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FINANCIAL ECONOMICS | RESEARCH ARTICLE Predictors of microfinance sustainability: Empirical evidence from Bangladesh

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Abstract: Poverty reduction and sustainability are the two major issues in achieving sustainable development. Microfinance emerged as an essential catalyst for socioeconomic development and financial inclusion to reduce poverty. MFIs cannot meet their primary objective of poverty reduction if they are not sustainable financially. With the theoretical support of the Profit Incentive theory, this paper examines the financial sustainability of microfinance providers (MFPs) in Bangladesh. A financial sustainability index (FSI) is developed by using Principal Component Analysis (PCA). This study analyzes the data using two-step system GMM from 2006 to 2018 collected from the MIX market of the World Bank. The results show that loan size, number of borrowers, percentage of women borrowers, and inflation significantly impact FSI positively. Organizational structure, liquidity, leverage, cost per borrower and GDP have significant negative impacts on the financial sustainability of the microfinance sector of Bangladesh. Upon further analysis, the estimates demonstrated that national governance indicators have a negative impact on the relationship between organizational structure, average loan balance per borrower and FSI. Similarly, a stronger national governance reduces (erases) the negative effect of number of borrowers and cost per borrower on FS of MFPs of Bangladesh. This study incorporated all six dimensions of the national governance indicators and developed a new financial sustainability index for measuring the financial sustainability of microfinance providers.



Maeenuddin





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Dr. Maeenuddin has an immense experience in the industry as a financial analyst. He has been working in the finance area for more than 12 years. He obtained his Ph.D. in Finance from Putra Business School, Universiti Putra Malaysia, Malaysia. He is very passionate about poverty reduction; thus his research works focus on poverty alleviation. Some of the works he has been doing among others are financial sustainability and poverty reduction for the development and the well-being of marginalized communities, and finance/corporate finance/microfinance/behavioral finance. With a passion for knowledge co-creation, he actively works with the research communities. To promote microfinance roles in reducing poverty, he has presented his research works at several conferences globally. Subjects: Economics; Finance; Business, Management and Accounting; Industry & Industrial Studies

Keywords: Financial sustainability; microfinance; sustainability; national governance indicators; sustainability index; microfinance providers

1. Introduction

Poverty reduction and sustainability are the two major issues that must be addressed to achieve sustainable development (Ballester & Pilar, 2021). The main problems are the unavailability of credit for rural communities and high prices. Microfinance sectors emerged as essential catalysts for socioeconomic development and financial inclusion. In contrast to the formal banking system, it provides small uncollateralized loans through innovative lending strategies such as group lending and progressive lending (Maeenuddin, S. Hamid, A. M. Nassir, et al., 2021; Sangwan & Nayak, 2020). MFIs cannot meet their primary objective of reaching the maximum number of society's poor if they are not sustainable financially. Empirical studies show that MFIs rely more on subsidies and donations if they cannot cover their operating cost, i.e. operating expenses, loan loss expense and financial expense from their income from interest on the loan (Githaiga, 2021). Unsustainable MFIs cannot support the poor in the long run, as they will no longer exist. The goal of financial sustainability encourages the MFIs to earn maximum profit to cover their expenses without donations and subsidies (Maeenuddin, S. Hamid, A. M. Nassir, et al., 2021).

Bangladesh's microfinance operations began in the 1970s which the Grameen Bank—which won the Nobel Peace prize along with its founder Muhammad Yunus in 2006 "for their efforts to create economic and social development from below" through micro-credit programs—and BRAC (earlier known as Bangladesh Rural Advance Committee) played predominant roles and were later joined by others likes the Association of Social Advancement (ASA), transforming the rural social and economic landscape completely. A World Bank study of 2014, which looked at the long-term impact of micro-credit programs, concluded that the microfinance sector of Bangladesh helped rural households earn more and consume more, thereby accounting for more than 10% of the total reduction in extreme poverty in the decade between 2000 and 2010. This helped Bangladesh avoid an increase in income inequality that many developing countries have witnessed.

A 2019 study by the World Bank states that the country has made significant strides in many dimensions of gender equality, creating opportunities for women and girls from all walks of life—reducing fertility rates, achieving gender parity in schooling and paving the way for millions of women to work in garments sector—in the past decade. So much so that today girls have a better chance than boys of completing school and surviving to 60. The labour force participation rate for women (FLFP) of 15 years and above has risen from 26% in 2003 to 36% in 2016 "in contrast to most other South Asian countries, where these rates fell". For example, in 2017, the FLFP for India was 27.2%, while that for Bangladesh was 33%, according to the UNDP's 2018 updated Human Development Indices and Indicators. The share of women in Bangladesh's national parliament (with 50 seats reserved for them) has also increased and remains above the regional average of 19.4% in 2017 at 20.3%. The UNDP's 2018 report shows Bangladesh's life expectancy at 72.8 years.

As part of their COVID-19 responses, the leading MFIs in Bangladesh have offered various solutions beyond microfinance-specific measures. While MFIs have proven resilient in the past, the impact of COVID-19 is still playing out. A CGAP global survey during the second half of 2020 showed that liquidity was not an urgent concern for MFIs. This was likely due to liquidity support from the government and funders, reduced lending during the lockdown, and reduced operational expenditures resulting from lower branch activity and staff layoffs. However, solvency remains an issue for MFIs.

Consequently, many MFIs, especially the smaller ones, have had to use capital funds for operational expenses. PAR 90, or the percentage of the gross loan portfolio for all available loans overdue by more

than 90 days, increased from an average of less than 2% in March 2020 to 39% in September 2020, according to a BFPB report. COVID-19 is unprecedented in many ways, but Bangladesh's MFIs have proven many resilient times before and will likely prove resilient again. With the achievement of the sustainability goals microfinance sector can perform better. It can achieve its primary objectives and help achieve the UN 2030 sustainable development Goals. It can directly contribute to achieving the SDGs, including SDG1 eradicating poverty, SDG2 ending hunger, SDG3 good health, SDG4 quality education, SDG5 gender equality and women empowerment, SDG8 promoting economic growth, SDG9 supporting industry, infrastructure, and SDG10 reducing inequality.

This study contributes to the current literature in two different ways. Firstly, the theoretical model of this study *controls for* all the six dimensions of the national governance indicators. In contrast, the previous studies have been done in other sectors and examine some of the governance indicators. Secondly, this study has been conducted in the microfinance sector of Bangladesh and looked at both microfinance banks and non-bank microfinance institutions. In contrast, the previous studies have been done mainly in the banking sector. The measurement of the sustainability of microfinance providers is still an unresolved issue (Saad et al., 2018). Hence, this study developed a new financial sustainability index for microfinance providers' economic sustainability (FSI). Both conventional and efficiency measures have been used in developing the index.

2. Literature review

2.1. Financial sustainability

According to Muhammad et al. (2019), microfinance is a financial service initially designed to alleviate poverty by providing loan facilities to society's poorest strata. Garrity and Martin (2018) developed a microfinance model to stop the poverty cycle by describing how to make & implement an effective microfinance program to derive economic empowerment in developing nations. Even though microfinance institutions and programs are vital in development strategies, the availability of knowledge about their impact is limited and contested (Hulme, 2000). Ahmad et al. (2019) examined the growth strategies of Pakistan's microfinance sector for 2013–2017. The results show that, although the industry showed tremendous growth but failed to meet the target. The authors also found that the sustainability level is weak, which needs to be addressed, while the productivity ratio is also low. The reason behind this low productivity and weak sustainability is the expansion of costly and inappropriate growth strategies. Unlike developed countries, where they achieved sustainability in their industrial sector, sustainability practices in developing countries or emerging economies are limited (Jamwal et al., 2021). Natural disasters and global shocks like pandemic force organizations to enhance financial sustainability (Aracil et al., 2021).

Financial sustainability is continually a debatable topic, especially between the two approaches, i.e. Welfarist and Institutionalist approaches. On one side, the Welfarist theory claims that the success of the MFIs could be shown by the number of poor people served by the MFI. This theory is based on the premise that establishing MFIs reduces poverty by empowering the poorest of the economically active poor (Marwa & Aziakpono, 2015). On the other hand, the Institutionalist theory suggests that MFIs need to create sustainable intermediation. For better financial services to reduce poverty, MFIs need to be sustainable (Mitra, 2017). The institutionalists state that only financially sustainable MFIs can provide financial services on a long-term basis to poor people with subsidies, donations and grants, ultimately stimulating the financial system (Morduch, 2000).

The theoretical foundation for financial sustainability is the Profit Incentive Theory (PIT) under the paradigm of the Institutionalist approach. Profit Incentive Theory (PIT) suggests that poverty can be reduced with sustainable MFPs. In concurrence with the Institutionalist paradigm, the PIT seconds the donor's funding is limited in amount, thus cannot find MFIs at mega-scale given the increasing demand for microfinance. This theory upholds the MFIs pursuing thrive to maximize revenue, minimize operational cost, cover expenses and build surpluses. MFIs which depend on grants/subsidies do not respond to profit maximization and cost minimization pressure, thus opting for outreach depth over efficiency by serving the poorest and rural clients, which have extra lending costs (Bogan, 2012).

Various studies have showed the existence of a trade-off between MFI's social and financial goals as more focus on profitability and sustainability through aggressive commercialization is likely to compromise on the social mission of the MFIs of reaching the poorest of the poor in society (Churchill, 2020). An increase in the breadth of outreach, i.e. number of borrowers, enhances the financial sustainability of for-profit institutions. Still, it leads to a decline in financial sustainability for the non-profit institution (Churchill, 2020). Churchill (2020) examined the data of 1,595 MFIs from 109 countries during their study. The study's findings show the existence of a trade-off between the social and financial sustainability of MFIs. Rizkiah (2019) examined the effect of social outreach on the financial performance of microfinance institutions in Bangladesh. Depth and breadth of outreach were used as proxies for social outreach, and ROA has been used to measure the financial performance of MFIs. Cross-sectional data were used from 434 MFIs for the year 2015. The result shows that the breadth of outreach has a significant positive relationship with financial performance ROA, while the depth of outreach has a negative relationship with ROA.

Bayai and Ikhide (2016) examined the relationship between financial sustainability and financing option for MFIs. They found that subsidies are responsible for inefficiency, spurring distortions, harbouring dependency syndrome, and are additive to financial sustainability with a threshold limit. On the other hand, Fersi and Boujelbéne (2016) revealed that organizational performance positively affects the sustainability of both Islamic and conventional microfinance institutions. The authors analyzed the data of 333 conventional and 14 Islamic MFIs from six different regions from 1996–2012. They used Return on Assets (ROA) as a proxy for financial performance, Operational Self-Sufficiency (OSS) for financial sustainability, and the number of active borrowers per loan officer (ABPLO) for organizational performance. They found that ROA does not affect the OSS of MFIs. A significant positive relationship has been recorded between organizational performance and operational self-sufficiency.

According to Rahman and Mazlan (2014), to maintain sustainability and generate financial revenue, MFIs need to simplify the distribution of loans, improve personal productivity and yield on the gross loan portfolio, reduce operating costs, reduce borrowing funds from donors, and utilize the maximum available financial resources. Rahman and Mazlan (2014) examined the operational self-sufficiency of MFIs in Bangladesh. Using multiple regressions for data analysis, they found that the size of MFIs, personal productivity ratio (PPR), and cost per borrower (CPB) positively correlated with financial sustainability measured by operational self-sufficiency. ALPB, DER, age of MFIs, NAB, and operating expense ratio have a negative effect on the OSS of MFIs. In the next section, we provide a comprehensive review of the literature on the factors that influence financial sustainability along with our research hypotheses.

2.2. Hypotheses development

2.2.1. Organizational structure

There are two primary forms of MFPs, i.e., microfinance banks and non-bank MFIs. Mumi et al. (2018) noted that MFIs had been developed with different capital structures and institutional objectives, resulting in various organizational forms. Golesorkhi et al. (2019) concluded that the impact of informal institutional differences between MFIs and their partners from developed countries is sigmoid-shaped. Mumi et al. (2018) noted that NGOs have better financial performance than credit unions and commercial banks. Hence this tested the following hypothesis.

H1: Structure of the MFPs significantly affects the FSI of MFPs.

2.2.2. Growth outreach

Firms with lower growth and smaller size are likely to have a higher non-survival probability. Musah et al. (2019) found that the growth of the firm has a significant positive relationship with

the firm financial performance measured by return on assets (ROA), an insignificant positive relationship with return on equity (ROE), and an insignificant negative relationship with return on capital employed (ROCE). Fernández et al., (2019) shows that, in the short run, growth has a positive impact on firm profitability. Naz et al. (2019) found that average loan size is one of the main factors affecting the profitability and sustainability of MFIs in Pakistan. Kinde (2012) noted that the depth of outreach affects financial sustainability. A significant relationship has been expected. Mekonnen and Zewudu (2019) find that MFIs with a larger number of clients show a higher value of operational self-sufficiency (OSS) and low cost per borrower, which shows that the breadth of outreach increases the sustainability of microfinance institutions. Kinde (2012) noted that the breadth of outreach affects financial sustainability. Similarly, Masanyiwa et al. (2022) noted that the sustainability of microfinance institutions was shown to be significantly impacted by the number of active borrowers. Hence this tested the following hypothesis.

H2: Growth outreach significantly affects the FSI of MFPs.

2.2.3. Women empowerment

There are two views concerning the impact of women as borrowers on the FSI of MFPs. Muhammad et al. (2019) & Burki et al. (2018) noted that as women are far more inclined toward each other than males (matching theory), hence it increases the repayment rate, which positively affects financial sustainability. Memon et al. (2020) argued that most of the borrowers are women living in rural areas, which is hard to reach, hence increasing the transaction cost, and negatively affecting the financial sustainability of the microfinance providers. Perera (2021) found that the female borrower proportion had no significant influence on the financial sustainability of MFIs in Sri Lanka. Hence, we tested the following hypothesis.

H3: Women as borrower significantly affects the FS of MFPs.

2.2.4. Liquidity

The risk of lacking the capability to meet immediate liabilities/obligations is known as liquidity risk (Gietzen, 2017). As MFPs increased the share of deposits, it exposed MFPs more to liquidity risk. Maintaining an optimum level of readily available financial resources is much more critical for MFPs with more deposits. Ngumo et al. (2017) found that liquidity risk has an insignificant negative relationship with the financial performance of MFBs in Kenya. Oludhe (2011) concluded from his study that liquidity has a weak relationship with financial performance measured by the firm's return on equity (ROE). Hence this study tested the following hypothesis.

H4: Liquidity significantly affects the FS of MFPs.

2.2.5. Leverage

The debt-to-equity ratio determines the loss absorption capacity of the MFIs (Tehulu, 2013). MFIs tend to be unsustainable in case of losing absorption capacity. Numerous studies have been conducted on the relationship between debt to equity ratio (capital structure or leverage) and the financial performance of MFIs (Masanyiwa et al., 2022; Parvin et al., 2020). Maaka (2013) states that the firm's liquidity and leverage negatively affect commercial banks' profitability. Mia et al. (2016) found that the debt-to-equity ratio or leverage has a negative relationship with the sustainability of the MFIs. Kinde (2012) found an insignificant relationship between capital structure and the sustainability of MFIs. Hence this tested the following hypothesis.

H5: Leverage significantly affects the FS of MFPs.

2.2.6. Cost efficiency

Aziz and Aziz (2019) examined the financial performance of MFIs in Pakistan result shows that the adjusted cost per borrower significantly impacts the performance of MFBs. Naz et al. (2019)

examined the financial performance of the microfinance sector of Pakistan. They found that cost efficiency significantly affects the profitability and sustainability of MFIs in Pakistan. Hence this tested the following hypothesis.

H6: Cost per borrower significantly affects the FS of MFPs.

3. Research methodology

3.1. The data

For the attainment of the objectives, an unbalanced panel data set from microfinance providers operating in Bangladesh has been used. The data is extracted from the MIX market of the World Bank for the years 2006–2018. Various criteria have been applied to include the MFPs in the sample (Ahamad et al., 2022; Mia et al., 2016; R. B. Maeenuddin et al., 2020). Firstly, MFPs must have data from at least the last three years, i.e., for 2016–2018. Secondly, observations and MFPs with missing or zero values will have to be excluded. As a result, the author arrived at a final sample of unbalanced panel data for 30 microfinance providers from Bangladesh, yielding 344 MFP-year observations.

3.2. Research model and measurement of variables

In order to compensate for outliers, the values of all variables are transformed into natural logarithms. Both static and dynamic models have been applied to examine the relationship between variables of concern. Following the studies (Adusei & Adeleye, 2020; S. Hussain et al., 2021), this study investigates the effect of organizational structure, growth outreach, women empowerment, liquidity, leverage and cost efficiency on financial sustainability.

3.3. Static panel model

$$FSIit = \beta \,\mathbf{0} + \beta j \,Xit + \beta kCit + (\gamma i + uit) \tag{1}$$

Where $(\gamma_i + u_{it}) = \varepsilon_{it}$, the composite error term; FSIit is the financial sustainability index of MFPs; X is the vector of explanatory variables (OS, ALPB, NAB, PWB, LQDT, DER, and CPB) and βj their respective coefficient; C is the vector control variables (GDP, Inflation) and βk their respective coefficient; i is the MFP 1, 2, ..., N; t is the number of years 1, 2, ..., T; γ_i indicates country-specific heterogeneity (country fixed effects) and uit is the idiosyncratic error term that is independently and identically distributed (i.i.d).

3.4. Dynamic panel model

In the dynamic equation, the following model, in line with Githaiga (2021); Thrikawala et al. (2017), has been used.

$$LogYit = \beta 0 + \beta 1 log (Yit - 1) + \beta jXit + \beta 3 Zit + \beta m(XZ)it + \beta kCit + \mu i + \epsilon i$$
(2)

Where **Y** is the dependent variable, y_{it-1} is the lagged level of the dependent variable, **X** represents the independent variables, **Z** shows the moderating variable (National Governance), and **XZ** represents the interaction terms. The symbol η and μi denote time-specific and country-specific effects, respectively, and ϵ_{it} is the error term.

The following Table 1 contains the methods used to measure variables along with references from the previous studies where those methods have been used.

3.5. Estimation method

The estimation model is a dynamic panel model to capture persistence. In the current study, the specified dynamic panel model is captured by including lagged-financial sustainability (dependent variable) as one of the independent variables. However, the endogeneity problem has been created by including the lagged dependent variable in the model, the correlation of the right-hand-side

Table 1. Measurement of variables							
Variable	Descriptions	Operationalization	References				
Financial Sustainability (FSI)	The ability of the MFP to cover its cost from its own generated income, whether subsidized or not.	FSI = ROA+ROE+OSS+FSS	(Bhanot & Bapat, 2015; Saad et al., 2019) (Bayai & Ikhide, 2018;				
Organizational Structure (OS)	Different forms of microfinance providers	Microfinance banks =1 Non-banks MFIs = 0	(Mumi et al., 2018)				
Growth Outreach (NAB & ALPB)	Increase in the number of active borrowers and Average loan size	No of active borrowers, Average Loan Size,	(Masanyiwa et al., 2022; Rauf & Mahmood, 2009)				
Women Empowerment (PWB)	The extent MFPs support women	Percentage of women borrowers	Memon et al. (2020)				
Liquidity (LQDT)	The ability of the MFPs to meet the short-term demand of funds.	Shorter-term Asset/Short term liabilities	(Gietzen, 2017)				
Leverage (DER)	It is a measurement of the relative level of debt.	Debt to Equity ratio	(Githaiga, 2021; Masanyiwa et al., 2022)				
Cost Efficiency (CPB)	It is the level of operating cost used per borrower during the operation	Operating Cost/Number of Active borrowers	(Aziz & Aziz, 2019; Naz et al., 2019)				
National Governance (NG)	Voice & accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law & Control of Corruption.	NG= VA+PS+GE+RQ+RL+CC	(Ahamad et al., 2022; Khan & Zubair, 2014;				
Gross Demestic Product (GDP)	Value of finished goods and services produced inside the country, no matter who makes it.	Annual % of country GDP growth	(Bibi et al., 2018; Phan et al., 2019; (Xie et al., 2022)				
Inflation (INF)	Annual change in consumer prices	Annual % of country Inflation rate	(Ahlin et al., 2011; Shkodra, 2019)				

variables with the error terms. The statistical consequences of endogeneity are biased estimated coefficients of the "endogenous" right-hand-side variables and hence, the statistical inferences can be misleading. The traditional panel estimators are inefficient in resolving the endogeneity issue. The present study adopts the dynamic Generalized Method of Moments (GMM) estimator or instrumental variable technique as its main econometric method.

3.5.1. Generalized Method of Moments (GMM)

When dealing with heteroskedasticity of uncertain form, the Generalized Method of Moments (GMM) developed by L. Hansen (1982) is the method of choice. The GMM was first suggested by Holtz-Eakin et al. (1988) and later on modified by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998) cited by (Maimun et al., 2021). It is designed to capture the country-specific effects and possible joint endogeneity problem of some independent variables, which may lead to simultaneity bias. 2SLS is a technique used to eliminate endogeneity from regression models. As an alternative, GMM can handle this problem with minimum standard error and does not need stationary analysis of the variables involved. GMM is a generic method for estimating parameters in statistical models. It uses moment conditions, the functions of the model parameter and the data such that their expectation is zero at the parameter's actual value. It controls for the endogeneity of the lagged dependent variables in a dynamic panel model where there is a correlation between independent variables and their error term. It also controls for omitted variable biases, unobserved panel heterogeneity, and measurement errors. First, difference transformation is one of the main weaknesses of this type as subtracting the previous

observations from the contemporary one thereby magnifies gaps in an unbalanced panel as this study also used unbalanced panel data. Two major GMM techniques are available in the literature; difference GMM & system GMM.

As in this study, we used unbalanced panel data, where all the microfinance providers do not have the data for all of the periods from 2006 to 2018. Hence, System GMM has to be the best possible data analysis option. However, system GMM suffers from problems with the overidentification of instruments, which can cause the problem of over-fitting the estimated model (Roodman, 2009). J-test and Sargan test of Hansen's (1982) can help detect the over-identification problem in system GMM. Hansen's (1982) J test and Sargan's (1985) tests for over-identifying restrictions: tests the null hypothesis of the overall validity of the instruments used. Failure to reject the null hypothesis supports the choice of tools. The second problem related to system GMM is the potentiality of second-order serial correlation; however, this can easily be detected through testing the error term of the differenced error term. AR(1) and AR(2) test with the null hypothesis that the different error terms are first and second-order serially uncorrelated. Failure to reject the null implies that the original error term is serially uncorrelated and the movement conditions are correctly specified (the value of AR(2) > 0.05).

4. Empirical results

4.1. Descriptive statistics

The following table (4.1) shows the descriptive statistics of all variables. It includes the number of observations, mean, standard deviation, minimum and maximum values of each variable.

Table 2 presents the summary statistics about the data, showing that the mean value of FSI is 5.539 and the maximum value is 6.381. It shows that most of the MFPs have relatively high FSI values. The standard deviation is 0.328, indicating that most of the data set is closer to the mean value. In other words, from the above statement, we can estimate that 95% of the value of FSI falls in the range of 5.539 - (2×0.328) to $5.539 + (2 \times 0.328)$ or between 4.883 and 6.195. The total number of observations is 345. Similarly, the mean value of the average loan per borrower and number of active borrowers shows that most MFPs have a smaller loan size and a large number of borrowers. The ALPB is a proxy that indicates the socioeconomic level of the borrower (Kinde, 2012). According to the MIX benchmark methodology, the average loan is USD 307. In the current study, the mean value of the average loan size is USD 186.44. It shows that MFPs operating in Bangladesh perform better in the depth of outreach, reflected in their lower average loan size than the MIX benchmark. The maximum value of the average loan size ALPB is USD 2,111.54. The highest value of the maximum value is an identification of serving relatively non-poor clients (Kinde, 2012).

According to the benchmark set by the MIX market, the breadth of outreach of the MFP has been categorized based on the number of borrowers NAB. As per the benchmark, MFP with several borrowers up to 10,000 has been considered minor, an MFP with NAB of more than 10,000 and less than 30,000 has been considered a medium scale, and an MFP with borrowers of more than 30,000 has been considered a large scale MFP (Kinde, 2012). Hence, during the current study, from the above tables, it has been noted that the mean value of NAB is 822,505, which is more than 30,000 and has been considered significant on average. The mean percentage of women borrowers (PWB) shows that most MFPs have a higher number of women borrowers. It reflects the focus of the MFPs on women's involvement and empowerment. Similarly, the mean value for leverage (DER) is 8.175. This shows the predominant debt financing of MFPs operating in Bangladesh. It has been noted that the mean value of cost per borrower is 21.67, which shows that a relatively less number of MFPs has a higher cost per borrower. One of the main reasons for smaller costs per borrower is the highest number of active borrowers. However, there may be some limitations in comparing the efficiency of microfinance institutions in different countries as it has been reported that country

Table 2. Descriptive Statistics								
Var.	Obs.	Mean Std. Dev		Minimum	Maximum			
FSI	345	5.539	0.328	2.266	6.381			
ALPB	345	186.440	122.410	27.680	793.08			
NAB	345	822,505	1,815,607	5,812	8,934,874			
PWB	345	0.921	0.128	0.002	1.271			
LQDT	345	3.242	10.193	0.029	135.398			
DER	345	7.940	12.588	-0.050	111.001			
СРВ	345	21.670	14.430	3.720	141.98			
GDP	345	0.066	0.007	0.056	0.079			
INF	345	0.071	0.017	0.054	0.114			
VA	345	-0.467	0.156	-0.747	0.433			
PS	345	-1.335	0.216	-1.628	-0.896			
GE	345	-0.746	0.058	-0.825	-0.172			
RQ	345	-0.882	0.067	-1.001	-0.448			
RL	345	-0.772	0.102	-0.929	-0.057			
СС	345	-0.961	0.157	-1.434	-0.428			

effects like operating and regulatory environments affect their efficiency (Balkenhol, 2007; Hermes & Lensink, 2007; Kinde, 2012).

4.2. Correlation matrix (Bangladesh)

In Inferential analysis, for the measurement of the degree of relationship among the relevant variables, Pearson's Correlation matrix is used.

Table 3 shows Pearson's correlation coefficients of the variables from the microfinance sector of Bangladesh. The pair-wise correlation between variables is less than 0.90 and is considered not highly correlated. The table shows a positive relationship between financial sustainability and ALPB, NAB, GLP, PWB, CPB, NGI, and GDP. Similarly, a negative relationship has been noted between financial sustainability and OS, Liquidity, DER, and Inflation.

4.3. Regression results

To ensure consistency and avoid bias, the two-step system GMM estimator has been used following the studies of (Ahamad et al., 2022; Githaiga, 2021; Thrikawala et al., 2017). It is an augmented two-step difference GMM, more robust than the one-step system GMM, and more efficient and robust in heteroskedasticity and Autocorrelation (Rodman 2009).

4.3.1. Linear regression model

Table 4 displays the regression analysis's primary outcomes using static and dynamic panel analyses. The robustness of the model has been checked by including new variables, such as Interaction terms of National Governance Indicators (NGIs), in the model.

The current year's financial sustainability positively impacts next year's financial sustainability South Asian context. The result shows that the lagged FSI significantly affects the FSI of Bangladesh microfinance sectors. Organizational structure has a negative impact on FSI in the MF sector of Bangladesh. The transformation of non-bank microfinance institutions into formal microfinance banks significantly negatively impacts the financial sustainability of MFPs in Bangladesh. Proxies for measuring growth outreach; ALPB has a significant positive impact on FSI. NAB has positive effect on the FSI of MFPs in Bangladesh. The percentage of women borrowers PWB has a significant positive effect on FSI. Liquidity significantly negatively impacts the FS of the MF sector of Bangladesh. Leverage (DER) negatively affects the FS of Bangladesh's microfinance sectors. Cost per borrower has a significant negative impact on the financial sustainability of the microfinance sectors of Bangladesh.

4.3.2. Regression model with interaction terms (robustness check)

As a robustness test, we also considered national governance as moderator variable and re-run our regression model by including interaction terms of national governance with the vector of explanatory variables. Table 5 explains the Interactions of national governance indicators with independent variables to influence the dependent. Variable.

Table 4.4 above shows that NGIs have a significant effect on the relationship between OS, ALPB, NAB, and CPB with the financial sustainability of the MFPs of Bangladesh. The tables 4.4 shows that national governance has a significant negative impact on the relationships between OS and ALPB with FSI of MFPs of Bangladesh. It reduces the positive effect of OS and ALPB on the FSI of MFPs. Hence, the moderation of the national governance indicator decreased the positive effect of OS and ALPB on the FSI of the microfinance sector of Bangladesh. Similarly, national governance reduces (erases) the negative effect of NAB and CPB on the FSI of MFPs of Bangladesh.

5. Discussion

The results show that the lagged FSI significantly effect the FSI of Bangladesh microfinance sectors. Organizational structure, number of borrowers, liquidity, leverage, and cost per borrower have a negative impact on FSI in the MF sector of Bangladesh. However, loan size and percentage of women borrowers significantly positively affect FSI. Golesorkhi et al. (2019) concluded that the impact of informal institutional differences between MFIs and their partners from developed countries are sigmoid-shaped. In contrast, formal institutional differences are not beneficial for MFIs' performance. According to Mumi et al. (2018), the structure of non-profit MFIs (NGOs) is best suited for achieving the primary objectives of MFIs. NGOs have better financial performance than credit unions and commercial banks. The results in Table 4.4 suggests that an increase in average loan per borrower ALPB positively impacts the financial sustainability of MFPs. It shows that the profitability of microfinance providers is linked to higher loan sizes. Similarly, larger loans are linked to higher cost-efficiency. The finding validates the mission drift, where MFIs provide services to relatively non-poor clients. The result of this study is consistent with studies by Adongo (2005), which state that profitability relates to selling bigger loans.

Table 3. Pearson's Correlation Matrix											
Var.	FSI	OS	ALPB	NAB	PWB	LQDT	DER	СРВ	NG	GDP	INF
FSI	1.000										
OS	-0.121*	1.000									
ALPB	0.300*	-0.067*	1.000								
NAB	0.285*	0.454 *	-0.053*	1.000							
PWB	0.064*	0.071*	-0.247*	0.093*	1.000						
LQDT	-0.143*	0.019*	-0.016*	-0.057*	0.010*	1.000					
DER	-0.476*	0.131*	-0.125*	-0.270*	-0.063*	0.099*	1.000				
CPB	0.062*	-0.121*	0.915*	-0.202*	-0.253*	0.012*	-0.041*	1.000			
NG	0.108*	-0.025*	0.593*	-0.011*	-0.026*	-0.011*	-0.041*	0.568*	1.000		
GDP	0.174*	-0.009*	0.484*	0.019*	-0.057*	-0.012*	-0.152*	0.455*	0.226*	1.000	
INF	-0.150*	0.010*	-0.454*	-0.002*	0.072*	-0.010*	0.049*	-0.386*	-0.200*	-0.299*	1.000

Note: * p < 0.01, ** p < 0.05, *** p < 0.10, Where FSI is the financial sustainability index, OS is Organizational structure, ALPB is the average loan per borrower, NAB is the number of active borrowers, PWB is the percentage of women borrowers, Lqdt is liquidity, DER is leverage, CPB is the cost per borrower, NG is National governance indicators Index.

Table 4. Simple Linear Regression Model							
Variable	OLS	REM	FEM	2SLS	(Sys) GMM		
FSI=L				0.132** (0.094)	0.151*** (0.029)		
OS	-1.021*** (0.230)	-0.794 (0.511)		-0.899*** (0.24)	-1.101*** (0.305)		
ALPB	2.114*** (0.170)	1.841*** (0.159)	1.944*** (0.165)	1.947*** (0.196)	1.875*** (1.951)		
NAB	0.0843*** (0.030)	0.045 (0.058)	-0.487*** (0.162)	0.076** (0.033)	0.151** (0.074)		
PWB	0.775** (0.314)	0.574* (0.343)	0.236 (0.375)	0.754** (0.306)	0.880*** (0.273)		
LQDT	-0.008* (0.005)	-0.110*** (0.004)	-0.007* (0.004)	-0.008* (0.004)	-0.001*** (0.003)		
DER	-0.031*** (0.005)	-0.031*** (0.006)	-0.026*** (0.006)	-0.025*** (0.005)	-0.022** (0.106)		
СРВ	-1.978*** (0.185)	-1.608*** (0.172)	-1.568*** (0.173)	1.739*** (0.200)	-1.440*** (0.272)		
NG	-0.160 (0.108)	-0.175* (0.101)	-0.118 (0.104)	-0.013 (0.114)	-0.237*** (0.069)		
GDP	1.312 (6.506)	0.441 (5.675)	1.914 (5.649)	-6.227 (7.062)	-17.671*** (3.870)		
INF	1.664 (2.490)	1.787 (2.149)	1.283 (2.128)	2.855 (2.476)	2.012** (0.938)		
Constant	-0.787 (1.038)	-0.188 (1.093)	5.165*** (1.871)	-1.593 (1.056)	-3.070** (1.499)		
Observations	345	345	345	315	285		
R-Squared	0.5321	0.6236	0.4371	0.5832			
F-Stat	37.99***	259.7***	26.40***	413.01***	529173.27***		
Breusch Pagan Ll	M test for random(98.16***					
Hausman test		8.87***					
Multicollinearity 1	est: mean VIF	2.62					
Heteroskedasticit	y test (Modified Wo	2811.13***					
Auto Correlation	(Wooldridge test)	13.911***					
Endogeneity test	(Dubrin & Wu-Hau	5.95984**/5.82407**					
Arellano bond tes	st AR(1) (Prob)	0.043					
Arellano bond te	st AR(2) (Prob)	0.8	0.877				
Sargan test of ov	erid. Restrictions: c	0.1	0.130				
Hanson test of o	verid. Restrictions: o	0.314					

Note: Regression in column 5th is two-step system GMM, Standard errors in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.10, Where FSI is financial sustainability index, OS is Organizational structure, ALPB is average loan per borrower, NAB is the number of the active borrower, PWB is the percentage of women borrowers, LQDT is liquidity, DER is leverage, CPB is the cost per borrower, NG is National governance indicators Index.

Thus, we may conclude that this study supports the concept of the trade-off between depth of outreach and financial sustainability in the microfinance sector in South Asia. This theory argues that an increase in the depth of outreach negatively affects the financial sustainability of the microfinance providers as it increases the cost per borrower. Kinde (2012) noted that the depth of outreach affects financial sustainability. The positive result indicates that the financial sustainability of MFPs is more or less dependent on higher loan size (Mekonnen & Zewudu, 2019). The breadth of outreach or the number of active borrowers (NAB) is one of the most significant sustainability factors of Microfinance providers Logtri (2006) cited in (Mekonnen & Zewudu,

Table 5. Regression Analysis with Interaction Terms					
Variable	OLS	REM	FEM	2SLS	(Sys) GMM
FSI=L				0.110** (0.093)	0.244*** (0.061)
OS	0.057 (1.097)	0.184 (1.041)		1.034 (1.454)	10.630* (6.020)
ALPB	2.745***	3.080***	2.802***	1.960*	8.109***
	(0.964)	(0.838)	(0.834)	(1.059)	(1.862)
NAB	-0.056	-0.156	-0.516***	-0.086	-1.238***
	(0.149)	(0.136)	(0.182)	(0.196)	(0.410)
PWB	-2.823	0.324	0.729	-5.597**	4.306
	(1.821)	(1.621)	(1.611)	(2.509)	(7.433)
LQDT	-0.008*	-0.011***	-0.0008*	-0.007*	-0.010***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.002)
DER	-0.119***	-0.111***	-0.094***	-0.092***	-0.047
	(0.027)	(0.024)	(0.025)	(0.030)	(0.116)
СРВ	-2.695	-3.189***	-2.968***	-0.793	-8.557***
	(0.920)	(0.804)	(0.805)	(1.132)	(2.476)
NG	-3.095	-2.166	-2.310	-0.417	0.322
	(2.715)	(2.409)	(2.396)	(3.956)	(2.885)
GDP	1.723	-0.762	-2.789	1.177	-0.671
	(7.889)	(7.122)	(7.189)	(8.269)	(0.517)
INF	1.587	2.198	2.322	2.240	0.012
	(2.555)	(2.248)	(2.252)	(2.455)	(0.006)
OSxNG	-0.622	-0.599	-0.461	-1.070	-5.197*
	(0.605)	(0.515)	(0.5090	(0.781)	(2.885)
ALPBxNG	-0.357	-0.656	-0.447	-0.054	-3.062***
	(0.504)	(0.439)	(0.441)	(0.547)	(0.907)
NABxNG	0.080	0.117*	0.064	0.090	0.506**
	(0.081)	(0.070)	(0.072)	(0.103)	(0.201)
PWBxNG	1.956**	0.186	-0.230	3.178**	-1.900
	(0.945)	(0.852)	(0.855)	(1.276)	(3.655)
DERxNG	0.047***	0.044***	0.037***	0.036**	0.007
	(0.014)	(0.013)	(0.013)	(0.015)	(0.061)
CPBxNG	0.428	0.856**	0.759*	-0.465	3.281***
	(0.477)	(0.416)	(0.418)	(0.577)	(1.159)
Constant	4.261	3.016	7.844*	-0.525	2.369
	(4.984)	(4.413)	(4.671)	(7.385)	(10.783)
Observations	345	345	345	315	285
R-Squared	0.5560	0.6193	0.4656	0.6001	
F-Stat	25.67***	286.74***	17.42***	450.33***	1704.35***
Breusch Pagan LM	1 test for random(89.2	7***	
Hausman test		55.28***			
Heteroskedasticit	y test (Modified Wo	6912.59***			
Auto Correlation	(Wooldridge test)	14.571***			
Endogeneity test	(Dubrin & Wu-Hau	5.893**/5.643**			
Arellano bond tes	t AR(1) (Prob)	0.036			
Arellano bond tes	t AR(2) (Prob)	0.618			
Sargan test of ov	erid. Restrictions: c	0.492			
Hanson test of o	verid. Restrictions: o	0.308			

Note: Regression in column 5th is two-step system GMM, Standard errors in parentheses, *** p < 0.01, ** p < 0.05, * p < 0.10, Where FSI is financial sustainability index, OS is Organizational structure, ALPB is average loan per borrower, NAB is the number of the active borrower, PWB is the percentage of women borrowers, Lqdt is liquidity, DER is leverage, CPB is the cost per borrower, NGI is National governance indicators.

2019). This positive result is consistent with the findings of the studies by (Churchill, 2020; Githaiga, 2021; Mekonnen & Zewudu, 2019; Rahman & Mazlan, 2014; Rizkiah, 2019).

Women are more responsible when it comes to instalment repayment, less prone to move, and more susceptible to social pressure than males; therefore, their participation as borrowers can improve financial success (Mia et al., 2022). The above table 4.4 has noted a positive association between the percentage of women borrowers (PWB) and financial sustainability. Mia et al. (2022) stated that female borrowers had a significant positive impact on the financial success of MFIs due to their improved organizing and monitoring skills and their more responsible use of loans. According to Skarlatos (2004) cited in (Mekonnen & Zewudu, 2019), Low-income women borrowers have low default rates than men and uses their loan in a well-programmed manner; hence, this specifies lower arrears and loan loss rate, which has a significant positive impact on the financial sustainability of MFPs (Mekonnen & Zewudu, 2019). The positive result is consistent with the study of (Aziz & Aziz, 2019; Burki et al., 2018; Ghosh & Guha, 2019; Ikram Ahmad et al., 2014; Mia et al., 2022; Muhammad et al., 2019). The result opposes the findings of (M. S. Hossain & Khan, 2016; Mersland & Strøm,). Due to mismanagement in maintaining the optimum level of readily available financial resources, the liquidity risk significantly affects the firm's financial sustainability. The negative result is consistent with the findings by (Ngumo et al., 2017). Liquidity has a weak relationship with financial performance measured by the firm's return on equity (ROE) (Oludhe, 2011).

Leverage is measured by debt to equity ratio (DER). DER has a significant negative association with the financial sustainability of the microfinance sector of Bangladesh. The positive impact of leverage (DER) on the FSI of MFPs is supported by the findings of (Githaiga, 2021; Rahman & Mazlan, 2014; Usman et al., 2016). They argued that MFIs with various capital sources could be less financially sustainable than other financing sources; the more MFIs are debt-financed, the less they can be financially sustainable. The result shows that an increase in CPB reduces the financial sustainability of MFPs. CPB has a statistically significant negative coefficient at a 1% significant level. An increase/decrease in cost per borrower decreases/increases the financial sustainability of MFPs of South Asia on average citrus paribus. The negative results show that the role of cost reduction gets better financial sustainability for MFPs (Mekonnen & Zewudu, 2019). This result is consistent with the study of Usman et al. (2016). This result opposes the findings of the survey of Rahman and Mazlan (2014), where CPB had a significant positive relationship with financial sustainability measured by the operational self-sufficiency of MFIs.

6. Conclusions

6.1. Conclusions

This study investigated the impact of organizational structure, growth outreach, women empowerment, liquidity, leverage, and cost-efficiency on financial sustainability by using the data from 30 MFPs of Bangladesh over the 2006–2018 period. A financial sustainability index has been developed using principal component analysis (PCA) and used as a proxy for financial sustainability. The result shows that the lagged FSI significantly impacts on the FSI of Bangladesh's microfinance sectors. Organizational structure, liquidity, leverage and cost per borrower have negative impacts on FSI of MFPs in Bangladesh. Proxies for measuring growth outreach; ALPB has a significant positive impact on FSI and NAB has negative effects on the FSI of MFPs in Bangladesh. The percentage of women borrowers PWB has a significant positive impact on FSI. National governance indicators significantly negatively affect the FSI of MFPs of Bangladesh. Control variable GDP growth negatively affects FSI while inflation positively affects the FSI of MFPs of Bangladesh. The results show that national governance has a significant negative impact on the relationship between OS and ALPB with FSI of MFPs of Bangladesh. Similarly, national governance reduces (erases) the negative effect of NAB and CPB on the FSI of MFPs of Bangladesh.

6.2. Limitations

The study period is 2006–2018; however, data for 2019 onward is affected by COVID-19 also. Hence, future studies can use the latest data and compare the data before COVID-19 and after COVID-19. As this study is focused on the Bangladeshi context, every country has different levels of National governance indicators; hence the NGIs can be tested in different contexts.

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