Determinants of financial sustainability of microfinance institutions in Pakistan

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Abstract. Since Pakistan achieved independence, poverty has become one of the most important issues in the country, which can be reduced with the help of microfinance sector. Pakistani microfinance institutions (MFIs) are facing a decline in profitability which makes it difficult for them to survive. The current study aims to investigate the determinants affecting the financial performance, i.e. profitability and sustainability of microfinance institutions in Pakistan, as well as to establish if attaining profitability and sustainability becomes a conflicting goal in serving the poorer strata. The paper utilizes an unbalanced panel data set of 29 MFIs for the period 2008–2014 obtained from MIX Market. The study uses fixed effect and random effect with later accounting for endogeneity through instrumental variables technique i-e 2SLS and 3SLS. The results reveal that MFIs' size, cost efficiency, portfolio at risk, average loan size and yield on loan portfolio are the main factors influencing the financial performance of MFIs in Pakistan. No sign of mission drift has been found rather serving to the poor is seen to be an increment for financial performance. The study provides guidance to MFIs' managers in determining the factors that could affect their financial performance and reaching foremost objectives of any MFI. Managers can get an idea how to achieve both goals simultaneously. To the authors knowledge, this is the first study concentrated specifically on Pakistan in determining performance and outreach factors to date considering the simultaneous causation adopting two-stage least square (2SLS) and three-stage least square (3SLS) estimation strategy.

Keywords: public administration; sustainability; profitability; outreach; microfinance; microfinance institution; Pakistan.

JEL Classification: G20, G21, G29

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INTRODUCTION

The importance of microfinance institutions (MFIs) has been acknowledged since they became part of the financial system in developing countries. Countries having larger MFIs experience lower poverty levels [Abdulai, Tewari, 2016]. MFIs serve as a tool of economic development aimed to benefit people with low income. Ledgerwood [1999] argues that the goal of MFIs, as development organizations, is to provide financial services to unserved or underserved individuals or markets for meeting development objectives, such as poverty reduction, job creation, women empowerment, as well as helping the existing companies to diversify their activities and developing new businesses. Microfinance is needed to improve the human development index of a country, since approximately one billion people globally live with per capita income of one dollar [Morduch, 2000]. Such institutions mostly work with the borrowers seeking comparatively small loans. However, most traditional conventional bankers believe it to be quite risky. The microfinance market is viewed to be beyond the need to support small projects as well as individual borrowers, although the market has achieved a considerable growth in recent years. Therefore, the initial goal of MFIs outreach is not fully achieved.

MFIs are a special kind of institutions having both non-profit/social and profit nature. Lützenkirchen, Weistroffer and Speyer [2012] presented a new "socio-commercial" methodology for crossing the threshold of sustainable growth, according to which microfinance has to manage a steadiness amongst social and commercial goals. For this purpose, fundamentals of all procedures are replaced with client-centered requirements. This promotes to the concept of the commercial nature of microfinancing and the supporters of a profit-oriented approach affirm that self-sustainability can be accomplished with earnings and help to enlarge its loan portfolio, which ultimately benefits more people. It is also claimed that non-profit MFIs are unable to endure any short of subsidization and thus prove to be less efficient [Morduch, 2000]. On the other hand, Hudon and Traca [2011] found that subsidized MFIs have shown a rise in productivity to a certain threshold. Oliveira Leite, Santos Mendes and Sacramento [2019] scrutinized profit-oriented MFIs in terms of differences in sustainability and revenue determination. To compare globally, the MFIs productivity is studied in relation to capital structure, outreach, cost and its effect. Meyer [2019] reorganized the rational association amongst the financial performance and social outreach to separate out the constituents of the financial return measure and actually tried to figure out the multidimensional direction of the relation concerning financial growth measures.

Financial sustainability is the ability of MFIs to keep on achieving their objectives without constant donor support [Dunford, 2003]. MFIs with truncated financial performance or generating loss are characterized as financially unsustainable. Moreover, profit-generating MFIs, covering its operational expenses with subsidies and funds, are also not considered as financially sustainable [Hossain, Khan, 2016].

Operational self-sufficiency (OSS) and financial self-sufficiency (FSS) are two ways found in the literature aimed at determining the financial sustainability of MFIs. Daher and Le Saout [2015] define operational sustainability as the capacity of MFIs to cover the operational cost independently from

generated income without donor support. However, MFIs are seen as financially self-sufficient, if they are capable of covering operational as well as financing costs or subsidies valued at market prices from the income generated. Profitability holds great importance for MFIs that demand financial sustainability and self-sufficiency in the future [Tucker, Miles, 2004]. Sustainability covers operational expenses even if financial aids and subsidies are no longer provided [Nyamsogoro, 2010]. It encourages MFIs to earn maximum profits to meet expenses in the absence of subsidies [Tucker, Miles, 2004; Mahmood, Rauf, 2012]. Unsustainable MFIs are unable to support the poor in the long run, as they will no longer be into existence because of their unsustainability [Ahmad, 2011].

In Pakistan, there is a substantial growth in the number of microfinance banks (MFBs) due to their unconventional offering mechanism and outreach in distant and remote regions. This lending model inclines towards maturity with a rapid growth in rural advances, enhances customer base and improves profitability. A wide-ranging flow of funds has been seen across different organizations operating in agriculture and livestock sectors, whereas enhanced growth in deposits served as indispensable funds. This fact is evident from a 300 % rise since 2013 in contrast to an increase in the number of commercial banks amounting to 74 % only. In addition, MFBs have observed a 45 % growth in balance sheet size in 2017 which is predominantly determined by an upsurge in advances, realizing PKR 133.0 billion (52 % in 2017). This is driven by the increased average loan size (14 %) and broadened customer base (33 %). Additionally, the development of rural loans is faster as compared to urban ones. In 2013–2017, an average yearly increase in rural loans equaled 61.19 % in contrast to 44.15 % average in urban loans[1].

Poverty has been an important issue in Pakistan since it gained independence. This is a developing country where many people live below the poverty line. However, this situation can be improved with the help of microfinance sector [Hartarska, Nadolnyak, 2007]. Therefore, the sustainability of MFIs in Pakistan is of considerable importance and there is a need to determine the factors that affect the financial viability of MFIs. Although the studies on financial sustainability of MFIs have been conducted worldwide, the results obtained for other countries are inapplicable for Pakistan due to its cultural, economic and other differences. The *goal of the research* is to establish the factors that affect the financial sustainability and profitability of MFIs in Pakistan and to figure out if sustainability and outreach influence each other. Pakistani microfinance institutions should be fully aware of their financial sustainability, as it holds significant importance in the country's economic development. For this reason, the scale of microfinance services needs to be augmented towards the users. An empirical analysis attempts to gauge whether particular developments can be explicitly credited to microfinance amenities and, as a result, puts an emphasis on the enquiry if microfinance facilities provide an aid in pov-

erty alleviation and improve the living standards of masses [Ledgerwood, 1999; Khandker, 2005; Islam, 2009]. The archival data for 29 microfinance institutions of Pakistan for the period of 2008–2014 are used for the analysis.

The present study contributes to determining the factors that empirically influence the financial sustainability and depth of outreach in Pakistan. Firstly, we address the issue about measuring outreach and sustainability providing for the nature of for-profit and non-profit organizations. Secondly, simultaneous equation models (SEMs) are used to properly observe the notion of trade-off, because it helps in identifying the causation between sustainability and outreach. These factors can enable MFIs managers to develop and adopt appropriate strategies. Since Pakistan is a developing country where many people live below the poverty line, providing finance to the poor but productive population will help MFIs in achieving their poverty reduction objective. The study is helpful to not only managers, but also other stakeholders, including the general public, government, and other financial institutions.

Microfinance refers to the provision of loans, leasing, savings, insurance, and several other financial services to needy and poor people, as they are unable to derive these benefits from traditional banks. Since traditional banks provide financial services to the wealthy, the main concern of microfinance institutions is to meet the financial and productive needs of poor society members. It is well-recognized that microfinancing is the most appropriate way to increase the earning capacity of poor people and to empower them. Various scholars provide different definitions of microfinance institutions, but the essence of all of them is similar. MFIs are a special kind of institutions having both the social and profit nature.

LITERATURE REVIEW AND HYPOTHESES
The findings of numerous MFIs studies conducted so far remain contradictory and depend on the circumstances and environment of different countries, which results in mixed conclusions.

Sustainability. Operational self-sufficiency (OSS) is widely used as a tool for measuring financial sustainability [Nurmakhanova, Kretzschmar, Fedhila, 2015; Ayayi, Sene, 2010]. The current study uses return on assets (ROA) and OSS to measure financial performance. It evaluates how efficiently MFIs use assets to earn profits, measured as profit after taxes/total assets. The study also includes the measure of depth of outreach to determine if profit-seeking MFIs deviate from their outreach objective specially to poorer borrowers.

Depth of Outreach. Depth of outreach refers to an average loan size (ALS) given to poor borrowers. Smaller loan size represents poor customers served by MFIs richer households, because it permits the types of economies of scale that have to be provided [Navajas et al., 2000]. Average loan size has turn out to be the most extensively used measure that might rank sustainability at the cost of their mission of outreach maximization and poverty alleviation. Furthermore, MFIs promote small average loan sizes as a significant indicator af-

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[1] State Bank of Pakistan. Financial Stability Review 2017. Available at: http://www.sbp.org.pk/FSR/2017/index.htm.

fecting outreach for emphasizing their core mission. In this section, the hypotheses are built based on the theoretical grounds as well as on the empirical evidence found in the literature.

Cost efficiency is measured as operating expenses/loan portfolio (OELP). A decrease in the ratio trend indicates improved efficiency of MFIs. Accordingly, OELP assumes to have a negative effect on profitability and sustainability. Armendáriz and Szafarz [2011] studied the problems of microfinance organizations that expected to maximize the level of outreach to the poorest population who remained financially sustainable. The findings revealed that trade-offs between sustainability, outreach or financial leverage were shaped by delegation cost and endogenous monitoring that arose in agency relationships based on moral hazards among loan staff, borrowers, equity owners as well as outside investors. Thus, higher interest (yield on loan portfolio) must be charged by sustainable MFOs, targeting poorer borrowers must be less leveraged along with high staff cost per loan. Daher and Le Saout [2015], Ayayi and Sene [2010] find that the increased operating expenses decrease sustainability. Hermes, Lensink and Meesters [2011] anticipated statistically significant and robust association amongst operating expenses and relative loan size. However, that is declining for greater loan sizes as predicted in the literature.

H1: OELP is negativity associated with the operational self-sufficiency (OSS) and ROA.

Average Loan Size. Average loan size (ALS) is the amount of loan given to poor borrowers. While risk associated with each customer rises, it is possible that MFIs decrease the average loan size [Kar, 2012]. Previous studies suggest that as administrative cost does not decline with a decrease in size of loan, it decreases the profitability of firms. However, if smaller size loan, in turn, provides better repayment rate, then we can expect a positive relationship between the two. Gonzalez [2007] and Mersland and Strøm [2010] found a negative insignificant relationship. Abdullah and Quayes [2016] examined the effect of commercialization on sustainability and outreach of microfinance institutions. A direct relationship is established between commercialization and financial sustainability, as sustainability increases with the increase in commercialization; however, it decreases the outreach of MFIs. Pedrini et al. [2016] revealed that mission drift has a positive effect on the performance of MFIs in terms of their profitability, however, reducing outreach mission. Millson [2013] identified that when MFIs show more financial interest i-e (operational sustainability and return on asset), they depart from their mission of serving the poorer strata of the population. Kipesha [2013] suggested that the cost of small and unsecured loan could still be covered without increasing the size of loan or monitoring costs. Mia and Rana [2018] found that gross loan portfolio had a positive significant effect on sustainability for both lower and high disclosure. Average loan size remained insignificant for lower disclosure, however, showed a negative effect on sustainability for higher disclosure. Bogan, Johnson and Mhlanga [2007]

established that depth of outreach measured through average loan balance positively affected the performance of MFIs measured through OSS and ROA, thus rejecting the view of the existence of trade-off between outreach and profitability. Abate, Borzaga and Getnet [2013] confirmed the trade-off existence between two goals of microfinance institutions indicating that the MFIs must forego the sustainability in order to reach the poor population. It was further highlighted that there would be the ongoing need for subsidies to meet the outreach goal. Later, Quayes [2015] systematically reviewed the performance of microfinance institutions. Churchill [2019] stated that adequate disclosure improved the financial performance; on the other hand, better financial performance resulted in adequate financial disclosure. In addition, loan loss provision and expense ratio are linked with reduced financial performance while capital/asset ratio is positively associated with performance. Bogan, Johnson and Mhlanga [2007] concluded that MFIs may continue to extend microcredit facilities to the poorer borrowers without further relying on donor support. Hermes, Lensink and Meesters [2011] argued that size and loan intensity (ALS) were significantly and positively associated with financial sustainability

H2: ALS is expected to have a significant impact on the operational self-sufficiency (OSS) and ROA.

Percentage of Female Borrowers. Percentage of female borrowers in MFIs is expected to have a positive impact on profitability and sustainability of MFI, since serving women is associated with higher repayment rates [Quayes, 2012]. In Indian self-help groups (SHG), female percentage of borrowers has a positive effect on the repayment performance [Ayele, 2015]. A similar pattern of the high repayment performance of female customers has been observed by Abdullah and Quayes [2016]. The higher repayment increases the sustainability and profitability of microfinance institutions. Whereas Mersland and Strøm [2010] found an insignificant relationship, the share of female borrowers cannot be neglected as it is an important social indicator [Feroze, 2011]. Aterido, Beck and Iacovone [2013] stated that women borrowings resulted in the improved financial performance (measured through yield on gross loan portfolio). However, the results did not confirm the efficiency of rural lending and group lending linked to enhanced financial performance. Gonzalez [2007] argued that women borrowers significantly and positively affected financial performance. Abdulai and Tewari [2016] stated that female borrowers, average loan size, operating expenses/total assets, borrowers per staff and total assets were the significant determinants of MFIs.

H4: PFB is expected to have positive impact on the operational self-sufficiency (OSS) and ROA.

MFIs Interest Rate. Yield (interest) on loan portfolio (YGLP) represents an interest rate charged by MFIs and is expected to have a positive relationship with profitability but to a limit; if interest rates are raised beyond the limit, it could have a negative effect on profitability and sustainability. The effect of macroeconomic factors depends largely on the yield on gross loan portfolio [Aterido, Beck, Iacovone, 2013]. Ayayi

and Sene [2010], Mia and Rana [2018] found a positive significant relationship with the sustainability indicating the affordable yields charged by MFIs. Similarly, D'Espallier, Hudon and Szafarz [2013] also found a positive association between yield and all measures of sustainability and profitability.

H5: YGLP is expected to have a significant impact on the operational self-sufficiency (OSS) and ROA.

Default Risk. Portfolio at risk 30 days (PAR30) represents default credit risk for outstanding loans that are yet to be received and is assumed to have a negative effect on the profitability and sustainability of MFIs. Microfinance loan portfolio depends on its risk profile, which is mainly based on the degree of risk aversion and the portfolio size. The recently established microfinance sector must explore this new risk management methodology to maintain its thriving, but challenging development [Janda, Zetek, 2016]. Daher and Le Saout [2015], Mersland and Strøm [2010] found a negative significant relationship between the sustainability and profitability of the MFIs, which indicated that MFIs needed to have a credit worthy client in the portfolio in order to achieve the increased profitability and sustainability. Awaworyi Churchill [2018] observed a positive effect on the quality of the loan portfolio. The deteriorating portfolio quality in the microfinance sector increases macroeconomic risks [Knewtson, Qi, 2019]. Tchakoute-Tchuigoua and Soumaré [2019] claimed that capital-asset ratio, operating expenses/loan portfolio and PAR>30 days were the major factors affecting sustainability of MFIs. Pimhidzai et al. [2019] suggested that portfolio at risk had a negative effect on financial sustainability. Tehulu [2013] proposed a comprehensive model having both financial sustainability and outreach and allowed a possible link among them. The results showed that the breadth and depth of outreach did not hurt necessarily by focusing on MFIs financial sustainability.

H6: Default risk is expected to have an effect on the operational self-sufficiency (OSS) and ROA.

Cost Per Borrower. Cost per borrower (CPB) measures the efficiency of managing cost [Ayele, 2015]. Churchill [2019] found a positive relationship between ALS and CPB indicating no mission drift. Again similar findings were drawn by Bogan, Johnson and Mhlanga [2007], while using CPB as an instrumental variable; it showed a positive correlation with average loan balance per borrower (ALBG).

H7: CPB is expected to have a negative impact on the operational self-sufficiency (OSS).

Gross Loan Portfolio. Gross loan portfolio (GLP) represents the size of an MFIs by total loans outstanding. The literature dysplayed mixed results of GLP on ALS. The variable is used in the three least square as dependent variable when the average loan size is used as dependent variable to see mission drift between the OSS and the ALS. Churchill [2019] found a positive relationship between ALS and GLP, which means an increase in sustainability by serving larger number of borrowers.

H8: GLP is expected to have a significant impact on the operational self-sufficiency (OSS).

RESEARCH METHODOLOGY

Research Design. Fixed and random effect with regression technique following by Hausman test is used to determine the effect of independent variable on dependent variables keeping in view the panel nature of current data. Regression model has been inspired by Mia and Rana [2018], Gonzalez [2007], Daher and Le Saout [2015]. Fixed and random effect model suffers from endogeneity, since where ALS (a primary objective of MFIs) could affect the sustainability and profitability of MFIs, ALS could also be affected by the sustainability and profitability level. The study adopted instrumental variables, 2SLS regression technique to account for individual endogeneity for model 1 and model 2, and the results are compared with fixed and random technique to check any difference in results keeping in view the endogenous nature of ALS. CPB is used as instrumental variable along with ALS as endogenous variable, when ROA and OSS are used as dependent variable [Bogan, Johnson, Mhlanga, 2007]. Lastly, 3SLS is adopted to determine any simultaneous relationship between outreach and sustainability, where both ALS and OSS are used as dependent variables to determine the simultaneous relationship between the two and to see if possible mission drift is taking place in Pakistan [Churchill, 2019; Gonzalez, 2007].

Sample Size. All microfinance institutions, banks and NGOs of Pakistan depending on the availability of data have been selected for the current study. However, 18 MFIs have been eliminated due to unavailability of data. Twenty-nine out of 48 MFIs were taken for comparative analysis of most recent data from 2008–2014.

Data Source. The data have been gathered from the MIX Market (Microfinance Information Exchange), which is the best global cross-country microfinance information provider. It contains financial indicators data of microfinance institutions. An unbalanced panel dataset of 29 MFIs is used to determine the factors that affect the financial performance of Pakistani MFIs.

Model Specifications

$$OSS_{it} = \alpha_0 + \beta_1 ALS + \beta_2 PFB + \beta_3 YGLP + \beta_4 OELP + \beta_5 PAR30 + \beta_6 MFZ + \beta_7 PROFST + e_{it} ; \quad (1)$$

$$ROA_{it} = \alpha_0 + \beta_1 ALS + \beta_2 PFB + \beta_3 YGLP + \beta_4 OELP + \beta_5 PAR30 + \beta_6 MFZ + e_{it} ; \quad (2)$$

$$OSS_{it} = \alpha_0 + \gamma ALS + \beta_1 PFB + \beta_2 YGLP + \beta_3 OELP + \beta_4 PAR30 + \beta_5 MFZ + \beta_6 PROFST + e_{it} ; \quad (3)$$

$$ALS = \alpha_0 + \delta_1 ROA + \delta_2 OSS + \beta_1 CPB + \beta_2 PFB + \beta_3 GLP + e_{it}, \quad (4)$$

where, OSS represents operational self-sufficiency; ROA denotes Return on Assets; ALS is average loan size (depth of outreach); PFB is percent participation of women borrowers; YGLP denotes yield (interest) on loan portfolio; OELP represents operating expenses/gross loan portfolio; PAR30 corresponds to outstanding loans past 30 days (default risk); GLP stands for gross loan portfolio (size); MFZ means size of MFIs; CPB is cost per borrower; PROFST represents profit or not-for-profit (Table 1).

RESULTS AND DISCUSSION

The study aims to investigate the determinants that affect the financial performance (profitability and sustainability) of microfinance institutions in Pakistan as well as to determine if attaining profitability and sustainability becomes a conflicting goal in serving the poorer strata. To attain the stated purpose, different financial performance measures were selected from the previous research studies. The unbalanced panel dataset was collected from MIX Market. Fixed and random effect models were employed on the dependent variables since the nature of data is panel that later accounts for endogeneity issue by employing instrumental variable technique i-e 2SLS and 3SLS.

Table 2 shows the descriptive statistics. The number of observations varies across variables, which is due to unbalanced panel data. The descriptive statistics shows that on av-erage the Pakistani MFIs are not operationally self-sufficient that puts them into the situation to get subsidies from the government. The statistics also demonstrates that the Pakistani MFIs suffer from loss measured through ROA, which indicates that the Pakistani MFIs do not use their assets efficiently. This is one of the reasons for not meeting the operational self-sufficiency.

Results with OSS as dependent variable. Since the study is aimed at investigating the determinants of operational self-sufficiency, equation 1 was estimated using fixed and random effect models, as well as two stage least square, where ALS was treated as endogenous variable. Since a number of authors find that ALS and financial performance must be treated as endogenous variables, where financial performance could be dependent on the level of outreach, outreach could also depend on financial performance i-e OSS and ROA.

Table 1 – Variable measurement and proxies
Таблица 1 – Переменные, прокси-переменные и их измерения

Variable	Variable Nature	Measurement	Reference
Credit Risk	Independent	(PAR30) Portfolio at risk past 30 days/the gross loan portfolio	D'Espallier et al., 2013; Kar, 2012; Mersland, Zamore, Djan, Sommeno, 2019
Cost Efficiency	Independent	(OELP) Operational expenses/gross loan portfolio	Kar, 2012
Size of (MFIs)/ MFZ	Independent	Natural log of total assets	Abate, Borzaga, Getnet, 2014; Bogan, Johnson, Mhlanga, 2007
PFB	Independent	% of Female borrowers	Armendáriz de Aghion, Morduch, 2000; D'Espallier et al., 2013
YGLP	Independent	Yield on loan portfolio and total expenses/total assets	Abate, Borzaga, Getnet, 2014; Kar, 2012
GLP	Independent	Log of gross loan portfolio	Abate, Borzaga, Getnet, 2014; Hermes, Lensink, Meesters, 2011
CPB	Instrumental	Cost per borrower	Kar, 2012; Ngo, Mullineux, Ly, 2014; Quayes, 2015; Tchakoute-Tchuigoua, 2010
PROFST	Independent	Dummy variable – 1 if MFIs are for-profit; otherwise – 0	Kar, 2012; Tchuigoua, 2015
ALS	Endogenous	Average loan balance per borrower/GNI per capita	Cull, Demirguç-Kunt, Morduch, 2007; Mersland, Strøm, 2010; Quayes, 2012
ROA	Dependent	Net income after taxes divided by the average total assets	Bassem, 2012; Kumar Kar, 2011; Mersland, Strøm, 2009
OSS	Dependent	Total Revenue/Financial Exp + Op.Exp + provision for loan loss	Bassem, 2012; D'Espallier et al., 2013; Hartarska, 2005; Hartarska, Nadolnyak, 2007; Kumar Kar, 2011; Mersland, Strøm, 2009

Table 2 – Descriptive Statistics
Таблица 2 – Дескриптивная статистика

Variable	Obs	Mean	Std.Dev	Min	Max
OSS	173	−0.009	0.004	−0.0009	0.0244
MFZ	171	6.935	0.731	4.847	8.382
GLP	172	6.648	0.816	3.894	8.456
CPB	158	1.610	0.413	0.845	3.245
YGL	161	0.373	0.171	0	0.904
ALS	173	0.3755	0.226	0	2.87
PEB	173	0.6374	0.346	0	1
OPGLP	173	0.516	0.327	0	2.80
PAR30	173	0.1523	0.157	0	0.803
ROA	156	−0.043	0.173	−1.11	0.194

To measure the given hypotheses, firstly, fixed and random effect models have been employed keeping in view the panel nature of data. However, scientific writings find ALS to be an endogenous variable, and treating it with other technique could bias the results. Therefore, two stage least square technique is used to deal with endogeneity.

$$OSS = \alpha + \beta_1 ALS + \beta_2 PFB \, \beta_3 YGLP + \beta_4 OELP + $$
$$+ \beta_5 PAR30 + \beta_6 MFZ + \beta_7 PROFST + e. \qquad (1)$$

Table 3 provides the results from the random effect model. The results showed that the random effect model was more preferable, since the prob > chi2 = 0.5811 (*P*-value was greater than 0.05), therefore, we prefer the results from random effect.

The value of *R*-squared 0.34 shows that 34 % variation in dependent variable (OSS) is due to the explanatory variables. Prob > *F*= 0.000 shows the fitness of model.

The results showed that Size of MFIs in terms of assets affects financial sustainability of microfinance institutions in Pakistan, as it has a positive and highly significant (0.000) relationship at 5 % significance level with financial sustainability. The results indicate that increasing the asset size in Pakistan MFIs would improve their sustainability. It could be performed through collecting more deposits from the clients. If a Pakistani firm does not have enough assets, they will be more dependent on subsidies support that ultimately reduces their financial sustainability. MFIs holding more assets attain better sustainability and they are more likely to serve a larger number of poor clients with the constant donor support. The results showed consistency with the findings by Mia and Rana [2018], Kipesha [2013], Mersland and Strøm [2010], Hartarska and Nadolnyak [2007].

The average loan size given by MFIs is found to have a negative insignificant (0.754) relationship with financial sustainability measured through operational self-sufficiency. However, the negative coefficient indicates that increasing

sustainability and serving poor borrowers may not become a conflicting goal for MFIs in Pakistan over time. The results showed consistency with Mia and Rana [2018], Abdulai and Tewari [2016], Churchill [2019].

Operating expense over gross loan portfolio has a negative and significant (0.00) relationship with the sustainability of Pakistani MFIs. The variable represents the expenses that they must face for the portfolios, representing that increased operating expenses would adversely affect the profitability of MFIs in Pakistan. Microfinance institutions should adopt cost reduction strategies and, by conducting trainings on cost controls for the employees, MFIs should control their portfolios cost to attain sustainability. The results are consistent with Mersland and Strøm [2010].

Portfolio at risk also found a negative but insignificant (0.284) effect on operational sustainability in case of Pakistani MFIs for the period under study. It represents credit risk for outstanding loans that are yet to be received and is assumed to have a negative effect on MFIs sustainability [Daher, Le Saout, 2015]. The negative coefficient demonstrated that sustainability was adversely affected by the portfolio's selection. Hence, Pakistani MFIs should be careful when making portfolios.

Participation of female borrowers also displayed a positive but insignificant (0.882) impact on operational sustainability of Pakistani MFIs. Female borrowers proved to have a positive effect on profitability and ultimately on sustainability, since better repayment rates are associated with them [Gonzalez, 2007]. As Pakistan is a male-dominated society and women hardly indulge in their own businesses, this could be the reason why female borrowers remained insignificant determinant of profitability and sustainability during the examined period. However, the results could also be violated due to cultural and economic differences and the unpredictable market of Pakistan [Abate, Borzaga, Getnet, 2014]. The results showed consistency with [Ayayi, Sene, 2010].

Table 3 – Results summary with OSS as dependent variable
Таблица 3 – Сводные результаты анализа при операционной самостоятельности (OSS) как зависимой переменной

Variable	Result	Hypothesis acceptance	Result consistency
Random Effect Model	R^2 = 34 %		Prob > chi = 0.000
MFZ	+/significant (0.000)	Accepted	Abate, Borzaga, Getnet, 2013; Bogan, 2012; Hartarska, Nadolnyak, 2007; Millson, 2013
ALS	–/insignificant(0.754)	Rejected	Abate, Borzaga, Getnet, 2013; Abdulai, Tewari, 2016; Quayes, 2012
OELP	–/significant (0.000)	Accepted	Millson, 2013; Kar, 2012
PAR30	–/insignificant (0.284)	Rejected	–
PFB	+/insignificant (0.884)	Rejected	Millson, 2013
YGLP	+/significant (0.000)	Accepted	Abate, Borzaga, Getnet, 2013; Kar, 2012
PROFST	–/insignificant (0.194)	Rejected	Kar, 2012
2 Stage Least Square			
R^2 = 34 %		Prob > chi = 0.000	
ALS	–/significant (0.000)	Accepted	Quayes, 2012
Post estimation test of endogeneity		*P*-value = (0.000)	

Yield on gross loan portfolio has a positive significant (0.000) relationship with the operational sustainability of MFIs in Pakistan during the period under review. Yield represents the interest charged by MFIs indicating and positively affecting the sustainability of Pakistani MFIs. Interest charged seems to be affordable to the poor borrowers, which, in turn, exerts a positive effect on sustainability through timely payment. The results showed consistency with Mia and Rana [2018].

Lastly, profit status was used as dummy variable to see if profit-oriented institutions get more sustainability; however, the results remained insignificant, which signifies that PROFST did not prove to be a good determinant for increasing sustainability in Pakistan. Furthermore, a negative coefficient shows that a for-profit organization could attain better sustainability than a non-profit one. The results are consistent with Ayayi and Sene [2010] and Churchill [2019] for lower disclosure level.

The study also estimated coefficients through second stage least square to be compared with random effect regression in order to see any difference when ALS is treated as endogenous variable with CPB as instrumental variable, since CPB would depend on the size of loan with OSS as dependent variable [Bogan, Johnson, Mhlanga, 2007].

$$OSS_{it} = \alpha_0 + \beta_1 ALS + \beta_2 PFB + \beta_3 YGLP + \beta_4 OELP + \beta_5 PAR30 + \beta_6 MFZ + \beta_7 PROFST + e_{it},$$

where ALS is endogenous variable

$$ALS_{it} = \alpha_0 + \beta_1 CPB + \beta_2 PFB + \beta_3 YGLP + \beta_4 OELP + \beta_5 PAR30 + \beta_6 MFZ + \beta_7 PROFST + eit.$$

CPB is used as instrumental variable to derive the predicted values for ALS

$$OSS_{it} = \alpha_0 + \gamma ALS + \beta_1 PFB\ \beta_2 YGLP + \beta_3 OELP + \beta_4 PAR30 + \beta_5 MFZ + \beta_6 PROFST + e_{it}.$$

The estimated results of 2SLS are given in Table 3, where ALS is treated as endogenous variable, since where outreach (ALS) is function of financial performance i-e OSS, financial performance could also depend on outreach level. Table shows the result of 2SLS with OSS as dependent variable.

Fixed effect results with ROA as dependent variable. The study also aims to investigate the determinants of ROA, because profitability holds great importance for MFIs demanding financial sustainability and self-sufficiency in future [Daher, Le Saout, 2015]. Therefore, equation 2 was estimated using fixed and random effect models as well as 2 stage least square, where ALS was treated as endogenous variable. According to the literature, ALS and financial performance should be treated as endogenous variables, where financial performance depends on the level of outreach, outreach could also depend on financial performance i-e OSS and ROA.

$$ROA = \alpha_0 + \beta_1 ALS + \beta_2 PFB + \beta_3 YGLP + \beta_4 OELP + \beta_5 PAR30 + \beta_6 MFZ + e. \qquad (2)$$

Table 4 provides the results from the fixed effect model. The Hausman test showed that random effect model was preferable, since the prob > chi2 = 0.000 (*P*-value was less than 0.05), therefore, we prefer the results from random effect. The value of *R*-squared 0.27 shows that 27 % variation in dependent variable (ROA) is due to the explanatory variables. Prob > *F* = 0.000 shows the fitness of model.

The results showed that Size of MFIs in terms of assets affects financial performance of microfinance institutions in Pakistan, as it has a positive and highly significant (0.000) relationship at 5 % significance level. The results indicate that increasing the asset size of Pakistani MFIs would improve their profitability. It could be implemented through collecting more deposits from the clients. If a Pakistani firm does not have sufficient assets, they will be more dependent on

Table 4 – Results summary with ROA as dependent variable
Таблица 4 – Сводные результаты анализа при рентабельности активов (ROA) как зависимой переменной

Variable	Result	Hypothesis acceptance	Result consistency
Fixed Effect Model		R^2 = 27 %	Prob>chi = 0.000
MFZ	+/significant (0.000)	Accepted	Cull, Demirguç-Kunt, Morduch, 2007; Daher, Le Saout, 2015
ALS	–/insignificant (0.184)	Rejected	Cull, Demirguç-Kunt, Morduch, 2007, 2011
OELP	–/significant (0.000)	Accepted	Daher, Le Saout, 2015; Kar, 2012
PAR30	–/significant (0.047)	Accepted	Daher, Le Saout, 2015
PFB	+/insignificant (0.409)	Rejected	Abate, Borzaga, Getnet, 2013; Kar, 2012; Millson, 2013
YGLP	+/insignificant (0.460)	Rejected	–
PROFST	–/insignificant (0.194)	Rejected	Kar, 2012
2 Stage Least Square			
R^2 = 49 %		Prob > chi = 0.000	
ALS	–/significant (0.010)	Accepted	Mersland, Strøm, 2009
YGLP	+/significant (0.000)	Accepted	Daher, Le Saout, 2015
Post estimation test of endogeneity		*P*-value = (0.000)	

subsidies, which ultimately reduces their profitability and sustainability. The results showed consistency with [Ahmed, Ibrahim, Bhuiyan, 2018; Daher, Le Saout, 2015].

Average loan size has an insignificant (0.184) effect on profitability of MFIs in Pakistan. However, the negative coefficient indicates that increasing profitability and serving poor borrowers may not become a conflicting goal for Pakistani MFIs over time. The results showed consistency with [Ahmed, Ibrahim, Bhuiyan, 2018; Akhtar, Ali, Sadaqat, 2011].

Operating expenses over gross loan portfolio demonstrate a negative and significant (0.000) relationship with profitability, representing that increased operating expenses would adversely affect the profitability of MFIs in Pakistan. Microfinance institutions should adopt cost reduction strategies and, by conducting trainings on costs control for their employees, MFIs should manage their costs in order to enhance profitability that would ensure sustainability in long run. The results showed consistency with Ayayi and Sene [2010], Daher and Le Saout [2015].

PAR30 has a significant and negative relationship (0.047) with ROA for Pakistani MFIs. It represents credit risk for outstanding loans that are yet to be received and is assumed to have a negative effect on profitability [Daher, Le Saout, 2015]. The results showed that profitability is adversely affected by the portfolios selection. Hence, Pakistani MFIs should be careful when making portfolios. In order to be financially sustainable in the future, creditworthiness of a client should be carefully checked and only those clients are selected, who demonstrate better repayment chances.

Participation of female borrowers also remained insignificant (0.409) indicating that female borrowers did not prove to be a good determinant of Pakistani MFIs. Since Pakistan is a male-dominated society and women hardly indulge in their own businesses. This might be the reason why females remained an insignificant determinant of profitability in Pakistan during the studied period. The results showed consistency with Mia and Rana [2018], Ayayi and Sene [2010], Mersland and Strøm [2010].

Yield on gross loan portfolio (interest charged) exerts a positive but insignificant (0.460) effect on profitability. Previous studies showed a positive relationship between the two; however, it remained insignificant for Pakistani MFIs. The unpredictable nature of the Pakistani market is a possible reason behind this [Abate, Borzaga, Getnet, 2014].

The study also estimated the coefficients through second stage least square given in Table 4 to be compared with random effect regression. It should be done in order to see any difference, when ALS is treated as endogenous variable with CPB as instrumental variable, since CPB would depend on the size of loan [Quayes, 2015] with ROA as dependent variable.

$$ROA_{it} = \alpha_0 + \beta_1 ALS + \beta_2 PFB + \beta_3 YGLP + \beta_4 OELP + \\ + \beta_5 PAR30 + \beta_6 MFZ + _{eit},$$

where ALS is endogenous variable

$$ALS_{it} = \alpha_0 + \beta_1 CPB + \beta_2 PFB + \beta_3 YGLP + \beta_4 OELP + \\ + \beta_5 PAR30 + \beta_6 MFZ + e_{it}.$$

CPB is used as instrumental variable to derive the predicted values for ALS

$$ROA_{it} = \alpha_0 + \gamma ALS + \beta_1 PFB\ \beta_2 YGLP + \beta_3 OELP + \\ + \beta_4 PAR30 + \beta_5 MFZ + e_{it}.$$

The estimated results of 2SLS, where ALS is treated as endogenous variable, since where outreach (ALS) is function of financial performance i-e ROA, financial performance could also depend on the outreach level. Table 4 shows the results of 2SLS with ROA as dependent variable.

Consistent with fixed effect model, MFZ and OELP remained significant. However, ALS (0.010) and YGLP (0.000) also remained significant, when ALS is treated as endogenous variable.

Average loan size has a significant (0.010) effect on profitability of MFIs in Pakistan. However, the negative coefficient indicates that increasing profitability and serving poor borrowers may not become a conflicting goal for MFIs over time. The results showed consistency with Bogan, Johnson and Mhlanga [2007].

Yield (interest charged) seems to be affordable to poor borrowers, which, in turn, puts a positive effect on profitability and ultimately on sustainability through timely payment [Daher, Le Saout, 2015].

Post estimation test of endogeneity is also performed according to whether ALS is treated as endogenous variable. P-value (0.000) signifies that ALS is endogenous variable, and we reject the null hypothesis that ALS is exogenous variable.

Interaction between OSS and ALS using 3 stage least square

The study aims to investigate if attaining sustainability and profitability becomes a conflicting goal in serving the poorer population of the country. Therefore, OSS and ROA are taken as independent variables along with three control variables, namely GLP, PFB and CPB. OSS was also used as dependent variable along with ALS to observe their mutual effect on each other. Therefore, equation 3 and equation 4 were checked simultaneously using 3SLS.

$$OSS_{it} = \alpha_0 + \gamma ALS + \beta_1 PFB\ \beta_2 YGLP + \beta_3 OELP + \beta_4 PAR30 + \\ + \beta_5 MFZ + \beta_6 PROFST + e_{it}. \qquad (3)$$

$$ALS = \alpha_0 + \delta_1 ROA + \delta_2 OSS + \beta_1 CPB + \beta_2 PFB + \\ + \beta3 GLP + e_{it}. \qquad (4)$$

Table 5 provides the results of 3 stage least square. The value of R-squared (0.2717) and (0.4895) shows 27 % and 49 % variation in dependent variables, namely OSS and ALS respectively, which is due to the explanatory variables. Prob value = (0.000) and (0.000) for both models shows the fitness of the models.

Consistent with random effect and 2SLS results, MFZ (0.000), YGLP (0.000) and PROFST (0.021) have a positive significant impact; OELP (0.000) and PAR30 (0.012) have a negative significant effect. PFB remained insignificant; however, PAR30 remained negative significant (0.012), when simultaneous equations were tested with OSS and ALS as dependent variables using 3SLS regressions.

Table 5 – Results using 3SLS, where ALS and OSS are treated as dependent variables
Таблица 5 – Результаты анализа с помощью трехшагового метода наименьших квадратов (3SLS),
где средний размер займа (ALS) и операционная самостоятельность (OSS) – зависимые переменные

Variable	Result	Hypothesis acceptance	Result consistency
OSS	R^2 = 27 %		Prob>chi = 0.000
MFZ	+/significant (0.000)	–	Abate, Borzaga, Getnet, 2013; Bogan, 2012; Hartarska, Nadolnyak, 2007; Millson, 2013
ALS	–/significant (0.000)	Accepted	Abate, Borzaga, Getnet, 2013; Abdulai, Tewari, 2016; Quayes, 2012
OELP	–/significant (0.000)	–	Millson, 2013; Kar, 2012
PAR30	–/significant (0.012)	–	Millson, 2013
PFB	+/insignificant (0.570)	–	Millson, 2013
YGLP	+/significant (0.000)	–	Abate, Borzaga, Getnet, 2013; Kar, 2012
PROFST	+/significant (0.021)	–	–
ALS	R2 = 49 %		Prob>chi = 0.000
R^2 = 49 %		Prob > chi = 0.000	
OSS	–/significant (0.035)	Accepted	Quayes, 2012
ROA	+/significant (0.006)	–	Quayes, 2012
GLP	+/significant (0.004)		Quayes, 2012
PFB	–/significant (0.012)		Quayes, 2012
CPB	+/significant (0.000)		Quayes, 2012

ALS demonstrated a negative significant (0.000) relationship with OSS, depicting that serving poor and attaining sustainability may not become a conflicting goal. Even the negative coefficient indicates that serving poor individuals can bolster the performance and ultimately enhance sustainability of Pakistani MFIs during the studied period.

The results with ALS as dependent variable showed that OSS had a negative and significant (0.035) relationship with the average loan size. This indicates that attaining operational self-sufficiency does not conflict with serving the poor strata for the period under review and it is possible to meet both objectives of enhancing financial performance and outreaching the poor. ALS is found to be associated with increased sustainability. This proves that, although smaller loans are somewhat more expensive, a better repayment rate by small loans increases sustainability. The results showed consistency with Churchill [2019].

ROA displays a positive and significant (0.006) relationship with ALS, depicting a trade-off between the two variables. The results show that Pakistani MFIs are eager to attain profitability, which implies increasing the loan size. This will deviate them from their primary objective of social outreach, since smaller loans are more expensive, reduce the efficiency of MFIs and ultimately put an adverse effect on profitability [Gonzalez, 2007; Daher, Le Saout, 2015]. However, if a smaller loan has better repayment rates, it will compensate for higher costs and increase profitability. The results are consistent with Mersland and Strøm [2010].

Cost per borrower has a positive significant (0.000) relationship with ALS, indicating that increasing CPB is a significant determinant of Pakistani MFIs. The positive coefficient indicates that lower costs are associated with small-sized loans that are standardized and require less monitoring. Therefore, Pakistani MFIs should serve poor borrowers, as it incurs lower costs and helps Pakistani MFIs to fulfill their primary social objective. The results showed consistency with Churchill [2019].

Gross loan portfolio demonstrates a positive significant (0.004) relationship with outreach, which reflects a negative impact on outreach. The results show that selection of borrowers' portfolios is not suitable while decreasing their outreach. It can be argued that risky customers reduce the amount of lendable funds to customers and ultimately lower the level of outreach to poor borrowers. The results are consistent with Churchill [2019].

The negative significant association of female borrowers with outreach states that serving more women would increase the outreach. As women are proved to be poorer, outreach increases with a rise in the number of female borrowers. The results showed consistency with Churchill [2019]. Furthermore, women borrowers are the reason for decreased sustainability and profitability due to their delay in repayments; therefore, creditworthy women should be selected for their loan portfolio. The results are consistent with Churchill [2019].

CONCLUSION
The study aims to investigate the determinants affecting the financial performance (profitability and sustainability) of microfinance institutions in Pakistan, as well as to determine if attaining profitability becomes a conflicting goal in serving the poorer strata.

The results showed that the size of assets increased financial sustainability and profitability of MFIs in Pakistan.

Pakistani microfinance institutions are not cost-efficient, which affects their financial sustainability and profitability. Therefore, in order to be financially sustainable, they should adopt cost reduction strategies. Yield on gross loan portfolio (interest charged) seems to be affordable to poor borrowers, which, in turn, puts a positive effect on sustainability and profitability through timely payment. The results also showed that sustainability was adversely affected by the portfolios (PAR30) selection.

It is revealed that attaining operational self-sufficiency (OSS) does not conflict with servicing the poor borrowers for the period of 2008–2014. Small-sizes loans are associated with lower costs. Selecting borrowers' portfolios is not suitable in Pakistan, since it decreases the outreach. Servicing more women would increase the outreach. As females are found to be poorer, outreach increases with a rise in the number of women borrowers. The results show that Pakistani MFIs are eager to attain profitability, which implies increasing the loan size. This will deviate them from their primary objective of social outreach. Nowadays, in Pakistan, the minimum interest rate for microfinance loans is at around 35 %, which was considerably lower in the early 2000s. With the purpose to curtail the trade-off between the social and commercial targets, the microfinance segment is required to reduce its focus on explosive growth and concentrate on developing the main human and financial means [Cull, Demirgüç-Kunt, Morduch, 2011].

Lastly, efficient portfolio management is needed. Loans should be provided after a thorough examination of the client for the maximum security, and standardized loan policies must not be made relaxed for any borrower to guarantee and improve sustainability of Pakistani MFIs. Further studies are expected in the cost efficiency domain, as the research has found that both costs per borrower and operating expenses/loan portfolio have an adverse effect on the sustainability of microfinance institutions in Pakistan. Determinants of profitability can also be determined, since it contributes to the achievement of financial sustainability while achieving the outreach purpose. Furthermore, because of the importance of corporate governance, it is suggested to identify the governance factors contributing to the financial sustainability and outreach of MFIs in Pakistan, which are the ultimate goals of the microfinance sector. ■

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Детерминанты финансовой устойчивости микрофинансовых институтов Пакистана

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Аннотация. С момента обретения Пакистаном независимости вопрос бедности в стране вышел на первый план. Одним из возможных способов борьбы с финансовым неблагополучием населения является деятельность микрофинансовых институтов (МФИ), которые в настоящее время столкнулись с проблемой падающих прибылей, что ставит под вопрос их дальнейшее существование. Статья посвящена анализу основных детерминант, влияющих на финансовые показатели МФИ Пакистана – прибыльности и устойчивости. Исследование также ставит задачу установить, станет ли уровень этих показателей препятствием при предоставлении финансовых услуг бедным слоям населения. Информационную базу исследования составляют данные мирового провайдера финансовой информации MIX Market для 29 микрофинансовых организаций Пакистана за период с 2008 по 2014 г. В статье используются модели с фиксированными и случайными эффектами с учетом эндогенности при помощи методов 2SLS и 3SLS (двух- и трехшаговый метод наименьших квадратов). Установлено, что основными факторами, влияющими на хозяйственную деятельность МФИ в Пакистане, являются их размер, экономическая эффективность, портфель рисковых кредитов, средний размер займа и доходность кредитного портфеля. В ходе исследования не выявлено признаков отклонения от миссии МФИ, поскольку работа с населением обеспечивает им прирост финансовых показателей. В статье даны рекомендации менеджерам по выявлению основных факторов, определяющих эффективность деятельности МФИ. По данным авторов, это первое исследование рынка микрофинансовых услуг Пакистана, выполненное с помощью 2SLS- и 3SLS-методов.

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