



Board gender diversity and debt utilization: Evidence from the global microfinance industry



Arpita Sharma^a, Swati Chauhan^b, Md Aslam Mia^{c,d,*}, Sunil Sangwan^e, Shoaib Alam Siddiqui^f, Sanjeev Kumar^g

^a Symbiosis Institute of Business Management Pune, Symbiosis International, Deemed University, Pune, 412115, India

^b Atal Bihari Vajpayee Institute of Good Governance and Policy Analysis, Bhopal, Madhya Pradesh, 462003, India

^c School of Management, Universiti Sains Malaysia, 11800, Penang, Malaysia

^d Miyan Research Institute, International University of Business Agriculture and Technology, 1230, Dhaka, Bangladesh

^e Institute of Rural Management Anand, Gujarat, 388001, India

^f School of Commerce, SVKM'S Narsee Monjee Institute of Management Studies Deemed to Be University, Indore Campus, 452005, India

^g Department of Accounting and Finance, Jindal Global Business School, O.P. Jindal Global University, Sonipat, Haryana, 131001, India

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ABSTRACT

To support the continued expansion of their operations, microfinance institutions (MFIs) worldwide rely heavily on debt, which exposes them to bankruptcy risk. This underscores the need for prudent selection of debt instruments by MFIs. Therefore, this study aims to investigate the possible influence of board gender diversity on the choice of debt instruments utilized by MFIs. Data from unique 1670 MFIs in 93 countries, spanning the period of 2010–2018, were collected from the World Bank and analyzed using various econometric methods, including Random Effects Model (REM), Fixed Effects Model (FEM), Pooled Ordinary Least Squares (POLS), Generalized Least Squares (GLS), and endogeneity-corrected techniques such as the Generalized Method of Moments (GMM). The study revealed that gender-diverse boards tend to utilize fewer debt instruments, reflecting the risk-averse nature of the female board members, as observed in the existing literature. However, the statistical significance of these outcomes varies depending on the specific debt, proxies, sub-sample, and econometric methods considered in the analysis.

1. Introduction

Microfinance institutions (MFIs) play a crucial role in providing financial services such as microcredits, savings, and insurance to the poor, particularly in developing economies where access to formal financial institutions is limited. The significance of microfinance in promoting financial inclusion and ultimately reducing poverty has gained global attention, resulting in its endorsement by various stakeholders. Through the collaborative efforts of national and international organizations, the microfinance industry has witnessed remarkable growth, with its global customer base rising from 13 million in 1997 to 211 million (including 114 million being the poorest of the poor) in 2013 (Campaign, 2015). With an annual average growth of 8.6% and 13.5% in its loan portfolio and client base, respectively (Mix, 2015), the

microfinance sector needs substantial capital to sustain its expansion and meet the loan demands of existing and potential borrowers.

While microfinance has achieved commendable global success, penetration rates remain uneven across nations, with just approximately 2% of the population in developing countries being microfinance borrowers (Cull et al., 2014). To increase this penetration rate, MFIs need to continuously secure funding to support small-scale enterprises, a challenge increasingly compounded by heightened industry competition and tighter capital market access. Consequently, MFIs seeking external funding often rely on various debt instruments, yet access depends on both firm-level characteristics and the broader institutional environment (Demirguc-Kunt & Maksimovic, 1999). Previous studies suggest that firms in favorable institutional environments tend to enjoy easier access to external funds with more advantageous terms (Antoniou et al.,

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* Corresponding author. School of Management Universiti Sains Malaysia (USM), 11800, Penang, Malaysia.

E-mail addresses: arpitasharma@sibmpune.edu.in (A. Sharma), swati.chauhan@mp.gov.in (S. Chauhan), aslammia@usm.my (M.A. Mia), sunilsangwan07@gmail.com (S. Sangwan), siddiqui.shoaibal@gmail.com (S.A. Siddiqui), sanjeevkumar@jgu.edu.in (S. Kumar).

2008; Fan et al., 2012; Li & Ferreira, 2011). However, this debt dependence poses a potential double-edged sword, exposing MFIs to bankruptcy risk. Given the strategic importance of funding decisions in optimizing microfinance's impact, investigating the influence of board gender diversity on these choices emerges as an intriguing research area.

Extensive studies have been conducted on capital structure and microfinance operations, which can be categorized into two main streams. First, studies examining the effect of capital structure on the financial and outreach objectives of MFIs (Bogan, 2012; Lassoued, 2021), and second, studies investigating the determinants of capital structure in MFIs (Khachaturyan et al., 2017; Tchuigoua, 2014, 2015). However, to the best of our knowledge, only a limited have explored the potential influence of board gender diversity on the choice of debt instruments utilized by MFIs. For instance, studies by Adusei (2019) and Adusei and Sarpong-Danquah (2021) observed a negative association between board gender diversity and the debt-to-equity ratio and borrowing levels. In other words, a more gender-diverse board in MFIs tends to utilize less debt to minimize the risk of bankruptcy (Adusei & Obeng, 2019). Unlike these studies that examine board gender diversity in relation to an aggregate measure of debt, this study specifically investigates the nexus between board gender diversity and the various types of debt instruments, including short-term borrowing, long-term borrowing, subordinated debt, and other liabilities.

The choice of debt by the MFIs is primarily influenced by the maturity structure of the debt. Long-term debt is more sensitive to pricing, as it is often mispriced compared to short-term debt. However, short-term debt entails higher monitoring and refinancing costs, which may be less appealing to risk-averse managers. Short-term debt also carries higher rollover costs than long-term debt (Brockman et al., 2010). Existing literature indicates that female executives tend to be more risk-averse than their male counterparts, making them more inclined to use long-term maturity debt (Adusei, 2019; Levin et al., 1988). Their higher propensity for risk avoidance suggests that women make sound financial and investment decisions within organizations (Francis et al., 2015), including the selection of suitable debt instruments. Furthermore, Huang and Kisgen (2013) suggest that CEOs' overconfidence also impacts the debt maturity structure. Overly confident managers and executives prefer short-term debt over long-term debt (La Rocca et al., 2020), partly due to their overestimation of their ability to refinance short-term debt at lower costs. Barber and Odean (2001) noted that male managers show overconfident behavior, leading them to prefer short-term debt, unlike their female counterparts. Therefore, it can be argued that board gender diversity may influence the types of debt instruments used in microfinance operations.

Existing studies on the impact of board gender diversity on broader firm performance are mixed. For instance, Mia et al. (2022) found a negative relationship between board gender diversity and the financing costs of MFI. Similarly, García and Herrero (2021) linked gender-diverse boards to reduced debt cost and maturity in 1416 European non-banking listed firms. On the other hand, Chang et al. (2023) and Amin et al. (2022) observed a positive relationship between board gender diversity and debt usage. Furthermore, some prior studies reported minimal to no significant effect between board gender diversity and firm performance (Gregory-Smith, Main and O'Reilly, 2014; Ellwood & Garcia-Lacalle, 2015). Specifically, Chapple and Humphrey (2014) found weak evidence for a negative correlation between women board members and firm performance across multiple industries while noting some positive impacts in specific sectors. Adusei (2020) argued that a gender-diverse board can introduce conflicts, potentially hindering risk mitigation and economic benefits. This conflicting evidence highlights the need for further investigation to fully understand the influence of board gender diversity on firm performance.

While most studies suggest a negative association between female directors and corporate leverage (García & Herrero, 2021; Huang & Kisgen, 2013; Schopohl et al., 2021), applying these findings to MFIs requires caution despite their shared use of boards of directors. Key

differences in context suggest that board gender diversity may play a different role in MFI decision-making and outcomes. First, MFIs prioritize poverty alleviation and financial inclusion, which could influence their decision-making priorities compared to profit-oriented corporate entities. This emphasis on social impact may lead diverse boards to contribute to different financing approaches. (Bateman & Chang, 2012; D'Espallier et al., 2011). Second, MFIs primarily serve individuals and communities with limited access to formal banking systems, often in developing or underserved regions. As a result, the risk profiles and financial needs of their clients may significantly differ from those of corporate clients. This distinction implies that the influence of board gender diversity on risk-taking behavior and financing decisions may vary in the context of MFIs (Armendariz & Morduch, 2010; Cull et al., 2018). Third, MFIs often adopt participatory governance structures involving stakeholders and borrowers, which could further influence how board gender diversity affects decision-making and overall outcomes (Hermes et al., 2011; Mersland & Strøm, 2009).

Despite its significance, the impact of female board members on debt use in MFIs has received limited research attention. However, the inclusion of female board members has the potential to affect MFI debt-related decisions in a variety of ways. These include enhancing risk management, improving corporate governance, and contributing to better social performance (García & Herrero, 2021). The contribution of this paper lies in its examination of the effects of board gender diversity specifically in the context of MFIs. By focusing on this unique sector, the paper can provide insights into whether the negative effects observed in corporate financing studies apply to the microfinance setting. This sector-specific analysis expands our understanding of the relationship between board gender diversity and financial outcomes in diverse organizational contexts, contributing to the literature on both gender diversity and microfinance.

Considering the impact of debt preference on firms' performance, investigating the relationship between gender diversity and debt choice in the microfinance context has several merits. First, it has been reported that MFIs with a higher degree of leverage ratio perform better by attaining economies of scale (Kyereboah-Coleman, 2007a). This suggests that the ratio of short-term debts to assets is negatively related to the operational self-sufficiency of the firms. Conversely, short-term debt can positively impact firm performance due to its easier accessibility. On the other hand, long-term funds may impede firm performance due to associated costs in accessing these funds. Therefore, examining the utilization of specific types of debt instruments across different time horizons (long-term and short-term) can contribute to resolving the debate surrounding the use of debt instruments in the operation of MFIs.

Second, it sheds light on the potential benefits of board gender diversity on governance and risk mitigation. The board of directors plays a vital role in aligning the interests of shareholders with those of firm managers, thereby mitigating conflict of interest and strengthening the internal governance mechanism (Adams & Ferreira, 2009; Jensen & Meckling, 1976; Rose, 2007). Gender composition, as a facet of board heterogeneity, can influence firm outcomes through enhanced decision-making and monitoring ability (Carter et al., 2010; Rose, 2007). Recent studies have shown increased interest in board diversity, fueled by evidence indicating that men and women differ in terms of risk-taking ability, level of confidence, and mutual trust (Beck et al., 2013). Previous studies have highlighted that women tend to be more risk-averse and less overconfident than men (Niederle & Vesterlund, 2007). This diversity in perspectives and experiences can enrich the board's ethical reasoning and risk-taking behavior, influencing MFIs' financial decisions (Post & Byron, 2015). Furthermore, a diversified board can enhance the MFI's institutional image among lending partners, potentially impacting its capital structure (Adusei & Sarpong-Danquah, 2021).

Third, it provides empirical evidence specifically tailored to the microfinance sector, offering valuable insights for decision-making within MFIs and contributing to a more nuanced understanding of the

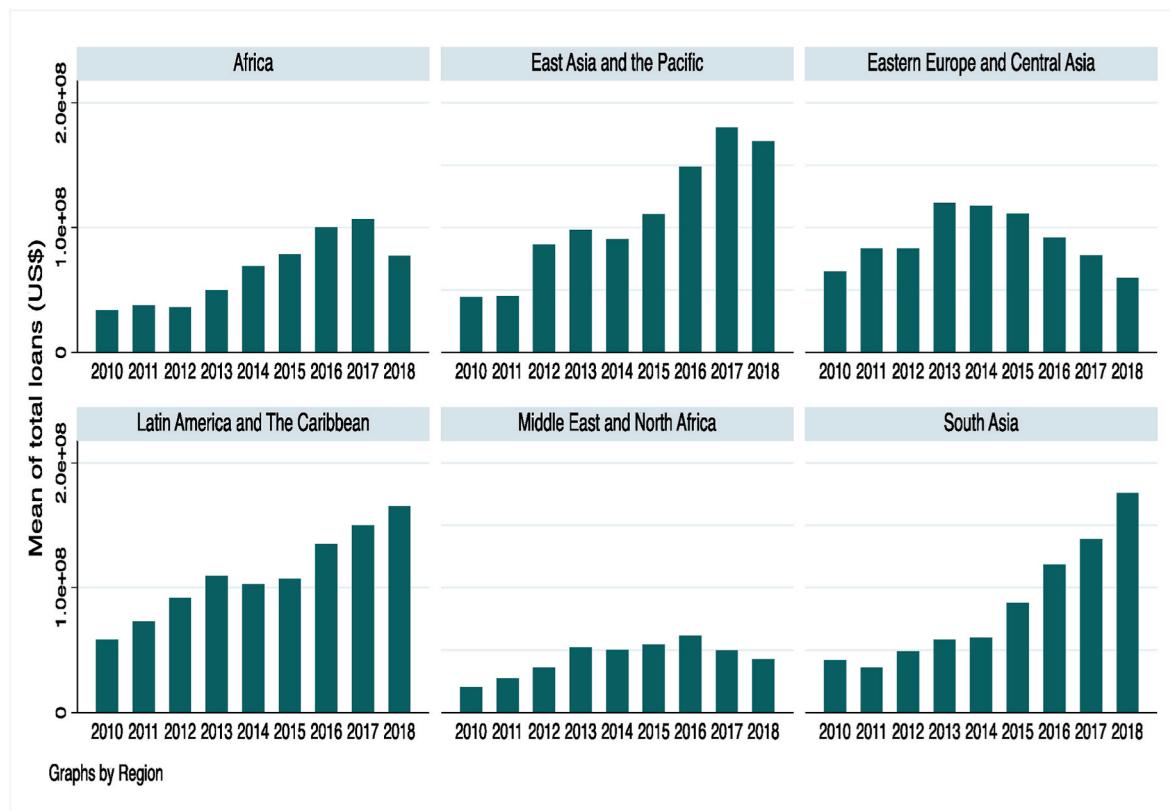


Fig. 1. Trend of the average total debt or total liabilities in the global microfinance industry.

Source: Authors. The variables were winsorized at 1% and 99% levels to address extreme outliers. The number of MFIs differs each year. Definition for each variables are presented in Table 1.

relationship between gender diversity and financing outcomes. The findings can inform discussions and policies related to gender equality and diversity in governance. Policymakers may be encouraged to recognize the importance of gender balance on boards, particularly in the microfinance sector. The research outcomes can guide public policy initiatives aimed at promoting gender diversity and inclusivity in MFIs. Given these considerations, our study aims to investigate the impact of board gender diversity on the generation of liabilities in MFIs through the utilization of different debt instruments.

The rest of the paper is organized as follows: the second section provides a brief literature review on different types of debt and the role of female board members in MFIs, the third section outlines the hypotheses of the study, the fourth section discusses the methodology employed, the fifth section presents the results and discussion, and the last section concludes the study with policy implications.

2. Brief overview of the types of debt and female board members

2.1. Overview of the debt instruments

The existing literature encompasses several theories, such as the Modigliani and Miller theorem, agency theory, pecking order theory, and trade-off theory, which discuss the importance of different funding sources and their impact on firm performance (Adusei & Sarpong-Danquah, 2021; Geresem & Michael, 2020; Nelson & Peter, 2019; Ngatno et al., 2021). According to the pecking order theory and trade-off theory, internal funds are the most preferred source of financing, followed by debt and equity financing (Bogan, 2012; Kyereboah-Coleman, 2007a; Myers & Majluf, 1984). A few studies have also evaluated the effect of varying proportions of debt and equity on firm characteristics (Caudill et al., 2009; Hagawe et al., 2023; Tchouigoua, 2014, 2015). Financing is a major concern for MFIs, especially those not

allowed to collect deposits. Debt capital is the preferred choice of financing for most MFIs, except for a few large firms that can afford the cost of going public (Hoque et al., 2011; Nair, 2012). However, equity issuance is the most expensive source of finance for MFIs, followed by subordinated debt (debt second in priority to senior debts) and then retail deposits (Dieckmann et al., 2007). Additionally, the ability of an MFI to access debt funds in a year depends on the debt maturity from the prior year (Dorfleitner et al., 2017).

Long-term debt and short-term debt are commonly used by MFIs as sources of funds (Kar, 2012). Short-term debts are issued for less than one year to maintain enough liquidity in the business, while long-term debt allows firms to offset tax liabilities by realizing capital losses in the event of an increase in interest rates (Kar, 2012; Kyereboah-Coleman, 2007b). The tax advantages offered by long-term debts make firms rely on them more (Kyereboah-Coleman, 2007a). However, Geresem and Michael (2020) argued that the composition of debt or equity does not necessarily have a significant influence on the performance of MFIs. Instead, effective monitoring and credit risk mitigation are crucial for achieving better financial performance. Hence, the presence of more debt in the capital structure of enterprises should be expected in an environment with a favorable tax system and reduced bankruptcy costs, and vice versa (Matemilola et al., 2019; Adusei and Sarpong-Danquah, 2021).

According to Goswami et al. (1995), interest-bearing long-term debt financing with dividend commitment is considered optimal for firms facing information asymmetry. On the other hand, long-term debt financing without dividend commitment is preferable in situations with cash flow uncertainties (Goswami et al., 1995). The study also indicated that short-term debt is suitable only when information asymmetry is uniformly distributed. Barclay and Smith (1995) highlighted that average firms have more than 37% long-term debt financing with a maturity of over five years. Their study also revealed that long-term debt

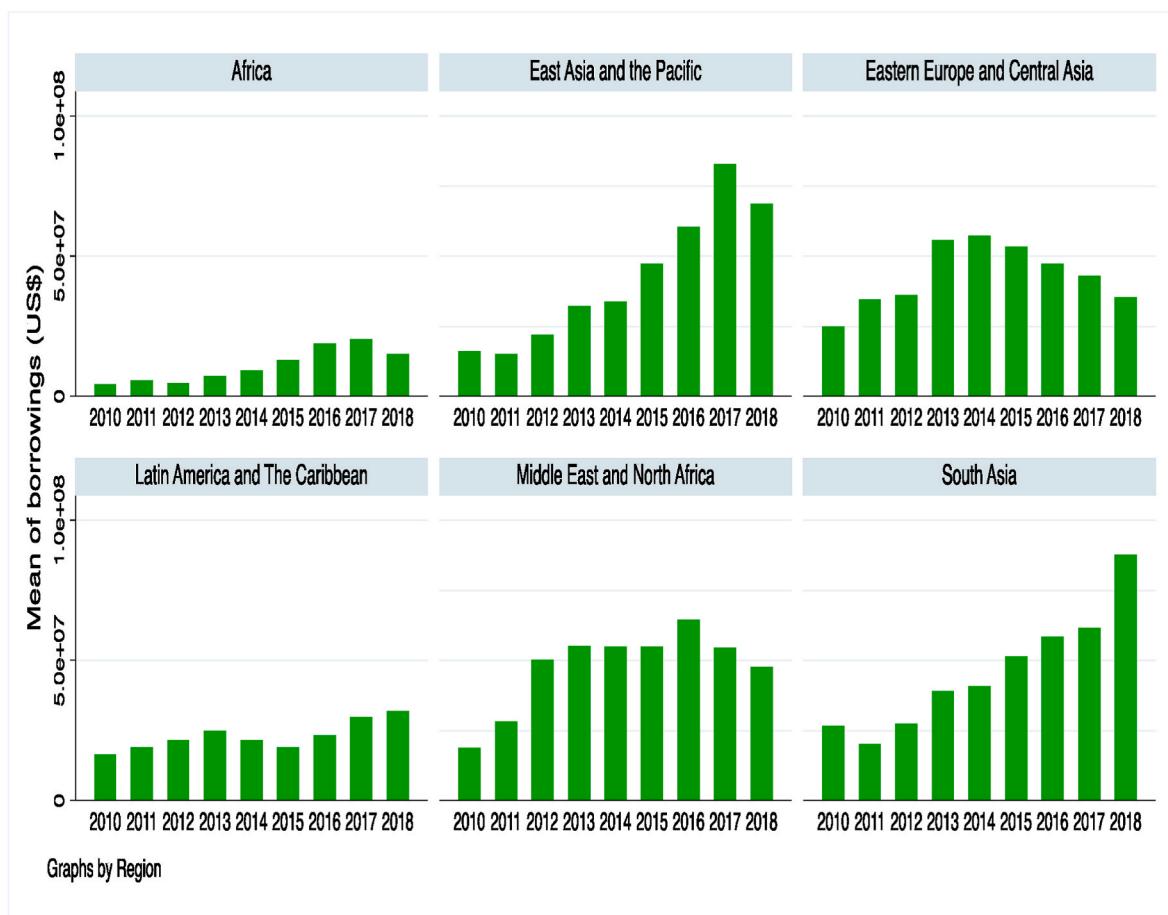


Fig. 2. Trend of the average borrowings in the global microfinance industry.

Source: Authors. The variables were winsorized at 1% and 99% levels to address extreme outliers. The number of MFIs differs each year. Definitions for each of the variables are presented in Table 1.

is preferred over short-term debt, as it helps avoid overpricing. To understand the regional MFIs' usage of various types of debt instruments, we have drawn Figs. 1–5. These figures demonstrate that the usage of different types of debt instruments varies across different regions. Additionally, Fig. 6 shows the trend of female board members in the global microfinance industry.

2.2. Female board member and microfinance

Multiple studies have explored the role of female board members in the microfinance industry. For example, Mersland and Strøm (2009) examined a sample of 278 MFIs from 60 countries between 2000 and 2007 and found that while 73% of borrowers were female, only 23.5% of CEOs were female. This disparity highlights the need to explore the underlying factors affecting female leadership at the board level. In the context of Kenya, Tanzania, and Uganda, Mori et al. (2015) reported that MFIs with a higher percentage of female board members showed greater depth and breadth of outreach. They also identified that female board members had a unique understanding of the needs of female borrowers, resulting in a mission-driven approach to providing improved loan access to women. In a similar tone, Alves et al. (2015) found that boards with more independent and gender-diverse directors increase the freedom and efficiency of the firms. Due to the higher ethical behavior of women, their presence on boards might lead to greater financial disclosure within the organization (Gul et al., 2011). Similarly, Beck et al. (2013) found that women loan officers exhibited distinct lending behavior and outcomes compared to their male counterparts. Women were associated with higher loan approval rates,

suggesting a more inclusive and less biased lending approach. In another study, Adusei and Obeng (2019) established a significant association between board gender diversity and the capital structure of MFIs. Their findings suggest that MFIs with higher levels of gender diversity on their boards tend to have a more balanced and diversified capital structure.

The relationship between female board members and the performance of MFIs is subject to varying findings in the literature. To illustrate, Strøm et al. (2014) reported weaker corporate governance in MFIs with more female board members. Furthermore, Memon et al. (2020) observed that MFIs with a higher number of female board members experience lower financial sustainability but excel in achieving social objectives. The above findings were also corroborated by Hartarska et al. (2014) who reported that women-led MFIs are about 33% less efficient than the MFIs with male leadership. Conversely, Adams and Ferreira (2009) revealed that gender-diverse boards devote more time and effort to monitoring, resulting in better firm performance. Additionally, outreach depth and breadth efficiencies have been positively associated with female leadership and board participation. Considering these contrasting findings, understanding how female leadership affects the debt choices of MFIs would be a valuable addition to the literature on gender diversity in the microfinance context.

3. Hypothesis development

Optimal capital structure is a critical financial decision of firms, but there is no one-size-fits-all approach. It involves finding the right balance between equity and debt to minimize the cost of capital. The board of directors plays a key role in determining this optimal mix, and gender

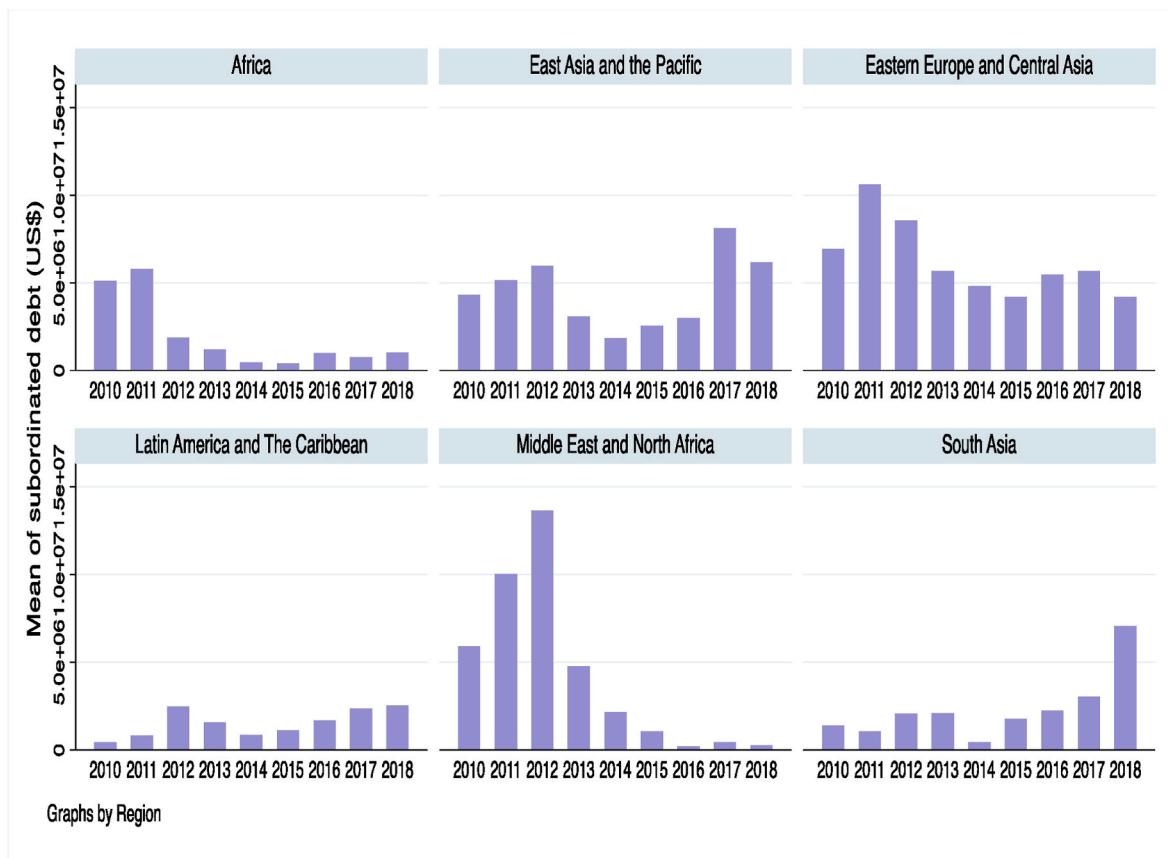


Fig. 3. Trend of the average sub-ordinated debt in the global microfinance industry.

Source: Authors. The variables were winsorized at 1% and 99% levels to address extreme outliers. The number of MFIs differs each year. Definition for each variables are presented in Table 1.

diversity at this level could influence such decisions (Guizani & Abdalkrim, 2021). Gender diversity on boards brings valuable cultural and demographical differences that promote board independence and proper representation of minorities (Carter et al., 2003). Furthermore, female directors and executives can positively influence the management styles and operations of the firms (Provasi & Harasheh, 2021). Datta et al. (2021) indicated that top female executives can help minimize conflicts between managers and shareholders. Moreover, the gender ethics framework suggests that women executives have higher integrity standards than their male counterparts. According to the resource-based theory, female executives are considered valuable resources for firms (Barney, 1996). Therefore, the microfinance industry needs to recognize how women's leadership can translate into better financial decision-making, including the optimal usage of various debt instruments.

As per the pecking order theory, firm managers make optimal decisions regarding internal or external financing to minimize information asymmetry between managers and the public. In addition, the agency theory advanced by Jensen (1986) suggests that debt financing reduces agency costs and helps mitigate conflicts between managers and shareholders. When it comes to debt financing, the selection of long and short-term debt plays a crucial role. Several factors affect the debt maturity structure, including liquidity/refinancing risk, mispricing risk, and problems related to underinvestment and overinvestment (Brockman et al., 2010). Women executives tend to focus less on private benefits and show a preference for sub-optimal long-term debt over short-term debt (Brockman et al., 2010; Datta et al., 2021) due to the reduced agency problems associated with it. Furthermore, Datta et al. (2021) suggest that the presence of women managers leads to a shift towards shorter debt maturities. Also, the biological and psychological

differences between men and women contribute to varying levels of risk aversion (Levin et al., 1988). This finding is supported by García and Herrero (2021), who found a negative association between board gender diversity and capital structure, including leverage and debt maturity.

In addition, gender-diverse boards are often associated with increased monitoring, taking into account other corporate governance aspects of the firm. This was also echoed by Li and Zhang (2019), who observed that boards with more female members use debt as a means of monitoring. However, in the presence of sound governance policies, the monitoring role of debt tends to diminish. This can be explained by the substitution effect, which suggests that higher gender diversity, particularly with more outside female directors, reduces the reliance on debt maturity as a monitoring mechanism (Datta et al., 2021). The study further indicates that female board directors are positively associated with the use of short-term debt. This aligns with Myers' (1984) pecking order theory, where firms prioritize less risky internal financing like short-time financings over riskier external options like long-term debt or equity. This preference is driven by the greater sensitivity of external financing to asymmetric information issues (Myers & Majluf, 1984). Additionally, Huang et al. (2016) suggest that overconfident CEOs tend to favor short-term debt due to perceived mispricing risks in long-term debt. Adusei and Obeng (2019) also argued that board gender diversity, measured by the percentage of female board members, negatively impacts the capital structure of MFIs. This suggests that having more women on boards leads to lower gearing ratios and a reduced likelihood of bankruptcy in these organizations. Based on these arguments, the study advances the following hypothesis.

H1. Female board members in MFIs are negatively associated with the use of various debt instruments.

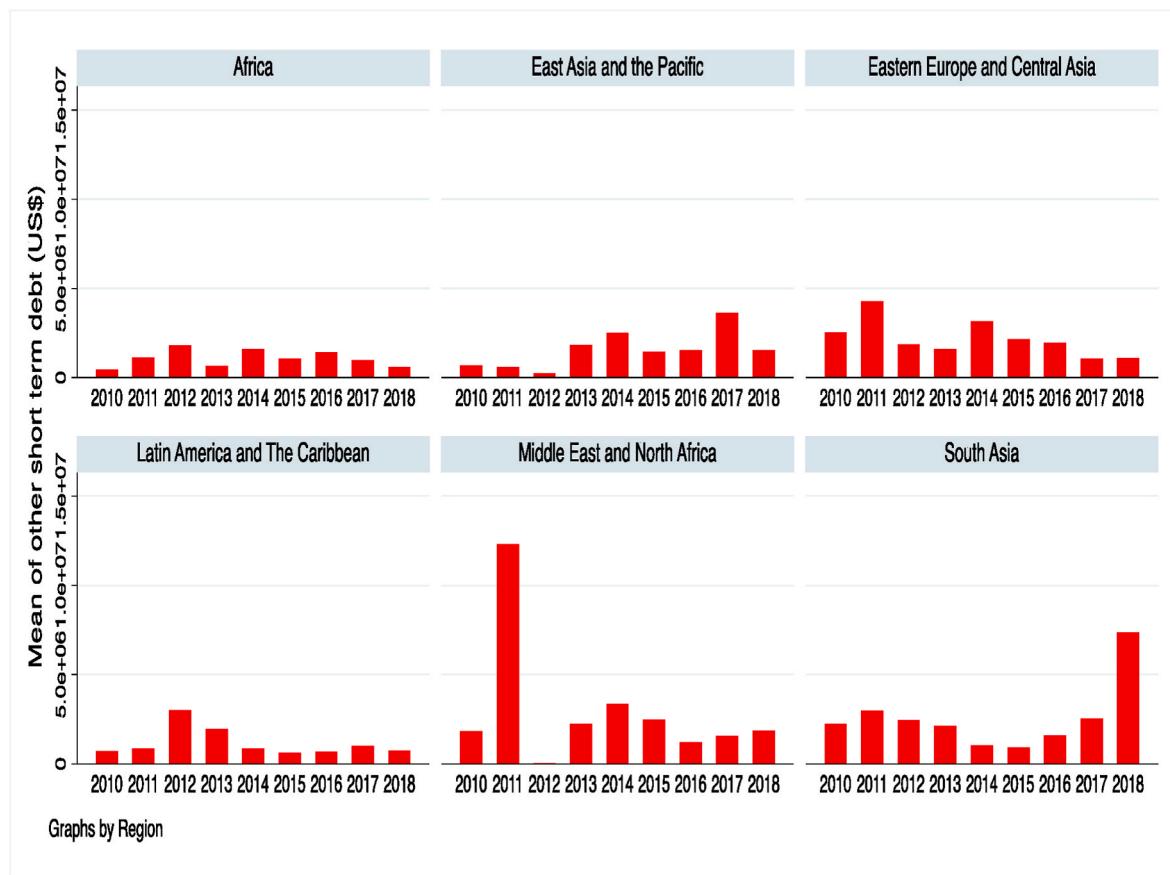


Fig. 4. Trend of the average other short-term debt in the global microfinance industry.

Source: Authors. The variables were winsorized at 1% and 99% levels to address extreme outliers. Definitions for each of the variables are presented in Table 1.

4. Methodology

4.1. Modeling of board gender diversity and the types of debt

Considering our use of unbalanced panel data, we initially derived the static model as below:

$$\begin{aligned}
 Y_{i,j,t} = & \beta_0 + \beta_1 FB_{i,j,t} + \beta_2 LNBOARD_{i,j,t} + \beta_3 OSS_{i,j,t} + \beta_4 PAR30_{i,j,t} \\
 & + \beta_5 LLR_{i,j,t} + \beta_6 LNNFA_{i,j,t} + \beta_7 LS_i + \beta_8 PS_i + \beta_9 INF_{j,t} + \beta_{10} GDPGR_{j,t} \\
 & + \beta_{11} LIR_{j,t} + \beta_{12} EDUF_{j,t} + \beta_{13} FSD_{j,t} + TD + RD + \varepsilon_{i,j,t}
 \end{aligned} \quad (\text{Eq:1})$$

where Y refers to the various types of debt instruments used in this model, such as borrowings (BORG), subordinated debt (SUBD), other short-term financial liabilities (OSD), other liabilities (OL), and total liabilities (TL). Furthermore, $i = 1, 2, 3 \dots, 1670$ refers to the cross-sectional units of MFIs in a country j (93 countries), time period $t = 2010, 2011 \dots, 2018$, and $\varepsilon_{i,j,t}$ is the error term. We also controlled our model by including a regional dummy (RD) and a time dummy (TD).

Apart from the board gender diversity, measured by the proportion of female board members (FB), this study also considered several control variables that may influence the debt structure or the types of debt used by MFIs. One of these variables is overall board size. A larger board is believed to promote transparency and increase the chances of having more independent directors. This, in turn, can contribute to better decision-making (Lassoued, 2018), particularly in determining the appropriate amounts and types of debt for MFI operations. Additionally, the study incorporates the operational self-sufficiency (OSS) of MFIs, which captures how well an MFI can cover its costs through the generation of operating revenues (Hartarska & Nadolnyak, 2007). In other

words, OSS indicates the financial health of MFIs, and a higher OSS means that the MFIs have a stronger financial position to service their existing debt, indicating their ability to handle additional debt financing.

Similarly, the study examined the impact of portfolio at risk over 30 days (PAR>30), a measure of credit risk faced by a firm, on the debt structure of MFIs. Regulatory requirements often mandate that an MFI with a growing portfolio at risk should infuse more equity. Studies have shown that a higher PAR>30 negatively affects the capital structure of MFIs (Adusei, 2019; Chauhan et al., 2020). This indicates that as credit risk increases, MFIs may face challenges in obtaining additional debt financing. The loan loss rate (LLR), which is the ratio of the difference between write-offs and loans recovered to the gross loan portfolio, is another control considered in this study. A higher LLR indicates inefficiency in loan portfolio management and raises concerns about the quality of the loans provided.

The size of MFIs, captured by net fixed assets (NFA), is another control variable. Generally, larger MFIs are considered stable and less volatile in terms of income. They can access long-term debt more easily compared to smaller MFIs. On the other hand, smaller firms may face earnings uncertainty and lack collateral, making it challenging for them to access long-term debt. Consequently, smaller firms may resort to funds from non-regulated sources, which often charge exorbitant interest rates and impose shorter payback periods. Moreover, smaller MFIs may struggle to secure funds from banks and other financial institutions due to their limited creditworthiness.

The study recognizes the importance of the legal status or regulatory structure of MFIs in shaping their capital structure decisions. Regulated MFIs, such as Non-bank Financial Institutions (NBFI), cooperatives, credit unions, rural banks, and commercial banks, are able to raise loans

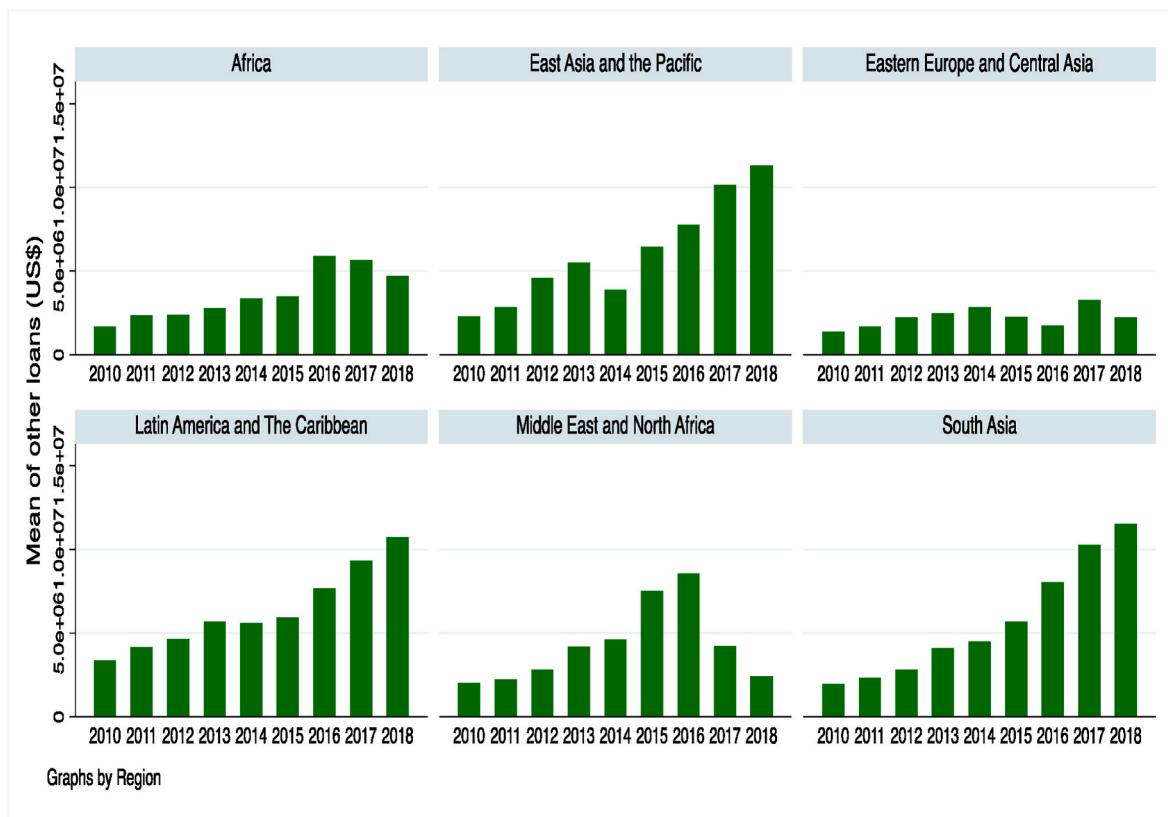


Fig. 5. Trend of average other loans in the global microfinance industry.

Source: Authors. The variables were winsorized at 1% and 99% levels to address extreme outliers. The number of MFIs differs each year. Definition for each variables are presented in [Table 1](#).

from various financial institutions without significant obstacles, while unregulated MFIs like Non-Government Organizations (NGOs) depend mainly on grants, donations, and government subsidies for their funding needs ([Ghose et al., 2018](#)). Financial institutions are subject to several prudential restrictions, including adequate capital requirements. This regulatory oversight ensures that MFIs maintain a certain amount of equity capital and do not exceed a specified level of debt financing, thus ensuring liquidity to support their operations. Therefore, legal status or regulatory structure can affect the capital structure of MFIs. Profit status is another important control variable that affects the short and long-term debt-capacity of a firm. Profit status denotes that MFIs are regulated under financial institution norms, enabling them to raise debt from institutions the or market more easily. Therefore, profit status is expected to have a positive effect on the capital structure of firms ([Chauhan et al., 2022](#)).

To control the country-specific effects, the study considered inflation, GDP growth, lending interest rates, the educational level of females, and financial sector development. Higher inflation rates tend to increase the cost of borrowing, which can reduce the likelihood of raising debt and affect the capital structure of a firm negatively. To measure the economic development/progress of any country, GDP growth was considered. Higher GDP growth rates generally indicate a more stable and growing economy, which can enhance the chances of borrowing from various sources; therefore, a positive association between GDP growth and the capital structure of firms is anticipated in this study.

Since we are examining the relationship between female board members and debt utilization, our model also incorporates the educational attainment of females at the primary level (EDUF) as a control variable. Given that most of the countries included in this study are low- and middle-income countries, using this level of education is more

appropriate than a higher level, as many women in these countries may not have access to higher education opportunities. Additionally, it is important to note that MFIs often rely on borrowing from various formal financial institutions within the country. Therefore, the development of the financial sector can significantly influence the funding availability and overall performance of MFIs ([Mia & Lee, 2017](#); [Vanroose & D'Espallier, 2013](#)). To account for this effect, we also included financial sector development (FSD) as a control variable in our model.

All the dependent variables, along with some of the independent variables (usually variables with larger values) were transformed into their natural logarithmic form to facilitate interpretation and enhance the overall model fitness. Additionally, converting the higher values to a natural log lessens the influence of outliers and makes the residuals approximately homoscedastic. The definition of all the variables, their units, short forms, and expected signs are given below in [Table 1](#).

4.2. Estimation techniques

Equation (1) presents the panel data estimation and can be measured using various methods, including POLS, REM, and FEM. However, due to the presence of time-invariant variables such as legal status and profit status, FEM was deemed unsuitable for our analysis. Therefore, the baseline regressions were reported using the REM, which was statistically preferred over POLS. To account for potential heteroskedasticity in the data, robust standard errors were estimated by clustering at the firm level. Unless specified otherwise, the estimation of Equation (1) also accounts for the year and regional effects. In order to address endogeneity in the data and dynamic relationship, the study employed the GMM ([Arellano & Bover, 1995](#); [Blundell & Bond, 1998](#)). The use of the GMM method also helps to examine the simultaneity bias among the variables. Board gender diversity may significantly influence the level of

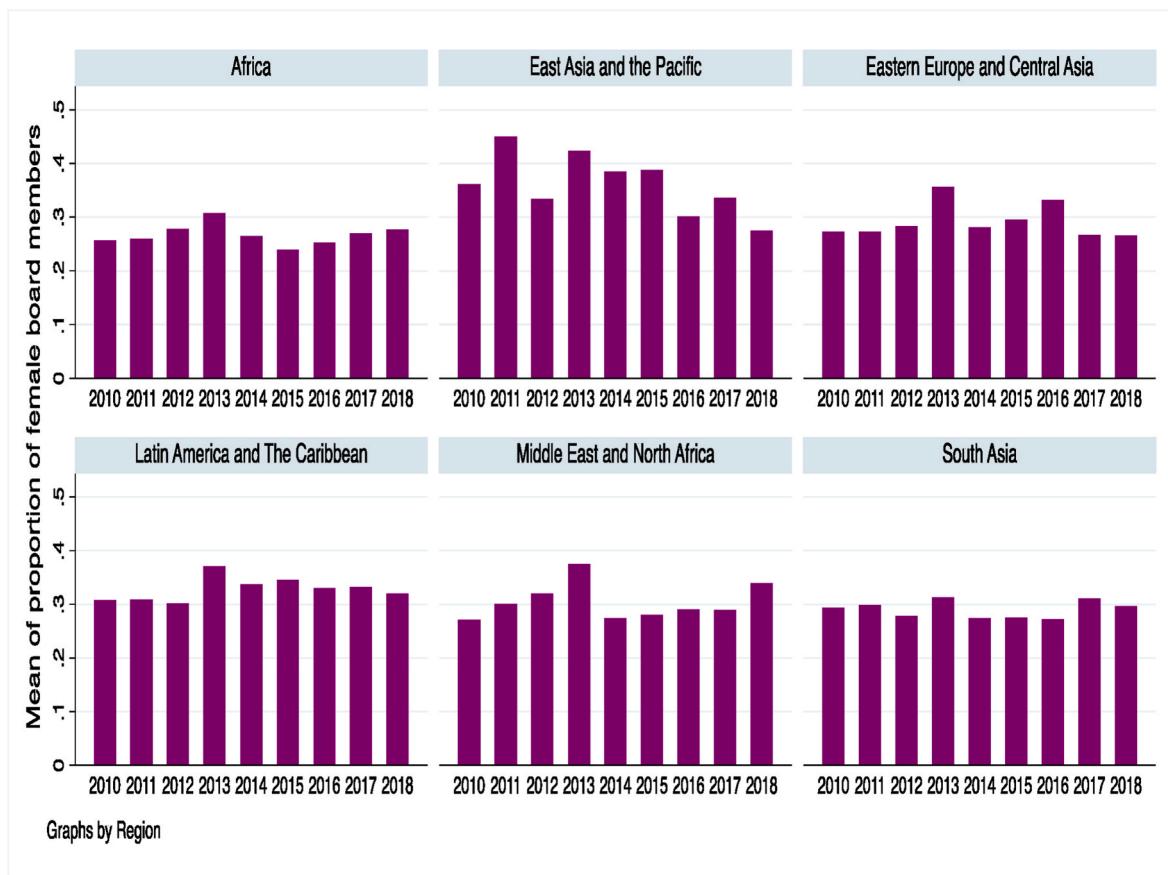


Fig. 6. Proportion of female board members in the global microfinance industry.

Source: Authors. The variables were winsorized at 1% and 99% levels to address extreme outliers. Definitions for each of the variables are presented in Table 1.

debt obtained, as debt financiers might consider gender representation when making funding decisions. Moreover, MFIs have the option to design their board's organizational structure to enhance advisory and control functions. Thus, an association can be expected between board gender diversity and the various types of debts observed in MFIs.

Furthermore, Blundell and Bond (1998) demonstrated that GMM offers higher efficiency by reducing variance and improving estimation accuracy. GMM is particularly suitable when dealing with short-time periods and large samples ($N > T$), dynamic dependent variables, potential correlation between the error term and control variables, and heteroscedasticity in the data (Ahamed & Mallick, 2019; Azmi et al., 2019; Blundell & Bond, 1998). The validity of the instruments used in the GMM estimation was examined using the Hansen (1982) test of over-identification, which tests the null hypothesis of no association between the residual and instrumental variables. In addition, the Arellano-Bond (AR 2) test was used to identify potential second-order serial correlation, with the null hypothesis assuming no second-order autocorrelation in the model.

4.3. Data and sources of data

The MFI data used for this study was obtained from the World Bank Database, which collaborated with the MIX Market to provide global data on MFIs free of charge. Although the dataset covers data from as early as 2000, we observed that data on gender diversity at the board level was only available between 2010 and 2018. Therefore, we selected MFI data covering the period 2010–2018 for our analysis. After cleaning the data for input errors and discarding data of uncategorized legal and profit status, we ended up with a total of 1670 unique MFIs from 93 economies. The inclusion of MFIs and countries in our study was also

determined by the availability of macroeconomic variables used in this study.

It is important to note that the panel data provided by MFIs to the World Bank database is voluntary, and not all MFIs may regularly update their information. This has resulted in unbalanced panel data. We should also highlight that the World Bank's database was last updated in 2019, and there are no plans to collect further data from MFIs. Therefore, despite our desire to use more recent data, 2018 is the latest data available for our analysis. Firm-year and country-wise observations are reported in Appendices A and B, respectively. The macroeconomic variables used in this study were collected from relevant World Bank databases, such as the World Development Indicators.

5. Results and discussion

Table 2 presents the descriptive statistics for the sample used in this study. The average amount of borrowings (BORG) raised by the MFIs was US\$ 21.931 million. It is worth noting some MFIs relied solely on internal capital, such as retained earnings, and had no external borrowings, resulting in minimum observed values of 0 for borrowing. On the other end of the spectrum, the maximum amount of debt funds raised by an MFI was US\$ 396.760 million. For subordinated debt (SUBD), the average value for the sample MFIs was US\$ 2.007 million, with a maximum value of US\$ 51.900 million. The average value for other short-term financial liabilities (OSD), such as overdrafts, amounted to US\$ 1.27 million. The study also accounted for other liabilities (OL), such as payables, employee benefits, other provisions, tax liabilities (current and deferred), and deferred revenue. However, it was observed that some MFIs reported zero values for these liabilities, indicating that they did not have payables, provisions, or deferred

Table 1
Definition of variables.

Variable	Short Form	Definition	Unit	Expected Sign
Dependent				
Borrowings (US\$)	BORR	The principal balance for all funds received through a loan agreement. It may include bonds or similar debt securities issued and credit lines.	Number	
Subordinated Debt(US\$)	SUBD	Debt that ranks after other debts should a company fall into receivership or be closed.	Number	
Other short-term financial liabilities(US\$)	OSD	Financial liabilities of short-term, generally with an initial term of less than one year. This account may include overdrafts or other short-term financing arrangements.	Number	
Other liabilities (US\$)	OL	All other liabilities accounts, including but not limited to trade and other payables, financial liabilities at fair value, provision for employee benefits, other provisions, tax liabilities (current and deferred) and deferred revenue.	Number	
Total Liabilities (US\$)	TL	The total value of present obligations of the financial institution arising from past events, the settlement of which is expected to result in an outflow from the financial institution of resources embodying economic benefits. For calculation purposes, liabilities are the sum of each individual liability account listed.	Number	
Independent				
Female board members	FB	Total female board members divided by the total number of board members.	Ratio	-/+
BLAU Index	BLAU	Defined as, $\frac{1}{n} \sum P_i^2$ where P_i is the proportion of group members in each of the i categories and the value of $n=2$ (men and women).	Number	-/+
Controls				
Board Members	BM	The number of members that comprise the board of directors.	Number	+/-
Operational Self-Sufficiency	OSS	Financial Revenue/(Financial Expense + Net Impairment Loss + Operating Expense)	Ratio	+
Portfolio at risk >30 days	PAR30	Outstanding balance, portfolio overdue >30 Days + renegotiated portfolio/Gross Loan Portfolio	Ratio	-
Loan Loss Rate	LLR	(Write-offs - Value of Loans Recovered)/Average Gross Loan Portfolio	Ratio	-
Net Fixed Assets (US\$)	NFA	Tangible assets that are held by an enterprise for use in the production or supply of goods or services or for administrative purposes and are expected to be used during more than one period, net of accumulated depreciation.	Number	+
Legal Status	LS	If the MFI is registered as an NGO, it gets the value 1, 0 otherwise	Dummy	-
Profit Status	PS	If the MFI is profit-oriented, it gets the value 1, 0 otherwise.	Dummy	+
Inflation	INF	Inflation as measured by the annual growth rate of the GDP implicit deflator shows the rate of price change in the economy.	Percentage	+
GDP Growth	GDPGR	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2015 prices, expressed in U.S. dollars.	Percentage	+
Lending Interest Rate	LIR	The lending rate is the bank rate that usually meets the short- and medium-term financing needs of the private sector.	Percentage	-
Educational Attainment	EDUF	Primary education, pupils (% female)	Percentage	-
Financial Sector Development	FSD	Domestic credit to private sector (% of GDP)	Percentage	+

Source: Authors compilation from the world bank field definitions.

revenues. The maximum value of ‘other liabilities’ (OL) among the sample MFIs was US\$ 18,433 million. Furthermore, Table 2 shows that the representation of females on the MFIs’ board of directors was relatively low globally. On average, there were only three female members on a ten-member board, suggesting male dominance in the decision-making body (Board of Directors) of MFIs. However, the sample also revealed scattered instances of MFIs that are fully owned and managed by female directors.

Although the sample MFIs’ average board size ranged from seven to eight members, the data also revealed that some MFIs operate without a board. The size of the board is influenced by various factors, such as firm characteristics, monitoring costs, and organizational complexity (Nguyen et al., 2021). The average value of OSS was above one, indicating that the sample MFIs were self-sufficient and capable of covering their operational expenses. However, the sample MFIs faced a concerning PAR 30 level of 7 %. Such a high percentage can have adverse effects on their financial performance and capital structure. On a more positive note, the sample MFIs had a relatively low loan loss rate (LLR)¹ of 2%. With respect to the legal status, approximately 69 % of the MFIs in the sample were registered as non-NGOs, as opposed to 49 % registered as for-profit organizations. The average bank lending interest rate (LIR) for the sample MFIs was 13.549%.

Table 3 reports the correlation matrix (Pearson Pairwise correlation) among the selected independent variables. The analysis shows that the correlations between the variables of interest were not high enough to

cause issues of multicollinearity.

5.1. Baseline results

The results of Eq (1) are presented in Table 4. To account for missing data for macroeconomic variables, we introduced the main variables and control variables separately in the regression. This approach allows us to examine if the results change due to differences in the sample size. However, the main results reported in Table 4 were based on the REM, suggested by the Lagrangian Multiplier Test, and are discussed accordingly. Furthermore, unlike previous studies that focused on specific debt components, the study used a unique and comprehensive set of liabilities, which are rarely considered in the literature. These include borrowings (LNBORR), subordinated debt (LNSUBD), other short-term debt (LNOSD), and other loans (LNOL).

Table 4 shows a negative and statistically significant (except for subordinated debt and Model-9) association between female board representation and the different types of liabilities of MFIs. This suggests that female board members tend to be risk-averse and prefer lower levels of debt in the capital structure of MFIs. These observations align with the pecking order theory, which suggests that the presence of women on corporate boards influences capital structure decisions. Accordingly, MFIs with gender-diverse boards consider low-cost and risk-free securities (retained earnings) as their first choice of financing, followed by external debt. This negative association is consistent with the findings of Adusei and Obeng (2019). Furthermore, it was observed that information asymmetry influences the relationship between MFIs and the capital market. As per Myers (1984), firms may prefer equity over debt as a source of financing if there is less information asymmetry between them

¹ The percentage of loans that are bad in nature and are facing non-repayments.

Table 2
Descriptive statistics.

Variable	Obs.	Mean	Std. Dev.	Min	Max
BORR (Million US\$)	7168	24.865	61.289	0.000	396.760
LNBORR	6637	15.268	2.240	2.079	19.799
SUBD (Million US\$)	3954	2.207	7.881	0.000	51.900
LNSUBD	1049	14.493	2.084	4.771	17.765
OSD (Million US\$)	4311	1.402	5.223	0.000	36.114
LNOSD	1878	12.608	2.749	0.693	17.402
OL (Million US\$)	7054	4.807	14.230	0.000	101.224
LNOL	6916	13.139	2.420	2.398	18.433
TL (Million US\$)	7428	87.918	244.512	0.008	1613.722
LNTL	7428	16.006	2.390	8.944	21.202
FB	4907	0.305	0.244	0.000	1.000
BLAU	4907	0.305	0.176	0.000	0.500
BM	5328	8.052	9.989	0.000	99.000
LNBM	5276	1.878	0.576	0.000	4.595
WOSS	7150	1.157	0.317	0.133	2.869
PAR30	6517	0.070	0.102	0.000	0.657
LLR	6364	0.018	0.038	-0.043	0.231
LS	8074	0.315	0.464	0.000	1.000
PS	8074	0.492	0.500	0.000	1.000
NFA (Million US\$)	7312	2.638	6.640	0.000	43.120
LNNFA	7261	12.852	2.200	4.111	17.579
INF	8074	6.123	5.750	-3.170	33.541
GDPGR	8074	4.801	2.666	-3.900	13.900
LIR	6758	13.327	8.066	3.552	50.808
EDUF	6878	48.410	1.506	43.997	52.253
FSD	7717	36.567	18.203	5.414	99.574

Source: Authors. Note: For ease of interpretation, absolute values for the types of debt and NFA were converted to million US\$. However, absolute numbers for debt instruments and NFA were used when converted to natural logarithms. We have also reported absolute values for variables that were transformed to natural log. LNBORR is the natural logarithm of total borrowings. LNBM is the natural logarithm of board members, LNTL is the natural log of total loans, and LNNFA is the natural log of net fixed assets. For the rest of the variable definitions, please see Table 1.

and the capital market. Research has shown that the presence of females on boards increases the level of public disclosures of firms, thus reducing information asymmetry and encouraging market efficiencies (Ahmed et al., 2017). Therefore, the study highlights the role of diverse boards in influencing financing choices, particularly capital structure and debt maturity.

Our findings diverge from prior research suggesting a positive association between female board members and MFI debt utilization (Amin et al., 2022; Chang et al., 2023; La Rocca et al., 2020; Li & Zhang, 2019). We observed a negative association between female board representation and various debt instruments. This contrast can be explained by considering the unique risk-averse nature of most MFI executives, as noted by Brockman et al. (2010). Lower debt levels align with their preference for reduced external monitoring and mitigate the potential for financial stress. Furthermore, the challenging environment faced by MFIs serving marginalized individuals adds another layer of complexity. Balancing outreach goals with debt-induced risks necessitates a cautious approach to financing. Diverse boards, with their broader perspectives and experiences, can effectively navigate these complexities by advocating for a less risky, cost-effective capital structure that prioritizes the needs of disadvantaged groups.

For control variables in Model 2, credit risk (PAR 30) exhibited a negative and statistically significant relationship with borrowings, suggesting that firms facing higher credit risk tend to borrow less. However, for LNUSUBD, the coefficient of PAR 30 was positive and significant, implying that firms with higher credit risk are more likely to raise funds through subordinated debt. Regarding the relationship between legal status and borrowings, while it was not consistently significant in some models, there was evidence that the transformation of MFIs from NGOs to NBFIs tends to raise their appetite for debt capital. This suggests that the commercialization of MFIs may lead to improved financial performance, enabling them to access external debts more readily. This

Table 3
Variance Inflation Factors (VIF) and Pearson pairwise correlation.

	VIF	FB	BLAU	LNBM	OSS	PAR30	LIR	LS	PS	LNNFA	INF	GDPGR	LIR	EDUF	FSD
FB	1.310	1.000													
BLAU	1.270	0.427***	1.000												
LNBM	1.220	0.004	0.173***	1.000											
OSS	1.050	-0.006	-0.043***	-0.038***	1.000										
PAR30	1.080	0.002	-0.048***	-0.051***	-0.203***	1.000									
LLR	1.090	-0.043***	-0.034***	-0.056***	-0.174***	-0.190***	1.000								
LS	1.860	0.156***	0.110***	0.013	0.018	-0.063***	-0.053***	1.000							
PS	1.880	-0.224***	-0.137***	-0.143***	0.010	0.011	0.143***	-0.630***	1.000						
LNNAFA	1.260	-0.114***	0.035***	0.327***	-0.026	-0.012	0.046***	-0.230***	0.124***	1.000					
INF	1.200	-0.033**	-0.073***	-0.103***	-0.086***	-0.035***	-0.045***	0.003	0.090***	-0.180***	1.000				
GDPGR	1.210	-0.008	-0.031**	0.047***	0.088***	-0.097***	-0.159***	0.029***	0.039***	-0.088***	0.070***	1.000			
LIR	1.260	-0.094***	-0.082***	-0.164***	0.046***	0.033***	0.087***	-0.037***	-0.067***	-0.010	0.279***	-0.146***	1.000		
EDUF	1.200	0.020	0.027*	0.056***	-0.026**	-0.086***	-0.027***	-0.007	-0.051***	0.043***	0.03	-0.015	0.079***	-0.009	1.000
FSD	1.300	0.037***	-0.009	-0.074***	0.051***	-0.148***	-0.057***	0.008	-0.113***	-0.045***	0.008	-0.239***	-0.065***	-0.021***	1.000

Source: Authors. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. We used the proportion of female borrowers (FB) natural logarithm of board members (LNBM), operational-self-sufficiency (OSS), portfolio at risk over 30 days (PAR 30), loan loss ratio (LLR), legal status (LS), profit status (PS), natural logarithm of net fixed assets (LNNFA), inflation (INF), GDP growth (GDPGR), lending interest rates (LIR), level of female education (EDUF) and financial sector development (FSD). For a detailed definition of the variables, please see Table 1.

Table 4

Baseline estimation results by Random Effects Model (REM).

	Model-(1)	Model-(2)	Model-(3)	Model-(4)	Model-(5)	Model-(6)	Model-(7)	Model-(8)	Model-(9)	Model-(10)	Model-(11)	Model-(12)
	DV=LNBORR	DV=LNSUBD	DV=LNSUBD	DV=LNOSD	DV=LNOSD	DV=LNOSD	DV=LNOL	DV=LNOL	DV=LNOL	DV=LNOL	DV=LNOL	DV=LNOL
FB	-0.334*** (0.122)	-0.245** (0.115)	-0.272** (0.132)	-0.822** (0.383)	-0.536* (0.299)	-0.571* (0.318)	-1.054** (0.416)	-0.498 (0.407)	-0.390 (0.500)	-0.553*** (0.151)	-0.347** (0.142)	-0.533*** (0.177)
LNB M		-0.031 (0.060)	0.015 (0.079)		0.207 (0.137)	0.252 (0.185)		-0.085 (0.174)	-0.069 (0.231)		0.100 (0.068)	0.086 (0.095)
OSS	0.073 (0.125)	0.079 (0.158)		0.385* (0.232)	0.389 (0.252)		0.324 (0.282)	0.440 (0.349)		0.489** (0.190)	0.302** (0.136)	
PAR30		-0.670** (0.317)	-0.126 (0.365)		2.027*** (0.642)	2.085** (1.061)		-0.509 (1.088)	-1.588 (1.405)		-0.739** (0.363)	-0.305 (0.388)
LLR	0.121 (0.715)	0.983 (0.948)		0.955 (1.864)	0.352 (2.592)			-2.047 (2.643)	-2.183 (3.210)		0.644 (0.850)	0.128 (1.091)
LS	0.109 (0.127)	0.028 (0.149)		-0.085 (0.314)	-0.164 (0.401)		0.426 (0.287)	0.331 (0.339)		-0.277** (0.119)	-0.361** (0.152)	
PS	0.846*** (0.128)	0.708*** (0.143)		0.610** (0.260)	0.633** (0.303)		1.094*** (0.267)	0.850*** (0.305)		0.565*** (0.110)	0.531*** (0.143)	
LNNFA	0.519*** (0.034)	0.528*** (0.044)		0.556*** (0.102)	0.597*** (0.118)		0.596*** (0.056)	0.624*** (0.070)		0.646*** (0.030)	0.656*** (0.040)	
INF		-0.013** (0.006)			-0.021 (0.013)			0.028* (0.015)			-0.014 (0.008)	
GDPGR		0.023** (0.010)			0.038 (0.026)			0.054 (0.041)			0.014 (0.013)	
LIR		-0.010 (0.007)			0.028* (0.015)			0.006 (0.014)			0.009 (0.006)	
EDUF		0.101*** (0.035)			-0.080 (0.093)			-0.021 (0.072)			0.102*** (0.034)	
FSD		0.009*** (0.003)			0.029** (0.012)			0.015* (0.009)			0.003 (0.004)	
T. D	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
R. D	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
CONS	15.189*** (0.122)	8.690*** (0.471)	3.514* (1.845)	13.253*** (0.330)	5.321*** (1.138)	7.113* (4.061)	12.038*** (0.339)	3.683*** (0.837)	3.037 (3.364) (0.144)	12.464*** (0.454)	4.031*** (0.454)	-0.961 (1.658)
Observations	4300	3753	2392	740	682	464	1241	1040	704	4414	3827	2433
Chi ²	245.006***	757.844***	580.780***	32.368***	245.334***	190.371***	64.716***	279.672***	231.080***	265.714***	1116.800***	814.715***
R ²	0.086	0.543	0.558	0.098	0.563	0.582	0.074	0.359	0.361	0.085	0.610	0.618
# of MFIs	1097	989	744	281	263	192	570	489	364	1162	1036	773

Source: Authors. Standard errors were computed using heteroskedasticity-robust standard errors clustered for firms and are presented in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. BPLM: Breusch and Pagan Lagrangian Multiplier Test. We used the natural logarithm of borrowings (LNBORR), subordinated debt (LNSUBD), other short-term debt (LNOSD), and other loans (LNOL) as the main dependent variables. Then, the proportion of female borrowers (FB) serves as a proxy of board gender diversity and main independent variable of interest in this study, and we included natural logarithm of board members (LNB M), operational-self-sufficiency (OSS), portfolio at risk over 30 days (PAR 30), loan loss ratio (LLR), legal status (LS), profit status (PS), natural logarithm of net fixed assets (LNNFA), inflation (INF), GDP growth (GDPGR), lending interest rates (LIR), level of female education (EDUF), financial sector development (FSD), T. D=Time dummies and R. D= Regional dummies as control variables. We did not include the coefficients of time dummies and regional dummies to conserve space. The results for POLS and FEM are included in the Appendix C. The BPLM test supports that REM is better than POLS.

Table 5

Additional proxy of the dependent variable, total liabilities (TL), REM, POLS & FEM.

	Model- (13)	Model- (14)	Model- (15)	Model- (16)	Model-(17)
	DV=LNTL	REM		POLS	FEM
FB	-0.208** (0.096)	-0.135 (0.090)	-0.243** (0.105)	-0.484*** (0.094)	-0.076 (0.122)
LNBM		0.169*** (0.046)	0.201*** (0.061)	0.130*** (0.047)	0.204*** (0.071)
OSS		0.160* (0.088)	0.274** (0.110)	0.156 (0.104)	0.239* (0.127)
PAR30		-0.441* (0.235)	-0.009 (0.257)	-0.733** (0.318)	0.286 (0.317)
LLR		0.021 (0.549)	0.127 (0.730)	-0.416 (0.996)	0.307 (0.763)
LS		-0.725*** (0.104)	-0.516*** (0.121)	-0.390*** (0.066)	—
PS		0.400*** (0.099)	0.554*** (0.117)	0.533*** (0.061)	—
LNNFA		0.573*** (0.033)	0.595*** (0.043)	0.812*** (0.014)	0.372*** (0.083)
INF			-0.016*** (0.004)	-0.003 (0.006)	-0.017*** (0.005)
GDPGR			0.022*** (0.008)	0.032*** (0.010)	0.024*** (0.008)
LIR			-0.006 (0.005)	-0.000 (0.003)	-0.015 (0.009)
EDUF			0.060** (0.030)	-0.014 (0.016)	0.095* (0.049)
FSD			0.004 (0.003)	0.012*** (0.002)	0.001 (0.005)
T. D	yes	yes	yes	yes	yes
R. D	yes	yes	yes	yes	No
CONS	15.539*** (0.121)	8.548*** (0.441)	4.939*** (1.643)	5.819*** (0.755)	5.934** (2.869)
Observations	4704	4034	2556	2556	2556
Chi ² /F Stat	367.678***	1249.657***	1144.419***	272.241***	19.595***
BPLM Test			1886.2400***		
Hausman Test					285.6900***
R ²	0.059	0.709	0.720	0.737	0.378
# of MFIs	1218	1070	797		797

Source: Authors. Standard errors were computed using heteroskedasticity-robust standard errors clustered for firms and are presented in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Note: BPLM: Breusch and Pagan Lagrangian Multiplier Test. We used the natural logarithm of total loans (LNTL) as the main dependent variable. Then, the proportion of female borrowers (FB) was used as a proxy of board gender diversity and the main independent variable in this study. We have further used the natural logarithm of board members (LNBM), operational-self-sufficiency (OSS), portfolio at risk over 30 days (PAR 30), loan loss ratio (LLR), legal status (LS), profit status (PS), natural logarithm of net fixed assets (LNNFA), inflation (INF), GDP growth (GDPGR), lending interest rates (LIR), level of female education (EDUF), financial sector development (FSD), T. D=Time dummies and R. D= Regional dummies as control variables. We did not include the coefficients of time dummies and regional dummies to conserve space. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

observation aligns with the observed positive and significant association between the MFIs' profit status and borrowings, further supported by [Adusei and Obeng \(2019\)](#) who noted that profitable MFIs are better positioned to access debt financing.

[Table 4](#) further shows that profit status (PS) had a positive and statistically significant association with various debt types, such as borrowings, subordinated debt, and other short-term liabilities. This means that profit-oriented MFIs rely more on different types of debt compared to their non-profit counterparts (Models 1–12). Moreover, there was a positive and significant association between the net fixed assets of MFIs (indicative of firm size) and debt (e.g., borrowings, subordinated debt, and other short-term debts) across all models in [Table 4](#). Larger firms with higher net fixed assets can offer more collateral, increasing their ability to secure debt from various financial institutions. The presence of collateral, represented by net fixed assets, also helps to reduce information asymmetry ([Berger et al., 2011](#)), leading to fewer adverse selection problems for lenders ([Almeida & Campello, 2007](#)). Additionally, the coefficient for the inflation variable was negative and significant, but only for borrowings and subordinated debt (Models 3–6). Higher inflation is usually associated with higher lending rates, making borrowings costlier for MFIs. We also found that overall, financial sector development had a positive effect on the usage of various debt instruments by MFIs. This indicates that the development of the financial sector enhances the availability and accessibility of different types of debt funding, making it more affordable and convenient for MFIs to secure funds for their operations.

To address potential heteroscedasticity and serial/autocorrelation issues, we employed the Generalized Least Squares (GLS) estimation method. The results are reported in [Appendix C](#). Consistent with our findings in [Table 4](#), the GLS analysis revealed a negative effect of female board members on all debt instruments used in the analysis. However, the statistical significance of these effects varies slightly across models (see [Appendix C](#), Models 46–49).

5.2. Robustness/additional tests

To ensure that our results are robust and reliable, we performed a comprehensive set of tests. Specifically, we examined whether our results remained consistent when considering (1) changes in the proxy of debt types, (2) changes in the proxy of board gender diversity measures, (3) sub-sample analysis by country category based on income, (4) changes in the methodology, and (5) changes in the observations.

First, instead of using different types of debts, we utilized total liabilities (TL) in Eq (1) and re-estimated the model as follows.

$$\begin{aligned} \text{LNTL}_{i,j,t} = & \beta_0 + \beta_1 \text{FB}_{i,j,t} + \beta_2 \text{LNBOARD}_{i,j,t} + \beta_3 \text{OSS}_{i,j,t} + \beta_4 \text{PAR30}_{i,j,t} \\ & + \beta_5 \text{LLR}_{i,j,t} + \beta_6 \text{LNNFA}_{i,j,t} + \beta_7 \text{LS}_i + \beta_8 \text{PS}_i + \beta_9 \text{INF}_{j,t} + \beta_{10} \text{GDPGR}_{j,t} \\ & + \beta_{11} \text{LIR}_{j,t} + \beta_{12} \text{EDUF}_{j,t} + \beta_{13} \text{FSD}_{j,t} + \text{TD} + \text{RD} + \varepsilon_{i,j,t} \end{aligned} \quad (\text{Eq:2})$$

Again, our findings revealed a negative effect of board gender diversity on total liabilities across the REM, POLS, and FEM models. However, the level of statistical significance varies among the estimated models ([Table 5](#), Models 13–17). Furthermore, we observed a positive and significant association between board size and total liabilities across Models (13–17), suggesting that firms with a larger board size are likely to raise a greater amount of debt as part of their financing to support their operational activities. Firms with a larger board size are expected to have effective monitoring and rigorous oversight over managerial actions, thus enhancing firm value ([Feng et al., 2020](#)). Besides, larger boards may provide greater network opportunities, facilitating easier access to external debt ([Zaid et al., 2020](#)).

Second, we changed the proxy for female board members to the BLAU Index and re-estimated the following model using the REM

Table 6
Additional proxy of board gender diversity (BLAU), REM.

	Model- (18) DV=LNBORR	Model- (19) DV=LNSUBDEBT	Model- (20) DV=LNOSD	Model- (21) DV=LNOL
BLAU	-0.292 (0.182)	-0.648 (0.442)	-0.874 (0.560)	-0.367** (0.185)
LNBM	0.044 (0.081)	0.357* (0.212)	-0.007 (0.223)	0.129 (0.092)
OSS	0.076 (0.158)	0.365 (0.248)	0.423 (0.347)	0.299** (0.135)
PAR30	-0.169 (0.357)	1.840* (1.019)	-1.701 (1.406)	-0.357 (0.392)
LLR	0.967 (0.949)	0.275 (2.530)	-2.110 (3.219)	0.135 (1.092)
LS	0.038 (0.150)	-0.124 (0.411)	0.403 (0.334)	-0.351** (0.155)
PS	0.734*** (0.143)	0.699** (0.315)	0.901*** (0.288)	0.583*** (0.143)
LNNFA	0.526*** (0.044)	0.591*** (0.121)	0.621*** (0.070)	0.655*** (0.040)
INF	-0.013** (0.006)	-0.022 (0.013)	0.029** (0.015)	-0.013 (0.008)
GDPGR	0.023** (0.010)	0.034 (0.026)	0.053 (0.041)	0.014 (0.013)
LIR	-0.009 (0.007)	0.028* (0.015)	0.006 (0.014)	0.010* (0.006)
EDUF	0.102*** (0.035)	-0.076 (0.093)	-0.013 (0.073)	0.103*** (0.034)
FSD	0.009** (0.003)	0.027** (0.012)	0.016* (0.009)	0.003 (0.004)
T. D	yes	yes	yes	yes
R. D	yes	yes	yes	yes
Cons	3.436* (1.841)	6.904* (4.104)	2.680 (3.384)	-1.115 (1.665)
Observations	2392	464	704	2433
Chi ²	565.147***	192.142***	227.967***	802.810***
R ²	0.555	0.582	0.363	0.614
# of MFIs	744	192	364	773

Note:

Source: Authors. Standard errors were computed using heteroskedasticity-robust standard errors clustered for firms and are presented in parentheses. We used the natural logarithm of borrowings (LNBORR), subordinated debt (LNSUBD), other short-term debt (LNOSD), and other loans (LNOL) as the main dependent variables. Then, the BLAU index was used as a proxy of board gender diversity and the main independent variable of interest. We have further used natural logarithm of board members (LNBM), operational-self-sufficiency (OSS), portfolio at risk over 30 days (PAR 30), loan loss ratio (LLR), legal status (LS), profit status (PS), natural logarithm of net fixed assets (LNNFA), inflation (INF), GDP growth (GDPGR), lending interest rates (LIR), level of female education (EDUF), financial sector development (FSD), T. D=Time dummies and R. D=Regional dummies as control variables. We did not include the coefficients of time dummies and regional dummies to conserve space. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

$$\text{LNTL}_{i,j,t} = \beta_0 + \beta_1 \text{BLAU}_{i,j,t} + \beta_2 \text{LNBOARD}_{i,j,t} + \beta_3 \text{OSS}_{i,j,t} + \beta_4 \text{PAR30}_{i,j,t} + \beta_5 \text{LLR}_{i,j,t} + \beta_6 \text{LNNFA}_{i,j,t} + \beta_7 \text{LS}_i + \beta_8 \text{PS}_i + \beta_9 \text{INF}_{i,t} + \beta_{10} \text{GDPGR}_{i,t} + \beta_{11} \text{LIR}_{i,t} + \beta_{12} \text{EDUF}_{i,t} + \beta_{13} \text{FSD}_{i,t} + \text{TD} + \text{RD} + \varepsilon_{i,j,t} \quad (\text{Eq:3})$$

The result once again confirmed a negative relationship between higher board gender and various types of debt instruments (Table 6, Models 18–21). However, the negative association was statistically significant only for ‘other short-term debt’ (Model-20). This finding suggests that boards with higher gender diversity are more likely to prefer short-term debt, as this form of debt offers firms greater financial flexibility to navigate unexpected changes and seize opportunities (Francis et al., 2013; Huang & Kisgen, 2013; La Rocca et al., 2020). Additionally, short-term debt can help address agency problems related to free cash flows. The need for frequent debt contract renewals in short-term debt induces external market participants to closely monitor firms, thus limiting managers’ discretion over cash flows (Jensen, 1986).

Third, we categorized the sampled countries into two groups as per the World Bank classification based on the GNI per capita (Atlas method-current US\$) for the reference year 2015.² Countries with GNI per capita below US\$ 4125 were considered lower-income countries, while those above were classified as middle-income countries.³ The results are reported in Table 7. Interestingly, we observed that the proportion of female board members had a negative effect on all types of debt instruments used by MFIs in middle-income countries. However, these results were statistically significant only for borrowings and other loans (see Table 7, Models 22 & 25). This suggests that the impact of board gender diversity may vary depending on the economic conditions of the countries included in the analysis. Conversely, in lower-income countries, the impacts of female board members on debt instruments were mixed and statistically insignificant. This implies that the behavior and attitudes of female board members differ based on the specific country context. Therefore, the overall results reported in the baseline regression might be influenced by the inclusion of countries with better economic conditions, where gender diversity in boardrooms is more valued and prevalent.

Fourth, to ensure the robustness of our findings and address potential endogeneity issues, we employed a two-step System Generalized Method of Moments (SGMM), and estimated the following model.

$$\begin{aligned} Y_{i,j,t} = & \beta_0 + \beta_1 Y_{i,j,t-1} + \beta_2 \text{FB}_{i,j,t} + \beta_3 \text{LNBOARD}_{i,j,t} + \beta_4 \text{OSS}_{i,j,t} \\ & + \beta_5 \text{PAR30}_{i,j,t} + \beta_6 \text{LLR}_{i,j,t} + \beta_7 \text{LNNFA}_{i,j,t} + \beta_8 \text{LS}_i + \beta_9 \text{PS}_i + \beta_{10} \text{INF}_{i,t} \\ & + \beta_{11} \text{GDPGR}_{i,t} + \beta_{12} \text{LIR}_{i,t} + \beta_{13} \text{EDUF}_{i,t} + \beta_{14} \text{FSD}_{i,t} + \text{TD} + \text{RD} + \varepsilon_{i,j,t} \end{aligned} \quad (\text{Eq:4})$$

The results are reported in Table 8. Following the methodology outlined by Roodman (2009a,b), we used Stata to execute the GMM estimation and calculated robust sample-corrected standard errors as proposed by Windmeijer (2005). The models passed all the diagnostic tests: the validity of the instruments was verified by the Hansen (1982) test and the presence of second-order autocorrelation in differenced residuals was confirmed by the Arellano and Bond (1991) test. The number of instruments used in estimating the models was lower than the number of groups/MFIs. It is important to note that all organizational-level characteristics of MFIs were treated as endogenous variables except for time-invariant variables (e.g., LS and PS). This decision was based on the likelihood of reverse causality in most of the organizational-level characteristics (Kar, 2013; Mersland & Strøm, 2010). In contrast, the macroeconomic variables, including the year effect, were treated as exogenous. This is because macroeconomic factors are generally more likely to influence the organizational characteristics of MFIs than vice versa.

Moreover, the Hansen J test p-value was higher than 0.10, further confirming the validity of the instruments used in our study. The statistical significance of the lag variables also indicates the existence of a dynamic relationship in the model. Consistent with our previous findings, the results of the SGMM estimation validated the negative effect of board gender diversity on the various types of debt, except for subordinated debt. However, the statistical significance of these effects varied depending on the types of debt instruments used in the analysis. For example, we observed a statistically significant negative effect of board gender diversity on other loans (LNOL) of MFIs in the dynamic model

² For simplicity of the analysis, we arbitrarily used 2015 GNI per capita classification of the World Bank as the reference year to classify the sample into two groups.

³ During our analysis, we found that only a few countries exceeded the middle-income thresholds of GNI per capita; therefore, they were treated as middle-income countries. Since dropping these high-income countries from the sample did not significantly affect the outcomes, we did not include them in the report to conserve space. However, for interested parties, the results can be requested from the corresponding author.

Table 7

Sub-sample analysis by different country category based on GNI Per capita (REM).

	Model- (22)	Model- (23)	Model- (24)	Model- (25)	Model- (26)	Model- (27)	Model- (28)	Model- (29)
	Countries with GNI Per Capita > US\$ 4125				Countries with GNI Per Capita < US\$ 4125			
	LNBORR	LNSUBDEBT	LNOSD	LNOL	LNBORR	LNSUBDEBT	LNOSD	LNOL
FB	-0.478*** (0.169)	-0.334 (0.346)	-0.281 (0.585)	-0.623*** (0.228)	0.178 (0.201)	-0.657 (0.785)	-0.805 (1.075)	-0.265 (0.267)
LNBM	0.022 (0.109)	0.359 (0.238)	0.030 (0.294)	0.075 (0.134)	0.046 (0.104)	0.233 (0.333)	-0.305 (0.337)	0.144 (0.123)
OSS	0.065 (0.184)	0.251 (0.304)	0.852** (0.421)	0.306* (0.165)	0.162 (0.264)	1.350** (0.548)	-0.577 (0.617)	0.242 (0.229)
PAR30	0.078 (0.370)	1.501* (0.872)	-0.877 (1.438)	-0.417 (0.443)	-1.205 (0.973)	2.353 (2.288)	-4.515 (3.391)	-0.051 (0.726)
LLR	0.287 (1.145)	-0.879 (5.899)	-1.145 (3.785)	0.206 (1.668)	2.572 (1.774)	-0.960 (3.563)	-10.698* (5.686)	-1.403 (1.458)
LS	-0.024 (0.172)	-0.026 (0.413)	0.491 (0.398)	-0.267 (0.191)	0.037 (0.272)	-0.689 (0.998)	-0.516 (0.777)	-0.699*** (0.262)
PS	0.550*** (0.157)	1.014*** (0.366)	0.787** (0.390)	0.458** (0.191)	0.926*** (0.261)	-0.662* (0.351)	0.889* (0.461)	0.678*** (0.200)
LNNFA	0.504*** (0.049)	0.403*** (0.098)	0.627*** (0.086)	0.625*** (0.041)	0.604*** (0.071)	0.881*** (0.106)	0.587*** (0.122)	0.708*** (0.072)
INF	-0.004 (0.006)	0.000 (0.011)	0.027 (0.017)	-0.011 (0.010)	0.007 (0.017)	0.046 (0.069)	0.015 (0.050)	0.005 (0.021)
GDPGR	0.009 (0.012)	0.060 (0.038)	0.062 (0.058)	0.033* (0.020)	0.011 (0.015)	0.058 (0.052)	-0.043 (0.068)	-0.018 (0.019)
LIR	-0.026** (0.011)	0.017 (0.015)	0.038** (0.016)	0.005 (0.008)	0.005 (0.011)	0.021 (0.039)	-0.046 (0.035)	0.017 (0.010)
EDUF	0.096*** (0.036)	-0.108 (0.104)	-0.012 (0.084)	0.092** (0.038)	-0.053 (0.102)	0.127 (0.240)	-0.365 (0.261)	0.039 (0.103)
FSD	0.009** (0.005)	0.030** (0.014)	0.012 (0.011)	0.001 (0.005)	0.005 (0.006)	-0.019 (0.022)	0.027 (0.018)	0.005 (0.007)
T. D	yes	yes	yes	yes	yes	yes	yes	yes
R. D	yes	yes	yes	yes	yes	yes	yes	yes
CONS	4.249** (1.861)	9.791** (4.534)	1.463 (3.774)	-0.178 (1.788)	11.332** (5.223)	-1.420 (11.101)	24.304** (11.775)	3.870 (5.211)
# of Observations	1629	358	488	1667	763	106	216	766
Chi ²	610.236***	170.743***	1011.729***	531.035***	1219.415***	271.110***	75.380***	3478.057***
R ²	0.533	0.540	0.395	0.587	0.643	0.812	0.413	0.707
# Of MFIs/ Groups	528	151	261	555	240	48	111	241

Source: Authors. Standard errors were computed using heteroskedasticity-robust standard errors clustered for firms and are presented in parentheses. T. D=Time dummies and R. D= Regional dummies. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. We used GNI per capita in the year 2015 as a reference point to categorize the countries as per the World Bank Atlas method (current US\$). To ensure that we have sufficient sampled MFIs and observations to run regressions for all the dependent variables, we have used two categories instead of the original four defined by the World Bank. The results for POLS and FEM qualitatively remain the same and were not reported here for brevity. However, they can be requested from the corresponding author. We used the natural logarithm of borrowings (LNBORR), subordinated debt (LNSUBD), other short-term debt (LNOSD), and other loans (LNOL) as the main dependent variables. Then, the proportion of female borrowers (FB) serves as a proxy of board gender diversity, a main independent variable in this study. We have further used the natural logarithm of board members (LNBM), operational-self-sufficiency (OSS), portfolio at risk over 30 days (PAR 30), loan loss ratio (LLR), legal status (LS), profit status (PS), natural logarithm of net fixed assets (LNNFA), inflation (INF), GDP growth (GDPGR), lending interest rates (LIR), level of female education (EDUF), financial sector development (FSD), T. D=Time dummies and R. D= Regional dummies as control variables. We did not include the coefficients of time dummies and regional dummies to conserve space

(Model-33). The consistency of the sign and statistical significance of female board members' impact on other loans (LNOL) across various models further strengthens the reliability and robustness of our findings.

Fifth and lastly, addressing potential bias due to unequal observations across the 93 countries, we re-estimated the baseline models after excluding countries with high (e.g., Ecuador, India, and Mexico) and low observations (e.g., Central African Republic, Malaysia, Namibia, and Thailand). Eq (1) was re-estimated using REM, with results reported in Table 9. Notably, our key finding remains, i.e., female board members exhibited a negative effect on the types of debt instruments used by MFIs. However, the statistical significance varies: Model (34) lacks significance, while Models (35–37) remain significant. This suggests that board gender diversity may discourage debt utilization in MFIs.

In summary, the significant contributions of our findings are as follows: i) The study establishes an inverse association between female board members and different types of debt instruments. ii) The research considers a unique set of debt/liability measures, examining their correlation with board gender diversity. iii) The study employs diverse proxies of board gender diversity, considers country categorization, and adopts different sample and estimation techniques, thereby affirming the significant and robust empirical outcomes.

6. Conclusion and policy implications

By utilizing relatively recent and large-scale firm-level data of 1670 MFIs, covering the period 2010–2018, we investigated the relationship between board gender diversity and the utilization of various types of debt instruments. Overall, the study findings demonstrate that MFIs with higher board gender diversity tend to use a lower level of debt across various debt instruments.

This empirical evidence reinforces the notion that women, generally perceived as risk-averse, contribute to a more meticulous evaluation of potential risks. This behavior, in turn, fosters a judicious mix of debt-equity instruments and an optimal cost structure, thereby enhancing the sustainability of MFIs. Moreover, the presence of women board members correlates with increased transparency, improving governance and decision-making processes within the organization. Board gender diversity in a firm reflects its inclusiveness and societal orientation, which can attract investors and stakeholders who value diversity and social responsibility.

Additionally, diverse boards may be better equipped to understand the needs of specific client groups, such as women borrowers, and design financial products and loan sizes tailored to their circumstances. This can contribute to increased outreach and positive social impact. Therefore, by promoting gender diversity, MFIs can refine their debt management strategies, boost profitability, and demonstrate their

Table 8

Endogeneity-corrected techniques, two-step System Generalized Method of Moments (SGMM).

	Model-(30)	Model-(31)	Model-(32)	Model-(33)
	DV:LNBORR	DV: LNSUBDEBT	DV:LNOSD	DV:LNOL
L.LNBORROW	0.797*** (0.085)			
L.LNSUBDEBT		0.580*** (0.149)		
L.LNOSD			0.421*** (0.110)	
L.LNOL				0.473*** (0.066)
FB	-0.249 (0.214)	0.214 (0.565)	-0.461 (0.667)	-0.618* (0.368)
LNBM	-0.152 (0.152)	-0.030 (0.137)	-0.924** (0.450)	0.224 (0.182)
OSS	0.148 (0.214)	0.185 (0.219)	-0.147 (0.401)	0.090 (0.258)
PAR30	-1.233** (0.579)	1.673 (1.217)	-4.716** (2.226)	-1.051* (0.594)
LLR	-0.137 (1.595)	-0.879 (1.466)	-6.359* (3.698)	1.170 (1.549)
LS	-0.177 (0.269)	0.117 (0.598)	0.074 (0.796)	0.619* (0.341)
PS	0.567* (0.301)	0.284 (0.370)	0.650 (0.641)	0.310 (0.385)
LNNFA	0.108 (0.069)	0.409** (0.181)	0.584*** (0.101)	0.467*** (0.080)
INF	0.004 (0.006)	-0.004 (0.010)	0.058** (0.024)	0.006 (0.008)
GDPGR	0.037*** (0.013)	0.078** (0.035)	0.075* (0.043)	0.046** (0.018)
LIR	-0.002 (0.004)	-0.009 (0.013)	-0.027 (0.027)	-0.004 (0.005)
EDUF	-0.012 (0.020)	0.068 (0.067)	-0.016 (0.089)	0.031 (0.027)
FSD	0.005 (0.003)	0.002 (0.008)	0.007 (0.012)	0.008** (0.003)
CONS	2.161* (1.168)	-3.672 (3.189)	1.932 (4.452)	-1.668 (1.417)
Observations	1868	284	354	1883
F Stat	104.155***	53.555***	15.855***	58.722***
AR1(p value)	-3.162 (0.002)	-1.654 (0.098)	-1.653 (0.098)	-4.067 (0.000)
AR2(p value)	-0.828 (0.407)	0.963(0.336)	-1.569 (0.117)	1.217 (0.224)
Hansen (p Value)	256.630 (0.340)	44.578 (0.364)	136.260 (0.993)	290.173 (0.503)
# of Instruments	263	57	194	306
# of MFIs	612	109	209	635

Note:

Source: Authors. Standard errors were computed using heteroskedasticity-robust standard errors clustered for firms and are presented in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Note: Due to the limited number of MFIs that have used subordinated debt in their operation, we did not treat all the organizational characteristics as endogenous to minimize instrument proliferation. We used the natural logarithm of borrowings (LNBORR), subordinated debt (LNSUBD), other short-term debt (LNOSD), and other loans (LNOL) as the main dependent variables. The variables L.LNBORR, L.LNSUBDEBT, L.LNOSD, and L.LNOL represent the one-year lag of borrowings, subordinated debt, other short-term debts, and other loans, respectively. The proportion of female borrowers (FB) serves as a proxy of board gender diversity, the main independent variable of interest in this study. We have also used the natural logarithm of board members (LNBM), operational-self-sufficiency (OSS), portfolio at risk over 30 days (PAR 30), loan loss ratio (LLR), legal status (LS), profit status (PS), natural logarithm of net fixed assets (LNNFA), inflation (INF), GDP growth (GDPGR), lending interest rates (LIR), level of female education (EDUF), financial sector development (FSD), T. D=Time dummies and R. D= Regional dummies as control variables. We did not include the coefficients of time dummies and regional dummies to conserve space.

Table 9

Baseline estimation results by Random Effects Model (REM) after excluding selected countries.^a

	Model-(34)	Model-(35)	Model-(36)	Model-(37)
	DV:LNBORR	DV: LNSUBDEBT	DV:LNOSD	DV:LNOL
FB	-0.150 (0.134)	-0.781* (0.418)	-0.928* (0.553)	-0.454** (0.196)
LNBM	-0.089 (0.074)	0.333 (0.213)	-0.122 (0.254)	0.034 (0.106)
OSS	-0.029 (0.169)	0.546** (0.269)	0.337 (0.340)	0.178 (0.144)
PAR30	-0.834 (0.515)	3.429*** (1.266)	-1.982 (1.558)	-0.950** (0.470)
LLR	0.998 (1.018)	-0.238 (2.474)	-3.193 (3.350)	0.379 (1.157)
LS	0.176 (0.166)	0.190 (0.556)	0.447 (0.361)	-0.253 (0.158)
PS	0.601*** (0.156)	0.315 (0.347)	0.802** (0.318)	0.410*** (0.149)
LNNFA	0.582*** (0.041)	0.732*** (0.120)	0.657*** (0.073)	0.683*** (0.048)
INF	-0.010* (0.006)	-0.024* (0.014)	0.027* (0.015)	-0.005 (0.009)
GDPGR	0.015 (0.010)	0.046* (0.026)	0.074* (0.044)	0.015 (0.014)
LIR	-0.011 (0.007)	0.026 (0.016)	0.008 (0.015)	0.007 (0.006)
EDUF	0.029 (0.038)	-0.207* (0.125)	0.011 (0.089)	0.040 (0.042)
FSD	0.009** (0.004)	0.023* (0.013)	0.020** (0.010)	0.007* (0.004)
T. D	yes	yes	yes	yes
R. D	yes	yes	yes	yes
CONS	6.499*** (1.807)	10.637** (4.938)	1.575 (3.918)	2.060 (1.879)
Observations	1856	340	583	1897
Chi ²	622.749	227.758	260.387	681.223
R ²	0.593	0.653	0.400	0.642
# of MFIs	590	135	303	617

Source: Authors. Standard errors were computed using heteroskedasticity-robust standard errors clustered for firms and are presented in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. ^a We dropped three countries with high observations (Ecuador, India & Mexico) and four countries with lowest observations (Central African Republic, Malaysia, Namibia, and Thailand) from the original sample and re-estimated the baseline models. The main dependent variables include the natural logarithm of borrowings (LNBORR), subordinated debt (LNSUBD), other short-term debt (LNOSD), and other loans (LNOL). The proportion of female borrowers (FB), a proxy of board gender diversity, serves as the main independent variable. We have also included the natural logarithm of board members (LNBM), operational-self-sufficiency (OSS), portfolio at risk over 30 days (PAR 30), loan loss ratio (LLR), legal status (LS), profit status (PS), natural logarithm of net fixed assets (LNNFA), inflation (INF), GDP growth (GDPGR), lending interest rates (LIR), level of female education (EDUF), financial sector development (FSD), T. D=Time dummies and R. D= Regional dummies as control variables. We did not include the coefficients of time dummies and regional dummies to conserve space. The results for POLS and FEM are estimated but not included for brevity. The results can be requested from the corresponding author.

commitment to diversity and inclusion. Furthermore, given our findings suggesting that large board sizes and larger MFIs tend to employ higher debts and face liquidity and solvency risks, gender diversity acts as a check on debt financing, providing improved debt management within the organization. This insight underscores why regulators in many nations are introducing mandatory gender quotas in boardrooms to enhance governance and decision-making.

While there is no threshold or rule of thumb for determining the ideal amount of debt to use, a gender-diverse board can facilitate the selection of debt options that are most beneficial to the organization. Therefore, our study recommends that MFIs promote gender diversity at the board level, particularly for those with lower levels of gender diversity in the

boardroom.

Our study also underscores that while a larger board size is associated with higher debt usage in MFIs, promoting board gender diversity can act as a counterbalance to ensure optimal usage of debt. The optimal use helps firms minimize both costs and risks associated with debt financing. Moreover, our findings highlight that large-scale MFIs tend to use different types of debt instruments in their operation, making them more vulnerable to bankruptcy risk. This outcome is expected, as larger MFIs often possess sufficient physical collateral to obtain debt financing. However, these large-scale MFIs must manage their assets prudently and create an optimal debt portfolio to minimize their bankruptcy risks. Therefore, the extended and diversified perspectives brought by a gender-diverse board can play a significant role in mitigating bankruptcy risks for these larger MFIs. Considering the implications of our study, it is recommended that regulators in various nations consider introducing compliance measures to encourage greater representation of females on corporate boards, in line with the growing call for mandatory gender quotas in the boardroom.

The implications of our study extend beyond its immediate findings and can serve as a foundation for future research in the microfinance sector. Researchers can build upon these findings to delve deeper into the relationship between gender diversity, financing decisions, and outcomes in MFIs. The study opens up avenues for exploring additional factors that may influence the interplay between board diversity and debt utilization, providing valuable insights for the industry. From a practical perspective, the microfinance sector can consider the study findings to make informed decisions regarding board composition and financing strategies. MFIs can evaluate the trade-offs between risk management and accessing debt financing, considering their unique circumstances. The social implications of the study are twofold. On the one hand, it highlights potential challenges related to debt financing in MFIs with a higher representation of female directors. These insights can inform public policy discussions and initiatives aimed at promoting gender equality while ensuring sustainable financing options for MFIs. On the other hand, the study may contribute to shaping public attitudes by fostering discussions about the gender dynamics within the microfinance sector and the potential implications for financial decision-making.

While our study has made strides in uncovering the relationship between board gender diversity and various debt instruments, it also highlights the potential for further investigation in this dynamic area. One avenue for future research could be to incorporate the ‘critical mass

theory’ to identify the optimal proportion of female representation on boards. Additionally, the usage of debt by MFIs might be affected by their growth trajectory and various stages of their life cycle. Therefore, incorporating growth and age variables, if available, could unravel important findings. To enhance the comprehensiveness of our model, future researchers may consider testing it with additional macroeconomic variables, such as indicators of government quality and specific regulatory aspects. Including these variables in the analysis could lead to more reliable and robust results. While these potential areas for further investigation do not compromise the integrity of our study’s findings and conclusions, they do offer promising opportunities to expand the research landscape in microfinance.

Data availability statement

The data related to the study can be freely accessed from the World Bank catalogue, <https://datacatalog.worldbank.org/dataset/mix-market>.

CRediT authorship contribution statement

Arpita Sharma: Conceptualization, Writing – original draft, Writing – review & editing. **Swati Chauhan:** Conceptualization, Writing – original draft, Writing – review & editing. **Md Aslam Mia:** Data curation, Visualization, Investigation, Writing – original draft, Supervision, Writing – review & editing. **Sunil Sangwan:** Writing – original draft, Writing – review & editing, Validation. **Shoaib Alam Siddiqui:** Conceptualization, Writing – original draft, Validation, Writing – review & editing. **Sanjeev Kumar:** Writing – original draft, preparation, Validation, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Firm-year observations

Year	Freq.	Percent	Cum.
2010	1253	15.52	15.52
2011	1212	15.01	30.53
2012	1008	12.48	43.01
2013	844	10.45	53.47
2014	876	10.85	64.32
2015	850	10.53	74.85
2016	690	8.55	83.39
2017	702	8.69	92.09
2018	639	7.91	100
Total	8074	100	

Source: Authors.

Appendix B. Country-wise number of MFIs and observations

Country	# of MFIs	Observations	Country	# of MFIs	Observations
Afghanistan	15	42	Iraq	12	42
Albania	6	21	Jamaica	6	24

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Country	# of MFIs	Observations	Country	# of MFIs	Observations
Angola	1	9	Jordan	7	33
Argentina	15	69	Kazakhstan	24	82
Armenia	14	83	Kenya	33	122
Azerbaijan	37	183	Kosovo	11	57
Bangladesh	43	292	Lebanon	5	20
Belarus	2	7	Liberia	3	11
Belize	1	3	Madagascar	13	65
Benin	28	125	Malawi	4	29
Bolivia	25	186	Malaysia	1	2
Bosnia and Herzegovina	14	69	Mali	13	46
Brazil	35	180	Mexico	100	570
Bulgaria	18	55	Moldova	9	34
Burkina Faso	22	83	Mongolia	13	54
Burundi	19	85	Montenegro	2	9
Cambodia	19	146	Morocco	9	53
Cameroon	16	71	Mozambique	8	36
Central African Republic	1	2	Namibia	1	1
Chad	2	5	Nepal	36	151
Chile	4	29	Nicaragua	29	206
Colombia	41	209	Niger	15	56
Comoros	3	4	Nigeria	70	184
Costa Rica	16	97	Pakistan	37	236
Dominican Republic	15	90	Panama	6	39
Ecuador	63	430	Papua New Guinea	6	39
El Salvador	16	80	Tanzania	13	57
Ethiopia	21	43	Thailand	1	2
Gambia, The	2	5	Togo	30	87
Georgia	14	60	Tonga	1	7
Ghana	43	121	Trinidad and Tobago	1	2
Guatemala	24	134	Tunisia	1	9
Guinea	3	5	Uganda	16	73
Guyana	1	8	Ukraine	2	10
Haiti	7	43	Uzbekistan	23	57
Honduras	26	185	Vietnam	17	93
India	162	851	Zambia	4	20
Indonesia	21	62	Zimbabwe	2	8
South Sudan	4	14			
Sri Lanka	16	51			
Sudan	2	7			
Suriname	3	10			
Tajikistan	48	192			
Paraguay	6	44			
Peru	66	440			
Philippines	65	277			
Poland	3	9			
Romania	6	28			
Rwanda	11	38			
Samoa	1	8			
Senegal	25	97			
Serbia	4	23			
Sierra Leone	5	15			
Solomon Islands	1	3			
South Africa	5	20	Total	1670	8074

Source: Authors' estimation based on the World Bank Mix Market data.

Appendix C. Pooled Ordinary Least Squares (POLS), Fixed Effects Models (FEM) and Generalized Least Squares (GLS)

	Model-(38)	Model- (39)	Model- (40)	Model- (41)	Model- (42)	Model- (43)	Model- (44)	Model- (45)	Model- (46)	Model-(47)	Model- (48)	Model- (49)
	LNBORROW	LNSUBDEBT	LNOSD	LNOL	LNBORROW	LNSUBDEBT	LNOSD	LNOL	LNBORROW	LNSUBDEBT	LNOSD	LNOL
	POLS			FEM				GLS				
FB	-0.586*** (0.127)	-0.309 (0.327)	-0.845** (0.426)	-0.742*** (0.138)	-0.064 (0.149)	-0.746* (0.401)	1.296* (0.769)	-0.225 (0.238)	-0.586*** (0.120)	-0.309 (0.314)	-0.845** (0.374)	-0.696*** (0.126)
LNBM	-0.243*** (0.068)	0.440*** (0.167)	-0.164 (0.179)	0.236*** (0.061)	0.041 (0.093)	0.127 (0.194)	0.533 (0.332)	0.095 (0.135)	-0.243*** (0.061)	0.440*** (0.140)	-0.164 (0.160)	0.028 (0.064)
OSS	-0.086 (0.145)	0.036 (0.411)	0.246 (0.343)	0.349*** (0.126)	0.110 (0.186)	0.494** (0.240)	0.051 (0.535)	0.097 (0.170)	-0.086 (0.105)	0.036 (0.319)	0.246 (0.300)	0.481*** (0.108)
PAR30	-1.327*** (0.430)	1.737 (1.225)	-2.370* (1.428)	-0.749* (0.398)	0.257 (0.433)	1.952* (1.039)	2.018 (2.771)	-0.380 (0.534)	-1.327*** (0.310)	1.737* (0.977)	-2.370** (1.086)	-0.514 (0.317)
LLR	2.327** (1.161)	-2.232 (2.567)	-5.182* (2.886)	1.817 (1.179)	0.858 (0.999)	-0.716 (2.146)	3.072 (4.034)	-0.060 (1.190)	2.327** (1.066)	-2.232 (2.192)	-5.182* (2.695)	1.680 (1.085)

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	Model-(38)	Model- (39)	Model- (40)	Model- (41)	Model- (42)	Model- (43)	Model- (44)	Model- (45)	Model- (46)	Model-(47)	Model- (48)	Model- (49)	
	LNBORROW	LNSUBDEBT	LNOSD	LNOL	LNBORROW	LNSUBDEBT	LNOSD	LNOL	LNBORROW	LNSUBDEBT	LNOSD	LNOL	
	POLS	FEM						GLS					
LS	-0.024 (0.080)	0.141 (0.271)	0.373	0.065	–	–	–	–	-0.024 (0.084)	0.141 (0.211)	0.373	-0.274*** (0.090)	
PS	0.485*** (0.079)	0.709*** (0.194)	0.890*** (0.243)	0.720*** (0.082)	–	–	–	–	0.485*** (0.080)	0.709*** (0.164)	0.890*** (0.240)	0.583*** (0.086)	
LNNFA	0.700*** (0.017)	0.671*** (0.067)	0.697*** (0.052)	0.776*** (0.019)	0.341*** (0.084)	0.649*** (0.164)	0.041 (0.209)	0.381*** (0.108)	0.700*** (0.016)	0.671*** (0.040)	0.697*** (0.047)	0.786*** (0.017)	
INF	0.005 (0.006)	-0.050*** (0.018)	0.047*** (0.015)	0.006 (0.008)	-0.014** (0.006)	-0.010 (0.014)	0.008 (0.014)	-0.015 (0.010)	0.005 (0.007)	-0.050*** (0.018)	0.047** (0.019)	0.001 (0.007)	
GDPGR	0.015 (0.012)	0.041 (0.030)	0.023	0.048*** (0.040)	0.024** (0.014)	0.079** (0.011)	0.123** (0.036)	0.018 (0.060)	0.015 (0.013)	0.041 (0.032)	0.023 (0.039)	0.022 (0.014)	
LIR	-0.007 (0.005)	0.017 (0.011)	-0.004	0.003	-0.016 (0.013)	0.104*** (0.004)	0.034 (0.013)	0.015 (0.034)	-0.007* (0.055)	0.017 (0.011)	-0.004 (0.004)	0.005 (0.004)	
EDUF	0.015 (0.021)	-0.006	-0.038	0.037	0.167*** (0.064)	-0.065 (0.061)	-0.090 (0.022)	0.220*** (0.059)	0.015 (0.021)	-0.006 (0.073)	-0.038 (0.057)	0.034 (0.061)	
FSD	0.013*** (0.002)	0.015** (0.007)	0.023*** (0.006)	0.012*** (0.002)	0.006 (0.006)	0.062*** (0.024)	-0.035 (0.024)	0.013 (0.008)	0.013*** (0.002)	0.015** (0.006)	0.023*** (0.006)	0.008*** (0.002)	
T. D	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	
R. G	yes	yes	yes	yes	no	no	no	no	yes	yes	yes	yes	
CONS	6.392*** (1.004)	3.662 (3.118)	3.548	-0.660	2.665 (3.305)	3.404	13.670 (7.917)	-3.622 (12.402)	6.392*** (3.917)	3.662 (2.734)	3.548 (1.001)	0.404 (2.941)	
Observations	2392	464	704	2433	2392	464	704	2433	2392	464	704	2433	
F-Stat/Chi ²	128.932	22.168	16.773	149.968	7.374	3.580	1.861	9.189	3290.70	698.28	416.87	4046.77	
R ²	0.579	0.601	0.372	0.595	0.198	0.389	0.127	0.191					
# Of MFIs/Groups					744	192	364	773	744	192	364	773	

Source: Authors. Standard errors were computed using heteroskedasticity-robust standard errors clustered for firms and are presented in parentheses. We used the natural logarithm of borrowings (LNBORR), subordinated debt (LNSUBBD), other short-term debt (LNOSD), and other loans (LNOL) as the main dependent variables. Then, the proportion of female borrowers (FB) was used as a proxy of board gender diversity and the main independent variable of interest in this study. We have further used natural logarithm of board members (LNBM), operational-self-sufficiency (OSS), portfolio at risk over 30 days (PAR 30), loan loss ratio (LLR), legal status (LS), profit status (PS), natural logarithm of net fixed assets (LNNFA), inflation (INF), GDP growth (GDPGR), lending interest rates (LIR), level of female education (EDUF), financial sector development (FSD), T. D=Time dummies and R. D= Regional dummies as control variables. We did not include the coefficients of time dummies and regional dummies to conserve space. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

References

- 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.
- Adusei, M. (2019). Board gender diversity and the technical efficiency of microfinance institutions: Does size matter? *International Review of Economics & Finance*, 64, 393–411.
- 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.
- 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.
- Adusei, M., & Sarpong-Danquah, B. (2021). Institutional quality and the capital structure of microfinance institutions: The moderating role of board gender diversity. *Journal of Institutional Economics*, 17(4), 641–661.
- Ahamed, M. M., & Mallick, S. K. (2019). Is financial inclusion good for bank stability? International evidence. *Journal of Economic Behavior & Organization*, 157, 403–427.
- Ahmed, A., Monem, R. M., Delaney, D., & Ng, C. (2017). Gender diversity in corporate boards and continuous disclosure: Evidence from Australia. *Journal of Contemporary Accounting and Economics*, 13(2), 89–107.
- Almeida, H., & Campello, M. (2007). Financial constraints, asset tangibility, and corporate investment. *Review of Financial Studies*, 20(5), 1429–1460.
- Alves, P., Couto, E. B., & Francisco, P. (2015). Board of directors' composition and capital structure. *Research in International Business and Finance*, 35, 1–32.
- Amin, A., ur Rehman, R., Ali, R., & Mohd Said, R. (2022). Corporate governance and capital structure: Moderating effect of gender diversity. *Sage Open*, 12(1), Article 21582440221082110.
- Antoniou, A., Guney, Y., & Paudyal, K. (2008). The determinants of capital structure: Capital market-oriented versus bank-oriented institutions. *Journal of Financial and Quantitative Analysis*, 43(1), 59–92.
- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, 58(2), 277–297.
- Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68(1), 29–51.
- Armendariz, B., & Morduch, J. (2010). *The economics of microfinance* (2nd ed.). MIT Press.
- Azmi, W., Ali, M., Arshad, S., & Rizvi, S. A. R. (2019). Intricacies of competition, stability, and diversification: Evidence from dual banking economies. *Economic Modelling*, 83, 111–126.
- Barber, B. M., & Odean, T. (2001). Boys will be boys: Gender, overconfidence, and common stock investment. *Quarterly Journal of Economics*, 116(1), 261–292.
- Barclay, M. J., & Smith, C. W., Jr. (1995). The maturity structure of corporate debt. *The Journal of Finance*, 50(2), 609–631.
- Barney, J. B. (1996). The resource-based theory of the firm. *Organization Science*, 7(5), 469–469.
- Bateman, M., & Chang, J. (2012). Microfinance and the illusion of development: From Hubris to nemesis in thirty years. *World Economic Review*, 1(1), 13–36.
- Beck, T., Behr, P., & Guettler, A. (2013). Gender and banking: Are women better loan officers? *Review of Finance*, 17(4), 1279–1321.
- Berger, A. N., Frame, W. S., & Ioannidou, V. (2011). Tests of ex ante versus ex post theories of collateral using private and public information. *Journal of Financial Economics*, 100(1), 85–97.
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115–143.
- Bogart, V. L. (2012). Capital structure and sustainability: An empirical study of microfinance institutions. *The Review of Economics and Statistics*, 94(4), 1045–1058.
- Brockman, P., Martin, X., & Unlu, E. (2010). Executive compensation and the maturity structure of corporate debt. *The Journal of Finance*, 65(3), 1123–1161.
- Campaign, M. S. (2015). State of the microcredit summit campaign report: Mapping pathways out of poverty. Available at, <https://nextbillion.net/tags/microcredit-t-summit/>.
- Carter, D. A., D'Souza, F., 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.
- Carter, D. A., Simkins, B. J., & Simpson, W. G. (2003). Corporate governance, board diversity, and firm value. *Financial Review*, 38(1), 33–53.
- Caudill, S. B., Gropper, D. M., & Hartarska, V. (2009). Which microfinance institutions are becoming more cost effective with time? Evidence from a mixture model. *Journal of Money, Credit, and Banking*, 41(4), 651–672.
- Chang, Y., Ali, M. M., Wang, Q., & Lin, S. H. (2019). Corporate board gender diversity and financing decision. *International Journal of Economics and Finance*, 15(8), 1–43.
- Chapple, L., & Humphrey, J. E. (2014). Does board gender diversity have a financial impact? Evidence using stock portfolio performance. *Journal of Business Ethics*, 122 (4), 709–723.
- Chauhan, S., Kumar, C., & Verma, A. (2020). Capital structure and performance of Indian microfinance institutions. *IUP Journal of Applied Finance*, 26(4), 30–48.

- Chauhan, S., Verma, A., & Kumar, C. V. R. S. V. (2022). Effect of capital structure on the financial and social performance of Indian microfinance institutions. *IIIB Business Review*, Article 23197145221099677.
- Cull, R., Demirguc-Kunt, A., & Morduch, J. (2014). Banks and microbanks. *Journal of Financial Services Research*, 46(1), 1–53.
- Cull, R., Demirguc-Kunt, A., & Morduch, J. (2018). The microfinance business model: Enduring subsidy and modest profit. *The World Bank Economic Review*, 32(2), 221–244. World Bank Group.
- D'Espallier, B., Guérin, I., & Mersland, R. (2011). Women and repayment in microfinance: A global analysis. *World Development*, 39(5), 758–772.
- Datta, S., Doan, T., & Toscano, F. (2021). Top executive gender, board gender diversity, and financing decisions: Evidence from debt structure choice. *Journal of Banking & Finance*, 125, Article 106070.
- Demirguc-Kunt, A., & Maksimovic, V. (1999). Institutions, financial markets, and firm debt maturity. *Journal of Financial Economics*, 54(3), 295–336.
- Dieckmann, R., Speyer, B., Ebding, M., & Walter, N. (2007). "Microfinance: An emerging investment opportunity," 19 pp. 1–20. Deutsche Bank Research.
- Dorfleitner, G., Röhe, M., & Renier, N. (2017). The access of microfinance institutions to debt capital: An empirical investigation of microfinance investment vehicles. *The Quarterly Review of Economics and Finance*, 65, 1–15.
- Ellwood, S., & García-Lacalle, J. (2015). The influence of presence and position of women on the boards of directors: The case of NHS foundation trusts. *Journal of Business Ethics*, 130(1), 69–84.
- Fan, J. P., Titman, S., & Twite, G. (2012). An international comparison of capital structure and debt maturity choices. *Journal of Financial and Quantitative Analysis*, 47 (1), 23–56.
- Feng, Y., Hassan, A., & Elamer, A. A. (2020). Corporate governance, ownership structure and capital structure: Evidence from Chinese real estate listed companies. *International Journal of Accounting and Information Management*, 28(4), 759–783.
- Francis, B., Hasan, I., Park, J. C., & Wu, Q. (2015). Gender differences in financial reporting decision making: Evidence from accounting conservatism. *Contemporary Accounting Research*, 32(3), 1285–1318.
- Francis, B., Hasan, I., & Wu, Q. (2013). The impact of CFO gender on bank loan contracting. *Journal of Accounting, Auditing and Finance*, 28(1), 53–78.
- García, C. J., & Herrero, B. (2021). Female directors, capital structure, and financial distress. *Journal of Business Research*, 136, 592–601.
- Geresem, O., & Michael, O. (2020). Capital structure, credit risk management and financial performance of microfinance institutions in Uganda. *Journal of Economics and International Finance*, 13(1), 24–31.
- Ghose, B., Paliar, S. J., & Menz, L. (2018). Does legal status affect performance of microfinance institutions?: Empirical evidence from India. *Vision*, 22(3), 316–328.
- Goswami, G., Noe, T., & Rebello, M. (1995). Debt financing under asymmetric information. *The Journal of Finance*, 50(2), 633–659.
- 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), F109–F128.
- Guizani, M., & Abdalkrim, G. (2021). Board gender diversity, financial decisions and free cash flow: Empirical evidence from Malaysia. *Management Research Review*, 45(2), 198–216.
- 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.
- Hagawe, H. M., Mobarek, A., Hanuk, A., & Jamal, A. (2023). A unique business model for microfinance institution: The case of assadaqaat community finance (ACF). *Cogent Business & Management*, 10(1), Article 2135202.
- Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica: Journal of the Econometric Society*, 50(4), 1029–1054.
- Hartarska, V., & Nadolnyak, D. (2007). Do regulated microfinance institutions achieve better sustainability and outreach? Cross-Country evidence. *Applied Economics*, 39 (10), 1207–1222.
- 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.
- Hermes, N., Lensink, R., & Meesters, A. (2011). Outreach and efficiency of microfinance institutions. *World Development*, 39(6), 938–948.
- Hoque, M., Chishty, M., & Holloway, R. (2011). Commercialization and changes in capital structure in microfinance institutions. *Managerial Finance*, 37(5), 414–425.
- Huang, J., & Kissgen, D. J. (2013). Gender and corporate finance: Are male executives overconfident relative to female executives? *Journal of Financial Economics*, 108(3), 822–839.
- Huang, R., Tan, K. J. K., & Faff, R. W. (2016). CEO overconfidence and corporate debt maturity. *Journal of Corporate Finance*, 36, 93–110.
- Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review*, 76(2), 323–329.
- 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.
- Kar, A. K. (2012). Does capital and financing structure have any relevance to the performance of microfinance institutions? *International Review of Applied Economics*, 26(3), 329–348.
- Kar, A. K. (2013). Mission drift in microfinance: Are the concerns really worrying? Recent cross-country results. *International Review of Applied Economics*, 27(1), 44–60. <https://doi.org/10.1080/02692171.2012.700701>
- Khachatrian, K., Hartarska, V., & Grigoryan, A. (2017). Performance and capital structure of microfinance institutions in eastern europe and central asia. *Eastern European Economics*, 55(5), 395–419.
- Kyereboah-Coleman, A. (2007b). The determinants of capital structure of microfinance institutions in Ghana. *South African Journal of Economic and Management Sciences*, 10 (2), 270–279.
- Kyereboah-Coleman, A. (2007a). The impact of capital structure on the performance of microfinance institutions. *The Journal of Risk Finance*, 8(1), 56–71.
- La Rocca, M., Neha, N., & La Rocca, T. (2020). Female management, overconfidence and debt maturity: European evidence. *Journal of Management & Governance*, 24(3), 713–747.
- Lassoued, M. (2018). Corporate governance and financial stability in Islamic banking. *Managerial Finance*, 44(5), 524–539.
- Lassoued, N. (2021). Capital structure and earnings quality in microfinance institutions. *International Journal of Managerial Finance*, 18(2), 240–260.
- Levin, I. P., Snyder, M. A., & Chapman, D. P. (1988). The interaction of experiential and situational factors and gender in a simulated risky decision-making task. *Journal of Psychology*, 122(2), 173–181.
- Li, D., & Ferreira, M. P. (2011). Institutional environment and firms' sources of financial capital in Central and Eastern Europe. *Journal of Business Research*, 64(4), 371–376.
- Li, Y., & Zhang, X. Y. (2019). Impact of board gender composition on corporate debt maturity structures. *European Financial Management*, 25(5), 1286–1320.
- Matemilola, B. T., Bany-Ariffin, A. N., Azman-Saini, W. N. W., & Nassir, A. M. (2019). Impact of institutional quality on the capital structure of firms in developing countries. *Emerging Markets Review*, 39, 175–209.
- Memon, A., Akram, W., & Abbas, G. (2020). Women participation in achieving sustainability of microfinance institutions (MFIs). *Journal of Sustainable Finance & Investment*, 12(2), 593–611.
- Mersland, R., & Strøm, R.Ø. (2009). Performance and governance in microfinance institutions. *Journal of Banking & Finance*, 33(4), 662–669.
- Mersland, R., & Strøm, R.Ø. (2010). Microfinance mission drift? *World Development*, 38 (1), 28–36.
- Mia, M. A., Hossain, T., Nesa, Z., Saifullah, M. K., Akter, R., & Hossain, M. I. (2022). The impact of board gender diversity on the financing costs of microfinance institutions: A global evidence. *Journal of Financial Reporting & Accounting*. <https://doi.org/10.1108/JFRA-04-2022-0125>.
- Mia, M. A., & Lee, H.-A. (2017). Mission drift and ethical crisis in microfinance institutions: What matters? *Journal of Cleaner Production*, 164, 102–114.
- Mori, N., Golesorkhi, S., Randøy, T., & Hermes, N. (2015). Board composition and outreach performance of microfinance institutions: Evidence from East Africa. *Strategic Change*, 24(1), 99–113.
- Myers, S. C. (1984). The capital structure puzzle. *The Journal of Finance*, 39(3), 574–592.
- Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13 (2), 187–221.
- Nair, T. S. (2012). Financing of Indian microfinance: Evidence and implications. *Economic and Political Weekly*, 47(25), 33–40.
- Nelson, J., & Peter, E. A. (2019). An empirical analysis of effect of capital structure on firm performance: Evidence from microfinance banks in Nigeria. *European Journal of Accounting, Auditing and Finance Research*, 7(9), 30–44.
- Ngatno, Apriatni, E. P., & Youlianto, A. (2021). Moderating effects of corporate governance mechanism on the relation between capital structure and firm performance. *Cogent Business & Management*, 8(1), Article 1866822.
- Nguyen, T., Bai, M., Hou, Y., & Vu, M.-C. (2021). Corporate governance and dynamics capital structure: Evidence from Vietnam. *Global Finance Journal*, 48, Article 100554.
- Niederle, M., & Vesterlund, L. (2007). Do women shy away from competition? Do men compete too much? *Quarterly Journal of Economics*, 122(3), 1067–1101.
- Post, C., & Byron, K. (2015). Women on boards and firm financial performance: A meta-analysis. *Academy of Management Journal*, 58(5), 1546–1571.
- Provasi, R., & Harasheh, M. (2021). Gender diversity and corporate performance: Emphasis on sustainability performance. *Corporate Social Responsibility and Environmental Management*, 28(1), 127–137.
- Roodman, D. (2009a). How to do xtabond2: An introduction to difference and system GMM in Stata. *STATA Journal*, 9(1), 86–136.
- Roodman, D. (2009b). A note on the theme of too many instruments. *Oxford Bulletin of Economics & Statistics*, 71(1), 135–158.
- Rose, C. (2007). Does female board representation influence firm performance? The Danish evidence. *Corporate Governance: An International Review*, 15(2), 404–413.
- Schopohl, L., Urquhart, A., & Zhang, H. (2021). Female CFOs, leverage and the moderating role of board diversity and CEO power. *Journal of Corporate Finance*, 71, Article 101858.
- Strøm, R.Ø., D'Espallier, B., & Mersland, R. (2014). Female leadership, performance, and governance in microfinance institutions. *Journal of Banking & Finance*, 42, 60–75.
- Tchuigoua, H. T. (2014). Institutional framework and capital structure of microfinance institutions. *Journal of Business Research*, 67(10), 2185–2197.
- Tchuigoua, H. T. (2015). Capital structure of microfinance institutions. *Journal of Financial Services Research*, 47(3), 313–340.
- Vanroose, A., & D'Espallier, B. (2013). Do microfinance institutions accomplish their mission? Evidence from the relationship between traditional financial sector development and microfinance institutions' outreach and performance. *Applied Economics*, 45(15), 1965–1982.
- Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*, 126(1), 25–51.
- Zaid, M. A., Wang, M., Abuhijleh, S. T., Issa, A., Saleh, M. W., & Ali, F. (2020). Corporate governance practices and capital structure decisions: The moderating effect of gender diversity. *Corporate Governance: The International Journal of Business in Society*, 20(5), 939–964.