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Comparative Study of Microfinance Sustainability: Credit Risk-Taking and Capital Structure

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The purpose of this paper was to investigate the determinants of risk-taking in the context of Islamic and conventional microfinance institutions (MFIs) while considering the capital structure's role in moderating the risk-taking decisions' effect on financial performance. Fixed and Random effects GLS with a first-order autoregressive disturbance was used to empirically analyze the impact of risk-taking on performance as well as the role of capital structure in moderating the effects on the relationship between non-performing loans and performance. The dataset covers 179 Conventional MFIs and 57 Islamic MFIs in four different regions over the 2005-2015 period. Risk-taking determinants exposed by high loan growth, low-interest margin, and low loan loss provisions were revealed to have negative consequences on risk exposures for both MFIs on average. These indicators are significantly and positively related to a lower loan portfolio quality. Therefore, this risk-taking behavior harms these MFIs' performance. The moderating effect of capital structure within leverage funding on the relationship between non-performing loan indicators and financial performance was confirmed in Conventional microfinance institutions. This paper can be considered a pioneer attempt to evaluate the determinants of risk-taking decisions and their implications on the financial performance and sustainability of microfinance institutions.

Keywords: Credit risk taking, capital structure, non-performing loans, performance, microfinance institutions

JEL: G21, G23, G41

Recently, microfinance is perceived as a real financial industry and it is considered to be a powerful instrument in poverty alleviation. The number of customers served and the credits granted are sufficient proof of the role played by the microfinance structures in improving the living conditions of the most vulnerable (Tchuigoua, 2018). However, being dedicated to financial inclusion, makes it struggle to perform effectively in its mission. Studies have shown that the struggles experienced by its structures are mostly linked to repayment difficulties (Nanayakkara and Stewart, 2015). Globally, the loan portfolio quality of Microfinance institutions has decreased significantly, from 4.7% in 2015 to 7.2% in 2016 measured by portfolio at risk. The latter is indeed rising again to stabilize between 2016 and 2018 at around 7% (Fassin and Valette, 2019). Despite internal processes that are constantly improving, the cost of risk in microfinance remains above 2% and has even

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increased slightly over the past ten years. An excessive default rate is challenging the financial performance of the MFI.

Credit risk is viewed as one of the major risks challenging the sustainability of Microfinance Institutions (MFIs). Generally, the majority of research studies gather the causes of non-performing loans in microfinance institutions into three main categories (Nanayakkara and Stewart, 2015). First, factors related to the characteristics and the nature of loans such as the maturity, amount, interest rate, and quantity of loans granted. Second, factors related to the characteristics of the institution itself i.e., legal form, and the experience of loan officers. Third, factors related to the characteristics of the borrower. However, our study provides a risk-taking analysis prolongation to the microfinance literature, regarding managerial factors for risk-taking.

Among the assumptions we have made, some support a capital structure moderating role in the relationship between risk-taking and financial performance. Traditional MFI financing is structured around three main components: self-financing, equity, and debt. Equity capital consists of both soft grants or loans and contributions made by social investors. Debt also involves both short-term bank deposits and loans. Most surveys on the financing structure of MFIs indicate that domestic short-term debt is the primary financing instrument for microfinance institutions (Baklouti and Bouri, 2013). In our empirical study, we tested the funding sources moderating effect on the impact of risk-taking factors on the financial performance of the two types of MFIs.

As part of the funding sources, this paper focused on studying the differences between conventional and Islamic MFIs regarding the role played by their capital structure. It also examined the financial characteristics of Islamic microfinance institutions compared to their conventional counterparts. In their operation, Islamic MFIs respect five basic principles. First, the prohibition of interest rates in financial transactions. Second, the requirement for an equitable sharing of losses and profits. Third, speculation and its derivatives are prohibited and transparency is a requirement. Fourth, it is mandatory for the fund sectors to be consistent with Islamic ethics. Finally, traceability is required and contracts have to be backed with tangible assets. The characteristics of the financial resources of Islamic MFIs are unique in nature. The main originality of their liability structure

resides in the presence of participating investment accounts which make a new category of liabilities. Their funds are theoretically treated as equity since they are remunerated on the basis of a variable rate of return and not at a fixed and predetermined interest rate (Fersi and Boujelbéne, 2017).

Understanding the factors that influence risk-taking and credit risk management in MFIs is paramount to ensure their sustainability. In this regard, Agency theory offers valuable insights by analyzing how the interests and motivations of different stakeholders influence risk-taking decisions within MFIs. Indeed, this theory highlights the possible conflicts of interest between shareholders, managers and creditors, which can impact the financing choices and the levels of risk taken by MFIs (Jensen and Meckling, 1976). However, despite the breadth of research on microfinance, there are still theoretical and practical gaps in our understanding of these aspects. Therefore, this study aims to fill these gaps by examining the relationship between risk-taking, capital structure, and financial performance of microfinance institutions.

Specifically, this study focuses on analyzing the moderating role of capital structure in the relationship between risk-taking and the financial performance of MFIs, with emphasis on the differences between conventional and Islamic MFIs. While the traditional funding structure of MFIs is based on self-financing, equity, and domestic short-term debt, Islamic MFIs have a unique accountability structure, including participatory investment accounts (Fersi and Boujelbéne, 2017). Trade-off theory provides additional perspective by explaining how MFIs make decisions about their capital structure by balancing the benefits of leverage (such as tax benefits) and the costs associated (such as financial distress) with different funding sources (Myers, 1984). The difference in capital structure can impact how MFIs to manage credit risk and influence their financial performance. Our study seeks to uncover the underlying forces that drive risk-taking, credit risk management, and capital structure decisions within MFIs.

It is essential to better understand how factors related to risk-taking, such as loan characteristics, institution characteristics, and borrower characteristics, as well as capital structure, influence the financial performance of MFI. The present research investigated whether the interaction between credit risk-taking, capital structure, and performance is influenced by the nature of the microfinance institutions i.e., conventional or Islamic.

Although credit risk management studies are important as they allow us to delineate the determinants of credit risk exposure, they have not fully explored this kind of risk in the context of MFIs. Our study dealt with credit risk management by introducing other determinants of the risk-taking and financial stability of MFIs worldwide. The limited number of risk-taking studies in the context of Islamic MFIs (Elgammal and Mohamed, 2023; Fersi and Boujelbène, 2022; Manan and Shafiai, 2015; Mutamimah *et al.*, 2022; Tamanni, 2019) has been our motivation to enhance the literature and provide novel empirical evidence on the risk-taking decisions and behavior affecting the performance of Islamic MFIs compared to their conventional counterparts.

In summary, this paper can be considered a pioneer attempt to evaluate the determinants of risk-taking decisions and their implications on the financial performance and sustainability of microfinance institutions. This study aims to provide new insights into credit risk management in MFIs, by exploring the determinants of risk-taking behavior and examining how capital structure can influence the relationship between risk-taking and financial performance. By filling this theoretical gap and providing innovative empirical results, this research will significantly contribute to the microfinance literature and help MFIs better manage credit risk and improve their financial sustainability.

This study aimed essentially to fill the identified gap, by exploring the moderating effect of the capital structure in the standard MFIs analysis. Particularly, in the first stage, we investigated the risk-taking behavior determinants, and in the second stage, examined the relationship between risk-taking behavior, financial performance, and capital structure within conventional and Islamic MFIs. Our research is therefore an enrichment of the existing literature bringing more insights into the credit-risk management of MFIs in two ways. First, we provided a behavioral explanation to the microfinance theory, regarding managerial decisions and motives for risk-taking. Second, we studied the moderation of the effect of credit-risk exposure on the financial sustainability played by the capital structure in the context of Islamic MFIs as compared to conventional ones. To the best of our knowledge, this is the first study investigating credit-risk management from a capital structure moderating effect perspective. It offers novel empirical findings on the Islamic MFIs' risk management tools.

The remainder of this paper is structured as follows. Section 2 reviewed the relevant literature, gathering theories as well as empirical studies analyzing key elements determining features of risk-taking decisions within financial institutions, financial structure, and regulatory capital as well as financial performance. Section 3 introduced the methodology justified with the empirical specification alongside details of the used MFIs data. The fourth section was devoted to the empirical results and their analysis according to the forwarded assumptions on the research issue; fifth section discusses the results; sixth, seventh, and eighth section present conclusion, implications and limitations and future directions, respectively.

LITERATURE REVIEW

Theoretical Underpinnings

Credit risk, also known as default risk, is described as the deterioration in loan portfolio quality, as a consequence of loan losses (Agene, 2011). Loan loss is a result of a client's failure to meet the terms of a loan contract. Small-sized loans, moral hazard, and adverse selection restrict the possibilities for regular banks to lend profitably to poor customers (Giné *et al.*, 2010). Microfinance institutions' clients are excluded from the formal financial system because of their high-risk profile. These borrowers are considered highly risky because of the lack of collateral assets, fixed annual revenues, and limited history of loans. In addition, the high transaction costs associated with small loans are one of the main barriers preventing a traditional banking system from serving poor rural households.

Islamic microfinance institutions face the same risk as their conventional counterpart (Ariffin *et al.*, 2009). Credit risk in IMFIs could originate in a weak administration of the funds, alongside moral hazard problems, and the vulnerable situation of borrowers (Kassim and Rahman, 2018). Financing instruments in Islamic finance in general and in Islamic microfinance in particular have to involve a real good (object) and the capital cannot claim a return on itself while the funds are granted depending on the type of activity. In addition, there are different types of exchange contracts viz. differed-trading contracts which can either be an object-differed sale or a price-differed sale. Bai' muajjal (price-differed sale) is the most practiced in Islamic microfinance

where the object is delivered at the time of concluding the contract and the price is paid later. Similarly, under the Murabaha contract (mark-up sale), an IMFI buys the asset then sells it to the beneficiary at a mark-up and the latter pays at a future date. The risk here arises when the client is unable to pay at the previously fixed dates in the contract. Credit risk in Islamic microfinance is unique according to each and every type of financial product. IMFIs are exposed to credit risk in Murabaha transactions when the good or asset is delivered to the client but in return, the latter does not succeed to pay back on time. In the case of investment contracts such as the Mudharaba investment when the IMFI is the principal (indicated as Rab al-Mal) providing the capital but cannot participate in the management process of the project and the client is the agent (called Mudharib) is working partner. In an imperfect market of information asymmetry and moral hazard the IMFI runs a credit risk related to the capital advanced to the Mudharib.

In the context of Islamic finance, funds generally come from three sources: shareholder capital; depositors who place their funds in a safe place (wadia'h); and those who invest-depositors who want their savings to be used to generate returns that come from sharing bank profits through investment accounts. In Liabilities, a common practice by all Islamic financial institutions is to accept deposits into investment accounts and current accounts. The liabilities of an Islamic financial institution are significantly different from what can be seen on the balance sheet of its conventional counterpart. It is in fact made up of different categories of deposits. These can be either deposits made by customers, entrusted to the bank for investment purposes, and which are not guaranteed in exchange for profit and loss sharing or simply unpaid current accounts.

The funding sources for Conventional MFIs come mainly from foreign donors, governments, and private investors as well as concessional debt. In addition to external funds (shareholder capital), customers' savings, and investment deposits, Islamic MFIs benefit from Islamic charitable donations known as Zakat, Awqaf, and Sadaqah (Ahmed, 2002). These philanthropic funds can be granted in the form of subsidies or interest-free loans to the poorest for their consumption needs, housing construction, or production purposes aimed at alleviating absolute poverty (Fersi and Boujelbène, 2017).

The trade-off theory offers a valuable framework for understanding the capital structure decisions of

microfinance institutions (MFIs). This theory delves into the complex balance that MFIs seek to establish between the benefits of debt, such as tax advantages, and the associated costs, including the risk of financial distress, inherent in various sources of funding. By integrating trade-off theory, a deeper understanding can be gained of the factors that steer MFIs towards specific funding sources, illuminating the logic behind their choices and discerning how these decisions ultimately shape their financial performance and risk management strategies. For microfinance institutions, equity is dedicated not only to cover investment needs but also to cover risk hedging requirements. They represent a system by which banking organizations guarantee their solvency and ensure the sustainability of their activities. They allow the institution to absorb unexpected losses which are neither provisioned nor included in the pricing of customer services (Descamps and Soichot, 2002). Focusing on deposit-taking MFIs, Abrar and Javaid (2016) investigate the impact of deposit-to-asset, net deposits, and debt-to-equity ratios as funding sources on profitability. Their findings show that deposits are positively linked to high profitability.

Empirical Studies

-Risk-Taking Behavior and Non-Performing Loans

According to conventional risk-taking analysis, moral hazard is presumed to be leading managers to undertake high-risk contracts (Hellman *et al.*, 2000; Kahn and Winton, 2004; Leland and Pyle, 1977). Agency theory states that the relationship between lenders (principal) and borrowers (agent) is characterized by information asymmetry and moral hazard. Behavioral finance, on the other hand, offers an intriguing perspective on the dynamics of risk taking. This approach recognizes that individuals are not always perfectly rational in their financial decisions, but are influenced by cognitive and emotional biases. Loan officers and managers within microfinance institutions can be plagued by biases such as excessive optimism, overconfidence or loss aversion. Under the assumption that profits will exceed expenses, managers are led to get involved in higher-risk activities. In this respect, Foos *et al.* (2007), and Salas and Saurina (2002) state that a higher net interest margin signifies that these loans are granted to higher-risk customers, who are charged more for their high

probability of default. Net interest margin is negatively linked to risk-taking, where low margins reflect higher non-performing loans. Excessive risk-taking is understood as according to low-interest loans, or offering high-interest deposits, which will negatively affect the risk levels in the long term (Foos *et al*., 2007). As socially oriented financial institutions, the intermediation between lenders and poor borrowers has to be carried out with the lowest possible costs. The microfinance sector is witnessing a growing demand for microfinance services. Thus, if the demand for saving services increases relative to the demand for loans, it is more likely to be in a situation of decreasing the net interest margin. However, the opposite is true if the demand for loans is higher relative to saving services. The term relative to net interest margin used in Islamic microfinance institutions is "profit and loss sharing margin" since interest is prohibited by Islamic law. Islamic MFIs are supposed to distribute funds to productive financing, based on profit and loss sharing mode of financing.

These theoretical underpinnings underlie our exploration of how cognitive biases, such as excessive optimism and overconfidence, can shape risk-taking behavior among loan officers and managers within MFIs. Building on the empirical and theoretical examination of the relationship between risk-taking behavior and portfolio quality degradation in the previous section, the following hypothesis is proposed to test the existing relationship between risk-taking behavior risk and non-performing loans.

H_1: Net interest margin has a significant negative influence on non-performing loans.

-Loan Growth and Credit Risk

The loan growth ratio is employed in the literature as an indicator of credit risk. Several studies used loan growth as a proxy of financial institution risk-taking (Ben Salah Mahdi and Boujelbène, 2018; Berger and Udell, 2004; Foos *et al*., 2007; Salas and Saurina, 2002). An aggressive loan growth policy is linked to loans granted to riskier borrowers. Excessive risk-taking is driven by underestimating borrowers' risk levels and overestimating their abilities to overcome future and external downturns. Loan officers overestimate the repayment capacities of borrowers and thus, are more willing to grant loans (Ben-David *et al*., 2013; Campbell *et al*., 2011; Goel and Thakor, 2008; Malmendier and Tate, 2005; Silipo *et al*., 2017). In addition, loan officers

underestimate the risk profile of their borrowers and therefore, tend to lend more to highly risky borrowers (Hirshleifer and Luo, 2001).

H_2: Excessive loan growth has a significant positive influence on non-performing loans.

-Loan Loss Provision and Expected Loan Loss

Usually, loan loss provisions are higher compared to regular financial institutions because microloan portfolios are often not backed by collateral. The provision for loan impairment assets indicates the expense incurred by the microfinance institution to anticipate future payment default and loan losses. Loan loss provisions are perceived as a reflection of the expected loan loss (Bikker and Metzemakers, 2005). The accrual rate is a measure that provides an indication of the provisions made by institutions to anticipate future loan losses. This expense is expected to increase concomitantly with the growth of the loan portfolio.

Provisions reflect the prospects for possible future risks. Any misestimation of future risk would be represented by smaller provisions against borrowed assets. Several previous studies have documented features of managerial loss prediction (Black and Gallemore, 2013; Eisenbach and Schmalz, 2015). According to these research studies, the forecasts accepted by managers who underestimate the risk profile of their assets are small and less connected with current and future non-performing loans.

H_3: Loan loss provisions have a significant negative relationship with non-performing loans.

-Risk-Taking Behavior and Performance

Each financial diagnosis revolves around two fundamental dimensions: profitability and risk. Financial theories report that risk and performance should not be judged independently. Since Markowitz (1952), theories have studied the interactions between risk, diversification, and performance. Financial theories reveal that asset profitability is mainly explained by the degree of diversification of the asset portfolio and the degree of risk-taking. The majority of empirical studies consider internal factors related to specific characteristics of banks as well as external factors related to the banking industry and the economy. Internal factors are generally

management-related factors such as risk management, cost management, liquidity, capital, size, etc. Credit risk also determines bank profitability. Credit risk is generally measured by the provisioning rate for bad debts. High credit risk indicates poor asset quality, therefore, declining profitability. Thus, credit risk negatively affects the profitability of banks. Studies have showed that credit risk negatively affects the return on assets of conventional microfinance institutions (Abdullah and Quayes, 2016; Chikalipah, 2018; Devi and Shaikh, 2017).

Most microfinance programs are based on a dual mission: to provide financial services to poor people and to achieve financial sustainability. Any Microfinance Institution (MFI) is vulnerable to risk given its financial character. Most microfinance institutions are small, unprofitable, and lack adequate systems to minimize their risks (Fersi and Boujelbène, 2023). Although the available literature on microfinance reports success stories such as BancoSol in Bolivia or the BIS Microfinance Section in Indonesia, it is clear that these cases are quite exceptional (Tisdell and Ahmad, 2018). In order to assist microfinance programs that strive to fulfill their dual mission of sustaining and assisting the poorest, the risk assessment framework must have two major components, namely: financial sustainability and institutional development.

H_4: In the case of conventional microfinance institutions as well as Islamic ones, non-performing loans have a significant negative influence on financial performance.

-Capital Structure as a Moderator

Capital structure refers to the combination of different sources of financing that a company uses to operate and grow its business. These sources typically include debt (such as loans or bonds) and equity (such as stock or retained earnings). Capital structure decisions involve determining the proportion of debt and equity that the company uses to finance its operations. In the context of research and analysis, a moderator is a variable that affects or modifies the strength or direction of the relationship between two other variables.

Using multiple regression, Hasbi (2015) studied the effect of capital structure, growth, and profitability on the firm value of 152 Islamic microfinance institutions (Baitul Maal Wat Tamwil- BMT) located in 12 provinces

in Indonesia for the 2009-2014 period. According to the empirical results, capital structure level has a significant positive effect on the financial performance of the studied Islamic microfinance institutions and provides a cushion to face possible future insolvency. Haron and Ibrahim (2016) analyze the determinants of Islamic MFIs' profitability in Malaysia over a seven-year period (2006-2012). The results of an OLS regression show that the IMFIs specifics affect its financial performance indicating that it is negatively determined by the capital ratio, inflation, and Gross National Income (GNI) per capita.

Thus, the trade-off theory postulates that the capital structure acts as a moderator in the relationship between risk taking and the financial performance of MFIs. The following hypothesis offers a framework to illuminate the underlying mechanisms and complex dynamics that shape the financial and operational decisions of MFIs, highlighting the importance of finding the right balance between different sources of funding to optimize their overall performance.

H_5: Capital structure moderates the effect of risk-taking factors on the financial performance of conventional and Islamic microfinance institutions.

METHODOLOGY

Sample and Procedure

The data set included financial statements of a diversified type of Microfinance institutions operating in different continents around the world. Our sample covers a strongly balanced panel dataset of 2596 observations over the period 2005 to 2015 (Conventional: 1969 observations; Islamic: 627 observations). The microfinance institutions included in the study are from East Europe and the Pacific (EAP), Eastern Europe and Central Asia (EECA), the Middle East and North Africa (MENA), and South Asia (SA). The data were extracted from the Mix Market database. The distribution of microfinance institutions sampled by type and region is summarized in Table 1.

Data Analysis Technique

Region	Conventional MFIs	Islamic MFIs
MENA	20	18
EECA	54	3
EAP	32	23
SA	73	13
Total	**179**	**57**

Source: Authors' computation using STATA

Table 1. MFIs by Type and Country

MFIs are unlisted organizations for the most part, which made us limit ourselves to the use of accounting indicators. As the sample is characterized by heterogeneous institutional forms and consequently a heterogeneity of strategic objectives pursued and intervention approaches, it was necessary to find common performance measurement indicators that could have the same interpretation for all the MFIs categories. MFIs are generally considered hybrid organizations. They are subject to operating logic that is difficult to reconcile since they are both private and collective. The MFIs performance issues are marked by the virulent debate between two competing postures (Morduch, 2000). Toward maximizing their sustainability, MFIs have to apply high interest rates, largely higher than market rates. But such a strategy is rather in opposition to the social orientation of these institutions because high-interest rates can exclude poor borrowers particularly those living in rural areas. Therefore, "financial self-sufficiency" is the selected indicator of financial performance. Whatever their statutes and legal forms are, MFIs aim to maximize the capacity to repay credit. This capacity is apprehended by the quality of the MFI portfolio and measured by the Risk Portfolio (PAR) (Abdullah and Quayes, 2016; Chikalipah, 2018; D'espallier *et al*., 2011; Devi and Shaikh, 2017; Périlleux and Szafarz, 2015). Risk coverage should be analyzed in conjunction with portfolios at risk since they are interdependent. Lower risk coverage generates increasing credit risks and costs, and consequently, lower efficiency. Risk-taking factors are measured by net interest margin, loan growth, and loan loss provisions.

The financial structure variables are closely related to equity and debt. Following Bogan (2012), "equity to total asset ratio" (CAR) is the first used measure for capital structure indicators. Debt consists of deposits and short-term bank loans. Most surveys on the MFIs funding structure indicate that domestic short-term debt is the primary financing instrument for these MFIs. Therefore, the "debt to equity ratio" (DER) is maintained as

the second indicator of capital funding structure. The volume of deposits also determines financial performance. The larger the volume of deposits is, the more the bank is able to expand and diversify its activities, thus to make profits. However, this can be achieved only if the institution is able to convert these deposits into productive assets. Therefore, the "deposits to total assets" (DAR) is selected as the third indicator on capital structure.

The Size variable allows models to be controlled by the specific characteristics of MFIs. Since the MFIs come from six regions, we checked the models against the characteristics of each country. The GDP per capita and inflation rate variables have been introduced for this purpose. The MFI type is measured by the variable " Dummy". It is a categorical variable that takes the value 1 if the MFI is Islamic and 0 otherwise. Table 2 (see Appendix-I) describes all the variables.

Model Specification

The analytical model was built to study the complex relationships between risk-taking factors, non-performing loans, capital structure, and financial performance of conventional and Islamic MFIs. Two main dimensions of MFI performance were considered: portfolio quality (measured by Portfolio at Risk - PaR) and financial performance (measured by Financial Self-Sufficiency - FP). To exploit the temporal (2005 to 2015) and cross-sectional (236 MFIs) nature of the data, regression analyses with panel data were conducted. The model includes eleven time-invariant explanatory variables that account for institutional variations. The selected econometric model is based on cross-sectional generalized least squares (GLS) with an autoregressive perturbation term of order one, dealing with the problems of heteroscedasticity and autocorrelation of order one (Baltagi and Wu, 1999). The general model, shown below, represents the equations for estimating portfolio quality and financial performance:

$$PaR_{ij} = \alpha 0 + \alpha_1 LG_{ij} + \alpha_2 NIM_{ij} + \alpha_3 LLP_{ij} + \alpha_4 Size_{ij} + \alpha_5 GDP_{ij} + \alpha_6 INFL_{ij} + \alpha_7 Dummy_{ij} + \varepsilon t \qquad (1)$$

$$FP_{it} = \alpha_0 + \alpha_1 DER * LG_{ij} + {}_2CAR * LG_{ij} + \alpha_3 DAR * LG_{ij} + \alpha_4 DER * NIM_{ij} + \alpha_5 CAR * NIM_{ij} + \alpha_6 DAR * NIM_{ij}$$

$$+ \alpha_7 DER * LLP_{ij} + \alpha_8 CAR * LLP_{ij} + \alpha_9 DAR * LLP_{ij} + \alpha_{10} LG_{ij} + \alpha_{11} NIM_{ij} + \alpha_{12} LLP_{ij} + \alpha_{13} DER_{ij} + \alpha_{14} CAR_{ij} + \alpha_{15} DAR_{ij} + \alpha_{16} PaR_{ij} + \alpha_{17} DER * PaR_{ij} + \alpha_{18} CAR * PaR_{ij} + \alpha_{19} DAR * PaR_{ij} + \alpha_{20} Size_{ij} + \alpha_{21} GDP_{ij} + \alpha_{22} INFL_{ij} + \alpha_{23} Dummy_{ij} + \varepsilon_t \quad (2)$$

Equation (1) captures the relationship between risk factors, non-performing loans and financial performance, while equation (2) captures the influence of capital structure on financial performance. The variables within each equation are defined in Table 2.

Through these equations, the study aims to provide insights into the interaction between risk-taking factors, capital structure and financial performance in the context of microfinance institutions, taking into account the unique aspects of conventional and Islamic MFIs in different regions and periods.

RESULTS

Univariate Analysis

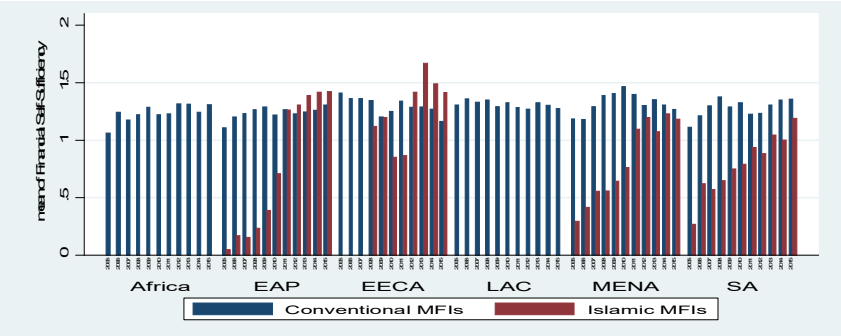
Table 3 provides the descriptive statistics for continuous variables. The differences in the means of the variables are significant at the 1% level. The descriptive statistics and the mean-comparison test indicate that on average conventional MFIs are financially sustainable (average FP of 1.2827), however, Islamic MFIs are

	Type	Mean	Stand. Dev.	Min	Max	Sig.	*t*-test
Financial Self-Sufficiency	CMFIs	1.2827	0.3722	0	6.67	0.009	22.84***
	IMFIs	0.7989	0.6692	0	2.73		
Capital to total asset (CAP)	CMFIs	0.3753	0.2861	-2.78	1.93	0.006	6.58***
	IMFIs	0.2844	0.3441	-1.87	1.25		
Debt to equity (DER)	CMFIs	3.9556	4.1945	-6.94	74.97	0.077	11.99**
	IMFIs	1.8486	2.3517	-1.72	11.38		
Deposit to total asset (DAR)	CMFIs	0.1935	0.2552	0	0.998	0.005	2.03***
	IMFIs	0.1692	0.2745	0	0.988		
Portfolio at Risk (PaR)	CMFIs	0.3802	0.0059	0	1.732	0.005	13.31***
	IMFIs	0.1949	0.0101	0	1		
Net Interest Margin (NIM)	CMFIs	0.3341	0.005	-0.718	0.999	0.004	8.66***
	IMFIs	0.2278	0.0102	-0.886	0.997		
Loan Growth (LG)	CMFIs	0.2793	0.0162	-1.14	15.17	0.013	5.78***
	IMFIs	0.1776	0.0202	-1	5.13		
Loan Loss Provisions (LLP)	CMFIs	0.2785	0.0079	-0.98	0.99	0.006	5.11***
	IMFIs	0.1987	0.0121	-0.9	0.97		
Ln_total asset (Size)	CMFIs	15.988	3.777	0	22.59	0.108	26.27*
	IMFIs	10.077	7.4101	0	19.79		

Source: Authors' computation using STATA

Table 3. Descriptive Statistics and the Mean-Comparison Test

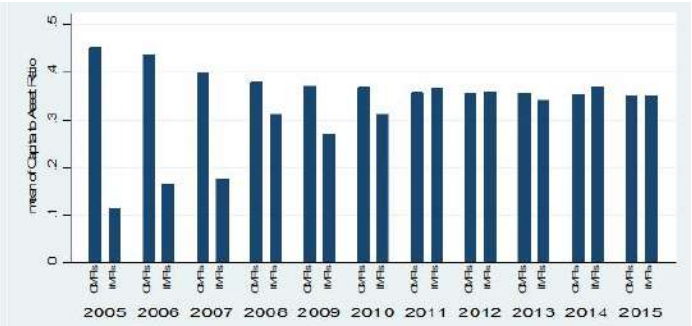
operationally self-sufficient (average FP of 0.7989). Notwithstanding, during the last four years of our study period Figure 1 reveals that IMFIs were financially sustainable and outperformed their conventional counterparts. This result is consistent with the results of empirical studies (Mahmood *et al.*, 2014).



Source: Authors' presentation

Figure 1. Financial Self-Sufficiency of Conventional and Islamic MFIs Distribution by Region

Regarding the capital structure ratio (CAR), the comparative analysis allows us to confirm the existence of differences between Islamic and conventional MFIs in terms of capital structure. The CAR is significant at the 1% level. Conventional MFIs have a higher proportion of equity compared to their Islamic counterparts. However, Figure 2 reveals that during the last four years of our study period, equity represents a larger source of asset funding in Islamic MFIs. The average CAR indicates that on average MFIs have a capitalization ratio above the regulatory minimum required in most regions of the world. On average, they have a satisfactory

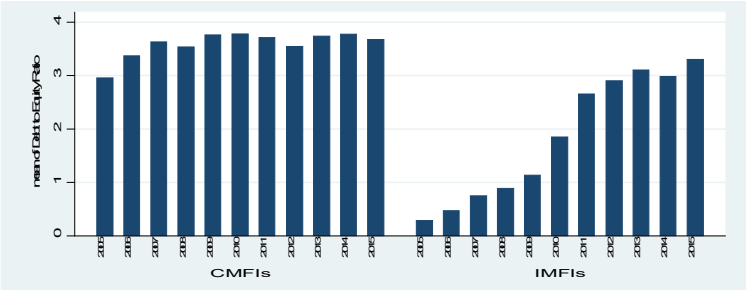


Source: Authors' presentation

Figure 2. Capital to Asset Ratio Distribution for CMFIs and IMFIs

capital reserve. This supplement allows them not only to face unforeseen risks but also to manage the difficulty of carrying out an instant capital increase. The debt to total equity ratio (DER) ratio, with an average of 3.9556 for conventional MFIs, is twice smaller within Islamic MFIs (1.8486) and significant at 1% level. The DER value was 3.96 times on average, which means that CMFIs use almost four times more debt than equity. DER indicates how much the CMFI's asset portfolio is funded by borrowings. Thus, it implies that these institutions highly rely on borrowings and subsidies as funding sources for lending. This result is consistent with that of Chauhan (2019) who reveals that MFIs are highly dependent on debt to finance their assets.

With regard to the indebtedness ratio, the comparative analysis shows that equity constitutes the majority of the funding sources in IMFIs. In addition, a lower DER indicates that IMFIs are on average less risky than their conventional counterparts. What significantly differentiates an Islamic microfinance system from the conventional one is the absence of an interbank money market where these institutions can refinance themselves. Furthermore, the IMFIs, cannot turn to other banks for refinancing in case of liquidity need. The central bank plays a marginal role in providing liquidity to IMFIs as part of its monetary policy and does not act as a last-resort lender. IMFIs refinance with the central bank at a fixed interest rate. However, Figure 3 shows that IMFI's borrowings have continuously increased during our study period. On average, Islamic MFIs have

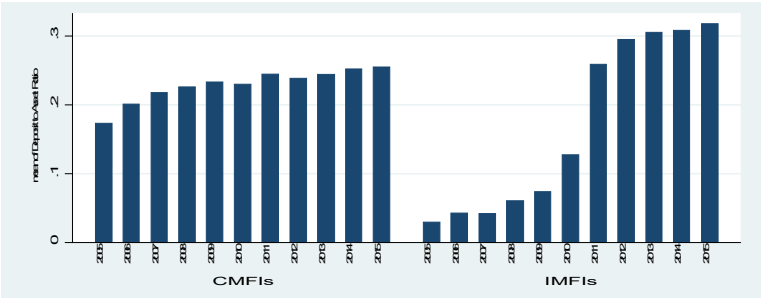


Source: Authors' presentation

Figure 3. Debt to Equity Ratio Distribution for CMFIs and IMFIs

a lower volume of deposits (DAR) compared to conventional MFIs and the difference is significant at the 1% level. Client deposits as a source of external bank funding are lower in Islamic MFIs. Contrariwise, Figure 4

shows that the deposits within the IMFIs gradually increased and reached higher levels than those recorded by conventional MFIs during the last years of the study period.



Source: Authors' presentation

Figure 4. Deposit to Asset Ratio Distribution for CMFI and IMFIs

The average quality of the portfolio (PAR) is 0.3802 (CMFIs) and 0.1949 (IMFIs), which is above the threshold of 0.1. It can be concluded that, on average the risk of the credit portfolio of our sample is high. The NIM, LG, and LLP variables are significantly higher than the 1% level in conventional MFIs. In terms of size (SIZE), Islamic MFIs are significantly smaller compared to conventional MFIs at the 1% level. They hold fewer assets. In general, The Islamic microfinance system is a new industry and IMFIs are recent institutions, which partly explain their small size.

The examination of the multi-collinearity of the explanatory variables (Table 4) shows that the correlation between the MFIs asset size (Size) and the nature of the MFI (Dummy) is strong and significant, indicating that Islamic microfinance is relatively a new industry and the institutions are recent, which partly explains their small size. The evaluation of multi-collinearity indicates that these correlated explanatory variables have, just like the other explanatory variables, VIFs (Variance Inflation Factor) less than ten. We conclude that these relationships slightly disturb the model and the estimation of the coefficients.

Multivariate Analysis

Determinants of Risk-taking and Financial Performance

In this section, we investigated the influence of risk-taking factors on credit risk exposure for conventional and Islamic MFIs. The regression model is generally significant, indicating that the risk-taking-related variables

	CAP	DER	DAR	NIM	LG	LLP	Size	Dummy	GDPG	INFL
CAP	1									
DER	-0.05*	1								
DAR	-0.02**	0.24***	1							
NIM	0.11**	0.13***	0.28***	1						
LG	0.03*	0.11***	-0.002	-0.007	1					
LLP	0.029	0.11***	0.103***	0.06***	0.1***	1				
Size	0.22***	0.20***	0.16***	0.12***	0.26***	0.15***	1			
Dummy	-0.13***	-0.29***	-0.04**	-0.11***	-0.17***	-0.09***	-0.46***	1		
GDPG	0.1***	-0.10***	-0.064***	-0.09***	0.07***	-0.09***	0.069***	-0.05**	1	
INFL	0.05***	0.017	-0.13***	0.08***	-0.12***	0.013	-0.09***	0.03	-0.3***	1
VIF	1.09	1.17	1.20	1.18	1.05	1.05	1.47	1.39	1.13	1.13

Source: Authors' computation using STATA
*, **, *** significant at the 5%, 1% and .1% respectively.
CAR: capital to asset ratio; DER: debt to equity; DAR: deposit to asset; NIM: net interest margin; LG: loan growth; LLP: loan loss provision; Size: logarithm of total asset; Dummy: type of MFI; GDPG: economic growth; INFL: economic inflation; VIF: variance inflation factor

Table 4. Correlation Matrix and VIF

influence the quality of the credit portfolios of conventional and Islamic MFIs. The determination coefficients (R^2 between) are close to those generally observed in studies using panel data. The R^2 close to 0.3 is considered to be significant. The chi-square test is highly significant. The Hausman test and the Breusch-Pagan test indicate that the random effects are significant at the 1% level. White's test significantly rejects the null hypothesis at the 1% level indicating the presence of heteroskedasticity. Finally, the Wooldridge autocorrelation test is significant at the 5% level.

The "portfolio at risk of 30 days" is selected as an indicator of credit risk. Table 5 (Appendix-III) displays the estimation results for the selected model of the determinants of credit risk exposure. The results provide different positive and statistically significant effects of the net interest margin, loan growth, and loan loss provisions as risk-taking factors on non-performing loans at the 1% level.

According to the findings, high net interest margins significantly influence the increase of non-performing loans at the level of 1%, also recorded for IMFIs. Therefore, the hypothesis H_1 which stipulates that risk-taking shown in charging high-interest margins positively impacts non-performing loans is confirmed within IMFIs. Thus, the non-performing loans are in certain ways a consequence of charging high-interest rates; hence, this indicator does not seem to be biased by managerial risk-taking on average. This finding is not in line with Adair

and Berguiga's (2015) study conclusion which claims that high-interest margins help MFIs avoid the deterioration of their loan portfolio.

The results also exhibit a negative and statistically significant relationship at the level of 1% between the credit portfolio quality and loan growth within CMFIs. Therefore, with each increase in lending by one unit, credit risk decreases by 2.48% for CMFIs. Thus, hypothesis H_2 is unconfirmed within CMFIs. This result is consonant with that of Yimga (2015) and Gonzalez (2010) who found a statistically significant adverse relationship between loan growth and portfolio at risk within their sampled MFIs, indicating that, at a certain level loan growth improves the loan portfolio quality.

According to the GLS regression results, there is a positive and statistically significant relationship between LLP and portfolio quality for IMFIs at the 1% level. This finding shows that with each increase of 1 unit in loan loss provision, non-performing loans increased by almost 6%. The Constitution of provisions for significant bad loans contributes to the deterioration of the IMFIs credit portfolio quality. Thus, hypothesis H_3 is rejected within the IMFIs context. This finding is consistent with that of Boudriga *et al*. (2010) and Bouvatier and Lepetit (2012) who found a significant positive relationship between loan loss provisions and credit risk.

The control variable size has a significant positive relationship with credit risk exposure at the 1% level. Large MFIs have more resources and are more experienced in dealing with bad borrowers. Small MFIs, on the contrary, may be exposed to the problem of adverse selection due to the lack of skills and experience necessary to effectively assess of their borrowers' credit quality.

Table 6 (see Appendix-IV) displays the results of the impact of risk-taking factors and credit risk exposure on financial performance measured by financial self-sufficiency within conventional and Islamic microfinance institutions. The regression model is generally significant, indicating that the variables related to credit risk influence the financial performance of both conventional and Islamic MFIs. The coefficients of determination (R^2 between) are significant over 50%. The chi-square test is highly significant. The Breusch-Pagan test indicates that the random effects are significant at the 1% level. White's test significantly rejects the null hypothesis at 10% indicating the presence of heteroscedasticity and the Wooldridge test indicates the

presence of autocorrelation of errors at the 1% level.

The findings reveal a significant negative relationship between the credit risk indicator and the Conventional and Islamic MFIs' financial performance. Our assumption in H_4 supposing that a high non-performing loan reduces the MFIs performance is, therefore, confirmed at the level of 1%. The results further show that one unit rises in nonperforming loans (deterioration of loan portfolio quality) decreases the financial performance by almost 1% and 4% for Conventional and Islamic MFIs, respectively. However, loan growth seems to positively impact financial performance once bad loans have had time to materialize. The results reflect a significant positive relationship between credit risk and performance alongside a significant positive effect of loan growth for CMFIs and IMFIs on average at the level of 1%. Low-quality loan portfolios, contemporarily with loan growth, contribute to better financial auto-sufficiency of conventional and Islamic MFIs on average. The achieved results attest to the importance of checking the models by the characteristics specific to MFIs and the countries where they evolve. Indeed, size has a positive and significant effect on the performance measured by financial self-sufficiency. On the other hand, performance is significantly higher in countries with a high economic development level. In addition, the level of price inflation has a negative influence on financial performance, indicating that MFIs operating in an institutional environment marked by inflation may suffer.

Moderating Role of Capital Structure

In this section, we investigated the influence of risk-taking factors on the financial performance of CMFIs and IMFIs while considering the moderating effect of capital structure. The regression model is generally significant, indicating that the variables related to risk-taking affect the financial self-sufficiency of conventional and Islamic MFIs. The coefficient of determination (R^2 between) is .3519 (35.19%) and is considered to be significant. The chi-square test is highly significant. The Hausman test and the Breusch-Pagan test indicate that the fixed effects are significant at the 1% level. White's test fails to reject the null hypothesis indicating the absence of heteroskedasticity. Finally, the Wooldridge first-order autocorrelation test is significant at the 1% level.

Capital structure indicators reveal a significant positive effect on financial performance for both Conventional and Islamic MFIs on average at the 1% level. These results are in accordance with those of

Hasbi (2015), and Qayyum and Noreen (2019), which revealed a significant positive relationship between capital structure and performance. The Debt-to-Equity ratio (Leverage) is the measure of the microfinance institution's overall leverage. This result suggests that the most capitalized MFIs are the most profitable. Thus, validating the first results obtained by the comparative analysis. This positive influence is the fruit of the good MFIs' financial health which guarantees them new capital contributions for an intensification of the credit activity. Leverage appears to significantly positively affect the financial performance of the two MFIs types on average. Meanwhile, the capital to total asset ratio (CAR) positively reflects the performance of the sampled MFIs as well as deposits to total assets (DAR). The introduction of the capital structure indicators in the model changed the impact of credit risk exposure on financial performance.

It is worth reminding that, in this study, we focused on the moderating effect of the financing structure on the relationship between credit risk-taking and the financial performance of CMFIs and IMFIs. More explicitly, we tested whether this relationship varies in the presence of three different funding mechanisms. In theory, the capital-risk relationship has developed mainly through theoretical constructs designed to study the effectiveness of capital regulation in mitigating banking risk. Empirically, the most of the studies dealing with this topic focused on the existence of a causal link between risk and capital (Ghosh, 2014; Tulchin, 2003; Yunus, 2007). In addition, many of these studies have proven the existence of a trade-off between risk-taking and inefficiency that can be critical to the design of an institution's financial structure (Abrar and Javaid, 2014; Armendariz and Szafarz, 2011; Banerjee *et al.*, 2015; D'espallier *et al.*, 2011). Table 7 (see Appendix-V) reports the estimation results of the moderating effect of capital structure on the relationship between risk-taking and financial performance.

According to the results, we report a significant positive impact at the level of 1% of capital to assets ratio on the relationship between risk exposure measured by a portfolio at risk and financial performance recorded for the full sample. In light of this finding, equity funding is moderating the effect of credit risk on financial performance for conventional and Islamic MFIs. Similarly, the moderating effect within equity means of funding is confirmed since the GLS estimation recorded a statistically significant and positive impact of capital-to-asset

ratio at the level of 5%, 1%, and 10% on the relationship between risk-taking behavior indicated by high-interest margins, aggressive loan growth and low loan loss provisions and financial performance, respectively.

The GLS estimation results show that the moderating effect of capital structure within equity funding on the relationship between low-interest margins and performance is positive and statistically significant at the level of 1% in conventional microfinance institutions. However, the moderating effect within leverage is statistically confirmed at the level of 5% recorded for Islamic microfinance institutions. The moderating effect of capital structure within leverage funding on the relationship between risk-taking behavior and financial performance is therefore confirmed in conventional as well as Islamic microfinance institutions.

DISCUSSION

Our research explored the financial performance of microfinance institutions by addressing the issue of non-performing loan portfolios from a behavioral perspective. Moreover, we widened our investigation to study the moderating role played by the capital structure. Previous studies have often examined credit risk from the perspective of moral hazard and adverse selection (Fianto, 2019; Ghatek and Guinnane, 1999; Lassoued, 2017), but the behavioral and emotional aspects of non-performing loans have been less studied. Our hypothesis suggested that overconfidence among loan officers/managers could lead to riskier portfolios and, therefore, an increase in non-performing loans. We used three accounting-based indicators, i.e., “loan growth”, “net interest margin” and “provision for loan losses”, as proxies of overconfidence behavior. The results indicated a positive correlation between non-performing loans and two of these indicators of overconfidence. This finding is consistent with the theoretical perspective that overconfident loan officers/managers may underestimate borrowers’ risk, thereby leading to an increase in non-performing loans.

Interest margins, reflecting default risk, often reveal lending to riskier customers (Foos *et al*., 2007). Therefore, lower interest margins may mean greater overconfidence. Contrary to the assertions of Adair and Berguiga (2015), our findings contradict their conclusions that high-interest margins help preserve the quality of the loan portfolio. Our results are more consistent with Korankye’s (2014) finding of a strong correlation between poor loan portfolio quality and high-interest rates.

Loan growth, an indicator of risk-taking, is negatively correlated with credit risk in our results, which is consistent with Gonzalez (2010) and Yimga (2015). This finding aligns with the theory that suggests aggressive lending expansion may be the result of overconfidence, leading to borrowers' underestimation of risk and eventually, non-performing loans.

Regarding loan loss provisions, our findings confirm a positive correlation with non-performing loans. Provisions reflect expected loan losses and relate to managers' outlook on potential future risk. This result agrees with Boudriga *et al*. (2010), and Bouvatier and Lepetit (2012), highlighting a significant positive relationship between loan loss provisions and credit risk. This is consistent with the theory that provisions reflect expected losses on loans and are linked to managers' perceptions of future risk.

Trade-off theory, suggests that MFIs seek to balance the benefits of debt, such as tax advantages, with the associated costs, including the risk of financial distress. Capital structure acts as a moderator in the relationship between credit risk and financial performance. It allows MFIs to guarantee their solvency and cope with unexpected losses. Our results show a significant positive effect, in agreement with Hasbi (2015), and Qayyum and Noreen (2019). The relationship between capital, risk, and performance revolves around achieving profitability for a given level of risk. Capital structure moderates the effect of risk-taking and credit risk on financial performance. Financing mechanisms such as equity financing and profit sharing play crucial roles for Islamic microfinance institutions. The moderating role of capital structure in the relationship between credit risk and profitability reinforces the sector's shift towards commercialization, aimed at accessing new sources of finance while serving vulnerable customers. Our findings enrich the understanding of manager risk-taking behavior in microfinance institutions and shed light on their transformation into for-profit entities to access financial markets while maintaining social goals.

CONCLUSION

Our research is an attempt to analyze the importance of risk-taking behavior in risk-taking decisions in the first step, and further investigate the role of the capital structure in moderating the impact of credit risk exposure

on the financial performance of Conventional and Islamic MFIs, in the second step. In light of our results, it can be concluded that there is a risk-taking behavior in lending decisions at the level of loan officers who are sensitive to the economic situation of the country and the quality of the loan portfolios within CMFIs. However, in the case of IMFIs, the risk-taking behavior is fueled by the quality of assets as well as the quality of non-performing loans. From this perspective, our results are consistent with those found by Ben-David *et al*. (2013), Ben Salah Mahdi and Boujelbène (2018), Lambert *et al*. (2012) and Silipo *et al*. (2017); who proved the positive relationship between emotional behavior and the risk-taking level.

The effect of capital structure within leverage funding in moderating the relationship between risk-taking behavior and financial performance is confirmed for CMFIs. However, equity and deposit funding sources seem to moderate the effect of risk-taking behavior in the case of IMFIs. Therefore, the assumption of the capital structure moderating role is confirmed in both CMFIs and IMFIs and within the four regions during the 2005-2015 period.

IMPLICATIONS

Theoretical implications take on an even more significant dimension by highlighting the critical importance of risk-taking behavior in lending decisions, as well as the primary role of financial structure in mitigating the detrimental impact of risk exposure to credit risk on the financial performance of conventional and Islamic MFIs. Our findings strongly reinforce the presence of risk-taking behavior in lending decisions within MFIs, further reinforcing the positive link between emotional behavior and risk-taking propensity.

The practical implications gain strength and relevance by highlighting the strategic role of credit risk management and financial structure in ensuring the sustainability and performance of MFIs. Policymakers can further capitalize on these lessons to strengthen credit risk management and MFI performance, with a focus on regulatory improvements, critical assessments, and attracting investment partners, both local and international.

The implications take on an extended dimension by highlighting the decisive moderating effect of financial

structure on the complex relationship between risk-taking behavior and financial performance. The results strongly suggest that funding sources such as equity and deposits have a determining impact on modulating risk-taking behavior within MFIs. This finding reinforces the imperative to consider capital structure in future studies of MFIs, using accounting-based information to further explore the interplay between risk exposure, capital structure, and performance.

LIMITATIONS AND FUTURE DIRECTIONS

A limitation of our study is the relatively small sample size of microfinance institutions (MFIs) and the focus on specific regions. To improve the generalizability of the findings, future research should consider expanding the sample to include a more diverse range of MFIs from different regions. This would provide a broader perspective on the relationships being examined. Our study relied on account-based indicators to serve as a proxy for risk-taking behaviors and financial performance. While these indicators provide valuable information, future studies could benefit from incorporating additional quantitative and qualitative data, such as surveys and interviews with loan officers and managers. Such data could provide deeper insights into the behavioral aspects influencing lending decisions and risk management. The study covered the period from 2005 to 2015. However, recent changes in the economic and regulatory environments could influence risk-taking behavior and financial performance differently. Future research should consider extending the analysis to include more recent data, allowing for a dynamic understanding of relationships over time. The cross-sectional nature of the study prevents us from drawing causal inferences regarding the observed relationships. Endogeneity issues may also arise due to possible reverse causation. Future researchers should explore more advanced econometric techniques, such as instrumental variable analysis or propensity score matching, to address these concerns.

To better understand the drivers of risk-taking behavior, future studies could integrate psychological and behavioral theories. Qualitative research methodologies, such as in-depth interviews or experiments, could help uncover underlying behavioral mechanisms influencing loan officers' risk perceptions and decisions.

Performing dynamic analysis of panel data could provide insights into changes over time in risk-taking behaviors and capital structure. This approach would explore lagged effects, feedback loops, and potential non-linear relationships between variables. Comparing risk-taking behaviors and financial performance across various financial sectors (e.g., banking, microfinance, fintech) could shed light on the uniqueness of MFIs. Examining whether the observed relationships hold true in other financial contexts could contribute to a broader understanding of risk management practices.

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Appendix-I

	Variables	Indicators	Definition
Performance	Financial Performance (FP)	Financial Self-Sufficiency	*Financial revenue / (Financial Expense + Net Loan Loss Provision + Expense Operating Expense)* Evaluates the ability of the MFI to cover its costs with its financial income.
	Solvency ratio	Capital total asset (CAR)	This indicator helps as a caution for MFIs in order to assess their ability to meet their obligations and absorb unexpected losses.
Capital Structure	Leverage	debt to equity (Leverage)	Leverage is measured by dividing *debts by total equity*. It thus, comprises short-term debts and long-term debts. Excessive leverage increases the MFI risk level because the institution may have limited ability to absorb unexpected credit losses or have borrowed more than it can repay in stress period.
	Deposits	Deposits to total asset (DEP)	This ratio is an indicator of how much a microfinance institution has mobilized its own funds to finance its portfolio and other assets. In accordance with the principles of Islamic finance law, IMFIs collect funds in the form of participatory investment deposits. These funds are unsecured, unlike conventional deposits. As a result, the mobilization of investment funds by IMFIs does not increase their bankruptcy nor financial risks.
Risk taking	Non-Performing Loans	Portfolio at Risk (PaR)	*PaR= outstanding balance of all loans with arrears in excess of 30 days to Gross Loan Portfolio* Credit risk represents the overall managerial approach to risk; it is a suitable representative of other risks. The quality of an MFI's portfolio refers to the quality of its clients' repayments.
	Risk taking factors	Net Interest Margin (NIM)	*Net interest income to earning asset* An excessive risk taking is understood as according low interest loans.
		Loan Growth (LG)	*Net loan portfolio (n-1) – net loan portfolio (n) to net loan portfolio (n-1)* An aggressive growth loan policy is linked with loans granted to more risky borrowers.
		Loan Loss Provisions (LLP)	*Provision for loan impairment to total assets* Low loan loss provisions are less connected with current and future non-performing loans.
MFI-specific control variables	Size	Ln_total asset (Size)	logarithm of total assets
	Type of MFI	Dummy	Binary variable: 1 if the MFI is Islamic and 0 otherwise. Table 1 describes all of the Variables
Region-specific control variables	Economic growth	GDPG	Real GDP growth has a negative effect on the volume of NPLs
	Inflation increase	Inflation rate (INFL)	High inflation can affect NPLs and subsequently hinder the stability of the banking System

Source: Authors' presentation

Table 2. Variables Measures and Definitions

Appendix-II

PaR (Model 1)	Sample	Sub-Sample CMFIs	Sub-Sample IMFIs
NIM	0.0712*** (0.0224)	0.0271 (0.0263)	0.1187*** (0.0413)
LG	-0.0207*** (0.0075)	-0.0248*** (0.0082)	0.00875 (0.0184)
LLP	0.0265* (0.0149)	0.0059 (0.0167)	0.0592* (0.0327)
Size	0.0099*** (0.0011)	0.00318** (0.0015)	0.0137*** (0.00153)
GDPG	0.00014† (0.0032)	0.00243 (0.0037)	0.00385 (0.0073)
INFL	-0.00081† (0.0017)	-0.00145† (0.0022)	-0.0062† (0.0031)
Dummy	-0.0923*** (0.0133)		
Const.	-0.0923* (0.0133)	0.317 (0.044)	0.01303*** (0.0525)
No. Obs.	2571	1962	609
No.Groups	236	179	57
R^2 between	30.36%	3.23%	26.4%
Wald chi2	182.81***	9.72	167.13***
Wooldridge autocorrelation test			
f (1.236) = 6.351			
Prob. > f = 0.0124			
White heteroscedasticity test			
Chi2 (34) = 99.59			
P-value = 0.0000			
Hausman test			
Chi^2 (6) = 9.03			
Prob>Chi^2 = 0.1717			
Breusch-Pagan test			
Chir(1) = 34.47			
p-value = 0.000			

Source: Authors' computation using STATA
†,*,**,*** significant at the 10%, 5%, 1% and .1% respectively.

Table 5. Random Effect GLS Regression

Appendix-III

FP: FSS (Model 2)	sample	Sub-Sample CMFIs	Sub-Sample IMFIs
PaR	-0.020** (0.0078)	-0.0093*** (0.0094)	-0.0309** (0.0616)
-NIM	0.070* (0.0356)	-0.0204** (0.0380)	0.1099* (0.0748)
LG	0.049** (0.0108)	0.0410** (0.0111)	0.0735** (0.0274)
LLP	0.018*** (0.0211)	-0.0317*** (0.0223)	0.0499** (0.0475)
Size	0.0352*** (0.002)	0.0068*** (0.00248)	0.0608** (0.0030)
GDPG	0.0117*** (0.0045)	0.0089*** (0.0048)	0.0152*** (0.009)
INFL	-0.0062*** (0.0027)	0.00065† (0.0023)	-0.015*** (0.0041)
Dummy	-0.024*** (0.033)		
Const.	0.0584** (0.051)	0.088** (0.061)	0.057** (0.079)
No. Obs.	2571	1962	609
No. Groups	236	179	57
R^2 between	52.41%	1%	48.83%
Wald chi2	683.85***	28.21***	757.32***
Wooldridge autocorrelation test *f* (1.236) = 21.602 Prob. > *f* = 0.0000			
White heteroscedasticity test Chi^2 (43) = 56.23 *p*-value = 0.0850			
Breusch-Pagan test Chir(1) = 33.38 *p*-value = 0.000			

Source: Authors' computation using STATA
†, *, **, *** significant at the 10%, 5%, 1% and .1% respectively.

Table 6. Regression Results of Financial Performance Models for Conventional and Islamic MFIs

Appendix-IV

	Sample	Sub-Sample	
		CMFIs	IMFIs
	FP: FSS (M2)	FP: FSS (M2)	FP: FSS (M2)
PaR	0.313 (0.0538)	0.0376*** (0.03122)	0.1487 (0.0683)
NIM	0.201 (0.0781)	-0.0581** (0.0388)	0.1219 (0.0717)
LG	0.123 (0.0193)	0.0425*** (0.0112)	0.1106 (0.0294)
LLP	0.111 (0.0438)	-0.0112*** (0.0229)	0.0955* (0.0524)
CAP	0.433 (0.0539)	0.0961** (0.0312)	0.2455 (0.0612)
DER	0.033*** (0.0046)	0.0009† (0.0023)	0.0590** (0.0100)
DAR	0.268 (0.0676)	0.1209 (0.0404)	0.0539** (0.0786)
CAP*PaR	0.211 (0.0687)	0.2840 (0.0708)	0.7140 (0.1917)
DER*PaR	-0.0336*** (0.0135)	-0.042*** (0.0138)	-0.206 (0.0632)
DAR*PaR	0.1603 (0.0852)	0.1101 (0.0922)	1.3886 (0.2341)
CAP*NIM	0.2234 (0.0972)	-0.0883* (0.0881)	0.5369 (0.1951)
DER*NIM	0.02725*** (0.0084)	0.0110*** (0.0074)	0.1241 (0.0391)
DAR*NIM	-0.1140 (0.1181)	-0.0070*** (0.1164)	-0.0716** (0.3087)
CAP*LG	0.1188 (0.0346)	0.0623** (0.0339)	0.1519 (0.0586)
DER*LG	0.00275*** (0.0032)	0.0021*** (0.0022)	0.0371*** (0.0191)
DAR*LG	0.0422** (0.0471)	0.0304*** (0.05228)	0.402 (0.1205)
CAP*LLP	0.1159 (0.0680)	-0.0586** (0.0508)	0.2517 (0.1501)
DER*LLP	0.0165*** (0.0068)	0.0021*** (0.0052)	0.0586 (0.0362)
DAR*LLP	0.1156 (0.0908)	0.0248*** (0.0872)	0.0910* (0.2153)
Size	0.0285*** (0.0019)	0.0074*** (0.0022)	0.0471*** (0.0036)
GDPG	0.0046*** (0.0051)	0.0041*** (0.0054)	0.0171*** (0.0112)
INFL	-0.0108*** (0.0028)	-.0012† (0.0023)	-0.018*** (0.0046)
Dummy	-0.0182*** (0.0324)		
Const.	0.4302 (0.0324)	0.2433 (0.050)	0.0764* (0.0425)
No. Obs.	2571	1962	609
No. Groups	236	179	57
R^2 between	35.19%	0.42%	41.28%
Wald chi2	18.38***	1.88***	30.85***
Wooldridge autocorrelation test f (1.236) = 20.584 Prob. > f = 0.000			
White heteroscedasticity test Chi^2 (34) = 156.32 p-value = 1.0000			
Hausman test			

Chi2 (6) = 54.80
Prob>Chi2 = 0.0001
Breusch-Pagan test
Chir(1) = 1.34
p-value = 0.2471

Source: Authors' computation using STATA
†, *, **, *** significant at the 10%, 5%, 1% and .1% respectively.

Table 7. Fixed Effect GLS Regression Results of Capital Structure Moderating Effect on Conventional and Islamic MFIs