

FEMALE ON BOARDS AND THE RISK-TAKING OF MICROFINANCE INSTITUTIONS: THE MODERATING ROLE OF OUTREACH

Michael Adusei *

* Department of Accounting and Finance, KNUST School of Business, Kwame Nkrumah University of Science and Technology, Ghana
Contact details: KNUST School of Business, Kwame Nkrumah University of Science and Technology, Accra Rd, Kumasi, Ghana



Abstract

How to cite this paper: Adusei, M. (2020). Female on boards and the risk-taking of microfinance institutions: The moderating role of outreach. *Corporate Board: Role, Duties and Composition*, 16(2), 19-34. <https://doi.org/10.22495/cbv16i2art2>

Copyright © 2020 The Author

This work is licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0). <https://creativecommons.org/licenses/by/4.0/>

ISSN Online: 2312-2722
ISSN Print: 1810-8601

Received: 13.04.2020
Accepted: 10.06.2020

JEL Classification: G20, G21, G23
DOI: 10.22495/cbv16i2art2

This study examines the effect of female on boards on risk-taking with data from 401 microfinance institutions (MFIs) drawn from 64 countries. The study also investigates whether the effect is sensitive to the outreach performance of MFIs. The MFIs sampled for this study are spread across the six MFI regions. The study measures MFI risk by its risk-taking Z-score and risk-adjusted return on assets. The fixed effects estimation technique, known to overcome the omitted variable bias, is deployed to analyze the data. The results show that female representation in the boardroom increases the risk-taking of MFIs. However, when female on boards interacts with the depth of outreach performance of an MFI, its positive impact on MFI risk is observed. It suggests that female directors are more likely to be beneficial to risk management in MFIs that lend more to indigent clients. Several tests, including an instrumental variable test for endogeneity, have been conducted to confirm the robustness of these results.

Keywords: Female on Boards, Stability, Risk-Taking, Microfinance Institutions, Outreach

Authors' individual contributions: The Author is responsible for all the contributions to the paper according to CRediT (Contributor Roles Taxonomy) standards.

Declaration of conflicting interests: The Author declares that there is no conflict of interest.

1. INTRODUCTION

The study seeks to answer two questions. First, does female on boards¹ significantly predict the risk-taking of microfinance institutions (MFIs)? Second, is the relationship between female on boards and the risk-taking of MFIs moderated by the outreach performance of MFIs? To the extent that the economic benefits of female representation on corporate boards remain debatable, finding answers to these questions will not only enrich the academic discourse on the subject but also go a long way to shape policy.

The determination to accelerate women's representation at the highest level of governance expressed in policy initiatives at the national level has sustained the empirical curiosity in the role of women on corporate boards. The case for women representation at the highest echelons of governance systems is articulated not only on its positive effects on firm outcomes but also on its valuable contribution to an economy. The European Commission (2012) posits: "The under-utilization of the skills of highly qualified women's [sic] constitutes a loss of economic growth potential. Fully mobilizing all available human resources will be a key element in addressing the EU's demographic challenges, competing successfully in a globalized economy and ensuring a comparative

¹ In this paper, female on boards, women on boards and board gender diversity are used interchangeably.

advantage vis-à-vis third countries” (p. 3). It is, therefore, not surprising that interest in the symbiosis between female on boards and firm performance among financial economics as well as management researchers has been growing (Finegold, Benson, & Hecht, 2007; Finkelstein, 1992). However, investigations on this relation have yielded mixed results. One observation is that female on boards promotes firm performance (Bennouri, Chtioui, Nagati, & Nekhili, 2018; Green & Homroy, 2018; Strøm, D’Espallier, & Mersland, 2014) and facilitates effective problem resolution due to the broader and unique perspectives it provides (Page, 2007). On the other hand, gender diverse boards may promote conflict in the boardroom (Jehn, Northcraft, & Neale, 1999), may neither enhance firm performance (Chauhan & Dey, 2017; Adams & Ferreira, 2009) nor reduce risk (Sila, Gonzalez, & Hagendorff, 2016).

Apart from the studies measuring the effect of board gender diversity on the performance of MFIs documenting a negligible effect (Kirsh, 2018), they also appear to have paid a little attention to the effect of female representation on boards on the risk-taking of MFIs. For instance, the systematic review of studies on the determinants of MFI performance by Hermes and Hudon (2018) covering close to 170 papers does not include any paper on the board gender diversity-risk-taking nexus. The risk-taking of an MFI is conceptualized in this paper as a measure of the MFI's distance from insolvency. It relates to the financial sustainability goal of MFIs. Risk-taking is operationalized in empirical studies by the risk-taking Z-score. It is obtained by adding return on assets (ROA) to equity-to-assets ratio and dividing the outcome by the risk-adjusted ROA. It is synonymous with stability (Houston, Lin, Lin, & Ma, 2010; Laeven & Levine, 2009). In this paper, MFI risk and MFI stability are used interchangeably.

Given the magnitude and popularity of recent policy interventions concerning female on boards and the expectations from female directors and the boards they sit on, it is crucial to know whether female on boards affects all facets of firm performance including risk-taking. Besides, over the years, the business case for boardroom diversity policies has been built around studies done by consulting companies (Credit Suisse, 2012; Joy, Wagner, & Narayanan, 2007; McKinsey, 2007) which lack high methodological and peer review standards usually characteristic of academic studies (Adams, 2016). For instance, the European Commission (2012) and the Australian Securities Exchange Corporate Governance Council (ASX, 2010) make their economic arguments for board gender diversity policies citing Joy, Wagner, and Narayanan (2007). It is the case of this paper that a more cogent argument can be made to push the gender diversity agenda to a higher notch if more scientific investigations are conducted to bring out its effects on all facets of firm performance. The paper shares the position of Adams (2016), that a piece of better scientific evidence "can help inform policy and shape expectations about the impact of boardroom diversity policies on corporate and economic outcomes" (p. 373). The purpose of this paper, therefore, is to address these issues and deepen the understanding of the effect of board gender diversity on the risk-taking of MFIs.

Female on boards could influence the risk-taking of an MFI either positively or negatively. The resource-based view of the firm (Barney, 1991) postulates that firms differ in terms of tangible and intangible assets as well as the organizational capabilities to utilize them (the assets) to create a competitive advantage. Solakoglu and Demir (2016) submit that diversity (particularly gender diversity) should positively impact firm performance. Diversity offers many benefits. Heterogeneity promotes a better understanding of the market place; boosts creativity and innovation; provides a better corporate image; improves the selection process of the firm which will lead to a better management team and enables a broader view of the business environment resulting in the improved decision-making process through evaluation of many alternatives. Greater diversity may enhance board independence because women directors have more tendencies to ask questions that would not be asked by male directors (Carter, Simkins & Simpson, 2003). Some improvement in organizational learning, climate, and performance should be expected when more women are placed in managerial positions because they have a better propensity towards supporting and maintaining relationships than men (Shrader, Blackburn & Iles, 1997). To the extent that diversity may enhance organizational capabilities in the utilization of its tangible and intangible assets, it accords with reason to predict a positive effect of female on boards on the risk-taking of MFIs. In other words, an increase in female on boards should make MFIs more stable.

The thesis of the agency theory of the firm (Jensen & Meckling, 1976) is that the board of directors performs a monitoring role to ensure that managers of the firm do not undermine shareholder wealth maximization. It posits that the superior knowledge of managers about the firm offers them some advantage over shareholders (Mizruchi, 1988). Especially where periodic increases in the manager's compensation are tied to their financial performance, there is a tendency for them to develop a higher appetite for risky projects since such projects carry higher returns. It may endanger the sustainability of the firm which, if not checked through tight policies and monitoring by the board, could lead to the demise of the firm. To the extent that diversity increases board independence (Carter, D’Souza, Simkins, & Simpson, 2007) which enhances its monitoring role, it is apt to rely on agency theory to predict that female on boards should improve MFI risk.

The negative effect of female on boards on the risk-taking of an MFI is predicated on social identity theory (de Luis-Carnicer, Martinez-Sanchez, Perez-Perez, & Vela-Jimenez, 2008). It suggests that the performance of a firm worsens when it achieves a gender-balanced board. It posits that a more homogenous board composition may lead to a better firm performance because of ease of communication and low relational conflict with accompanying greater cohesion that are characteristic of homogenous groups. Besides, the diversity-as-process-loss hypothesis suggests that diverse groups display conflict, poor communication, decision-making delays and fragmentation (Kirsh, 2018). It supports the postulation that board gender diversity should negatively impact the risk of MFIs.

It is known that microfinance focuses on women. Therefore, it is one of the few industries that easily lend themselves to econometric inquiries into the gender effects on firm outcomes. It is on record that women easily occupy leadership positions in the often more mission-driven non-government organizations (NGOs) and co-operatives (Strøm et al., 2014). It explains the decision to pick a sample from the microfinance industry. In the sample for this study, the median percentage of female directors is 33.3%. It suggests that efforts at promoting female inclusion at the upper echelons of institutions, including MFIs, are yielding good results, although there is room for improvement.

The novelty of this paper is argued on the ground that the investigations into the effect of female on boards on financial performance and risk (Poletti-Hughes & Briano-Turrent, 2019; Bennouri et al., 2018; Chauhan & Dey, 2017; Green & Homroy, 2018; Sila et al., 2016; Strøm et al., 2014; Adams & Ferreira, 2009) have not covered the total risk of MFIs. Three insightful findings are reported in this paper. Female on boards negatively impacts the risk of MFIs. The implication is that an increase in the percentage of female on the boards of MFIs worsens their risk-taking. However, when female on boards interacts with the depth of outreach, its positive impact on risk-taking is observed. It indicates that female directors are beneficial to the depth of outreach-oriented MFIs. This finding is particularly intriguing because it informs the practitioners of MFIs with a social performance focus, especially NGOs that they should pay particular attention to gender diversity in their boardrooms to improve their risk. To the best knowledge of the author, the results that female on boards escalates the risk-taking of MFIs and that MFIs with better depth of outreach performance are more likely to experience the benefits of female boardroom representation are new to the microfinance as well as the international corporate governance literature. Besides, the finding that the depth of outreach improves the risk of MFIs contributes to the trade-off between financial and social performance debate in microfinance. It upholds the position of the studies that have reported a positive relationship between the financial and social performance of MFIs (e.g., Kaur, 2016). These results, therefore, constitute the significant contributions of this paper to the microfinance literature in particular and international corporate governance literature in general.

The structure of this paper is as follows. Section 2 reviews the relevant literature. Section 3 presents the research methodology adopted for the study. Section 4 presents and discusses the results of the study. The conclusion section provides some policy implications of the findings of the paper.

2. EMPIRICAL REVIEW

There is accumulating empirical evidence on the effect of gender diversity on the corporate outcome. Mahadeo, Soobaroyen, and Hanuman (2012) report that the proportion of female directors positively impacts corporate performance. Strøm et al. (2014) analyze data from MFIs drawn from many countries and find that a female chief executive officer (CEO)

and a female chairperson of the board are positively related to MFI performance. Nguyen, Locke, and Reddy (2015) use a sample of 120 publicly listed companies in Vietnam, covering four years from 2008 to 2011 and report that female on boards matters for firm performance. Conyon and He (2017) also report a significant positive impact of boardroom gender diversity on firm risk. Their analysis of annual data from over 3000 US firms covering 2007 to 2014 financial years using quantile regression methods reveals that the presence of women directors alters the dispersion of firm performance. They also observe that female directors exhibit a significantly larger positive impact in high-performing firms relative to low-performing firms. Green and Homroy (2018) analyze a sample of EuroTop 100 firms for the period 2004-2015 and observe a robust positive impact of female boardroom representation on firm performance. Chen, Leung, and Evans (2018) find, among other things, that female board representation improves performance in innovation-intensive industries. Bennouri et al. (2018) analyze data (2001-2010) from 394 French firms and report that female boardroom representation significantly improves firms' accounting performance measured by the return on assets (ROA) and the return on equity (ROE).

One area of gender diversity-performance relation that is gradually attracting increasing scholarly attention is whether gender diversity has any significant implications for firm risk-taking. The literature documents that women are more risk-averse than men (Byrnes, Miller, & Schafer, 1999) and have a tendency to discourage risk-taking when considering lotteries and money matters (Fehr-Duda, de Gennaro, & Schubert, 2006; Powell & Ansic, 1997). Although the risk aversion attitude of women is controversial, recent empirical evidence appears to swing in its favour. An analysis of data (1992-2004) from US firms by Khan and Vieito (2013), for example, reveals that when the CEO of a firm is a female, the firm's risk level is smaller than otherwise. Wilson and Altanlar (2011) report that the number of women directors on boards is inversely related to firm bankruptcy. With regards to stock return volatility and female directorship, Adams and Ferreira (2009) find that firms with higher stock return volatility have a lower proportion of female directors. Harjoto, Laksmana, and Yang (2018) find that diverse boards (including gender-diverse boards) show more risk aversion with lower capital spending and lower stock return volatilities. Lenard, Yu, York, and Wu (2014) study the relation between female on boards and risk management as well as firm performance and show that more gender diversity on the board impacts firm risk by contributing to lower variability of the stock market return. They also show that the higher the percentage of female directors on the board, the lower the variability of corporate performance. Khaw, Liao, Tripe, and Wongchoti (2016) use data (1999-2010) from 1361 firms in China to investigate the impact of female on boards on corporate risk-taking activities among Chinese corporations. They report that there is a positive relation between male-only boards and corporate risk-taking activities among Chinese firms, suggesting that the

risk-appetite of Chinese firms rises when their boards are male-only.

A recent study by Poletti-Hughes & Briano-Turrent (2019) in Latin America on the effect of board gender diversity on corporate risk-taking presents some interesting findings. The proportion of independent female directors increases venturing risk but does not interfere with performance hazard risk. On the other hand, the proportion of non-independent female directors increases performance hazard risk significantly but only in family firms. These contrast with the outcome of another recent study by Nadeem, Suleman, and Ahmed (2019) using data from UK listed firms (2007-2016) which reports a negative relationship between women on boards and firm risk.

There are sound reasons why the presence of female directors in the board room should lead to improved risk management, especially the risk of instability. Female executives are more cautious than male executives in making critical corporate decisions (Huang & Kisgen, 2013). Female directors are more diligent monitors and require more audit efforts than male directors (Adams & Ferreira, 2009; Gul, Srinidhi, & Tsui, 2008). Furthermore, female directors offer different perspectives and experiences in the boardroom, which improve the quality of board decisions and enhance the legitimacy of firm practices (Hillman, Shropshire, & Cannella Jr., 2007). It is also documented that gender-diverse boards could partially counterbalance weak corporate governance (Gul, Srinidhi, & Ng, 2011).

Despite the above, some studies do not observe any significant effect of female on boards on firm performance. Francoeur, Labelle, and Sinclair-Desgagne (2008) study the 500 largest Canadian firms and find, among other things, that the impact of female directors on firm performance is insignificant. Babalos, Caporale, and Philippas (2015) also find that gender does not influence fund performance. Sila et al. (2016) provide results to the effect that female boardroom representation does not influence equity risk. Recent evidence from data (2002-2014) gathered from 3000 firms in India suggests that board gender diversity does not matter for Indian firms (Chauhan & Dey, 2017).

The above literature suggests that some cloud of doubt hangs over the relation between female on boards and firm outcomes such as risk-taking. Does female on boards promote MFI risk? The paper attempts to answer this question by testing the following hypothesis:

H1: Female on boards should be positively associated with MFI risk.

Risk-taking relates to the financial performance of MFIs. There has been a raging debate on the compatibility between MFI's financial and social performance. One strand of the literature suggests that the trade-off between MFI's financial and social performance is contingent on context-specific factors. Whereas Hartarska (2005) points to the representation of stakeholders as a conditioning factor, Bassem (2009) submits that the trade-off depends on the size and the proportion of unaffiliated directors on the boards of MFIs. Hartarska, Nadolnyak, and Mersland, (2014) consider

board gender diversity as an important contextual factor that may account for a trade-off between an MFI's financial and social performance. It is, therefore, interesting to explore whether the effect of female on boards on risk-taking depends on the social performance of MFIs. The following hypothesis is, thus, tested:

H2: The social performance of an MFI interacts with female on boards to significantly influence MFI risk.

3. RESEARCH METHODOLOGY

In this section, we explain the econometric strategy adopted to carry out this study. Variables for the study are selected and defined and the analytical approach adopted is explained. Next, we identify the sources of data and also describe our data.

3.1. Variable selection and definitions

3.1.1. MFI risk-taking measures

In this paper, the primary measure of risk-taking is Z-score, which comprises accounting measures of profitability, leverage and volatility (Demirgüç-Kunt & Huizinga, 2010; Stroh 2004a, 2004b). It is computed as:

$$Z - score (RISK1)_{i,t} = \frac{ROA_{i,t} + E/A_{i,t}}{\sigma(ROA_{i,p})} \quad (1)$$

where $RISK1_{it}$ is the risk-taking Z-score of an MFI which is the primary of measure of risk-taking in this paper, i in time t , ROA_{it} is the return on assets ratio, E/A_{it} is the equity-to-asset ratio of an MFI i in time t , and σROA_{ip} is the standard deviation of the ROA of MFI i over the whole sample period p (Köhler, 2015). Z-score is defined as the number of standard deviations by which an MFI's ROA has to fall for the MFI to become insolvent. It is, thus, an indicator of solvency risk (Schulte & Winkler, 2019). Thus, a higher Z-score predicts a lower risk of risk-taking or insolvency. To deal with the skewness of the Z-score, we use its natural logarithm. It does not depart from the empirical literature (e.g., Houston et al., 2010). Following the example of Köhler (2015), we also use one component of the Z-score as a dependent variable. The component is labelled in this study as $RISK2$ and is defined as:

$$RISK2 = \frac{ROA_{i,t}}{\sigma(ROA_{i,p})} \quad (2)$$

where $RISK2$ refers to risk-adjusted ROA.

3.1.2. Independent variable

We measure female on boards (FOB) by the per cent of women directors on the boards of MFIs. It is consistent with the empirical literature. Studies such as Ström et al. (2014), Lenard et al. (2014), Ahern and Dittmar (2012), and Adams and Ferreira (2009) have measured female on boards with the per cent of women on boards.

3.1.3. MFI and country control variables

MFI-specific variables included in this study are size, age, efficiency, outreach, profit status, regulation of MFIs, the level of financial development of the country in which an MFI operates, the level of human development and the level of economic development of the country in which an MFI operates. We use the natural logarithm of total assets to measure size. The benefits of economies of scale and scope derived from a large size may make larger MFIs more efficient than smaller MFIs making them achieve better financial performance. Thus, we expect size to influence the stability of MFIs positively.

The effect of age on the risk of MFIs is ambiguous. Life cycle theory indicates that performance may evolve with the age of the firm. As a firm matures, its performance may improve due to accumulated experience. This phenomenon is sometimes described as the learning curve effect. Experienced MFIs may enjoy a first-mover advantage that enables them to ward off potential competitors by denying them access to valuable resources or market niches. In line with the literature, the age of an MFI is included in the model as a control variable to recognize the lifecycle differences among MFIs (Sila et al., 2016; Strøm et al., 2014; Faccio, Marchica, & Mura, 2016). We expect more mature MFIs to be more stable than their counterparts. Based on life cycle theory, age should positively affect MFI stability. However, the possibility of more mature MFIs getting stuck in outmoded and less efficient processes makes it possible for age to hurt the stability of MFIs.

An efficient MFI should generate more profits from its operations which should contribute to its stability. It is because efficient MFIs minimize the costs of delivering their financial services. One of the standard measures of MFI efficiency is the cost per borrower (MIX, 2006). Thus, we include the natural logarithm of cost per borrower measured in US dollars in this study as a control variable. We expect it to improve the risk of MFIs.

The social performance of MFIs, usually referred to as outreach, has two dimensions: breadth and depth. The average coverage of MFIs is described as its breadth of outreach. In the literature, it is usually measured by the number of customers served by an MFI (Hermes & Hudon, 2018). The depth of an MFI's outreach gauges the socio-economic profiles of clients it serves. The literature identifies two standard measures of this social performance dimension of MFIs: active female borrowers to the number of active borrowers' ratio and the size of the loan as the ratio of gross national income (GNI). The number of active female borrowers to the number of active borrowers' ratio is used on the basis that female borrowers are generally known to be among the poorest of the population and that they, in most cases, lack access to loans from formal banks. We use the size of the loan as the ratio of GNI as a barometer of the average poverty level of clients served by an MFI (Mersland & Strøm, 2009). The intuition is that due to the potential risk of non-repayment, MFIs may not be interested in approving more substantial sums of loans to most indigent clients. Thus, when this social performance indicator is rising, the conclusion is

that an MFI has a lower depth of outreach to needy clients. Studies such as Chmelíková, Krauss, and Dvouletý (2019) and Mersland and Strøm (2009) use this as proxy for the depth of outreach. We follow these studies to measure the breadth of outreach of MFIs by the natural logarithm of the number of active borrowers and the depth of outreach by the percentage of female borrowers of an MFI. To the extent that female borrowers are known to improve the repayment performance of MFIs, we expect the depth of outreach to improve the risk of an MFI. On the other hand, we project the breadth of outreach to exacerbate the risk of an MFI because as an MFI extends loans to more clients, it increases its credit risk which may increase its insolvency risk, *ceteris paribus*.

Profit status as a control variable is anchored on the differences in the performance of MFIs relative to their institutional type. Not-for-profit MFIs (mainly NGOs) are known to have lower financial performance but better social performance than for-profit organizations (e.g., Gutierrez-Goiria, San-Jose, & Retolaza, 2016). However, evidence exists that, on average, cooperative banks though part of the not-for MFIs, have less incentive to assume more risk. Therefore, they opt for more risk-averse strategies, leading to greater stability over time, less volatility in profits and lower credit risk (Köhler, 2015; Groeneveld & de Vries, 2009; Chaddad & Cook, 2004). For-profit organizations are commercial banks and non-bank financial institutions. They are expected to be more aggressive in their activities and should be more stable than the not-for-profit MFIs.

The inclusion of regulation in the analysis is in line with the extant literature (Strøm et al., 2014). It is coded 1 if an MFI is regulated by banking authorities and 0 otherwise. Regulated MFIs may ensure prudential standards in their intermediation exploits. Thus, it is appropriate to expect regulated MFIs to be more stable than non-regulated ones.

The domestic credit to the private sector as a share of GDP measures the level of financial development in the country in which an MFI operates (Adusei & Obeng, 2019). We use the natural logarithm of domestic credit to the private sector as a share of GDP to deal with the skewness in the data. Its effect on MFI risk is ambiguous. Three main reasons explain the positive effect of the level of financial system development on the risk-taking of an MFI. First, if the financial system of a country is well developed, driven by prospects of making more profits, commercial banks may become actively involved in providing financial services to the poor. It exerts more competitive pressure on MFIs which may compel them to reduce costs leading to an improvement in their stability. Second, where the development of the financial system is characterized by the active involvement of commercial banks in microfinance, this may create an opportunity for MFIs to acquire modern and more efficient banking methods which may improve their stability. Third, the opportunity for MFIs themselves to access better financial services when they operate in a developed financial system cannot be discounted. The substitution effect hypothesis could explain the negative effect of financial system development on MFI's risk. It posits that clients of MFIs may swift from MFIs to commercial banks on account of

prospects of lower costs, more choices and more flexibility. Also, the competition created by financial system development may negatively affect MFI's repayment performance due to the possibility of multiple borrowing from different financial institutions by their clients which may lead to an increase in their risk (Hermes & Hudon, 2018).

The level of human development in the countries in which MFIs operate is accounted for in this study by the Human Development Index sourced from the United Nations Development Program (UNDP). It measures the standard of living, life expectancy and education. A higher value suggests higher productivity of labour which should translate into a higher financial performance of MFIs in the country. Iqbal, Nawaz, and Ehsan (2019) include this variable in their model. We expect it to drive the risk-taking of an MFI positively.

The gross domestic product per capita measures the level of economic development of the countries in which MFIs operate. The inclusion of this variable is consistent with the position of prior

studies that macroeconomic variables matter for MFI performance (Strøm et al., 2014; Ahlin, Lin, & Maio, 2011). Its effect on MFI risk could either be positive or negative. On the one hand, a growing economy may promote more micro-entrepreneurship, which may trigger demand for more microfinance. Besides, a growing economy may imply an increase in income levels which may facilitate loan repayment. These two reasons support the positive effect of the level of economic development on MFI risk. On the other hand, when an economy develops, households and micro-entrepreneurs may be able to finance their activities from their profits or access finance from the mainstream financial institutions with negative implications for the risk of MFIs.

3.2. Models

Based on the above, we estimate the following static models:

$$RISK1_{i,t} = \beta_0 + \beta_1 FOB_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AGE_{i,t} + \beta_4 EFFIC_{i,t} + \beta_5 BOUT_{i,t} + \beta_6 DOUT_{i,t} + \beta_7 PSTATUS + \beta_8 REGU + \beta_9 FINDEV + \beta_{10} HDI + \beta_{11} ECONDEV + u_{i,t} \dots \dots \dots \quad (3)$$

$$RISK2_{i,t} = \beta_0 + \beta_1 FOB_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AGE_{i,t} + \beta_4 EFFIC_{i,t} + \beta_5 BOUT_{i,t} + \beta_6 DOUT_{i,t} + \beta_7 PSTATUS + \beta_8 REGU + \beta_9 FINDEV + \beta_{10} HDI + \beta_{11} ECONDEV + u_{i,t} \dots \dots \dots \quad (4)$$

where *RISK1* = the risk-taking Z-score of an MFI; *RISK2* = risk-adjusted ROA of an MFI; *FOB* = female on boards; *SIZE* = size of MFI; *AGE* = the age of an MFI; *EFFIC* = the efficiency of an MFI; *BOUT* = the breadth of the outreach of an MFI; *DOUT* = the depth of outreach of an MFI; *PSTATUS* = the profit status of an MFI; *REGU* = the regulatory status of an MFI; *FINDEV* = the level of financial development in a country; *HDI* = the human development index of a country; and *ECONDEV* = the level of economic development of a country.

We adopt a panel regression technique without instruments. The adoption of this estimation technique is consistent with previous studies (Strøm et al., 2014; Beck, Behr, & Guettler, 2013). The heterogeneous nature of the data justifies the estimation of the models with fixed effects approach. The use of this approach allows the study to deal with the omitted variable bias (Chmelíková et al., 2019). The fixed effects model (FE model) accounts for two effects: time-fixed and firm-fixed effects. Time-fixed effects capture all variables that affect the regression model and vary over time but are the same for all firms in the sample.

On the other hand, firm-fixed effects account for all variables that possibly may influence the regression cross-sectionally, but are invariant over time (Brooks, 2008). Firm-fixed effects, therefore, control for omitted variables (e.g., culture and managerial ability) that differ among firms in the sample. Focus is placed on MFI fixed effects to deal with omitted variable bias.

3.3. Endogeneity

The use of the FE estimation technique addresses the omitted variable endogeneity. However, there is another problem that requires attention which is simultaneity or reverse causality problem (Nguyen

et al., 2015; Carter, D'Souza, Simkins & Simpson, 2010). Risk-taking may predict the variations in the female boardroom representation. In other words, the level of an MFI risk-taking may influence the appointment of female directors (Adams & Ragunathan, 2017). Indeed, the results of Farrell and Hersch (2005) and Gregory-Smith, Main, and O'Reilly (2014) confirm that neither a director's gender nor the proportion of female directors on boards is exogenous random variables. It suggests that reverse causality is likely to be an issue in investigations into the impact of gender diversity on firm risk (Sila et al., 2016). Unstable MFIs may appoint female directors onto their boards because of their better monitoring and higher risk-aversion (Sila et al., 2016; Adams & Ferreira, 2009). It is also possible for females to seek appointment onto the boards of more stable MFIs because of their higher risk-aversion attitude (Faccio et al., 2016; Farrel & Hersch, 2005).

The paper follows the extant literature (El Ghouli & Zheng, 2016; Huang & Kisgen, 2013) to adopt the instrumental variable approach to address reverse causality in this paper. It involves two stages. Stage one involves the selection of an instrument which is added to the control variables in the original model of the study to predict female directorship. The residuals of the instrumental model are saved and used to represent female on boards variable in the second-stage analysis. The chosen instrument must satisfy some conditions. It must display a strong correlation with the independent variable of interest (female on boards) both statistically and theoretically (relevance condition) and influence the dependent variable (financial stability) through the independent variable (female on boards) of interest (exclusion condition). The paper opts for per cent of female managers (FM) of an MFI as an instrument. Theoretically, this

instrument is connected with female on boards. Bottom-up ascription theory (Elliott & Smith, 2001) posits that diversity begets diversity and that diversity among top leadership ranks is associated with greater diversity at lower levels of an organization (Skaggs, Stainback, & Duncan, 2012). Leaders who represent a demographic minority will increase the representation of other demographic minorities by pushing for more diverse hires, serving as role models and mentors to those hires and moderating the impact of bias in recruitment, hiring and promotion (Duguid, Loyd, & Tolbert, 2012). Female on boards is, therefore, expected to correlate with female managers positively. Terjesen and Singh (2008) report from their study of 43 countries that countries with higher representation of women on boards are more likely to have women in senior management. We address the question of whether the instrument meets the statistical relevance as well as exclusion conditions under the results section of the paper.

3.4. Data

Three sources have provided data for this study. We access the MFI-specific data from the Microfinance Information Exchange (MIX) market². This source is a web-based platform that hosts comprehensive and reliable cross-country data on MFIs. Data hosted by this platform are widely accepted and used by microfinance scholars. Even though the dataset is self-reported by MFIs which raises quality concerns, MIX has implemented a quality control system over the last few years to ensure the soundness of the data (Bibi, Balli, Matthews, & Tripe, 2018). The dataset is seen by Cull, Demirgüç-Kunt, and Morduch (2011) and Hartarska and Nadolnyak (2008) as the largest industry data source on the finances of microfinance institutions. The sample picked for this study are mainly from MFIs rated four or five diamonds because of the reliability of their data. The financial statements of such MFIs are audited with some rated by rating agencies (Gul, Podder, & Shahriar, 2017; Tchakoute Tchuigoua, 2014; Ahlin et al., 2011).

More importantly, to be part of the sample, an MFI must have at least three-year data on the female on boards variable. Applying this approach and guided by the availability of data on variables of interest, yield 401 MFIs from 64 countries. The dataset is made up of banks, credit unions/cooperatives, non-bank financial institutions (NBFIs), non-government organizations (NGOs); rural banks and unspecified MFIs. Banks are deposit-taking financial institutions engaged in lending with their funds obtained from the public and the sale of bonds, securities or obligations of any kind. They can be corporations, companies or associations. Credit unions/co-operatives are MFIs that operate on co-operative principles. They are not-for-profit MFIs that are mutually owned and operated by their members with deposit-taking and lending as their focus. NBFIs are entities that provide quasi banking services including lending, investment and placement of funds. NGOs are unregulated, not-for-profit and non-deposit-taking MFIs that generally depend on subsidies and donations for their operations. Rural banks are usually

development banks privately managed and mostly privately owned that offer deposit and credit facilities to farmers and merchants. The focus of their financial intermediation is the rural community. They may be government-sponsored or assisted. MFIs classified as "others" are construed to include informal providers such as money lenders and self-help groups.

Country-level factors are known to drive the performance of microfinance institutions (Ahlin et al., 2011). Thus, to tackle the possible bias of the results emanating from country heterogeneity, three country-level control variables are employed: the level of financial system development, the level of economic development and the level of human development. We collect the data on the first two variables from the World Bank Group³. We obtain human development data from www.hdr.undp.org/en/statistics/hdi.

Data constraints have informed our decision to restrict the study to 2010-2014. One major constraint is that the MIX Market database, which is the source of our MFI-specific data, started collecting data on the gender compositions of MFIs' boards of directors in 2010 (Augustine, Wheat, Jones, Baraldi, & Malgwi, 2016). The second constraint is missing data on the main variables of interest for many of the MFIs in the database.

Table 1 presents the median distribution of the critical variables according to the legal status of MFIs and the regions in which MFIs operate. Most of the MFIs in this study are NGOs, followed by NBFIs, representing 42.89% and 31.42% respectively. The least represented MFIs are the MFIs with the unspecified legal status. They constitute approximately 1% of the sample. In terms of risk-taking measured by the risk-taking Z-score, credit unions/co-operatives have the highest median. It suggests that they are more stable than other types of MFIs. Probably this confirms the position of the extant literature that cooperative banks, though part of the not-for MFIs, have less incentive to assume more risk and, therefore, opt for more risk-averse strategies, leading to greater stability over time, less volatility in profits and lower credit risk (Köhler, 2015; Groeneveld & de Vries, 2009; Chaddad & Cook, 2004). The least stable MFIs in the sample are banks. Table 1 shows that the unspecified MFIs have the highest female on boards median of 85.71%. Next to them are rural banks that have 50% median of female on boards. Banks and NBFIs have the lowest median in the sample. They both have 30% women directors on their boards. In terms of breadth of outreach measured by the number of active clients of an MFI, it is evident that banks have the highest median, followed by NBFIs. Credit unions are last. MFIs classified as others have the highest median in terms of depth of outreach measured by the percentage of female borrowers followed by rural banks. Last on the log are credit unions. This, coupled with the breadth of outreach, supports the conclusion that credit unions in the sample have the lowest outreach performance. It may be due to their risk aversion attitude.

It is evident in Table 1 that 168 MFIs representing 41.9% of the sample operate in Latin America and the Caribbean (LAC), 106 MFIs constituting 26.43% of the sample operate in South

² www.mixmarket.org

³ www.worldbank.org

Asia, 64 representing 15.96% are located in Eastern Europe & Central Asia (EECA), 34 forming 8.48% of the sample operate in East Asia and the Pacific (EAP) region, 17 representing 3.99% operate in Africa, and 13 constituting 3.24% are located in the Middle East and North Africa (MENA) region. These statistics suggest that most of the MFIs in the sample have come from the LAC region. The region with the lowest representation in the sample is MENA. What is refreshing about these statistics is that each of the six MFIs regions in the MIX database is represented in the sample. This coupled with the inclusion of the six types of MFIs in the MIX Market database makes the findings of this study representative of the microfinance industry in the world, save the fact that it is not every MFI that submits its report to the database. In terms of stability, MFIs in the MENA region appear to be the most stable, followed by those in the EAP region. MFIs operating in East Asia are the least stable.

Regarding female on boards, again, women are most represented on the boards of MFIs in the MENA region. Next to them are the MFIs in EAP. It appears that women have the lowest access to boardroom representation in the South Asia region. The reason for this is not apparent. Ironically, MFIs in this region outperform all MFIs in the sample in terms of the breadth and depth of outreach performance. MFIs in Africa region perform better in terms of the depth of outreach than in the breadth of outreach. They are next to MFIs in South Asia in terms of the depth of outreach but last in terms of the breadth of outreach compared to MFIs in other regions. The opposite of the outreach performance of MFIs in Africa is observed about MFIs in the MENA region. They are next to MFIs in South Asia in terms of the breadth of outreach but last in terms of the depth of outreach performance.

Table 1. Median distribution of key variables according to legal status and MFI region

	Legal status						MFI region					
	BANK	CU	NBFI	NGO	OTHER	RBANK	AFRICA	EAP	EECA	LAC	MENA	SA
RISK1	23.8	38.21	29.36	25.58	36.23	35.39	25.99	31.9	27.24	28.68	36.4	25.4
FOB	30%	36.61%	30%	33.33%	85.71%	50%	25.99%	31.9%	27.24%	28.68%	36.4%	25.4%
BOUT	103678	6458.5	30157	15361	17676	21855.5	17404	22298	24033	11276	35564.5	38350
DOUT	49.95%	48.15%	57.14%	80.60%	95.75%	80.76%	68.75%	68.46%	66.62%	55.95%	54.91%	89.78%
N	33	49	126	172	4	17	16	34	64	168	13	106
% of the sample	8.23%	12.22%	31.42%	42.89%	1%	4.24%	3.99%	8.48%	15.96%	41.90%	3.24%	26.43%

Notes: RISK1 = the risk-taking Z-score; FOB = female on boards; BOUT = breadth of outreach; DOUT = depth of outreach; CU = credit union/co-operative; NBFI = non-bank financial institution; NGO = non-governmental organizations; RBANK = rural bank; EAP = East Asia and the Pacific; EECA = Eastern Europe & Central Asia; MENA = Middle East & North Africa; LAC = Latin America and the Caribbean; and SA = South Asia.

We report the descriptive statistics of the full data in Table 2. The number of observations is 1308, save the depth of outreach variable that has 1286 as its number of observations. RISK1, RISK2, SIZE, EFFIC, BOUT, FINDEV and ECONDEV representing risk-taking Z-score, risk-adjusted ROA, the size of an MFI, the efficiency of an MFI, the breadth of the outreach of an MFI, the level of financial system

development and the level of economic development respectively are in their natural logarithm forms. FOB and DOUT representing female on boards and the depth of outreach of an MFI respectively are in percentages. The median percentage of female board members on boards of MFIs is 33.3% while that of the depth of outreach of MFIs in this study is 64.97%.

Table 2. Descriptive statistics

	RISK1	RISK2	FOB	SIZE	AGE	EFFIC	BOUT	DOUT	PSTA	REGU	FINDEV	HDI	ECONDEV
Mean	3.59	1.19	38.01	16.76	0.87	4.62	10.05	66.93	0.37	0.64	3.83	0.66	7.89
Median	3.47	1.22	33.3	16.75	1.00	4.96	9.82	64.97	0.00	1.00	3.93	7.95	7.95
Std. Dev.	1.07	1.18	21.76	16.70	0.33	1.23	1.82	24.91	0.48	0.48	0.51	0.81	0.81
Observations	1308	1308	1308	1308	1308	1308	1308	1286	1308	1308	1308	1308	1308

Notes: RISK1 = primary measure of risk-taking; RISK2 = secondary measure of risk-taking; FOB = female on boards; SIZE = size of MFI; AGE = the age of an MFI; EFFIC = the efficiency of an MFI; BOUT = the breadth of the outreach of an MFI; DOUT = the depth of outreach of an MFI; PSTA = the profit status of an MFI; REGU = the regulatory status of an MFI; FINDEV = the level of financial development in a country; HDI = the human development index of a country; and ECONDEV = the level of economic development of a country.

Table 3 represents the Pearson Correlation Matrix which depicts the correlations that exist among the variables. The female on boards variable has a negative correlation with both RISK1 and RISK2. Breadth and depth of outreach negatively and positively load on the risk-taking Z-score and risk-adjusted ROA (RISK2), respectively.

One problem that could create spurious results in regression analysis is multicollinearity among the variables in the regression equation. The

conventional method for checking the presence or otherwise of this problem is the Pearson Correlation Matrix. Per the 0.80 standard suggested by Kennedy (2008), we conclude that multicollinearity is not an issue among the variables. The reason is that the correlations between pairs of variables are well below 80% except for the correlation between the Human Development Index and economic development⁴.

⁴ Variance inflation inflator analysis, the results of which have been annexed to the paper as an appendix, generally lends credence to this conclusion.

Table 3. Pearson Correlation Matrix

	RISK1	RISK2	FOB	SIZE(ln)	AGE	EFFIC	BOUT	ABOUT	PSTATUS	REGU	FINDEV	HDI	ECONDEV
RISK1													
RISK2	0.35												
FOB	-0.02	-0.03											
SIZE	-0.06	0.02	-0.16										
AGE	0.06	0.02	0.04	0.13									
EFFIC	0.11	-0.04	0.06	0.12	0.13								
BOUT	-0.15	0.04	-0.15	0.76	0.03	-0.48							
DOUT	-0.11	0.05	0.06	-0.15	-0.10	-0.72	0.37						
PSTAT	-0.01	-0.03	-0.16	0.30	-0.22	0.06	0.22	-0.09					
REGU	-0.05	0.02	-0.00	0.36	-0.08	-0.00	0.28	-0.09	0.37				
FINDEV	0.07	-0.03	-0.16	-0.01	0.01	-0.37	0.21	0.34	-0.03	-0.22			
HDI	0.06	-0.13	0.11	0.08	0.06	0.56	-0.30	-0.38	-0.03	-0.09	-0.10		
ECONDEV	0.13	-0.02	0.08	0.04	0.12	0.62	-0.35	-0.42	-0.12	-0.24	0.01	0.85	

Notes: RISK1 = the primary measure of risk-taking; RISK2 = the secondary measure of risk-taking; FOB = female on boards; SIZE = the size of an MFI; AGE = the age of an MFI; EFFIC = the efficiency of an MFI; BOUT = the breadth of the outreach of an MFI; DOUT = the depth of outreach of an MFI; PSTAT = the profit status of an MFI; REGU = the regulatory status of an MFI; FINDEV = the level of financial development in a country; HDI = the human development index of a country; and ECONDEV = the level of economic development of a country.

4. RESULTS AND DISCUSSION

4.1. The relation between female on boards and stability

As can be observed from Table 4, the R^2 is between 42% and 49%. It indicates that between 42% to 49% variation in MFI risk is explained by the independent and control variables in the two models estimated. This paper predicts that female representation in the boardroom should positively influence MFI risk. This prediction is grounded on two theories: resource-based theory and agency theory. The results in Table 4 do not offer support for this prediction. Female boardroom representation instead hurts MFI risk. Under RISK1, female boardroom representation shows a negative, statistically significant relation with MFI risk. Holding other factors constant, a 1% increase in the representation of women in the boardroom of an MFI worsens its risk by about 31%. We also observe the negative impact of female representation on MFI risk under RISK2. At the 1% significance level, a 1% increase in the presence of women directors in the boardroom of an MFI triggers about 43% deterioration in its risk, *ceteris paribus*. These results suggest that hypothesis H1 which postulates that female on boards should be positively related to MFI risk-taking is unsupported. An increase in female directors on the board of an MFI is likely to make it riskier. This observation kinks towards the strand of literature that casts doubt on the economic value of female representation in the boardrooms of firms (Chauhan & Dey, 2017; Sila et al., 2016; Adams & Ferreira, 2009). There are plausible reasons why gender diversity in the boardroom could create negative consequences for an MFI risk. Diversity may result in decision making becoming more time-consuming; may create different objectives and more conflicts in the board that lower the effectiveness of decision-making process; and may lead to the possibility of value destruction rather than value creation in firms operating in sectors that require a quick response to market shocks (Solakoglu & Demir, 2016; Petrovic, 2008).

Among the control variables, size, age, and efficiency show no statistically significant effects on any of the two measures of risk-taking. It means that their predicted effects on the risk of an MFI are unsupported. The coefficient of the breadth of outreach is negative and statistically significant at 5% significance level under risk-taking Z-score, which is the primary measure of risk-taking in this study. Thus, holding other factors, a 1% increase in the breadth of the outreach of an MFI causes about a 19% increase in its risk. It suggests that the prediction that it should worsen MFI risk is confirmed. The lower the depth of outreach, the more indigent the clients served by an MFI. Under RISK2 measure of risk-taking, the coefficient of the depth of outreach is positive and statistically significant at 1% significance level. The prediction that the depth of outreach should worsen MFI risk-taking is somewhat confirmed since the depth of outreach positively and significantly loads on the second measure of risk-taking. The loan repayment challenges associated with the indigent clients of MFIs may explain this outcome.

Table 4 reveals that MFIs with profit status (mainly commercial banks and non-bank financial institutions) are less stable than their counterparts. Thus, the hypothesis that they should be more stable than their counterparts is unsupported. The prediction that regulated MFIs should be more stable than unregulated ones is supported. Regulatory status positively and significantly loads on the two measures of risk-taking. It confirms the prediction that regulated MFIs should be more stable than unregulated due to prudential standards in financial intermediation usually ensured by regulation. The results in Table 4 support the positive effect hypothesis of financial sector development. Financial development positively and significantly loads on the risk-taking Z-score. Holding other factors constant, a 1% increase in financial development causes about a 24% increase in the stability of an MFI. Three main reasons may explain this observation. First, if the financial system of a country is well developed, commercial banks, driven by prospects of making more profits, may become actively involved in the provision of financial services to the poor. It exerts more competitive pressure on MFIs which may compel

them to reduce costs leading to an improvement in their stability. Second, where the development of the financial system is characterized by the active involvement of commercial banks in microfinance, this may create an opportunity for MFIs to acquire modern and more efficient banking methods which may improve their stability. Third, the opportunity for MFIs to access better financial services when they operate in a developed financial system can also be the reason why financial development positively drives MFI risk.

Contrary to the predicted positive effect of human development on risk-taking, it negatively and significantly loads on the risk-taking Z-score which suggests that an improvement in human development in a country may have negative consequences for the stability of MFIs operating in

it. A unit increase in the human development score of a country results in about 3% reduction in the stability of MFIs, *ceteris paribus*. The reason may be the unique business models of MFIs which deny them the benefits of an improvement in human development in their countries. The positive and statistically significant coefficient of the economic development variable does not come as a surprise. Two reasons may explain this. A growing economy may promote more micro-entrepreneurship, which may trigger demand for more microfinance which, all things being equal, should lead to less risk of insolvency. Besides, a growing economy may imply an increase in income levels which may facilitate loan repayment, leading to lower risk or more stability of MFIs.

Table 4. The impact of female on boards on risk-taking

Variable	RISK1			RISK2		
	Coefficient	t-value	p-value	Coefficient	t-value	p-value
Female on boards	-0.31	-1.94	0.0532*	-43.36	-3.57	0.0004***
Size	0.06	0.86	0.3897	7.38	1.28	0.1967
Age	-0.11	-1.06	0.2901	0.62	0.08	0.9396
Efficiency	-0.05	-0.67	0.5012	-4.93	-0.87	0.3864
Breadth of outreach	-0.19	-2.42	0.0156**	-5.24	-0.86	0.3864
Depth of outreach	-0.24	-1.10	0.2774	47.02	2.78	0.0055***
Profit status	-0.02	-0.21	0.8371	-17.02	-2.37	0.0181**
Regulatory status	0.17	1.86	0.0627*	12.38	1.74	0.0828*
Financial development	0.24	2.82	0.0049***	-3.67	-0.57	0.5684
Human Development	-3.00	-3.59	0.0004***	36.64	0.57	0.5666
Economic Development	0.25	2.47	0.0136***	-0.60	-0.08	0.9383
C	4.03	5.95	0.0000***	-61.98	-1.18	0.2391
R ²	0.49			0.42		
Observations	1280			1280		
Method	Fixed effects			Fixed effects		

Notes: RISK1 = the primary measure of risk-taking; RISK2 = another measure of risk-taking. ***, ** and * represent 1%, 5% and 10% significance levels respectively.

4.2. Robustness checks

The robustness of the above results is checked by controlling for institutional type, data splitting and endogeneity test. Variable dropping is also done. Following the example of Tchakoute Tchuigoua (2014) data splitting is done to establish the external validity of the results reported in Table 4.

4.2.1. Institutional type as an additional control variable

In addition to the profit status taxonomy of MFIs, it is essential also to check if the introduction of the three leading institutions involved in microfinance delivery (Bank, credit union/co-operatives and NGOs) as additional control variables will alter the effect of female on boards on risk-taking. We report the results in Table 5. Across the six regressions involving the separate introduction of each of the three institutional types, the effect of female on boards on risk-taking does not change. It upholds the robustness of the finding in Table 4 that female on boards hurts the risk of MFIs.

Table 5. The impact of female on boards on MFI risk-taking when we introduce dummies of bank, credit union/co-operatives and NGOs

Variable	RISK1			RISK2		
	1	2	3	4	5	6
Female on boards	-0.29* (-1.84)	-0.31** (-1.97)	-0.31** (-1.96)	-43.60*** (-3.58)	-43.34*** (-3.57)	-43.28*** (-3.56)
Size	0.07 (-0.97)	0.04 (0.56)	0.04 (0.54)	7.25 (1.25)	7.45 (1.29)	8.12 (1.40)
Age	-0.10 (-0.93)	-0.11 (-0.98)	-0.07 (-0.66)	0.42 (0.05)	0.59 (0.07)	-0.66 (-0.08)
Efficiency	-0.06 (-0.86)	-0.03 (-0.39)	-0.04 (-0.49)	-4.72 (-0.83)	-5.00 (-0.87)	-5.35 (-0.94)
Breadth of outreach	-0.21*** (-2.65)	-0.16** (-2.01)	-0.17** (-2.14)	-4.98 (-0.81)	-5.33 (-0.86)	-5.91 (-0.97)
Depth of outreach	-0.18 (-0.81)	-0.21 (-0.91)	-0.12 (-0.54)	46.75*** (2.71)	46.90*** (2.80)	43.41*** (2.53)
Profit status	-0.25* (-1.77)	0.02 (0.18)	-0.23** (-1.99)	-13.52 (-1.24)	-17.15** (-2.33)	-10.07 (-1.24)
Regulatory status	0.12 (1.25)	0.15 (1.60)	0.07 (0.67)	13.19* (1.79)	12.46* (1.73)	15.61** (2.06)
Financial development	0.25*** (3.02)	0.22*** (2.65)	0.22*** (2.62)	-3.94 (-0.61)	-3.62 (-0.56)	-3.15 (-0.49)
Human Development	-3.31*** (-3.91)	-2.94*** (-3.53)	-3.35*** (3.40)	41.42 (0.64)	36.47 (0.57)	47.43 (0.74)
Economic Development	0.25*** (2.51)	0.25*** (2.47)	0.26*** (2.59)	-0.65 (-0.08)	-0.59 (-0.08)	-0.91 (-0.18)
BANK	0.33** (2.17)	-	-	-4.97 (-0.43)	-	-
CU	-	0.27* (1.84)	-	-	-0.91 (-0.08)	-
NGO	-	-	-0.39*** (-3.19)	-	-	11.65 (1.24)
C	4.16*** (6.14)	3.96*** (5.85)	4.55*** (6.57)	-63.97 (-1.21)	-60.75 (-1.17)	-76.97 (-1.44)
R ²	0.50	0.50	0.50	0.42	0.42	0.42
Observations	1280	1280	1280	1280	1280	1280
Method	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects

Notes: RISK1 = the primary measure of risk-taking; RISK2 = another measure of risk-taking. ***, ** and * represent 1%, 5% and 10% significance levels respectively. The figures in parentheses are t-statistics.

4.2.2. Data splitting

To further check the robustness of the finding in Table 4, we divide the sample into two: 3-year data covering 2010-2012 and 2-year data covering 2013 and 2014. Since the dataset is unbalanced, splitting it this way provides sufficient observations for analysis. We present the results in Table 6. It is

evident that under the two measures of risk-taking, the negative coefficient of female on boards observed in Table 4 is also observed in Table 6 only that it is only statistically significant under the 2010-2012 subsample. The statistically significant effect of female on boards on MFI risk observed in 2010-2012 partly establishes the external validity of the result in Table 4.

Table 6. The impact of female on boards on MFI risk-taking when we split the sample

Variable	RISK1		RISK2	
	2010-2012	2013-2014	2010-2012	2013-2014
Female on boards	-0.67*** (-2.99)	-0.18 (-0.53)	-0.40 (-1.37)	-0.51 (-1.22)
Size	-0.08 (-0.74)	-0.05 (-0.37)	0.23 (1.61)	-0.10 (-0.58)
Age	-0.07 (-0.53)	-0.02 (-0.06)	-0.10 (-0.55)	-0.05 (-0.15)
Efficiency	0.08 (0.77)	0.08 (0.51)	-0.26* (-1.82)	0.19 (0.98)
Breadth of outreach	0.02 (0.15)	-0.04 (-0.26)	-0.15 (-1.02)	0.17 (0.92)
Depth of outreach	-0.99*** (-2.95)	-0.30 (-0.61)	-1.32*** (-3.08)	0.71 (1.33)
Profit status	-0.13 (-0.97)	-0.17 (-0.73)	-0.22 (-1.26)	0.19 (0.64)
Regulatory status	-0.13 (-0.91)	-0.08 (-0.36)	-0.51*** (-2.80)	-0.68** (-2.18)
Financial development	0.10 (0.78)	-0.18 (-0.69)	0.00 (0.01)	-0.66** (-2.08)
Human Development	-4.49*** (-3.39)	9.37*** (3.29)	-3.34** (-1.92)	12.85*** (3.68)
Economic Development	0.28* (1.82)	-1.02*** (-3.11)	0.03 (0.17)	-1.16*** (-2.93)
C	5.87*** (5.96)	7.45*** (4.43)	3.51*** (2.73)	3.72* (1.80)
R ²	0.69	0.78	0.58	0.73
Observations	770	510	770	509
Method	Fixed effects	Fixed effects	Fixed effects	Fixed effects

Notes: RISK1 = the primary measure of risk-taking; RISK2 = secondary measure of risk-taking. ***, ** and * represent 1%, 5% and 10% significance levels respectively. The figures in parentheses are t-values.

4.2.3. Endogeneity analysis

Table 7 shows the results of the endogeneity analysis. In column 1 of the table, the female managers variable (the chosen instrument) significantly predicts female on boards at 1% significance level. Therefore, it satisfies the statistical relevance condition of a valid instrument. In column 2, the coefficient⁵ of the female managers insignificantly loads on *RISK1*, thus, satisfying the exclusion condition of a valid instrument. In column 2, we observe that the instrumented female on boards negatively and significantly loads on risk-taking. It confirms the robustness of the finding that female on boards hurts the risk-taking of MFIs. It tells us that the finding in Table 4 does not suffer from endogeneity bias.

Table 7. Results of endogeneity analysis using female managers as an instrument

Variable	Stage 1: Dependent variable - Female on boards	Stage 2: Dependent variable - <i>RISK1</i>
	1	2
Instrumented female on boards		-0.28* (-1.67)
Female managers	0.14*** (5.09)	0.15 (1.01)
Size	-0.03* (-1.88)	0.08 (1.08)
Age	0.01 (0.28)	-0.13 (-1.14)
Efficiency	0.01 (0.98)	-0.09 (-1.16)
Breadth of outreach	0.01 (0.65)	-0.22*** (-2.74)
Depth of outreach	0.16*** (3.57)	-0.29 (-1.29)
Profit status	-0.10*** (-5.58)	0.04 (0.39)
Regulatory status	0.03* (1.63)	0.14 (1.51)
Financial development	-0.06*** (-3.74)	0.29*** (3.32)
Human Development	0.12 (0.71)	-2.86*** (-3.33)
Economic Development	0.01 (0.67)	0.25*** (2.47)
C	0.60*** (4.39)	3.83*** (5.57)
R ²	0.55	0.50
Observations	1207	1207
Method	Fixed effects	Fixed effects

Notes: *RISK1* = the primary measure of risk-taking; *RISK2* = secondary measure of risk-taking. ***, ** and * represent 1%, 5% and 10% significance levels respectively. The figures in parentheses are t-values.

4.2.4. Further robustness checks

Further robustness checks are done by dropping the variables whose variance inflation factors exceeded 10. The results of these further robustness checks strengthen the results reported in Table 4. They are not reported but are available upon request.

4.3. The effect of interaction between social performance (outreach) and female on boards on risk-taking

We interact the female on boards variable with the two dimensions of outreach (breadth and depth) to test the hypothesis that the social performance of an MFI interacts with its board gender diversity to influence its risk-taking. We report the results in Table 8. Columns 1 and 2 present the results when the risk-taking Z-score measures risk-taking. Columns 3 and 4 present the results when risk-taking is measured by the risk-adjusted ROA, which is the second measure of risk-taking in this study. The evidence in Table 8 suggests that whereas the interaction between the breadth of outreach and female on boards does not change the effect of female on boards on risk-taking, that of female on boards and the depth of outreach does. A rising depth of outreach performance of an MFI completely turns the negative effect of female on board on risk-taking into a positive effect (-1.64 + 1.89 = 0.25). It implies that an improvement in board gender diversity is beneficial to an MFI's risk-taking in the presence of an improvement in its depth of outreach performance. Hypothesis *H2* is, therefore, partially supported. The no-alternative hypothesis is invoked to explain this observation. The poor and financially excluded who, in most cases, are women have no alternative sources of funding apart from MFIs. Therefore, when women directors on the boards of MFIs use their influence to push for more loans to them, they have no choice but to honour their obligations which improves the repayment performance of MFIs. Better loan repayment improves the revenues of MFIs which may translate into their less exposure to bankruptcy risk, *ceteris paribus*.

Table 8. Results of the interaction effect of outreach on female on boards - risk-taking nexus

Variable	<i>RISK1</i>		<i>RISK2</i>	
	1	2	3	4
Female on boards	-1.36 (-1.61)	-1.64*** (-3.64)	-1.94** (-1.92)	-0.89* (-1.63)
Breadth of outreach	-0.23*** (-2.72)		-0.30*** (-2.89)	
Female on boards X breadth of outreach	0.11 (1.26)		0.18 (1.75)	
Depth of outreach		-0.93*** (-3.00)		-0.34 (-0.91)
Female on boards X depth of outreach		1.89*** (3.16)		1.01 (1.38)
C	4.39*** (5.97)	4.53*** (6.54)	1.03 (1.16)	0.69 (0.82)
Other controls	Added		Added	
R ²	0.50	0.50	0.40	0.40
Observations	1280	1280	1279	1279
Method	Fixed effects	Fixed effects	Fixed effects	Fixed effects

Notes: *RISK1* = the primary measure of risk-taking; *RISK2* = secondary measure of risk-taking. ***, ** and * represent 1%, 5% and 10% significance levels respectively. The figures in parentheses are t-values.

⁵ We obtain from a separate regression using the original *RISK1* model in which female managers is added as a control variable.

5. CONCLUSION

This paper investigates the relationship between female on boards and the risk-taking of MFIs. It also explores whether the social performance of MFIs moderates the relation between female on boards and risk-taking. It applies panel regression techniques to the annual data from 401 MFIs in 64 countries in six MFI regions. Risk-taking is studied through the use of the risk-taking Z-score obtained by adjusting the amalgamation of ROA and equity-to-asset ratio by the standard deviation of ROA. Risk-adjusted ROA is also used to measure risk-taking. The results indicate that female representation in the boardrooms of MFIs is associated with more risk-taking. However, an interaction analysis yields results that show that the risk-taking of MFIs is more likely to benefit from an improvement in board gender diversity matched with more lending to the poor.

In recent times, the pursuit of profit maximization with an increasing emphasis on financial sustainability and efficiency in the microfinance industry has been the agenda of most donors. It is aimed at reducing donor support to the industry (Abdullah & Quayes, 2016). Risk-taking aligns with the sustainability objective of MFIs. Therefore, the negative impact of female on boards on risk-taking points to the need for MFIs to proceed with some reasonable circumspection in their pursuit of gender diversity on their boards. However, since the interaction analysis results reveal the possibility of risk-taking gains from the coupling of female on boards and more lending to female clients, MFIs with social performance focus such as NGOs may consider more gender diversity on their boards.

Considering the rigorous campaign aimed at pushing more women into the higher echelons of

firms including MFIs, the finding that the risk of an MFI is likely to worsen when more females are appointed or elected to its board should be a wake-up call for policymakers. Policymakers should, for example, be interested in the quality of female directors on the boards of MFIs. If women directors are unable to contribute positively to MFI risk management due to capacity deficit, then policymakers can cure this through, for example, the development and implementation of corporate governance capacity-building programmes for existing and potential female directors.

The finding that female directors worsen the risk of MFIs challenges the general position of the empirical literature that women take less risk than men. Since this is one of the few studies that cast doubt on this position, future research is encouraged to interrogate the women-risk linkage further. Picking samples from other traditional industries for analysis is likely to make a valuable contribution to knowledge and shape policy.

Finally, the study is not oblivious of possible data limitations that may have some effect on its results. First, the data hosted by the MIX Market platform are self-reported. Thus, some of the reporting MFIs can manipulate figures for some self-serving purposes, such as the attraction of donor support. Second, the data in the MIX Market database do not cover all MFIs in the world. They are data some MFIs have voluntarily submitted to the platform. Therefore, the results of this study may not be representative of all MFIs in the world. Notwithstanding these limitations, the paper aptly responds to the call for a piece of better scientific evidence that "can help inform policy and shape expectations about the impact of boardroom diversity policies on corporate and economic outcomes" (Adams, 2016, p. 373).

REFERENCES

1. Abdullah, S., & Quayes, S. (2016). Do women borrowers augment financial performance of MFIs? *Applied Economics*, 48(57), 5593-5604. <https://doi.org/10.1080/00036846.2016.1181831>
2. Adams, R. B. (2016). Women on boards: The superheroes of tomorrow? *The Leadership Quarterly*, 27(3), 371-386. <https://doi.org/10.1016/j.leaqua.2015.11.001>
3. Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics*, 94(2), 291-309. <https://doi.org/10.1016/j.jfineco.2008.10.007>
4. Adams, R. B., & Ragunathan, V. (2017). *Lehman sisters* (Unpublished Working Paper). <https://doi.org/10.2139/ssrn.3046451>
5. Adusei, M., & Obeng, E. Y. T. (2019). Board gender diversity and the capital structure of microfinance institutions: A global analysis. *The Quarterly Review of Economics and Finance*, 71, 258-269. <https://doi.org/10.1016/j.qref.2018.09.006>
6. Ahern, K. R., & Dittmar, A. K. (2012). The changing of the boards: The impact on firm valuation of mandated female board representation. *The Quarterly Journal of Economics*, 127(1), 137-197. <https://doi.org/10.1093/qje/qjr049>
7. Ahlin, C., Lin, J., & Majo, M. (2011). Where does microfinance flourish? Microfinance institutions performance in macroeconomic context. *Journal of Development Economics*, 95(2), 105-120. <https://doi.org/10.1016/j.jdeveco.2010.04.004>
8. ASX Corporate Governance Council. (2010). *Corporate governance principles and recommendations with 2010 amendments* (2nd ed.). Retrieved from ASX website: http://www.asx.com.au/documents/asx-compliance/cg_principles_recommendations_with_2010_amendments.pdf
9. Augustine, D., Wheat, C. O., Jones, K. S., Baraldi, M., & Malgwi, C. A. (2016). Gender diversity within the workforce in microfinance industry in Africa: Economic performance and sustainability. *Canadian Journal of Administrative Sciences*, 33(3), 227-241. <https://doi.org/10.1002/cjas.1365>
10. Babalos, V., Caporale, G. M., & Philippas, N. (2015). Gender, style diversity, and their effect on fund performance. *Research in International Business and Finance*, 35, 57-74. <https://doi.org/10.1016/j.ribaf.2015.02.020>
11. Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120. <https://doi.org/10.1177/014920639101700108>

12. Bassem, B. S. (2009). Governance and performance of microfinance institutions in Mediterranean countries. *Journal of Business Economics and Management*, 10(1), 31-43. <https://doi.org/10.3846/1611-1699.2009.10.31-43>
13. Beck, T., Behr, P., & Guettler, A. (2013). Gender and banking: Are women better loan officers? *Review of Finance*, 17(4), 1279-1321. <https://doi.org/10.1093/rof/rfs028>
14. Bennouri, M., Chtioui, T., Nagati, H., & Nekhili, M. (2018). Female board directorship and firm performance: What really matters? *Journal of Banking and Finance*, 88, 267-291. <https://doi.org/10.1016/j.jbankfin.2017.12.010>
15. Bibi, U., Balli, H. O., Matthews, C. D., & Tripe, D. W. L. (2018). New approaches to measure the social performance of microfinance institutions (MFIs). *International Review of Economics and Finance*, 53, 88-97. <https://doi.org/10.1016/j.iref.2017.10.010>
16. Brooks, C. (2008). *Introductory economics for finance*. <https://doi.org/10.1017/CBO9780511841644>
17. Byrnes, J. P., Miller, D. C., & Schafer, W. D. (1999). Gender differences in risk taking: A meta-analysis. *Psychological Bulletin*, 125(3), 367-383. <https://doi.org/10.1037/0033-2909.125.3.367>
18. Carter, D. A., D'Souza, F. P., Simkins, B. J., & Simpson, W. G. (2007). *The diversity of corporate board committees and financial performance*. <https://doi.org/10.2139/ssrn.1106698>
19. Carter, D. A., D'Souza, F. P., Simkins, B. J., & Simpson, W. G. (2010). The gender and ethnic diversity of US boards and board committees and firm financial performance. *Corporate Governance: An International Review*, 18(5), 396-414. <https://doi.org/10.1111/j.1467-8683.2010.00809.x>
20. Carter, D. A., Simkins, B. J., & Simpson, W. G. (2003). Corporate governance, board diversity, and firm value. *The Financial Review*, 38(1), 33-53. <https://doi.org/10.1111/1540-6288.00034>
21. Chaddad, F. R., & Cook, M. L. (2004). Understanding new cooperative models: An ownership-control rights typology. *Review of Agricultural Economics*, 26(3), 348-360. <https://doi.org/10.1111/j.1467-9353.2004.00184.x>
22. Chauhan, Y., & Dey, D. K. (2017) Do female directors really add value in Indian firms? *Journal of Multinational Financial Management*. 42-43, 24-36. <https://doi.org/10.1016/j.mulfin.2017.10.005>
23. Chen, J., Leung, W. S., & Evans, K. P. (2018) Female board representation, corporate innovation and firm performance. *Journal of Empirical Finance*, 48, 236-254. <https://doi.org/10.1016/j.jempfin.2018.07.003>
24. Chmelíková, G., Krauss, A., & Dvouletý, O. (2019) Performance of microfinance institutions in Europe — Does social capital matter? *Socio-Economic Planning Sciences*, 68, 100670. <https://doi.org/10.1016/j.seps.2018.11.007>
25. Conyon, M. J., & He, L. (2017) Firm performance and boardroom gender diversity: A quantile regression approach. *Journal of Business Research*, 79, 198-211. <http://doi.org/10.1016/j.jbusres.2017.02.006>
26. Credit Suisse. (2012). *Gender diversity and corporate performance*. Retrieved from https://wapp.hks.harvard.edu/files/wapp/files/gender_diversity.pdf
27. Cull, R., Demirgüç-Kunt, A., & Morduch, J. (2011). Does regulatory supervision curtail microfinance profitability and outreach? *World Development*, 39(6), 949-965. <https://doi.org/10.1016/j.worlddev.2009.10.016>
28. Cull, R., & Spreng, C. P. (2011). Pursuing efficiency while maintaining outreach: Bank privatization in Tanzania. *Journal of Development Economics*, 94(2), 254-261. <https://doi.org/10.1016/j.jdeveco.2010.01.010>
29. de Luis-Carnicer, P., Martínez-Sánchez, A., Pérez-Pérez, M., & Vela-Jiménez, M. J. (2008). Gender diversity in management: Curvilinear relationships to reconcile findings. *Gender in Management: An International Journal*, 23(8), 583-597. <https://doi.org/10.1108/17542410810912708>
30. Demirgüç-Kunt, A., & Huizinga, H. (2010). Bank activity and funding strategies: The impact on risk and returns. *Journal of Financial Economics*, 98(3), 626-650. <https://doi.org/10.1016/j.jfineco.2010.06.004>
31. Duguid, M. M., Loyd, D. L., & Tolbert, P. S. (2012). The impact of categorical status, numeric representation, and work group prestige on preference for demographically similar others: A value threat approach. *Organization Science*, 23(2), 386-401. <https://doi.org/10.1287/orsc.1100.0565>
32. El Ghouli, S., & Zheng, X. (2016) Trade credit provision and national culture. *Journal of Corporate Finance*, 41, 475-501. <https://doi.org/10.1016/j.jcorpfin.2016.07.002>
33. Elliott, J. R., & Smith, R. A. (2001). Ethnic matching of supervisors to subordinate work groups: Findings on "bottom-up" ascription and social closure. *Social Problems*, 48(2), 258-276. <https://doi.org/10.1525/sp.2001.48.2.258>
34. European Commission. (2012). *Proposal for a Directive of the European Parliament and of the Council on improving the gender balance among non-executive directors of companies listed on stock exchanges and related measures*. Retrieved from European Commission website: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2012:0614:FIN:en:PDF>
35. Faccio, M., Marchica, M.-T., Mura, R. (2016). CEO gender, corporate risk-taking, and the efficiency of capital allocation. *Journal of Corporate Finance*, 39, 193-209. <https://doi.org/10.1016/j.jcorpfin.2016.02.008>
36. Farrell, K. A., & Hersch, P. L. (2005) Additions to corporate boards: The effect of gender. *Journal of Corporate Finance*, 11(1-2), 85-106. <https://doi.org/10.1016/j.jcorpfin.2003.12.001>
37. Fehr-Duda, H., de Gennaro, M., & Schubert, R. (2006). Gender, financial risk, and probability weights. *Theory and Decision*, 60(2), 283-313. <https://doi.org/10.1007/s11238-005-4590-0>
38. Finegold, D., Benson, G. S., & Hecht, D. (2007). Corporate boards and company performance: Review of research in light of company reforms. *Corporate Governance: An International Review*, 15(5), 865-878. <https://doi.org/10.1111/j.1467-8683.2007.00602.x>
39. Finkelstein, S. (1992). Power in top management teams: Dimensions, measurement and validation. *Academy of Management Journal*, 35(3), 505-536. <https://doi.org/10.5465/256485>
40. Francoeur, C., Laballe, R., & Sinclair-Desgagné, B. (2008). Gender diversity in corporate governance and top management. *Journal of Business Ethics*, 81(1), 83-95. <https://doi.org/10.1007/s10551-007-9482-5>
41. Green, C. P., & Homroy, S. (2018) Female directors, board committees and firm performance. *European Economic Review*, 102, 19-38. <https://doi.org/10.1016/j.euroecorev.2017.12.003>
42. Gregory-Smith, I., Main, B. G. M., O'Reilly, C. A. (2014). Appointments, pay and performance in UK boardrooms by gender. *The Economic Journal*, 124(574), 109-128. <https://doi.org/10.1111/eoj.12102>

43. Groeneveld, H., & de Vries, B. (2009). European co-operative banks: First lessons of the subprime crisis. *The International Journal of Cooperative Management*, 4(2), 8-21. Retrieved from https://v3.globalcube.net/clients/eacb/content/medias/publications/external_studies/Cb_first_lessons_financial_crisis_Rabobank_2009.pdf
44. Gul, F. A., Podder, J., & Shahriar, A. Z. M. (2017). Performance of microfinance institutions: Does government ideology matter? *World Development*, 100, 1-15. <https://doi.org/10.1016/j.worlddev.2017.07.021>
45. Gul, F. A., Srinidhi, B., & Ng, A. C. (2011). Does board gender diversity improve the informativeness of stock prices? *Journal of Accounting and Economics*, 51(3), 314-338. <https://doi.org/10.1016/j.jacceco.2011.01.005>
46. Gul, F. A., Srinidhi, B., & Tsui, J. S. L. (2008). *Board diversity and the demand for higher audit effort* (Working Paper). <https://doi.org/10.2139/ssrn.1359450>
47. Gutierrez-Goiria, J., San-Jose, L., & Retolaza, J. L. (2016). Social efficiency in microfinance institutions: Identifying how to improve it. *Journal of International Development*, 29(2), 259-280. <https://doi.org/10.1002/jid.3239>
48. Harjoto, M. A., Laksmana, I., & Yang, Y.-W. (2018). *Board diversity and corporate risk taking* (Working Paper). <https://doi.org/10.2139/ssrn.2412634>
49. Hartarska, V. (2005). Governance and performance of microfinance institutions in Central and Eastern Europe and the Newly Independent States. *World Development*, 33(10), 1627-1643. <https://doi.org/10.1016/j.worlddev.2005.06.001>
50. Hartarska, V., & Nadolnyak, D. (2008). Does rating help microfinance institutions raise funds? Cross-country evidence. *International Review of Economics & Finance*, 17(4), 558-571. <https://doi.org/10.1016/j.iref.2007.05.008>
51. Hartarska, V., Nadolnyak, D., & Mersland, R. (2014). Are women better bankers to the poor? Evidence from rural microfinance institutions. *American Journal of Agricultural Economics*, 96(5), 1291-1306. <https://doi.org/10.1093/ajae/aau061>
52. Hermes, N., & Hudon, M. (2018). Determinants of the performance of microfinance institutions: A systematic review. *Journal of Economic Surveys*, 32(5), 1483-1513. <https://doi.org/10.1111/joes.12290>
53. Hillman, A. J., Shropshire, C., & Cannella Jr., A. A. (2007). Organizational predictors of women on corporate boards. *Academy of Management Journal*, 50(4), 941-952. <https://doi.org/10.5465/amj.2007.26279222>
54. Houston, J. F., Lin, C., Lin, P., & Ma, Y. (2010). Creditor rights, information sharing, and bank risk taking. *Journal of Financial Economics*, 96(3), 485-512. <https://doi.org/10.1016/j.jfineco.2010.02.008>
55. Huang, J., & Kisgen, D. J. (2013). Gender and corporate finance: Are male executives overconfident relative to female executives? *Journal of Financial Economics*, 108(3), 822-839. <https://doi.org/10.1016/j.jfineco.2012.12.005>
56. Iqbal, S., Nawaz, A., & Ehsan, S. (2019). Financial performance and corporate governance in microfinance: Evidence from Asia. *Journal of Asian Economics*, 60, 1-13. <https://doi.org/10.1016/j.asieco.2018.10.002>
57. Jehn, K. A., Northcraft, G. B., & Neale, M. A. (1999). Why differences make a difference. A field study of diversity, conflict, and performance in workgroups. *Administrative Science Quarterly*, 44(4), 741-763. <https://doi.org/10.2307/2667054>
58. Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305-360. [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
59. Joy, L., Wagner, H. M., & Narayanan, S. (2007). *The bottom line: Corporate performance and women's representation on boards* (Catalyst Report). Retrieved from Catalyst website: <https://www.catalyst.org/research/the-bottom-line-corporate-performance-and-womens-representation-on-boards/>
60. Kaur, P. (2016). Efficiency of microfinance institutions in India: Are they reaching the poorest of the poor? *Vision: The Journal of Business Perspective*, 20(1), 54-65. <https://doi.org/10.1177/0972262916628988>
61. Kennedy, P. (2008). *A guide to econometrics* (6th ed.). Malden, Massachusetts, the USA: Blackwell Publishing.
62. Khan, W. A., & Vieito, J. P. (2013). CEO gender and firm performance. *Journal of Economics and Business*, 67, 55-66. <https://doi.org/10.1016/j.jeconbus.2013.01.003>
63. Khaw, K. L.-H., Liao, J. Tripe, D., & Wongchoti, U. (2016). Gender diversity, state control, and corporate risk-taking: Evidence from China. *Pacific-Basin Finance Journal*, 39, 141-158. <https://doi.org/10.1016/j.pacfin.2016.06.002>
64. Kirsh, A. (2018). The gender composition of corporate boards: A review and research agenda. *The Leadership Quarterly*, 29(2), 346-364. <https://doi.org/10.1016/j.leaqua.2017.06.001>
65. Köhler, M. (2015). Which banks are more risky? The impact of business models on bank stability. *Journal of Financial Stability*, 16, 195-212. <https://doi.org/10.1016/j.jfs.2014.02.005>
66. Laeven, L., & Levine, R. (2009). Bank governance, regulation and risk taking. *Journal of Financial Economics*, 93(2), 259-275. <https://doi.org/10.1016/j.jfineco.2008.09.003>
67. Lenard, M. J., Yu, B., York, E. A., & Wu, S. (2014). Impact of board gender diversity on firm risk. *Managerial Finance*, 40(8), 787-803. <https://doi.org/10.1108/MF-06-2013-0164>
68. Mahadeo, J. D., Soobaroyen, T., & Hanuman, V. O. (2012). Board composition and financial performance: Uncovering the effects of diversity in an emerging economy. *Journal of Business Ethics*, 105(3), 375-388. <https://doi.org/10.1007/s10551-011-0973-z>
69. McKinsey & Company. (2007). *Women matter: Gender diversity, a corporate performance driver*. Retrieved from <https://www.mckinsey.com/business-functions/organization/our-insights/gender-diversity-a-corporate-performance-driver>
70. Mersland, R., & Strøm, R. Ø. (2009). Performance and governance in microfinance institutions. *Journal of Banking & Finance*, 33(4), 662-669. <https://doi.org/10.1016/j.jbankfin.2008.11.009>
71. MIX. (2006). *The microbanking bulletin: Focus on MFI performance by region* (12th issue). Retrieved from MIX website: www.themix.org
72. Mizuchi, M. S. (1988). Managerialism: Another reassessment. In M. Schwartz (Ed.), *The structure of power in America: The corporate elite as a ruling class* (pp. 7-15). New York, the USA: Holmes & Meier.
73. Nadeem, M., Suleman, T., & Ahmed, A. (2019). Women on boards, firm risk and the profitability nexus: Does gender diversity moderate the risk and return relationship? *International Review of Economics and Finance*, 64, 427-442. <https://doi.org/10.1016/j.iref.2019.08.007>

74. Nguyen, T., Locke, S., & Reddy, K. (2015). Does boardroom gender diversity matter? Evidence from a transitional economy. *International Review of Economics and Finance*, 37, 184-202. <https://doi.org/10.1016/j.iref.2014.11.022>
75. Page, S. E. (2007). *The difference: How the power of diversity creates better groups, firms, schools and societies*. <https://doi.org/10.2307/j.ctt7sp9c>
76. Petrovic, J. (2008). Unlocking the role of a board director: A review of the literature. *Management Decision*, 46(9), 1373-1392. <https://doi.org/10.1108/00251740810911993>
77. Poletti-Hughes, J., & Briano-Turrent, G. C. (2019). Gender diversity on the board of directors and corporate risk: A behavioural agency theory perspective. *International Review of Financial Analysis*, 62, 80-90. <https://doi.org/10.1016/j.irfa.2019.02.004>
78. Powell, M., & Ansic, D. (1997). Gender differences in risk behaviour in financial decision-making: An experimental analysis. *Journal of Economic Psychology*, 18(6), 605-628. [https://doi.org/10.1016/S0167-4870\(97\)00026-3](https://doi.org/10.1016/S0167-4870(97)00026-3)
79. Schulte, M., & Winkler, A. (2019). Drivers of solvency risk - Are microfinance institutions different? *Journal of Banking and Finance*, 106, 403-426. <https://doi.org/10.1016/j.jbankfin.2019.07.009>
80. Shrader, C. B., Blackburn, V. B., & Iles, P. (1997). Women in management and firm financial value: An exploratory study. *Journal of Managerial Issues*, 9(3), 355-372. Retrieved from https://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1001&context=management_pubs
81. Sila, V., Gonzalez, A., & Hagendorff, J. (2016). Women on board: Does boardroom gender diversity affect firm risk? *Journal of Corporate Finance*, 36, 26-53. <https://doi.org/10.1016/j.jcorpfin.2015.10.003>
82. Skaggs, S., Stainback, K., & Duncan, P. (2012). Shaking things up or business as usual? The influence of female corporate executives and board of directors on women's managerial representation. *Social Science Research*, 41(4), 936-948. <https://doi.org/10.1016/j.ssresearch.2012.01.006>
83. Solakoglu, M. N., & Demir, N. (2016). The role of firm characteristics on the relationship between gender diversity and firm performance. *Management Decision*, 54(6), 1407-1419. <https://doi.org/10.1108/MD-02-2015-0075>
84. Stiroh, K. J. (2004a). Do community banks benefit from diversification? *Journal of Financial Services Research*, 25, 135-160. <https://doi.org/10.1023/B:FINA.0000020657.59334.76>
85. Stiroh, K. J. (2004b). Diversification in banking: Is noninterest income the answer? *Journal of Money, Credit and Banking*, 36(5), 853-882. <https://doi.org/10.1353/mcb.2004.0076>
86. Ström, R. Ø., D'Espallier, B., & Mersland, R. (2014). Female leadership, performance, and governance in microfinance institutions. *Journal of Banking and Finance*, 42, 60-75. <https://doi.org/10.1016/j.jbankfin.2014.01.014>
87. Tchakoute Tchuigoua, H. (2014). Institutional framework and capital structure of microfinance institutions. *Journal of Business Research*, 67(10), 2185-2197. <http://doi.org/10.1016/j.jbusres.2014.01.008>
88. Terjesen, S., & Singh, V. (2008). Female presence on corporate boards: A multi-country study of environmental context. *Journal of Business Ethics*, 83, 55-63. <http://doi.org/10.1007/s10551-007-9656-1>
89. Wilson, N., & Altanlar, A. (2011). *The survival of newly incorporated companies and the impact of founding director characteristics* (Working Paper). <https://doi.org/10.2139/ssrn.1929398>

APPENDIX A

Table A.1. Variance inflation factors

Variables	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.183040	219.0517	NA
FOB	0.019400	4.395969	1.102262
SIZE	0.003487	1183.901	12.09547 ⁶
AGE	0.008527	8.918749	1.124270
EFFIC	0.003388	92.30566	6.095276
BOUT	0.003643	455.1156	14.48826 ⁷
DOUT	0.001988	2.368056	1.809668
PSTATUS	0.004782	2.146416	1.341304
REGU	0.005521	4.230502	1.521810
FINDEV	1.92E-06	7.596062	1.327940
HDI	0.493111	258.1926	3.984912
ECONDEV	0.007186	541.4097	5.722418

Notes: FOB = female on boards; SIZE = size of MFI; AGE = the age of an MFI; EFFIC = the efficiency of an MFI; BOUT = the breadth of the outreach of an MFI; DOUT = the depth of outreach of an MFI; PSTA = the profit status of an MFI; REGU = the regulatory status of an MFI; FINDEV = the level of financial development in a country; HDI = the human development index of a country; and ECONDEV (in log) = the level of economic development of a country.

⁶ This exceeds the threshold of 10. Therefore, in a separate regression it is dropped but the effect of female directors on risk-taking observed In Table 4 remains intact.

⁷ This exceeds the threshold of 10. So it is dropped in a separate regression but the effect of female directors on risk-taking does not change.