability; asset/liability management; efficiency and portfolio quality) of MFIs financial performance, most of the institutional factors show a positive impact on the financial performance indicator in question.

It is thus concluded that while macroeconomic factors are important, improving macro-institutional factors, policies to raise country-level institutional qualities are required for making the activities of MFIs more sustainable under the global recession.

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Table 1

Summary Statistics

Variables	N	Mean	SD	MIN	MAX
Return on Assets	4943	0.0034	0.13	-3.5	0.62
Debt to Equity Ratio	5566	9.6	295	-3567	21050
Operating Expense Ratio	4945	0.29	0.42	0	19
Write-off Ratio	4661	0.018	0.045	-0.13	1.3
Portfolio at Risk	5145	0.067	0.1	0	1.8
GDP PER CAPITA	4567	1585	1664	89	11071
Domestic Credit	4367	40	28	-30	198
MFIs' Gross Loan Portfolio	5716	3.30E+07	2.90E+08	0	1.90E+10
European Settlers Mortality Rate	3547	212	446	16	2940
GLP*NOAB)*No. of MFIs	5734	40921	111627	15	845546
Voice and Accountability	5702	-0.34	0.61	-1.9	1.2
Political Stability	5676	-0.77	0.72	-2.9	1.1
Control of Corruption	5702	-0.62	0.42	-1.6	1.4
Regulatory Quality	5676	-0.34	0.51	-2.4	1.6
Rule of Law	5702	-0.63	0.49	-2.1	1.3
Government Effectiveness	5695	-0.46	0.47	-1.9	1.3
Average Governance (RL, PS & CC)	5702	-0.67	0.46	-2.1	1.2
Regulate	5554	0.55	0.5	0	1
Legal Status	5688	3.2	1	1	6

Figure 1

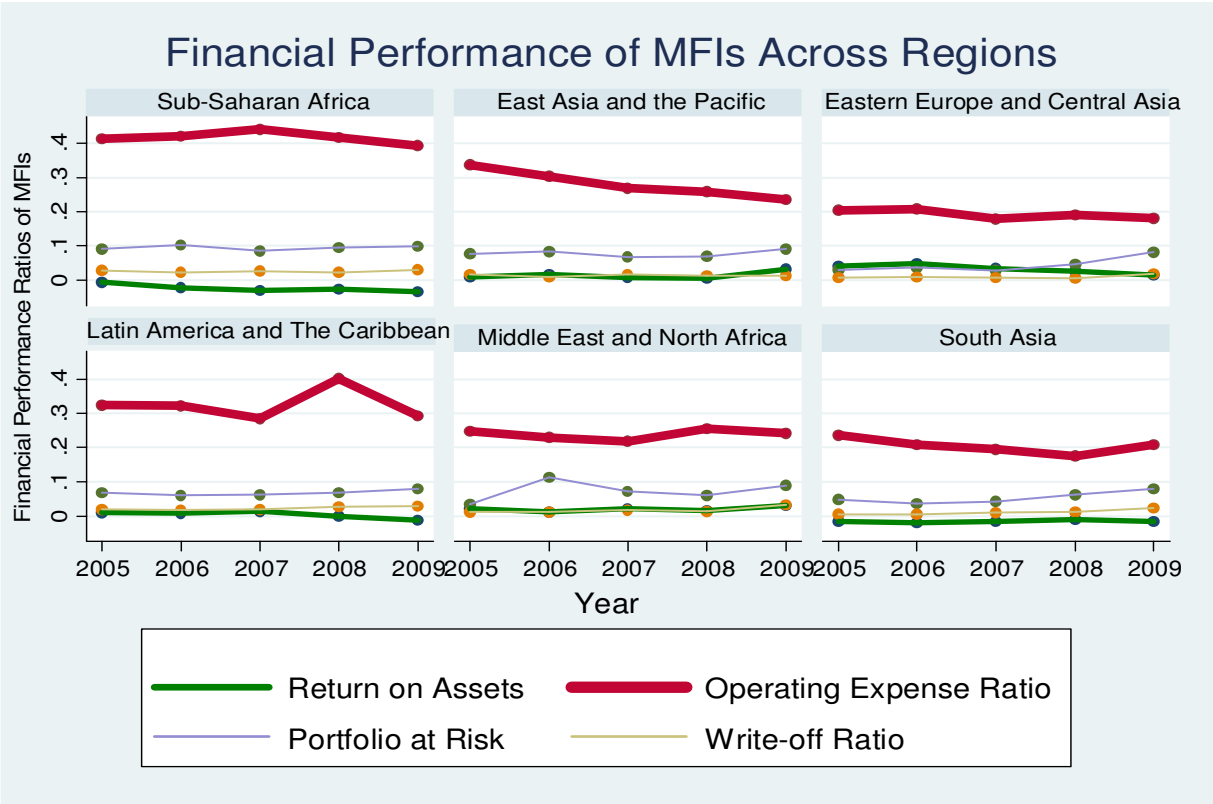
Financial Performance of MFIs Across Regions
Sub-Saharan Africa
East Asia and the Pacific
Eastern Europe and Central Asia
Latin America and The Caribbean
Middle East and North Africa
South Asia
Financial Performance Ratios of MFIs
0
.1
.2
.3
.4
2005
2006
2007
2008
2009
Year
Return on Assets
Operating Expense Ratio
Portfolio at Risk
Write-off Ratio

TABLE 2
Effect of Institutional Factors on MFI Financial Performance:
Three Stage Least Squares and Fixed Effects Vector
Dependent Variable: Return on Assets

	Control of Corruption		Rule of Law		Voice and Accountability		Political Stability		Average Governance	
Explanatory Variables	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**
Log of GDP Per Capita	1.84	0.28	1.25	0.31	2.47	0.30	1.88	0.31	1.50	0.30
	[7.38]**	[19.33]**	[4.78]**	[21.12]**	[8.13]**	[20.87]**	[3.07]**	[21.56]**	[5.54]**	[20.72]**
Log of GDP Per Capita Squared	-0.13	-0.02	-0.09	-0.02	-0.17	-0.02	-0.13	-0.02	-0.11	-0.02
	[-7.75]**	[-19.02]**	[-4.96]**	[-21.14]**	[-8.24]**	[-20.80]**	[-3.31]**	[-21.41]**	[-5.92]**	[-20.42]**
Domestic Credit	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.01	0.00
	[11.77]**	[4.79]**	[7.35]**	[7.56]**	[11.21]**	[2.98]**	[10.13]**	[2.61]**	[10.70]**	[5.20]**
Log of MFIs' Gross Loan Portfolio	**-0.40**	**0.03**	**-0.28**	**0.03**	**-0.56**	**0.03**	**-0.42**	**0.03**	**-0.33**	**0.03**
	[-6.91]**	**[40.13]****	**[-4.54]****	**[42.99]****	**[-8.10]****	**[40.54]****	**[-2.87]****	**[40.34]****	**[-5.10]****	**[40.66]****
Institutional Factors	**0.23**	**-0.03**	**0.11**	**-0.03**	**0.19**	**-0.02**	**0.23**	**-0.02**	**0.26**	**-0.04**
	[3.78]**	**[-8.97]****	**[3.19]****	**[-12.03]****	**[3.79]****	**[-7.84]****	**[3.29]****	**[-11.57]****	**[4.77]****	**[-12.72]****
Age	0.05	-0.00	0.04	-0.00	0.07	-0.00	0.06	-0.00	0.05	-0.00
	[9.20]**	[-12.51]**	[6.87]**	[-17.61]**	[9.80]**	[-12.28]**	[4.37]**	[-13.03]**	[7.44]**	[-12.59]**
Age Squared	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	[-9.00]**	[-36.43]**	[-6.92]**	[-36.36]**	[-9.66]**	[-37.29]**	[-4.29]**	[-39.26]**	[-7.32]**	[-38.00]**
Regulate	0.32	-0.02	0.24	-0.03	0.46	-0.03	0.40	-0.03	0.28	-0.03
	[7.09]**	[-8.18]**	[5.36]**	[-8.83]**	[9.63]**	[-9.13]**	[3.83]**	[-9.44]**	[5.70]**	[-8.84]**
Credit Union / Cooperative	-1.24	0.10	-0.94	0.11	-1.63	0.10	-1.36	0.10	-1.05	0.10
	[-8.27]**	[17.78]**	[-6.04]**	[19.39]**	[-9.14]**	[17.80]**	[-3.67]**	[17.93]**	[-6.43]**	[18.02]**
Non- Bank Financial Institution	-0.87	0.03	-0.65	0.03	-1.12	0.02	-0.88	0.02	-0.72	0.02
	[-8.30]**	[5.69]**	[-6.06]**	[6.05]**	[-9.10]**	[5.06]**	[-3.26]**	[4.49]**	[-6.25]**	[5.17]**
Non-Governmental Organization	-1.55	0.04	-1.18	0.05	-2.02	0.04	-1.71	0.04	-1.32	0.04
	[-8.75]**	[7.92]**	[-6.38]**	[9.35]**	[-9.48]**	[7.85]**	[-3.91]**	[6.86]**	[-6.87]**	[7.64]**
Rural Bank	-2.09	0.17	-1.59	0.19	-2.78	0.17	-2.33	0.16	-1.79	0.17
	[-8.65]**	[23.81]**	[-6.31]**	[26.51]**	[-9.54]**	[24.29]**	[-3.81]**	[23.04]**	[-6.74]**	[23.98]**
Other	-2.17	-0.01	-1.63	-0.01	-2.75	-0.03	-2.34	-0.02	-1.80	-0.02
	[-8.07]**	[-0.67]	[-5.87]**	[-0.48]	[-8.95]**	[-1.66]+	[-3.67]**	[-1.35]	[-6.17]**	[-0.99]
2006 Year Dummy	0.06	-0.00	0.04	-0.01	0.11	-0.01	0.03	-0.01	0.04	-0.01
	[2.06]*	[-1.52]	[1.62]	[-2.26]*	[3.79]**	[-1.93]+	[0.63]	[-1.91]+	[1.42]	[-1.80]+
2007 Year Dummy	0.13	-0.02	0.09	-0.02	0.22	-0.02	0.09	-0.02	0.10	-0.02
	[3.74]**	[-5.94]**	[2.66]**	[-7.10]**	[5.48]**	[-6.44]**	[1.26]	[-6.11]**	[2.80]**	[-6.44]**

2008 Year Dummy	0.15	-0.02	0.10	-0.03	0.25	-0.03	0.10	-0.02	0.12	-0.03
	[3.93]**	[-7.31]**	[2.74]**	[-8.32]**	[5.62]**	[-7.73]**	[1.26]	[-7.05]**	[2.88]**	[-7.65]**
Log of GDP Per Capita										
Log of lag of Agric. Val Per Worker	1.28		1.22		1.26		1.25		1.27	
	[110.91]**		[102.83]**		[108.44]**		[103.59]**		[108.18]**	
Log of lag of Agric. Val Per Worker Squared	-0.03		-0.03		-0.03		-0.03		-0.03	
	[-23.66]**		[-17.35]**		[-22.04]**		[-20.16]**		[-21.89]**	
Domestic Credit										
Financial Openness	-0.76		0.84		-0.79		-0.57		-0.62	
	[-1.66]+		[1.88]+		[-1.71]+		[-1.24]		[-1.35]	
Log of MFIs' Gross Loan Portfolio										
Log of Country level (GLP/NOAB)*MFI	1.45		1.47		1.46		1.45		1.45	
	[119.52]**		[121.26]**		[120.53]**		[119.42]**		[119.35]**	
Institutional Factors										
Log of European Settlers Mortality	-0.11		-0.12		-0.03		-0.11		-0.09	
	[-29.26]**		[-29.58]**		[-5.44]**		[-18.42]**		[-24.95]**	
Error Term (Second Stage)		1.00		1.00		1.00		1.00		1.00
		[92.61]**		[92.53]**		[92.18]**		[92.80]**		[92.51]**
Constant		-1.40		-1.49		-1.44		-1.48		-1.46
		[-28.17]**		[-30.09]**		[-29.00]**		[-29.77]**		[-29.47]**
N	2122	3542	2122	3542	2122	3542	2122	3542	2122	3542
Adj. R^2		0.703		0.703		0.703		0.704		0.704
F-Statistics		570.51		572.19		570.24		572.27		572.25
Log-likelihood	-2.0e+04		-1.9e+04		-2.1e+04		-2.1e+04		-1.9e+04	

t statistics in brackets ---- + p<.10, * p<.05, ** p<.01

TABLE 3
Effect of Institutional Factors on MFI Financial Performance:
Three Stage Least Squares and Fixed Effects Vector
Dependent Variable: Debt to Equity Ratio

	Control of Corruption		Rule of Law		Voice and Accountability		Political Stability		Average Governance	
Explanatory Variables	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**
Log of GDP Per Capita	1880.23	22.00	1536.51	-8.45	610.79	6.69	959.29	-11.68	2142.46	3.69
	[4.80]**	[0.32]	[3.45]**	[-0.12]	[1.62]	[0.10]	[1.01]	[-0.17]	[4.54]**	[0.05]
Log of GDP Per Capita Squared	-130.67	-2.73	-106.39	-0.28	-43.71	-1.44	-66.62	-0.19	-148.94	-1.41
	[-4.99]**	[-0.54]	[-3.53]**	[-0.06]	[-1.69]+	[-0.29]	[-1.06]	[-0.04]	[-4.75]**	[-0.28]
Domestic Credit	7.36	0.02	6.36	-0.14	3.64	0.12	4.46	0.14	9.03	0.02
	[7.03]**	[0.07]	[4.54]**	[-0.59]	[3.25]**	[0.52]	[3.61]**	[0.64]	[7.93]**	[0.11]
Log of MFIs' Gross Loan Portfolio	**-420.60**	**-17.87**	**-343.53**	**-21.27**	**-131.81**	**-16.29**	**-216.45**	**-19.71**	**-481.95**	**-17.78**
	[-4.48]**	**[-5.25]****	**[-3.25]****	**[-6.24]****	**[-1.52]**	**[-4.79]****	**[-0.95]**	**[-5.79]****	**[-4.25]****	**[-5.23]****
Institutional Factors	**150.99**	**33.31**	**109.48**	**37.61**	**105.44**	**17.26**	**-7.42**	**16.50**	**170.86**	**35.47**
	[1.56]	**[2.10]***	**[1.91]+**	**[2.73]****	**[1.76]+**	**[1.70]+**	**[-0.07]**	**[1.92]+**	**[1.83]+**	**[2.45]***
Age	52.58	-5.52	46.00	-2.99	14.89	-6.38	25.99	-4.93	62.30	-5.37
	[4.78]**	[-4.37]**	[3.72]**	[-2.37]*	[1.42]	[-5.04]**	[1.01]	[-3.91]**	[4.76]**	[-4.26]**
Age Squared	-0.49	0.40	-0.43	0.39	-0.13	0.40	-0.23	0.43	-0.58	0.40
	[-4.49]**	[16.53]**	[-3.54]**	[16.00]**	[-1.24]	[16.50]**	[-0.94]	[17.52]**	[-4.52]**	[16.52]**
Regulate	267.28	-8.69	219.33	-6.53	74.26	-6.41	136.54	-4.21	311.84	-6.68
	[4.05]**	[-0.60]	[3.16]**	[-0.45]	[1.40]	[-0.45]	[1.00]	[-0.29]	[4.11]**	[-0.46]
Credit Union / Cooperative	-1255.65	-65.33	-1095.15	-77.97	-405.31	-58.43	-657.48	-71.56	-1457.94	-64.60
	[-4.93]**	[-2.40]*	[-3.86]**	[-2.86]**	[-1.70]+	[-2.15]*	[-1.07]	[-2.63]**	[-4.75]**	[-2.37]*
Non- Bank Financial Institution	-850.50	1.00	-736.59	-1.88	-273.14	5.04	-440.38	6.40	-977.35	3.60
	[-4.92]**	[0.04]	[-3.84]**	[-0.08]	[-1.67]+	[0.21]	[-1.01]	[0.26]	[-4.65]**	[0.15]
Non-Governmental Organization	-1481.30	-23.57	-1299.83	-36.37	-480.32	-16.97	-774.22	-23.52	-1731.36	-21.32
	[-5.09]**	[-0.87]	[-3.97]**	[-1.34]	[-1.73]+	[-0.62]	[-1.11]	[-0.86]	[-4.96]**	[-0.78]
Rural Bank	-1930.23	-117.50	-1698.75	-144.19	-639.97	-107.91	-1020.20	-126.62	-2255.29	-116.25
	[-5.17]**	[-3.50]**	[-4.06]**	[-4.28]**	[-1.81]+	[-3.21]**	[-1.12]	[-3.76]**	[-5.02]**	[-3.47]**
Other	-2061.03	-2.72	-1794.79	-6.40	-639.76	15.49	-1063.98	7.58	-2394.75	4.63
	[-4.85]**	[-0.04]	[-3.78]**	[-0.08]	[-1.60]	[0.20]	[-1.08]	[0.10]	[-4.68]**	[0.06]
2006 Year Dummy	-24.83	-27.19	-20.56	-24.51	-56.07	-25.70	-37.24	-24.96	-17.92	-25.80
	[-0.72]	[-1.77]+	[-0.59]	[-1.60]	[-1.87]+	[-1.67]+	[-0.76]	[-1.63]	[-0.49]	[-1.68]+
2007 Year Dummy	110.01	-12.41	88.37	-8.71	-10.57	-11.72	30.31	-10.80	135.56	-11.13
	[1.95]+	[-0.79]	[1.48]	[-0.55]	[-0.20]	[-0.75]	[0.26]	[-0.69]	[2.11]*	[-0.71]

2008 Year Dummy	131.90	-13.26	106.93	-10.39	-4.99	-12.32	42.46	-12.81	161.92	-12.46
	[2.10]*	[-0.82]	[1.61]	[-0.64]	[-0.09]	[-0.76]	[0.32]	[-0.79]	[2.25]*	[-0.77]
Log of GDP Per Capita										
Log of lag of Agric. Val Per Worker	1.27		1.21		1.25		1.24		1.25	
	[118.66]**		[110.29]**		[115.92]**		[111.14]**		[116.01]**	
Log of lag of Agric. Val Per Worker Squared	-0.03		-0.03		-0.03		-0.03		-0.03	
	[-24.60]**		[-17.88]**		[-22.95]**		[-20.88]**		[-22.74]**	
Domestic Credit										
Financial Openness	-0.57		1.21		-0.60		-0.62		-0.37	
	[-1.32]		[2.85]**		[-1.38]		[-1.41]		[-0.85]	
Log of MFIs' Gross Loan Portfolio										
Log of Country level (GLP/NOAB)*MFI	1.45		1.46		1.45		1.44		1.44	
	[126.94]**		[128.43]**		[128.14]**		[126.68]**		[126.66]**	
Institutional Factors										
Log of European Settlers Mortality	-0.11		-0.12		-0.03		-0.10		-0.09	
	[-31.25]**		[-30.97]**		[-6.21]**		[-18.10]**		[-25.80]**	
Error Term (Second Stage)		1.00		1.00		1.00		1.00		1.00
		[37.04]**		[37.01]**		[37.01]**		[37.13]**		[37.07]**
Constant		299.82		431.11		302.30		406.22		354.66
		[1.27]		[1.83]+		[1.28]		[1.72]+		[1.50]
N	2437	4032	2437	4032	2437	4032	2437	4032	2437	4032
Adj. R^2		-0.011		-0.011		-0.011		-0.009		-0.010
F-Statistics		81.66		81.73		81.66		82.04		81.84
Log-likelihood	-4.0e+04		-4.0e+04		-3.9e+04		-4.0e+04		-4.0e+04	

t statistics in brackets ----- + p<.10, * p<.05, ** p<.01

TABLE 4
Effect of Institutional Factors on MFI Financial Performance:
Three Stage Least Squares and Fixed Effects Vector
Dependent Variable: Operating Expense Ratio

	Control of Corruption		Rule of Law		Voice and Accountability		Political Stability		Average Governance	
Explanatory Variables	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**
Log of GDP Per Capita	-8.87	-1.11	-5.94	-1.15	-8.44	-1.16	-6.44	-1.18	-7.23	-1.14
	[-8.13]**	[-28.78]**	[-4.92]**	[-30.10]**	[-7.64]**	[-30.33]**	[-2.97]**	[-30.68]**	[-5.85]**	[-29.78]**
Log of GDP Per Capita Squared	0.63	0.08	0.42	0.09	0.60	0.09	0.46	0.09	0.52	0.08
	[8.57]**	[29.25]**	[5.13]**	[30.97]**	[7.82]**	[31.01]**	[3.20]**	[31.21]**	[6.28]**	[30.26]**
Domestic Credit	-0.04	-0.00	-0.03	-0.00	-0.04	-0.00	-0.04	-0.00	-0.04	-0.00
	[-12.73]**	[-6.50]**	[-7.38]**	[-6.31]**	[-11.27]**	[-5.44]**	[-9.34]**	[-5.18]**	[-11.29]**	[-7.39]**
Log of MFIs' Gross Loan Portfolio	**1.95**	**-0.12**	**1.33**	**-0.12**	**1.93**	**-0.12**	**1.47**	**-0.12**	**1.60**	**-0.12**
	[7.65]**	**[-61.55]****	**[4.71]****	**[-62.53]****	**[7.64]****	**[-64.12]****	**[2.84]****	**[-60.89]****	**[5.46]****	**[-61.61]****
Institutional Factors	**-1.28**	**0.06**	**-0.67**	**0.03**	**-0.85**	**0.04**	**-0.44**	**0.07**	**-1.27**	**0.09**
	[-4.86]**	**[6.45]****	**[-4.37]****	**[4.23]****	**[-4.78]****	**[7.97]****	**[-1.81]+**	**[14.67]****	**[-5.20]****	**[11.63]****
Age	-0.26	0.01	-0.20	0.02	-0.25	0.02	-0.21	0.01	-0.23	0.01
	[-9.94]**	[21.06]**	[-7.06]**	[23.24]**	[-9.46]**	[25.61]**	[-4.28]**	[21.35]**	[-7.77]**	[21.10]**
Age Squared	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	[9.58]**	[38.06]**	[6.98]**	[37.49]**	[9.27]**	[36.03]**	[4.21]**	[39.18]**	[7.52]**	[38.05]**
Regulate	-1.50	0.04	-1.15	0.04	-1.58	0.04	-1.38	0.04	-1.33	0.04
	[-7.75]**	[4.60]**	[-5.49]**	[5.15]**	[-9.15]**	[5.38]**	[-3.76]**	[5.56]**	[-6.06]**	[4.96]**
Credit Union / Cooperative	5.76	-0.47	4.35	-0.48	5.51	-0.49	4.56	-0.47	4.90	-0.47
	[8.79]**	[-32.43]**	[6.04]**	[-32.89]**	[8.48]**	[-33.60]**	[3.49]**	[-32.20]**	[6.59]**	[-32.42]**
Non- Bank Financial Institution	4.02	-0.14	3.01	-0.14	3.80	-0.13	3.00	-0.12	3.32	-0.13
	[8.87]**	[-10.77]**	[6.08]**	[-10.73]**	[8.49]**	[-10.64]**	[3.18]**	[-9.66]**	[6.42]**	[-10.47]**
Non-Governmental Organization	7.26	-0.25	5.51	-0.26	6.93	-0.27	5.82	-0.23	6.23	-0.25
	[9.38]**	[-17.36]**	[6.47]**	[-17.76]**	[8.93]**	[-18.61]**	[3.77]**	[-15.88]**	[7.11]**	[-17.04]**
Rural Bank	10.08	-0.63	7.69	-0.65	9.77	-0.67	8.15	-0.60	8.67	-0.63
	[9.35]**	[-34.28]**	[6.46]**	[-35.14]**	[9.04]**	[-36.40]**	[3.70]**	[-32.37]**	[7.05]**	[-33.99]**
Other	10.03	-0.27	7.49	-0.25	9.26	-0.24	7.80	-0.25	8.34	-0.26
	[8.53]**	[-5.78]**	[5.84]**	[-5.55]**	[8.24]**	[-5.15]**	[3.46]**	[-5.41]**	[6.28]**	[-5.68]**
2006 Year Dummy	-0.29	0.02	-0.24	0.02	-0.39	0.02	-0.18	0.02	-0.23	0.02
	[-2.40]*	[2.08]*	[-1.88]+	[2.50]*	[-3.58]**	[2.44]*	[-1.01]	[2.24]*	[-1.75]+	[2.20]*
2007 Year Dummy	-0.67	0.04	-0.51	0.04	-0.79	0.04	-0.43	0.04	-0.56	0.04
	[-4.43]**	[4.61]**	[-3.13]**	[5.04]**	[-5.42]**	[5.19]**	[-1.64]	[4.52]**	[-3.34]**	[4.92]**
2008 Year Dummy	-0.75	0.07	-0.55	0.08	-0.86	0.08	-0.45	0.07	-0.61	0.07
	[-4.41]**	[8.26]**	[-3.02]**	[8.57]**	[-5.25]**	[8.79]**	[-1.50]	[7.76]**	[-3.23]**	[8.48]**

Log of GDP Per Capita										
Log of lag of Agric. Val Per Worker	1.28		1.22		1.26		1.25		1.27	
	[111.13]**		[103.07]**		[108.59]**		[103.78]**		[108.43]**	
Log of lag of Agric. Val Per Worker Squared	-0.03		-0.03		-0.03		-0.03		-0.03	
	[-23.67]**		[-17.40]**		[-22.03]**		[-20.17]**		[-21.94]**	
Domestic Credit										
Financial Openness	-0.65		0.92		-0.68		-0.50		-0.50	
	[-1.41]		[2.04]*		[-1.48]		[-1.09]		[-1.08]	
Log of MFIs' Gross Loan Portfolio										
Log of Country level (GLP/NOAB)*MFI	1.45		1.47		1.45		1.45		1.45	
	[119.10]**		[120.84]**		[120.11]**		[118.94]**		[118.92]**	
Institutional Factors										
Log of European Settlers Mortality	-0.11		-0.12		-0.02		-0.11		-0.09	
	[-29.33]**		[-29.64]**		[-5.31]**		[-18.45]**		[-24.99]**	
Error Term (Second Stage)		1.00		1.00		1.00		1.00		1.00
		[140.09]**		[140.13]**		[139.79]**		[140.05]**		[139.95]**
Constant		5.80		5.91		5.98		6.00		5.93
		[44.36]**		[45.05]**		[45.69]**		[45.71]**		[45.19]**
N	2127	3549	2127	3549	2127	3549	2127	3549	2127	3549
Adj. R^2		0.858		0.858		0.858		0.858		0.858
F-Statistics		1335.98		1336.68		1339.04		1337.24		1336.06
Log-likelihood	-2.3e+04		-2.3e+04		-2.3e+04		-2.4e+04		-2.3e+04	

t statistics in brackets ---- + p<.10, * p<.05, ** p<.01

TABLE 5
Effect of Institutional Factors on MFI Financial Performance:
Three Stage Least Squares and Fixed Effects Vector
Dependent Variable: Portfolio at Risk

	Control of Corruption		Rule of Law		Voice and Accountability		Political Stability		Average Governance	
Explanatory Variables	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**
Log of GDP Per Capita	-1.17	-0.14	-1.15	-0.15	-0.39	-0.15	-0.18	-0.14	-1.41	-0.14
	[-9.45]**	[-11.04]**	[-7.21]**	[-11.24]**	[-4.77]**	[-11.21]**	[-1.40]	[-11.18]**	[-8.34]**	[-10.95]**
Log of GDP Per Capita Squared	0.08	0.01	0.08	0.01	0.03	0.01	0.01	0.01	0.09	0.01
	[9.72]**	[10.82]**	[7.29]**	[11.11]**	[4.88]**	[11.09]**	[1.45]	[10.96]**	[8.60]**	[10.79]**
Domestic Credit	-0.01	0.00	-0.01	0.00	-0.00	0.00	-0.00	0.00	-0.01	0.00
	[-13.79]**	**[0.38]**	**[-9.42]****	**[1.11]**	**[-9.50]****	**[0.57]**	**[-4.93]****	**[0.47]**	**[-13.01]****	**[0.31]**
Log of MFIs' Gross Loan Portfolio	**0.30**	**-0.02**	**0.30**	**-0.02**	**0.10**	**-0.02**	**0.05**	**-0.02**	**0.36**	**-0.02**
	[9.25]**	**[-29.73]****	**[7.20]****	**[-30.87]****	**[4.98]****	**[-30.48]****	**[1.53]**	**[-28.63]****	**[8.17]****	**[-28.44]****
Institutional Factors	0.01	0.00	0.01	-0.00	-0.04	-0.00	0.02	0.01	0.00	0.00
	[0.31]	[0.44]	[0.42]	[-1.44]	[-2.80]**	[-0.58]	[1.30]	[3.51]**	[0.04]	[0.93]
Age	-0.06	0.01	-0.06	0.01	-0.02	0.01	-0.01	0.01	-0.08	0.01
	[-10.26]**	[44.42]**	[-8.31]**	[46.14]**	[-5.64]**	[45.92]**	[-1.72]+	[43.60]**	[-9.20]**	[43.58]**
Age Squared	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00
	[10.24]**	[-25.99]**	[8.33]**	[-27.56]**	[5.65]**	[-28.02]**	[1.74]+	[-26.20]**	[9.16]**	[-27.16]**
Regulate	-0.23	0.01	-0.21	0.01	-0.08	0.01	-0.04	0.01	-0.26	0.01
	[-9.26]**	[2.00]*	[-7.55]**	[2.19]*	[-5.56]**	[2.10]*	[-1.68]+	[2.06]*	[-8.46]**	[1.93]+
Credit Union / Cooperative	0.69	-0.04	0.70	-0.04	0.26	-0.04	0.13	-0.04	0.83	-0.04
	[10.11]**	[-8.17]**	[8.27]**	[-8.65]**	[5.67]**	[-8.41]**	[1.88]+	[-7.53]**	[9.04]**	[-7.29]**
Non- Bank Financial Institution	0.47	-0.02	0.48	-0.02	0.17	-0.02	0.09	-0.02	0.57	-0.02
	[9.96]**	[-5.18]**	[8.15]**	[-5.20]**	[5.37]**	[-5.25]**	[1.65]+	[-4.83]**	[8.78]**	[-4.96]**
Non-Governmental Organization	0.94	-0.06	0.97	-0.06	0.35	-0.06	0.18	-0.06	1.14	-0.06
	[10.50]**	[-12.15]**	[8.50]**	[-12.74]**	[5.92]**	[-12.57]**	[1.92]+	[-11.32]**	[9.36]**	[-11.42]**
Rural Bank	1.41	-0.05	1.43	-0.06	0.56	-0.06	0.32	-0.04	1.68	-0.04
	[11.07]**	[-8.26]**	[8.96]**	[-9.02]**	[6.81]**	[-8.68]**	[2.39]*	[-6.98]**	[9.79]**	[-6.92]**
Other	1.05	-0.05	1.08	-0.05	0.38	-0.05	0.18	-0.05	1.29	-0.05
	[9.13]**	[-3.44]**	[7.57]**	[-3.31]**	[4.78]**	[-3.42]**	[1.49]	[-3.36]**	[8.25]**	[-3.36]**
2006 Year Dummy	-0.04	0.01	-0.05	0.01	-0.00	0.01	-0.00	0.01	-0.05	0.01
	[-3.31]**	[2.01]*	[-3.22]**	[2.08]*	[-0.59]	[2.08]*	[-0.09]	[2.02]*	[-3.25]**	[1.95]+
2007 Year Dummy	-0.13	0.00	-0.13	0.00	-0.04	0.00	-0.02	0.00	-0.15	0.00
	[-6.66]**	[0.39]	[-5.69]**	[0.39]	[-3.32]**	[0.40]	[-1.24]	[0.29]	[-6.21]**	[0.29]

2008 Year Dummy	-0.14	0.01	-0.13	0.01	-0.03	0.01	-0.01	0.01	-0.16	0.01
	[-6.07]**	[4.04]**	[-5.15]**	[3.97]**	[-2.12]*	[3.99]**	[-0.39]	[3.87]**	[-5.76]**	[3.96]**
Log of GDP Per Capita										
Log of lag of Agric. Val Per Worker	1.27		1.20		1.25		1.24		1.25	
	[112.11]**		[103.65]**		[109.70]**		[104.26]**		[109.00]**	
Log of lag of Agric. Val Per Worker Squared	-0.03		-0.02		-0.03		-0.03		-0.03	
	[-22.94]**		[-16.49]**		[-21.24]**		[-19.24]**		[-20.94]**	
Domestic Credit										
Financial Openness	-0.34		1.35		-0.29		-0.39		-0.15	
	[-0.75]		[3.05]**		[-0.64]		[-0.86]		[-0.33]	
Log of MFIs' Gross Loan Portfolio										
Log of Country level (GLP/NOAB)*MFI	1.43		1.45		1.44		1.43		1.43	
	[120.82]**		[122.49]**		[121.92]**		[120.65]**		[120.61]**	
Institutional Factors										
Log of European Settlers Mortality	-0.11		-0.12		-0.02		-0.10		-0.09	
	[-29.80]**		[-29.65]**		[-5.01]**		[-17.81]**		[-24.62]**	
Error Term (Second Stage)		1.00		1.00		1.00		1.00		1.00
		[80.07]**		[79.84]**		[79.85]**		[79.87]**		[79.84]**
Constant		0.76		0.77		0.76		0.76		0.74
		[17.25]**		[17.31]**		[17.31]**		[17.16]**		[16.77]**
N	2200	3693	2200	3693	2200	3693	2200	3693	2200	3693
Adj. R^2		0.603		0.602		0.602		0.601		0.601
F-Statistics		409.91		408.75		408.45		407.97		407.65
Log-likelihood	-1.9e+04		-2.0e+04		-1.8e+04		-1.8e+04		-2.0e+04	

t statistics in brackets ---- + p<.10, * p<.05, ** p<.01

TABLE 6
Effect of Institutional Factors on MFI Financial Performance:
Three Stage Least Squares and Fixed Effects Vector
Dependent Variable: Write-off Ratio

	Control of Corruption		Rule of Law		Voice and Accountability		Political Stability		Average Governance	
Explanatory Variables	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**	**3SLS**	**FEVD**
Log of GDP Per Capita	-0.49	-0.06	-0.33	-0.06	-0.45	-0.06	-0.31	-0.06	-0.38	-0.06
	[-6.92]**	[-7.88]**	[-4.27]**	[-8.28]**	[-6.56]**	[-8.70]**	[-3.28]**	[-8.84]**	[-4.94]**	[-8.51]**
Log of GDP Per Capita Squared	0.03	0.00	0.02	0.00	0.03	0.00	0.02	0.00	0.03	0.00
	[7.27]**	[7.79]**	[4.41]**	[8.40]**	[6.71]**	[8.83]**	[3.45]**	[8.80]**	[5.24]**	[8.49]**
Domestic Credit	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	[-10.46]**	[-2.92]**	[-6.40]**	[-2.59]**	[-9.80]**	[-1.77]+	[-6.77]**	[-1.93]+	[-8.61]**	[-2.74]**
Log of MFIs' Gross Loan Portfolio	**0.12**	**-0.01**	**0.08**	**-0.01**	**0.11**	**-0.01**	**0.08**	**-0.01**	**0.09**	**-0.01**
	[6.66]**	**[-24.33]****	**[4.25]****	**[-22.10]****	**[6.68]****	**[-25.54]****	**[3.28]****	**[-23.60]****	**[4.76]****	**[-24.06]****
Institutional Factors	**-0.06**	**0.01**	**-0.03**	**0.00**	**-0.04**	**-0.00**	**-0.00**	**0.01**	**-0.05**	**0.01**
	[-4.06]**	**[4.42]****	**[-3.09]****	**[2.13]***	**[-4.03]****	**[-0.22]**	**[-0.16]**	**[6.19]****	**[-4.00]****	**[4.30]****
Age	-0.02	0.01	-0.02	0.01	-0.02	0.01	-0.02	0.01	-0.02	0.01
	[-7.99]**	[34.76]**	[-5.65]**	[32.84]**	[-7.73]**	[35.98]**	[-4.11]**	[34.73]**	[-6.04]**	[34.72]**
Age Squared	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00	0.00	-0.00
	[7.84]**	[-17.52]**	[5.56]**	[-16.90]**	[7.60]**	[-18.31]**	[3.98]**	[-17.70]**	[5.87]**	[-17.69]**
Regulate	-0.08	0.00	-0.07	0.00	-0.08	0.00	-0.06	0.00	-0.07	0.00
	[-6.72]**	[1.64]	[-4.93]**	[1.84]+	[-7.80]**	[2.12]*	[-4.04]**	[2.21]*	[-5.28]**	[1.99]*
Credit Union / Cooperative	0.26	-0.05	0.19	-0.04	0.24	-0.05	0.17	-0.05	0.21	-0.05
	[7.04]**	[-16.52]**	[4.88]**	[-15.05]**	[6.77]**	[-17.34]**	[3.52]**	[-16.10]**	[5.24]**	[-16.31]**
Non- Bank Financial Institution	0.19	-0.02	0.14	-0.02	0.17	-0.02	0.12	-0.02	0.15	-0.02
	[7.02]**	[-7.07]**	[4.79]**	[-6.47]**	[6.60]**	[-7.08]**	[3.15]**	[-6.41]**	[4.96]**	[-6.78]**
Non-Governmental Organization	0.38	-0.04	0.29	-0.04	0.35	-0.04	0.25	-0.04	0.31	-0.04
	[7.59]**	[-14.55]**	[5.23]**	[-13.07]**	[7.25]**	[-15.29]**	[3.77]**	[-13.62]**	[5.65]**	[-14.21]**
Rural Bank	0.54	-0.08	0.41	-0.08	0.51	-0.09	0.37	-0.08	0.44	-0.08
	[7.59]**	[-22.98]**	[5.26]**	[-21.03]**	[7.38]**	[-24.12]**	[3.75]**	[-21.79]**	[5.64]**	[-22.66]**
Other	0.48	-0.03	0.35	-0.03	0.42	-0.03	0.31	-0.03	0.37	-0.03
	[6.84]**	[-3.69]**	[4.67]**	[-3.31]**	[6.45]**	[-3.37]**	[3.29]**	[-3.27]**	[4.88]**	[-3.42]**
2006 Year Dummy	-0.02	0.00	-0.02	0.00	-0.03	0.00	-0.02	0.00	-0.02	0.00
	[-3.07]**	[1.23]	[-2.46]*	[1.27]	[-3.85]**	[1.62]	[-1.89]+	[1.33]	[-2.27]*	[1.36]

2007 Year Dummy	-0.04	0.01	-0.03	0.01	-0.04	0.01	-0.03	0.01	-0.03	0.01
	[-4.20]**	[4.02]**	[-2.97]**	[3.90]**	[-4.74]**	[4.29]**	[-2.07]*	[3.84]**	[-3.02]**	[4.10]**
2008 Year Dummy	-0.05	0.01	-0.03	0.01	-0.05	0.01	-0.03	0.00	-0.04	0.01
	[-4.27]**	[3.30]**	[-2.85]**	[3.19]**	[-4.64]**	[3.45]**	[-2.03]*	[3.00]**	[-3.02]**	[3.33]**
Log of GDP Per Capita										
Log of lag of Agric. Val Per Worker	1.28		1.22		1.26		1.25		1.27	
	[108.38]**		[99.94]**		[105.92]**		[100.35]**		[105.34]**	
Log of lag of Agric. Val Per Worker Squared	-0.03		-0.03		-0.03		-0.03		-0.03	
	[-22.88]**		[-16.52]**		[-21.09]**		[-19.12]**		[-21.08]**	
Domestic Credit										
Financial Openness	-0.11		1.56		-0.05		-0.00		0.10	
	[-0.24]		[3.39]**		[-0.10]		[-0.01]		[0.20]	
Log of MFIs' Gross Loan Portfolio										
Log of Country level (GLP/NOAB)*MFI	1.44		1.46		1.44		1.43		1.43	
	[114.32]**		[116.21]**		[115.24]**		[114.19]**		[114.17]**	
Institutional Factors										
Log of European Settlers Mortality	-0.11		-0.13		-0.02		-0.11		-0.09	
	[-28.82]**		[-29.16]**		[-5.18]**		[-18.81]**		[-24.76]**	
Error Term (Second Stage)		1.00		1.00		1.00		1.00		1.00
		[53.28]**		[53.47]**		[53.26]**		[53.36]**		[53.35]**
Constant		0.33		0.32		0.34		0.34		0.34
		[13.23]**		[12.73]**		[13.72]**		[13.73]**		[13.54]**
N	1991	3319	1991	3319	1991	3319	1991	3319	1991	3319
Adj. R^2		0.334		0.335		0.335		0.334		0.334
F-Statistics		173.69		174.32		174.07		173.74		173.97
Log-likelihood	-1.6e+04		-1.5e+04		-1.6e+04		-1.6e+04		-1.5e+04	

t statistics in brackets ---- + p<.10, * p<.05, ** p<.01

Appendix 1: Correlation matrix

Variables	Return on Assets	Portfolio at Risk	Write-off Ratio	Operating Expense Ratio	Debt-to-Equity Ratio	Log of GDP PC	Log of MFIs' GLP	Voice and Accountability	Political Stability	Government Effectiveness	Regulatory Quality	Rule of Law	Control of Corruption	Domestic Credit	Log of lag Agric. Val. Add. Per Worker	Log of European Settlers Mortality Rate	Financial Openness	Log of country level (GLP/NOAB)*MFIs
Return on Assets	1.00																	
Portfolio at Risk	-0.10	1.00																
Write-off Ratio	-0.20	0.25	1.00															
Operating Expense Ratio	-0.40	0.04	0.14	1.00														
Debt-to-Equity Ratio	0.00	-0.02	-0.01	-0.01	1.00													
Log of GDP PC	-0.06	0.01	0.12	0.16	-0.02	1.00												
Log of MFIs' GLP	0.27	-0.11	-0.01	-0.23	-0.04	0.09	1.00											
Voice and Accountability	-0.07	0.00	0.04	0.08	0.03	0.36	0.01	1.00										
Political Stability	-0.08	0.03	0.06	0.13	0.00	0.31	-0.09	0.40	1.00									
Government Effectiveness	-0.09	-0.04	0.08	0.12	0.02	0.38	-0.03	0.55	0.35	1.00								
Regulatory Quality	-0.01	0.04	0.14	0.11	0.00	0.50	0.05	0.49	0.39	0.76	1.00							
Rule of Law	-0.07	-0.09	-0.03	0.02	0.05	-0.04	-0.06	0.46	0.34	0.78	0.49	1.00						
Control of Corruption	-0.07	0.00	0.09	0.09	0.01	0.44	0.03	0.60	0.49	0.79	0.74	0.66	1.00					
Domestic Credit	0.04	-0.05	0.00	0.02	0.02	0.02	0.04	0.09	0.12	0.37	0.10	0.45	0.16	1.00				
Log of lag Agric. Val. Add. Per Worker	-0.06	0.00	0.11	0.15	-0.02	0.86	0.09	0.17	0.28	0.14	0.29	-0.19	0.23	0.12	1.00			
Log of European Settlers Mortality Rate	-0.04	0.14	0.03	0.03	-0.03	-0.32	-0.13	-0.06	0.34	-0.24	-0.02	-0.08	-0.08	-0.35	-0.20	1.00		
Financial Openness	0.08	0.06	0.08	0.02	-0.03	0.53	0.08	0.06	0.12	-0.20	0.23	-0.41	0.06	-0.23	0.53	-0.03	1.00	
Log of country level (GLP/NOAB)*MFIs	0.07	0.03	0.02	-0.02	-0.01	0.48	0.09	0.32	0.03	-0.05	0.17	-0.31	0.18	-0.38	0.34	-0.11	0.60	1.00

Appendix 2: Interpretation of Dependent Variables (ratios)

Variable	Financial Performance category	Interpretation
Return on Assets	Profitability [OPE. INC. Less Taxes/Assets]	*Higher values are preferred*
Leverage Ratio	Asset Management [Liabilities(debt)/Equity]	*Lower values are preferred**
Operating Expense	Efficiency/Productivity [OPE. EXP/GLP]	*Lower values are preferred*
Portfolio at Risk (30 days)	Portfolio Quality[PAR/GLP]	*Lower values are preferred*
Write-off Ratio	Portfolio Quality [Write-offs/GLP]	*Lower values are preferred*

- *This is not always the case as either low or high leverage suggests respectively indicates a potential or risk in operation from the perspective of borrowing and use of funds.*

Appendix 3: Data Structure

Year	No. of MFIs	No. of Countries
2005	**1077**	**106**
2006	**1163**	**105**
2007	**1181**	**105**
2008	**1269**	**105**
2009	**1050**	**105**
Total	**5740**	

Appendix 4 List of Countries (Final Estimation)

No.	Country	No.	Country	No.	Country
1	Afghanistan	34	Georgia	67	Nigeria
2	Albania	35	Ghana	68	Pakistan
3	Angola	36	Guatemala	69	Palestine
4	Argentina	37	Guinea	70	Panama
5	Armenia	38	Guinea-Bissau	71	Papua New Guinea
6	Azerbaijan	39	Haiti	72	Paraguay
7	Bangladesh	40	Honduras	73	Peru
8	Benin	41	Hungary	74	Philippines
9	Bolivia	42	India	75	Romania
10	Bosnia and Herzegovina	43	Indonesia	76	Russia
11	Brazil	44	Iraq	77	Rwanda
12	Bulgaria	45	Jordan	78	Senegal
13	Burkina Faso	46	Kazakhstan	79	Serbia
14	Burundi	47	Kenya	80	Sierra Leone
15	Cambodia	48	Kosovo	81	South Africa
16	Cameroon	49	Kyrgyzstan	82	Sri Lanka
17	Central African Republic	50	Laos	83	Swaziland
18	Chad	51	Lebanon	84	Syria
19	Chile	52	Macedonia	85	Tajikistan
20	China, People's Republic of	53	Madagascar	86	Tanzania
21	Colombia	54	Malawi	87	Thailand
22	Congo, Democratic Republic of the	55	Malaysia	88	Togo
23	Congo, Republic of the	56	Mali	89	Trinidad and Tobago
24	Costa Rica	57	Mexico	90	Tunisia
25	Cote d'Ivoire (Ivory Coast)	58	Moldova	91	Uganda
26	Croatia	59	Mongolia	92	Ukraine
27	Dominican Republic	60	Montenegro	93	Uruguay
28	East Timor	61	Morocco	94	Uzbekistan
29	Ecuador	62	Mozambique	95	Venezuela
30	Egypt	63	Namibia	96	Vietnam
31	El Salvador	64	Nepal	97	Zambia
32	Ethiopia	65	Nicaragua		
33	Gambia, The	66	Niger		