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Article

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Can Kuznets curve hypothesis explain the mission drift of microfinance institutions? Evidence from developing countries

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ABSTRACT

In order for microfinance institutions (MFIs) to significantly impact the society, they must achieve both financial sustainability and outreach goals simultaneously. However, when MFIs prioritize financial sustainability at the expense of their outreach goals, it is regarded as mission drift. This study introduces the concept of the Kuznets curve hypothesis to explain the occurrence of mission drift in MFIs. By analysing data from 1,323 unique MFIs across 105 emerging countries, between 2010 and 2018, our findings corroborate the existence of the Kuznets curve for outreach and financial goals. The findings demonstrate that MFIs initially prioritize their outreach goal of serving more female clients but gradually shift focus towards financial performance as they expand and accumulate fixed assets. Moreover, we also empirically quantified the critical asset size of MFIs beyond which they are less likely to achieve their outreach and financial sustainability goals. The implications of these findings for policy are also discussed.

1. Introduction

While microfinance was initially established to serve the poor by providing affordable financial services, the pursuit of financial sustainability has taken precedence in recent years. Research suggests that MFIs achieve better financial performance by charging higher interest rates and catering to relatively wealthier clients who require larger loans. Unfortunately, this often results in neglecting the "poorest of the poor," which is commonly referred to as "mission drift." Mission drift occurs when an MFI prioritizes reaching wealthier, unbanked individuals, while simultaneously excluding the poor clients who are in greater need (Armendáriz & Szafarz, 2011).¹ The primary objective of MFIs was originally to combat poverty by offering small, subsidized loans and banking services to the most economically vulnerable segments of society (Mersland & Strøm, 2010; Mia & Lee, 2017). However, there has been a noticeable increase in the emergence of for-profit MFIs over non-profit-oriented ones in developing countries (Biancini, Ettinger & Venet, 2017). This shift poses a threat to the core mission of MFIs, as these institutions now focus on targeting new customer groups,

particularly relatively wealthier or already successful individuals capable of taking on larger loans (Mersland & Strøm, 2010).

Due to variations in estimation techniques and the proxies used to assess mission drift, there is inconclusive evidence regarding whether modern MFIs have truly veered away from their original objective of serving the poor in favor of prioritizing financial performance (Armendáriz & Szafarz, 2011). Furthermore, the lack of clarity in understanding mission drift within MFIs' management or board further undermines claims of pursuing improved financial outcomes (Hishig-suren, 2007). Given the significance of this topic, we have adopted a different approach, such as, incorporating the framework of the Kuznets curve hypothesis to understand potential mission drift within MFIs.

Some previous studies based on country and/or global-level data have found no evidence of mission drift within the microfinance industry (Mersland & Strøm, 2010; Quayes, 2021). However, contrasting findings from other research suggest the presence of mission drift in certain MFIs (Abate, Borzaga, & Getnet, 2014; Cozarenco, Hartarska, & Szafarz, 2022; Mia & Lee, 2017; Ranjani & Kumar, 2018; Serrano-Cinca & Gutiérrez-Nieto, 2014). There are concerns that the pursuit of higher

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¹ Following Cull and Morduch (2017), we define individuals as poor if their income falls below the international poverty lines or if their income places them in the bottom half of their country's poor population. Otherwise, we consider the individual to be relatively wealthy.

profits may overshadow the outreach to poorer clients, as some studies argue that greater profits lead to lower outreach (Zainuddin, Mahi, Akter, & Yasin, 2020). However, recent research (Varendh-Mansson, Wry, & Szafarz, 2020) also suggests that a more commercially oriented microfinance industry can be beneficial in terms of providing services to economically disadvantaged individuals, as profit-oriented efforts promote efficiency.

The issue of mission drift in MFIs arises primarily due to the recent commercialization of the traditionally non-profit microfinance industry. This shift is driven by the necessity to ensure sustainability and efficiency within these institutions (Bardhan, Nag, Mishra, & Tarei, 2021; Mia & Lee, 2017). Additionally, Ghosh and Van Tassel (2008) observed that new and affluent donors have entered the microfinance industry, advocating for the restriction of subsidized financing to new MFIs, with the expectation that they become profit-oriented after an initial period of covering their operating costs. While this approach may provide MFIs with sustainable capital to reach more impoverished households, it can also have adverse effects on the extent of their outreach. Commercialized MFIs heavily rely on high interest rates and additional charges for financial sustainability, which may prove unaffordable for the poorest borrowers, leading to their exclusion from accessing financial services (Coleman, 1999; Copestake, Dawson, Fanning, McKay, & Wright-Revolledo, 2005).

Numerous efforts have been undertaken in the past to gain a deeper understanding of mission drift in MFIs. One notable study by Serrano-Cinca and Gutiérrez-Nieto (2014) employed Pareto's 80/20 principle and revealed that the majority of MFI clients belong to the lower end of the wealth distribution. These clients, due to their small deposits, high administrative costs associated with serving them, and reliance on subsidies, are considered less attractive for MFIs to engage with. Consequently, this has led to mission drift among certain MFIs. Other studies have also explored various factors associated with mission drift in MFIs, including the sources of funds (Mia & Lee, 2017), high operating costs (Segun, 2017), fractionalization (Awaworyi Churchill, 2017), and the profit orientation of MFIs (Mersland & Strøm, 2010), among others.

In order to advance our understanding of the mission drift in the microfinance sector, this study explores the applicability of the Kuznets curve to this phenomenon. The original Kuznets curve proposes that income inequality initially deepens during the early stages of economic development until it reaches a peak, after which it begins to diminish as the economy continues to progress (Kuznets, 1955a&b). This implies an inverted-U-shaped relationship between income inequality and economic development. Building upon this concept, we argue that MFIs initially play a significant role in reducing inequality by providing access to subsidized loans for all categories of poor households, with a particular emphasis on women. However, as MFIs become highly commercialized, they tend to exacerbate the wealth gap. This occurs because their capital becomes affordable only to relatively wealthier clients, leading to the exclusion of extremely poor borrowers who are less profitable and incur higher administrative expenses. Consequently, this widening gap between the poor and the rich is a manifestation of mission drift within commercialized MFIs.

Given the validity of the aforementioned perspective, the Kuznets curve can serve as a valuable tool in identifying the extent to which an MFI deviates from its original mission of serving the poor. Therefore, the primary objective of this study is to answer the following research question: Can the Kuznets curve be applied to assess the relationship between MFIs' dual mission of outreach and financial sustainability? In other words, the study aims to specifically investigate the applicability of the Kuznets curve to MFIs' goals related to outreach and/or financial sustainability.

To achieve this objective, we conducted an analysis of 1,323 unique MFIs across 105 countries during the period from 2010 to 2018, based on the available data. The data was analyzed using conventional econometric tools and techniques, such as Pooled Ordinary Least

Squares, Random Effects Model, and Seemingly Unrelated Regression. Additionally, we employed endogeneity corrected techniques, including the Hausman-Taylor method. The results of our analysis demonstrate that initially, MFIs prioritize serving female borrowers to enhance their outreach. However, as MFIs grow in terms of their physical assets, they gradually shift their focus towards financial sustainability and drift away from serving female borrowers. This finding aligns with the conventional understanding of mission drift within the microfinance industry.

This paper makes several significant contributions. Firstly, it emphasizes the importance of understanding mission drift within the field of microfinance research. By adopting a novel approach to identifying the persistence of this issue among MFIs, this study aims to shed light on why poverty remains stubbornly high in developing countries despite the existence of MFIs for several decades. Secondly, the integration of the Kuznets hypothesis into the explanation of mission drift in MFIs appears to be a unique contribution to the existing microfinance literature, as far as our knowledge extends. Thirdly, to ensure reliable and robust findings, this paper employs several measures of mission drift, as well as different techniques and tools. Fourthly, the findings of this study are expected to provide valuable guidance for policymakers and practitioners in the microfinance industry. This guidance can inform reforms and efforts to strengthen the social objectives of MFIs, thereby enhancing financial inclusion and promoting gender equality, as emphasized in the Sustainable Development Goals (SDGs). Lastly, this study contributes to the theoretical understanding of MFIs by challenging the prevailing notion that mission drift occurs as a one-off instance following commercialization. Instead, it argues that mission drift is a gradual process that takes time to manifest, even after the commercialization of MFIs. In other words, MFIs may initially achieve their primary mission until reaching certain thresholds, beyond which mission drift becomes apparent. Thus, this study integrates the literature on the Kuznets curve to provide an explanatory framework for understanding mission drift in MFIs.

The organization of the article is as follows: Section 2 provides a detailed discussion of the Kuznets hypothesis, mission drift and the relationship between the two. Section 3 discusses data and modelling. Section 4 presents the discussion and findings of the results. Finally, Section 5 highlights the policy implications, limitations, and guidance for future research.

2. Literature Review

2.1. Kuznets Hypothesis

For over six decades, economists have conducted extensive research to understand the relationship between development and income inequality. Among these efforts, Simon Kuznets (1955 a&b) made a significant breakthrough, leading to the development of the Kuznets curve or hypothesis. According to this hypothesis, income inequality tends to increase during the early stages of economic development until it reaches a peak, after which it gradually decreases as the economy continues to advance. As a result, an inverted-U-shaped relationship is observed between income inequality and economic development. In Kuznets (1955b) words:

"... at the initial stages of economic development, though per capita income increases but at the same instance, income distribution becomes really worse. However, after reaching to a stage, due to a further increase in per capita income, income inequality diminishes gradually (p. 3)".

In 1991, Grossman and Krueger introduced a modified concept known as the Environmental Kuznets Curve (EKC) (Grossman and Krueger, 1991). The EKC proposes that during the initial stages of economic growth, there is an increase in environmental degradation. However, as an economy reaches a high level of affluence, further economic growth leads to an improvement in environmental quality.

Since its introduction, the EKC has been widely applied by environmental economists to analyze the non-linear relationship between various indicators of environmental quality and economic growth.

In recent years, a growing body of research, employing various samples and methodological approaches, has provided evidence that access to finance enhances the consumption and entrepreneurial activities of poor households (Mehta & Bhattacharya, 2018). However, to fully comprehend this phenomenon, it is useful to consider the financial Kuznets curve initially observed by Greenwood and Jovanovic (1990). According to this theory, inequality tends to increase during the early stages of financial transformation and subsequently decreases in the later stages. This theory offers two main interpretations regarding the relationship between microfinance and inequality. One perspective suggests an inverted U-shaped association between microfinance and inequality (Azam & Raza, 2018; Baiardi & Morana, 2016). In other words, as the economy progresses through the transitional phase, inequality is likely to increase. However, as the economy enters an advanced phase of development, inequality is expected to decrease. During this advanced phase, more households gain access to the financial sector, resulting in an upsurge in their income (Azam & Raza, 2018; Batuo, Guidi, & Mlambo, 2010).

2.2. Microfinance Institutions and Mission Drift

The achievement of sustainable economic growth and development relies on enhancing social welfare through poverty alleviation. In this context, the microfinance industry has emerged as a promising avenue, as it has the potential to serve the unbanked population (Quayes, 2021). However, concerns have arisen in recent times regarding the industry's departure from its core objective of assisting the poor. Despite the proliferation of numerous microfinance institutions (MFIs) in developing countries across Africa, Asia, and Latin America, a significant portion of the population, especially women, remains trapped in poverty (Quayes, 2021; Segun, 2017). Consequently, policymakers and practitioners are apprehensive that many MFIs may have deviated from their primary goal of reaching the most vulnerable segments of society (Quayes, 2021). An increasing number of MFIs, including prominent regional entities like Banco Compartamos in Mexico, Banco FIE in Brazil, Bandhan and SKS in India, have transitioned into for-profit organizations (D'Espallier, Goedecke, Hudon & Mersland, 2017). This transformation has raised concerns about mission drift, particularly in Latin American MFIs. For example, Banco Compartamos, which became a publicly traded company in 2007, has experienced a decline in the percentage of female borrowers by nearly 10 points, dropping from 97.35% in 2006 to 88.67% in 2018 (World Bank, 2022).

The involvement of large commercial donors and investors in the microfinance industry has marked a significant turning point for MFIs, as these stakeholders often have objectives beyond poverty alleviation (Ghosh & Van Tassel, 2008). While they can provide substantial funds to MFIs for their lending activities, their focus is often profit-oriented, prioritizing maximum returns on investment. The gradual entry of these profit-motivated investors (Ghosh & Van Tassel, 2008; Mia, 2022) suggests that they may eventually outnumber non-profit-oriented donors, exerting influence on the commercialization of MFIs. This raises the fundamental questions: "Can the social and financial missions of MFIs coexist?" and "Will the intensive pursuit of profit or financial sustainability by MFIs overshadow their social mission?"

Advocates of MFI commercialization argue that the dual missions of social impact and financial sustainability can coexist when carefully balanced, leading to the development of a competitive and sustainable business model (Nestor, 2011). This concept is referred to as the "double bottom line" by Foote and Folan (2016). According to Kar (2013) and Schreiner (2002), commercialization in the microfinance industry can enhance the performance of MFIs in reaching a larger number of extremely poor individuals. The profit motive incentivizes institutions to become more efficient and proactive in seeking new markets for their

loans, enabling them to achieve financial independence. However, critics advocating for a welfare-oriented approach argue against the commercialization of the microfinance industry, highlighting concerns about mission drift as a consequence of the process. The main apprehension is that profit motives may gradually overshadow the social mission of MFIs, leading them to prioritize transactions with financially viable clients while neglecting the needs of the poor (Paxton, Graham, & Thraen, 2000).

Microfinance institutions (MFIs) have long recognized poverty alleviation as their primary objective, with a focus on reaching the poor (Copestake, 2007). However, literature suggests the possibility of MFIs deviating from this goal in pursuit of profit, leading to a phenomenon known as mission drift (Zainuddin et al., 2020). Specifically, there is a tendency for MFIs to shift their financial services, such as loans, away from the impoverished segments of the population, particularly women, and towards relatively wealthier individuals (Segun, 2017).

From an empirical perspective, D'Espallier, Goedecke, Hudon, and Mersland (2017) conducted an analysis using a within estimator to examine how commercialization affects 66 transformed MFIs from 1993 to 2011. Their findings provide evidence of mission drift, as the transformation significantly increases the average loan size both in absolute and relative terms. Similarly, Hossain, Galbreath, Hasan, and Randøy (2020) indirectly support the findings of D'Espallier et al. (2017) by demonstrating that competition has a negative impact on MFIs' economic sustainability, reducing their breadth of outreach but enhancing their depth of outreach. They arrived at these findings by analyzing data from 1139 unique MFIs operating in 59 countries from 2005 to 2014, utilizing generalized least squares and two-stage least squares techniques. In another study, Pati (2021) employs the non-parametric Kendall's tau rank correlation test to estimate mission drift and uses a fixed effect regression estimator to analyze the factors contributing to mission drift among 34 Indian MFIs from 2008 to 2015. The Kendall's tau rank correlation test confirms the existence of mission drift, providing further evidence in this regard.

In contrast, Chikalipah (2020) employed the system generalized method of moments (GMM) to examine the relationship between outreach and the financial performance of 479 MFIs in 37 Sub-Saharan African (SSA) countries from 1998 to 2012. The study reveals a positive and significant association between outreach and the financial performance of MFIs in SSA. Furthermore, Blanco-Oliver, Irímia-Diéguez, and Vázquez-Cueto (2023) conducted an analysis to determine the optimal size of microcredit using data envelopment analysis and Tobit regression (panel) estimator. Their research indicates a U-shaped effect of loan size on financial and social efficiencies, suggesting that there can be a simultaneous achievement of the dual mission without trade-off. Similarly, Jia and Sun (2023) applied growth curve modeling and variance decomposition on a sample of 2,902 MFIs operating in 122 countries from 1999 to 2017. Their findings demonstrate that these institutions have the capacity to achieve a double bottom line of financial and social missions. Overall, the literature presents mixed results regarding the mission drift of MFIs, which can be attributed to variations in the proxies of mission drift, analytical techniques, and data used in the analyses. In this context, our paper contributes by shedding light on the analysis of mission drift from a different perspective, incorporating Kuznets' curve, which has not been extensively explored in microfinance literature.

2.3. Mission Drift and Kuznets Curve

The welfarists implicitly emphasize that mission drift may lead to a non-linear relationship between MFIs' financial performance and income inequality. This implies that as the microfinance industry becomes increasingly commercialized over time, an inverted Kuznets Curve could be observed. In the initial stage of MFIs' operations, the gap between the rich and the poor may be relatively narrow, as most institutions are NGO-based and rely heavily on highly subsidized funds from donors. Consequently, during this stage, MFIs are more likely to prioritize

serving the poor and vulnerable, as required for regulatory compliance. However, as MFIs become firmly established in the industry, they may be enticed by financial support from commercial investors, which can shift their focus towards financial sustainability and profitability.

Based on the preceding explanations, we can observe two key aspects of mission drift. Firstly, the presence of a U-shaped relationship between the physical wealth of MFIs and their financial performance. This may be attributed to MFIs' lack of operational self-sufficiency during the early stages of operation. At this stage, MFIs have limited access to diverse sources of financing, with donations and grants serving as the primary funding channels. As a result, the relationship between physical wealth and financial performance remains linear until a certain threshold is reached. As MFIs accumulate more wealth and assets, they enhance their financial independence. This growth phase attracts private investors who recognize the potential competitive advantage of MFIs and become motivated to invest in them. Secondly, the existence of an inverted U-shaped relationship between the physical wealth of MFIs and their outreach. This is because during the early stage, subsidized funding predominates the wealth of MFIs, leading them to operate as NGO-based entities and prioritize reaching a significant proportion of the poorest clients, particularly women. However, as MFIs strive for financial independence, they may increasingly rely on funding from commercial investors. Consequently, these commercial investors become the primary source of funding for the physical assets of the MFIs, prompting them to pursue improved financial results. This shift compels MFIs to prioritize reaching financially viable or wealthier clients among the poor, thus altering their target clientele.

There have been numerous instances where MFIs have undergone a transformation from their original legal status, such as NGOs, to a more commercialized entity, such as banks or non-bank financial corporations (Anitha, Galab, & Reddy, 2021; D'Espallier, Goedecke, Hudon, & Mersland, 2017; Pati, 2018, 2021). As this process unfolds, there is a risk that their pursuit of profit may overshadow their social mission, leading them to prioritize financially viable clients while marginalizing the poor. This phenomenon can widen the gap between the rich and the poor, ultimately undermining the original objective behind the establishment of MFIs. Considering these observations, it is likely that MFIs will initially prioritize serving the poor but may gradually shift their focus towards achieving financial sustainability as their physical wealth increases over time. Therefore, we advance the following hypothesis:

H1: The dual mission of MFIs exhibits a Kuznets curve, where there is an inverted U-shaped relationship between outreach and physical wealth, and a U-shaped relationship between financial sustainability and physical wealth.

3. Methodology

3.1. Modelling Kuznets curve and mission drift of MFIs

Considering the availability of the unbalanced panel data, we have considered the following model:

$$\begin{aligned}
 Y_{i,j,t} = & \beta_0 + \beta_1 \text{LNNFA}_{i,j,t} + \beta_2 \text{LNNFA}_{i,j,t}^2 + \beta_3 \text{LNCPB}_{i,j,t} + \beta_4 \text{LNBM}_{i,j,t} \\
 & + \beta_5 \text{LLR}_{i,j,t} + \beta_6 \text{DTE}_{i,j,t} + \beta_7 \text{DOND}_{i,j,t} + \beta_8 \text{LS}_i + \beta_9 \text{PS}_i \\
 & + \beta_{10} \text{GDPGR}_{j,t} + \beta_{11} \text{INF}_{j,t} + \beta_{12} \text{UNEMP}_{j,t} + \beta_{13} \text{REALINT}_{j,t} \\
 & + \beta_{14} \text{EXCHNGE}_{j,t} + \varepsilon_{i,j,t}
 \end{aligned} \quad (1)$$

where $i = 1, 2, 3, \dots, 1,323$ refers to the cross-sectional units of MFIs in a country j (105 countries), time period $t = 2010, 2011, \dots, 2018$, and error term $\varepsilon_{i,j,t}$.

Y is the outcome variables of the MFIs namely financial sustainability and outreach, and has been captured in this study using two different proxies. First, we utilized the Operational Self-sufficiency (OSS), a widely used indicator to gauge the financial sustainability dimension of

MFIs (Navin & Sinha, 2021). The OSS is an appropriate measure as it reflects the ability of MFIs to cover all operational expenses and run their operations without relying on subsidies (Remer & Kittilakoski, 2021). Second, to capture the outreach of MFIs, we have used the proportion of female borrowers, in line with the past literature (Nyanzu, Peprah, & Ayayi, 2019; Quayes, 2012). This variable is particularly relevant as it addresses the goal of MFIs to provide financial services to the poor. However, women often face greater poverty and vulnerability compared to their male counterparts due to limited access to mainstream financial sectors (Awaworyi Churchill, 2020; Quayes, 2019). Therefore, using the proportion of female borrowers as an indicator for assessing the outreach of MFIs is appropriate.

One of the key challenges in this research was identifying a suitable variable to represent the Kuznets curve of MFIs. After a thorough examination of the existing literature, we have determined that net fixed assets (NFA) would be the most appropriate choice. In the MIX Market database, MFIs report NFA as their only tangible assets (net of accumulated depreciation). Using this variable offers several advantages in this context. Firstly, NFA serves as a measure of the wealth or physical capital possessed and utilized by MFIs for long-term benefits. By employing NFA, we can capture the extent of wealth possessed by MFIs more accurately than by using short-term variables. Variables such as revenue or income, which fluctuate frequently and are influenced by external factors, may not provide a true reflection of the actual wealth of MFIs. Since achieving financial sustainability and serving the underprivileged are long-term policy goals of MFIs, utilizing variables that encompass these long-term decision-making dimensions offers significant advantages over short-term measures. Secondly, while income or profit can sometimes be negative, MFIs may not be able to immediately implement policies to reverse this situation. On the other hand, NFA is always positive, based on the dataset used in this study. Therefore, we employ the natural logarithm of NFA (LNNFA) as one of the primary independent variables. Additionally, we included the quadratic term of the same variable (LNNFA²) to examine the existence of the Kuznets curve. Our approach of using the linear and quadratic term is consistent with some of the past microfinance literature (Hartarska and Mersland, 2012; Mohamed & Elgammal, 2023).

In line with previous studies investigating mission drift in the microfinance context, our study also includes a set of organizational and macroeconomic control variables. For instance, we introduced the natural logarithm of cost per borrower (LNCPB) as a measure of cost efficiency in serving clients. It is widely recognized that serving women can be costly (Abate, Borzaga, & Getnet, 2014; Kittilaksanawong & Zhao, 2018) due to factors such as their need for smaller loan amounts and deposit sizes, resulting from their vulnerability in patriarchal societies. The administration of smaller loans and deposits increases the overall administrative costs for MFIs, thereby potentially impacting their financial performance negatively (Abate, Borzaga, & Getnet, 2014; Kittilaksanawong & Zhao, 2018).

We have also included a corporate governance variable, specifically the board size (LNBM) (Epstein & Yuthas, 2010) to capture the effectiveness of board in achieving the dual goals of MFIs. A larger board size can have both positive and negative effects on performance. On the one hand, a larger board may lead to free riding problems among board members (Hartarska & Mersland, 2012) and increased decision-making complexities (Cheng, 2008). These factors can potentially have a negative impact on performance. On the other hand, a larger board size can bring in additional resources, skills, and the ability to handle smaller tasks, which can contribute to improved performance in the activities of the firm (Hartarska & Mersland, 2012; O'Regan & Oster, 2005). Unfortunately, existing research on the relationship between board size and dual performance outcomes in the context of MFIs has yielded inconsistent, insignificant or weak results (Hartarska, 2005; Mersland and Ström, 2009). In our study, we have applied natural logarithm transformations to variables such as asset size, board size, and cost per borrower. This transformation helps to mitigate heteroscedasticity,

enhance model fitness, and facilitate the interpretation of the findings.

Furthermore, we incorporate the loan loss rate (LLR) as a measure of loan portfolio quality or the riskiness of outstanding loans (Abeysekera, Oguzoglu, & Le, 2014). A higher loan loss rate generally indicates reduced financial sustainability for MFIs, which may lead institutions to target wealthier clients and overlook female borrowers. To capture the leveraging capacity of MFIs, we included the debt-to-equity ratio (DTE) in this study (Pati, 2021). Conventional wisdom suggests that a higher proportion of debt capital in MFIs' funding can exert pressure towards commercialization. This, in turn, may motivate institutions to increase loan sizes and focus on financially sound borrowers (Pati, 2021). Consequently, this targeting strategy can result in fewer opportunities for women borrowers. However, relying excessively on debt financing also exposes MFIs to default risk, which can have adverse effects on their financial performance.

Similarly, we included variables such as the donations dummy (DONDD), legal status (LS), and profit orientation (PS) in our analysis. The donations dummy variable (DONDD) indicates whether an MFI receives donations, assigned a value of 1 if it does, and 0 otherwise (Jia, Cull, Guo, & Ma, 2016). Legal status (LS) is a binary variable, assigned a value of 1 for NGOs and 0 otherwise (Armendáriz & Szafarz, 2011; Kar, 2013). Profit orientation (PS) is also a binary variable, assigned a value of 1 for non-profit-oriented MFIs and 0 otherwise (Armendáriz & Szafarz, 2011; Awaworyi Churchill, 2020; Kar, 2013). Donors and socially oriented investors provide donations and subsidized funds to MFIs, enabling them to extend loans to the poor at more affordable rates and cover a portion of their administrative or operational expenses, as permitted by the donors. Therefore, receiving donations can enhance both the financial and outreach objectives of MFIs. Initially, micro-finance services were primarily provided by NGOs, which were assumed to be pro-poor, less commercialized, and more focused on reaching out to those in need rather than pursuing financial gains (Vanroose & D'Espallier, 2013). This has been confirmed by previous studies, such as Vanroose & D'Espallier (2013), which found that NGOs enhance outreach but have lower financial performance compared to other categories of MFIs. In recent years, for-profit-oriented MFIs have emerged, aiming to maximize financial gains for stakeholders (Mia, 2022). Consequently, for-profit MFIs are expected to target relatively wealthier clients by providing larger loans, which can simultaneously reduce operating costs and increase profitability. On the other hand, non-profit MFIs have a genuine concern for serving more women who are poor and vulnerable (Kar, 2012). Therefore, legal status can have mixed impacts on the dual goals of MFIs.

With respect to the macroeconomic variables, we considered the growth of the Gross Domestic Products (GDPGR) variable (Xu, Copes-take, & Peng, 2016), the overall rate of price changes/inflation in the economy (INF) (Mia & Lee, 2017), and unemployment rates (UNEMP) (Awaworyi Churchill, 2020; Sheremenko, Escalante, & Florkowski, 2017). A thriving economy can have positive implications for the businesses of the poor, which are financed by MFIs, leading to improved repayment rates and financial performance. Moreover, when the economy is growing, MFIs are likely to have access to sufficient resources to extend their loans and financial services, thanks to enhanced social welfare (Lopatta, Tchikov, Jaeschke, & Lodhia, 2017; Vanroose & D'Espallier, 2013). On the other hand, in a higher inflationary environment, overall interest rates tend to be higher, making borrowing costs potentially unaffordable for the poor. This may result in weakened demand for loans, including among women, due to the higher cost of borrowing and inflation risks (Xu, Copektake and Peng, 2016). Additionally, in a high inflation environment, MFIs may struggle to achieve economies of scale due to lower loan demand, resulting in lower financial performance.

Then, the unemployment rate can have mixed consequences for the dual goals of MFIs. On the one hand, a higher unemployment rate is expected to increase the demand for microfinance services, as it can provide opportunities for self-employment among the poor (Awaworyi

Churchill, 2019). On the other hand, a higher unemployment rate can lead to repayment problems and loan defaults, which can reduce the financial sustainability of MFIs. Blanco-Oliver et al. (2023) also found that the unemployment rate has a positive and statistically significant effect on the social efficiency of MFIs. However, when considering a linear model, the effect on financial performance is negative but statistically insignificant.

Since MFIs run their operation based on charging interest on their loans to the poor, higher real interest rates (REALT) would increase the overall interest rates (Díaz-Martín, Feria-Dominguez, & Naranjo-Gil, 2022). Therefore, it might be unaffordable for the poor, particularly women borrower who relies on small scale loans for their entrepreneurial activities (Arrassen, 2017; Kahihu, Wachira, & Muathe, 2021). Moreover, lesser demand for loans due to higher real interest rates could also take a toll on MFIs financial sustainability as they will face higher costs of funds (Kahihu, Wachira, & Muathe, 2021). Thus, a negative effect of real interest rates is expected on both outreach and financial sustainability. Lastly, MFIs also borrow money from international lenders and the volatility in exchange rates could also affect their dual goals. Al-Azzam and Mimouni (2016) found that MFIs charge lower interest rates to their clients if they are operating in countries with fixed exchange rates regimes than floating exchange. Moreover, the risk associated with exchange rates is also transferred fully to the clients (Al-Azzam & Mimouni, 2016). Therefore, higher volatility in the exchange rate will increase the overall interest rates and less outreach. Moreover, Daher & Le Saout (2015) argue that exchange rate fluctuations is one of the most external factors towards MFIs profitability or financial sustainability. Thus, exchange rate is expected to have a negative outcome on MFIs outreach and sustainability goals.

See Table 1 for full definition and descriptive statistics of the variables employed in the study.

3.2. Data and its sources

The study utilized organizational-level data from MFIs obtained from the MIX Market data catalogue of the World Bank, which is now freely accessible (World Bank, 2023). Although the dataset includes data as early as 2000, certain variables, such as board members' data, were not available before 2010. Consequently, the initial time period selected for analysis was 2010. During data collection in late 2020, the latest available data spanned until 2018². Based on our understanding of the database, there are no plans for the MIX Market or World Bank to collect more recent data.³ Therefore, it was not feasible to incorporate more recent data, and the study proceeded with data from 2010 to 2018. Due to the voluntary nature of the database, some MFIs provided data for certain years while omitting data for others, resulting in an unbalanced panel data structure.

After addressing input errors and eliminating duplicates, a total of 1,323 unique MFIs' data were included, covering 105 countries over the selected duration. Appendix C provides firm-year observations, and Appendix D presents the number of MFIs by country. The number of MFIs and countries included in this study is consistent with other research works that have employed the same database (Al-Azzam, Mimouni, Smaoui, & Temimi, 2022; Awaworyi Churchill, 2020; Githaiga, 2022). Another advantage of using the MIX Market data is its conversion of all local currencies into US dollars, enabling meaningful cross-country comparisons. Consequently, the usage of this database has gained popularity in recent years (see for example, Al-Azzam, Mimouni, Smaoui, & Temimi, 2022; Awaworyi Churchill, 2020; Githaiga, 2022).

² Only a handful of observations were available for the year 2019. Since year dummies were used in the model, Data for the year 2019 were discarded from investigation.

³ Some brief information on the data source can be found in the following link: <https://datacatalog.worldbank.org/search/dataset/0038647>

Table 1
Definitions & Descriptive Statistics

Variable	Definition of Variable	Unit	Obs.	Mean	Std. Dev.	Min	Max	Skewness*	Kurtosis**
OSS	Operational Self-Sufficiency: Financial Revenue/ (Financial Expense + Net Impairment Loss + Operating Expense)	Ratio	4,050	1.1568	0.3063	0.2536	2.4171	0.7868	6.9775
FEMBORR	Proportion of female borrowers	Ratio	4,156	0.644	0.2596	0.1007	1	-0.0418	1.8451
NFA	Net Fixed Assets: 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 for more than one period, net of accumulated depreciation in US\$.	Number	4,057	2,034,282	4,893,309	2,094	34,100,000	4.5410	26.2781
LNNFA	Natural logarithm of NFA.	Number	4,057	12.8011	2.0452	7.6468	17.3443	-0.1505	2.6273
CPB	Cost per borrower in US\$	Number	3,828	237.8814	300.9546	8	1981	3.3806	17.6662
LNCPB	Natural logarithm of CPB	Number	3,828	4.8281	1.239	2.0794	7.5914	0.3601	2.4504
BM	Board Members: The number of members that comprise the board of directors.	Number	3,946	6.9876	3.5557	1	23	1.7263	7.6811
LNBM	Natural Logarithm of BM	Number	3,946	1.8245	0.506	0	3.1355	0.6005	5.05
LLR	Loan Loss Rate: (Write-offs - Value of Loans Recovered) / Average Gross Loan Portfolio	Ratio	3,860	0.0152	0.0305	-0.0382	0.1837	2.9883	14.594
DTE	Total debt over total equity	Ratio	4,066	3.8388	4.0593	-3.0500	25.5900	2.4992	12.5181
DOND	If an MFI has received donations, it gets the value 1, 0 otherwise	Dummy	3,259	0.4066	0.4913	0	1	0.3804	1.1447
LS	If an MFI is an NGO, it gets the value 1, 0 otherwise	Dummy	4,272	0.3347	0.47200	0	1	0.7004	1.4905
PS	If an MFI is non-profit oriented it gets the value 1, 0 otherwise	Dummy	4,272	0.5417	0.4983	0	1	-0.1672	1.0273
GDPGR	The annual percentage growth rate of GDP at market prices based on constant local currency	Percentage	3,900	4.7719	2.6973	-3.2759	11.6489	-0.4195	3.303
INF	Overall rate of price change in an economy	Percentage	3,900	5.7218	5.2014	-2.491	27.9553	1.8218	7.394
UNEMP	Unemployment, total (% of total labour force) (modelled ILO estimate)	Percentage	3,860	6.0483	4.5456	0.3900	27.4900	2.3490	9.8417
REALINT	Real interest rate is the lending interest rate adjusted for inflation as measured by the GDP deflator.	Percentage	3,122	7.3976	8.1343	-13.1700	41.7138	1.5628	7.9329
EXCHNGE	Official exchange rate refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar).	Number	3,876	661.0508	2260.4450	0.7100	18612.92	6.108	45.2224

Source: Authors based on the MIX Market and World Development Indicators of the World Bank. All continuous variables were winsorized at 1% and 99% levels. For variables that were converted to natural logarithm, we have also provided their descriptive statistics prior to transformation (e.g., NFA, CPB and BM) * Skewness – Skewness measures the degree and direction of asymmetry. Generally, a symmetric or normal distribution has a skewness of 0 ** Kurtosis is a measure of the heaviness of the tails of a distribution. A normal distribution has kurtosis of 3. Although some of our variables are not normally distributed as per the Skewness and Kurtosis, our sample is large enough to rely on asymptotic properties similar with Bibi et. al (2018).

Regarding missing values, no transformations or imputations were applied to fill the gaps. Instead, the data was utilized in its original form. Additionally, macroeconomic variables were obtained from the World Development Indicators of the World Bank and merged with the MIX data using the country code as a matching criterion. However, some macroeconomic variables for certain countries were missing during the study period, and the actual number of observations and MFIs used in the estimation of the results can be found in the result tables of Section 4. To mitigate the impact of extreme outliers on our results, we applied winsorization to each continuous variable, at the 1st and 99th percentiles. This approach aligns with previous studies conducted in the field of microfinance (Schulte & Winkler, 2019; Sun & Liang, 2021).

3.3. Estimation strategy

To account for the unbalanced panel data structure, we initially estimated Eq (1) using both the Pooled Ordinary Least Squares (POLS) and Random Effects Model (REM), which align with previous studies in the field. Since our model incorporates some time-invariant variables (e. g., legal and profit status), employing the Fixed Effects Model (FEM) may not be appropriate. However, to determine the preferred model between REM and POLS, we conducted the Breusch Pagan Lagrangian Multiplier (BPLM) test. Furthermore, in our model estimation, we included year dummies (YD) and region dummies (RD) to account for technological progress over time and regional effects, respectively (stated otherwise). Robust standard errors were computed by clustering

at the firm/MFI levels to address potential heteroscedasticity and serial/ autocorrelation concerns.

To examine the robustness of our results against endogeneity concerns, we performed the Hausman-Taylor approach, which is a commonly employed method in microfinance research (Afrifa, Gyapong, & Zalata, 2019; Ayele, 2015; Quayes, 2015; Vanroose & D'Espallier, 2013). Additionally, we conducted Seemingly Unrelated Regression (SUR) techniques as further robustness tests. The estimation techniques employed in this study closely align with previous studies that utilized similar databases to investigate various research objectives related to MFIs (see, Quayes, 2015, 2021; Meyer, 2019). Therefore, we argue that the estimation procedures and findings reported in this study are reliable and robust.

4. Results and Discussion

Table 1 provides the definitions and descriptive statistics for the samples and variables utilized in this study. To address the impact of extreme outliers, the data were winsorized at the 1% and 99% percentile levels. This standard practice is necessary since data obtained from secondary sources often contain outliers that can distort the analysis. Operational self-sufficiency (OSS), a metric used to evaluate the financial sustainability of MFIs, has a mean value of 1.1568, indicating that, on average, the industry has the capacity to cover its expenses and achieve self-sufficiency. However, it is worth noting that some MFIs have OSS values below 1, indicating their inability to meet their

operational and financing costs. The female borrower ratio (FEMBORR), which reflects the outreach of MFIs to women, stands at 0.644. This value is of concern, as it suggests that women, who are often more economically disadvantaged, may not be adequately reached by MFIs compared to their male counterparts. The trend of OSS and FEMBORR over the years are presented in [Appendices A and B](#), respectively. The variable Net Fixed Assets (NFA) exhibits a mean value of US\$ 2,034,282.0, with a maximum value of US\$ 34,100,000. This discrepancy indicates a substantial variation in physical wealth among MFIs, highlighting differences in their asset base.

The average per-cost borrower is reported as US\$ 237.88, with a considerable variation amounting to US\$ 300.9. The mean number of board members falls within the range of six to seven, with some MFIs having only one board member. The loan loss rate exhibits both negative and positive values, suggesting a mixed-quality loan portfolio. The leverage ratios (DTE) demonstrate a mean value of 3.8388. However, it is worth noting that certain MFIs have negative DTE values, indicating a higher risk profile where liabilities exceed assets. Regarding DOND and PS, approximately 40% of MFIs receive donations, while 54.6% operate as non-profit-oriented institutions. The macroeconomic variables indicate a higher inflation rate compared to GDP growth, which may have implications for investment decisions and future uncertainties. A lower GDP coupled with higher inflation contributes to an approximate mean unemployment rate of 6% across the sampled countries.

[Table 2](#) displays the correlation matrix among the independent variables to identify potential multicollinearity concerns. None of the coefficients surpass the threshold value of 0.7, indicating that the presence of multicollinearity in our estimation is less likely. However, it is important to note that certain organizational characteristics, particularly the net fixed assets, exhibit positive associations with the cost per borrower, debt-to-equity ratio, board size, and loan loss ratio, and these associations are statistically significant. These findings suggest that MFIs with higher physical wealth tend to incur higher costs in serving borrowers, rely more on debt financing, have larger board sizes, and experience relatively lower loan portfolio quality. Conversely, donations, legal status (LS), and profit status (PS) demonstrate negative and statistically significant correlations with physical assets. This implies that larger MFIs are less likely to receive donations and are predominantly non-governmental organizations (NGOs) with a for-profit orientation. Furthermore, it is worth noting that LS and PS exhibit a relatively high correlation coefficient of 0.6167. This highlights that a significant portion of the NGOs in our sample are indeed not-for-profit entities, which aligns with the argument made by [Gietzen \(2017\)](#).

4.1. Baseline Results

[Table 3](#) presents the baseline results, which include the outcomes of the POLS and REM models. The statistically significant result of the BPLM test indicates that the REM model is superior to POLS. To emphasize, the Kuznets curve hypothesis and mission drift among MFIs suggest that the relationship between fixed assets and the outreach or financial performance mandate will initially be positive (negative), and later, it will become negative (positive). The empirical findings revealed that LNNFA (logarithm of net fixed assets) and its quadratic form (NNNFA²) exhibit significant negative and positive associations with operational self-sufficiency (OSS) (Model 4). This implies that, in the early stages of their operation, MFIs may lack operational self-sufficiency due to insufficient assets. This trend persists until a certain threshold is reached. However, once this threshold is surpassed, further accumulation of wealth leads to an improvement in the institutions' financial independence. Furthermore, during the initial stage, MFIs have limited access to financing sources, with only NGOs and donors willing to provide them with funds. As they advance, private investors may become motivated to invest in these institutions.

We then proceeded to estimate the vertex curve or point, which represents the junction where two or more curves, lines, or edges

Table 2
Correlation Matrix

	LNNFA	LNCBP	LNBM	LLR	DTE	DOND	LS	PS	GDPGR	INF	UNEMP	REALINT	EXCHANGE
LNNFA	1.0000												
LNCBP	0.2606***	1.0000											
LNBM	0.3350***	-0.1217***	1.0000										
LLR	0.0238	0.1388***	-0.0416**	1.0000									
DTE	0.1819***	-0.0256	0.1335***	-0.0370**	1.0000								
DOND	-0.0981***	-0.1390***	0.0517**	-0.0185	-0.0962***	1.0000							
LS	-0.1839***	-0.2676***	0.0377*	-0.0164	-0.1001***	0.3258***	1.0000						
PS	-0.0965***	-0.0852***	0.1401***	-0.0955***	-0.0592***	0.3323***	0.6167***	1.0000					
GDPGR	-0.0936***	-0.3873***	0.0439**	-0.1277***	0.0691***	0.0638***	0.0402**	-0.1066***	1.0000				
INF	-0.1443***	-0.0521***	-0.1238***	-0.0035	-0.0334***	0.0231	0.0066	-0.0935***	0.1231***	1.0000			
UNEMP	0.0079	0.1761***	-0.1799***	0.0760**	-0.0987***	0.0243	-0.0718***	0.0073	-0.2521***	-0.0156	1.0000		
REALINT	0.0093	0.2511***	-0.1600***	0.0364*	-0.1039***	-0.0343*	0.0373**	0.0512***	-0.1839***	-0.3282***	0.1001***	1.0000	
EXCHANGE	-0.0477**	-0.1004***	-0.0385**	-0.0595***	-0.0011	0.0656***	0.0111	0.0014	0.1045***	-0.0153	-0.1551***	0.0365**	1.0000

Source: Author

* $p < 0.10$

** $p < 0.05$

*** $p < 0.01$. Note: We have estimated Pearson pairwise correlation.

Table 3
Kuznets Curve and the Financial Performance of MFIs

	Model-(1) DV: Operational Self-Sufficiency (OSS) POLS	Model-(2)	Model-(3) REM	Model-(4)
LNNFA	0.0118*** (0.0038)	-0.1380*** (0.0343)	-0.0012 (0.0059)	-0.1020** (0.0520)
LNNFA ²		0.0059*** (0.0013)		0.0040** (0.0020)
LNCBP	-0.0710*** (0.0110)	-0.0719*** (0.0109)	-0.0629*** (0.0192)	-0.0635*** (0.0193)
LNBM	0.0189 (0.0161)	0.0161 (0.0160)	0.0219 (0.0180)	0.0221 (0.0178)
LLR	-1.7108*** (0.2940)	-1.7150*** (0.2957)	-1.5323*** (0.2898)	-1.5527*** (0.2908)
DTE	-0.0111*** (0.0016)	-0.0118*** (0.0016)	-0.0102*** (0.0025)	-0.0103*** (0.0025)
DOND	-0.0295** (0.0134)	-0.0283** (0.0132)	-0.0258* (0.0153)	-0.0242 (0.0152)
LS	0.0105 (0.0183)	0.0100 (0.0183)	0.0018 (0.0284)	0.0039 (0.0284)
PS	-0.0186 (0.0182)	-0.0127 (0.0182)	-0.0155 (0.0284)	-0.0144 (0.0282)
GDPGR	0.0079** (0.0036)	0.0079** (0.0036)	0.0137*** (0.0041)	0.0135*** (0.0041)
INF	0.0037** (0.0018)	0.0038** (0.0018)	0.0038 (0.0023)	0.0038 (0.0023)
UNEMP	0.0013 (0.0018)	0.0021 (0.0017)	0.0009 (0.0026)	0.0013 (0.0026)
REALINT	0.0009 (0.0009)	0.0009 (0.0009)	-0.0011 (0.0018)	-0.0011 (0.0018)
EXCHNGE	<0.0001** (0.0000)	<0.0001** (0.0000)	<0.0001** (0.0000)	<0.0001** (0.0000)
YD	yes	Yes	yes	yes
RD	yes	Yes	yes	yes
CONS	1.2880*** (0.0624)	2.0501*** (0.1997)	1.3416*** (0.0981)	1.8065*** (0.2880)
Observations	1974	1974	1974	1974
F/Chi ²	11.3668	12.3688	191.8666	191.4507
R ²	0.1526	0.1631	0.1374	0.1480
BPLM Test				296.60***
U-Test (t-value)				1.8900**
Vertex Point				12.6968
# of groups/MFIs		710		

Source: Authors. Robust standard errors in parentheses

* p < 0.10

** p < 0.05

*** p < 0.01. Vertex point or Extreme point ($f(x)=x^2$) = -linear coefficient/(2* quadratic coefficient). We introduced the linear term separately and in conjunction with the quadratic term to examine any potential changes in the results. Overall, we observed that the results remained qualitatively consistent for the other control variables, even after including the quadratic term. Additionally, we calculated the Variance Inflation Factors (VIF) for the estimated models, and none of the VIF values exceeded the maximum threshold of 10. For further information regarding the VIF threshold, please refer to the work of Marcoulides and Raykov (2019).

intersect. This analysis helps identify the values of net fixed assets at which a sign change or mission drift occurs. Based on the results obtained, we found that MFIs with net fixed assets exceeding US\$ 326,700 ($\exp^{12.6968}$) experience a switch in the OSS value from negative to positive (Model-4). Therefore, a minimum net fixed asset value of US\$ 326,700 is required for MFIs to become operationally self-sufficient or financially independent. To confirm the U-shape or inverted U-shape relationship, we conducted the Lind and Mehlum (2010) test, also known as the U-test, and the results are presented in Table 3.

Consistent with the findings of Foosse and Folan (2016) and Kar (2013), as MFIs become more commercialized or profit-oriented, they tend to improve their operational self-sufficiency and become more efficient. Having access to both NGO-based and conventional financing options at a later stage enables the institutions to be competitive, as conventional investors may pressure them to enhance their efficiency. These financing sources provide MFIs with the necessary funds to

acquire the minimum net fixed assets. In contrast, MFIs may not have an outstanding financial performance during their initial stage of operation due to lack of capital, high operating costs, limited client base, and severe competition from the incumbent. That is why, observing the negative relationship between asset size and operational self-sufficiency in the initial stage is in line with the convention. Considering only the linear effect of net fixed assets, our findings align with those of Bensalem and Ellouze (2017), whereby a negative and significant effect of size was observed for the financial efficiency of non-profit-oriented MFIs. Moreover, our findings are partially in contrast with that of Kendo & Tchakounte (2022) and Hossain, Galbreath, Hasan, and Randøy (2020), whereby a positive effect was observed with the financial performance of MFIs. But our findings for the non-linear effect of asset size (LNNFA²) are consistent with their overall arguments. The differences in the outcome may be because our sample size is relatively larger, covers more countries, uses the most recent data, and different estimation techniques and modelling compared to Hossain et al., (2020) and Kendo & Tchakounte (2022). Nonetheless, the above studies have only considered the linear effect of asset size on the financial performance of MFIs, therefore, the findings should be interpreted with caution.

The loan loss rate (LLR) was found to have a negative and statistically significant association with OSS in Model 4. This implies that a poor-quality loan portfolio leads to a decrease in OSS. Additionally, the DTE was observed to be significant and negatively associated with OSS, indicating that higher levels of debt bring operational issues for MFIs. While this finding is consistent with the studies of Henock (2019) and Sarpong-Danquah et al. (2023), it contrasts with studies that report no effect of DTE on financial performance (Mugun et al., 2019) or demonstrate a positive impact (Adesina et al., 2015; Githaiga, Soi & Buigut, 2023; Kpwe, 2017). The finding may seem counterintuitive at first, as a high DTE suggests that a larger proportion of an MFI's funding is obtained through borrowing. This could result in increased financial risks, as MFIs are obligated to repay the loan and interest regardless of their operational performance. This situation may even lead to financial distress for MFIs, especially when operating in low-income areas. The descriptive statistics in Table 1 also revealed that the institutions' DTE is relatively high, approximately four times the equity on average. This high debt-to-equity ratio can limit the operational flexibility of the institutions, as creditors may impose stringent conditions on them. Moreover, a high leverage capacity may make MFIs highly vulnerable to external shocks. These factors have the potential to reduce the OSS of MFIs.

The GDPGR is another variable that was observed to have a significant positive association with the OSS, which implies that sustainable economic growth is beneficial for the OSS of MFIs (Adusei & Adeleye, 2021; Bogan, 2012). As the economy grows, more resources become available to finance MFIs and support poverty reduction efforts. The variables donation dummy (DOND), legal status (LS) and profit orientation (PS) were found to be statistically insignificant despite having the expected signs. Similarly, the inflation rate (INF) and unemployment rate (UNEMP) were also statistically insignificant.

On the other hand, the study also found significant positive associations between LNNFA and the proportion of female borrowers, and significant negative associations between LNNFA² and the proportion of female borrowers (Table 4). This indicates that the dual mission of MFIs, namely financial performance and outreach, can be explained by the Kuznets curve. For the outreach goal of MFIs, the vertex point is reached when the NFA of MFIs is valued at around US\$ 326,700 ($\exp^{12.6968}$). In other words, when the NFA of MFIs exceeds US\$ 326,700, they begin to focus less on female borrowers. If we consider LNNFA as a measure of the size and actual assets of MFIs, our findings align with some existing studies that suggest larger MFI sizes are associated with lesser outreach (Agbloyor, Asongu, Muriu & Yawson, 2022; Kendo & Tchakounte, 2022; Kyereboah-Coleman & Osei, 2008; Navin & Sinha, 2021). However, our findings contrast with some existing studies that have documented a positive association between size and outreach performance of MFIs

Table 4
Kuznets Curve and the Outreach Goal of MFIs.

	Model-(5) DV: Proportion of Female Borrowers (FEMBORR) POLs	Model-(6) POLs	Model-(7) REM	Model-(8) POLs
LNNFA	-0.0035 (0.0025)	0.0427** (0.0206)	0.0009 (0.0034)	0.0565*** (0.0207)
LNNFA ²		-0.0018** (0.0008)		-0.0022*** (0.0008)
LNCBP	-0.1110*** (0.0072)	-0.1107*** (0.0071)	-0.0444*** (0.0099)	-0.0441*** (0.0097)
LNBM	0.0020 (0.0104)	0.0029 (0.0102)	-0.0070 (0.0095)	-0.0076 (0.0095)
LLR	-0.0702 (0.1471)	-0.0691 (0.1483)	0.1598 (0.0995)	0.1726* (0.0995)
DTE	-0.0035*** (0.0011)	-0.0032*** (0.0011)	-0.0018 (0.0012)	-0.0019 (0.0012)
DOND	-0.0285*** (0.0089)	-0.0288*** (0.0089)	0.0011 (0.0075)	0.0001 (0.0076)
LS	0.0584*** (0.0122)	0.0589*** (0.0122)	0.0904*** (0.0211)	0.0890*** (0.0212)
PS	-0.0118 (0.0113)	-0.0138 (0.0113)	-0.0288 (0.0191)	-0.0291 (0.0190)
GDPGR	0.0006 (0.0020)	0.0006 (0.0020)	0.0011 (0.0014)	0.0012 (0.0014)
INF	-0.0016 (0.0011)	-0.0017 (0.0011)	-0.0018** (0.0009)	-0.0018** (0.0009)
UNEMP	0.0056*** (0.0012)	0.0053*** (0.0012)	0.0038** (0.0016)	0.0037** (0.0016)
REALINT	-0.0027*** (0.0006)	-0.0027*** (0.0006)	-0.0011** (0.0005)	-0.0012** (0.0005)
EXCHNGE	<-0.0001* (0.0000)	<-0.0001 (0.0000)	<-0.0001 (0.0000)	<-0.0001 (0.0000)
YD	yes	yes	yes	yes
RD	yes	yes	yes	yes
CONS	1.2469*** (0.0463)	0.9587*** (0.1387)	0.9941*** (0.0525)	0.6570*** (0.1410)
Observations	1941	1941	1941	1941
F/Chi ²	161.5993***	155.7129***	936.2505***	1029.9782***
R ²	0.5807	0.5820	0.5304	0.5336
BPLM Test				986.2200***
U-Test (t-value)				2.4600**
Vertex Point				12.6848
# of groups/MFIs			705	

Source: Authors. Robust standard errors in parentheses

* p < 0.10

** p < 0.05

*** p < 0.01. Vertex point or Extreme point ($f(x) = x^2$) = -linear coefficient/(2* quadratic coefficient). We introduced the linear term separately and in combination with the quadratic term to analyze any changes in the results. Overall, the results remained qualitatively consistent for the other controls, even after including the quadratic term. Additionally, we estimated the Variance Inflation Factors (VIF) for the models, and none of them exceeded the maximum threshold of 10. For further details on the VIF threshold, please refer to [Marcoulides and Raykov \(2019\)](#). YD=Year dummies and RD= Regional dummies.

(Adusei, 2022; Hartarska & Nadolnyak, 2007; Wijesiri, Yaron, & Meoli, 2017). During the early stage of MFIs' operation, they heavily rely on donations, grants, and subsidized debt, functioning as NGO-based institutions with the objective of reducing poverty. However, as they strive for financial independence and operational self-sufficiency, MFIs transform into profit-oriented entities, with investors becoming their primary source of funding in the advanced stage. The findings indicate that commercialized MFIs deviate from their primary mission of serving the vulnerable among the poor to reduce transaction costs. These commercialized MFIs prioritize transactions with financially viable clients, potentially excluding the poorer segments of the population.

The loan loss rate highlights a significant and positive relationship with outreach (model 8 in [table 4](#)). This may indicate that when MFIs have relatively risky borrowers in their portfolio, they tend to focus more on female borrowers, as they are considered safer and more reliable clients compared to their male counterparts. The positive association of Legal status (LS) indicates that NGOs type MFIs will tend to focus

more on women borrowers. Economic factors like the unemployment rate (UNEMP) was positively associated with outreach, which suggests that increasing unemployment rates raise the demand for microfinance services, leading to a positive impact on MFI services and women beneficiaries. Moreover, outreach also declines when the inflation rate and real interest rate increase, as this increases the cost of borrowing. Although the expected signs were observed for DTE (Debt to equity), Donation status and PS, these variables were not statistically significant.

The application of the Kuznets curve hypothesis has yielded a significant finding. Initially, the size or wealth of an MFI exhibits a negative association with its financial self-sufficiency. However, once a certain point, identified as the vertex point, is reached, the size/wealth starts to positively impact the financial performance of the MFI. Conversely, smaller MFIs tend to experience an increase in outreach. However, beyond this critical point, the size/wealth of the MFI begins to have a negative effect on the proportion of female borrowers and the outreach goals, revealing the contrasting nature of the twin objectives of MFIs. This occurs because, in their pursuit of attracting larger and wealthier customers, MFIs may unintentionally neglect their socially disadvantaged client base. The empirical findings presented in [Tables 3 and 4](#) indicate that although MFIs have dual objectives, these objectives are likely to become mutually exclusive at certain stages of their life cycle, which is possibly determined by their physical capital.

The findings of the study are consistent with arguments put forth in previous studies ([Armendáriz & Szafarz, 2011](#); [Beisland, D'Espallier & Mersland, 2019](#); [Hartarska, Shen, & Mersland, 2013](#); [Mersland & Strøm, 2010](#)) regarding the occurrence of mission drift within MFIs. These studies suggest that MFIs tend to prioritize serving wealthier individuals who are already banked, rather than focusing on their intended beneficiaries. Furthermore, [Sharma and Rastogi \(2021\)](#) propose that MFIs compromise their social mission by neglecting poor beneficiaries and instead prioritizing financial efficiency through asset utilization and revenue generation.

However, the findings contradict the study conducted by [Jia and Sun \(2023\)](#), which suggests that MFIs can effectively fulfill both their financial performance and outreach goals. Additionally, [Serrano-Cinca and Gutiérrez-Nieto \(2014\)](#) have also argued that some MFIs exhibit mission drift by excluding the poor from their services. Other studies ([Abate et al., 2014](#); [Cull, Demirgüç-Kunt, & Morduch, 2011](#)) have revealed that cost-efficient MFIs tend to have larger loan sizes and fewer women borrowers, which goes against the objective of reaching out to the underprivileged. Our findings support the notion of mission drift and reject the hypothesis of a double bottom line, suggesting that it is challenging for MFIs to simultaneously achieve high operational self-sufficiency and extensive outreach. Regarding the relationship between net fixed assets and outreach, our findings indicate an inverted U-shaped Kuznets curve. In the initial stages of an MFI's operation, there is an increase in outreach but a decrease in operational self-sufficiency within certain ranges of net fixed assets. However, in the advanced stages of operation, beyond certain thresholds, there is a decrease in outreach but an increase in operational self-sufficiency. The plausible explanation behind the outcome may also link with the objective of MFIs. For example, MFIs may allegedly focus more on outreach, such as serving more female clients, in the early stage to fulfil regulatory requirements and attract potential investors. However, once they achieve a certain level of female client base as reflected by the larger asset size, they started to bypass their female clientele to achieve better financial sustainability to appease the shareholders. Because female borrowers generally require smaller loan amounts and incur higher administrative expenses.

4.2. Asset Size of MFIs and Mission Drift

Based on the aforementioned results, we conducted a further analysis to examine how the vertex point analysis could aid in identifying the Kuznets curve hypothesis. Our findings revealed that when MFIs have

net fixed assets exceeding US\$ 326,700, they tend to shift their focus away from their outreach goal, resulting in a decline in serving women borrowers (Fig. 1). Conversely, MFIs with assets above this threshold demonstrated improved financial performance, indicated by a higher OSS. Therefore, it appears that the dual objectives of MFIs, namely financial sustainability and extensive outreach, are mutually exclusive. This suggests that achieving financial sustainability often comes at the expense of the outreach goal, leading to the presence of mission drift among MFIs. The Kuznets curve hypothesis provides valuable insights into understanding the dynamics of this mission drift phenomenon.

To gain insights into the distribution of MFIs susceptible to mission drift, we created two scatterplots that illustrate the relationship between 'operational self-sufficiency' (Fig. 2) and the 'proportion of female borrowers' (Fig. 3) with the natural logarithm of net fixed assets. Each figure is divided into two parts based on the vertex point obtained from the baseline regression results (Models 4 & 8). In Fig. 2, MFIs situated on the right-hand side of the dashed line are likely to prioritize their financial performance. Conversely, Fig. 3 indicates that MFIs positioned on the left-hand side of the dashed line are more inclined to focus on their social mission by serving a higher proportion of female borrowers within their client base. It is important to note that these figures utilize average values for the variables, and the positioning of MFIs may vary if the estimation were based on yearly values instead (putting yearly values make the figure unreadable).

4.3. Robustness Test/Additional Analysis

As a robustness measure, we adopted the Hausman-Taylor (H-T) (Hausman & Taylor, 1981) approach for the estimation of Eq (1), and the results are reported in Table 5. This technique has been extensively employed in microfinance literature to address the potential endogeneity problem, particularly when the model includes time invariant variables (Afrifa, Gyapong, & Zalata, 2019; Ayele, 2015; Quayes, 2015; Vanroose & D'Espallier, 2013).⁴ By applying the H-T model, we allow for the possibility of correlation between some explanatory variables and the individual effects of MFIs (Quayes and Joseph, 2021). Our findings once again confirm the presence of the Kuznets as both LNNFA and LNNFA² exhibit the expected signs. However, while the relationship remains statistically insignificant for financial performance, it is statistically significant for the outreach goal of MFIs. Thus, we can argue that MFIs initially prioritize serving a larger proportion of female clients, gradually shifting their focus as they accumulate wealth in terms of net fixed assets and expand in size.

We further utilized the Seemingly Unrelated Regression (SUR) technique, developed by Zellner (1962 & 1963), and the results are presented in Table 6. This approach is commonly employed in microfinance research, allowing us to regress the same set of independent variables against two distinct outcome variables of MFIs, such as outreach and financial sustainability (Gutierrez-Goiria, San-Jose & Retolaza, 2017). One of the key advantages of SUR is that it enables more efficient estimation of the regression results compared to estimating each equation individually using ordinary least squares (Ali, Gueyie, & Chrysostome, 2023; Caudill et al., 2012; Gutierrez-Goiria, San-Jose & Retolaza, 2017). This efficiency gain is particularly pronounced when the disturbance terms in different equations exhibit a high degree of correlation, which is the case in our research as well. Consistent with our previous findings, the results from SUR confirm that MFIs initially prioritize serving female borrowers, but gradually shift their focus towards operational sustainability. Thus, we can conclude that MFIs are prone to deviating from their original mission as they

accumulate more wealth in the form of physical assets..

5. Conclusion

This study aims to explore the application of the Kuznets curve hypothesis to gain insights into the dual objectives and mission drift of MFIs. The hypothesis was tested using global-level data from 1,323 MFIs across 105 emerging countries between 2010 and 2018. The findings suggest as MFIs increase their physical capital and wealth, they tend to deviate from serving women and poor clients and prioritize achieving better financial performance. We argue that as MFIs become wealthier in terms of size and physical capital, they initially face challenges in achieving financial performance but gradually become self-sufficient over time. Donors and investors are more likely to invest in MFIs that demonstrate self-sufficiency and strong performance. This further motivates MFIs to sustain their growth, retain investors, and achieve even better financial outcomes, which often leads to a focus on maximizing returns and potentially increasing interest margins. This shift in focus favors clients who can afford to pay relatively higher interest rates, while marginalized borrowers, particularly women and the poor, become financially excluded. Therefore, the study reveals that as MFIs grow in wealth and size, they tend to prioritize serving fewer women and poor clients, aligning with the concept of mission drift. Consequently, the empirical findings suggest a trade-off between the goals of outreach and financial sustainability, rather than these objectives being complementary to each other. These findings have important implications for policymakers and practitioners, as they highlight the need to address mission drift within MFIs.

One of the key implications of this study is that small-scale MFIs, which are initially established to serve specific localities or regions, tend to perform better in terms of achieving their outreach goals. However, as these MFIs grow larger, there is a tendency for them to deviate from their original mission of serving poor women. Therefore, it is important for policymakers to consider promoting the establishment of MFIs that focus on specific locations or regions. By doing so, the commercial interests of MFIs can be balanced with their outreach goals. Promoting localized MFIs allows them to develop and innovate financial products and services that are tailored to the specific needs of their target customers. Given the evidence that MFIs are likely to deviate from their original mission as they grow, it is crucial for MFI managers and practitioners to have mechanisms in place to safeguard and prioritize their outreach goals.

Our findings highlight the importance of regulatory oversight to ensure that MFIs fulfill their dual objectives. It is essential for regulatory authorities to monitor and intervene regularly to prevent any potential bypassing of female borrowers by MFIs. Additionally, there could be a consideration to establish a requirement for MFIs to maintain a certain percentage of female clients in their overall client base, especially for larger MFIs that have accumulated significant physical wealth. From a managerial perspective, MFIs should prioritize their outreach objective while maintaining financial sustainability through the adoption of cost-efficient practices. Although not explicitly investigated, it is likely that some MFIs may shift their focus towards financial sustainability, as they transform from non-profit to profit-oriented organizations and focus more on accumulating physical assets. Therefore, regulatory authorities should oversee the transformation process and ensure that MFIs continue to prioritize their social mission alongside their financial goals.

The estimation has also been influenced by several organizational characteristics such as donation, legal status, profit orientation and macroeconomic factors (e.g., GDP, inflation, and unemployment). Since the macroeconomic environment also plays a role in the dual goals of MFIs, it is crucial for managers to have an understanding of the current macroeconomic cycles and develop strategies to ensure that their dual objectives are not hindered.

To simplify our results and findings, we chose to use only one variable to capture each dimension of MFIs' performance. However, there

⁴ To conserve space, we have omitted a detailed discussion on how the Hausman-Taylor estimation addresses endogeneity concerns. However, for a comprehensive understanding of the methodological perspective, interested readers can refer to Afrifa, Gyapong, and Zalata (2019).

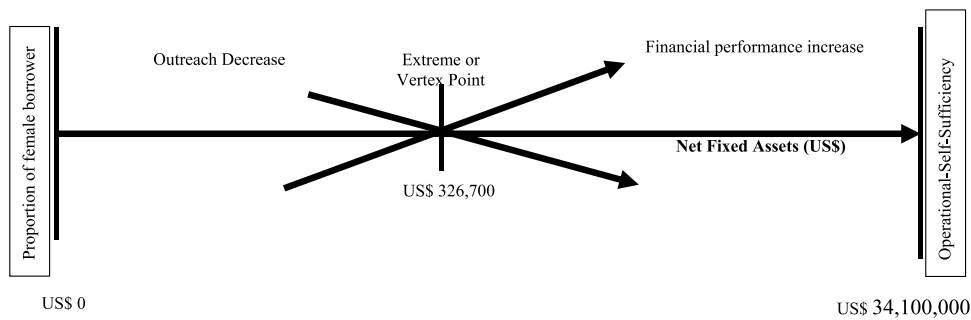


Fig. 1. Fixed Asset size in relation to dual goals of MFIs.

Source: Authors. Note: The maximum value of Net Fixed Assets was plotted based on the descriptive statistics. It is worth noting that there is a marginal disparity between the vertex points presented in Tables 3 and 4. As a result, we have chosen a single extreme or vertex point to illustrate the above figure. In accordance with the Kuznet's curve hypothesis, we have positioned the outreach goal on the left-hand side and financial sustainability on the right-hand side of the plot.

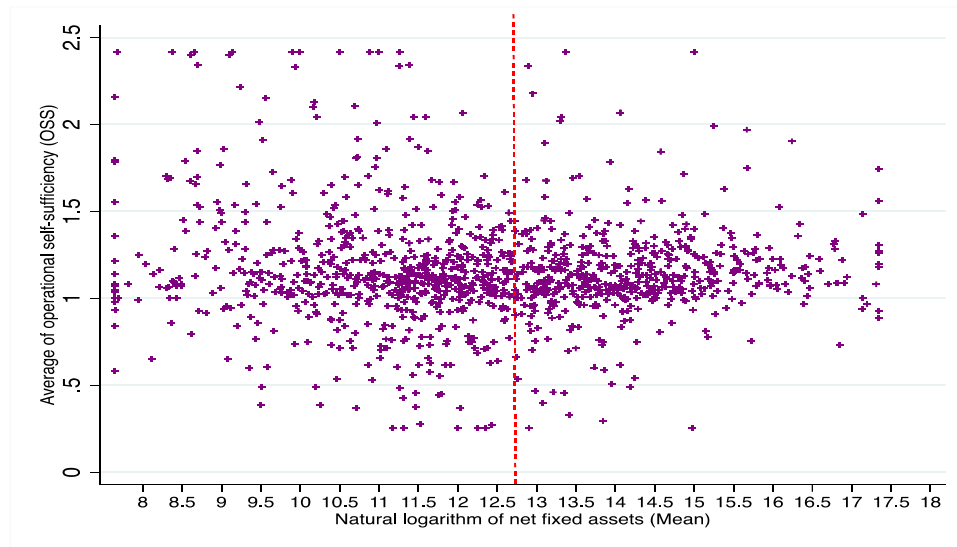


Fig. 2. Scatterplot (operational self-sufficiency- OSS and natural logarithm of net fixed assets-LNNFA).

Source: Authors. We have calculated the mean of OSS and LNNFA at the MFIs level to plot this graph.

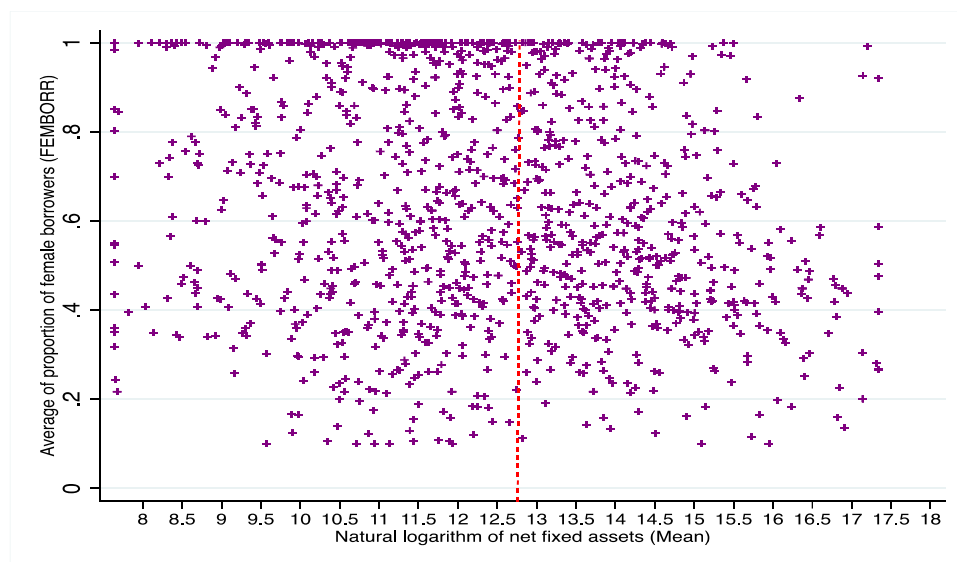


Fig. 3. Scatter plot (proportion of female borrowers-FEMBORR & natural logarithm of net fixed assets-LNNFA).

Source: Authors. We have calculated the means of FEMBORR and LNNFA at the MFI level to plot this graph.

Table 5
Robustness by Hausman-Taylor Approach

	Model-(9) DV: OSS	Model-(10) DV: FEMBORR
LNNFA	-0.0387 (0.1027)	0.0457** (0.0196)
LNNFA ²	0.0008 (0.0040)	-0.0017** (0.0008)
LNCBPB	-0.0487* (0.0260)	-0.0242** (0.0096)
LNBM	0.0415* (0.0227)	0.0025 (0.0106)
LLR	-1.4838*** (0.3011)	0.1999* (0.1025)
DTE	-0.0094*** (0.0028)	-0.0015 (0.0012)
DOND	-0.0164 (0.0160)	0.0048 (0.0079)
LS	0.0080 (0.0284)	0.0878*** (0.0221)
PS	-0.0306 (0.0288)	-0.0001 (0.0200)
GDPGR	0.0133*** (0.0045)	0.0023* (0.0013)
INF	0.0005 (0.0022)	0.0002 (0.0007)
UNEMP	0.0011 (0.0028)	0.0037** (0.0016)
REALINT	-0.0020 (0.0019)	-0.0004 (0.0005)
EXCHNGE	<0.0001*** (0.0000)	<-0.0001 (0.0000)
YD	no	no
RD	yes	yes
CONS	1.5087*** (0.4890)	0.5977*** (0.1090)
Observations	1974	1941
Chi ²	14604.7005	8568.0014
U-Test(t-value)	^a	1.46*
# of groups/MFIs	710	705

Source: Author. Robust standard errors in parenthesis

* $p < 0.10$

** $p < 0.05$

*** $p < 0.01$. ^a Extremum outside interval - trivial failure to reject H_0 . We introduced the linear term separately and in conjunction with the quadratic term to examine any potential changes in the results. Overall, we observed that the results remained qualitatively consistent for the other control variables, even after including the quadratic term. Additionally, we calculated the Variance Inflation Factors (VIF) for the estimated models, and none of the VIF values exceeded the maximum threshold of 10. For further information regarding the VIF threshold, please refer to the work of [Marcoulides and Raykov \(2019\)](#). YD=Year dummies and RD= Regional dummies.

are many alternative proxies available to measure the financial and social performance of MFIs, such as return on assets (ROE) and profit margin. Future studies can explore multiple factors to cross-verify our results. It is expected that LNNFA and LNNFA² would have a positive and negative relationship, respectively, with ROE, and the reverse would be the case for LNNFA and LNNFA² with profit margin. Higher values of net fixed assets are likely to result in lower ROE. Nonetheless, studying specific cases can provide qualitative insights into the reasons behind mission drift. Furthermore, while we selected net fixed assets as the variable to assess the Kuznets hypothesis, researchers can explore the use of other variables related to this proxy to determine if similar or

Table 6
Seemingly unrelated regression (SUR).

	Model-(11) OSS	Model-(12) FEMBORR
LNNFA	-0.1375*** (0.0346)	0.0436** (0.0205)
LNNFA ²	0.0058*** (0.0013)	-0.0019** (0.0008)
LNCBPB	-0.0706*** (0.0109)	-0.1106*** (0.0071)
LNBM	0.0178 (0.0161)	0.0026 (0.0102)
LLR	-1.6560*** (0.2927)	-0.0673 (0.1473)
DTE	-0.0120*** (0.0016)	-0.0032*** (0.0011)
DOND	-0.0282** (0.0133)	-0.0287*** (0.0089)
LS	0.0113 (0.0185)	0.0586*** (0.0121)
PS	-0.0136 (0.0184)	-0.0136 (0.0112)
GDPGR	0.0083** (0.0036)	0.0006 (0.0020)
INF	0.0038** (0.0018)	-0.0016 (0.0011)
UNEMP	0.0022 (0.0018)	0.0054*** (0.0012)
REALINT	0.0009 (0.0009)	-0.0027*** (0.0005)
EXCHNGE	<0.0001** (0.0000)	<-0.0001 (0.0000)
YD	yes	yes
RD	yes	yes
CONS	2.1159*** (0.2414)	0.9528*** (0.1379)
Observations	1937	1937
F Stat	13.5300***	98.2700***
R ²	0.1606	0.5816
Breusch Pagan Test of Independence (Chi ²)		48.7010***

Source: Authors. Robust standard errors in parentheses. * $p < 0.10$

** $p < 0.05$

*** $p < 0.01$. We also conducted an assessment of the Variance Inflation Factors (VIF) for the estimated models, and found that they all fall below the maximum threshold of 10. For more detail on VIF threshold, please see [Marcoulides & Raykov \(2019\)](#). YD=Year dummies and RD= Regional dummies.

different results are obtained. Additionally, while outreach was measured as the proportion of female borrowers, the scope of outreach, using average loan size, among other factors, can also be empirically tested.

Data availability

The data related to this study can be freely accessed from the following link: <https://databank.worldbank.org/source/mix-market>

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.

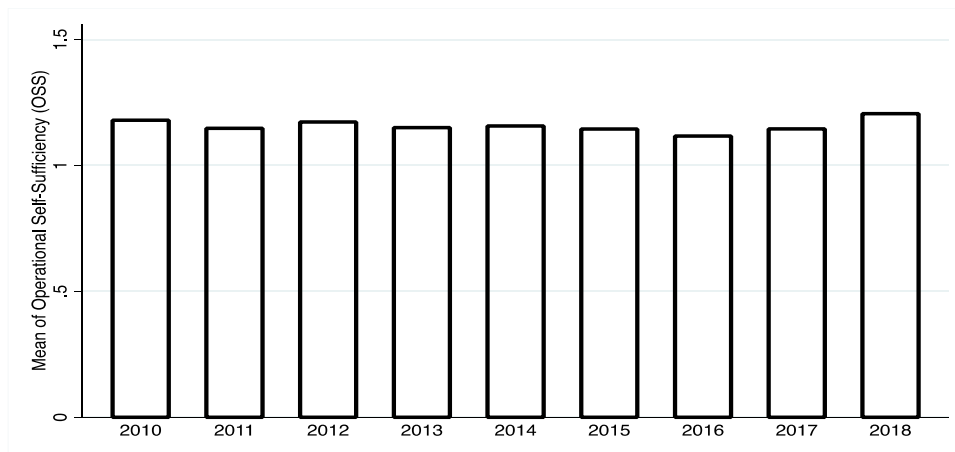
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Appendix A

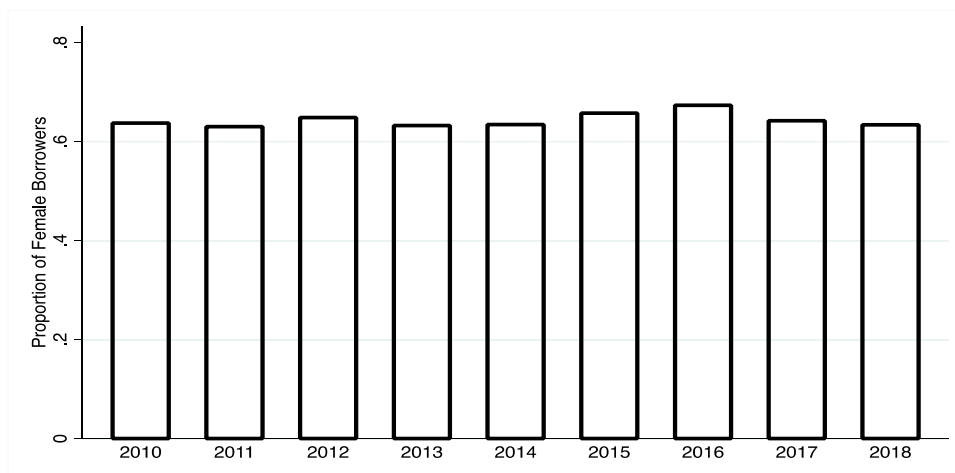
Trend of Operational Self-Sufficiency (OSS) of the global microfinance industry (2010-2018).



Source: Authors. Note: OSS value over 1 indicates that MFIs' generated revenue is sufficient to cover their financial expense, operating expense and net impairment loss.

Appendix B

Trend of Proportion of Female Borrowers (2010-2018).



Source: Authors.

Appendix C

Distribution of sample by year.

Year	Freq.	Percent	Cum.
2010	635	14.86	14.86
2011	553	12.94	27.8
2012	507	11.89	39.69

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Year	Freq.	Percent	Cum.
2013	398	9.31	49.01
2014	449	10.51	59.51
2015	501	11.72	71.24
2016	482	11.28	82.52
2017	413	9.67	92.18
2018	334	7.82	100
Total	4,272	100	

Source: Authors.

Appendix D

Distribution of sample by country.

Country	# of MFIs	Obs.
Afghanistan	7	16
Albania	5	16
Angola	1	3
Argentina	11	40
Armenia	12	54
Azerbaijan	29	100
Bangladesh	38	123
Belarus	2	7
Belize	1	2
Benin	20	52
Bolivia	19	112
Bosnia and Herzegovina	11	58
Brazil	27	96
Bulgaria	16	43
Burkina Faso	10	23
Burundi	1	5
Cambodia	19	112
Cameroon	14	28
Central African Republic	2	2
Chad	1	1
Chile	5	20
China, People's Republic of	11	19
Colombia	33	139
Congo, Democratic Republic of the	10	24
Congo, Republic of the	2	2
Costa Rica	14	40
Cote d'Ivoire (Ivory Coast)	13	24
Dominican Republic	13	56
East Timor	2	10
Ecuador	57	292
Egypt	10	49
El Salvador	13	51
Ethiopia	7	19
Gambia, The	1	1
Georgia	15	59
Ghana	21	51
Guatemala	19	74
Guinea	1	1
Guyana	1	3
Haiti	6	19
Honduras	24	85
India	149	530
Indonesia	11	30
Iraq	12	30
Jamaica	2	7
Jordan	9	39
Kazakhstan	18	58
Kenya	20	47
Kosovo	8	40
Kyrgyzstan	16	57
Laos	11	17
Lebanon	5	18
Liberia	1	4
Macedonia	3	23
Madagascar	11	25
Malawi	4	16
Mali	6	17
Mexico	65	125

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Country	# of MFIs	Obs.
Moldova	7	17
Mongolia	9	38
Montenegro	1	4
Morocco	8	43
Mozambique	5	15
Myanmar (Burma)	10	24
Namibia	1	1
Nepal	14	31
Nicaragua	23	87
Niger	6	11
Nigeria	45	79
Pakistan	33	77
Palestine	7	28
Panama	5	14
Papua New Guinea	5	25
Paraguay	6	22
Peru	39	122
Philippines	38	132
Poland	2	6
Romania	4	17
Russia	32	64
Rwanda	6	10
Samoa	1	3
Senegal	9	18
Serbia	3	15
Sierra Leone	3	9
Solomon Islands	1	2
South Africa	2	5
South Sudan	2	2
Sri Lanka	11	16
Sudan	1	4
Suriname	1	1
Syria	2	10
Tajikistan	28	112
Tanzania	9	21
Togo	11	23
Tonga	1	4
Tunisia	1	9
Turkey	2	6
Uganda	11	27
Ukraine	1	5
Uzbekistan	14	29
Venezuela	1	3
Vietnam	16	40
Yemen	6	18
Zambia	3	7
Zimbabwe	2	2
Total	1323	4272

Source: Authors based on the MIX Market data.

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