Performance and corporate governance in microfinance institutions

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Abstract

We trace the relationship between firm performance and corporate governance in microfinance institutions (MFI) utilising a self constructed global data set on MFIs, collected from third-party rating agencies. We study the effect of board characteristics, ownership type, competition and regulation on the MFI's outreach to poor clients and its financial performance. The results show that split roles of CEO and chairman, a female CEO, and competition are important explanations. Larger board size decreases the average loan size while individual guaranteed loan increases it. No difference between nonprofit organisations and shareholder firms in financial performance and outreach is found.

Keywords: Microfinance organisation, governance, performance

JEL classification codes: G30, G32, J23

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1 Introduction

In this paper we trace the relationship between firm performance and corporate governance in Microfinance institutions (MFI). MFIs supply banking services to micro-enterprises and supposedly poor families. Most MFIs claim having a dual mission of reaching poor clients and being financially sustainable. Hence, firm performance should be measured along both these dimensions. Good corporate governance has been identified as a key bottleneck in strengthening MFIs' financial performance and increase their outreach (Rock et al., 1998; Labie, 2001; Helms, 2006; United Nations, 2006; Otero and Chu, 2002). However, except for the Hartarska (2005) study of East European MFIs, the influence of corporate governance on the MFIs' performance has not been empirically studied before, partly due to lack of data. This paper aims to fill the void by exploiting recently released data from third party rating agencies, yielding a unique panel data set of rated MFIs spanning 57 countries. Thus, we respond to the Morduch (1999); Hartarska (2005) request for more studies and, equally important, better data to analyse the relationship between firm performance and corporate governance in the microfinance industry.

Microfinance is high on the public agenda after the UN Year of Microcredit in 2005 and the Nobel Peace Prize to Mohammed Yunus and Grameen Bank in 2006. Christen et al. (2004) report an astonishing 500 million persons served, mostly with savings accounts, while the Microcredit Summit in the 2006-meeting in Halifax celebrated the milestone of 100 million borrowers reached. Nevertheless, microfinance still reaches only a fraction of the world's poor (Robinson, 2001; Christen et al., 2004). Hence, there is a supply challenge in the industry (Helms, 2006; C-GAP, 2004, 2006).

? report systematic differences in governance between banking and manufacturing firms. This indicates that governance structures are industry specific. Hence, to improve the performance of MFIs there is a need to better understand the influence of different corporate governance mechanisms in this specific industry. **?** point out that beside the owner-board/manager agency relationship found in nearly all firms, the agency aspects in the firm-customer interactions are potentially more important in banking than in other industries. In microfinance this becomes even more evident because the repayment problem is so central[1].

The point of departure for this article is that corporate governance, understood as the

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[1] Two factors make a MFI's loan portfolios different from a bank's; first, because it is generally semi- or uncollateralized, and second, because repayment time is generally short, ranging from 3 to 12 months. Thus an MFI risks steep deterioration of its portfolio in a matter of weeks only.

system, or the set of mechanisms, by which organisations are directed and controlled (OECD, 2004), influences organisations' performance. Specifically we study the effect of how the internal mechanisms of top management and ownership together with the external mechanisms competition and regulations influence the financial and outreach performance of MFIs.

The results show that the overall financial performance (ROA) is improved when the roles of CEO and chairman are split, when the CEO is a woman, and when loans are made to individuals. Stronger competition reduces operational costs, portfolio yield and return on assets. The effect of regulation turns out to be insignificant. We find no significant board size and composition effects upon average loans and credit clients, yet the loan methodology is an important determinant for these outreach variables. Outreach, measured by the number of credit clients served and clients' poverty level, is improved with group lending. There is generally no difference between nonprofit organizations and shareholder firms neither in financial performance nor in outreach.

The paper proceeds as follows. Section 2 briefly reviews the few related studies and 3 develops hypotheses. Then section 4 gives an overview of the data sources and estimation method, while we report descriptive statistics in section 5. In section 6 the econometric evidence is presented, before the concluding section 7.

2   Former literature

Hartarska (2005) investigates the relationship between governance mechanisms and financial performance utilising three surveys of rated and unrated east European MFIs from three random samples in the period 1998 to 2002. However, the number of observations is low. In regressions its range is from 46 to 144 in a dataset, depending on the samples used. Financial performance and outreach constitute dependent variable dimensions, and governance mechanisms encompass board characteristics, CEO compensation, and ownership type[2]. Several institutional variables as well as firm control variables are included. She finds that a more independent board has better ROA, but a board with employee directors gives lower financial performance and lower outreach. The difference between different ownership types in terms of financial performance and outreach is unnoticeable. In contrast to our consistently collected global data, Hartarska (2005) utilises east European data from several sources. Furthermore, while she has a number of variables for stakeholders, very few observations are present in our study.

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[2]Ownership type refers to the various legal incorporations found in microfinance institutions, ranging from shareholder owned firms to cooperatives.

Cull et al. (2007) looks at MFI financial performance and outreach as well, with a focus on lending methodology[3], controlling for capital and labour cost as well as institutional features. They use data from 124 rated MFIs, and find that financial performance is improved, up to a point, with individual loans, and that MFIs concentrate more on individual loans. No governance variables, such as board characteristics or ownership type, are taken into account.

The limited number of academically based studies available, the lack of more comprehensive global datasets and the fact that several governance mechanisms remain unexplored indicate a need for our study. For example, neither Hartarska (2005) nor Cull et al. (2007) take account of the product market competition. Hence, there is a need for investigations using better data and variables that cover different aspects of governance, and at the same time take into account characteristics of microfinance.

3 Governance and performance in MFI

3.1 The microfinance challenge

Before discussing specific governance mechanisms, we need to consider the special nature of banks. As a provider of banking services, the MFI is subject to adverse selection and moral hazard from credit clients with little or no collateral (Armendariz de Aghion and Morduch, 2005). Stiglitz and Weiss (1981) point out that adverse selection arises since the bank does not have enough information to differentiate between good and bad risks. Maybe this insight has particular relevance in the microfinance field, since customers often have a short or no credit history, and little or no collateral. Moral hazard is the problem that the borrower will not exert necessary effort to repay the loan, when the bank is unable to monitor. What sets the new microfinance initiatives apart is that of finding new ways to deal with these problems through group lending, character lending and the stepwise building of a credit history[4], and thereby, to establish workable business models.

The adverse selection and moral hazard story on the part of the MFI should be extended

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[3]Lending methodology refers to the way loans are given. Individual loans, group loans, and village banks – which are bigger groups that often have wider objectives than to serve as a guarantee mechanism only – are the categories used.

[4]Hansmann (1996) shows that group lending liability, may be the most conspicuous novelty in microfinance, was used extensively in 19th century non-profit and mutual banks and insurance companies. Also Bouman (1995) outlines how informal savings and credit groups are widespread and have been around for centuries. Thus, the group lending innovation is more a rediscovery than a complete novelty.

to problems on the part of depositors and borrowers. How can they judge if the MFI does not use its informational advantage in the money markets to charge too high loan interest, or to take on too much risk with depositors' money? These are questions particularly important to ask in the microfinance market where the level of customer education is, at best, moderate and people repeatedly experience exploitation and fraud. Thus, the microfinance industry is beset by mutual adverse selection and moral hazard problems. It is no surprise that Macey and O'Hara (2003) maintain that the relationships to depositors and borrowers are as important to the success of the bank as the managers' and the board's relationship to its owners. Therefore incentive problems have a *dual nature*, one between owners and managers, the other between the MFI and its customers. Furthermore, the special nature of banks as providers of financial infrastructure often requires public regulations of the bank-customer relationship in order to get customers to entrust their savings and avoid possible economy-wide breakdowns. Therefore the monitoring of the bank is not as straightforward as in ordinary firms, and we need to take the MFI's regulatory framework into consideration.

3.2 Performance measures

Governance is about achieving corporate goals. For most MFIs, dual goals exist. One goal is to contribute to development. This involves reaching more clients and poorer population strata, the main outreach "frontiers" of microfinance (Helms, 2006; Johnson et al., 2006). The second goal is to do this in a way that achieves financial sustainability and independence from donors. We analyse the relationship between governance mechanisms and both outreach and financial performance. As measures for financial performance we use return on assets (ROA)[5], but also variables that go behind ROA, that is, operational costs and portfolio yield, as Christen (2000) suggests. The outreach measures are the MFI's average outstanding loan and the number of credit clients served. The average outstanding loan is a measure of the so called depth of microfinance, that is, the reaching out to the poorest segments of customers, and the number of credit clients is a measure of breadth, for obvious reasons (Schreiner, 2002). Thus, our firm performance measures should cover a number of interesting features of the microfinance reality.

Table 1 gives an overview of dependent variable definitions.

Table 1

While Rhyne (1998) considers the two main goals of financial performance and outreach

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[5]Debt/equity levels differ considerable between MFIs. Hence, ROA is more appropriate than ROE when measuring financial results across different institutions.

to be a "win-win" situation, claiming that those MFIs that follow the principles of good banking will also be those that alleviate the most poverty, Woller et al. (1999); Morduch (2000) think that the proposition is far more complicated, noting that programmes continue to be subsidised, and that the financially sound MFIs are not those celebrated for serving the poorest clients. In this paper, we do a simple test of the proposed "win-win" relationship by including the outreach variable average loan in one of the ROA regressions.

3.3   Internal and external governance mechanisms

In this section, we spell out hypotheses concerning the association between firm performance and governance. Since the effects upon outreach are little explored in the literature and therefore little known, the comments mostly refer to financial performance only. Table 2 summarises the dependent variables, their definitions and hypotheses to the variables in table 1.

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Table 2

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Successful governance should alleviate two-sided adverse selection and moral hazard problems. We differentiate between internal and external governance mechanisms. The internal comprise the functions of the CEO and the board, and the ownership type. These mechanisms are made by choice and are called internal accordingly. We specify external governance mechanisms as the product market competition and regulation. Both kinds of governance mechanisms are used in the analysis. Thus, we are able to pinpoint relationships between various forms of governance mechanisms and financial performance and outreach.

3.4   Internal governance mechanisms

The importance of internal governance mechanisms is recognised in the microfinance literature (Rock et al., 1998; Otero and Chu, 2002; Helms, 2006). This concerns first of all board oversight and control of management (Fama and Jensen, 1983; Becht et al., 2003; Hermalin and Weisbach, 2003). The owners-board relationship concerns how well the board is aligned to owner interests, how well the board is informed, and how decisive the board is (Bøhren and Strøm, 2005). The higher is the score on these dimensions of the board's characteristics, the better is financial performance.

In MFIs, the board is supposed to be better aligned if the CEO and chairman are different

persons, and if the percentage of international directors increases. Independent boards are considered better able to monitor the CEO on the behalf of the owners. A CEO/chairman duality may be a sign of CEO entrenchment (Hermalin and Weisbach, 1991, 1998), that is, the opposite of independence, since then the CEO may pursue policies that give him private benefits. However, Brickley et al. (1997) did not find that firms with a CEO-chairman split outperformed those with a CEO-chairman duality. On the other hand Oxelheim and Randøy (2003) found that firm performance was better in firms with international directors which they consider to be an indication of independence.

Information variables encompass gender and the internal board auditor. We expect that the better the CEO and the board are informed, the better will financial performance be. One of the innovations in microfinance has been the targeting of female customers (Armendariz de Aghion and Morduch, 2005). Presumably, having a female CEO or a high fraction of women on the board would help the MFI understand its customers better so as to separate the good risks from the bad. Our data contain the gender of the CEO. Thus, this better customer knowledge should influence both the MFI's operational costs as well as its overall profitability. Alternatively, gender can be seen as a sign of board heterogeneity, specified by the fraction of women directors (Shrader et al., 1997). It would then be grouped among the decisiveness variables. In western companies, the evidence on gender impact is mixed. However, we prefer to group gender among information variables, because of its supposedly close link to the MFI's customers.

Another information variable is the internal board auditor. At its best, the internal board auditor provides independent, objective assessments on the appropriateness of the organisation's internal governance structure and the operating effectiveness of specific governance activities. This activity should be value enhancing. Policy papers for MFIs stress the importance of internal audit and recommend that the internal auditor reports directly to the MFI board (Steinwand, 2000). Hence, in some of our regressions we include this internal governance variable. Thus, an MFI allowing their internal auditors to report directly to the board should show higher financial performance.

Information variables could also include CEO experience and educational background as well as stakeholder representatives. A more experienced CEO is likely to bring better and more relevant information to the board's attention. Likewise, representatives of employees and customers should enhance the bank's knowledge of its markets, and also, help to align the stakeholders to the MFI mission. At least, this is the position in the stakeholder theory (Freeman and Reed, 1983; Blair, 1995; Conger et al., 2001). However, since stakeholder representatives on boards are almost absent in our dataset we cannot include them in a meaningful way in regressions. The lack of stakeholder representatives

is in itself a surprising finding and we recommend future studies to explore the existence and role of stakeholders in microfinance governance.

When it comes to decisiveness, larger and more heterogeneous boards can bring about higher decision costs (Mueller, 2003). A reason for this is that a larger board may induce members to free ride in monitoring, giving the CEO a freer position. Yermack (1996); Eisenberg et al. (1998); Bøhren and Strøm (2005) report that larger boards are associated with lower firm performance, measured as Tobin's Q^6 or ROA, and Hartarska (2005) adds the same negative result in ROA regressions for MFIs. Adams and Mehran (2003) give contrary evidence for banking firms in the USA. Larger boards improve Tobin's Q significantly, but shows no significance for ROA. Thus, in banks the importance of board may be different from industrial firms. We include board size, but are unable to find measures of heterogeneity.

The legal incorporation, or the ownership type, may play a role for firm performance. Similar to regular banking (Rasmussen, 1988; Hansmann, 1996; Labie, 2001), ownership of MFIs differs widely. Private suppliers are normally incorporated as member based Cooperatives (COOPs), Non Profit Organisations (NPOs) or Shareholder Firms (SHFs). NPOs are often considered weaker structures since they lack owners with a financial stake in the operations (Jansson and Westley, 2004). It is taken as a matter of truth that this leads to lower financial performance than in SHFs. Gutierrez-Nieto et al. (2007) confirm that this is the case using data from 30 Latin-American MFIs. Therefore Ledgerwood and White (2006); Hishigsuren (2006); Fernando (2004) argue for the transformation of NPOs into SHFs. On the other hand, NPOs are supposed to better reach poor customers. Hence, the ownership type implies that SHFs should have better financial performance but reach less poor clients than NPOs.

However, this dichotomy along ownership type need not be the best description. First of all, the NPO needs to perform well in order to stay in business. The ownership-premise is that incentive problems between owners and managers are more pronounced in NPOs and diffused owned firms, but that the NPOs have an offsetting benefit of reducing customer adverse selection and moral hazard (Hansmann, 1996; Desrochers and Fischer, 2002), since they are better able to tap into local information networks. Group lending is an instance of such a local information network mechanism. On the other hand, many SHFs are hardly run on the shareholder value model, but may also have a commitment to reach the poor. Thus, the ownership type dichotomy should perhaps be moderated.

Furthermore evidence from comparisons of SHFs and NPOs in other settings contradict

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[6]Tobin's Q is commonly measured as the firm's market value divided by the book value of its assets.

the claim that shareholder owned banks perform better than others. Crespi et al. (2004); Bøhren and Josefsen (2007) show that the financial performance of savings banks is on par with commercial banks in Spain and Norway, respectively. Valnek (1998) reports that the mutual building societies have outperformed the stock retail banks in the UK. However, in a large survey of banks in 15 European countries Iannotta et al. (2007) find that mutual banks and government-owned banks exhibit a lower profitability than privately owned banks, in spite of their lower costs and better loan quality and lower asset risk.

Historical evidence provided in Cull et al. (2006) show that throughout North Atlantic countries, intermediaries emerged to supply finance for small businesses and persons, tapping into local information networks. In France, notaries played this role, in Anglo-American countries the role was filled by small commercial banks as well as for instance credit unions, and in Germany and Scandinavian countries the function was filled by savings banks. Thus, the common practice has been a multitude of ownership types in the start-up phase of economic development, and of course, in many countries the different ownership types have survived until today. Furthermore, Rasmussen (1988) reports historical bank evidence that mutual banks attract smaller customers and take on less risk than stock banks when regulation is weak.

In summary, recent comparisons of performance in different ownership types as well as historical evidence suggest that financial performance does not vary systematically between ownership forms. Therefore an alternative hypothesis may be that both financial performance and outreach of the two ownership types are equally good.

We operationalise ownership type as NPO, SHF, and other ownership types, and include dummies to identify the NPO and the SHF. It turns out that the great majority of firms in our sample are either SHFs or NPOs. The contrast to the remaining ownership types may not be reliable. Therefore we also perform alternative regressions with a dummy signifying an SHF if the dummy is 1.

3.5 External governance mechanisms

The external governance mechanisms product market competition and regulation may be related to firm performance. In general, the more intense the competition, the less need owners have for internal governance mechanisms (Hart, 1983; Schmidt, 1997), so that competition is a substitute mechanism to internal governance. Gorton and Winton (2003, p. 465) discuss how increased competition may undermine bank-customer long-time relationships. Such a relationship allows the bank to earn rents on survivors.

When relationships are undermined through competition, firm financial performance is weakened. Thus, from both general and industry specific theories we expect higher competition to go along with lower ROA, but increased efficiency levels.

To measure the level of competition we have created a subjective scale based on general competition information provided in the rating reports. In the reports the raters provide written information about market conditions including the level of competition the MFI is facing. We subjectively assess this information to indicate on a 1 to 7 point scale the level of market competition. Since the raters have multi-country experience and have rated dozens of MFIs they should be able to provide judged information. Furthermore, since many MFIs only have local or regional coverage, proxies for national level of competition like relative number of MFI-clients in a country would in many cases turn out to be less reliable than the proxy we are using. Nevertheless, we admit that our proxy may not be reliable in individual cases, but for the time being we consider it to be the best one available as it should serve as a rough guide to the relative competition pressures in the microfinance markets.

Now, look at regulation predictions. A regulated MFI is more likely to earn customer trust, which should lead to a higher financial performance. On the other hand, Macey and O'Hara (2003) have pointed at the moral hazard problem of depositor insurance: The banks may pursue a more risky lending practice when it knows that the government will guarantee the deposits. Thus, higher agency costs may pull financial performance into the opposite direction. At the same time regulation is associated with costs like security requirements, investments in information technology etc. Hence, the final outcome of the sign for financial performance is uncertain. The outreach effects are contradictory. For MFIs regulation implies the access to an important and low-cost funding source through the right to mobilise savings. This gives the MFI the opportunity to increase the number of clients, but also to increase average loan amounts for existing customers. Therefore the effects upon depth and breadth in outreach may be uncertain as well, either upon depth or breadth, or a combination of the two.

3.6   Control variables

Finally, we include control variables that are specific for the MFIs. The inclusion of these variables will also help to inform the ongoing debate in the microfinance literature on matters such as the "microfinance schism" (Morduch, 2000) between financial performance and outreach, and the advantages of group lending. We will comment on the results for these aspects as well when they yield interesting insights, although the main

focus is on issues concerning internal and external governance.

First, the loan methodology, whether group or individual lending, may be associated with firm performance[7]. Microfinance has produced innovations in lending that may overcome the adverse selection and moral hazard problems. Armendariz de Aghion and Morduch (2005) point out that group lending may increase the repayment rate. This happens because group lending leads to assortative grouping, that is, that the best credit risk groups band together naturally, out of local knowledge of trustworthiness. MFIs may have different fractions of group lending. A dummy variable indicates whether the main loan methodology in the MFI is to group or individual borrowers. The group lending encompasses village banks and solidarity loans.

Second, MFIs often target their lending at the rural population to a greater extent than ordinary banks, although they too struggle to reach rural population (Johnson et al., 2006). Different proportions of these customer groups may influence firm performance.

The third control variable is the average loan size, considered to be a main cost driver in MFIs. To the extent that there is a "mission drift" from reaching poor clients to reaching the more better-off in some MFI institutions, then this difference should be accounted for. Likewise, the average labour productivity, the MFI experience, and firm size are included as controls. The MFI experience variable has been constructed by subtracting the first year of MFI experience from the year of observation[8].

Last, the human development index (Human Development Report, 2006) controls for country-specific effects. The index is a composite of a country's average results in three areas, that is, life expectancy, education, and income (GDP per capita). The figures are the latest available and are from 2004.

4   Data issues and methodology

The rating reports used are in the public domain at the `www.ratingfund.org`. The dataset contains information from risk assessment reports made by five rating agencies: MicroRate, Microfinanza, Planet Rating, Crisil and M-Cril. Comparisons of the methodologies applied by the rating agencies reveal no major differences in MFI assessment.

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[7]Group lending encompasses village banks and solidarity groups. A village bank normally consists of 10-30 members while the size of a solidarity group normally ranges between four and eight persons.

[8]Our experience variable measures years of experience with microfinance operations. Some organisations have been involved in other activities before and may be older than the reported years of experience, while some may have changed their charter and thus legally they are younger than reported.

All the five agencies are approved official rating agencies by the Rating Fund of the Consultative Group to Assist the Poor (C-GAP) (`www.ratingfund.org`).

Transparency in microfinance has been emphasized as increasingly important. No commonly accepted international standards for microfinance existed until some years back, when the rating agency MicroRate invited the Inter-American Development Bank (IDB), the Consultative Group to Assist the Poor (CGAP), the United States Agency for International Development (USAID) and two of the other rating agencies M-Cril and Planet Rating to agree on a set of commonly used indicators. This resulted in a document published by IDB called Performance Indicators for Microfinance Institutions. All five rating agencies adopted the common ratio-definition.

Rating is considered a benefit in the microfinance industry. According to Ratingfund, MFIs benefit from rating or assessment in four ways. First, ratings or assessments increase the financial transparency when it is made publicly accessible for all interested parties. Second, rating reports provides a benchmark against other MFIs and give the management of the different organisations the opportunity to compare their results against peers. Third, ratings make the organisations want to improve performance and through in-depth analysis of the institution, management can point out areas that need attention. Fourth, ratings and assessments give investors and donors the opportunity to compare and monitor standardized information on their investments.

Different organisations sometimes tend to have different ways of presenting their financial figures. Hence, the rating agencies present some adjusted variables to allow a better comparison with other organisations. The main adjustments are normally adjustments considering interest on delinquent loans, elimination of subsidies, standard calculation of provisions, adjustments for inflation, and adjustments for write-offs on loans. Comparing the methods of adjustment applied by the different agencies uncover only occasional slight differences. The source of information should therefore only to a minor degree influence the data.

The rating agencies differ in their emphasis and abundance of available information. Thus, different N on different variables and in different years is reported. When needed all numbers in the dataset have been annualised and dollarised using official exchange rates at the given time.

The rating reports making up the database are from year 2000 to year 2006 with the vast majority being from the last three years. In the cases where several rating reports are available from the same organisation the most recent report (as of different dates during 2006) has been selected.

The data have a certain sample selection bias, since only rated MFIs enter. However, of the rated MFIs most rating categories are represented in the data. On a uniform rating scale from 0-100% the average rating grade is 52.8% with a standard deviation of 17.8%. Yet, this selection has advantages from an estimation point of view, since much of the background noise has been eliminated by only including MFIs able and willing to be rated. This allows for better comparisons of ownership types, those that are regulated, and so on.

Furthermore, our sample is quite representative of the MFIs practicing microfinance in a business oriented manner. The vast majority of NPOs and COOPs involved in microfinance are very small and not rated. The total number of MFIs that actually practice, or intend to practice, microfinance in a business oriented manner is also quite limited. The lack of professional and business oriented MFIs is considered to be a major bottleneck in the industry (C-GAP, 2004). Moreover, the largest international lender to MFIs, Oikocredit, known to be relatively forthcoming to MFI customers in offering loan capital, has less than 500 MFIs as clients (`www.oikocredit.org`). This limited number is not because of lack of capital, but due to lack of potential borrowers with the needed business orientation in place. In addition Ratingfund has co-funded most of the costs related to being rated for more than six years, but still only around 300 MFIs have accepted the offer and become rated. A further piece of evidence comes from Daley-Harris (2006) who report a total of 3133 MFIs and microcredit programmes. However, of these only 907 had 2500 or more clients. Furthermore Daley-Harris indicate that only 9 MFIs have more than 1 million clients. These organisations too are screened out in our sample. Hence, the dataset consisting of 226 MFIs do represent an important and representative share of the professionally oriented MFIs and the best hopes when it comes to reaching the dual goal of developmental and financial performance.

4.1 Estimations by random effects

The panel data structure is such that we have repeated observations on the dependent performance variables for up to four consecutive years, while the dependent governance variables are often reported only once and thus assumed constant during the whole period. For instance, board variables are constant. We can estimate the relationship either by regressions year by year, or choose the random effects method, which allows the inclusion of all years.

We follow Greene (2003, p. 294-5) who formulates the random effects model as

$$y_{it} = \mathbf{x}'_{it}\boldsymbol{\beta} + (\alpha + u_i) + \epsilon_{it} \tag{1}$$

Here, α is the mean of the unobserved heterogeneity, u_i is heterogeneity specific to firm i, while ϵ_{it} is the remaining firm-year heterogeneity. y_{it} is the dependent variable, and $\mathbf{x}'_{it}\boldsymbol{\beta}$ are the vector of explanatory variables and the vector of coefficients, respectively. Thus, this formulation implies that the constant term in the regression must be interpreted as the average firm-year heterogeneity.

The random effects method amounts to transforming the original data. Using y_{it}, the dependent variable for the ith case in year t, as an example, the transformed y_{rit} is

$$y_{rit} = \frac{1}{\sigma_{\epsilon}} \left(y_{ti} - \theta \overline{y}_l \right) \qquad \text{where} \qquad \theta = 1 - \frac{\sigma_{\epsilon}}{\sqrt{\sigma_{\epsilon}^2 + T\sigma_u^2}} \tag{2}$$

Here, $\overline{y}_l$ is the individual firm average. σ_{ϵ} is the standard deviation of the residual ϵ_{it}, and it is assumed to be constant. σ_u is the standard deviation of the firm heterogeneity, also assumed to be constant. T is the number of years of data, that is four in this case.

We find these standard deviations by first running a generalised least squares (GLS) regression on the data assuming a random effects structure. Then we do the transformations in (2), and run a three-step least squares (3SLS) (Greene, 2003) on the transformed data. The full procedure produces about the same coefficients as the original GLS regression, but the standard errors are smaller. Since the assumed relationships are linear, the 3SLS is a valid method. Using ordinary least squares (OLS) method instead of 3SLS in the last run gives about the same results as the 3SLS. This is not surprising, since the 3SLS requires a GLS estimation in the first step. An advantage of 3SLS is that the method does not depend upon assumptions of distributional form, for instance normality, in common with other moment-based estimation methods.

5　Descriptive statistics

We start by giving some descriptive statistics. Table 3 shows main values on board and management characteristics.

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Table 3

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In the rightmost '% no' column we report the percentage of the variable that scores zero. For instance, 74.4% of the firms have no international directors.

The number of women in board and management positions is quite high. 25.0% of the CEOs and 20.6% of presidents are women. The percentage of MFIs with at least one female director is high, too, but this 71.6% comes from very few observations, only 88. We are forced to drop this variable in later analyses. The high incidence of women in microfinance institutions is perhaps natural, since women are often the main customers. Conversely, with women in management and on the board, the firm should have a better knowledge of its customer base, that is, it should be better able to overcome information asymmetries.

Obviously, the CEO is not a novice in business. Only 8.8% have no former business experience, and only 20.7% have no business education.

High numbers on the board size, few board meetings, as well as the CEO-chairman duality may all be seen as signs of agency costs. The board size is among the lower in international comparison. The average is 7.45 directors, and falls within the Council of microfinance equity funds (2005) recommendation (7-9 directors). In fact, 64.5% of all boards have 5 to 9 members, with 17.0% below and 18.5% above this range. Also, the number of board meetings seems to be close to averages found in other industries, while the CEO-chairman duality is low.

Having an internal auditor reporting to the board is a way to connect board governance with internal firm governance. In our sample half of the MFIs have an internal auditor with direct access to the board. Based on the importance given to this measurement in microfinance policy we consider this low. However, as tables 6 to 9 indicate, the internal board auditor seems not to have any significant influence on MFI performance.

Table 4 shows the main characteristics of the dependent variables used in the analysis.

Table 4

The table reflects the high portfolio yield usually experienced in MFIs. Thus, an average of nearly 40% is not a surprise in these markets. The high yield stems mainly from the high operational costs, in our sample above 31% on average. The average loan is again a reflection of the 'micro' in microfinance. The lowest loan amount is USD 15.00, while the average is USD 794.54. The maximum amount of nearly USD 25,000 is an extreme case, about twice the size of the second largest. Five institutions excluding the maximum report an average loan higher than USD 10,000. The median is USD 441.04. We have kept the extreme case in our dataset since robustness checks indicate that filtering it out does not significantly influence our overall findings.

In table 5 we report descriptive statistics on explanatory and control variables not shown in table 4.

Table 5

The table shows that the number of observations on most variables is far fewer than for the dependent variables. The reason is simply that these are firm characteristics that we assume constant over time. For instance, being a shareholder owned firm does not change from year to year. This has consequences for the choice of the random effects model in the econometric analysis, see section 4.

The mean of many variables can be interpreted as the percentage of the firms in the category. Thus, there are 30.1% shareholder owned firms, 58.4% non-governmental organisations, and 8.8% cooperatives. The remainder belongs to state banks and an 'other' category.

The table shows that 34.9% of the firms are regulated by the banking authorities. Unregulated MFIs are not in a position to accept depositors' money, which limits their lending. Our subjective competition measure shows that MFIs rate the competition in their market as high.

The MFI's main market served is indicated with the two market variables of urban and rural. The remaining market indicates MFIs that consider both markets to be of equal importance to them. Thus, we observe that the rural market is 22.6%, far lower than the urban. This reflects the MFI's trouble in reaching the rural market.

Next, the table shows the three categories of loan methodology, the village bank, the solidarity group, and individual loans. These three categories constitute 99.5% of the cases. We have created a dummy called loan methodology by merging the village bank and solidarity group categories into group lending, with individual loans taking up the remainder. Thus, the dummy is 1 if the main loan methodology practiced by the MFI is individual loans. We see that group lending constitutes 44.0% of the total, but that individual loans constitute 55.5%. Thus, individual loans are relatively more important. This is a surprising finding since group lending has been considered one of the main attributes of microfinance. What are the driving forces behind the increased practice of individual lending should become subject for future research.

We also see that the typical MFI is a rather young organisation, although one institution can trace its microfinance activity roots to 1923 when it started to give loans to small farmers. However, generally speaking, MFIs have had little time to build a relationship with their customers, allowing a reduction in informational asymmetry. Berger and Udell

(1998) sum up empirical evidence from several countries showing that costs for the customer tend to decline with the length of the bank-borrower relationship for some small businesses. Hence, the newness of the industry probably contributes to the high MFI portfolio yield we have observed in table 4.

A brief comment on the human development index (HDI) is in order. The minimum and maximum values show that firms come from a wide variety of country background, which is further corroborated in the country list in the appendix. Gorton and Winton (2003, p. 436) argue that institutions, regulations, and laws are important in the study of financial intermediaries. For MFI institutions, the inclusion of the HDI may capture some of these institutional differences.

6 Econometric evidence

We report results from econometric tests of the relationships between the financial performance and the outreach on the one hand, and the internal and external governance mechanisms on the other. We present results first for traditional financial performance measures, and then on outreach.

6.1 Financial performance

Table 6 shows the results from regressions with our financial performance measures as dependent variable. We look at return on assets (ROA), portfolio yield (PY), and operational cost (OC).

<div align="center">Table 6</div>

We have performed four kinds of regressions for ROA in table 6. The first column includes international directors and internal board auditor variables, while these are dropped in column two and in the remaining regressions. We drop these variables in order to increase the number of observations, and because these variables turn out not to be significant. In the third ROA column the average loan is included while the loan methodology is left out. Both cannot be included in the same regression due to high correlation between the two. When average loan is in the regression, this allows for the test of whether financial performance and outreach (measured as average loan) are substitutes. A similar multicollinearity problem occurs with regulation and ownership type, since most SHFs are regulated while most NPOs are not. However, robustness tests in table 9 where regulation is left out, show that the ownership type results are not affected. Therefore we

choose to include both in regressions. Last, in the fourth ROA column we have dropped ownership types other than SHF and NGO, and replaced these with the dummy variable ownership type, showing 1 if the firm is an SHF and 0 if it is an NGO. We choose this last formulation since the number of other ownership types (co-operatives, state MFIs, and others) is fairly low.

We comment on internal and external governance mechanisms across regressions. Concerning top management characteristics, it turns out that the variables international directors and internal board auditor are not significant. Board size is not significant either, but has a negative sign. The board size result is at odds with common findings in studies of non-financial firms. However, Adams and Mehran (2003) report a positive, but non-significant sign for ROA regressions for banks in the USA, while in the Hartarska (2005) the sign is negative and significant. Thus, our result is weak, but in line with the extant literature.

We find that the entrenchment effect of CEO/chairman duality has a negative relationship to ROA, unlike Brickley et al. (1997). However, a female CEO is positive. The two variables are either significant or very close to significance at the 10% level in all ROA regressions. The non-significant results of the CEO/chairman duality and the female CEO for the portfolio yield is interesting compared to their significance in the operational costs regression. Taken together they imply that management is not able to influence product prices, but are able to do so for costs. Thus, the CEO/chairman duality turns out to be associated with higher operational costs, while a female CEO with a lower. The result for the female CEO confirms the importance of gender for microfinance institutions, where female customers are often considered to be of special importance. We interpret this as a way to overcome informational asymmetries. Also, the positive sign for ROA confirms former findings for female members of top management, such as Welbourne (1999). In conclusion the results may be taken as a sign that good board composition and management are important in producing a favourable financial performance in the young and immature microfinance industry. While the negative impact of the CEO/chairman duality may be seen as a result of moral hazard in the owner-manager relationship, the female CEO result shows the importance of the information asymmetries in the bank-customer relationship. The dual nature of incentive problems in MFIs is confirmed.

Ownership type (SHF or NPO) shows a significant result for the NPO in the portfolio yield regression only, while the SHF is nowhere significant at the 10% level. This is obtained when ownership type is specified either as dummy variables for SHF and NPO as against other ownership types, or as a dummy variable showing either SHF or NPO in the fourth ROA regression. In the portfolio yield regression, the NPO is significant and

the SHF is close. We note that the coefficients of the SHF and the NPO are very close in this regression. This means that in the regression that obtains the significant result, the coefficients are so close that we cannot differentiate between the two. The upshot is that ownership type does not differentiate between MFIs. The NPOs are as well in producing financial performance as their incorporated competitors. This is a surprising finding for at least two reasons: First because policy makers tend to advocate a shareholder structure in MFIs and the transformation of NPOs into SHFs, and second, because some promoters of microfinance argue that the NPOs are needed to avoid mission drift and remain a client friendly industry. Higher portfolio yield can hardly be considered more client friendly. However, from a banking perspective our findings are not necessarily surprising. This is the same result as found in Crespi et al. (2004); Bøhren and Josefsen (2007) for savings banks compared to commercial banks in Spain and Norway. Another explanation is that market competition in customer, donor and financial markets drives MFIs to adopt workable business models, whatever their ownership type, in order to survive and to lend again.

The external conditions of competition and regulation show significant results for competition. Thus, even though our competition measure is subjective, it captures the effect that increased competition leads to lower ROA. The result confirms predictions to developments in long-term bank-customer relationships when the bank is exposed to competition (Gorton and Winton, 2003, p. 465). This is further reflected in the significant and negative competition coefficient in the portfolio yield regression and, at the same time, the non-significant result for operational costs. Competition moves market prices, but not directly operational costs. For the regulation impact we find no significant results. Maybe the fact that the MFIs in the sample are rated implies an homogeneity among the firms with respect to regulation. Maybe transparency is sufficient regulation.

The control variables merit some comments as well. First, loan methodology measures the effect of group lending. It is a dummy variable being 1 if the loan is for an individual and 0 if it is for group lending. The variable shows expected results, being positive to ROA and negative to portfolio yield and operational costs. This indicates that ROA is improved with more individual lending, and that operational costs are lower. The negative result on portfolio yield may be due to higher competition in these market segments or better collateral or better credit history in lending to individual customers, allowing the MFI to reduce its portfolio yield. This evidence supports the ongoing tendency in the industry to shift attention from group lending to individual lending (Armendariz de Aghion and Morduch, 2005). Apparently for group lending the cost argument is more important than the repayment argument. The supposed comparative efficiency in group lending does not

hold. Hartarska (2005) could not find any significant relationship on this variable.

Second, the market served, urban or rural, turns out to give few significant results. The urban market dummy is significant in the portfolio yield regression. Urban markets tend to drive portfolio yields higher. This result could be due to better business opportunities available in urban areas compared to the agriculturally based rural economy. But may be the few significant results also point out that doing good banking in rural markets is possible. Whether such a positivistic view on rural lending holds true should be the subject for further research.

A third aspect concerns the average loan, which shows a positive and significant sign for the ROA. This implies that financial performance and outreach are to some extent substitutes. A higher average loan brings better ROA. So reaching out to poor clients with smaller average loans lowers the ROA. This "microfinance schism" has been hotly discussed in the microfinance literature (Woller et al., 1999; Morduch, 2000; Schreiner, 2002; Rhyne, 1998), and we favour those who say that outreach and financial performance are substitutes. Nevertheless, our results indicate that good banking in terms of financial performance can be performed on small loans. However, the price seems to be that outreach, in terms of reaching poorer clients, is lower than it could otherwise be.

Finally, including labour productivity, MFI experience, firm size, and a country specific variable, the human development index, underlines the necessity of bringing control variables into play.

In another unreported regression, we tried portfolio yield adjusted for inflation. Presumably, the inflation is very different between countries, and therefore a measure adjusted for inflation should give better results. Yet, we did not obtain results that differ much from those reported in table 6, neither for significant results nor for coefficient values. The reason for these results is first, that we include a country control variable (HDI), and second, that the random effects method uses deviations from the individual firm's average as part of the data transformations, thus wiping out individual heterogeneity.

The discussion so far yields five conclusions. First, the discussion of top management influence shows that the agency conflict between owners and management expressed in the CEO/chairman duality is confirmed. Also, the beneficial effect of the female CEO points to a diminution of informational asymmetries in the bank-customer relationship. The second main conclusion is that ownership type does not differentiate between MFIs. This means that ownerless MFIs such as NPOs are as capable of producing a favourable or unfavourable financial performance as a shareholder owned MFI. Our sample indicates that from a governance point of view there is no need to change legal incorporation to

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a shareholder owned firm. Third, competition is a major determinant of firm financial performance, mediating the influence of internal governance variables. Fourth, financial performance is improved with individual loans. The fifth conclusion is that financial performance and outreach are substitutes, at least to some extent.

6.2   Outreach

Table 7 shows regressions of two measures of outreach against our variables.

Table 7

Top management variables have little impact upon outreach. In fact, only board size turns out to be significant for average loan. A larger board tends to give smaller loans, showing that the larger the board, the lower is the average loan. Thus, in terms of outreach, boards should be large. However, this runs counter to most financial performance results on board size in the literature, where larger boards are associated with higher agency costs. The reason given is that members in a large board may free ride on other members monitoring, with the result that the overall monitoring is weaker. Possibly, such an effect turns out for the average loan as well. We saw in table 6 that ROA is reduced with lower average loans. Thus, a larger board that does not keep management focussed upon financial performance is more willing to grant smaller loans. The positive, although insignificant, board size coefficient in the credit clients regression confirms the result.

Ownership type matters as little for outreach as it does for financial performance. Only one significant result is obtained, and then the coefficient values for the SHF and the NPO are about the same. Thus, different ownership types do not imply differences in depth and breadth outreach. The SHF reaches poor clients and as many clients just as well as NPOs. Our interpretation of this result is that many SHFs are committed to reaching poor clients, and not only focussed on producing satisfactory financial results. Likewise, since NPOs need to perform financially well in order to sustain lending, a curtailment of the outreach may be necessary. In all, these adjustments in both ownership types make the SHFs and NPOs fairly alike on both financial and outreach goals.

External conditions, competition and regulation, have no significant signs in outreach. This is in stark contrast to the results for financial performance.

In fact, the control variables turn out to be the source of importance for outreach. This is perhaps not surprising since our control variables contain variables typical for the microfinance industry.

Loan methodology turn out to be a major source of importance on both outreach dimensions. Individual loans tends to be associated with higher average loans and at the same time a decrease in the number of credit clients. The converse of this is of course that group lending improves outreach measures. The loan methodology finding confirms the results in Cull et al. (2007).

We also see that the MFI experience is significant and positive in the average loan regression, but negative in the credit clients regression. Thus, with time the MFI will tend to give more individual loans, and the number of clients is restricted. This seems to indicate that the MFI will increasingly concentrate on the more profitable individual customers, as the MFI learns who is a good risk.

When comparing these findings with the better financial performance related to individual lending and the ongoing tendency in the industry to shift from group loans to individual loans (Armendariz de Aghion and Morduch, 2005), this might indicate that the industry is putting increased emphasis on financial performance and less on outreach. Whether this is the case should be subject for further research.

6.3   Robustness regressions

Are the results robust to alternative specifications? Tables 6 and 7 give various specifications, but here we look at possible multicollienarity problems among explanatory variables. The most likely candidates concern external governance mechanisms and ownership types.

Most NPOs are not regulated, while most of the SHFs are. A simple cross-tabulation for the last year of data reveals that 75.4 per cent of the SHFs are regulated, while only 11.3 per cent of the NPOs are. Furthermore, competition is perhaps the most pronounced among unregulated MFIs. Competitive pressures drove a number of banks out of business after the industry was deregulated in the 80s in the USA (Gorton and Winton, 2003, p. 520). It is also a possibility that ownership type is related to competition. The historical evidence of Cull et al. (2006) shows that non-SHFs appeared at an early development stage when no banking alternatives existed. The same could be the case here, implying that non-SHFs will be associated with low competition. If these arguments hold, multicollinearity problems occur in regressions.

To investigate the potential for multicollinearity problems in regressions in tables 6 and 7 we run correlation analysis of external governance mechanisms and ownership type. Table 8 shows the correlations among ownership types, competition, and regulation.

Table 8

The table shows that regulation is indeed strongly correlated with ownership types, but that other variables have low correlations. Thus, the multicollinearity problem of keeping both regulation and ownership types in the same regression seems worth investigating. We test for the significance of leaving either regulation or ownership type in robustness regressions.

Table 9 gives results when we have removed first regulation and then ownership type in regressions where ROA and the average loan are dependent variables.

<div align="center">Table 9</div>

We should compare the ROA results with the second column in table 6 and the average loan results with the second column in Table 7. The table 9 evidence largely conforms to earlier findings. In the ROA regressions the significance of the CEO/chairman duality, the female CEO and the MFI age come out more clearly. The CEO/chairman duality is nearly significant at the 10.0% level in the second regression in table 9. In the outreach regressions the board size, NPO, and rural market variables are similarly close to significance. At the same time, the coefficient values remain in the same area as before. But neither ownership types nor regulation become significant when leaving either of them out. Thus, the effect of multicollinearity is evident, but it does not affect the variables themselves.

Overall, the multicollinearity test does not upset earlier conclusions. Specifically, the ownership type conclusion is upheld. The ownership types do not appear to perform differently in the microfinance market.

7   Conclusion

This article studies the effect of corporate governance in microfinance institutions (MFIs). Utilising a comparatively large and unique self constructed dataset based on rating reports spanning four years we are able to study how various internal and external governance mechanism influence different dimensions of financial performance and outreach. We reach the following main conclusions:

- MFIs need to improve top management characteristics just as much as ordinary firms. We find that a CEO/chairman duality is associated with a lower ROA and higher operational costs, but a female CEO with higher ROA and lower operational

costs. The findings confirm theories of agency relationships in both the owner-management dimension as well as in the bank-customer dimension.

- The legal incorporation of the MFI matters less than how the firm is run. This includes both top management characteristics and the choice of group versus individual loans. We could not find that a shareholder owned firm brings better profitability or lower outreach than non-profit organisations. This shows that MFIs are equally good or bad at creating profitability and reaching the poor independently of ownership type.

- Competition is a major driver of financial performance. In particular, the portfolio yield is lower with higher competition. This means that more competition among MFIs will bring lower interest rates to clients, but lower ROA to MFIs.

- Group lending does not contribute positively to financial performance, but to outreach. Thus, if the MFI wants to reach the poorer fractions of the population it should stick to group lending. However, its financial sustainability will be negatively affected. On the other hand, if the objective is to lend again without donor support and to improve its financial performance it should concentrate more on giving individual loans and less on group loans.

- Financial performance and outreach are competing objectives. ROA increases with average loan size. We find no "win-win" logic between poverty outreach and financial performance.

The conclusions could bring about a rethinking of some assumed truths in microfinance. Specifically,

- The call for transforming NPOs into shareholder owned firms lacks foundation. Instead, a pragmatic attitude is needed. Different incorporations work well side by side, and for particular clients and MFIs, a non-profit organisation may work better than a shareholder owned.

- There is a need to keep up and to strengthen close ties to customers in order to overcome informational asymmetries. However, this should not necessarily be done through group lending as this approach increases costs.

- A viable MFI needs to be profitable. Thus, as long as donors or governments are not willing to take on a long term obligation to subsidies[9], good financial performance needs to be accepted, even if this means lower outreach in the short term.

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[9]Long term subsidies of microfinance loans is not necessarily a bad idea (Morduch, 1999).

- Stronger competition among MFIs should be encouraged. The role of the state should thus be to foster competition in the MFI field. This is perhaps the major contribution the state can make for microfinance.

Some answers in microfinance governance have been found, more questions remain. We find it puzzling that stakeholders are virtually absent in MFI boards when so many MFIs are organised as non-profit organisations. Also, the similarity of financial and outreach performance in SHFs and NPOs calls for an investigation into causes for this. Can it be that the NPOs have different governance systems than SHFs, for instance a more independent board? What are the driving forces behind policy advocates' call for transformation of NPOs into SHFs and the overall regulation of MFIs? Are MFIs becoming less concerned about outreach and more about financial performance? The puzzles are still many in the young and much celebrated microfinance industry.

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Table 1 Definitions of dependent variables used in analyses

Variable	Explanation
Financial performance	
ROA	Return on assets
Portfolio yield	The portfolio yield at the end of the period
Operational costs	Operating expenses divided by the annual average total loan portfolio
Debt/equity	Total debt, including savings, divided by equity
Outreach	
Average loan	Clients average outstanding loan
Credit clients	The number of credit clients
Branch offices	The number of branch offices

Table 2 Definitions of independent variables and their hypothesised sign to financial (FinP) and outreach firm performance

		Hypothesis	
Variable	*Explanation*	FinP	Outreach
Board size	The number of directors	-	-
International directors	International directors divided by board size	+	-
CEO/chairman duality	CEO and chairman are the same person	-	-
Female CEO?	A dummy indicating a female when 1	+	+
Internal board auditor	A dummy being 1 if internal board auditor reports directly to the board	+	-/+
SHF	Shareholder firm	+	-
NPO	Non-profit microfinance firm	-/+	+
Rural/urban market	A dummy being 1 if main market is urban	-	-
Loan methodology	A dummy being 1 if loans are mainly made to individuals	-	-
Competition	A subjective scale from 1 to 7 with higher values indicating stronger competition	-	+
Regulation	A dummy being 1 if the MFI is regulated by banking authorities	-/+	+
MFI experience	Years of experience as a MFI		
Labour productivity	The total number of loan clients divided by the total number of employees		
Firm size	The natural logarithm of assets		
Human Development Index	A composite index covering life expectancy, education, and income (GDP per capita)		

Table 3 Board and management characteristics

	Mean	Std	Min	Max	N	% no
Board size	7.450	4.013	0.000	33.000	200	
International directors	0.591	1.234	0.000	6.000	176	74.4
Female directors	1.670	1.799	0.000	7.000	88	28.4
Debt holder directors	0.054	0.357	0.000	3.000	185	97.3
Board meetings per year	7.318	6.673	0.000	52.000	129	
Female CEO?	0.250	0.434	0.000	1.000	188	75.0
Female board president?	0.206	0.406	0.000	1.000	155	79.4
CEO chairman duality	0.154	0.362	0.000	1.000	195	84.6
CEO's business experience	0.912	0.284	0.000	1.000	171	8.8
CEO's business education	0.793	0.407	0.000	1.000	92	20.7
Internal board auditor	0.489	0.501	0.000	1.000	186	51.1

Table 4 Descriptive statistics on dependent variables used in analysis

Variable	Mean	Std Error	Min	Max	N
ROA	0.016	0.124	-0.749	0.790	725
Portfolio yield	0.391	0.203	0.034	1.825	724
Operational costs	0.313	0.274	-0.599	3.507	702
Average loan	795	1493	15	24589	726
Credit clients	14504	29329	0	394374	729

Table 5 Descriptive statistics on independent variables relevant for econometric analysis

Variable	Mean	Std Error	Min	Max	N
Shareholder owned firms	0.301	0.460	0.000	1.000	226
Non-governmental organisation	0.584	0.494	0.000	1.000	226
Cooperative organisation	0.088	0.285	0.000	1.000	226
Mainly urban market	0.369	0.484	0.000	1.000	217
Mainly rural market	0.226	0.419	0.000	1.000	217
Village bank	0.258	0.439	0.000	1.000	209
Solidarity group	0.182	0.387	0.000	1.000	209
Individual loan	0.555	0.498	0.000	1.000	209
Competition	4.485	1.721	1.000	7.000	204
Regulation	0.349	0.478	0.000	1.000	212
First year microfinance experience	1993.199	7.987	1923	2004	226
MFI experience	12.801	7.974	2	83	226
Labour productivity	129.403	83.156	6.569	720.339	720
Firm size (log)	15.037	1.359	9.856	19.337	749
Human Development Index	0.683	0.122	0.338	0.863	222

Table 6 Financial performance measures regressed on top management, ownership types, and external variables. Random effects panel data 3SLS estimation on four years of observations. The coefficients are scaled up by 100.

| | *Dependent variable* | | | | | |
	ROA	ROA	ROA	ROA	Portfolio yield	Operational costs
Constant	-11.12	-22.03	-30.00**	-24.36*	69.18**	134.96**
Board size	-0.01	-0.17	-0.12	-0.26	-0.03	0.28
International directors	-4.57					
CEO/chairman duality	-5.61*	-4.85	-4.63	-4.54	3.69	10.01*
Female CEO?	4.19	4.86*	4.04	5.10*	-2.21	-9.17**
Internal board auditor	0.20					
SHF	2.36	1.01	2.71		10.94	6.93
NPO	2.85	3.94	5.26		11.69*	6.72
Ownership type				-3.82		
Competition	-1.12	-1.84**	-2.01**	-2.00**	-2.01*	-0.36
Regulation	0.44	1.47	1.39	2.60	1.23	2.75
Loan methodology	4.55	4.91*		5.18**	-9.02**	-12.39**
Urban market	1.49	1.30	1.56	1.29	7.45*	4.02
Rural market	7.02	1.70	0.09	0.22	-2.34	0.27
Average loan			2.03*			
Labour productivity	0.03**	0.04**	0.05**	0.04**	0.02*	-0.02
MFI experience	-0.26*	-0.23	-0.24	-0.15	-0.39*	0.16
Firm size	0.52	1.40**	1.29	1.70**	-3.45**	-8.29**
Human Dev. Index	4.67	5.27	4.18	8.05	34.49*	29.00
Wald F (sign.)	0.008	0.000	0.000	0.000	0.000	0.000
N	287	395	402	373	397	383

The Wald test (Greene, 2003, p. 107) is here a test of the null hypothesis that the coefficients in the given equation are all zero. A low value indicates null hypothesis rejection. If R is the $q \times K$ matrix of q restrictions and K coefficients, $\hat{\gamma}$ the K vector of coefficients, and r the vector of the q restrictions, the Wald $\chi^2(q)$ statistic is
$\chi^2(q) = (r - R\hat{\gamma})' [R\Sigma_X R']^{-1} (r - R\hat{\gamma})$, where Σ_X is the estimated covariance matrix of coefficients.
Significant results at the 5% (10%) level are marked with ** (*).
'Ownership type' is a binary variable showing 1 if the MFI is a shareholder owned firm and 0 if it is a non-profit, voluntary organisation. 'Competition' is a self-constructed measure showing ... 'Loan methodology' is a binary variable showing 1 if loans are mainly made to individuals and 0 if loans are mainly to groups.

Table 7 Outreach performance, specified as average loan and the number of credit clients, regressed against board characteristics, MFI innovations and external variables. Random effects panel data 3SLS estimation on four years of observations.

| | *Dependent variable* | | |
	Average loan	Average loan	Credit clients
Constant	0.51	-0.44	1.42
Board size	-0.03	-0.05*	0.04
International directors	0.11		
CEO/chairman duality	-0.05	-0.03	0.10
Female CEO?	0.03	-0.01	0.01
Internal board auditor	0.02		
SHF	-0.67	-0.78*	0.20
NGO	-0.52	-0.54	0.25
Competition	0.02	0.06	-0.07
Regulation	0.10	0.22	0.03
Loan methodology	0.71**	0.61**	-0.46**
Urban market	0.01	0.08	-0.10
Rural market	0.86*	0.48	-0.57
(Labour productivity)·100	0.42**	0. 34**	0.48**
MFI experience	0.01	0.02**	-0.04**
Firm size	0.37**	0.36**	0.59**
Human Dev. Index	0.96	2.24**	-2.50**
Wald F (sign.)	0.000	0.000	0.000
N	284	393	396

Significant results at the 5% (10%) level are marked with ** (*).
The Wald test is explained in table 6.

Table 8 Bivariate correlations between external governance mechanisms and ownership types in 2006

		Competition	Regulation
Regulation	Pearson Correlation	-0.013	
	Sig. (2-tailed)	0.861	
	N	192	
SHF	Pearson Correlation	0.021	0.565
	Sig. (2-tailed)	0.764	0.000
	N	204	212
NGO	Pearson Correlation	0.071	-0.588
	Sig. (2-tailed)	0.316	0.000
	N	204	212

Table 9 Robustness tests when regulation and ownership types are removed in regressions for ROA and average loan. Random effects panel data 3SLS estimation on four years of observations. For ROA estimations, all coefficients are scaled up by 100.

	ROA		Average loan	
	Regulation removed	Own'ship removed	Regulation removed	Own'ship removed
Constant	-24.02*	-19.39	-0.323	-1.002
Board size	-0.12	-0.05	-0.044	-0.054*
CEO/chairman duality	-5.32*	-4.78	-0.110	-0.109
Female CEO?	4.63*	4.78*	-0.001	0.074
SHF	1.97		-0.674*	
NGO	3.54		-0.607	
Competition	-1.74**	-1.65**	0.078	0.052
Regulation		-0.23		0.115
Loan methodology	5.36**	4.91*	0.655**	0.582**
Urban market	1.31	1.47	0.069	0.109
Rural market	3.15	1.23	0.556	0.565
Labour productivity	0.05**	0.04**	-0.003**	-0.003**
MFI experience	-0.24*	-0.24*	0.017**	0.020**
Firm size	1.49**	1.35**	0.347**	0.361**
Human dev. Index	4.43	4.84	2.100**	2.185**
Wald F (sign.)	0.00	0.00	0.000	0.000
N	409	395	407	393

The Wald test is explained in table 6.
Significant results at the 5% (10%) level are marked with ** (*).

A Appendix: Data descriptions

Table 10

Table 10 Countries in the data base

1	Albania	16	Dominican Republic	30	Kazakhstan	44	Peru
2	Argentina	17	East Timor	31	Kenya	45	Philippines
3	Armenia	18	Ecuador	32	Kyrgyzstan	46	Romania
4	Azerbaijan	19	Egypt	33	Madagascar	47	Russian Federation
5	Bangladesh	20	El Salvador	34	Mali	48	Senegal
6	Benin	21	Ethiopia	35	Mexico	49	South Africa
7	Bolivia	22	Georgia	36	Moldova	50	Sri Lanka
8	Bosnia Hercegovina	23	Guatemela	37	Mongolia	51	Tanzania
9	Brazil	24	Guinee	38	Morocco	52	Togo
10	Bulgaria	25	Haiti	39	Nepal	53	Trinidad and Tobago
11	Burkina Faso	26	Honduras	40	Nicaragua	54	Tunisia
12	Cambodia	27	India	41	Nigeria	55	Uganda
13	Cameroun	28	Indonesia	42	Pakistan	56	Vietnam
14	Chile	29	Jordan	43	Paraguay	57	Yugoslavia
15	Colombia						