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## CONTENTS

Sr. No.	TITLE & NAME OF THE AUTHOR (S)	Page No.
1.	INTELLECTUAL CAPITAL AND BANKING SECTOR OF PAKISTAN MUHAMMAD KHALIQUE, DR. ABU HASSAN MD. ISA & MOHAMMED ALKALI	1
2.	ASSESSMENT OF ENTREPRENEURSHIP INTENTION AMONG AGRICULTURAL STUDENTS OF RAZI UNIVERSITY ABDOLHAMID PAPZAN, KOBRA ARKAVAZI & MALIHE SADAT AKHAVAN KAZEMI	5
3.	THE IMPACT OF OVERCROWDED CLASSROOM ON THE ACADEMIC PERFORMANCE OF THE STUDENTS AT SECONDARY LEVEL JEHANGIR SHAH & DR. HAFIZ MUHAMMAD INAMULLAH	9
4.	MICROFINANCE EFFICIENCY AND FINANCIAL SUSTAINABILITY: EVIDENCE FROM RURAL MFIs IN TANZANIA GANKA DANIEL NYAMSOGORO	12
5.	EFFECTS OF MACROECONOMIC VARIABLES ON GROSS DOMESTIC PRODUCT IN BANGLADESH MINA MAHBUB HOSSAIN & SAYEDUL ANAM	18
6.	DETERMINANTS OF FOOD INSECURITY AMONG HOUSEHOLDS IN ADDIS ABABA CITY, ETHIOPIA GIRMA GEZIMU & GIRMA BEREHE	26
7.	PERFORMANCE EVALUATION OF SPECIAL ECONOMIC ZONES IN INDIA SHAHAZADI BEGUM SHAIK, R. VIJAYA & A. NARASIMHA RAO	33
8.	JOB -STRESS OF FACULTY MEMBERS IN PRIVATE PROFESSIONAL COLLEGES LOCATED IN NCR, DELHI SWAPAN KUMAR BISHAYEE	37
9.	ARBITRAGE PRICING THEORY TESTED IN INDIAN STOCK MARKET DR. BAL KRISHAN & DR. REKHA GUPTA	40
10.	AN ANALYSIS OF REGIONAL DISPARITIES IN THE PERFORMANCE OF SARVA SHIKSHA ABHIYAN (SSA) IN INDIA DR. M. INDIRA & R. PRASAD	48
11.	IMPACT OF SOCIAL COMPETENCE ON DEVELOPMENT OF YOUNG TECHNOCRATS: AN APPENDAGE TO ONESELF DR. RUCHI SINGH & DR. RUCHI SHARMA	54
12.	RURAL WOMEN IN GROUP ENTERPRISES DR. K. VIDYAVATHI	60
13.	RELATIONSHIPS ARE EASY TO GET INTO.... BUT DIFFICULT TO GET OUT OF! – A CASE OF EU AND GREECE DR. GIRIJA NIMGAONKAR	65
14.	PURCHASE BEHAVIOUR AND INFLUENCE OF SOCIO ECONOMIC FACTORS WITH REFERENCE TO ORGANIC FOOD PRODUCTS DR. P. SANTHI	68
15.	WOMEN-IS THEIR PERSPECTIVE REALLY CHANGED? (A RESEARCH PAPER BASED ON WOMEN PERCEPTIONS ABOUT WOMEN) DR. SUMAN NASA	74
16.	TALENT MANAGEMENT: IMPORTANCE, PROCESS, RETENTION AND STRATEGIES FOR BUSINESS ORGANIZATION DR. KUMUDHA & SENTHILKUMAR	78
17.	EVOLUTION OF IT SERVICES OUTSOURCING MODELS IN THE e-BUSINESS ENVIRONMENT DR. VENKATESH.J & AARTHY. C	85
18.	THE LAW AND THE CRISIS MANAGEMENT IN A HOSPITAL SETUP VIZ A VIZ CONSEQUENCES ON HEALTH CARE DELIVERY- A CASE STUDY OF JEHOVAH'S WITNESSES DR. PRAKASH.K.N, DR. CYNTHIA MENEZES & S. HARISH BABU	89
19.	A COMPARATIVE STUDY OF CORPORATE GOVERNANCE DISCLOSURE PRACTICE OF SELECTED BANKING UNITS PAYAL J. THAKAR, JAIMIN H TRIVEDI & RIDDHI A TRIVEDI	92
20.	BUSINESS ENVIRONMENT IN INDIA AND CHINA: KEY INDICATORS AND GROWTH OF ECONOMY AMITA MAXWELL	95
21.	EMPLOYEE ABSENTEEISM ITS IMPACT ON PRODUCTIVITY WITH REFERENCES TO SUKJIT SCRATCH MILLS AT NIZAMABAD CH.R.S.CH.MURTHY	103
22.	A STUDY OF THE IMPACT OF MACROECONOMIC VARIABLES ON STOCK PRICE MOVEMENTS FOR THE PERIOD 1993- 2010 ZOHRA ZABEEN SABUNWALA	107
23.	ROLE OF LAW IN WOMEN EMPOWERMENT DR. SANGEETA NAGAICH & PREETI SHARMA	111
24.	WORK LIFE BALANCE FOR BANKING EMPLOYEES: A COMPARATIVE STUDY DR. DIVYA NEGI & SEEMA SINGH	115
25.	SAVINGS AND INVESTMENT PATTERN OF SCHOOL TEACHERS -A STUDY WITH REFERENCE TO UDAIPUR DISTRICT, RAJASTHAN DR. DHIRAJ JAIN & PARUL JAIN	119
26.	AN EXPERIMENTAL STUDY ON PERCEPTION OF CELEBRITY ENDORSEMENT BY VIEWERS JATIN PANDEY, NEEMA ARJUN BATHIJA & ANUPAMA SUNDAR	128
27.	GENDER BUDGETING AS A TOOL FOR WOMEN EMPOWERMENT R.ARUNAJAYAMANI	138
28.	AN CONTRASTING ASSESSMENT OF THE ATTITUDE FUNCTIONS OF CONSUMER TOWARDS DURABLES- FMCG, A STUDY AMONG URBAN WORKING WOMEN IN KERALA ANILKUMAR. N	141
29.	A STUDY OF CONFLICT MANAGEMENT STYLES USED BY MBA FACULTY TO ADDRESS CLASSROOM CONFLICTS PADMA S RAO	146
30.	THE DICHOTOMY BETWEEN CORPORATE CRIMINAL LIABILITY AND DIRECTORS' INDIVIDUAL CRIMINAL LIABILITY: AN APPRAISAL OF TWO JURISDICTIONS (THE PEOPLE'S REPUBLIC OF CHINA & UNITED KINGDOM) VIS-A-VIS THE SCENARIO IN INDIA ABHISHEK TRIPATHY	150
	REQUEST FOR FEEDBACK	156

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## MICROFINANCE EFFICIENCY AND FINANCIAL SUSTAINABILITY: EVIDENCE FROM RURAL MFIs IN TANZANIA

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### ABSTRACT

*Efficiency and sustainability are closely related. While the relationship between efficiency and financial sustainability of microfinance institutions is well documented, there is but few (if any) systematic study which focuses specifically on how microfinance institutions' efficiency affects their financial sustainability. This paper uses panel data analysis to determine, which among the efficiency indicators have significant relationship with financial sustainability. Using four-year survey data obtained from 98 rural microfinance institutions in Tanzania the paper provides empirical evidence that yield on gross loan portfolio, the level of portfolio at risk, liquidity level, staff productivity, and operating efficiency significantly affect the financial sustainability of rural microfinance institutions. Moreover, selling high volume loans alone does not improve financial sustainability. The findings in this paper suggest that, for sustainability, MFIs should strive to operate at relatively low costs while keeping the staff productivity and repayment rates higher.*

### KEYWORDS

Efficiency, Financial sustainability, Microfinance, Panel data, Tanzania.

### INTRODUCTION

**M**icrofinance is the provision of small-scale financial services to the unbanked poor. Growth of microfinance institutions (MFIs) has been associated with their efficiency (Gonzalez 2007). It has been reported that efficiency helps microfinance institutions to attain financial sustainability (Thapa et al. 1992) and therefore the desire for financial sustainability has been viewed as a locus of incentive for efficiency (Gonzalez-Vega 1998:5).

While the relationship between efficiency and financial sustainability is well documented (Cull, Demirgüç-Kunt and Morduch 2007; Gonzalez 2007; Woller and Schreiner 2002; Gonzalez-Vega 1998; Thapa et al. 1992) reviewing microfinance literature that we have to-date one would say there is but few (if any) systematic study which focuses specifically on how microfinance institutions' efficiency affects their financial sustainability. Few studies that we know have indicated the relationship between efficiency and financial sustainability by looking at various cost and revenue elements (Christen et al. 1995; Rosenberg 1996; Christen 2000; Woller 2000; and Cull et al. 2007). Some studies have also used the personnel productivity measures of efficiency as part of their analysis (Christen et al. 1995; Woller and Schreiner 2002). Other studies have linked microfinance efficiency with commercialization (Richardson and Lennon 2001; Christen and Drake 2002; Woller 2002; Hishigsuren 2007) and still some relate it with microfinance best practice (CGAP 1996; Gonzalez-Vega 1998; Woller, Dunford and Warner 1999; and Woller 2000).

This paper attempts to provide empirical evidence on how microfinance efficiency influences financial sustainability, by exploring small-size MFIs in rural Tanzania. The remaining sections of this paper are structured as follows: the next section (Section 2) provides a theoretical background. Section 3 is methodology followed by results (Section 4). The last section is conclusion.

### THEORETICAL BACKGROUND

Efficiency refers to the ability to produce maximum output at a given level of input (Chua and Llanto 1996). It is measured in terms of how an organization has managed to reduce costs at the same level of revenue or increase revenue at the same level of costs or both. Cost reduction however, is often seen as a more difficult exercise than revenue improving. As Gonzalez-Vega (1998) has argued, many microfinance institutions are inefficient because they think in terms of levels of speed of collections, not in terms of operational costs. His argument is based on the fact that for profitability and therefore sustainability cost reduction is as important as increasing revenue.

Financial sustainability of a microfinance institution refers to its ability to cover its operating expenses from its own operations. It is a situation where microfinance income is higher than microfinance expenses, also known as profitability. Thus, profitability has been used as an indicator of financial sustainability (Von Pischke 1996; CGAP 2003; Woller and Schreiner 2002; Adongo and Stork 2006; Armendáriz and Morduch 2007; Cull et al. 2007; and Gonzalez 2007). This is based on the assumption that an MFI is and will continue to be a going concern (Woller et al. 1999). Profitability has also been viewed as a stepping-stone to financial sustainability (Schreiner 2000).

The expenditure (costs) and income (revenue) of the microfinance institutions can be affected by either internal factors or external factors or both. The level of the impact that these factors cause on profitability may vary from one factor to another regardless of whether they are internal or external factors. The internal factors are those internal to the MFI and, therefore, are controllable within the MFI. These include: the number of staff, amount of loan disbursed, and the volume of costs and revenue of the MFIs. Anything that management of an MFI does to influence these factors will have an impact on the overall profitability of an MFI. There are also other factors that may drive the level of income or expenditure of microfinance institutions, which are not controllable within the microfinance institutions. We call them external factors. Examples of the external factors are where the government through its regulating body sets interest rate caps beyond which MFIs are not allowed to charge the interest rates; and where the government has set high wages and salaries level that some small MFIs may not afford employing a qualified personnel without significantly affecting its overall operating expenses and, therefore, its sustainability. In this paper, efficiency refers to internal factor. That is factors controllable by the organization's management.

Efficiency of microfinance institutions in managing their liabilities and assets, including loan portfolio, and efficient utilization of human resources, that is, loan officers and other staff in general will lead into increased income and reduced expenditure. The increased income and reduced expenditure will improve the profitability, which transforms to financial sustainability.

The measures of efficiency of microfinance institutions can be categorized into three: assets and liabilities management; portfolio quality; and human resource productivity. They capture how efficient the microfinance institutions are in utilizing their assets (both monetary valued assets, including loan portfolio, and human resource or MFI staff) and the MFI's liabilities. The results from the efficient utilization of assets and management of liabilities lead an MFI to increase income at a given level of operation and reduce expenditure at the same level. This paper defines these measures following the 2003 Microfinance Consensus Guidelines issued by the Consultative Group to Assist the poor (CGAP).

#### ASSET AND LIABILITY MANAGEMENT MEASURES

The assets and liability management measures indicate how well the microfinance institutions' management manage liabilities, and how they manage the assets to generate income towards financial sustainability. Current assets are the working capital for the microfinance institutions. They make a higher proportion of the total assets of the microfinance institutions. The current assets of an MFI are made up of cash, loans to clients or members, and other short-term investment. The liabilities are made up of trade creditors, short-term loans, and other creditors. The key measures under the assets and liabilities management that were considered in this paper are: the yield on gross loan portfolio; current ratio and yield gap.

**(a) Yield on Gross Loan Portfolio**

The yield on gross loan portfolio indicates the ability of an MFI to utilize the short-term assets to generate cash financial revenue. The cash revenue could be from interest on loan, fees, penalties, and commissions. According to CGAP (2003), the yield on gross loan portfolio does not include any unpaid revenue. That is, even if the revenue has accrued, it is not included in this computation as long as it has not yet been received in cash by the MFI. This is because, part of MFIs' accrued interest revenue never get received as the borrowers default.

The yield on gross loan portfolio measure is a ratio of cash financial revenue from loan portfolio to average gross loan portfolio. The higher the ratio the better the MFI is, indicating the efficiency with which the MFI has utilized its resources in generating cash revenue.

**(b) Current Ratio**

An MFI's current ratio is a ratio of its current assets to current liabilities. The current ratio indicates the dollar value of current assets, also known as short-term assets, available to meet each one dollar short-term obligation, also known as short-term liabilities or current liabilities (Brealey, Myers and Allen 2006). Thus, it is called liquidity ratio. It measures the efficiency with which an MFI matches its assets and liabilities (Collier 2006, Barrow 2006).

**PORTFOLIO QUALITY MEASURES**

The portfolio quality measures are generally a part of asset management measures with specific emphasis on how management makes and manages the loan portfolio. That is, among others, how they select customers to minimize the effects of adverse selection, and how they make repayment follow-ups to enhance higher repayment rates, and, therefore, reduce the effects of ex-post and ex-ante moral hazards. The adverse selection refers to a situation where lender may make wrong risk estimation about the borrower and thus, ends up selecting a risky borrower (Ghatak 1999; Hermes and Lensink 2007).

Armendáriz and Morduch (2007) define ex-ante moral hazard as the action taken by the borrower after loan disbursement but before realization on project returns, which may affect the probability of getting good return. While the ex-ante moral hazard occurs after the loan disbursement but before realization of project returns, the ex-post moral hazard, as the name suggests, occurs after realizing the project returns. In this case, the borrower may claim that his or her project was not successful, and thus, ask for extension or not turn up to repay the loan (Armendáriz and Morduch 2000, 2007). The effects of both ex-post and ex-ante moral hazards are reflected in the quality of an MFI's portfolio.

The longer the loan remains unpaid, the higher the risk that the same will not be repaid, thus, known as loan at risk or portfolio at risk (PAR). The PAR indicates the amount of loan with one or more past due repayment installments by certain number of days. According to CGAP (2003), the portfolio at risk is probably the most acceptable measure of portfolio quality. Current microfinance literature indicates that, interest from loan is the main source of income to microfinance institutions (Tellis and Seymour 2002; Fernando 2006). The amount of interest income to be received from loans will depend on the quality of loan portfolio. The quality of a loan portfolio indicates, among other things, the loan principal and interest repayment performance (Godquin 2004). It is, therefore imperative that, the management of a loan portfolio should be one of the key daily tasks of an MFI's management.

The portfolio at risk measure is given by the value of the portfolio at risk, at a given number of days, divided by gross loan portfolio. The higher portfolio at risk will indicate poor collection policy, and or that an MFI is not efficient in making collection. Sometimes the poor collection is an indication of adverse selection and or moral hazards (Armendáriz and Morduch 2007).

**PRODUCTIVITY MEASURES**

The productivity measures indicate how well an MFI utilizes its assets and staff in general, and loan officers in particular in influencing loan repayment, enhancing increase in income, and reduction in overall microfinance expenditure. According to CGAP (2003), the productivity measures indicate how efficient an MFI is in using its resources. Efficiency of microfinance staff has a role to play in bringing about profitability and, therefore, sustainability of microfinance institutions. The commonly used productivity measures are: loan officer productivity; personnel productivity; average disbursed loan size; operating expenses ratio and cost per borrower or client.

**(a) Loan Officer Productivity**

Loan officers of an MFI are regularly involved directly in revenue generating activities of microfinance institutions. Duties of the loan officers vary from one microfinance institution to the other. However, to most microfinance institutions, loan offices are the ones involved with finding, screening and selecting clients, and when a loan is granted, making follow-ups for loan repayment. Their efficiency in this task then deserves to be measured.

The loan officer productivity measure is computed by dividing the number of active borrowers by the number of loan officers (CGAP 2003). The loan officer productivity measure indicates that, all things held constant, the larger the number of clients served by a loan officer, the efficient is the microfinance in utilizing loan officers. However, the efficiency in utilizing loan officers needs to be compared to what the large number of borrowers means to the overall revenue of an MFI.

**(b) Personnel Productivity**

Apart from using loan officer's productivity measure alone, some microfinance institutions compute the productivity ratio based on total number of personnel. This is because some of the duties of loan officers and that of other microfinance staff tend to overlap. According to CGAP (2003), the personnel productivity ratio measures how efficient an MFI is in utilizing its total human resources in managing its clients and thereby contributing to income for the microfinance institution.

The personnel productivity ratio is computed by dividing either number of active borrowers or number of active clients as numerator, by the number of personnel as denominator. When personnel productivity ratio is used, according to the Microfinance Consensus Guideline issued by CGAP (2003), most MFIs use the number of clients as numerator. This is probably because some of the staff may not be directly involved with borrowers; they may rather be involved with savers or clients for other services. Again, all things held constant, the higher the number of clients per staff would indicate microfinance efficiency in utilizing its staff.

**(c) Average Disbursed Loan Size**

Although microfinance institutions have various products, the loan product is the most common one to most of them. The more loans are disbursed, all things being equal, the better the microfinance business or services. The average disbursed loan size measures the average loan size that is disbursed to clients (CGAP 2003). It measures the efficiency of microfinance institutions in selling loans. The average disbursed loan size is computed by dividing the value of loans disbursed in a period by total number of loans disbursed during the same period. All things being equal, the large the size of average disbursed loan, the efficient the MFI in selling loans.

**(d) Operating Expenses Ratio**

According to CGAP (2003), the operating expenses ratio is the most commonly used measure of microfinance efficiency. It measures how an MFI's management has been efficient in reducing costs of operation at a given level of operation. The level of operation is measured by the average gross loan portfolio. The lower the operating expenses ratio will indicate efficiency in microfinance institutions' cost reduction strategy. That is, an MFI is operating at lower cost, which means, all things being equal, efficiency.

The operating expenses ratio is computed by dividing operating expenses by average gross loan portfolio. The operating expenses include all administrative and staff expenses. CGAP (2003) suggests the average total assets to be an appropriate denominator for microfinance institutions which have other products other than loan. This is because, when an average gross loan portfolio is used as denominator, comparative between loan-only MFIs and MFIs with other products like savings and deposits becomes biased and unfavorable.

**(e) Cost Per Borrower and Cost per Client Ratios**

Cost reduction is one of the efficiency parameter of an MFI. The cost per borrower and the cost per client ratio measure the efficiency of microfinance institutions in serving their client. They determine the average cost of maintaining a borrower or a client. The lower the cost per borrower or client will indicate the microfinance efficiency. This will also mean higher profitability and, therefore, financial sustainability. Cost per borrower ratio is computed by dividing operating expenses by average number of borrowers (CGAP 2003). Again, when an MFI has other non loan products, the appropriate denominator is the average number of clients. This indicates the cost per client as a measure of how much it costs an MFI to maintain a client.



## THE DATA AND DESCRIPTIVE STATISTICS

The data used for this study were collected from 98 rural MFI in Tanzania. Data covered four-year period from 2004 to 2007, gathered via questionnaires administered during fieldwork in 2008. The 98 MFIs included 95 cooperatives also known as member-based MFIs (MB-MFIs) and 3 nongovernmental organizations (NGO-MFIs). The 3 NGO-MFIs are those that had branches in rural areas. In total there were 21 branches from these 3 NGO-MFIs. The branches were autonomous. They also had different amount of loan disbursed, different number of clients, number of staff, and therefore different productivity. Bearing in mind these differences and the fact that the branches keep separate branch accounts we adopted NGO-MFI decomposition to capture these branch specific features that could affect the efficiency of microfinance. Thus with branch decomposition we had a total of 116 financial units (95 from MB-MFIs and 21 from NGO-MFIs) for data analysis purposes. Branch analysis is useful especially where an MFI has several branches and it has been used in previous studies to capture branch-specific features (Hartarska and Nadolnyak 2008). The four-year data from the 116 study units gave us a total 424 observation for the variables under study descriptive of which are in Table 1.

TABLE 1: DESCRIPTIVE STATISTICS

Variable	Observations	Mean	Std. Dev.	Min	Max
FSS	424	1.566226	0.8717998	0.16	7.39
yield	424	0.1624349	0.0922478	0	0.4173244
PAR	424	0.2670321	0.2190385	0.0012695	0.9674952
liqratio	424	7.960213	29.69224	0.7296336	326.696
borrpstaff	424	109.1185	152.2688	4.75	1026.5
stcospbor	424	13320.94	25140.72	0	372645
aepborr	423	7930.802	13069.06	7.807465	136851.8
costpclie	424	22363.52	39387.6	93.88715	418266.6
oeratio	424	0.2129245	0.2775142	0	2.35
avdisbloan	424	520164.1	673442.8	5200	3212295

Source: Authors' survey, 2008

The mean ratio of the financial sustainability measure (FSS) for the rural MFIs is 1.566 indicating profitable and, therefore, sustainable MFIs. In total we had 424 observations out of which 337 (79.5%) indicated sustainability and the remaining 87 observations (20.5%) the MFIs were not financially sustainable. From the 424 observations, 340 (80.2%) were member-based MFIs of which 265 (77.9%) were financially sustainable and 75 observations (22.1%) were not sustainable. The remaining 84 observations (19.8%) were the NGO-MFIs of which 72 observations (85.7%) were financially sustainable and only 10 observations (14.3%) were not sustainable. The above statistics tend to suggest that the MB-MFIs are less sustainable than the NGO-MFIs. However, the test for mean difference between the MB-MFI and the NGO-MFI's sustainability was not statistically significant leading us to conclude that the two are not statistically significantly different.

The mean yield on gross loan portfolio shows that rural MFIs in Tanzania generated 16.24 cents cash for each 1 shilling in the outstanding loan portfolio. The mean yield on gross portfolio for the MB-MFIs (340 observations) was 16.21 percent while for the NGO-MFIs (80 observations) was 16.37 percent. The test for mean difference indicated that the difference was not statistically significant.

The mean portfolio at risk (PAR) was 26.7 percent, with the highest PAR being 96.75 percent. The MB-MFIs had PAR of 27.24 percent while the NGO-MFIs had PAR of 24.4. Comparatively, the NGO-MFI appeared to have higher repayment rate (low PAR ratio) than MB-MFIs. However, the t-test statistic of mean difference indicated that the difference was not statistically significant.

The mean liquidity ratio was 7.9 indicating that, on average, the value of the current assets was 7.9 times the value of their short-term liabilities (obligations). Only in 14 observations (3.3%) out of 424 MFIs had liquidity ratio of less than 1. All things being equal, this is a good indication of good working capital (current assets) management. Again, for the MB-MFIs, the mean liquidity ratio was 7.55 times while for the NGO-MFIs was 9.61 times. The test for mean difference however, indicated no significant difference between the two.

Very high liquidity ratios could indicate idle short-term resources. However, given the nature of institutions, the microfinance institutions, sometimes it may be reasonable to have higher liquidity to meet any unplanned resource requirement. Moreover, as opposed to banks, that treat savings and deposits as short-term liabilities, for most MFIs, especially MB-MFIs the savings and deposits are considered as part of capital and, therefore, categorized as part of long-term liabilities and capital leading to higher liquidity ratio.

The mean number of borrowers per staff was 109. The minimum number of borrowers per staff was 5 while the maximum was 1026. A comparison of the mean difference for the MB-MFIs (109) and NGO-MFI (108) indicated insignificant difference. MB-MFIs had mean of 109 while NGO-MFIs had a mean of 108 borrowers per staff.

In this study we adopted the decomposition of cost per borrower to explain the contribution of efficiency in reducing each of the individual components of cost per borrower namely, administrative expenses and staff or personnel related expenses. The mean administrative cost per borrower for all MFIs was TShs. 7930 (equal to USD 6.08) while the maximum was TShs. 136,851 (USD 104.95). The MB-MFIs appeared to operate at relatively lower administrative costs (TShs. 5,373 or USD 4.12) than the NGO-MFIs (TShs. 18,254 or USD 14). The test for the mean difference was strongly statistically significant at 1 percent significance level.

The staff expenses measurement indicated higher deviations on staff costs per borrower among MFIs. The standard deviation was TShs. 25,140.72 (USD 19.28) while the mean was TShs. 13,320 (USD 10.2) and the maximum was TShs. 372,645 (USD 285.77). Once again, the t-test of the mean difference indicated that the difference between the mean for the MB-MFIs (TShs. 8,474.6) and NGO-MFIs (TShs. 32,937.08) was statistically significant indicating that the MB-MFIs operate at relatively lower costs per borrowers than their counterpart.

A total cost per client variable was included to measure the overall efficiency in cost reduction in serving one MFI client regardless as to whether the same is a borrower or a client for other of the MFI's products or services. The descriptive statistics for this variable indicated high deviations among MFIs. The mean cost per client was TShs. 22,363.52 (USD 17.15) while the minimum was TShs. 93.88 (USD 0.07) and maximum was TShs. 418,266.6 (USD 320.75). For the MB-MFIs, the mean cost per client was TShs. 8,214.15 (USD 6.3) while for the NGO-MFIs it was TShs. 79,634.78 (USD 61.06). The t-test for the mean differences among these types of MFIs for this variable was statistically significant.

The MFIs operated at mean operating expenses ratio of 21.29 percent of their outstanding portfolio. The mean ratio for the MB-MFIs was 16.92 percent while for the NGO-MFIs was 39 percent. The test statistic for the mean difference for this variable indicated that the NGO-MFIs operate at relatively higher costs than their counterpart.

The average disbursed loan size was TShs. 520,164.1 (USD 398.9). Compared with the mean average outstanding loan size of TShs. 210,096.5 (USD 161.12) this shows that, all things being equal, around 60 percent of the loans disbursed were paid back within the same year. Only 40 percent remained outstanding, out of which, according to the portfolio at risk statistics in Table 1, 26.7 percent of total outstanding portfolio (or 66 percent of the amount that remain unpaid in the year when the loan was disbursed) are at risk. Moreover, 63 percent of the amounts disbursed were repaid within the same year for the MB-MFIs while only 48 percent was repaid within the same year for the NGO-MFIs. Statistics for the portfolio at risk shows that of the unpaid amount within the same year 74 percent became at risk for the MB-MFIs while for the NGO-MFI is 47 percent. While the mean differences for average outstanding loan size was statistically significant, the difference for portfolio at risk was not significant. The analysis in this section considered a one-year maximum loan duration allowed by the MFIs studied.

Generally, the data suggest that while the MB-MFIs and NGO-MFIs were performing equally on income and productivity related variables, the MB-MFIs performed better in cost related variables. That is, the MB-MFIs operated at relatively lower costs than their counterpart.

## EMPIRICAL MODEL

This study used random effect (RE) panel regression model for data analysis. The suitability of the RE was tested using the standard Hausman test in which the RE was compared with the fixed effect (FE) model. The test for multicollinearity was done using the variance inflation factor (VIF) and found no multicollinearity problem. The highest VIF was 3.43, and the mean was 1.93. The following regression model was estimated:

$$FSS_{it} = \alpha_i + \beta_1 yield_{it} + \beta_2 PAR_{it} + \beta_3 Inliqratio_{it} + \beta_4 Inborrpstaff_{it} + \beta_5 Instcospbor_{it} + \beta_6 Inaepborr_{it} + \beta_7 Incostpcle_{it} + \beta_8 Inoeratio_{it} + \beta_9 Inavdisbloan_{it} + \varepsilon_{it}$$

Where: FSS is the financial self-sufficiency, which is the dependent variable;  $\alpha_i$  is a constant term;  $\beta_s$  measure the partial effect of independent or explanatory variables in period  $t$  for the unit  $i$  (MFI); the  $X_{it}$  are the explanatory variables as indicated in Table 2; and  $\varepsilon_i$  is the error term. The variables, both dependent and independent, are for cross-section unit  $i$  at time  $t$ , where  $i$  = MFIs (1 to  $n$ ), and  $t$  = 1 to 4.

TABLE 2: INDEPENDENT VARIABLES

S/N	Variable standard name	Variable name as used in regression model	Variable description as used in regression model	Expected Effect on FSS
1.	Yield (yield on Gross Loan Portfolio)	yield	Yield on gross loan portfolio	+
2.	Portfolio at Risk (PAR)	PAR	Portfolio at risk	( - )
3.	Liquidity ratio (Current Ratio)	Inliqratio	Natural log of liquidity ratio	( + / - )
4.	Number of borrowers per staff	Inborrpstaff	Natural log of number of borrowers per staff	( + / - )
5.	Administrative expenses per borrowers	Inaepborr	Natural log of administrative expenses per borrower	( - )
6.	Staff costs per borrower	Instcospbor	Natural log of staff cost per borrower	( - )
7.	Cost Per client	Incostpcle	Natural log of cost per client	( - )
8.	Operating Expenses Ratio	Inoeratio	Natural log of operating expenses ratio	( - )
9.	Average disbursed loan size	Inavdisbloan	Natural log of the average disbursed loan size	( + )

The Breusch-Pagan / Cook-Weisberg test for heteroskedasticity was applied and found that there was heteroskedasticity. To remedy it we estimated the model using heteroskedasticity robust standard errors. The dependent variable (FSS) is given by:

$$FSS = AFR / (OE + FE + LLPE + EA)$$

Where: AFR is adjusted financial revenue; OE is operating expenses; FE is financial expenses; LLPE is loan loss provision expenses; and EA is expense adjustment. The expense adjustments made were to deduct the amortized amount of subsidies as adopted by MFIs surveyed. The adjustments are meant to indicate whether or not the microfinance institutions are able to cover their costs without any subsidization also assuming that the capital is raised at commercial rates (CGAP 2003, Balkenhol 2007). The effects of taking off the subsidies however were very small due to the fact that most of MFIs surveyed did not have substantial amount of subsidies during the study period. Moreover, the concessional loan amounts were also not substantial making the effect of cost of capital adjustment not to be felt.

The independent variables as used in the regression model are described in Table 2. Log transformation was adopted for some variables to smooth the differences among these variables for model fitting purposes. Natural logarithms of the variables were used as indicated in Table 2.

## ECONOMETRIC RESULTS

The econometric results indicate that the overall Wald statistic is statistically significant at 1 percent significance level leading us to reject the hypothesis that all coefficients are equal to zero. Summary of econometric results on how the microfinance efficiency parameters affect the financial sustainability are presented in Table 3.

TABLE 3: SUMMARY OF ECONOMETRIC RESULTS

Variable	Coefficient	Robust SE	P>z
yield	4.869958	0.7170055	0.000***
PAR	-0.46002	0.1573824	0.003***
Inliqratio	0.1710332	0.0661661	0.010**
Inborrpstaff	-0.145104	0.0389201	0.000***
Inaepborr	0.019158	0.029039	0.509
Instcospbor	-0.0355257	0.0651731	0.586
Incostpcle	-0.1167503	0.0615061	0.058*
Inoeratio	-0.6179029	0.0756633	0.000***
Inavdisbloan	0.0082543	0.036585	0.821

Source: Authors' survey, 2008

The yield on gross outstanding loan portfolio (*yield*) indicates the efficiency of microfinance institutions in generating cash revenue from their outstanding portfolios. The higher yield on gross outstanding loan portfolio ratio, other things being equal, indicates efficiency. The econometric results in Table 3 show strong positive relationship between *yield* and financial sustainability of the microfinance institutions. This provides evidence that the efficiency of microfinance institutions in generating cash revenue will positively affect their financial sustainability.

The portfolio at risk (*PAR*) measure indicates how efficient an MFI is in making collections. The higher the *PAR* implies low repayment rates, an indication of inefficient MFI. The higher the *PAR*, the more inefficient the MFI will be and, therefore, the less financially sustainable. The econometric results indicate a negative relationship between *PAR* and financial sustainability. This shows that, the less efficient the MFI is (higher *PAR*) the less will be its financial sustainability. The coefficient for the *PAR* variable was statistically significant at 1 percent level of significance.

Apart from being able to influence higher repayment rates, microfinance institutions should also have enough resources (working capital) to meet their outstanding short-term obligations including disbursing loans and repay clients' savings and deposits. The ability to pay short-term obligations when they fall due is determined by the liquidity ratio (*Inliqratio*). All things being equal, the higher the liquidity ratio the better, an indication of microfinance efficiency. The econometric result in Table 3 confirms this. The coefficient for the liquidity ratio variable is positive and statistically significant at 5 percent significance level. This indicates that, the MFIs' liquidity level affects their financial sustainability, and that holding all factors constant, the higher the liquidity the more financially sustainable MFI will be.

The number of borrowers per staff (*Inborrpstaff*) variable measures the efficiency with which MFIs utilize their staff to serve and manage a certain number of borrowers. All things being equal, the higher the number of borrowers per staff means efficiency utilization of microfinance staff. However, the econometric result indicated that the number of borrowers per staff was negatively and strongly statistically significantly related to the financial sustainability. This shows that the increase in number of borrowers per staff affected negatively the financial sustainability of rural MFIs in Tanzania.

The negative relationship between staff productivity and financial sustainability in this study implies that the more numbers of borrowers is required to be served by a staff the less financially sustainable the microfinance will be. That is, microfinance staff for rural MFIs are not efficient as a result of their failing to manage the borrowers when the number grows causing the microfinance institutions to suffer poor repayment rates and, therefore, become less financially sustainable. Although contradicting the findings by Christen et al. (1995) that staff productivity is not associated with financial sustainability, the findings in this study are in line with the findings by Christen (2000) and Woller and Schreiner (2002). The findings in our study also confirm the findings by Gregoire and Tuya (2006) and Hermes, Lensink and Meesters (2008) that outreach and efficiency are negatively correlated.

Microfinance institutions are expected to operate at relatively low costs to be able to maximize their profit and become financially sustainable. The cost per borrower variable measures this. In this study we decompose the cost per borrower to gain more insight into the effect of each of the major individual

components of the cost per borrower on financial sustainability. These are the administrative costs per borrower (also known as operating costs) and staff related costs per borrower. The lower the cost per borrower element, all things being equal, would indicate microfinance efficiency.

The coefficient for the administration expenses per borrower (*lnaepbrr*) in Table 3 is positive but not significant even at 10 percent significance level. The positive coefficient of this variable indicates that the higher the amount spent in managing the portfolio, all things being equal, and the higher repayments will be. The higher repayments would lead to relatively higher profitability and, therefore, financial sustainability. This relationship although contradicting the accounting profitability theory that higher costs, all things being equal, reduce profitability, it helps to explain the nature of microfinance business. With microfinance institutions, the more you invest in customer monitoring, including field visits, the higher repayments will be. This finding should, however, be interpreted with caution. The focus here should be to spend more on managing the loan portfolio and less on other activities which may be less related to the main business. Moreover, although not statistically significant, the positive sign of the coefficient of this variable tends to contradict the findings by Christen (2000) and Woller and Schreiner (2002) that higher administrative expenses affect negatively the financial sustainability.

Another component of the cost per borrower considered in our study was the staff costs per borrower (*lnstcostpbrr*). The coefficient for this variable was negative but statistically insignificant. The insignificant effects of the staff costs per borrower on the financial sustainability is contrary to the findings by Christen et al. (1995) and Woller and Schreiner (2002), which show that salary levels significantly determine financial sustainability of microfinance institutions. The finding in our study also contradicts Cull et al. (2007), which shows that to achieve profitability MFIs should invest heavily in staff costs. The possible explanation for this deviation can be based on the nature of most MFIs studied, especially the MB-MFIs, where the staff-pay is not based on their efficiency, the possible case with Cull et al. (2007) findings. Thus, higher staff-pay, all things remaining constant, could lead them into more leisure than in doing more work for the MFIs' main business especially where facilitation for field visits is low. This can also help to explain why possibly the administrative expenses are positively related with financial sustainability.

Hartarska (2005) found that lower wages worsen microfinance depth of outreach. This implies that high wages relates to reaching poorer clients as indicated by smaller loans which have been associated with less profitability (Gonzalez 2007). Thus, the negative coefficient for the staff costs per borrower confirms that, if higher staff costs improves depth of outreach (lower loan size), which is associated with lower profitability, then the higher the staff costs per borrower, all things being equal, means less profitability and, therefore, less financial sustainability.

While we decomposed the cost per borrower to explain the effects of each cost component, we also used the overall cost per client (*lnstcostplie*) variable to assess the effects of microfinance efficiency (measured by the overall cost reduction) on the financial sustainability. The results show that the efficiency in reducing overall costs positively affects the financial sustainability of rural MFIs in Tanzania. The coefficient for this variable was negative, statistically significant at 10 percent level, as expected indicating that higher cost reduction (low cost per client) improves financial sustainability.

On expenses related variables, we finally assessed the effects of the operating expenses ratio (*lnoeratio*) on the financial sustainability. The econometric result for this variable suggests that the operating expenses ratio strongly affect the financial sustainability of microfinance institutions. The coefficient for operating expenses ratio variable was negative and statistically significant at 1 percent significance level. This indicates that, the more MFIs are efficient in reducing the operating costs at a given level of outstanding loan portfolio the more profitable they become and, therefore, financially sustainable.

The last variable is average disbursed loan amount (*lnavdisbloan*). The coefficient for this variable was positive but statistically insignificant even at 10 percent significance level. A possible explanation for this variable's coefficient sign is that, all things being equal, the higher the volume of loans sold would mean higher interest income which leads to higher profitability and, therefore, sustainability. However, without higher repayments, the higher volume of loans may not contribute positively to the financial sustainability of microfinance institutions. With rural MFIs in Tanzania, as revealed in the descriptive statistics in Table 3 above, the PAR is over 26 percent which translates into less than 74 percent repayment rates.

## CONCLUSION

From the econometric results presented in this paper, we conclude that the following indicators of Microfinance institutions' efficiency have significant relationships with financial sustainability: the yield on gross loan portfolio; the level of portfolio at risk, the liquidity level; the number of borrowers per staff; and the operating efficiency. Moreover, selling higher volumes of loans alone does not improve financial sustainability. The same should be accompanied by effective follow-ups to ensure higher repayment rates. The findings in this paper provide evidence and support the microfinance theory that links efficiency to the financial sustainability. Thus, to become financially sustainable, MFIs should strive to operate at relatively low costs while keeping the staff productivity and repayment rates higher.

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