SOUTH ASIAN MICROFINANCE OUTREACH: AN ECONOMIC CONTEXT

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Abstract: This study analyses the breadth and depth of outreach of microfinance institutions (MFIs) from the economic perspective, considering both open and close economic indicators. Additionally, this study differentiates the impact of the welfare variable (human development) on breadth and depth of outreach of microfinance institutions in the South Asian region. We use Market-Mix data from the year 1999 to 2017. For analysis, we employed a fixed-effect model based on the Hausman test. Additionally, two-stage least squares used to identify the endogeneity problem. The results illustrate the positive impact of welfare indicator (Human development) and closed economic factors (Economic growth, private credit, labor force participation) on the depth of outreach except for the inflation and interest rate that are negatively impacted. Whereas, open economic factor (Foreign investment) does not impact on the depth of outreach. However, all sets of open, close, and welfare economic indicators positively impact on the breadth of outreach except the interest rate and inflation rate. It is concluded from the results that macroeconomic variables affect the depth of outreach of microfinance institutions. The government and microfinance policymakers can use economic indicators to increase further microfinance outreach that further helps in alleviating poverty from the region.

Keywords: Outreach, Microfinance, Economic-Indicators, Poverty.

JEL Classification: A12, G21, G28, O1, Q01.

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1. Introduction

The microfinance sector has the largest market and performs a dynamic contribution in the finance sector because MFIs serve most customers and work for the welfare of low-income level people (Mersland et al., 2013). The trend of the microfinance industry is proliferating in the global world, and they put continuous efforts to alleviate poverty (Khan, 2010). Microfinance Barometer (2018) reported that the global microfinance sector offered an estimated $114 billion microcredit to 139 million poor people in 2018, and it uplifts by approximately 15% loan portfolio and 6% borrowers from the previous year. Moreover, the South Asian region is serving most of the borrowers nearly 60% of the global outreach in which India plays a leading role in the South Asian microfinance sector by serving loans to approximately 51 million people.

Despite the high coverage of South Asian MFIs in the financial sector development, the overall South Asian region is facing the challenge of a high poverty ratio (UNESCAP, 2017). World Development Indicator (WDI) reported that the South Asian region consists of more than 1.814 billion population, approximately 24.7% world population in 2018. In 2013, last recorded in the WDI database, the poverty headcount ratio at $1.9 a day was about 16.1% South Asian population live below the poverty line. More specifically, in figure 01, WDI recorded the high Poverty headcount ratio in India, approximately 21.2 in 2017.

Figure-01: Poverty headcount ratio at $1.9 a day (2011 PPP) (percentage of population) of all South Asian Countries except Afghanistan (not available) in 2017.

Then a question arises what factors affect the microfinance outreach that further helps the microfinance sector in reducing poverty from the South Asian region. Therefore, we keen to
study the breadth and depth of South Asian MFIs, as their main target is to provide microcredit facilities to poor people (Mersland et al., 2013).

So in this regard, we have developed the connection of how macro-level economic decisions affect the micro-level decision of MFIs because the sustainable microfinance sector provides safety nets to poor people and helps to reduce poverty. Therefore, this research intends to study the impact of economic indicators on breadth and depth of outreach of South Asian MFIs from the year 1999 to 2017. Further, this study differentiates the economic indicators into open, close, and welfare economic factors to estimates the result.

We have found a strong positive connection of economic indicators on outreach dimensions. Precisely, in the perspective of the depth of outreach, the results depict the positive impact of welfare indicator (Human development) and closed economic factors (GDP growth, private credit, labor force participation) except the inflation and interest rate that are negatively impacted. Whereas, open economic factor (foreign investment) does not impact on the depth of outreach. However, all set of variables positively impact on the breadth of outreach except the interest rate and inflation rate that do not impact. Moreover, this study also found little variation in the South Asian perspective as compared to global analysis that previously conducted in the literature (Ahlin et al., 2011; Imai et al., 2011). The reason could be the high poverty ratio and recorded more than 16% of people live below the poverty line in the South Asian region (WDI, 2013).

This research contributes to microfinance literature in three aspects. First, this research purely investigates the economic indicators and differentiate into open, close, and welfare indicators, whereas Imai et al. (2011) and Ahlin et al., (2011) focuses on overall macro indicators included both economic and institutional variables. Whereas, Awaworyi (2019) and Xu et al. (2016) also explore the economic indicators along with the country’s institutional quality but only consider the social mission of MFIs. Second, we consider the endogeneity problem in the model to avoid the lousy relationship between the explanatory and dependent variables. Third, we consider only South Asian MFIs into account because the United Nations reported that the poverty ratio is high in the South Asian region despite the microfinance development (UNESCAP, 2017).

This study connects economic factors with microfinance outreach for economic policy and decision making for both South Asian economies and management of MFIs to reduce poverty, gender inequality, and for the economic and financial development of the economy. In this way, the results contribute to
regional cooperation in facing these challenges by the South Asian Association of Regional Cooperation (SAARC) countries. Further, this research helps in achieving Sustainable Development Goals (SDGs) and in making economic policies for financial development and reducing poverty through microfinance development. MFIs contribute to achieving SDGs; thus, it requires proper decision making by the government as well as management of MFIs to achieve SDGs because economic and monetary policies affect the financial sector due to change in interest rate, inflation, foreign investment, private credit, human development, and capital formation.

A subsequent section is a review of prior studies. It is followed by a description of data, variables, and estimation techniques that have used to estimate the results. Then findings have presented and discussed. Finally, this research presents the conclusion.

2. Literature review

The MFIs are playing an integral role in the financial market to alleviate poverty in developing economies, particularly in South Asia, wherefrom the concept of MFIs emerged. MFIs not only work for poverty alleviation but also contribute to the economic development, women empowerment, microenterprise, and small business initiatives and social benefit because their main target is to offer microcredit to poor people mainly to women.

The conception of microfinance started from the 1970s by Muhammad Yunus, the founder of Grameen Bank of Bangladesh, to provide loans to poor people. The primary purpose of introducing a microcredit facility is to offer financial services to under-served people who are unable to repay a larger amount of loan.

2.1 Microfinance outreach

Microfinance outreach consists of the breadth and depth of outreach. Mainly, the breadth of outreach refers to how much low-income level people served by MFIs, which measures through the total number of active clients or ratio of the female client (Lensink et al., 2018). In contrast, the depth of outreach refers to the poverty level because the average loan size indicated the more impoverished clients (Mersland & Strom, 2009).

In the microfinance literature, most of the studies are focusing on estimating the determinants of MFIs performance and sustainability (Tehulu, 2013). Nowadays lending to women (Kittilaksanawong & Zhao, 2018), microfinance plus services (Lensink et al., 2018), governance (Bibi et al., 2017), capital structure (Bayai & Ikhide, 2018) and others are emerging research studies conducted in the area of MFIs sustainability and outreach for alleviating poverty but the economic impact in the literature of
microfinance outreach is in question especially in the context of South Asian region.

### 2.2 Economic indicators and Microfinance Development

In literature, macroeconomic stability and financial sector development are the critical areas of research. The study found that economic decisions and financial performance of an organization interlinked because economic and monetary policies affect the financial development (Fung, 2009). Specifically, Nwachukwu (2014) suggests the inflation and interest rate are the key macroeconomic indicators determine the stability of the economy and financial sector development. The higher the fluctuation in economic indicators disturbs financial development. However, Honohan (2004) explains the lower variation between economic indicators and microfinance development.

More specifically, reviewing the economic decisions and microfinance development. Few studies link the macro-level indicators with microfinance performance. Vanroose (2007) did a literature driven study and gave a strong connection between economic and microfinance performance. Moreover, Vanroose (2008) found that gross national income and population density positively affect MFIs performance. Empirically, Ahlin et al. (2011) and Imai et al. (2011) more critically reviewed the macroeconomic indicators along with institutional variables that influence the financial performance of MFIs and found a positive impact of economic growth on microfinance development.

Country related indicators are external forces that affect the overall performance of all sectors including the microfinance sector. The countries’ economic policies like; interest rate, tax policy, inflation rate, unemployment have an impact on MFI’s performance (Ahlin et al., 2011). To increase the microfinance coverage, it needs to understand the country’s scope analysis while making microfinance strategy. The macroeconomic decisions contribute to achieving the dual objectives of MFIs to earn returns for investors as well as social performance (Ahlin et al., 2011). Notably, in the literature of microfinance outreach, there are only two studies that link the economic factors with microfinance outreach; these are: (Xu et al., 2016; Awaworyi, 2019). Whereas, other studies just take economic factors as control variables to consider the country level cross-sectional variance.

Xu et al. (2016) analyzed that foreign investment and Private credit positively impact on loan size growth. Conversely, Awaworyi (2019) has identified that better economic and institutional conditions hinder
the microfinance outreach because of the informal nature of MFIs. However, Barry and Tacneng, (2014) found a positive effect of GDP on breadth and depth of outreach because people can have more access to credit in a stable economic development. 

2.3 Economic indicators and Microfinance Outreach

This section describes each economic indicator and differentiates the indicator into closed, opened, and welfare economic factors, in which GDP growth, interest rate, inflation rate, labor force participation, and private credit are closed economic factors. However, foreign investment relates to the open economic variable. In comparison, Human development is an outcome variable of both open and close economic factors. Further, this section connects these economic factors with the microfinance outreach dimension.

GDP growth:

Gross domestic product (GDP) growth is the primary indicator that measures economic growth and development. It is defined as the total value of goods and services produced in the specified time period. In literature, Ahlin et al. (2011) and Vanroose and D’Espallier (2013) found that GDP growth has a positive impact on microfinance financial and Social performance because it surges the finances and investments in the economy and also reduces the operating cost thus the MFI perform better. Barry and Tacneng, (2014) also found a positive impact of GDP on breadth and depth of outreach because people can have more access to credit in a stable economic development. Whereas, the contradict argument explains the negative effect of GDP growth on outreach because the poverty ratio may be lower when economic growth increases. Consequently, it reduces the microcredit demand due to an increase in wage employment opportunities (Awaworyi, 2019).

Interest rate:

The interest rate is one of the main sources of revenue for financial institutions. Scandizzo (2016) defined Interest rate as the specified percentage of credit that microfinance charged in against the borrowing money. Usually, MFIs charge a higher interest rate than other banks because they provide microcredit facility and the operating cost of microloans has become higher (Rosenberg et al., 2013). Similarly, Morduch (1999) identified that MFIs charge higher interest in microcredit because demand is not highly elastic. Generally, in comparison to other banks, MFIs charge higher interest in microcredit because the cost incurred in a small amount of credit is higher (Ayayi et al., 2010). Ahlin et al. (2011) identified that the change in interest has a negative impact on outreach because a higher interest rate increases the cost of financing. This creates
the problem of loan repayment, especially for poor people. Accordingly, it reduces the demand for microcredit (number of borrowers).

Moreover, higher interest rate increases the burden of borrowers (Sun & Im, 2015). Overall, the rise in interest rate is favorable for microfinance (supply-side). In contrast, it increases the financial burden for borrowers (demand side).

**Inflation rate:**

The inflation as an internal economic indicator adversely affects the lives of poor people because as inflation increases, people do not have sufficient income for consumption and investment, so they need credit to fulfil their needs. Inflation defined as a general increase in consumer price index (Jehle, 2001). Inflation hinders in achieving the MFIs financial and social objectives because the unexpected change in inflation lowers the returns of MFIs thus, the financial sustainability eventually reduces (Ahlin et al., 2011). Also, the study found that inflation negatively impacts on microfinance outreach because it hinders the financial performance of institutions. On the demand side effect, inflation also has a negative impact. For borrowers, higher inflation leads to a higher interest rate. This creates the repayment issue (D’Espallier et al., 2013).

**Private Credit:**

Private credit is the close economic indicator that described as the total amount of credit offered to private enterprises from financial institutions included MFIs, because it offers the credit facility to SMEs (Liu, & Kool, 2018). Private credit measures the total domestic loan to the private sector that influences the microfinance outreach (Ahlin et al., 2011). Also, it argued that intensive competition hinders the financial performance and outreach of MFIs (Vanroose & D’Espallier, 2013). Consistently, Xu et al. (2016) result allied in case of the breadth of outreach but not in case of depth of outreach. The study suggests that there is a negative impact on the breadth of outreach due to intensive competition between microfinance and commercial banks, and it leads to down MFIs market. However, in the case of depth of outreach, Xu et al., (2016) demonstrate the positive impact of PC on average loan size because of the increase in demand for credit from private firms and SMEs.

**Labor force participation:**

Labor force participation rate is an economic activity describes as the total percentage of people, the age of 16-64, is employed and looking for a job currently. Labor force participation is negatively associated with borrower and loan size growth because more people are economically active and employed and do not need microcredit (Xu et al., 2016).
It results that higher the industrial growth in terms of employment in developed economies lowers the MFIs outreach because people have sufficient income to fulfill their basic needs.

**Foreign investment:**
Foreign investment is an open economic factor that creates investment from foreign countries in the manufacturing, agriculture, and service sector of the economy. FDI defined as the form of investment made by an individual or firm in a foreign country for earning purposes. FDI has a direct and indirect impact on outreach. The most commercially oriented FDI has a direct positive impact on the depth of outreach, and negative impact on the breadth of outreach because foreign investors are more likely to get larger loans (Vanroose & D'Espallier, 2013). Consequently, it increases the average loan portfolio and reduces the number of clients. Similarly, Ahlin et al. (2011) and Xu et al. (2016) suggested an indirect negative impact of FDI on outreach because higher FDI increases the wage employment, and the demand for the microcredit diminishes because people have enough income to spend.

**Human development:**
Mahbub ul Haq, an economist, first introduced the concept of human development. The HDI describes as a welfare economic indicator that increases the freedom and opportunities for people and improves human life (Sen, 1994). According to world development, Human development index is the reliable indicator that is composed of three elements; health, education and living style of the people, measured through life expectancy, years of schooling and Gross National Income (GNI) per capita respectively (Sen, 1994; Foster et al., 2018). In the literature, Lensink et al. (2018) also found that HDI positively impacts on the number of women targeted and loan size growth. Therefore, it shows that the better living standard of people in the economy leads to an increase in the outreach because they are aware of the financial system of MFIs.
3. Research Methodology

3.1 Data
We have selected the South Asian countries to study the economic impact on breadth and depth of MFIs because of the high poverty ratio, regardless of the growth in the South Asian microfinance sector. The Microfinance barometer 2018 reported that the South Asian countries are serving microcredit to most borrowers, approximately 60% of global outreach in which India plays the leading role in the region.

We have taken the microfinance data from the MIX (Microfinance Information Exchange) market database, an online database that provides a platform to exchange the financial and non-financial data of MFIs throughout the world to promote the research in the field of microfinance. The main purpose of the MIX market is to collect and analyze MFIs data for the transparent microfinance sector. While the data of all economic indicators extracted from the WDI database except the Human development index that collects from reports published by the United Nations Development Program (UNDP).

The initial sample consists of a total of 411 South Asian MFIs from the time of 1999 to 2018 except the Bhutan and Maldives due to the unavailability of microfinance data. Similarly, we have taken economic data of South Asian countries from the year 1999 to 2018. After merging the microfinance dataset with economic data and dropping repeated observation, the final data sample contains 2232 observations of 409 South Asian MFIs.
from the year 1999 to 2017. Furthermore, we have used STATA software to manage and estimate the results.

3.2 Model Specification

A panel regression model is used to accomplish the objective of investigating the economic impact on overall microfinance outreach. The general panel regression equation expressed and given below:

\[ Y_{it} = \beta + \sum \beta_{ev} E_{it} + \gamma SIZE_{it} + \epsilon_{it} \]  

(1)

Here, \( Y_{it} \) represents the proxy of breadth and depth of outreach of \( i^{th} \) MFI operating in the South Asia region at time \( t \). \( EV \) indicates the vector of economic variables like GDP growth, interest rate, inflation rate, Human development index, private credit, foreign direct investment, and labor force participation. Whereas, the model contains MFIs size as a firm-specific control variable to consider the cross-section variance because every firm differs concerning its size. While, \( \beta \), \( \beta_{mev} \), and \( \gamma \) specify the coefficients, and \( \epsilon \) is the error term.

From the perspective of microfinance literature, different researchers use different estimation techniques that best suit their context of the study. Previous studies used pooled Ordinary Least Squares (OLS) with a random effect model to identify microfinance performance (Lensink et al., 2018; Ahlin et al., 2011). Whereas, Bibi et al. (2017) used the Fixed Effects Vector Decomposition (FEVD), model. Additionally, a simple OLS model (Quayes, 2012), three-stage least squares (3SLS) (Imai et al., 2011), logit model (Quayes, 2012), and probit model (Bayai and Ikhide, 2018) have already employed to study the microfinance outreach. Based on the literature, we consider fixed and random effect models along with the Hausman test for estimating the coefficients.

3.2.1 Fixed and Random effect regression model

The fixed and random effect models are panel regression models that consist of both the cross-sectional and time-series data. Expressly, the fixed-effect model permits the heterogeneity among firms by permitting each firm to have its intercept because every firm differs from each other. Theoretically, the fixed-effect model is more suitable to use in case of estimating the individual effect of the entity because every entity (firm or country) varies to its size, age, capital structure and policies (Bibi et al., 2017). From equation 1, the general form of a fixed-effect model represents:

\[ Y_{it} = \beta_{0} + \sum \beta_{ev} E_{it} + \gamma SIZE_{it} + \epsilon_{it} \]  

(2)
From equation 2, the fixed-effect model for each proxy of outreach given below:

\[
\ln ALS_{it} = \beta_1 + \beta_2 GDPG_{it} + \beta_3 INF_{it} + \beta_4 IR_{it} + \beta_5 PC_{it} + \beta_6 HDI_{it} + \beta_7 FDI_{it} \\
+ \beta_8 LFP_{it} + \gamma_1 \text{Size}_{it} + \epsilon_{it} \\
(2.1)
\]

\[
\ln NAC_{it} = \beta_1 + \beta_2 GDPG_{it} + \beta_3 INF_{it} + \beta_4 IR_{it} + \beta_5 PC_{it} + \beta_6 HDI_{it} + \beta_7 FDI_{it} \\
+ \beta_8 LFP_{it} + \gamma_1 \text{Size}_{it} + \epsilon_{it} \\
(2.2)
\]

In equation (2.1) and (2.2), \(\ln ALS_{it}\) (Natural log of average loan size) and \(\ln NAC_{it}\) (Natural log of the number of active clients) are taken as a proxy of depth and breadth of the outreach of \(i^{th}\) MFI operating in the South Asian region at time \(t\), respectively. On the right-side equation, \(\beta_{1i}\) shows that each \(i^{th}\) entity/firm has its intercept and also represents the vector of economic predictors and its coefficient. Economic indicators categorized into close indicators such as GDPG (Gross domestic product growth), IR (Interest rate), INF (Inflation rate), PC (private credit) and LFP (Labour force participation). An open economic indicator is FDI (Foreign direct investment), and the welfare indicator refers to HDI (Human development index) in the model. Firm size is included as firm-specific control variable in the model with \(\gamma_1\) its coefficient and \(\epsilon_{it}\) is the error term. Further, the description of all variables given in table 01.

Despite the heterogeneity effect in the fixed-effect model, the intercept is still time-invariant that does not change over time. In solution to the time-invariant effect of each entity, the random effect model, also known as Variance Component model (VCM) that considers the time series variance in the model. Referring to the same fixed model, equation (2), the constant term \(\beta_{1i}\) does not contain the ‘i’ subscript because it treats as a random variable in the random effect model. Therefore, the constant term for each firm expressed as:

\[
\beta_{ii} = \beta_1 + \epsilon_i \\
(3)
\]

Where \(\epsilon_i\) is random error term with zero mean value and constant variance under normality assumption. The intercept \(\beta_1\) in random model shows that every firm has a common intercept, but now the individual effect reflects in \(\epsilon_i\), instead of \(\beta_{1i}\) in fixed effect model. The random effect model specifies through substituting equation (3) into equation (2), we obtain:

\[
Y_{it} = \beta_1 + \sum \beta_{ev} EV_{it} + \sum \gamma CV_{it} + \epsilon_i + \epsilon_{it} \\
(4)
\]
Where, $\omega_i = \varepsilon_i + \varepsilon_i$ referred to as a composite error term, also known as Error Component model (ECM) because it consists of both time-series and cross-section error terms in which it varies with the cross-section and time. By following equation (5), the random effect model for each proxy of the dependent variable given below:

$$ Y_{it} = \beta_1 + \sum \beta_{1i} E_{it} + \sum \gamma CV_{it} + \omega_{it} $$

3.2.2 Two-Stage Least Squares (2SLS)

For robustness, we employed Instruments based 2SLS model, proposed by Lewbel (2012) to deal with endogeneity in the model. The main reason behind using 2SLS is to deal with endogeneity through instrument variables because literature argued that there are more chances of endogeneity when we are dealing with economic data. This model also helps in identifying the quality of instruments in the model. That is why we prefer 2SLS to estimate the coefficient. The Endogeneity issue ascends when the independent variable is correlated with the error term of the model (Lewbel, 2012). Mainly, the endogeneity issue arises due to reverse causality, sample selection, measurement error such as omitted variables, and functional form misspecification (Imai et al., 2011). This study uses the instrument variables based on the literature and correlation matrix (Imai et al., 2011), taking the lagged value of endogenous variables (Mileva, 2007). Also, the Wu-Hausman and Durbin Watson score test conduct to identify the endogeneity in the model after applying the 2SLS model.

3.3 Variables

Table 01 describes all variables consisted of dependent, explanatory, and control variable with its measurement. This study takes the natural log of average loan size and a number of active clients as the proxy of depth and breadth of outreach, respectively (Lensink et al., 2018; Ahlin et al., 2011). Whereas, all set of open, close, and welfare economic indicators takes as the independent variables. Moreover, we have added MFI size, taken as the natural log of total assets in the model to control the firm difference. The difference in the economy of the South Asian countries, the MFIs are also differing in their size. Therefore, MFIs size selects as a firm-specific control variable. Barry and Tacneng, (2014) explained the positive effect of firm size on
MFIs performance. It means larger MFIs perform better because they have enough resources to invest in the betterment of their clients.

<table>
<thead>
<tr>
<th>Table 01: Description of Variables.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
</tr>
<tr>
<td>-------------------------------------</td>
</tr>
<tr>
<td><strong>Dependent Variable</strong></td>
</tr>
<tr>
<td><strong>Social performance</strong></td>
</tr>
<tr>
<td>Active Clients</td>
</tr>
<tr>
<td>Average loan size</td>
</tr>
<tr>
<td><strong>Independent Variables (Economic Indicators)</strong></td>
</tr>
<tr>
<td>Economic Growth</td>
</tr>
<tr>
<td>Inflation</td>
</tr>
<tr>
<td>Interest rate</td>
</tr>
<tr>
<td>Private Credit</td>
</tr>
<tr>
<td>Labour force Participation</td>
</tr>
<tr>
<td><strong>Open economic Indicators</strong></td>
</tr>
<tr>
<td>Foreign direct investment</td>
</tr>
<tr>
<td><strong>Welfare economic Indicators</strong></td>
</tr>
<tr>
<td>Human development index</td>
</tr>
<tr>
<td><strong>Firm level control Variable</strong></td>
</tr>
<tr>
<td>MFI Size</td>
</tr>
</tbody>
</table>

perform better because they have enough clients.

4. Results and discussions

The descriptive statistics depict the mean, standard deviation, minimum and maximum value of each variable in table 02. The results depict the average value of loan size, and the number of clients has recorded 500 clients and 1020.94 dollars, respectively, in the South Asian region. Overall sample, on average, reported annual 6.36% GDP growth over the time that is quite better. Whereas the mean consumer price index (annual %) is much higher, about 7.36%, the reason could be economic and political instability in the region. The average interest rate is recorded by 4.30%.

Moreover, PC is 41.02 (% of GDP), and the average FDI net inflows are 1.33 (% of GDP). On average, the LFP is recorded as 59.40 (% of the total population more significant than 15 years). The average value of HDI is 56.77% that is greater than 50%, so it seems a good education, health, and income level throughout the region. The average of MFIs total assets of South Asian sample is recorded about 1592 dollars.
Furthermore, this research conducts the correlation analysis to detect the multicollinearity between variables. There is always the danger of multicollinearity when we deal with the multivariate regression model. The multicollinearity issue arises when there is an entirely direct relationship between explanatory variables. The problem of multicollinearity raises the value of estimators when the variables are highly correlated (Wooldridge, 2010). Moreover, this issue makes variables statistically insignificant even when these are statistically significant in literature and also supported by theory (Wooldridge, 2010).

Table 03 presents the correlation matrix to identify the degree of correlation between the variables. Kennedy (2003) suggested that the value of correlation analysis is equal to or greater than 0.8 (80%) considered as the multicollinearity between the variables. Based on the rule of thumb, the correlation matrix reported a higher level of correlation between PC and FDI is 0.5184 (51.84%) that is below 80% since the correlation level of remaining variables is relatively lower between the independent variables.
The results of fixed and random effect models for each dependent variable given in table 04. The results of the Hausman test are statistically significant at 1%. Therefore, we reject the null hypothesis of random effect model is appropriate in both models. It signals that the fixed effect model is appropriate.

The results depict the significant positive impact of GDP growth on lnALS and lnNAC. The positive impact of GDP growth on outreach indicators shows that GDP growth increases the breadth and depth of outreach because people can have more access to credit in a stable economy hence the social performance increases. These results are consistent with (Hartarska & Nadolnyak, 2007; Ahlin et al., 2011; Awaworyi, 2019).

The inflation has a significant negative impact on lnALS at 5% significant level because an increase in inflation brings little negative change in loan size because of the devastating effect of inflation microfinance development. The inflation is hindering both financial returns and outreach of MFIs because, for borrowers, high inflation means higher the interest rate on credit, that is the reason it reduces the loan size and active borrowers. The results are consistent with (Chernikova et al., 2018; D’Espallier et al., 2013; Jawaid, et al., 2019; Khan, et al., 2018).

Table 04: Fixed and Random effect model

<table>
<thead>
<tr>
<th>Variable</th>
<th>lnALS FE</th>
<th>lnALS RE</th>
<th>lnNAC FE</th>
<th>lnNAC RE</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDPG</td>
<td>0.0180***</td>
<td>0.0138***</td>
<td>0.0658***</td>
<td>0.0001</td>
</tr>
<tr>
<td>INF</td>
<td>-0.0072**</td>
<td>-0.0099***</td>
<td>-0.0018</td>
<td>0.0183</td>
</tr>
<tr>
<td>IR</td>
<td>-0.0068**</td>
<td>-0.0063*</td>
<td>0.0175</td>
<td>-0.0238</td>
</tr>
<tr>
<td>PC</td>
<td>0.0088***</td>
<td>0.0063***</td>
<td>0.0386***</td>
<td>0.0217***</td>
</tr>
<tr>
<td>FDI</td>
<td>-0.0194</td>
<td>-0.0193</td>
<td>0.0886*</td>
<td>-0.0179</td>
</tr>
<tr>
<td>LFP</td>
<td>0.0522***</td>
<td>0.0308***</td>
<td>0.216***</td>
<td>-0.0331***</td>
</tr>
<tr>
<td>HDI</td>
<td>7.6154***</td>
<td>5.5092***</td>
<td>22.6544***</td>
<td>1.9876</td>
</tr>
<tr>
<td>lnSize</td>
<td>0.1348***</td>
<td>0.1838***</td>
<td>0.1883***</td>
<td>0.3982***</td>
</tr>
<tr>
<td>C</td>
<td>-4.9178***</td>
<td>-3.0578***</td>
<td>-19.1935***</td>
<td>4.1468***</td>
</tr>
<tr>
<td>R-squared</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within</td>
<td>0.5598</td>
<td>0.5518</td>
<td>0.7453</td>
<td>0.6544</td>
</tr>
<tr>
<td>Between</td>
<td>0.1191</td>
<td>0.2028</td>
<td>0.0027</td>
<td>0.6784</td>
</tr>
<tr>
<td>Overall</td>
<td>0.1747</td>
<td>0.2332</td>
<td>0</td>
<td>0.6833</td>
</tr>
<tr>
<td>F-statistics</td>
<td>240.55***</td>
<td>126.17***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chi-square</td>
<td>1883.41***</td>
<td>948.31***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observation</td>
<td>1866</td>
<td>542</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hausman test</td>
<td>104.31***</td>
<td>271.51***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: ***, ** and *show significance at 1%, 5% and 10% level, respectively.

Source: Authors’ own calculation.

Table 04 presents fixed and random effect coefficients along with the result of Hausman test that is used to choose most appropriate model. Additionally, table included R-squared within
The interest rate has a significant negative impact on loan size because people are less likely to avail larger amount of credit when MFIs charge more interest on credit. Secondly, it also increases the cost of financing because of poor people unable to avail of credit facility and repayment of the outstanding loan in this situation. In contrast, it has an insignificant positive impact on lnNAC and does not affect due to a change in interest rate. The reason could be the intense poverty in the region; borrowers must require a loan to meet their basic needs. The results support the study of (Nwachukwu, 2014; Ahlin et al., 2011; Safdar, et al., 2020; Alvi, et al., (2020).

The private credit has a significant positive impact on lnALS and lnNAC at 1% significant level. The positive association of PC and outreach indicators in South Asian countries indicates higher demand from SMEs for microcredit because MFIs apply less regulation in processing credit as compared to other financial institutions. Consequently, loan size and a number of clients increases the overall outreach. These findings are consistent with (Imai et al., 2011; Ahlin et al., 2011; Xu et al., 2016; Alvi, et al., 2019; Khan, et al., 2019).

The LFP is positively impacted by lnALS and lnNAC because LFP increases the wage employment in the economy, and it may create the market for SMEs and microenterprises. Therefore, the borrower and loan size growth increases. These findings are consistent with (Ahlin et al., 2011; Awaworyi, 2019). The results depict that the set of close economic factors indicates the positive change in the microfinance outreach dimension.

Considering the external economic factor, the positive association between FDI and lnNAC is significant at a 10% level because commercially oriented FDI attracts higher deposits. Therefore, it may raise the total number of clients. Whereas lnALS do not affect due to change in an external economic factor. The reason could be the unattractive microfinance sector in the South Asian region for investment purposes because foreign investors keen to invest only in profitable MFIs. The overall results are inconsistent with the (Ahlin et al., 2011; Vanroose and D’Espallier 2013; 2009; Xu et al., 2016).

Whereas, the HDI, a welfare economic variable, positively impacts on lnALS and lnNAC and consistent with because it increases the awareness among the people and
works for the social development (Lensink et al., 2018). This shows that the welfare economic factor increases the outreach dimension of microfinance that further helps in reducing poverty.

The overall results illustrate the positive impact of welfare indicator (Human development) and closed economic factors (GDP growth, private credit, labor force participation) except the inflation and interest rate that are negatively impacting on loan size (depth of outreach). Whereas, open economic factor (foreign investment) does not impact on the depth of outreach. However, all set of variables positively impact on the number of active clients (breadth of outreach) except the interest rate and inflation rate that do not impact.

For robustness, we have employed instrument based 2SLS to deal with endogeneity because literature suggested that there are more chances of endogeneity in the model when we are dealing with economic indicators (Imai et al., 2011). It suggests that GDPG and HDI can endogenously impact in the model of MFIs performance (Imai et al., 2011). Additionally, we have checked the correlation between the explanatory variables and model error term and found that GDPG and HDI are highly correlated with the error term. Hence the model faces an endogeneity problem. Therefore, we assumed that GDPG and HDI work as an endogenous variable in the model.

The instrument variable used to overcome the endogeneity problem that is exogenous variable must correlate with the endogenous variable and not with the error term. Mileva (2007) suggested that we can use the lag value of the endogenous variable as an instrument. Therefore, we have taken lag of GDPG and HDI as an instrument variable, also preferred by the study (Awaworyi, 2019). After estimating the coefficients through 2SLS, we have tested the endogeneity in the overall model and quality of the instrument.

Table 05: Two-Stage least squares (2SLS)

<table>
<thead>
<tr>
<th>Variable</th>
<th>lnALS</th>
<th>lnNAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDPG</td>
<td>-0.0846**</td>
<td>0.2138*</td>
</tr>
<tr>
<td>INF</td>
<td>-0.0086</td>
<td>0.008</td>
</tr>
<tr>
<td>IR</td>
<td>0.0069</td>
<td>-0.0051</td>
</tr>
<tr>
<td>PC</td>
<td>0.0031</td>
<td>-0.0264</td>
</tr>
<tr>
<td>FDI</td>
<td>-0.0248</td>
<td>-0.3977***</td>
</tr>
<tr>
<td>LFP</td>
<td>0.0182***</td>
<td>-0.0298**</td>
</tr>
<tr>
<td>HDI</td>
<td>4.2649***</td>
<td>1.1779</td>
</tr>
<tr>
<td>lnSize</td>
<td>0.1386***</td>
<td>0.7598***</td>
</tr>
<tr>
<td>C</td>
<td>-0.2335</td>
<td>0.1975</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.2425</td>
<td>0.8356</td>
</tr>
</tbody>
</table>
Ainan Memon, Waqar Akram, Iram Yasmin & Ghulam Abbas

<table>
<thead>
<tr>
<th>Chi squares</th>
<th>466.43***</th>
<th>1771.09***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observations</td>
<td>1408</td>
<td>347</td>
</tr>
<tr>
<td>Durbin Score</td>
<td>5.01655</td>
<td>1.9470</td>
</tr>
<tr>
<td>Wu-Hausman score</td>
<td>2.49758</td>
<td>0.9479</td>
</tr>
<tr>
<td>Eigen value</td>
<td>52.4442**</td>
<td>45.065***</td>
</tr>
</tbody>
</table>

Note: ***, ** and * show significance at 1%, 5% and 10% level, respectively

Source: Authors’ own calculation.

The results of 2SLS estimators, endogeneity test and quality of instrument variables given in Table 05. The Durbin score and Wu Hausman score employed to test the endogeneity problem. Both tests of endogeneity suggested that variables are exogenous in both models that fail to reject the null hypothesis of variables that are exogenous. Hence, these results conclude that the fixed model is appropriate in both models.

5. Conclusion

This study links the economic factors and microfinance outreach because it is essential to steady and regulate the microfinance sector by understanding its economic surrounding context in which the MFI is operating. Hence, we have studied the impact of the economic environment on the breadth and depth of outreach of MFIs. We have taken South Asian MFIs because the poverty ratio is high in the region despite the sustainable growth in the microfinance sector. To answer the research questions, we have taken the data of 409 MFIs working in South Asian countries from the year 1999 to 2017. We have used both the fixed effect regression model based on the Hausman test. Additionally, 2SLS is used to identify and resolve the issue of endogeneity. From the perspective of the depth of outreach, the results illustrate the positive impact of welfare indicator (Human development) and closed economic factors (GDP growth, private credit, labor force participation) except the inflation and interest rate that are negatively impacted. Whereas, open economic factor (foreign investment) does not impact on the depth of outreach. However, all set of variables positively impact on the breadth of outreach except the interest rate and inflation rate that do not impact. This study also found little variation in the South Asian perspective as compared to global analysis that previously conducted in the literature (Ahlin et al., 2011; Imai et al., 2011). The study concludes from the results that macroeconomic variables affect the depth of outreach of microfinance institutions. The government and microfinance policymakers can use economic indicators to increase further microfinance outreach that further helps in alleviating poverty from the region.
References


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