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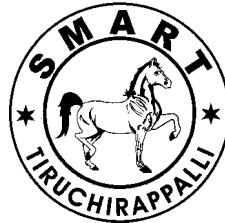
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## OPERATIONAL SELF-SUFFICIENCY OF SELECT NBFC-MFIS OF ANDHRA PRADESH

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### ***Abstract***

*Operational Self Sufficiency (OSS), expressed in percentage terms, provides an indication as to whether a Microfinance Institution (MFI) is earning sufficient revenue (through interest, fee and commission income) so as to cover its total costs - financial costs, operational costs and loan loss provisions. MFIs can achieve OSS of 100%, either by increasing their operating income or by decreasing their total costs. This paper analyzed the Operational Self Sufficiency (OSS) of six select Non-Banking Financial Companies (NBFC)-MFIs, which have their headquarters in Andhra Pradesh. It has identified five factors that have an effect on the OSS of these MFIs, using the multiple regression analysis technique. These five factors are - Yield on Gross Loan Portfolio (Nominal), Total Assets, Cost per Borrower, Gross Loan Portfolio and Number of Active Borrowers. The study results indicated that an increase in the yield on gross loan portfolio and total assets of a MFI, resulted in the increase of OSS while an increase in the cost per borrower and number of active borrowers, decreased the OSS of the MFIs.*

**Keywords:** *Microfinance, Non-Banking Financial Companies, Operational Self-Sufficiency, Multiple Regression*

**JEL Code:** *G10, G20, G21, G23*

### **1. Introduction**

Poverty is one of the stark realities in the present era of globalisation. Poor people need access to sources of finance, for starting small, income-generating enterprises. However, due to paucity of quality assets (as security), their

request for loans is generally put aside by the commercial banks and Non-Banking Financial Companies (NBFCs). Microcredit refers to loans of very small amounts (microloans), provided to the poor people, for income-generating activities and thus improve their living

standards. Such poor borrowers, who usually cannot offer collateral security, as demanded by the banks and formal financial institutions, suffer from financial exclusion. Microfinance covers broad range of services such as microcredit, savings products, micro-insurance and remittance services, provided to the people of low-income groups. It can be said that the practice of providing microcredit facility was extended to include variety of financial products and services, specially designed for the poor people, giving rise to the microfinance movement all over the world.

The Task Force on Supportive Policy and Regulatory Framework for Microfinance, set up by the National Bank for Agriculture and Rural Development (NABARD), in 1998, has defined microfinance as “Provision of thrift, credit and other financial services and products of very small amounts, to the poor in rural, semi-urban or urban areas, for enabling them to raise their income levels and improve living standards”. The typical borrowers of microfinance are those people who do not have access to formal financial markets (Von Pischke, 2002).

Microfinance Institution (MFI) refers to an organisation whose aim is the economic betterment of poor people, by providing them appropriate financial services and products. They have come into the picture in order to support the poor people, by offering small loan amount (without any collateral security) and other financial services, for starting income-generating activities and help them become economically self-reliant. MFIs mobilise financial resources from donors, banks,

government and philanthropists. Along with microcredit, MFIs also provide vocational training and skill development, to the poor clients, so as to create self-employment opportunities and promote entrepreneurship.

## 2. Operational Self Sufficiency

Operational Self Sufficiency (OSS), expressed in percentage terms, provides an indication of whether a MFI has earned sufficient operating revenue in order to cover its total expenses, comprising operational expenses, financial expenses and loan loss provisions. As the name indicates, the examination of this ratio helps in determining the degree to which the operations of an organisation are self-sustaining. **Pollinger, Outhwaite and Cordero-Guzman (2007)** have defined sustainability as the ability to cover annual budgets, including grants, donations and other fund raising. According to the authors, long term viability, in the microfinance sector, can be achieved through the mechanism of self-sufficiency which leads to decrease in costs and increase in efficiency.

According to **Woolcock (1999)**, sustainability is the program’s capacity to remain financially viable, in the absence of domestic subsidies or foreign support. In the opinion of **Rhyne (1998)**, the goal of outreach to the poor can be achieved through sustainability. If a MFI is not able to achieve operational self-sufficiency, its equity capital will start diminishing, resulting in less volume of funds, being available as loans to the borrowers, ultimately resulting in the closing down of the MFI. The formula for computing OSS is as follows (**Sa-Dhan, 2003**):

$$\text{Operational Self – Sufficiency (OSS)} = \frac{\text{Operating Income (Loans + Investments)}}{\text{Operating Costs + Loan Loss Provisions + Financing Costs}}$$

**Trend:** An increasing OSS is positive and vice versa.

**Standard:** OSS at 100% (**Sa-Dhan, 2003**)

Operating income is the sum of the following components:

- ❖ Interest on current and past due loans
- ❖ Loan fees and service charges
- ❖ Late fees on loans
- ❖ Interest on investment

Operating costs is the sum of the following components:

- ❖ Salaries and benefits
- ❖ Administrative expenses
- ❖ Occupancy expenses
- ❖ Travel
- ❖ Depreciation
- ❖ Others

Financial costs include interest, fee and commission, payable on commercial and concessional borrowings, mortgages and other liabilities. Loan loss provision expense is the portion of the Gross Loan Portfolio (GLP) that is at risk of default.

### 3. Literature Review

In the microfinance literature, there are certain variables that are considered to have influence on the OSS of MFIs. The description of these variables, based on the literature review, is given below.

#### i. Cost Per Borrower

This factor determines the efficiency level of the operation of the MFI, in terms of the cost, incurred in servicing each borrower. To increase its efficiency, MFIs should service the loan requirement of the borrowers, at the lowest possible cost. **Qayyum and Ahmad (2006)** had conducted a data envelopment analysis study, on 25 Indian MFIs. The researchers found direct relationship between efficiency and sustainability. The authors used cost per borrower as an alternative for

expenditures. **Savita (2006)** conducted three case study analyses on Indian MFIs and came to the conclusion that cost efficiency can be achieved by minimising the cost per borrower. The performance analysis study of 42 Indian MFIs by **Crombrugghe, Tenikue, & Sureda (2008)** and the studies conducted by **Ayayi and Sene (2007)**, have depicted cost efficiency by considering cost per borrower and total cost ratio.

#### ii. Gross Loan Portfolio

In order to achieve sustainability, it is necessary to increase the scale of MFI's operations and outreach in India (**Bharti, 2007**). Economies of scale directly influence sustainability of MFIs in India (**Qayyum & Ahmad, 2006**). **Crombrugghe et al., (2008)** used Gross Loan Portfolio (GLP) and total number of borrowers as alternatives for growth, in their study on the impact of growth on the sustainability of 42 Indian MFIs, covering the year 2003. Similarly, **Ayayi and Sene (2007)** studied the impact of growth on the sustainability of 217 MFIs, spread across 101 countries, by considering client outreach as an alternative for growth. Both these studies have confirmed that growth has a positive impact on the sustainability of the MFIs. **Nair (2005)** has also suggested that economies of scale could be achieved, by Indian MFIs, by following the growth factor.

#### iii. Number of Active Borrowers

The depth of the MFIs outreach is measured, in terms of the ability of the MFIs, to serve poor clients, by reaching out to them. Breadth of the outreach refers to the number of poor clients in need of services under microfinance. **Woller and Schreiner (2002)**, in their study, have mentioned that number of active borrowers is a measure of breadth of outreach. In the studies of **Christen, 2001; Navajas, Schreiner, Meyer, Gonzalez-Vega, & Rodriguez-Meza, 2000; Bhatt & Tang, 2001; Olivares-Polanco, 2005; and Von**

**Pischke, 1996**, it is assumed that outreach of the MFIs would be deeper if a large number of poor and women clientele had been served by the MFIs. According to **D’Espallier, Guerin & Mersland (2011)**, when the number of women clientele for an MFI is higher, it leads to lower portfolio-at-risk, lower write-offs and lower loan loss provisions, other things being equal. Thus, this leads to higher OSS. The regression analysis, conducted by **Crombrugghe et al. (2008)**, suggests that the financial results of the MFIs can be improved by increasing the number of borrowers per field officer, particularly in collective delivery models.

#### iv. Yield on Gross Loan Portfolio

Interest rates and fee incomes generate revenue for the MFIs. According to **Robinson (2001) and Conning (1999)**, only those MFIs, which charge high interest rates that can cover their costs, exhibit profitability. The same point has also been mentioned by **Cull and Morduch (2007)** in their study. In addition, the authors also argue that when interest rates become very high (i.e., more than 60%), then the demand for microcredit will come down, resulting in MFIs losing their profitability. According to **Crombrugghe et al. (2008)**, the interest rates, charged to borrowers, have an effect on the financial performance of the MFI’s, in terms of sustainability (Financial or Operational self-sufficiency) and also in terms of repayment of loans, considered with regard to Portfolio-at-Risk (PAR).

#### v. Total Asset

The value of assets is an indicator to the size of an MFI. (**Qayyum & Ahmad (2006); Mersland & Storm, 2009; Hermes & Lensink, 2007; Hartarska, 2005**). **Hartarska and Nadolnyak (2007)** have found that the size of the MFI (considered in terms of total assets and savings to total assets ratio) positively affects the sustainability of the MFI when considered with regard to operational

sustainability. However, the magnitude of the effect is small. The research results of **Gregoire and Tuya (2006)** and **Bogan (2008)**, reveal that those MFIs, having larger asset base, tend to display higher self-sufficiency levels. Such MFIs can deliver their services to larger group of clients or can provide larger loan amount to the clients.

#### vi. Age

Age refers to the period since which an MFI has been carrying on its operations, right from its inception. In their study, **Ayayi and Sene (2007)** have hypothesized that age (as a variable) has a direct relationship with sustainability. However, **Crombrugghe et al. (2008)** have found that age is not a significant variable, influencing the sustainability of the MFIs and the performance of the MFIs would not improve beyond certain threshold for age. In the regression analysis, conducted by **Nadiya, Olivares-Polanco and Ramanan (2012)**, it was found that age was not significant in explaining the changes in OSS.

#### vii. Debt-Equity Ratio

Capital structure of a company consists of various sources of capital, all of which come under two categories – debt capital and equity capital. **Kyereboah-Coleman (2007)** studied the impact of leveraged capital structure on the sustainability of MFIs and found positive relationship between debt and sustainability. Similarly, **Bogan (2008)** has also found that capital structure is a key issue with respect to operational self-sufficiency. **Rhyne & Otero (1992)** have found that institutions, having high level of equity in the capital structure, tend to be more profitable. MFIs, that employ higher level of debt in their capital structure or are highly leveraged, show more profitability (**Muriu, 2011**). The author has also mentioned that the age of the MFI affects its debt-equity composition and the maturity factor helps MFIs to access capital. According to **Dissanayake**

(2012), debt-equity ratio implies causality for the return on assets and self-sufficiency.

#### viii. Average Loan Balance per borrower

The average loan balance or loan size (computed by dividing GLP by the number of active borrowers), can be considered a proxy for depth of outreach. If the average loan balance is small, the depth of the outreach would be large. In the studies of **Christen, 2001; Navajas, Schreiner, Meyer, Gonzalez-Vega & Rodriguez-Meza, 2000; Bhatt & Tang, 2001; Olivares-Polanco, 2005; and Von Pischke, 1996**, it is perceived that average loan size per borrower of a MFI is a substitute for the poverty level of clientele. These studies also regard female clients poorer compared to male clients. **Adongo and Stork (2005)**, in their study, have found that financial sustainability of the MFIs can be improved by reducing costs, increasing the number or size of loans disbursed (without compromising on the loan portfolio) or by decreasing the rates of default. According to **Gregoire and Tuya (2006)**, the cost efficiency of the MFIs is influenced by the average loan size.

#### 4. Statement of the Problem

A major problem, faced by the MFIs, is to achieve suitable balance between their social and commercial missions. The social mission of the MFI is to administer financial products and services to a large number of poor clients, at affordable interest rates. On the other hand, the commercial mission of the MFI, demands good rate of return, for the investors and equity holders. Thus, on the one hand, MFIs should become financially and operationally sustainable while on the other hand, they are expected not to burden their poor clients, with high interest rates or fees. Indian MFIs are progressively transforming from 'Not-for-profit' to 'For-profit' commercial entities (which are NBFC-MFIs), in order to increase the scale and scope of their operations. **Bogan (2008)**, while investigating the impact of capital structure on the MFIs, has found

evidence through regression analysis that the use of grants and concessional loans, decreased the OSS. The author is of the view that only commercially funded MFIs work towards increasing revenues and decreasing costs and their orientation is towards earning profits. Thus, MFIs should depend less on grants, soft loans and donor funds. Instead they should make effort to attract funds from the investors and financial institutions on a commercial basis and demonstrate operational sustainability and competitiveness.

NBFC-MFIs have a lion's share of Indian microfinance sector and the following points highlight this fact (**Sa-Dhan, 2014**).

- NBFC-MFIs account for 82% of both clients outreach and outstanding portfolio.
- The share of NBFC-MFIs is 85% and NGO-MFIs account for 15% of the total borrowing from the lenders.
- Since NBFC-MFIs are regulated by the RBI, lenders prefer to lend money to this category of MFIs.

Most of the studies, regarding operational and financial sustainability of the MFIs, have been conducted in foreign countries. There are only a few studies in this area in the Indian context, particularly with regard to NBFC-MFIs. Therefore, this study was taken up, to determine which of the variables have an impact on the OSS of the NBFC-MFIs and to explore the reasons for the nature of their impact.

#### 5. Objectives of the Study

- To analyze the effect of five select variables – Yield on gross loan portfolio (Nominal), Total Assets, Cost per Borrower, Gross Loan Portfolio and Number of Active Borrowers-on the OSS of the six select NBFC-MFIs, by means of multiple regression analysis.
- To present the reasons, with regard to the impact of the variables, on the OSS of the six select NBFC-MFIs.

## 6. Hypotheses

Based on the literature survey, the following hypotheses were formulated for the five independent variables, with OSS being the dependent variable.

**Hypothesis 1:** Change in yield on gross loan portfolio is directly related to change in OSS. Higher the yield (return) from the gross loan portfolio, better is the OSS of the MFI. Hence expected effect is positive (+).

**Hypothesis 2:** Change in total assets is directly related to change in OSS. Higher the total assets, better is the OSS of the MFI. Hence expected effect is positive (+).

**Hypothesis 3:** Change in cost per borrower is inversely related to the change in OSS. Lower the cost per borrower, higher is the cost efficiency and better is the OSS of the MFI. Hence expected effect is negative (-).

**Hypothesis 4:** Change in gross loan portfolio is directly related to change in OSS. Higher the GLP of the MFI, better is the OSS of the MFI. Hence expected effect is positive (+).

**Hypothesis 5:** Change in the number of active borrowers is directly related to change in OSS. Higher the number of active borrowers, better is the OSS of the MFI. Majority of borrowers of MFIs are women, reputed for prompt repayment of loans. Hence expected effect is positive (+).

## 7. Data and Methodology

### (a) Sample Selection

In the present study, the required sample selection was done by selecting six MFIs which are NBFCs and having their headquarters in the undivided State of Andhra Pradesh (AP). Credit Rating Information Services India Ltd. (CRISIL), brought out a report in 2009, titled, "India Top 50 Microfinance Institutions". In this report, it listed India's top 50 leading MFIs, based on certain parameters. Out of these top 50 MFIs,

- ❖ 23 MFIs were NBFCs
- ❖ 13 MFIs were Societies
- ❖ 06 MFIs were Trusts
- ❖ 04 MFIs were under Section 25 of the Companies Act
- ❖ 04 MFIs were Cooperative Societies

Out of the above 23 MFIs, which were NBFCs, eight of them had their headquarters in AP. These are listed in **Table-1**. The two NBFC-MFIs, Future Financial Services Ltd. and Annapurna Financial Services Pvt. Ltd., started their microfinance operations only in the year 2008. Since the period of study for this research was 9 years (2004-2005 to 2012-2013), these two MFIs were dropped from this study and the remaining six MFIs were considered for the present study.

### (b) Sources of Data

The data needed for the analysis were taken from the annual reports of the six select NBFC-MFIs and also from the Microfinance Information Exchange (MIX) market database. Some independent variables were in the form of ratios while others, which were not in the form of ratios, were transformed into their natural logarithm.

### (c) Period of Study

The period of study, considered for the analysis of the OSS of the NBFC-MFIs, was 9 years, from 2004-2005 to 2012-2013.

### (d) Tools used for the study

This study was based on quantitative research approach. Numerical data analysis in this study was done by means of statistical technique of multiple regression analysis. E-Views version 8 and SPSS version 22 software were used to perform the analysis on the numerical data.

## 8. Empirical Analysis

Under the multiple regression analysis, OSS was taken as the dependent variable. As

discussed in the literature review, a total of eight independent variables were considered to have influence on the dependent variable (i.e. OSS). These eight independent variables were Yield on Gross Loan Portfolio, Total Assets, Cost per Borrower, Gross Loan Portfolio, Number of Active Borrowers, Age of the MFI, Debt to Equity Ratio and Average Loan Balance per Borrower.

The next step was to determine which of these eight independent variables were important (i.e., significant) from the statistical point of view, so as to be included in the multiple regression analysis. This was done through an automated procedure known as Backward Stepwise Regression, available in the SPSS software. This automated procedure initially considered all the eight independent variables selected. Then at each step (stage), some independent variables were discarded, based on their relative importance. Thus, by applying this automated procedure, five independent variables, that were finally selected, were Yield on Gross Loan Portfolio (YGLP), Total Asset (TA), Cost per Borrower (CPB), Gross Loan Portfolio (GLP), and Number of Active Borrowers (NAB). The description of these five independent variables and their likely/hypothesized impact on the OSS (based on the literature review) are shown in **Table-2**.

### Multiple Regression Model

In the present study, the model of the multiple regression technique is expressed as:

$$OSS_{it} = \alpha_1 + \beta_1 YGLP_{it} + \beta_2 \ln TAN_{it} + \beta_3 \ln CPB_{it} + \beta_4 \ln GLP_{it} + \beta_5 \ln NAB_{it} + \varepsilon_{it}$$

Where,

- ❖  $OSS_{it}$  is the operational self-sufficiency ratio (a dependent variable) of microfinance  $i$  at time  $t$  (where  $t = 1$  to 9 are the nine years);
- ❖  $\alpha_1$  is a constant term;
- ❖  $\beta$ 's measures the partial effect of independent or explanatory variables in period  $t$  for the unit  $i$ (MFI);

- ❖  $\varepsilon_{it}$  is the error term.
- ❖  $YGLP_{it}$ ,  $TAN_{it}$ ,  $CPB_{it}$ ,  $GLP_{it}$  and  $NAB_{it}$  are the explanatory/independent variables used in the regression model.

Here, the natural logarithms of TAN, CPB, GLP and NAB were taken in the regression model. The variables, both dependent and independent, were for cross-section unit  $i$  at time  $t$ , where  $i$  = MFIs (1 to 6), and  $t = 1$  to 9, expressed in years. The descriptive statistics of both the dependent and independent variables, is described in **Table-3**. It shows that the mean of OSS was 1.03478 (103.47%), indicating that on an average, the OSS of the MFI's was about 103%. Thus, these six select NBFC-MFIs had satisfied the threshold operational sustainability standard of 100% (**Sa-Dhan, 2003**). The result of multiple regression analysis, based on Classical Linear Regression Model (CLRM), using the method of Least Squares, is shown in **Table-4**. The various assumptions of the CLRM, with respect to the regression results obtained, are examined below.

**i. Test of Autocorrelation:** CLRM assumes that the disturbance term, relating to any observation, is not influenced by the disturbance term relating to any other observation (**Gujarati, 1995**). Symbolically, this can be expressed as:

$$E(e_i, e_j) = 0; i \neq j$$

It is assumed that the errors are uncorrelated with one another. If the errors are correlated with one another, it is known as autocorrelation. The most common test for autocorrelation is the Durbin-Watson (DW) statistic. This statistic is a test for first order autocorrelation (wherein relationship between an error and its immediately previous value is tested). Durbin-Watson statistic is defined as:

$$D = \frac{\sum_{i=2}^n (e_i - e_{i-1})^2}{\sum_{i=1}^n e_i^2}$$



Where,  $e_i$  = residual at the time period  $i$ . To conduct the DW test, the Null and the Alternate hypotheses were stated as follows:

$H_0$ : No Autocorrelation ( $\rho = 0$ )

$H_a$ : Autocorrelation ( $\rho \neq 0$ )

Based on a thumb rule, if the value of  $D$  approaches two, it indicates no first-order autocorrelation. If the value of  $D$  is 0, it indicates the existence of perfect positive autocorrelation. On the other hand, if the value of  $D$  approaches four, then there is perfect negative correlation among the successive residuals.

From **Table-4**, the value of  $D$  is found to be 1.307093. This value of  $D$  is greater than 0 but very much less than 2. Hence it cannot be definitely concluded whether there was autocorrelation or not. Hence the null hypothesis cannot be accepted and thus the CLRM has been discarded. Now, in order to overcome the problem of autocorrelation, the Generalized Least Squares (GLS) method, using the first-order autoregressive or AR (1) model, was used. The steps are:

- a) Obtaining an estimate for correlation

coefficient  $\rho$  as:  $\rho \approx 1 - \frac{D}{2}$ . Where,  $D$  is the DW statistic.

- b) Transform all the dependent and independent variables as:

$$Y_t^* = Y_t - \rho \cdot Y_{t-1}$$

$$X_{1t}^* = X_{1t} - \rho \cdot X_{1(t-1)}$$

$$X_{2t}^* = X_{2t} - \rho \cdot X_{2(t-1)}$$

- c) Now the modified regression equation is given as:

$$Y_t^* = \alpha + \beta_1 \cdot X_{1t}^* + \beta_2 \cdot X_{2t}^* + \sigma_t$$

New estimates of  $\alpha$ ,  $\beta_1$  and  $\beta_2$  would be free from autocorrelation. Based on this, the following regression results, based on Generalized Least Squares (GLS) method, using the first-order autoregressive or AR(1) model,

were obtained, using E-Views and shown in **Table-5**. The value of  $D$  was 1.93, which approached two. Hence now there was no autocorrelation.

#### ii. Breusch-Godfrey Serial Correlation LM Test:

The regression result, for Breusch-Godfrey Serial Correlation LM Test, is presented in **Table-6**. It is found that the observed R-square value was 1.658083 and the corresponding p-value was 0.4365(43.65%). This probability ( $p$ ) value was higher than 0.05(5%). Thus it can be concluded that there was no serial correlation.

iii. **Normality Test:** Following the assumption of normality, it is necessary that the disturbance be normally distributed around the mean. The null and alternate hypotheses for the normality test are stated as follows:

$H_0$ : Normally Distributed Errors

$H_a$ : Non-Normally Distributed Errors

The test of normality was conducted, using the Jarque-Bera Test. The probability ( $p$ ) value of the Jarque-Bera normality test should be greater than 0.05 so as not to reject the null hypothesis of normality at 5% level of significance. The p-value of the Jarque-Bera test was 0.713473 (71.35%), which was above the value of 0.05 (5%), indicating that the errors were normally distributed. On the basis of this statistical result, the null hypothesis or normality at 5% level of significance cannot be rejected. The output results of the Jarque-Bera Test, as obtained from E-views, is shown in **Figure-1**.

iv. **Multicollinearity Test:** One of the assumptions of the CLRM is that there is no multi-collinearity, among the regressors, included in the regression model (**Gujarati, 1995**).

**Table-7** presents the correlation matrix related to the dependent variable and the independent variables. It is found that there was significant positive correlation between TAN and NAB, TAN and GLP and between GLP and NAB. By considering **Table-5**, multicollinearity was

not a serious problem, when  $R^2$  was high and the regression coefficients were individually significant, as revealed by their higher 't' values.

**v. Heteroskedasticity Test:** One of the assumptions of the CLRM is that the variance of each disturbance term  $u_i$ , conditional on the chosen values of the explanatory variables, is some constant number, equal to  $\sigma^2$  (Gujarati, 1995). This is the assumption of homoskedasticity, or equal (homo) spread (skedasticity), that is, equal variance. Symbolically, it is expressed as:

$$E(u_i^2) = \sigma^2 \quad i = 1, 2, \dots, n$$

Following null and alternate hypotheses were tested for Heteroskedasticity.

$H_0$ : No Heteroskedasticity (Homoskedastic)

$H_a$ : Heteroskedastic

The Breusch-Pagan-Godfrey Test, for testing heteroskedasticity, was used in this analysis. The results of the Breusch-Pagan-Godfrey Test for heteroscedasticity, (as obtained from E-Views), are shown in **Table-8**. It is found that the observed  $R^2$  (R-Squared) value was 2.728274 and the corresponding p-value was 0.7418 (74.18%) which was higher than 0.05 (5%). Hence the null hypothesis cannot be rejected. There is no heteroskedasticity in this GLS model.

## 9. Findings

The findings of the multiple regression analysis are as follows:

- i.  $R^2$  (R-Squared) value was 0.807820 (80.78%). Thus, 80% of the variation in the dependent variable could be explained by the independent variables. Hence it is quite significant. Moreover, the values of F-statistic, in the regression output and its p-value, were 32.23 and 0.000000 respectively. Here, the p-value of the F-statistic was 0.000000 which was less than 0.05(5%). Therefore, all the independent variables were jointly

significant, in explaining the OSS of the selected MFIs.

- ii. The p-values of the variables YGLP, TAN, CPB and NAB were less than 0.05(5%). Hence these variables were quite significant. Thus, four out of five independent variables were quite significant in this regression model.
- iii. The coefficient of YGLP was positive. This indicates that as YGLP increased, the OSS of the MFI also increased and if YGLP decreased, then the OSS also decreased. This result is in confirmation with Hypothesis 1.
- iv. The coefficient of TAN was positive. This indicates that as the total assets of the MFI increased, the OSS also increased. This result is in confirmation with Hypothesis 2.
- v. The coefficient of CPB was negative. This indicates that as the CPB increased, the OSS decreased. This result is in confirmation with Hypothesis 3.
- vi. The p-value of the independent variable, GLP, was greater than 0.05 (5%). Hence it was not a significant variable in this regression model. Therefore, hypothesis 4 is not considered further, for testing the results of the regression analysis, related to GLP in this study.
- vii. The coefficient of NAB was negative. This indicates that as the number of active borrowers increased, the OSS decreased. This result is not in confirmation with Hypothesis 5.

## 10. Conclusion and Suggestions

The conclusion, drawn from the regression results and suggestions, are given below:

- i. The positive relationship, between OSS and YGLP, shows that revenue for the MFI in the form of interest, fees, penalties and commission are important, in running the

day-to-day operations of the MFI, thereby ensuring operational sustainability. NBFC-MFIs should take steps for increasing the YGLP, by lending loans to clients, after proper screening process so as to reduce the incidence of default. MFIs should also provide training and skill development programmes to the clients. This is necessary because most of the poor clients may not have the requisite technical and managerial skills, to run their income-generating enterprises. Only when the small enterprises of the clients become productive, the clients can repay interest and installments of the principal in a timely manner, thereby ensuring steady stream of revenue for the MFIs.

- ii. The possible reason for the positive relationship between total assets and the OSS of the MFI, is that as the total assets (or the size of the MFIs) increases, it is able to borrow at a lower rate of interest from the banks and financial institutions. 70% of the funding, for the assets of the MFIs, was through the institutional or outside debt and 78% of the total outside debt was cornered by the MFIs, with portfolio > Rs. 500 crore (**Sa-Dhan, 2011**). It is found that MFIs, whose assets were large, could easily obtain institutional debt (mainly from the banks) at a reduced rate of interest. Thus, such MFIs could conveniently keep their lending rate higher, compared to their borrowing rate and thus increase their revenue. This will in turn help them to increase the OSS percentage and become operationally self-sufficient. Moreover, with a large asset base, MFIs could also withstand patches of downward trends, in their businesses, as witnessed during the AP microfinance crisis, 2010.
- iii. The negative relationship, between OSS and CPB, demonstrates that the MFIs should control their operating costs, particularly the cost incurred in serving a borrower. The

profits will increase only when the costs are reduced. MFIs can neither charge high interest rates to their poor clients nor demand collateral for the loans extended to them. Thus, the only option left for them is to control their operating costs, from spiraling above their revenue. The operations of the MFIs are labour-intensive. Hence to control administrative and operating costs, MFIs should give proper training and incentives to their field officers so as to increase their productivity. In addition, MFIs should take measures to prevent frauds and ensure safety of the cash collected from the clients. This is because frauds and improper handling of cash has the potential of increasing the cost per borrower, thereby reducing the OSS. For instance, during the financial year 2013, there were financial frauds to the tune of Rs. 2.1 crore in SKS Microfinance Ltd., committed by the employees and this was mentioned in the company's annual report.

- iv. The possible reason, for the negative relationship between OSS and NAB, is as follows. As the gross loan portfolio of the MFIs, under study, increased over a number of years, the number of active borrowers also increased. Before the advent of Reserve Bank of India (RBI) Directions, there was no cap on the maximum loan amount given to the clients. Also due to competition from MFIs, the clients could easily borrow loans from more than one MFI. There were also no active credit bureaus, for the microfinance sector, to authenticate the credit history of the clients. These three factors may have contributed towards the indebtedness of a large number of clients. Large number of over indebted clients defaulted (culminating in the AP Microfinance Crisis, 2010), thereby decreasing the OSS of the MFIs. Thus, it is suggested that NBFC-MFIs should

follow RBI guidelines, with regard to the cap on the maximum loan disbursement and become members of Credit Information Companies (CIC), to ensure that the loans are given only to genuine clients.

## 11. Limitations of the Study

i. This study was limited to the OSS of only six select NBFC-MFIs, having their headquarters in the undivided State of AP. The results of this study may not be applicable to the 'Not-for-Profit' MFIs in India, which exist in other forms such as Societies, Trusts and Section 25 of the Companies Act.

ii. The data, used in this study, were sourced from Mix Market database and also from the Annual reports of the companies. The data from these sources were cross verified. However, there may be some discrepancies in the data sources.

## 12. Scope for Further Research

This study determined the impact of certain variables, on the OSS of the MFIs, using the multiple regression analysis technique. New studies could be undertaken, for determining the impact of these and other variables, on the financial self-sufficiency, along with the operational self-sufficiency. In addition, studies could also be undertaken, to determine the impact of these variables on Return on Assets (RoA) and on Return on Equity (RoE) of the MFIs. This study pertains to the NBFC-MFIs. Other studies could be undertaken to determine the sustainability of 'Not-for-Profit' MFIs.

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**Table - 1**  
**NBFC-MFIs with Headquarters in Andhra Pradesh**

| S. No. | Name of MFI                                      | Legal Status                | Headquarters |
|--------|--|-----------------------------|--------------|
| 1.     | SKS Microfinance Ltd. (SKS)                      | Public Ltd. Company(NBFC)   | Secunderabad |
| 2.     | Spandana Sphoorthy Financial Ltd. (SSFL)         | Public Ltd. Company (NBFC)  | Hyderabad    |
| 3.     | Share Microfin Ltd. (SHARE)                      | Public Ltd. Company (NBFC)  | Hyderabad    |
| 4.     | Asmitha Microfin Ltd. (AML)                      | Public Ltd. Company (NBFC)  | Hyderabad    |
| 5.     | Bhartiya Samruddhi Finance Ltd. (BSFL)           | Public Ltd. Company (NBFC)  | Hyderabad    |
| 6.     | Future Financial Services Ltd.                   | Public Ltd. Company (NBFC)  | Chittoor     |
| 7.     | SWAWS Credit Corporation India Pvt. Ltd. (SWAWS) | Private Ltd. Company (NBFC) | Secunderabad |
| 8.     | Annapurna Financial Services Pvt. Ltd.           | Private Ltd. Company (NBFC) | Hyderabad    |

**Source:** Compiled from 'India Top 50 Microfinance Institutions', Published by CRISIL (2009)

**Table - 2**  
**Variable Description (Independent Variables)**

| S. No | Variable Name                           | Description  | Variable Name in Regression Model | Variable Description used in the Regression Model                  | Hypotheses   |
|-------|---|--|-----------------------------------|--|--|
| 1.    | Yield on Gross Loan Portfolio (Nominal) | Financial Revenue from Loan Portfolio/Average Gross Loan Portfolio         | YGLP                              | Financial Revenue from Loan Portfolio/Average Gross Loan Portfolio | <b>Hypothesis 1:</b> Change in yield on gross loan portfolio is directly related to change in OSS. Higher the yield (return) from the gross loan portfolio better is the OSS of the MFI. Hence, expected effect is positive (+)  |
| 2.    | Total Assets                            | Total assets of the MFI  | TAN                               | Natural logarithm of the Total Asset                               | <b>Hypothesis 2:</b> Change in total assets is directly related to change in OSS. Higher the total assets, better is the OSS of the MFI. Hence, expected effect is positive (+)  |
| 3.    | Cost Per Borrower                       | Operating expenses/Average number of active borrowers                      | CPB                               | Natural logarithm of Cost Per Borrower                             | <b>Hypothesis 3:</b> Change in cost per borrower is inversely related to the change in OSS. Lower the cost per borrower, higher is the cost efficiency and better is the OSS of the MFI. Hence, expected effect is negative (-).   |
| 4.    | Gross Loan Portfolio                    | All outstanding principal due from all the clients within or at 12 months. | GLP                               | Natural logarithm of Gross Loan Portfolio                          | <b>Hypothesis 4:</b> Change in GLP is directly related to change in OSS. Higher the GLP of the MFI better is the OSS of the MFI. Hence, expected effect is positive (+).   |
| 5.    | Number of Active Borrowers              | Number of active borrowers with loans outstanding                          | NAB                               | Natural logarithm of Number of Active Borrowers                    | <b>Hypothesis 5:</b> Change in the number of active borrowers is directly related to change in OSS. Higher the number of active borrowers better is the OSS of the MFI. Majority of borrowers of MFIs are women who have the reputation of making prompt repayment of loans. Hence, expected effect is positive (+). |

**Source:** Researcher's own compilation from Review of Literature and Regression Model

**Table - 3**  
**Results of Descriptive Statistics**

| <b>Statistical Parameter</b> | <b>OSS</b> | <b>YGLP</b> | <b>CPB</b> | <b>TAN</b> | <b>GLP</b> | <b>NAB</b> |
|------------------------------|------------|-------------|------------|------------|------------|------------|
| Mean                         | 1.034748   | 0.202822    | 6.436242   | 22.19417   | 22.12963   | 13.33261   |
| Median                       | 1.127350   | 0.220900    | 6.424863   | 22.20949   | 22.00000   | 13.61744   |
| Maximum                      | 1.925500   | 0.334200    | 7.355989   | 24.46829   | 24.00000   | 15.64685   |
| Minimum                      | -0.122400  | -0.039800   | 5.376125   | 17.27702   | 17.00000   | 9.097732   |
| Standard Deviation           | 0.472324   | 0.084516    | 0.447108   | 1.544442   | 1.614163   | 1.449693   |
| Skewness                     | -0.767939  | -0.700071   | -0.105874  | -0.647651  | -0.673912  | -0.502318  |
| Kurtosis                     | 2.978506   | 2.991643    | 3.064859   | 3.204781   | 3.189182   | 2.761959   |
| Jarque-Bera                  | 5.308616   | 4.411057    | 0.110349   | 3.869420   | 4.167949   | 2.398403   |
| Probability                  | 0.070347   | 0.110192    | 0.946320   | 0.144466   | 0.124435   | 0.301435   |
| Sum Sq. Dev.                 | 11.82378   | 0.378580    | 10.59498   | 126.4209   | 138.0926   | 111.3853   |
| Observations                 | 54         | 54          | 54         | 54         | 54         | 54         |

**Source:** Researchers own extraction from the Eview's result

**Table - 4**  
**Regression Results of OSS Based on CLRM**

| <b>Variable</b>                | <b>Coefficient</b> | <b>Standard Error</b> | <b>t-statistic</b> | <b>Probability</b> |
|--------------------------------|--------------------|-----------------------|--------------------|--------------------|
| <b>C</b>                       | 2.285720           | 1.066185              | 2.143829           | 0.0371             |
| <b>YGLP</b>                    | 4.406306           | 0.425217              | 10.36248           | 0.0000             |
| <b>TAN</b>                     | 0.444007           | 0.146241              | 3.036135           | 0.0039             |
| <b>CPB</b>                     | -0.560202          | 0.082891              | -6.758279          | 0.0000             |
| <b>GLP</b>                     | -0.226536          | 0.101073              | -2.241315          | 0.0297             |
| <b>NAB</b>                     | -0.253535          | 0.142922              | -1.773933          | 0.0824             |
| <b>R-Squared</b>               | 0.766860           |                       |                    |                    |
| <b>Adjusted R-Squared</b>      | 0.742574           |                       |                    |                    |
| <b>F-Statistic</b>             | 14.77352           |                       |                    |                    |
| <b>Prob(F-Statistic)</b>       | 0.000000           |                       |                    |                    |
| <b>Durbin-Watson Statistic</b> | 1.307093           |                       |                    |                    |

**Source:** Researchers own extraction from the Eview's result



**Table - 5**  
**Regression Results – GLS [AR (1) Method]**

| <b>Variable</b>                | <b>Coefficient</b> | <b>Standard Error</b> | <b>t-statistic</b> | <b>Probability</b> |
|--------------------------------|--------------------|-----------------------|--------------------|--------------------|
| <b>C</b>                       | 0.912343           | 1.182770              | 0.771361           | 0.4444             |
| <b>YGLP</b>                    | 4.193636           | 0.437393              | 9.587796           | 0.0000             |
| <b>TAN</b>                     | 0.532992           | 0.141044              | 3.778903           | 0.0005             |
| <b>CPB</b>                     | -0.566163          | 0.098623              | -5.740678          | 0.0000             |
| <b>GLP</b>                     | -0.111813          | 0.095722              | -1.168111          | 0.2488             |
| <b>NAB</b>                     | -0.482665          | 0.154027              | -3.133652          | 0.0030             |
| <b>R-Squared</b>               |                    | 0.807820              |                    |                    |
| <b>Adjusted R-Squared</b>      |                    | 0.782753              |                    |                    |
| <b>F-Statistic</b>             |                    | 32.22647              |                    |                    |
| <b>Prob (F-Statistic)</b>      |                    | 0.000000              |                    |                    |
| <b>Durbin-Watson Statistic</b> |                    | 1.931528              |                    |                    |

**Source:** Researchers own extraction from the Eview's result

**Table - 6**  
**Breusch-Godfrey Serial Correlation LM Test**

|                     |          |
|---------------------|----------|
| F-Statistic         | 0.710488 |
| Prob. F(2,44)       | 0.4970   |
| Obs*R-squared       | 1.658083 |
| Prob. Chi-Square(2) | 0.4365   |

**Source:** Researchers own extraction from the Eview's result

**Table - 7**  
**Correlation Matrix**

|             | <b>OSS</b> | <b>YGLP</b> | <b>CPB</b> | <b>TAN</b> | <b>GLP</b> | <b>NAB</b> |
|-------------|------------|-------------|------------|------------|------------|------------|
| <b>OSS</b>  | 1          |             |            |            |            |            |
| <b>YGLP</b> | 0.707758   | 1           |            |            |            |            |
| <b>CPB</b>  | -0.23373   | 0.279819    | 1          |            |            |            |
| <b>TAN</b>  | -0.01256   | 0.191487    | 0.179924   | 1          |            |            |
| <b>GLP</b>  | -0.08889   | 0.123473    | 0.132723   | 0.975041   | 1          |            |
| <b>NAB</b>  | -0.04408   | 0.147431    | 0.106051   | 0.983222   | 0.973163   | 1          |

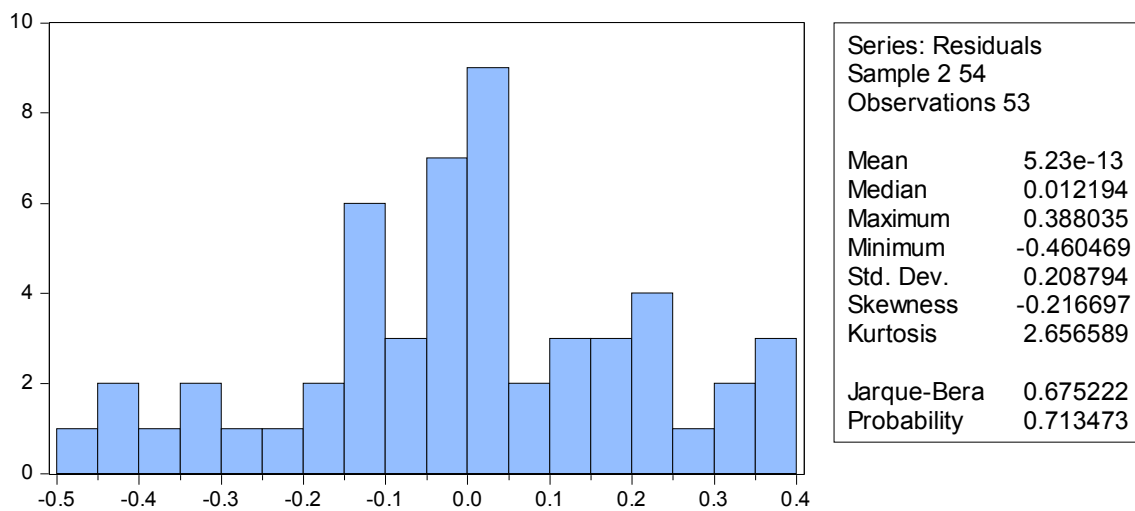
**Source:** Researchers own extraction from the Eview's result

**Table - 8**  
**Heteroskedasticity Test: Breusch-Pagan-Godfrey**

|                     |          |
|---------------------|----------|
| F-Statistic         | 0.510143 |
| Prob. F(5,47)       | 0.7671   |
| Obs*R-squared       | 2.728274 |
| Prob. Chi-Square(5) | 0.7418   |
| Scaled explained SS | 1.702302 |
| Prob. Chi-Square(5) | 0.8886   |

**Source:** Researchers own extraction from the Eview's result

**Figure - 1**  
**Jarque-Bera Test**



**Source:** Researchers own extraction from the Eview's result