Variables for Modeling SACCOS in Tanzania

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Abstract

In order to publish a quality article in a journal, an author must understand how to apply the econometric skills to construct models which explain the relationship between the independent and dependent variables. This study used the literature review to examine the variables used to establish relationship between the independent and dependent variables in Savings and Credits Cooperative Societies (SACCOS) in Tanzania. The findings reveal that currently few studies have been conducted to model SACCOS in Tanzania and scholars mostly applied the regression models. Moreover, the findings show that most scholars have empirically studied the outreach and sustainability of SACCOS in Tanzania compared to other topics. The studies also show that most of issues have not been addressed in the research. This study recommends that financial management researchers should learn econometrics so that they might gain skills which might help them to model SACCOS and other MFIs. Moreover, topics which were not addressed in research should be given priority by the researchers in Tanzania and in other countries.

Keywords: Variables, modeling, SACCOS, Tanzania

1. Introduction

1.1 Background of the Study

Tanzania is one of the least developing countries located in Eastern part of Africa with a population of 44 million. Liberalization of economy in Tanzania took place in 1980s where the socialism policies dominated the economy since independence in 1961. Majority of Tanzanians (more than 80%) engage in peasant agricultural production and dwell in rural areas (NBS 2013). Savings and Credits Cooperatives Societies (SACCOS) have been established since 1980s after liberalization of the financial services (Maghimbi 2010). Wangwe (2004) asserted SACCOS have helped to provide the financial services to many clients who the formal financial institutions such as banks did not serve them. Hence SACCOS have solved the problem of capital inadequacy for rural people in Tanzania.

Qin and Ndiege (2013) and Bwana and Mwakujonga (2013) revealed that SACCOS significantly contribute to GDP of Tanzania. The government of Tanzania promotes the establishment of SACCOS even to very remote areas because of their importance contribution to the country economy (Wangwe, 2004). Therefore the SACCOS increase rapidly each year because of government sensitization. The total SACCOS in Tanzania were 5,559 in March 2013 whereas the number of members, amount of shares, savings and deposits were 1,153,248 and 463.5 billion TZS respectively (MOFT 2013). The government establishes various policies and regulations in order to supervise the SACCOS and cooperatives in Tanzania. Based on the history, the literatures indicate that improper management, frauds, inadequate capital, business misconduct and Non Performing Loans (NPL) are the problems facing cooperatives and SACCOS in Tanzania (TFC 2006; Bibby 2006; Maghimbi 2010; Magali 2014).

Various scholars have designed models which accommodate different variables to investigate various issues in MFIs. The most famous models in MFIs measure the performance, credits risk, efficiency, impacts, outreach and sustainability. Scholars usually use the variables of returns of assets or equity (ROA, ROE) or profitability to measure performance while they use NPL to measure the credits risk management. Moreover, they use inputs and outputs to measure the efficiency whereas they use the livelihood variables to assess the efficiency and impacts of MFIs. Furthermore, authors use the average loan size, number of clients or borrowers, number of female clients to measure the outreach but they use ROA, Financial Self Sustainability (FSS) or Operational Self Sustainability (OSS) to measure financial sustainability of MFIs. Often regression models are used to measure the relationship between independent and dependent variables for MFIs when measuring performance, credits risk, efficiency, impacts, outreach and sustainability. However, in measuring efficiency data envelopment analysis (DEA) model is mostly used. Moreover, scholars use the logistic regression for the models which have dichotomous outcomes. Some models measure the social performance of the MFIs. Zeller et al (2003) asserted that outreach to the poor and excluded, adaptation of the services and products to the target clients, improving social and political capital of clients and communities and social responsibility are the four major dimensions of the social performance model of MFIs.

In MFIs modeling, one model can be applied to examine the relationship between the MFIs variables in various circumstances. What is important is the possession of knowledge by the applicant of the model. Most scholars apply rules based scoring, statistical method and neural network models for modeling of credits risk in MFIs (Sur 2008). Moreover, most scholars use Value at Risk (VaR) to measure the market risks of stocks and other assets (Alam and Masukujjaman 2011). Salari et al (2012) recommended VaR for measuring loans portfolio. Rouk (2008) argued that credit grades model (CGM) calculate the credits risk and indicates that the loans need to be impaired. Logistic regression model was used by Vasanthi and Raja (2006) in measuring the credits risks for state housing authorities in Australia. However, Haque et al (2011) applied the logistic regression model to assess the impacts of a MFI to the beneficiaries. Moreover, Doreitnera and Pribernya (2011) designed a model to measure the probability of default in MFIs by taking into consideration variables from the stock markets. Likewise, some scholars use multivariate discriminant analysis (MDA) to model the credits risk of default in banks (Castagnolo and Ferro 2014; Raj and Sindhu 2013; Chijoriga 2011). Moreover, some authors use the Bayesian models to predict the credits probability of default in banks and MFIs (Mileris 2010; Figini and Giudici 2013). The list is long, however the listed examples show that scholars explain the relationship between the MFIs variables by designing the new or apply the existing models.

1.2 Problem Statement and Justification

The literatures show that most scholars modeled the credits risk in banks (Rouk 2008; Abdou and Pointon 2011; Lefcaditis et al 2011; Kruppa et al 2013). However, few scholars modeled the credits risk in MFIs (Doreitnera and Pribernya 2011; Kinda and Achonu 2012; Elías et al 2012). Likewise, various empirical studies have been conducted to assess the banks and MFIs performance, efficiency, outreach and sustainability. The literatures also show that SACCOS in Tanzania are important engine for the economic growth and development. Moreover, the literatures show that only few empirical studies concerned SACCOS are done in Tanzania. Likewise, most university academic staff specialized in finance or business management in Tanzania don't publish scientific papers in journals because they lack skills in SACCOS or MFIs modeling. Lack of skills in modeling the MFIs and SACCOS variables, made the university academic staff to stay in their academic grades for long time (some for more than ten years). Furthermore, many students who are doing their researches in finance or financial management especially at undergraduate and master levels in Tanzania fail to structure their studies empirically because they don't have knowledge and skills on how to model the MFIs or SACCOS' variables. Thus they only design their studies qualitatively or descriptively. Therefore, this paper describes how to use the SACCOS variables to construct models. The paper might be very useful to students and university academic staff who want to model SACCOS and other MFIs. I believe that this paper will encourage many students and academic staff to conduct the empirical quantative studies by modeling the MFIs variables which is a key step toward articles' publication.

2. Literature review

2.1 Descriptive and Qualitative Studies Done in SACCOS outside Tanzania

Mostly scholars analysed the problems in SACCOS by using descriptive and qualitative

analysis. The following are some of studies which applied the descriptive and qualitative analysis. Waweru (2011) investigated the cash balance management approaches for Kenya SACCOS at Nakuru region. Fiorillo (2006) assessed the effects of wholesale lending to SACCOs in Uganda. Sebhatu (2011) studied the outreach and sustainability of SACCOS in Ethiopia. Sharma et al (2005) assessed the impact assessment of SACCOS in Nepal's Hill district by using PRA and descriptive analysis. Matumo et al (2013) examined the impact of front office SACCOS' activity on SACCOS' performance in Kenya. Odera (2012) assessed the corporate governance problems SACCOS in Kenya. Friends Consult Ltd (n.d) investigated the delinquency management for the Umurenge SACCOS in Rwanda.

Gingrich (n.d) examined a sustainable means for microfinance delivery for community based savings and credit cooperatives in Nepal while Hall (2005) studied the strengths and weaknesses of Koperasi Citra Lestari and Koperasi Mawar Putih savings and credit cooperatives microfinance institutions at East Java Indonesia. Chahayo et al (2013) analyzed the reasons for financial mismatch in SACCOS in Kenya. Mwangi, et al (2013) analysed the role of SACCOS in growth of youth entrepreneurship in Kenya. Mwangi and Wanjau (2013) examined the role of SACCO in growth of youth entrepreneurship in Kenya. Makori et al (2013) studied the challenges facing deposit-taking SACCOS' regulatory compliance at Gusii region in Kenya and Ondieki et al (n.d) assessed the effect of external financing on financial performance of SACCOS at Kisii central district, Kenya. The literatures show that Kenyan scholars lead to study about SACCOS' problems.

2.2 Quantative Studies Done Outside Tanzania

Scholars use various models to study issues in SACCOS. Awotide et al (n.d) used the queue model to analyse the effectiveness of cooperative societies' in delivering credits for agricultural enterprises in Southwest Nigeria. The three variables were modeled to measure the effectiveness of credits delivery as follows:

$$Arrival\,rate = \frac{Number\,of\,arrival}{Time}$$

$$Service\,rate = \frac{Number\,of\,served}{Time}$$

$$Traffic\,\mathrm{int}\,ensity = \frac{Arrival\,rate}{Service\,rate}$$

They asserted that arrival rate depicts the number of loan request per month, the service rate represents the number of application accepted while traffic intensity measures the efficiency in queue management, which is achieved when arrival rate =service rate.

Lagat et al (2013) studied the effects of credits risk management practices on lending portfolio among SACCOS in Kenya by using a multiple regression model. The portfolio performance (PP) was used as a dependent variable and the independent variables were: Risk Identification (RI), Risk Assessment (RAA), Risk Monitoring (RM) and Credit Risk Analysis (CRA). The model was specified as follows:

$$PP = \beta_0 + \beta_1 URM_i + \beta_2 RI_i + \beta_3 RAA_i + \beta_4 RM_i + \beta_5 CRA_i + E_i \quad \text{Where} \quad \beta_0 = \text{intercept and} \quad E_i \text{ is}$$

the error term. Moreover, Onsase et al (n.d) studied the effects of performance management practices on provision of financial services for SACCOS in Kenya by using the Likert scale and the univariate regression model. The regression model was written as: Y=a+bx Where; Y is the dependent variable, that is performance of financial services (PFS) and X, is the independent variable that is performance management practices (PMP).

Olando et al (2013) examined the contribution of SACCOS' financial stewardship to the growth of SACCOS' wealth (GSW) in Kenya by using a multiple linear regression analysis. The financial stewardship was measured by loan evaluation (LE), loan disbursement (LD), loan recovery (LR), loan protection (LP), default risk (DS), staff competence (SA) and innovativeness (TEC). The model was constructed as:

$$GSW = \beta_0 + \beta_1 LE + \beta_2 LD + \beta_3 LR + \beta_4 LP + \beta_5 DS + \beta_6 SA + \beta_7 TEC + \varepsilon \quad \text{Where:} \quad \beta_0 = \text{constant}$$

term and $\beta_1 - \beta_7 = $ coefficient of the independent variables and $\varepsilon = $ error term. Onchangwa and Memba (2012) investigated whether investment in SACCOS have effect on members' investment culture in Kenya. The univariate regression model expressed the relationship between savings and investment as follows: Y= a + bX$_1$ Where: Y= investment, X$_1$= savings in SACCOS, a = the intercept and b =the beta coefficient.

Auka and Mwangi (2013) examined the factors influencing SACCOS' members to seek services from other financial service providers in Kenya. The relationship between independent variables and dependent variable was established by the regression model as follows:

$$FI = \beta_0 + \beta_1 TP + \beta_2 PT + \beta_3 MD + \beta_4 SP + \beta_5 PS + \beta_6 PE + e \quad \text{Where:} \quad FI = \text{Financial service}$$

provider, TP = type of financial product, PT = processing time of loan applications, SP =staff performance, PS = promotion strategies, PE = physical evidence, β_0 = Intercept, β$_1$-β$_6$=estimated coefficients of independent and e = Error term. Mosongo et al (2013) investigated the relationship between the financial innovation and financial performance for SACCOS at Nairobi County in Kenya by using the descriptive and multivariate regression analysis. The dependent variable (Y) was the financial performance and the independent variables were institutional (X$_1$), process (X2) and product innovations (X$_3$). The multivariate regression model was specified as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \mu$$

Mpiira et al (2013) studied the factors influencing households' participation in SACCOS programmes in Uganda using the ordered probit regression model which was presented as follows:

$$Pr(S_n = k) = \beta_0 + \beta_1 Y^P + \beta_2 AGE + \beta_3 AGE^2 + \beta_4 \sum_{i=1}^{3} DINFO + \beta_5 EDUC + \beta_6 GENDER + \beta_7$$

$$\sum_{i=1}^{5} DDEP + \beta_8 MARITAL + \beta_9 \sum_{i=1}^{3} STABLE + \beta_{10} DIST + \beta_{11} URBAN + \beta_{12} DISTRICT + u$$

Where pr is the probability that the household will choose to participate in the programme and $S_n = k$ represent the household status whether is a non-member or a member who save or don't save. the independent variables of the model includes: Y^P which determines the presence of permanent income, AGE of the household head, age of spouse (AGE^2), dummy of information about the famous banks used for depositing the children school fees (DINFO), the education level of the household (EDUC), GENDER of respondent, dummy variable of children going school whether in nursery, primary, secondary or university (DDEP), MARITAL status, dummy of STABLE income, distance from home to the SACCOS office (DIST), dummy of household location whether in rural or URBAN and DISTRICT of residence whether is a base district or otherwise.

Ahimbisibwe (2007) studied the effects of SACCOS on members' saving culture in Ntungamo district in Uganda. The author applied the multivariate linear regression model where saving culture was the dependent variable. The model was expressed as follows:

$$Y_t = \beta_0 + \beta_1 INCOME + \beta_2 NOCHILD + \beta_3 GOSCH + \beta_4 PRIM + \beta_4 SEC + \beta_6 TERT + \varepsilon_t$$

Where: INCOME = A dummy for income, NOCHILD = A dummy for number of children in a family, GOSCH = A dummy for number of school going children, PRIM = A dummy for primary level of education, SEC = A dummy for secondary level of education, TERT = A dummy for tertiary level of education, Y_t = Saving culture, β_0 =intercept, β_1 -β_6 = estimated coefficients of independent variables and ε_t = error term. Similarly, Mohammed (2011) applied the regression model to examine how financing strategies and financial sustainability strategies which influenced the sustainability and outreach of SACCOS in Uganda. The independent variable was the financing strategies of SACCOS which was measured by debt, equity and individual savings while the independent variables were operational self sustainability, financial self sustainability, active borrowers and average loan size. The study used the first and the second two variables to measure the financial sustainability and outreach of the SACCOS respectively.

Tesfamariam et al (2013) applied the data envelopment analysis to examine the relative efficiency of rural SACCOS in Ethiopia where they specified total expenses and savings and loans and total income as inputs and outputs respectively. Moreover, Dong and Featherstone (2004) studied the technical and scale efficiencies of Chinese rural credit cooperatives by using a Bootstrapping approach in DEA and treated deposits as inputs and loans as outputs. Similarly, Kipesha (2012) assessed the efficiency of microfinance institutions in East Africa by using DEA. Kipesha asserted that a simple DEA model to measure the technical efficiency using input oriented approach for MFI (including cooperative MFIs such as SACCOS) can be

constructed by assuming that there is K decision making units (DMUs or MFIs) which utilize N inputs to produce M outputs. Kipesha (2012) argued that if inputs are denoted by xjk with j=1…n and outputs by yik with i=1…m for each DMU, the technical efficiency for DMU under inputs specification can be expressed as:

$$MinTE = \frac{\sum_{i=1}^{m} uiyis}{\sum_{j=1}^{n} vjxjk} - - - - - -r = 1....K$$

$$Subjecto = \sum_{i=1}^{m} uiyr - yiF + w \geq 0$$

$$Xjr - \sum_{j=1}^{n} ujxk \geq 0 \qquad ui \text{ and } vj \geq 0$$

Where ui and vj are the weights of output and input correspondingly (Kipesha, 2012).

2.3 Empirical Descriptive Studies Done in SACCOS from Tanzania

Some studies in Tanzania explain issues in SACCOS by using descriptive and qualitative analysis. Piprek (2007) examined the links between SACCOS and CRDB bank in expanding the access of financial service in rural areas. Magali and Qiong (2014) compared the commercial banks and rural SACCOS' credits risk management. Magali (2014) investigated the influence of leadership, corporate governance and regulations on credits risk management on rural SACCOS. Kyessi and Furaha (2010) examined the access of housing loans by the urban poor clients from WAT-SACCOS in Dar es Salaam by using descriptive and pictorial presentation. Karumuna and Akyoo (2012) studied the challenges faced the Kibaigwa financial services and credit cooperative society (KIFISACCOS) in Kongwa district by using descriptive and SWOT analysis while Bwana and Mwakujonga (2013) studied the issues related with SACCOS' development in Kenya and Tanzania by using the literature review.

2.4 Empirical SACCOS' Studies Which Applied Models in Tanzania

Since 2010 Tanzanian scholars are motivated to model SACCOS' variables in Tanzania. Kushoka (2013) analysed the sustainability of an employee based SACCOS at Dar es Salaam city in Tanzania by using the Likert scale and linear regression model. The model was written as follows: $Y = \beta_0 + aX_1 + bX_2 + \mu$ where Y=Sustainability, β_0=intercept, X_1=Capital base, X_2=amount of loans issued, a & b = coefficients of X_1 and X_2 and μ=error term.

Qin and Ndiege (2013) assessed the role SACCOS in economic growth in Tanzania. They applied econometric model which captures the time series data. The model was specified as:

$$(RPGDP)_t = \beta_0 + \beta_t(CGDP)_t + \beta_2(SGDP)_t + \beta_3(INFL)_t + \beta_4(INTR)_t + \mu_{it}$$

Where

RPGDP =real GDP per capita which was used to measure the economic growth, (CGDP) = credits divided by real GDP per capita and SGDP =savings divided by real GDP per capita. The two proxies were used to measure the financial deepening in SACCOS while inflation rate (INFL) and real interest rate (INTR) were used as controlling variables.

Magali (2013d) assessed the impacts of rural SACCOS' loans on borrowers in Tanzania by using the logit model which was expressed as:

$$Logit(P) = Log\left[\frac{P_i}{1-P_i}\right] \ldots\ldots\ldots..(1)$$ where the term within the square brackets is the

odd of an event occurring, i.e odd of a SACCOS' borrower to perceive the impacts from using loans

Let: $P_{i=}\text{Pr}(Y = 1 | X = x_i)$ ……………….(2) Then the model was written as:

$$Log\left[\frac{P_i}{1-P_i}\right] = Logit(P_i) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \mu \ldots\ldots(.3)$$

P_i = Probability that of a borrower to realize positive impacts while $(1-P_i)$ =probability of a borrower to realize the negative impacts from using the credit from the rural SACCOS. The independent variables specified in the model were: improvement in health and education, buying of assets, improvement of income, improvement of crop yields, increment of business' capital and improvement of housing structure after receiving loan from the rural SACCOS. Similarly, Girabi and Mwakaje (2013) assessed the impact of rural SACCOS on smallholder farm productivity in Iramba District, Singida region Tanzania. The regression model was specified as follows:

$$Q = a + b_1 X_1 + b_2 X_2 + b_3 X_2 + b_4 X_4 + b_5 X_5 + b_6 X_6 + u$$ **.**Where: Q = farm's output (bags) a =

constant b_s = estimated coefficients, X_1 = inputs (fertilizer, seeds, pesticides) X_2 = technology (tractor, ox-plough or hand hoe); X_3 = hired labour X_4 = money (in Tanzania shillings-TZS), X_5 = land u = error term.

Magali (2013e) examined whether the rural SACCOS in Tanzania are currently sustainable by using the multivariate regression model. The study measured the outreach by using the log average loan size and the model was specified as follows:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \mu$$. The independent variables were savings and deposits

to total assets, age of SACCOS, log of cost per borrower and OSS. Moreover, OSS measured

the sustainability of the rural SACCOS and the model was written as:

$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \mu$. In this model NPL to Equity, log of cost per borrower, age of SACCOS, grants to total loans and log of average loan size were regarded as independent variables.

Ndiege et al (2013) examined relationship between sources of funds and outreach for SACCOS in Tanzania by using two similar regression models. The number of members (Memb) and average credits (AVC) were used as dependent variables for breadth and depth of outreach in the first and second model while credits per assets (CRAR), external source of funds (EQT), internal sources of funds (LIB) and external-internal sources ratio (LER), age of SACCOS (YEAR) and number of SACCOS (SACC) were used as independent variables. The two models were specified as follows:

$$Memb_{it} = \beta_1 + \beta_2 YEAR_i + \beta_2 SACCO_{it} + \beta_3 LBL_{it} + \beta_3 CRAR_{it} + \beta_3 LER_{it} + \mu_{it} \ldots \ldots (1)$$

$$AVC_{it} = \beta_1 + \beta_2 YEAR_i + \beta_2 SACCO_{it} + \beta_3 LBL_{it} + \beta_3 CRAR_{it} + \beta_3 LER_{it} + \mu_{it} \ldots \ldots (2)$$

Temu and Ishengoma (2010) used the multivariate regression model to examine effects of financial linkages on performance and sustainability of the rural SACCOS in Tanzania by using the regression model. In the model the financial linkages was measured by a dummy variable of 1 if on a study year, a MFI received a loan from commercial banks or large MFI at least TZS 50000 per its individual member or 0 otherwise. The independent variables were membership growth, membership size, size of loan and interest income. The model was written as follows:

$$P = a + bL + [SIGMA]bc + e$$

Pi = A + [SIGMA][[beta].sub.i][C.sub.i] + [SIGMA][[beta].sub.2][L.sub.i] + [.sub.i] (1), where P, C, L, and e represented the SACCOs' performance, controllable variables, financial linkages and error term correspondingly while [[beta].sub.1], and [[beta].sub.2] presented the controllable variables and linkages parameters.

Similarly, Nyamsogoro (2010) used dependent variable as Financial Self Sufficiency (FSS) to assess the sustainability of rural MFIs (SACCOS, NGOs and SACAS) in Tanzania. The independent variables were: MFIs capital structure (equity/capital), interest rates, lending type (group or individual), cost per borrower, product type, MFI size, age, number of borrowers (as a proxy for outreach), female clients, yield on gross loan portfolio, level of portfolio risk, liquidity level, staff productivity and operating model (regulated vs non regulated). Average loan size was used as a proxy measure for outreach while the size of MFI was measured by total assets. Difficulty in assessing data forced the author to measure the depth of outreach by assessing the relationship between number of borrowers and profitability instead of using poor clients. I include this study because 82% of the sample size was SACCOS and SACAS while the remaining sample items were NGO MFIs.

The model was specified as follows:

$$FSS = \alpha_i + \beta_1 capstruc_{it} + \beta_2 int\,rate_{it} + \beta_3 \ln st\cos tpdol_{it} + \beta_4 instalind_{it} + \beta_5 \ln insta\lg r_{it} + \beta_6$$
$$\ln\cos tpborr_{it} + \beta_7 prodtype_{it} + \beta_8 \min loanindi_{it} + \beta_9 \min loangr_{it} + \beta_{10} mfiage_{it} + \beta_{11} mfitype_{it} + \beta_{12}$$
$$\ln avoutloan_{it} + \beta_{13} \ln mfisize_{it} + \beta_{14} female_{it} + \beta_{15} reguted_{it} + \beta_{16} \ln borrowers_{it} + \beta_{17} educarea_{it} +$$
$$\beta_{18} agrarea_{it} + \beta_{19} \ln T2matind_{it} + \beta_{20} \ln T2matigr_{it} + \varepsilon_{it}$$

Magali (2013a) assessed the factors affecting credit default risks for rural SACCOS' borrowers in Tanzania by using the multivariate regression analysis where the default risk (dependent variable) was proxied by Non-Performing Loans (NPL). The model was specified by the following equation:

$$Y = b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + b_4 x_4 + b_5 x_5 + b_6 x_6 + b_7 x_7 + b_8 x_8 + b_9 x_9 + b_{10} x_{10} + \mu .$$ The specified

factors which determined the default risk were: age of the respondent, education of the respondent, size of household, marital status, interest rate, received loan amount, loan maturity, value of collateral, borrowers' experiences in years and loan activity. Similarly, Magali (2013b) examined the rural SACCOS' variables which influence the loans default risks in Tanzania by using the multivariate regression model where the loans default risk was measured by NPL. The model was specified as follows

$$Y = b_0 + x_1 b_1 + x_2 b_2 + x_3 b_3 + x_4 b_4 + \mu$$. The independent variables were savings and deposits,

total assets, year of schooling of the manager and the number of borrowers with outstanding loans.

Moreover, Magali (2013c) assessed the impacts of credits risk management on profitability of rural SACCOS in Tanzania by using the univariate regression model where the credits risk management was measured by NPL ratio and profitability was measured by returns on asset (ROA) and returns on equity (ROE). The univariate regression model was expressed as:

$$P(ROA, ROE) = \alpha + \beta \left({NPL}/{TL} \right) + \mu \qquad (1),$$

By simplifying the model, it can be written as:

$$P(ROA, ROE) = \alpha + \beta \left(\frac{LogNPL}{LogTL} \right) \qquad (2),$$

where P represents profitability and diversity of NPL and TL were reduced by introduction of base 10 logarithm.

Furthermore, Magali and Pastory (2013) assessed the technical efficiency of rural SACCOS in Tanzania by using DEA where number of members, total savings and deposits and total expenses were classified as inputs while the loans issued were classified as output while Marwa and Aziakpono (2013) assessed the technical and scale efficiency of SACCOS in Tanzania by using DEA where the total costs and total fixed assets were classified as inputs while the total deposits and total loans in a portfolio were used as outputs.

3. Discussion of the Findings

The findings show that Kenyan scholars lead in studying SACCOS' issues. The findings from Tanzania, Kenya and other countries show that most scholars apply the regression analysis to model the SACCOS' variables. Clock Backward (2009) asserted that most scholars prefer to use the univariate or multivariate regression models which apply Ordinary Least Square (OLS) method because its application in computers is simple, it can handle problems of various fields, simple to analyse mathematically as opposed to other models and the results from the regression analysis can be interpreted easily even to a non-mathematician. However, the results from the multivariate regression models need to be tested against heteroscedasticity, autocorrelation and multicollinearity as proposed by Gujarat and porter (2010). Likewise the findings show that most scholars in Tanzania examined the outreach and sustainability of the SACCOS while few scholars analysed the efficiency. However, efficiency studies need to be extended so as to reveal the real situation of both rural and urban SACCOS' efficiencies in Tanzania separately.

The findings further indicate that Magali (2013a &b) assessed the credits risk management in rural SACCOS by using NPL as dependent variables with a multiple regression model. This is an innovation since majority of authors use the amount of loans repaid by borrowers with multiple regression models to assess the credits/loans repayment performance in MFIs (Oladeebo and Oladeebo 2008; Acquah and Addo 2011; Haque et al 2011; Ojiako and Ogbukwa 2012). However, studies which examined the borrowers' loans default risk applied the logit models (Tra and Lensink n.d; Vasanthi and Raja 2006; Kohansal and Mansoori 2009). Moreover, Mensah (2013) measured loans default by counting the number of times the borrower defaulted. Magali (2013b) also adopted the model from commercial banks in measuring the impacts of credits risk management on profitability of the rural SACCOS. Scholars who assessed the impacts of credits risk management on profitability of banks include Achou and Tenguh (2008), Haneef et al (2012), Funso et al (2012) and Kaaya and Pastory (2013). The findings show that this is the first study to be done in rural MFI (i.e SACCOS) in Tanzania.

The findings also indicate that to the best of my knowledge, only two studies (Magali and Pastory 2013 and Marwa and Aziakpono 2013) assessed the technical efficiency of SACCOS in Tanzania by using DEA. However, only Magali and Pastory (2013) focused the efficiency of rural SACCOS in Tanzania while Marwa and Aziakpono (2013) assessed the efficiency of both rural and urban SACCOS. The literatures show that most scholars are interested to the study the efficiency of banks or other MFIs (Misra 2006; Kipesha 2012, Gwahula 2012). Likewise the findings indicate that impacts of loans on clients were measured by using the logistic regression model (Magali 2013d). The use of logistic regression in measuring impacts of MFIs is not famous by many authors .The literature show that Haque et al (2011) applied the logistic regression model to investigate the impacts of a MFI in Bangladesh.

4. Conclusion and Recommendations

This study used the literature review to examine the variables used to establish relationship between the independent and dependent variables in SACCOS modeling. The findings reveal

that currently few studies are done in Tanzania and scholars applied mostly the regression models. However, the findings show that most studies which modeled the SACCOS variables were conducted in Kenya. The findings further revealed that most scholars have empirically studied the outreach and sustainability of SACCOS compared to other topics. The studies from Tanzania also show that most of issues have not been addressed in the research. This article recommends that scholars to assess issues which limit the SACCOS' performance such as current influence of regulations in financial performance of SACCOS, the effectiveness of the credits risk management and efficiency of SACCOS in all zones of Tanzania. Also I recommend that scholars should design research to assess the factors affecting the SACCOS' business performance, compare the performance of rural and urban SACCOS, farmers' and Workers SACCOS and SACCOS and village banks or other rotational funds. Moreover, I recommend scholars to study econometrics so that they might gain more skills which will help them to model the SACCOS' and MFIs variables in Tanzania and in other countries.

References

Abdou, H. & Pointon, J. (2011). Credit Scoring, Statistical Techniques And Evaluation Criteria: A Review Of The Literature. *Intelligent Systems in Accounting, Finance and Management*, *18* (2-3), 59-88. http://dx.doi.org/10.1002/isaf.325.

Achou, T. F. & Tenguh, N. C. (2008). *Bank Performance and Credit Risk Management.* Unpublished Report of Master Degree Project in Finance, University of Skövde.

Acquah, H.D. & J. Addo, J. (2011). Determinants of Loan Repayment Performance of Fishermen: Empirical Evidence from Ghana. *Cercetări Agronomice în Moldova* XLIV, *4*(148), 89-97.

Ahimbisibwe, F. (2007). *The Effects of Savings and Credit Co-Operatives (SACCOS) on Members' Saving Culture Case Study: Ntungamo District*. Cooperatives Development Department Ministry of Tourism, Trade and Industry, Uganda.

Auka, D. O. & Mwangi, J. K. (2013). Factors Influencing SACCO Members to Seek Services of Other Financial Service Providers in Kenya. *International Review of Management and Business Research*, *2*(2), 610-626.

Awotide, D.O.,Aihonsu J.O.Y. & Adekoya A.H. (n.d). Cooperative societies' effectiveness in credit delivery for agricultural enterprises in Ogun State, Southwest Nigeria. *Asian Journal of Business and Management Sciences, 2*(3), 74-79.

Bwana, K.M. & Mwakujonga, J. (2013). Issues in SACCOS Development in Kenya and Tanzania: The Historical and Development Perspectives. *Developing Country Studies, 3*(5), 114-121.

Castagnolo, F. & Ferro, G. (2014). Models For Predicting Default: Towards Efficient Forecasts. *The Journal of Risk Finance, 15*(1), 52-70. http://dx.doi.org/ 10.1108/JRF-08-2013-0057.

Chahayo, S. A., Bureti,F., Juma, Maende, C. M., Douglas, M. & Aketch R. A. (2013). Analysis of Financial Mismatch in Co-Operative Societies: A Case of Kakamega County, Kenya". *International Journal for Management Science and Technology, 1*(5), 1-29.

Chijoriga, M.M. (2011). Application of Multiple Discriminant Analysis (MDA) as a Credit Scoring and Risk Assessment Model. *International Journal of Emerging Markets*, *6*(2), 132-147. http://dx.doi.org/ 10.1108/17468801111119498.

Chris D. & Gingrich (n.d). Community-Based Savings and Credit Cooperatives in Nepal: A Sustainable Means for Microfinance Delivery? *Journal of Microfinance*, *6*(1), 21-39.

Clock Backward (2009). Ordinary Least Squares Linear Regression: Flaws, Problems and Pitfalls. Available online at http://www.clockbackward.com/2009/06/18/ordinary-least-squares-linear-regression-flaws-problems-and-pitfalls/ (February 02, 2014)

Dong, F. & Featherstone, A. (2004). *Technical and Scale Efficiencies for Chinese Rural Credit Cooperatives: A Bootstrapping Approach in Data Envelopment Analysis*. Working Paper 04-WP 366, Center for Agricultural and Rural Development, Iowa State University.

Doreitnera, G. & Pribernya, C. (2011). *A Quantitative Model for Structured Microfinance*. Preprint submitted to 2nd European Research Conference on Microfinance March 16, 2011.

Elías, A. Padilla, A. & Padilla, F. (2012). *Credit Scoring for Microfinance Institutions in México an Ensemble and Hybridized Approach.* 2012 International Conference on Technology and Management Lecture Notes in Information Technology, *21*, 138-144.

Figini, S. and Giudici, P. (2013). *Credit Risk Predictions With Bayesian Model Averaging*. DEM Working Paper Series, No. 34, (02-13).

Fiorillo, A. (2006). *The Effects of Wholesale Lending to SACCOS in Uganda*. Financial Sector Deepening Project.

Friends Consult Ltd (n.d). *Module Five: Financial and Delinquency Management for the Umurenge SACCOS.* Rwanda Cooperatives Agency (RCA), Kampala, Uganda.

Funso, K. T., Kolade, A. R. & Ojo, O. M. (2012). Credit Risk and Commercial Banks' Performance in Nigeria: A Panel Model Approach. *Australian Journal of Business and Management Research, 2*(02), 31-38.

Girabi, F. & Mwakaje, A.E.G. (2013). Impact of Microfinance on Smallholder Farm Productivity in Tanzania: The Case of Iramba District. *Asian Economic and Financial Review, 3*(2), 227-242.

Gujarat, D.N. & Porter, C.P. (2010). *Basic Econometrics*, Fifth Edition. McGraw-Hill Company and China Renmin University Base.

Gumparthi, S. & Manickavasagam, V. (2010). Risk Classification Based on Discriminant Analysis for SMEs. *International Journal of Trade, Economics and Finance*, *1*(3), 242-246.

Gwahula, R. (2012). Commercial Banks Efficiency in Tanzania: A Non Parametric Approach. *European Journal of Business and Management, 4*(21), 55-67.

Hall, N. (2005). *Savings and Credit Cooperatives as Microfinance Institutions. Two Case Studies: Koperasi Citra Lestari & Koperasi Mawar Putih in East Java*. Unpublished Bsc Thesis. University of New South Wales.

Haneef, S., Riaz, T., Ramzan, M., Rana, M. A. Ishaq, H. M. & Karim Y. (2012).   Impact of Risk Management on Non-Performing Loans and Profitability of Banking Sector of Pakistan. *International Journal of Business and Social Science, 3*(7), 307-315.

Haque, M. S., Akter, R. & Laoubi, K. (2011). Effectiveness of Community Based Organization (CBO) Microcredit Programme of Concern Worldwide: A Case Study of Bangladesh. *African Journal of Business Management, 5*(24), 10101-10107.

Hull, J. (2009). *Options, Futures and Other Derivatives*. Sixth Edition, Pearson Education Asian Ltd and Tsihua University Press.

Kaaya, I. & Pastory, D. (2013). Credit Risk and Commercial Banks Performance in Tanzania: a Panel Data Analysis. *Research Journal of Finance and Accounting, 4* (16), 55-62.

Karumuna, L. & Akyoo, A. (2011). *Rural Finance Challenges in Tanzania-the case of Kibaigwa Financial Services and Credit Cooperative Society (KIFISACCOS) in Kongwa District.* Business Minds Africa, Case series, number 2 June 2011.

Kinda, O. & Achonu, A. (2012). Building a Credit Scoring Model for the Savings and Credit Mutual of the Potou Zone (MECZOP)/Senegal. *The Journal of Sustainable Development, 7* (1), 17–33.

Kipesha, E. F. (2013). Impact of Size and Age on Firm Performance: Evidences from Microfinance Institutions in Tanzania. *Research Journal of Finance and Accounting*, *4*(5), 105-116.

Kipesha, E.F. (2012). Efficiency of Microfinance Institutions in East Africa: A Data Envelopment Analysis. *European Journal of Business and Management, 4*(17), 77-88.

Kohansal, M.R. & Mansoori, H. (2009). *Factors Affecting on loan Repayment Performance of Farmers in Khorasan-Razavi Province of Iran*. Conference on International Research on Food Security, Natural Resource, Management and Rural Development. University of Hamburg Tropentag, October 6-8, 2009.

Kruppa, J., Schwarz, A., Arminger, G. & Ziegler, A. (2013). Consumer Credit Risk: Individual Probability Estimates Using Machine Learning. *Expert Systems with Applications, 40,* 5125–5131. http://dx.doi.org/10.1016/j.eswa.2013.03.019.

Kushoka, I. (2013). Sustainability of an Employee Based Savings and Credit Co-Operative Society: A Case of Dar Es Salaam City Council SACCOS Tanzania. *American Based Research Journal*, *2*(7), 88-94.

Kyessi, A. & Furaha, G. (2010). Access to housing finance by the urban poor: The case of

WAT-SACCOS in Dar es Salaam, Tanzania. *International Journal of Housing Markets and Analysis, 3*(3), 182-202. http://dx.doi.org/1108/17538271011063861.

Lagat, F.K., Mugo, R. & Otuya, R. (2013). Effect of Credit Risk Management Practices on Lending Portfolio Among Savings and Credit Cooperatives in Kenya. *European Journal of Business and Management, 5*(19), 93-105.

Lefcaditis, C., Tsamis, A. & Leventides, J. (2014). Concentration Risk Model For Greek Bank's Credit Portfolio. *The Journal of Risk Finance*, *15*(1), 71-93. http://dx.doi.org/ 10.1108/JRF-06-2013-0043.

Magali, J.J. (2013a). Factors Affecting Credit Default Risks For Rural Savings and Credits Cooperative Societies (SACCOS) in Tanzania. *European Journal of Business and Management*, *5*(32), 60-73.

Magali, J.J. (2013b). The Influence of Rural Savings and Credits Cooperatives Societies (SACCOS') Variables on Loans Default Risks: The Case Study of Tanzania. *Research Journal of Finance and Accounting, 4*(19), 77-91.

Magali, J.J. (2013c). The Impacts of Credits Risk Management on Profitability of Rural Savings and Credits Cooperative Societies (SACCOS): The Case Study of Tanzania. *International Journal of Management Sciences and Business Research, 2*(12), 62-77.

Magali, J.J. (2013d). Impacts of Rural Savings and Credits Cooperative Societies (SACCOS') Loans on Borrowers in Tanzania. *International Journal of Management Sciences and Business Research, 2*(12), 32-48.

Magali, J.J. (2013e). Are Rural SACCOS in Tanzania Sustainable? *International Journal of Management Sciences and Business Research, 3*(1), 111-126.

Magali, J.J. & Pastory, D. (2013). Technical Efficiency of the Rural Savings and Credits Cooperative Societies in Tanzania: A DEA Approach. *International Journal of Management Sciences and Business Research, 2*(12), 49-61.

Magali, J.J. and Qiong, Y. (2014). Commercial Banks Vs Rural SACCOS Credits Risk Management Practices in Tanzania. *Journal of Economics and Sustainable Development, 5* (2), 33-45.

Majumdar, S.K. (1997). The Impact of Size and Age on Firm-Level Performance: Some Evidence from India. *Review of Industrial Organization, Kluwer Academic Publishers, 12*, 231–241.

Makori, J., Munene, C. & Muturi, W. (2013). The Challenges Facing Deposit-Taking Savings and Credit Cooperative Societies' Regulatory Compliance in Kenya. A Case of the Gusii Region. *Interdisciplinary Journal of Contemporary Research in Business, 4*(12), 1014-1081.

Marwa, N. & Aziakpono, M. (2013). *Technical and Scale Efficiency of Saving and Credit Cooperatives: Evidence from Tanzania*. University of Stellenbosch Business School, South Africa.

Matumo, N. G., Maina, K. E. & Njoroge, N.N. (2013).The impact of front office Sacco activity on SACCOS performance in Kenya; A case study of Meru South and Maara district in Tharaka Nithi County in Kenya. *Global Advanced Research Journal of Management and Business Studies, 2*(5), 285-290.

Mensah, C. (2013). The Relationship between Loan Default and Repayment Schedule in Microfinance Institutions in Ghana: A Case Study of Sinapi Aba Trust. *Research Journal of Finance and Accounting*, *4*(19), 165-175.

Mileris, R. (2010). Estimation of Loan Applicants Default Probability Applying Discriminant Analysis and Simple Bayesian Classifier. *Economics and Management*: *15*, 1078-1084.

Ministry of Finance, Tanzania (MOFT 2013). Speech by the Minister for Finance Hon. Dr. William Augustao Mgimwa (Mp). *The Estimates of Government Revenue and Expenditure for the Fiscal Year 2012/2013 and 2013/2014*.

Misra, B. S. (2010). Performance of Primary Cooperatives in India: An Empirical Analysis. MPRA Paper No. 21890.

Mohammed, S. (2011). *Financing Strategies, Financial Sustainability and Outreach of SACCOS in Uganda.* Unpublished MSc. Thesis, University of Makerere.

Mosongo, E., Gichana, I., Ithai, J. & Nguta, M. (2013). Financial Innovation and Financial Performance: A Case of SACCOS in Nairobi County. *International Journal of Research in Management, 5*(3), 93-100.

Mpiira, S., Kiiza, B., Katungi, E., Staver, C., Tabuti, J. S., Kyotalimye, M. Muwumba, P., Karamura, E. & Tushemereirwe, W. K. (2013). Factors Influencing Households Participation in The Savings and Credit Cooperative (SACCO) Programmes in Uganda. *African Journal of Agricultural Research, 8*(43), 5276-5284.

Mwangi, I. W. & Wanjau, K. L. (2013). The Role of SACCO in Growth of Youth entrepreneurship in Kenya: A Case of Nairobi County. *Greener Journal of Business and Management Studies*, *3*(3), 113-118.

Ndiege, B.O., Haule, T. B. & Kazungu, I. (2013). Relationship between Sources of Funds and Outreach in Savings and Credits Cooperatives Societies: Tanzanian case. *European Journal of Business and Management, 5*(9), 188-196.

Nyamsogoro, D. (2010). *Financial Sustainability of Rural Microfinance in Tanzania.* Unpublished PhD Thesis, University of Greenwhich.

Odera, O. (2012). Corporate Governance Problems of Savings, Credit and Cooperative Societies. *International Journal of Academic Research in Business and Social Sciences*, *2*(11), 89-103.

Ojiako, I. A. & Ogbukwa, B. C. (2012). Economic Analysis of Loan Repayment Capacity of Smallholder Cooperative Farmers in Yewa North Local Government Area of Ogun State, Nigeria. *African Journal of Agricultural Research, 7*(13), 2051-2062.

Oladeebo, J. O. & Oladeebo, O. E. (2008), Determinants of Loan Repayment among Smallholder Farmers in Ogbomoso Agricultural Zone of Oyo State, Nigeria. *Journal of Socio Science*, *17*(1), 59-62.

Olando, C. O., Jagongo, A. & Martin, O. M. (2013).The Contribution of SACCO Financial Stewardship to Growth of SACCOS in Kenya. *International Journal of Humanities and Social Science, 3*(17), 112-137.

Onchangwa, G. A. & Memba, F. S. (2012). Does Savings and Credit Cooperative Societies (SACCOS) Have Any Effect on Members' Investment Culture In Kenya? *International Journal of Arts and Commerce, 1*(6), 160-166.

Ondieki, A. N., Okioga C., Okwena, D. K. & Onsase, A. (n.d). *Assessment of the Effect of External Financing on Financial* Performance of Savings and Credit Cooperatives in Kisii Central District, Kenya. Available online at http://elearning.jkuat.ac.ke/journals/ojs/index.php/jscp/article/viewFile/842/753 (March 06, 2014)

Onsase, A., Okioga, C., Okwena, D. K. & Ondieki, A. N. N. (n.d). Assessment of the Effects of Performance Management Practices on Provision of Financial Services by Savings and Credit Cooperative Societies: A Case of Gusii Mwalimu SACCO, Kisii Central District, Kenya. Available online at elearning.jkuat.ac.ke/journals/ojs/index.php/jscp/article/download/850/761 (March 06, 2014)

Piprek (2007). Linking with Savings and Credit Cooperatives (SACCOs) to expand financial access in rural areas: a case study of CRDB Bank in Tanzania. Available online at http://www.ruralfinance.org/fileadmin/templates/rflc/documents/1188984200805_CRDB_Ta nzania.pdf (February 27, 2014).

Qin, X. & Ndiege, B.O. (2013).Role of Financial Development in Economic Growth: Evidence from Savings and Credits Cooperative Societies in Tanzania. *International Journal of Financial Research*, *4*(2), 115-125.

Rockafellar, R. T. & Uryasev, S. (2002). Conditional Value-At-Risk for General Loss Distributions. *Journal of Banking & Finance*, *26*, 1443–1471.

Rouk, S.J. (2008). *Measuring Counterpart Credit Risks: An Overview of Theory and Practice*. Unpublished Magister Scientiae Thesis, University of Pretoria.

Salari, M., Ghodsypour, S. H., Lemraski, M.S. & Heidari. H. (2012). A Credit Risk Model For Bank's Loan Portfolio & Optimize The Var. *Interdisciplinary Journal of Contemporary Research in Business, 4*(1), 125-140.

Sebhatu, K.T. (2011). Management of Savings and Credit Cooperatives from the Perspective of Outreach and Sustainability: Evidence from Southern Tigrai of Ethiopia. *Research Journal of Finance and Accounting, 2*(7/8), 10-23.

Sharma, N., Simkhada, N.R. & Shrestha, R. (2005). *Impact Assessment of SACCOS in Nepal's Hill Districts*. Centre for Micro-Finance (Pvt) Limited, Kathmandu.

Sollis, R. (2009). Value at Risk: A Critical Overview. *Journal of Financial Regulation and Compliance, 17*(4), 398-414. http://dx.doi.org/10.1108/13581980911004370.

Temu, S.S., & Ishengoma, E.K. (2010). Financial Linkages and Performance of Rural Microfinance Cooperatives: Tanzanian Case. *Indian Journal of Economics and Business*, Vol. 9. No. 2.

Tesfamariam, K., Tesfay, H., & Tesfay, A. (2013). Relative Efficiency of Rural Saving and Credit Cooperatives: An Application of Data Envelopment Analysis. *International Journal of Cooperative Studies*, *2*(1), 16-25.

Tra, T.T. & Lensink, R. (n.d). *Household borrowing in Vietnam: A comparative study of default risks of informal, formal and semi-formal credit.* University of Groningen, The Netherlands.

Vasanthi, P. & Raja, P. (2006). Risk Management Model: an Empirical Assessment of the Risk of Default: *International Research Journal of Finance and Economics, 7*(1), 17–33.

Waweru, K. M. (2011). An Investigation into the Cash Balance Management Approaches in Saving and Credit Cooperative Societies (SACCOs) in Nakuru County, Kenya. *Journal of Business Studies Quarterly*, *2*(4), 17-26.

Zeller, M., Lapenu, C. & Greeley, M. (2003). *Measuring social performance of micro-finance institutions: A proposal Social Performance Indicators Initiative (SPI).* Final Report Submitted to Argidius Foundation and Consultative Group to Assist the Poorest (CGAP).

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