Board Characteristics and Microfinance Institutions' Performance: Panel Data Evidence from Nigeria

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ABSTRACT

Purpose: This paper examines the effect of board characteristics on MFIs performance in Nigeria. A specific country study is warranted given the results from pooled cross-country studies may be biased owing to a failure to control for country differences. It is also particularly challenging to generalise the outcome of these results into a specific country given that many factors about MFIs, ranging from the nature of governance, legal status, size and prudential regulations, are not similar across countries.

Methodology: The relationship between board characteristics and microfinance banks performance in Nigeria is tested using a sample of 120 firm-year observations covering 30 MFIs in the periods of 2010 to 2013. The study extracted all microfinance level data from the Microfinance Information eXchange (MIX) database.

Findings: We document a positive and significant relationship between board size and MFIs performance. We also find negative relation between female directors and MFIs performance, but not significant. The results suggest that larger board size indicates good corporate governance practice, which leads to reduced agency cost.

Implications: This study sheds new lights on the Nigerian MFIs' board room dynamic. As the government is increasingly contemplating on the board structure and corporate governance policies, our study offers useful and timely empirical guidance to the Nigerian regulators.

Originality: Given the important role of microfinance industry in Nigeria, this is the first study of its kind analysing the impact of board characteristics on microfinance performance among Nigerian MFIs.

Keywords: Nigeria, Microfinance, Corporate governance, Panel data analysis

1.0 INTRODUCTION

Microfinance today is a major industry that comprise of thousands of institutions serving around 155 million clients worldwide (Armendariz and Morduch, 2010). In its modern form, microfinance is a tool that provides sustainable financial services to populations typically excluded by mainstream banking institutions (Yunus, 2007). Nevertheless, microfinance still reaches only a fraction of the world's poor (Christen et al., 2004). Many studies have attributed lower outreach to lack of strong and sustainable MFI's (Helms, 2006). Recent evidence suggest that governance forms a major obstacle to MFI growth and sustainability (CSFI, 2008; Strom et al., 2014). Good governance can go a long way in preparing an MFI to better handle the risks that are inherently part of managing an MFI. This is because risk taking is at the heart of microfinance business and the board of directors is ultimately responsible for the level of risk assumed by the institutions (Benedetta et al., 2015).

Corporate governance has assumed increasing importance in the Nigerian microfinance sector over the last few years. This attention is mainly driven by the promulgation of Microfinance Policy, Regulatory and Supervisory Framework and the code of corporate governance for other financial institutions by the Central Bank of Nigeria. Consistent with the agency theory assumptions (Fama and Jensen 1983; Jensen, 1986), these regulatory guidelines ensure high ethical conduct, and provide minimum acceptable governance standard that can reduce agency problems and improve MFIs performance. Unlike other jurisdictions, the guideline prescribes the board structure of MFIs, for instance, the minimum and maximum number of board of directors is prescribed based on MFIs category. However, the impact of governance structure on MFIs performance under this regulatory regime is not yet subject of investigation. Therefore, it is unwise to generalise the findings of cross-country studies.

The microfinance literature contains a host of studies examining the nature and the determinants of microfinance institutions governance. While in general the literature has succeeded in linking governance structures to MFIs performance (Strom et al., 2014; Mersland and Strom, 2009), it has largely done so using pooled observations across countries. However, many factors about MFIs, ranging from the nature of governance, legal status, size and prudential regulations, are not similar across countries. Hence, the results from pooled cross-country studies may be biased owing to a

failure to control for country differences. In this case, it is particularly challenging to generalise the outcome of these results into a specific country.

For instance, prior studies on the impact of governance on microfinance performance indicated that board characteristics is an important determinant of MFIs performance (Strom et al., 2014; Hartarska and Mersland, 2012; Mersland and Strom, 2009). Many of these studies demonstrate that board characteristics are relatively homogenous when compared across countries. However, recent studies highlighted some variations in the board characteristics across countries. For instance, Ferreira and Kirchmaier (2013) show that board size is heterogeneous across European countries. Similarly, Catalyst (2003) and Vinnicombe and Singh (2003) find that percentage of female directors in large companies is 13.6% in the United States, compared with 8.6% in the United Kingdom, 11.2% in Canada, 8.6% in Australia, and 7.1% in South Africa. These evidences show that there is much more heterogeneity of board characteristics across countries, hence we expect their impact to vary from one country to another.

This study examines the impact of board characteristics on MFIs performance for a panel data of 30 microfinance banks in Nigeria over the time period 2010 to 2013, giving a total of 120 firm-year observation. The results of pooled OLS analysis and fixed effect estimation are generally contradicting the findings of many prior microfinance studies. We found a significant positive relationship between board size and MFIs performance. This result is quite indicative because it contradicts the wide assumption that larger board is associated with slower and longer decision-making process which invariably has negative impact on firm performance. Our results lend credence to the literature of governance in developing countries (Arora and Sharma, 2016) where larger boards are associated with greater depth of intellectual knowledge, which in turn helps in decision making and enhances performance. We also found a negative relationship between female directors and MFIs performance but not significant.

This study therefore contributes to the debate on the impact of board characteristics on MFIs performance. To our knowledge, this is the first study of its kind analysing the impact of board characteristics on microfinance performance in Nigeria. As such it brings information on one key channel of transmission through which governance regulations can influence performance in the Nigerian microfinance sector. The study also has major normative implication. Since larger board size means positive impact on MFIs performance, it implies that increase in board size can

practically lead to reduced agency costs. We also contribute to the literature on the significant role of leverage in determining MFI board size.

The remainder of this paper is organized as follows: Section 2 reviews the literature and develop hypothesis on the relationship between board characteristics and MFIs performance. Section 3 discusses the sample selection, its characteristics and data sources. Section 4 presents the empirical model and the results. Section 5 concludes the study.

Background context

Nigeria is one of the developing countries in Africa, with a population of more than 140 million. However, approximately 70% of the population live below the poverty line while 60% are financially excluded with no access to formal financial services. The Gross Domestic Product (GDP) was estimated at US$510 billion in 2013 with finance and insurance contributing only 3.57% of real GDP. The aggregate micro credit facilities in Nigeria accounts for about 0.2% of the GDP, that is >1% of total credit to the economy (National Bureau for Statistics, 2014).

The country has a long history of community banks, microfinance and small and medium enterprise (SME) finance initiatives to provide financial services to the unbanked population. However, the performance of these initiatives remains mixed. Therefore, the Central Bank of Nigeria been aware of the need to strengthen the Microfinance sector initiated and launched the Microfinance policy, regulatory and supervisory framework in 2005 and revised in 2011 and 2013. Such framework has initiated a prime turning point in the industry which led to the creation of privately owned, deposit taking microfinance banks. Prior to this, most of the institutions are smaller community banks, cooperatives, NGO's and non-bank financial institutions with low capital, outreach and challenges of becoming profitable (CGAP, 2011). The policy framework categorized MFIs into three. The first category, Unit MFIs, are now allowed to open one branch outside the Head Office, within the same Local Government Area, subject to availability of free funds of at least N20 million and compliance with other prescribed minimum prudential requirements. The second category, which are State MFIs are to maintain a minimum capital base of N100million and can open branches/cash centers within one state. The third category, which are National MFIs can open branches and cash centers in all states and shall maintain a capital

base of N2.0 billion. The policy also prescribes various sources of capital to Microfinance banks such as shareholders fund, deposits/savings of customers, debenture/medium to long term loans, donations/grants from individuals, organizations, various tiers of government, and commercial funding from international sources with prior Central Bank of Nigeria's approval of the draft Memorandum of Understanding (MOU); interest income, Fees and commissions.

At the end of 2014, there were 884 licensed MFIs, representing an increase of 63 MFIs from December 2013. The total assets of the microfinance banking sub-sector increased by 27.5% from N227 billion in 2013 to N290 billion in 2014. The capital base of the sector, as represented by the total shareholders' funds has been increasing steadily from 2010 to 2014. It increased by 24.2% from N44 billion in 2010 to N55 billion in 2013. It increased further by 15.3% to N63 billion in 2014. The sector has been succeeded in mobilizing funds from the informal sector into the formal banking system through savings and other deposit products offered to the target market. Total deposits increased by 50.4% from N76 billion in 2010 to N114 billion at the end of December 2013. Funds mobilized by the MFIs have also been channeled towards economic empowerment of the target groups to start new businesses or to grow the existing businesses, resulting in poverty alleviation and employment generation. Total loans and advances in the subsector was N97 billion at the end of December 2012. It increased by 19.6% to N116 billion in 2013. It stood at N145 billion as at 31st December 2014 representing an increase of 25% from 2013 (CBN, 2014).

A major highlight of the Revised Microfinance Policy Regulatory and Supervisory Framework for Nigeria in 2013 was the corporate governance guidelines. Corporate governance is not an entirely new concept in Nigeria. Among the corporate governance provisions in Nigeria are the Companies and Allied Matter Act (CAMA) 1990, the Bank and other Financial Institutions Act (BOFIA) 1991 (as amended), the Investments and Securities Act (ISA) 2007 (and its accompanying Rules and Regulation), etc. And only recently the CBN issued a Code of Conduct for Directors of licensed Banks and Financial institutions and a code of Corporate Governance for Banks in Nigeria. These laws which placed the responsibility for regulating MFI's corporate governance on the Central Bank of Nigeria following concerns on issues of corporate governance. The policy framework prescribes and approves the guidelines that can adequately address the features of MFI boards. For instance, the guideline prescribes the maximum number of directors on board for a unit MFI to be seven (7), while the minimum shall be five (5). For a state or national MFI, however, the maximum

number of directors (Executive Directors inclusive) shall be at the discretion of the CBN. To qualify for the position of a director in an MFI, it is required that the nominee must not be a current employee of a bank or other financial institution except where the MFI is promoted by the bank or other financial institution and the proposed director is representing the interest of such an institution. However, there are to date no requirements in the guidelines that prescribes the composition of MFI boards, for example, board gender diversity (CBN, 2011).

Despite the recognition of the need to establish a sound microfinance policy framework by the Central Bank, it was reported that 83 microfinance banks were liquidated in 2013, which is mainly due to the inability to recapitalize as well as issues surrounding governance (MIX Market, 2014). An examination of 731 microfinance banks in 2013 by the Nigerian Deposit Insurance Commission in collaboration with the Central Bank of Nigeria reveals that MFIs suffer from "extreme weaknesses in corporate governance" (NDIC, 2015). Since board of directors of MFIs are responsible for establishing strategic objectives, policies and procedures that would guide and direct the activities of the bank. Many of the MFIs examined are lacking in that respect. They operate without strategic plans, policies and procedures. Also, there were rampant issues of self-serving practices and insider abuse by the owners, board and management of some of the MFIs. These also manifested in inaccurate financial report, weak internal control systems and high incidences of fraud and forgeries. Similarly, the Central Bank of Nigeria has also recognized that incompetent and inept boards of directors, high levels of non-performing insider-related credits, insider dealings, fraudulent and unethical practices by some directors and management staff have culminated in the observed weak corporate governance in some MFIs (CBN, 2014). Therefore, it cannot however be said that the CBN code of corporate governance is sufficient in itself. For this reason, Wilson (2006) posits that unless accompanied by institutional and regulatory reforms, the code of corporate governance for banks will be rendered useless and the aim of strengthening the banking system will be defeated.

2.0 LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The corporate governance literature has identified relationship between board characteristics and firm performance (Hartarska and Mersland, 2012; Bhagat and Bolton, 2008; Eisenberg et al., 1998). This paper examines the relationship between MFIs performance and two board characteristics, namely board size and board diversity. Within the corporate governance literature, board of directors are considered as an internal governance mechanism that resolves agency problem between managers and principals. Firms suffer from an incentive problem simply because those who run the firms are not the same as those who own them (Jensen and Meckling, 1976; Eisenhardt, 1989). Managers are commonly the employees of the firm hence will have more incentive to pursue their own self-interest and do not act in the best interest of the shareholder when making corporate decisions. However, one of the solutions to this problem is to enhance monitoring by board of directors. Fama and Jensen (1983) argue that efficient board monitoring and guidance plays an essential role in mitigating agency problems. In the microfinance sector, the board of directors play a vital role in aligning the interest of providers of funds such as investors and donors, as well as the managers.

Many studies have established a model of effective corporate governance in African context. For example, Nkundabanyanga et al., (2013) studied a model of effective board governance in Ugandan service sector. The result show that improvement in the way board meetings are organized and controlled, improvement in communications of the board and efficient board activities will improve board governance in Ugandan service sector firms, thereby enhancing firm performance. Similarly, Nkundabanyanga et al., (2014) investigates the mediation effect of intellectual capital on board governance and firm financial performance. Contrary to the findings of significant relationship between board governance characteristics and financial performance, the relationship becomes insignificant when mediation of intellectual capital is allowed. The finding signifies the presence of intellectual capital significantly acts as a conduit in the association between board governance and financial performance. However, these studies fail to address the direct link between board characteristics and firm performance.

Abiola (2012) analyzed the relevance of internal auditor in determining the corporate governance practices of Nigerian Banks and find that management as the most crucial driver of corporate governance. This is inconsistent with agency theory's prescription which puts the board before

management as the most crucial driver of corporate governance. A study by Ejuvbekpokpo and Esuike (2013) on corporate governance and bank failure in Nigeria was carried out to investigate issues, challenges and opportunities associated with corporate governance and Bank failure in Nigeria, and to ascertain if a significant relationship exists between corporate governance and Banks failure. The result of the study not only revealed that the new code of corporate governance for Banks is inadequate to curtail Bank distress, improper risk management, corruption of Bank officials and over expansion of Banks are the key reasons Banks fail. However, these studies cannot be extrapolated to the microfinance sector. Therefore, there is a need to investigate the impact of board characteristics on MFIs performance in Nigeria.

The recent waves of crisis in the Nigerian microfinance sector reveals the need to improve upon the governance practices of microfinance banks in Nigeria. In 2013 several microfinance banks have been liquidated due to ineffectiveness of board committees, non-adherence to the Central Bank of Nigeria code of corporate governance and weak ethical standards amongst others (NDIC, 2015). Also, there were serial incident of self-serving practices and insider abuses. Therefore, the need for a strong corporate governance cannot be overemphasized. A board's ability to steer the organization towards success is even more important because of the high level of competition in the industry and MFI's goal to achieve a dual objective of serving the poor while remaining profitable. It is in light of this, the CBN prescribes the number of directors on MFI boards. Although the impact of board size on firm performance remains mixed, the literature has established board size as the major governance mechanism that influences agency problems. Similarly, board diversity has been used in literatures as proxies of governance quality and its consequent effect on agency problem is somewhat unclear. Given that CBN does not prescribe the level board diversity, insights from the literature on governance in banks, non-financial firms, non-profit organizations and microfinance institutions are used to formulate and test our hypothesis.

Board size and MFIs performance

Prior studies' findings on the relationship between board size and performance are rather mixed. Larger part of the findings suggest that larger boards are less effective than smaller boards (Yermack, 1996; Eisenberg et al., 1998; Adams and Ferreira, 2009). Among others, the argument centers on suggesting that larger boards may encourage individual board member's free riding

behaviour while exercising their monitoring responsibility. This hypothesis was tested in a sample of both larger and smaller firms by Yermack (1996) and Eisenberg et al. (1998). They found a negative relationship between board size and firm performance hence confirming the hypothesis. In another study, Adams and Ferreira (2009) also confirmed such a negative relationship. It has been reasoned that firms tend to lose business opportunities due to slower and longer decision making associated with larger boards.

In contrast, several studies found that smaller boards are less effective hence affecting firm's performance negatively (Singh and Davidson III, 2003; Belkhir, 2009). For instance, Singh and Davidson III (2003) find significant positive relationship between board size and asset utilization ratio. They conclude that the agency cost diminishes as the size of the board becomes larger. This result is supported by Belkhir (2009) who finds positive association between board size and performance. However, studies that are dealing with the endogeneity issues in board size and firm outcomes reflect a trade-off between the firm specific benefits of increased monitoring and the cost of such monitoring (Linck et al., 2008; Boone et al., 2007; Baker and Gompers, 2003). They find that board size tends to vary with the firm's size and complexity. Hence, it is quite difficult to predict the exact relationship between board size and performance in this instance.

Compared to other organizations, microfinance institutions are widely regarded as having larger boards but their impact on the firms' performance is somewhat less clear. For instance, Mersland and Strøm (2009) find a negative relationship between board size and MFIs performance using a self-constructed global dataset on MFIs collected from third-party rating agencies. In another study, Hartarska and Mersland (2012) find that there are some benefits to a larger board, but the effect reverses for a particular board size. These results are consistent with the literature on boards in banks and not-for-profit organizations, for which the boards are commonly found to be larger than the boards for non-financial institutions.

The discussions above show that empirical studies on board size and firm performance reveal a rather conflicting set of results. Given that the Central Bank of Nigeria policy framework prescribes and approves the number of directors to be appointed by MFIs, little is known about the optimal number of board of directors. Therefore, exploring the impact of board size and MFIs performance is important because of the relatively limited research in the Nigerian microfinance sector. This study may provide an insight on the optimal number of board directors that can reduce

agency problem. As Coles et al., (2008) suggested, board size arises from differences between complex and simple firms. Given that MFIs in Nigeria are categorized according to size and the regulatory policy prescribe number of board of directors for each category, the impact of board size in reducing agency cost and the consequent effect on their performance can partly be addressed in this study. The following hypothesis is proposed:

Hypothesis 1: Board size affects MFIs performance.

Board diversity

Board diversity is an important aspect of governance mechanism that has been widely studied. In particular, women and ethnic minorities on board are the two mechanisms mostly studied (Adams and Ferreira, 2009; Welbourne et al., 2007; Hillman et al., 2007). Although it is commonly observed that women directors are under-represented in firms' board structure, their presence can be plausibly explained from two different perspectives, namely fairness and shareholders' wealth maximization. Higgs (2003) argues that women directors' presence promotes wider participation hence upholding fairness principle in the firm's decision-making process. Brancato and Patterson (1999) suggest that women directors marginally contribute to the decision-making process hence improving overall firm's shareholders' wealth maximization objective. It is also argued that such wealth maximization objective is amplified by diverse board structure that has the advantage of better relationship with clients and employees (Ellis and Keys, 2003).

Empirical results on board diversity and firm performance converge on the idea that female directors improve firm's performance (e.g., Smith et al., 2006; Francoeur et al., 2008). To some extent, this relationship is more apparent in firms with weak corporate governance structure (Adams and Ferreira, 2009). Welbourne et al. (2007) find that short and long-term IPO-related performance improves when women sit in the firm's top management. From the developing market perspective, Liu et al. (2014) document significant positive relationship between board gender diversity and firm performance in China's listed firms. They also found that female directors have stronger positive effect on firm performance than female independent directors.

In the case of female directors and microfinance institutions, Mersland and Strom (2009) report that MFI's financial performance improves with female CEO. This result is consistent with

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Welbourne (1999) and Smith et al. (2006). Using a global panel of 329 MFIs in 73 countries, Strom et al. (2014) find that female leadership is positively related to MFI performance, but they further argue that such performance is not driven by improved governance.

It is interesting to note that the effect of gender-diverse board on corporate decision is subject to firm's governance quality. Adams and Ferreira (2009) argue that in a well-governed firm, female directors can negatively affect firm value due to excessive monitoring. On the contrary, Gull et al. (2011) suggest that firms can to some extent remedy their weak governance by having high female directors on board. This seems to be the case with MFIs where Strom et al (2014) find a negative relationship between female directors and governance mechanisms. This means that MFIs with more female directors perform better with less monitoring and oversight because female leadership is decisive in the microfinance sector and may substitute for weak governance. The mere presence of female in the board improves governance quality, which may positively affect MFIs performance.

As mentioned earlier, the quality of country's institutional framework and legal regime are an impediment to sound corporate governance in Nigeria (Wilson, 2006). These institutional factors are much less developed Nigeria compared to developed economies. Hence over-monitoring is much less an issue. Given Nigeria's weak corporate governance, gender-diverse boards may have beneficial effect on MFIs performance due to the partial substitute effect. We therefore, propose the following hypothesis:

Hypothesis 2: Board diversity has positive impact on MFIs performance.

3.0 DATA AND SUMMARY STATISTICS

Our primary source of data to test the hypothesis regarding the relationship between board characteristics and microfinance banks performance in Nigeria is the Microfinance Information eXchange (MIX) database[1]. The study extracted all our microfinance level data from the MIX

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[1] The Mix market platform is publicly available platform that discloses information of more than 1900 microfinance institutions, 200 partners and nearly 100 investors (mixmarket.org).

database[2]. Our initial sample consists of 270 firm year observations between 1998 and 2014. We require that observations must correspond to a calendar fiscal year; therefore, all quarterly reported observations are excluded from our analysis. MFIs with duplicated firm year observation are also eliminated from our data. Due to lack of data on board characteristics before 2010 and lack of sufficient data on MFIs performance, we limited our data for the period of four years starting from 2010 to 2013. Some missing data on board characteristics and performance are manually collected from the annual reports of the MFIs. The implementation of these filters has rendered us with a final sample of 120 firm-year observations covering 30 MFIs for the period of 2010 to 2013.

Performance measures

Following recent literature on MFIs performance (Hermes at al., 2011; Quayes, 2012; Bogan, 2012; Strom et al., 2014), the most common financial performance variables measures are return on assets (ROA) and return on equity (ROE). Market performance measures seem impossible since most of the MFIs in Nigeria are not listed. ROA is measured by adjusted net operating income divided by adjusted average total assets. ROE is measured by adjusted net operating income divided by adjusted average total asset. Therefore, our financial performance measures are according to MIX Market standard definitions and consistent with prior microfinance literature (Bogan, 2012; Quayes, 2012; Strom et al., 2014). Table 1 presents the summary statistics of performance measures. The average ROA and ROE are 4% and 7% respectively, over the sample period.

Measures of board characteristics

The key variables of interest in this study are number of board of directors and number of female directors. Many studies use different specification to measure board size. Liu et al., (2014) and Wen et al., (2002) use the natural logarithm to measure board size, whereas, Strom et al., (2014) and Mersland and Strom (2009) use the absolute number of board of directors in our analyses. We

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[2] MIX database is used in growing microfinance literature ((Ahlin et al., 2011; Bogan, 2012; Cull et al., 2009; D'Espallier et al., 2013; Hermes & Lensink, 2011; Servin, Lensink, & Van den Berg, 2012; Vanroose & D'Espallier, 2013; Tchuigoua, 2014).

follow the latter's measurement criteria that is, the absolute number of board of directors in our regression and subsequently, we use natural logarithm of board size in our robustness. Table 1 shows that the average board size is 6 and the median is 7. This seems to be similar with previous microfinance studies and international experience (Mersland and Strom, 2009; Strom et al., 2014).

The second board characteristics variable in our analysis is board diversity measured by the number of female directors. Many previous studies have used percentage of female directors on board as a measure of board gender diversity (Ahern and Dittmar, 2012; Adams and Ferreira, 2009). Other studies employ number of female directors or a dummy variable to weigh the influence of women directors (Liu et al., 2014; Simpson et al, 2010). We follow Strom et al., (2014) to measure female directors as the absolute number of percentage of female directors in our main analysis and subsequently we use the percentage of female directors as a robustness. Table 1 shows an average of 15% female directors in our sample. This is relatively lower compared to other microfinance study that reported 29% (Strom et al., 2014).

Controls

Following the recent microfinance literature (Tchugoua, 2014), we group the control variables into two categories. The MFI-specific variables include the size (natural log of total asset), age and leverage. It is assumed that larger and complex MFIs tend to adopt more formal governance mechanism, which translates to more monitoring compared to smaller MFIs (Strom et al., 2014). The country level control variable is the annual growth of the GDP per capita (adjusted for purchasing power parity) provided by the World Bank indicators.

[Insert Table 1 here]

[Insert Table 2 here]

Correlation among variables

Table 3 shows the correlation among the explanatory variables used in our regression analysis. As a rule of thumb, Kennedy (2008) indicates that the correlation value of 0.8 or higher shows evidence of multicollinearity. This is not the case in this study. We also demonstrate in Appendix 1 that the Variance Inflation Factors (VIF) for all our explanatory variables are below 5 indicating no evidence of multicollinearity. Appendix 2 presents the scatterplots of those variables.

[Insert Table 3 here]

4.0 ECONOMETRIC MODEL

To test the hypotheses whether board characteristics affect MFI's performance in Nigeria, the following panel model is proposed:

$$Performance_\text{it} = \alpha_i + \beta_k\ Board\ characteristics_\text{it,k} + \beta_k\ MFI\ controls_\text{it,k} +$$
$$\beta_i\ Country\ control_\text{it} + \mu_i + \gamma_\text{it.}$$

where index *i* denotes individual MFI and *t* year. *Performance* is one of the two measures financial performance in this study (ROA and ROE). *Board characteristics* are measured by the number of board of directors and number of female directors (# Board size and # Board Diversity). *MFI controls* represents three measures of MFI-specific variables (size, age and leverage). *Country control* variable comprises of annual growth rate of the GDP (GDP growth). α_i is the constant, μ_i is the MFI fixed effects and γ_{it} is the remainder of the disturbance.

We begin by estimating a pooled ordinary least squares (OLS) regression. A usual problem in the panel data studies is the existence of unobserved heterogeneity which can make OLS estimates problematic. Since any unobserved heterogeneity problem can be induced by independent variables that are observable or unobservable (i.e., not included in the regression model). Therefore, the estimators provided by these regressions may be biased and inconsistent given that we assume the individual fixed effects are uncorrelated with the MFI level explanatory variables.

Since OLS estimators would yield biased estimates, the study employs the panel data analysis. The use of panel data is not only improving sample size relative to a single period cross-sectional

analysis, but is also better in terms of capturing effects than either cross-sectional or time series data alone (Baltagi, 2005). First, the study estimates the random effect model by assuming that the unobserved effect is uncorrelated with MFI-level variables but exploits the serial correlation in the composite error in a generalised least squared (GLS) framework (Wooldridge, 2010). A problematic assumption in a random-effects model is that it assumes that fixed effects are uncorrelated with the MFI level explanatory variables. Random effect estimates may not be consistent if the true model is fixed effect. Hence, we also estimate the fixed effect model by assuming that MFI fixed effect estimator allows for arbitrary correlation between unobserved effect and the explanatory variables in any time period. For this reason, any explanatory variable that is constant over time for all MFIs' get swept away by the fixed effect transformation (Wooldridge, 2010). The study uses fixed effects because it controls for omitted variable bias and year fixed effects, which will help control for economy-wide yearly fluctuations, thus limiting potential endogeneity issues. This allows us to go beyond correlation and bring us closer to identifying causal relationships. We apply the Haussmann specification test to determine which method is more appropriate for our study.

Unlike Adam and Ferreira (2009) and Liu et al., (2014) that used lagged board characteristics variables in the main regression and estimate the augmented regression via fixed effect model and Arellano-Bond dynamic panel data estimator. Our study cannot implement this method due to sample size constraint. We therefore report our robustness check using various specifications of board characteristics variables. Liu et al., (2014) and Wen et al., (2002) show that different board size specification has different impact on firm financial performance. We use the log number of board of directors in our regression consistent with prior studies. Similarly, Adams and Ferreira (2009) and Strom et al (2014) also show that financial performance results may be sensitive to the various definitions of female directors. We perform regression with different female director specification. In particular, we put to test the percentage of female directors.

Overall, the use of panel data in this study was largely instigated by previous studies on board characteristics and firm performance in Nigeria, which use observations drawn from a single period. Panel data not only improves sample size relative to single-period cross-sectional analysis, but is also better able to capture effects than either cross-sectional or time-series data alone (Hsiao, 1986; Baltagi, 2005). One therefore, seeks to explicitly test whether prior conclusions regarding

the relationship between board characteristics and firm performance in Nigeria holds once firm-specific, time-invariant heterogeneity is controlled for, a factor that has so far received limited attention in the Nigerian literature.

Board characteristics and performance

The relationship between board characteristics and performance of MFIs is first examined by controlling for the year fixed effects. Pooled OLS, random effects and fixed effects estimations are used for each performance variables (ROA and ROE). Tables 4 and 5 present the results. All models are controlled for MFI-specific and country-specific variables. The formal Hausman specification test for fixed versus random effects panel estimation identifies the estimation method that is suitable for each case in terms of the underlying assumption regarding the error term.

[Insert Table 4 here]

The OLS results from Table 4 suggest that larger boards increase MFIs performance (ROA and ROE). The coefficient for board size is positive and significant at 1% level. However, board diversity has no effect on MFIs performance. The estimators provided by these regressions may be biased and inconsistent given that we assume the individual fixed effects are uncorrelated with the MFI-level explanatory variables. To address this, we run panel data analysis in Table 5.

[Insert Table 5 here]

We report the random effect estimates in Columns 1 and 2 of Table 5. The results are largely consistent with the above OLS estimates. Recognising the potential issue of omitted variable bias, we run fixed effect estimates in Columns 3 and 4 in Table 5. Moreover, the computed Hausmann statistics rejects random effects in favour of our chosen fixed effect model. The coefficients of board size remain positively significant at 5% and 10% level for ROA and ROE respectively. This

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suggests that the positive relationship between the board size and the MFI performance is not driven by the unobserved variables. The positive impact of larger board size on MFI performance confirms our hypothesis but contradicts previous studies' findings (Adams and Ferreira, 2009; Eisenberg et al., 1998). This provides an original evidence that the relative influence of board size on entity's performance differs between typical non-financial firms and microfinance providers. A possible explanation can be the differences in the level of leverage undertaking. As Jensen (1986) argued that firms with higher leverage are in most cases associated with larger boards. This seems to be the case with MFIs in Nigeria, where leverage undertaking is higher for MFIs compared to other financial institutions (CBN, 2014). In this line of thinking, the result signifies MFIs greatly depend on their boards to raise funds or to approve fundraising. Given the changing business and risk-taking profile of MFIs as evidenced by high leverage, the characteristics of a governing board, as per good governance practices can be seen in board size increase. In this case, board assumes more responsibility for oversight, accountability, and organizational performance.

Second, the Nigerian microfinance sector is characterised by weak corporate governance (CBN, 2014). However, the result suggests that increase in the number of board of directors may remedy that. Contrary to the shared thoughts of effectiveness of small boards (Meralnd and Strom, 2009; Strom et al., 2014) MFIs may reduce agency cost by increasing number of board of directors. (Singh and Davidson III, 2003; Belkhir, 2009). This is contributory because as MFIs in Nigeria continue to scale up and comply with regulatory requirements, their management has become more complex due to greater outreach, product diversification. Larger boards may engage in closer monitoring and provide required expertise and knowledge for the sustainability of MFIs.

The literature on board gender diversity has ambiguous predictions for the effect of diversity on performance (see the survey by Milleken and Martins, 1996). In this study, we find negative relationship between board gender diversity and MFI performance but not significant. If this empirical result were statistically significant, it would be inconsistent with our hypothesis. Such a finding seems to support the findings of Adams and Ferreira (2009), while at odd with those of Strom et al., (2014) and Liu et al., (2014). Strom et al., (2014) find that more gender-diverse boards are associated with weak governance practices. This means that, on average, female-led MFIs perform better with less oversight, less monitoring. The upshot is that the quality of leadership is decisive in microfinance institutions. However, our findings do not support this view, this is

because there is no reason to expect female-led boards to add value to MFIs. We believe that the value of gender diverse board depends on the strength of other governance mechanism. If MFIs have otherwise strong governance, having more female directors could lead to over-monitoring. But if MFIs have otherwise weak governance, we could expect more female directors to be particularly valuable. It is remarkable that in our findings, more female directors on boards does not substitute for weak corporate governance which invariably leads to poor performance. Since Microfinance institutions in Nigeria seems to suffer most from the agency problem created by poor corporate governance practices (CBN, 2014). The implication of this findings is that strengthening governance quality could reduce agency cost and discourage free-riding in the Nigerian microfinance sector rather than increasing female board representation.

In the MFI-specific variables, leverage shows an interesting implication and is generally consistent with previous studies linking corporate governance and firms' performance. We find positive relationships between leverage and both performance measures. The coefficients are highly significant at 1% level. This is consistent with the agency costs hypothesis where leverage serves as a disciplinary mechanism for the managers (Jensen, 1986). Other important MFI-specific variables such as size and age remain positive but not significant.

Robustness checks

We report our robustness checks using different specification for our board characteristic variables, namely board size and board diversity. This is motivated by the diversity of results in the literature depending on the definition of the variables. First, we follow Liu et al., (2014) and Wen et al., (2002) to examine board size using the natural logarithm of number of board directors. Second, we use percentage of female directors on board as a measure of board gender diversity (Ahern and Dittmar, 2012; Adams and Ferreira, 2009). Table 6 reports the results. Overall, the robustness estimations confirm our preceding findings. The use of different definition of variables does not alter the results. The result show that there are significant association only in the case of board size. The results are statistically insignificant in the case of board gender diversity. The control variables have signs in line with preceding findings. In as much as board size turns out to be significant, it may still not be easy to draw conclusion that it is the board size that makes firms to improve governance quality and consequently increase MFI performance. This set of variables

(board size and board gender diversity) is probably endogenously determined, thus making it difficult to draw outright cause-and-effect relationships only based on estimated regression coefficients.

[Insert Table 6 here]

5.0 SUMMARY AND CONCLUSION

This study presents the first empirical panel data evidence on the effect of board characteristics on MFIs performance in Nigeria. The testing of association between board characteristics and MFIs performance is based on the 30 MFIs from 2010 to 2013. The empirical results show that board size has significant and positive impact on MFI performance as measured by return on assets and return on equity. The positive impact primarily indicates that larger board size translates to good corporate governance practice, which leads to lower agency cost to MFIs. To certain extent, our results are not supporting the role of board diversity in influencing MFIs performance in Nigeria. In general, these results illustrate that MFIs desire to improve financial performance depends on the ability of larger board to reduce agency problem and consequently improving governance quality.

The evidence presented so far demonstrates the dynamics of MFI board room in Nigerian. In particular, it is the aspiration of the Central Bank of Nigeria to improve the corporate governance practice in all financial firms including the microfinance sector (CBN, 2014). This study therefore has important implication by offering useful empirical guidance to regulators and policy makers. The most important policy implication of our study is that in the current state of weak corporate governance in Nigeria, board size is beneficial to MFIs performance. As corporate governance in Nigeria advances and becomes more efficient, this beneficial effect may diminish over time. Until then, the Central Bank of Nigeria should consider increasing the prescribed number of board of directors in dealing with weak corporate governance.

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Table 1
Summary statistics

Variables	Mean	Median	Standard deviation	Minimum	Maximum	Obs
Performance variables						
ROA	0.04	0.04	0.10	-0.36	0.18	117
ROE	0.07	0.19	0.52	-2.10	0.74	109
Board Characteristics						
# Board Size	6.37	7.00	1.16	5.00	11.00	119
Ln_Board Size	1.84	1.95	0.18	1.39	2.48	119
# Board Diversity	0.97	0.00	1.53	0.00	8.03	119
% Board Diversity	0.15	0.00	0.20	0.00	0.86	119
MFI controls						
Size (Ln TA)	14.33	13.70	2.37	5.99	19.18	120
Age	1.60	1.00	0.72	1.00	3.00	120
Leverage	4.25	2.68	8.54	0.11	74.81	119
Country controls						
GDP growth	6.13	5.39	1.51	4.28	7.84	120

Table 2
Variables

Variable identity	Definition
Performance variables	
ROA	(Adjusted Net Operating Income - Taxes) / Adjusted Average Total Assets
ROE	(Adjusted Net Operating Income - Taxes) / Adjusted Average Total Equity
Board Characteristics	
# Board size	Number of directors
Ln_Board size	Natural log of the board size
# Board Diversity	Number of female directors
% Board Diversity	Female directors as fraction of all directors
MFI controls	
Size (Ln TA)	Natural logarithm of total assets
Age	Years functioning as an MFI
Leverage	Adjusted Total Liabilities/Adjusted Total Equity
Country controls	
GDP growth	Annual growth rate of the GDP per capita of a country

Table 3
Pearson correlation matrix between all explanatory variables

	1	2	3	4	5	6
# Board size	1.00					
# Board Diversity	0.40	1.00				
Size (Ln TA)	0.00	0.32	1.00			
Age	-0.03	0.20	0.60	1.00		
Leverage	-0.08	-0.13	-0.12	-0.14	1.00	
GDP growth	0.04	-0.10	-0.30	-0.23	0.10	1.00

Table 4. Results of pooled ordinary least squares

Variables	ROA	ROE
Board characteristics		
# Board size	0.046***	0.241***
	(2.82)	(3.01)
# Board Diversity	0.002	-0.046
	(0.19)	(-1.03)
MFI controls		
Size (Ln TA)	0.004	0.029
	(0.51)	(0.75)
Age	0.053**	0.329***
	(2.13)	(2.73)
Leverage	-0.003**	-0.010
	(-2.18)	(-1.64)
Country controls		
GDP growth	0.014	0.088*
	(1.57)	(1.97)
CONSTANT	-0.472***	-2.848***
	(-3.16)	(-3.92)
Time dummies	Yes	Yes
Obs	117	109
Adjusted R^2	0.29	0.31
F_stat	4.59***	4.91***

The sample consists of 30 MFIs during the 2010-2013 periods. The dependent variables are ROA and ROE. All other variables are defined in Table 2. White's heteroscedastic-consistent covariance matrix estimation (1980) is used to correct for heteroscedasticity in the OLS estimations. *t*-statistics are reported in parentheses. Adjusted R^2 values are reported in the estimates. ***, **, * indicate the coefficient estimates are significant from zero at the 1%, 5% and 10% levels.

Table 5. Panel data analysis

Variables	Random effect		Fixed effect	
	ROA	ROE	ROA	ROE
	(1)	(2)	(3)	(4)
Board characteristics				
# Board size	0.026*	0.081*	0.013**	0.068*
	(1.81)	(1.85)	(2.04)	(1.92)
# female directors	0.000	-0.011	-0.002	-0.008
	(-0.05)	(-0.76)	-1.47	-1.46
MFI controls				
Size (Ln TA)	0.010	0.046	0.004	0.007
	(1.27)	(1.54)	(0.28)	(0.12)
Age	0.022	0.047	0.006	-0.013
	(1.12)	(0.75)	(0.59)	(-0.37)
Leverage	0.001	0.008***	0.003***	0.010***
	(1.55)	(4.38)	(3.91)	(8.34)
Country control				
GDP growth	0.006	0.018	0.001	0.007
	(0.98)	(0.97)	(0.21)	(0.37)
CONSTANT	-0.347*	-1.352**	-0.137	-0.536
	(-1.88)	(-2.23)	(-0.59)	(-0.77)
Time dummies	Yes	Yes	No	No
Obs	117	109	117	109
Adjusted R^2	0.17	0.11	0.09	0.05
Joint test statistics (regressions)	7.07*	37.47***	8.96***	23.37***
Haussmann test FE vs RE (X2)			20.37***	26.1***

The sample consists of 30 MFIs during the 2010-2013 periods. The dependent variable are ROA and ROE. All other variables are defined in Table 2. White's heteroscedastic-consistent covariance matrix estimation (1980) is used to correct for heteroscedasticity in the estimations. *t*-statistics are reported in parentheses for the Random and Fixed effects estimates. Adjusted R^2 values are reported in the estimates. The joint test statistics reports F-test for fixed effect estimations, while Wald Chi2 is reported for random effect estimation. For the panel data regressions, fixed effects estimates are preferred over random effects estimates based on the Haussmann test. ***, **, * indicate the coefficient estimates are significant from zero at the 1%, 5% and 10% levels.

Table 6. Results of Fixed effects

Variables	ROA	ROE
Board characteristics		
Ln_Board size	0.074*	0.429**
	(1.98)	(2.03)
% Board Gender Diversity	-0.010	-0.031
	(-0.77)	(-0.69)
MFI controls		
Size (Ln TA)	0.005	0.008
	(0.35)	(0.15)
Age	0.006	-0.019
	(0.49)	(-0.50)
Leverage	0.003***	0.010***
	(3.92)	(8.47)
Country controls		
GDP growth	0.001	0.007
	(0.22)	(0.37)
CONSTANT	-0.205	-0.905
	(-1.00)	(-1.58)
Time dummies	No	No
Obs	117	109
Adjusted R^2	0.07	0.04
F_stat	7.34***	22.35***

The sample consists of 30 MFIs during the 2010-2013 periods. The dependent variables are ROA and ROE. All other variables are defined in Table 2. White's heteroscedastic-consistent covariance matrix estimation (1980) is used to correct for heteroscedasticity in the estimations. *t*-statistics are reported in parentheses for the Fixed effects estimates. Adjusted R^2 values are reported in the estimates. ***, **, * indicate the coefficient estimates are significant from zero at the 1%, 5% and 10% levels.

APPENDIX 1 Variance Inflation Factors (VIF) of explanatory variables

Variable	VIF	1/VIF
Age	2.09	0.477435
Size (lnTA)	2.06	0.486382
#Board Size	1.3	0.766596
#Board Diversity	1.24	0.808643
GDP growth	1.11	0.898377
Leverage	1.06	0.941515
Mean VIF	1.48	

APPENDIX 2 Scatterplots of explanatory variables