LIQUIDITY MANAGEMENT AND FINANCIAL PERFORMANCE OF TEACHERS DEPOSIT TAKING SAVINGS AND CREDIT COOPERATIVE SOCIETIES IN KENYA

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ABSTRACT

Purpose: The study objective was to establish the effect of liquidity management on the financial performance of Teachers DT Saccos in Kenya and to evaluate the moderating effect of the size on liquidity management and financial performance of Teachers DT Saccos in Kenya.

*Methodology***:** This study adopted a post-positivist research paradigm to interpret the effect of liquidity management on the financial performance of deposit-taking Saccos in Kenya. The study adopted a descriptive, survey research design. The target population was 18 Saccos classified under teachers' based DT SACCOs according to SASRA records of December 2017 (SASRA, 2018). Census Methodology was used. The study used a data capture form that has been designed by the researcher to collect the data on the independent variables of liquidity management, moderator variable size and dependent variable which was DT Saccos financial Performance. Data were analysed using a combination of descriptive and inferential statistics with the statistical package STATA. Analysed data was presented using graphs and tables.

*Findings***:** The study established that there was a significant effect of capacity and purchased funds on the financial performance of Teachers DT Saccos. The study also established that cash position, total deposit, and core deposit had an insignificant effect on the financial performance of Teachers DT Saccos and that size of the Sacco affects the relationship between liquidity management and financial performance of Teachers DT Saccos.

Unique contribution to theory, practice and policy: The study recommended the development of a more robust liquidity monitoring policy as well as enhancement of the oversight on liquidity management practices. The study also recommended that Teachers DT Saccos should reduce the provisions of loan losses as well as their reliance on external borrowing. Further, the study recommended future studies using other factors influencing liquidity in the Teachers DT Saccos. Lastly, the study recommends a comparative study using other financial intermediaries with similar deposit and asset features such as Deposit Taking Micro Finance Institutions.

Keywords: *Liquidity, financial performances, Teachers DT Saccos*

1.0 INTRODUCTION

The Sacco sub-sector of the cooperative movement has over the years received recognition as important economic players both in developed and developing economies including Kenya, where it has positively impacted the lives of many people. Birchal (2013) observed that after the global financial crisis between 2007 and 2009, there had been increased interest in financial cooperatives as a credible alternative to the traditional banking system. Ademba (2010) noted the evolution of the Sacco movement in Africa over the past 40 years into a formidable force for social and economic transformation. According to WOCCU (2012), there were more than 55,959 financial cooperatives in Africa with a combined membership of over 200 million and 7.72% penetration of the population. WOCCU (2012) ranks the Sacco movement in Kenya as first in Africa with over 5.1 million members, US $ 3.3 million in savings and shares and US$ 4.3 million in loans. This sub-sector of the cooperative movement continues to serve as a critical player in the provision of financial services to Kenya households and small business segments. Kinyua (2013) contends that Saccos play a vital role in mobilizing resources for investment which SASRA (2010) estimates as contributing 43 percent to the country's gross domestic product.

There are two main clusters of Cooperative Societies in Kenya based on the Cooperative Societies Act (ROK, 1997), non-financial and financial cooperatives. The first category deals with the marketing of members' products and services while financial cooperatives offer financial services. Financial cooperatives constitute over 45% of the total number of cooperatives and include Saccos, housing, and investment cooperatives (SASRA, 2013). Before the establishment of the Sacco Societies Regulatory Authority in 2010, the regulation of Sacco activities was through the Cooperative Services Act of 1997 (ROK, 1997) and the Ministerial order of 1997. With the establishment of SASRA, categorization of cooperative societies changed to non-deposit-taking whose business is limited to the mobilization of deposits for purposes of lending to members and deposit-taking which besides mobilizing deposits also offer basic banking' services (SASRA, 2013).

DT Saccos as co-operative societies have traditionally been formed and founded along unique common bond linkages from where they draw their membership, which previously served as the eligibility criteria for their members. SASRA (2018) provides five (5) main categories of classification for DT Saccos in Kenya based on the original common bond that defined the principal sources of membership; government, farmers' teachers' private sector, and the community-based DT Saccos. The government and teachers DT Saccos combined control over 70% of both the assets and deposits in the DT Saccos segment, despite having a combined membership of just about 34% of the total membership in the DT Saccos segment (SASRA, 2018). While the traditional fields of membership as DT SACCOs now embrace an open field of membership the traditional fields of membership of DT-SACCOs remain essential in analysing the general performance and risks associated with a particular common catchment area of membership which is predominant.

Liquidity management is a combination of actions undertaken by a financial intermediary in the course of their day to day operations to ensure they meet their obligations as they fall due and increase profitability and shareholder's wealth. According to FSRA (2013) liquidity management, this is the ability for DT Saccos to fund at a reasonable cost all its contractual

obligations and inability to meet obligations as they fall due and persistent illiquidity or liquidity stress can lead to financial distress or even insolvency.

Financial performance is the result of a firm's policies and operations in monetary terms. It is the result of many different activities undertaken by an organization as cited by Rotich, Namiinda and Njeje (2015). The objective of measuring financial performance is to establish the maximum return on the capital employed in the business (Ngui, 2010). According to the WOCCU (2012), the measurement of financial performance in Saccos is through financial ratios based on six indicators, Protection, Effective financial structure, Asset quality, Rates of return and cost.

Liquidity management and financial performance are essential considerations in determining the growth and performance of DT Saccos. One of the dilemmas in liquidity management is the achievement of the desired trade-off between liquidity and profitability (Reheman & Nasr, 2007). In the DT Saccos subsector, liquidity management is an essential component of the overall risk management framework (Majid, 2003). Owalabi & Obida (2012) contend that profitability does not translate to liquidity in all cases and that a bank can be profitable even without maintaining liquidity.

Liquidity is a core function of a DT Saccos business model which revolves around revenue generation, lending, and payment and should, therefore, be managed to attain minimum requirements below which will result in an inability to meet short term obligations by institutions. Liquidity management therefore according to Mucheru, Shukla & Kibachia (2017) involves daily assessment of liquidity requirements to ensure an amount of liquidity consistent with the desired level without distorting the profit-making ability and operations of the bank.

Size of DT SACCOs

When considering the size and importance of banks and the banking system, total assets represent the indicator which regulators and academics use most frequently (IMF, 2017). Deposits represent the savings of members and are the most important source of funding in ensuring that DT Saccos meet their credit obligations to the members. (SASRA, 2019). SASRA has peer-grouped DT Saccos in terms of their total assets and total deposits to assess those with a high concentration of risks and determining their strengths categorizing them as large, medium or small (SASRA, 2018). According to CUAC (2016), larger credit unions were found to have better viability compared to their smaller counterparts.

In the year 2015, the total deposits in the DT Saccos system registered a 15.3% growth to stand at Kshs 237.4 billion from Kshs 205.9 billion recorded in the previous year (SASRA, 2016). During the year 2018, twenty-seven (27) DT Saccos held assets worth Kshs 5 billion and above and represented 65.8% of the total asset market share in the DT Saccos system. This is in comparison with 21 DT Saccos during the previous year. It is imperative to note that 57 DT Saccos held assets of between Kshs 1 billion and Kshs 5 billion controlling 27.37% of the assets portfolio while the rest of the remaining 90 DT Saccos had assets of below Kshs 1 billion and controlled 6.83% of the entire asset portfolio of the DT Saccos system (SASRA, 2019).

1.1 Problem Statement

DT Saccos act as alternative providers of financial services and according to WOCCU (2014) serves more than 5 million. Kinyua (2013) contends that DT Saccos play a vital role in pooling

resources for investment and wealth creation. They spur economic growth through the mobilization of domestic saving savings with an estimated contribution of 43 percent of the country's gross domestic product (SASRA, 2010).

Achieving a trade-off between liquidity and profitability is a key consideration for the financial sustainability of DT Saccos. The challenge facing DT Saccos is due to the inability to raise liquidity on account of the existence of a mismatch between asset and liability management which will expose the financial institution to financial losses. Maina (2011) posits that the ability of a DT SACCO to fulfil the needs of share and savings withdrawals, external borrowing repayments, member loan demand and operating expenses is negatively affected by low liquidity. The low liquidity ultimately leads to decreased levels of income generation because of low loan disbursements (Kimathi, 2014).

Marozva (2015) observes that the depressed income generation is a significant cause of failure of many DT SACCOs including Teachers DT Saccos as it leads to low levels of economic development, loss of confidence among investors and increased unemployment in the country. Teachers DT Saccos serve a significant segment of the DT SACCOs membership, currently controlling the second highest market share of the DT-SACCOs total assets and total deposits at 35.93% and 34.83% respectively in 2018. The liquidity challenges, therefore, seem to impair the Teachers DT Saccos' ability to offer timely services.

Studies by Shafana (2013); Ibe (2013); Dezfouli, Hasanzadeh, and Shahchera (2014); Bassey and Moses (2015) and Marozva (2015) showed that management of liquidity influences the financial performance of financial intermediaries. Liquidity is directly related to the dividend policy because it determines the timing and how much to distribute and the effects of cash outflows considering that the SACCO Societies Act (2008) prohibits the Teachers DT Saccos from declaring dividends if they have not met the liquidity provisions and if they have not met other administrative requirements. As a result financial performance of Teachers DT Saccos can be strengthened if they can achieve better assets and liabilities structure in pursuit of profit.

The literature reviewed did not appear to address the question of asset-liability management in the DT Sacco sector. In line with Bassey (2015), who determined that liquidity management is inversely related to the performance of commercial banks, this study seeks to address the gap in the study of management of asset and liability management and the influence on the financial performance of Teachers DT Saccos in Kenya.

2.0 LITERATURE REVIEW

2.1 Theoretical Literature

The study was guided by one theory of financial performance, the shareholder theory.

Shareholder theory

Financial intermediaries such as Saccos provide opportunities for members to build savings, earn interest on the savings, and earn dividends from shares. The shareholder theory is credited to Friedman (1970). The theory holds that businesses are merely arrangements by which one group of people, the stockholders, and advance capital to another group, the managers, to be used to realize specified ends and for which the stockholders receive an ownership interest in the

venture. Arguing in favour of maximizing financial return for shareholders and considering the firm as owned by and operated for the benefit of the shareholders, Brandt and Georgiou (2016) view shareholder value as oriented towards an average diversified shareholder who wants maximum profit from his investment in shares.

In this study, shareholders were members of Teachers DT Saccos who besides the opportunity to save and obtain loans, expect a return in the form of dividends and interest on deposits. The relevance of this theory to the study was that the goal of maximization of members of Sacco wealth ensures a closer interdependence between strategy and operational objectives decision making by Teachers DT Saccos in Kenya

Prior research in support of this assertion that shareholders seek to obtain the maximum return from the investment of their capital. Guul, Sajid, Razzaq, Iqbal and Khan (2012) determined that there is a significant influence of dividend policy on shareholder wealth as far as the dividend-paying companies are concerned. Afzal and Mirza (2010) found a positive association between individual ownership and determination of the level of corporate dividend payment. Rajeeva, (2006) concludes that shareholder wealth maximization as a goal ensures that strategy formation matches with the set of operational objectives for managerial decisions.

2.2 EMPIRICAL REVIEW

Liquidity management is fundamental to the wellbeing of the DT Saccos. It ensures proper function of DT Sacco in meeting member needs and determines their sustainability, growth, and development. The number of factors is estimated to determine liquidity management measures of DT Saccos. Koranteng (2016) examined the determinants of liquidity of banks listed on the Ghana stock exchange. The researcher used random-effects GLS regression based on the Hausman test is to estimate the determinants of bank liquidity based on a data set of 7 banks over ten years spanning 2004 and 2013. The study employed liquid assets to total assets as the measure of liquidity for the dependent variable with return on assets, loans, capital adequacy, inflation, gross domestic product, unemployment, and return on equity and bank size as the explanatory variables. The results of the panel data regression showed that, while capital adequacy, bank size and return on equity exhibit a positive and a statistically significant relationship with liquidity, inflation and unemployment have no significant relationship with liquid assets to total assets.

Financial performance is among the critical factors that impact on the sustainability of DT Saccos to ensure they realize their full growth potential in meeting the economic needs of its members. Many factors are believed to influence the financial performance of DT SACCOs.A study by Kristianti and Yovin (2016) explored the internal factors that affect the performance of government and private banks in Indonesia using ROA as the dependent variable and capital adequacy ratio (CAR), operational efficiency, net interest margin (NIM), non-performing loans (NPL) and loan to deposit ratio (LDR) as independent variables. Sampling both government and private banks whose assets were top 10 from 2004 through 2013, the results showed that operational efficiency, NIM, and NPL significantly influence the performance of the government banks while CAR and operational efficiency influence the performance of private banks.

DT SACCOs similar to financial institutions have to be highly concentrated on developing sound techniques for a proper trade-off between liquidity and profitability to ensure they met the needs

of its members in accessing credit and earning a return on their deposits. A study by Dezfouli, Hasanzadeh and Shahchera (2014) attempted to examine the relationship between liquidity risk variables and profitability factors in the Iranian banking system concluded that there is a significant relationship between dependent variables, non-performing loans ratios, liquidity ratios, liquidity gap ratio, capital ratio, and bank size and the independent variables ROE and ROA.

One of the control variables in studies on the financial performance of financial intermediaries is size because economic theory suggests that larger institutions could provide services at lower cost until diseconomies of scale set in. SASRA has peer grouped DT SACCOs in Kenya in terms of their total assets and total deposits. Bisher (2012) sought to determine the relationship between size and financial performance of commercial banks in Kenya. The study was carried out on 43 banks from 2000 to 2011 using multiple regression and correlation analysis. The study findings indicated a weak relationship between size and financial performance but the relationship was statistically significant. Kinyua (2013) undertook a study to establish whether the size of the Saccos as measured by total assets, deposits, and, turnover affects financial performance as measured by the return on asset ratio. While adopting a descriptive survey design and a population of all the deposit-taking Saccos in Kenya licensed by SASRA as at December 2012 using stratified sampling method, the study picked a sample of 30 Saccos consisting of all the three categories of Saccos namely, large, medium and small based on the value of the assets. The study concluded that a strong relationship existed between financial performance and size of Saccos in Kenya.

3.0 RESEARCH METHODOLOGY

This study adopted a post-positivist research paradigm to interpret the effect of liquidity management on the financial performance of deposit-taking Saccos in Kenya. The study adopted a descriptive, survey research design. The target population was 18 Saccos classified under teachers' based DT SACCOs according to SASRA records of December 2017 (SASRA, 2018). Census Methodology was used. The study used a data capture form that has been designed by the researcher to collect the data on the independent variables of liquidity management, moderator variable size and dependent variable which was DT Saccos financial performance. The basis of the study was secondary data on the study variables obtained from SASRA for the study period. The paper was primarily based on panel data, which was collected through a structured document review. The collected panel data were subsequently analysed using descriptive statistics and multiple linear regression analysis. Mean values were generated using the statistical software package STATA to analyse the general trends of the data 2011 to 2018 based on the sector sample of eighteen teachers' based DT Saccos. Standard deviations were calculated to account for the variance in maximum and minimum values collected from the data points. A multiple linear regression model and t-static were used to determine the relative importance of each independent variable in influencing financial performance. The analysed data was presented using graphs and tables.

4.0 FINDINGS

4.1 Descriptive Analysis

Descriptive statistics describe the basic features of the data in the study by providing simple summaries about the sample and measures that can be presented using a simple graphical analysis (Bryman and Bell, 2011). The liquidity management was analysed based on cash position indicator, capacity ratio, total deposits ratio, purchased funds ratio and core deposits ratio to determine the mean, standard deviation and trends of the data from 2011 to 2018. Table 1 presents a summary of the results of the descriptive analysis.

Table 1: Descriptive Analysis Table

	N	Mean	Std. D	Min	Maximum
Interest on Deposits	144	0.06	0.037	0.01	0.125
Total Assets	144	3,984,937,448	7,417,289,514	151,357,283	45,155,799,000
Cash Position Indicator	144	0. 0657	0. 04285	-0.029	0.185
Capacity Ratio	144	0. 6777	0.2140	0.133	0.892
Total Deposit Ratio	144	0. 6530	0.1821	0.423	0.981
Purchased Funds Ratio	144	0.0788	0. 0823	0.001	0.455
Core deposit Ratio	144	0.5400	0. 1774	0.003	0.824

Note. Table 1 reports the mean and standard deviation of all the variables over the sample period. It also reports the minimum and maximum score of both the dependent and the independent variables.

The mean score for the interest on deposits which is measured by the total interest expense on deposits divided by total deposit liabilities is 6 %. The average rate of interest on deposits paid by DT Saccos in 2018 was 7.10% compared to an average rate of 6.95% paid in 2017 (SASRA, 2019). This means that interest on dividends paid by Teachers DT Saccos was in line with the sector average. The standard deviation of 0.037 accounted for the variation between the minimum and maximum values of 12.5 percent and 1 percent respectively. This picture suggests that the sampled Teachers DT Saccos on average offer an average interest on deposit of 6 percent with some Teachers DT Saccos which offer interest on deposit of up to 12.5%, while others are offering as little as 1%. Since interest on deposits reflects the financial performance of the DT SACCO, the higher the interest on deposits the better the financial performance.

Cash position indicator as measured by total cash and deposits due from other financial institutions divided by total assets registers a mean value of 0.0657 with a maximum and minimum value of 0.185 and -0.029 respectively. With a measurement range from 0 to 1, the higher the ratio the better the liquidity to fund immediate cash needs. Besides, the standard deviation of the Cash position indicator was 0.04285 within the period of the study indicating a small variation in values of cash position. The mean of 0.0657 is evidence of a low capacity ratio meaning that on average, Teachers DT Saccos are not in a strong position to fund immediate

cash needs. This according to Kimathi (2014) will lead to decreased levels of income generation due to low disbursements.

The second independent study variable, Capacity Ratio registers a mean value of 0.6777 with a maximum and minimum value of 0.892 and 0.133 respectively. The variable which is measured by Net Loans divided by total assets reported a standard deviation of 0.2140 an indicator of the minimal variation in the values of the capacity ratio. The value of capacity ratio ranges between 0 and 1 and the higher the ratio the better the liquidity to fund immediate cash needs. The mean of 0.6777 is evidence of a high capacity ratio meaning that on average, Teachers DT Saccos can fund immediate cash needs which Miriti (2014) identifies as a measure of financial performance.

The third independent variable used in the study, Total Deposit ratio as measured by total member deposits divided by total assets posted a mean value of 0.6530 with a maximum and minimum value of 0.981 and 0.423 present respectively. The higher the total deposit ratio, the lower is the perceived liquidity risk because unlike purchased funds, customer deposits are less sensitive to a change in interest rates or minor deteriorations in business performance. The standard deviation of 0.1821 reflects minimal deviation in the total deposit ratio values. According to SASRA (2015), DT-SACCOs rely on their ability to mobilize deposits from its members which are in turn utilized to finance the loan portfolio. The mean of 0.6530 indicates that Teachers DT Saccos on average have a stable source of funding from member deposits.

Teachers DT Saccos dependence on Purchased funds registers an average score of 0.0788 with a minimum of 0.001 and a maximum of 0.455 respectively with a standard deviation of 0.0823 accounting for this variation. Purchased funds is measured by the sum of short term borrowings and purchased funds divided by total assets and a high ratio consisting of commercial short term borrowings and other purchased funds represent a liquidity risk because this kind of funding is very sensitive to interest rates. The research evidence suggests that about 7.8% of the Teachers DT Saccos funding in meeting their obligations was sourced from borrowings and therefore contradicts, SASRA (2017) estimates that only 12 percent of DT SACCOs can comfortably fund loans from member's savings

Further evidence from the results of the fifth independent variable, Core Deposit gives an average of 0.5400 in a range of 0.003 to 0.824 within the study period. Core deposit ratio as measured by Core deposits divided by the Total assets The standard deviation of 17.4% accounted for the variation in Core deposit ratio for the study period as measured by Core deposits divided by total assets. The higher the ratio, the lower the perceived liquidity risk because it emphasizes the stable base of deposits. At an average of 54.0%, research evidence supports that Teachers DT Saccos have a stable base of deposits which according to SASRA (2015) they can rely on regardless of seasonal swings. Upon completion of analysis of data trends using mean values and standard deviations for the study period 2011 to 2018 based on the study sample, the research utilised the regression analysis known as OLS to estimate the relationship between liquidity management and financial performance.

4.2 Regression Analysis Results

This section presents the results of the regression analysis to determine the effect of liquidity management on the financial performance of Teachers DT Saccos in Kenya. In this study, Interest on deposits was used as a proxy for financial performance measure which was the

dependent variable. Interest on deposits was regressed on the independent variables, cash position indicator, capacity ratio, total deposits ratio, purchased funds ratio and core deposits ratio using the ordinary least squares model. The regression analysis result is subsequently presented using tables for the model.

Brooks (2008) underlies that there are basic assumptions that are required to determine whether the ordinary least squares model developed had the number of desirable properties and that the hypothesis tests regarding the coefficient estimates could validly be conducted. Where the Classical Linear Regression Model (CLRM) assumptions hold, then the estimators determined by the model will have the desirable properties known as Best Linear Unbiased Estimators.

This study, therefore, undertook diagnostic tests is to ensure that there is no violation of the assumptions of classical regressions. To check the normality, the study used Shapiro-Wilk test, histograms and normal probability curves to confirm whether the residuals follow a normal probability distribution. Upon confirmation of normality, the study tested for multicollinearity using tolerance and variance inflation factor. Any independent variable with a variable inflation factor greater than 10 will be omitted from the analysis.

The Breusch Pagan test (1979) was then utilised in this study to detect heteroscedasticity problems where the errors do not have the same variance. Where heteroscedasticity is detected the model will be re-specified by expressing the model in log-linear form. The last diagnostic test was to test the presence of Autocorrelation, which is the relationship between an error and its immediate previous value, using the Wooldridge test (2002).

4.2.1 Diagnostic Test Results

The following sections discuss the results of the diagnostic tests that were conducted to ensure whether the data fits the basic assumptions of the classical linear regression model. The implication of the test, limits therein, test results and their discussion are also presented.

4.2.2 Normality Test

The normality test was conducted to establish whether the observed values follow a normal distribution. The Shapiro-Wilk test for normality was used to establish whether the observed values of the variables are normally distributed. The results of the Shapiro-Wilk test for normality are presented in Table 2.

Table 2

Normality tests

Variable	Obs	W	V	z	Prob>z
Interest on deposits	144	0.80305	3.819	2.65	0.00402
Cash position ratio	144	0.9229	1.495	0.795	0.21328
Capacity ratio	144	0.93311	1.297	0.514	0.30349
Total Deposit ratio	144	0.86841	2.551	1.853	0.07198
Purchased funds ratio	144	0.93381	1.283	0.493	0.31088
Core Deposit ratio	144	0.92743	1.407	0.675	0.24972
Log of total assets	144	0.86781	2.563	1.862	0.06133

Note. To perform the test, the following hypotheses were used; H_0: The study data are normally distributed while H_1: The study data are not normally distributed.

The results of the test found the prob > z for the variables to be greater than 0.05 except for interest on deposits. The results using a histogram of residuals are shown in figure 1 below.

Figure 1: Histogram of residuals
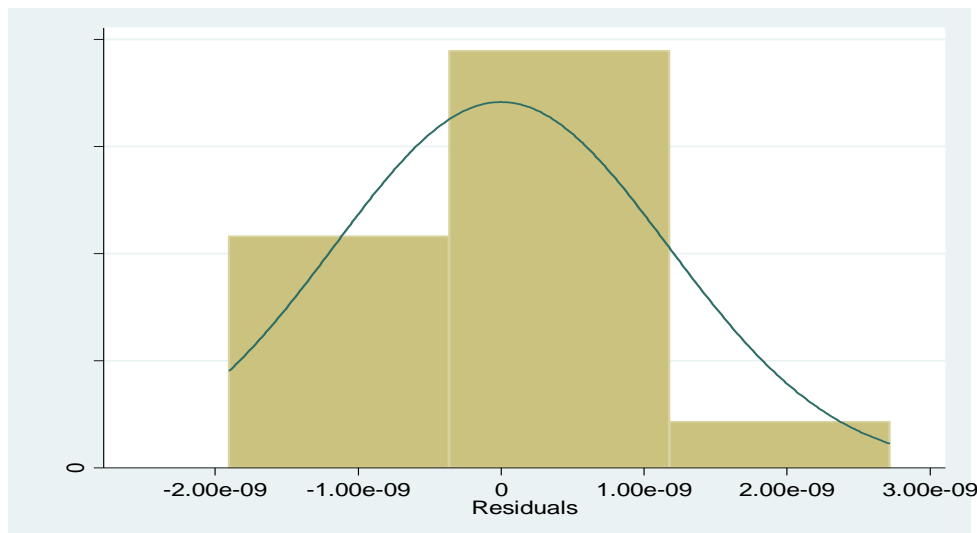
Note. The study concluded that the residuals are normally distributed with a mean value of zero. The study consequently accepted the null hypothesis that the study data is normally distributed and could, therefore, allow for linear regression analysis.

4.2.3 Multicollinearity Test

Multicollinearity test was undertaken to check for the levels of multicollinearity to ensure it does not affect the regression analysis. In this case, the variance inflation factor (VIF) was applied in the study for which tolerance close to 0 indicates a multicollinearity threat (Williams, 2015). A tolerance of below 0.10 or a VIF greater than 10 indicates serious multicollinearity. Table 4.3 presents the results on the test for Multicollinearity.

Table 4.3:

Multicollinearity Results

Variable	VIF	1/VIF
Total Deposit Ratio	3.01	0.332052
Core Deposit Ratio	2.21	0.451985
Log of Total Assets	2.09	0.477791
Capacity Ratio	1.95	0.513104
Purchased Funds Ratio	1.32	0.756969
Cash Position Ratio	1.1	0.906049
Mean VIF	**1.95**	**0.572992**

Note. The results indicate that the mean VIF= 1.95. This was less than 5 which implied that there is no multicollinearity (Salmeron, Garcia, Lopez and Garcia, 2016). This was affirmed by the tolerance factor (values of 1/VIF) for each of the variables being less than 1. This was in agreement with the classical linear model (CLM) assumptions that for a regression analysis to be performed, there should be no multicollinearity in the independent variables.

4.2.4 Heteroskedasticity Test

Test for heteroskedasticity was conducted to test whether the residuals were constant. The study conducted the Breusch-Pagan test for heteroskedasticity was conducted to test whether the residuals were constant. The null hypothesis for the test is that the residuals are homoskedastic which should be shown by a p-value of more than 0.05. The results of the test are presented in Table 3.

Table 3: Heteroskedasticity Results

Heteroskedasticity Test	Breusch-Pagan / Cook-Weisberg test
Ho	Constant variance
Variables	Fitted values of Interest on Deposits
Chi2 (1)	6.38
Prob > chi2	0.0916

Note. Test results revealed a prob>chi2=0.0916 which was greater than 0.05. Thus the null hypothesis (constant variance) was accepted hence the study concluded that there was homoscedasticity. This aligns with the CLM assumption that the variance of error terms is constant.

4.2.5 Autocorrelation

The study also carried out the Autocorrelation test for the relationship between an error and its immediate previous value. The study conducted the Wooldridge test to test for the relationship between an error and its immediate previous value. The null hypothesis of the test is that there is no first-order autocorrelation. Table 4 presents the results on the test for Autocorrelation.

Table 4: Autocorrelation Results.

Test for Autocorrelation in panel data	Wooldridge test
H_o	No first-order autocorrelation
F(1, 17)	0.051
Prob > F	0.8242

Note. Test results revealed a Prob>F=0.8242 which was greater than 0.05. Thus the null hypothesis (constant variance) was accepted hence the study concluded that there was no serial autocorrelation. This aligns with the CLM assumption that the errors associated with one observation do not relate to the errors of any other observation.

The results of the diagnostic tests indicate that the classical linear regression assumptions hold and the model is therefore fit to regress the dependent variable, interest on deposits on the

independent variables, cash position indicator, capacity ratio, total deposits ratio, purchased funds ratio and core deposits ratio.

4.2.6 Model Specification Test

The study undertook the model specification test to determine the choice between the panel estimator approaches to be used. In determining whether to use a fixed-effect or random-effect model, the Hausman test was performed. The null hypothesis, fixed-effect is not the best fit, is rejected if the p-value is less than 0.05. The test results are presented in Table 5

Table 6: Hausman Test

	Coefficients			
	(b) fixed	(B) random	(b-B) Difference	Sqrt (diag (V_b-V-B))S.E
Cash Position	-.0513656	-.0356406	-.0157249	.0276815
Capacity	.0534622	.0778496	-.0243674	.0088868
Total Deposit	.0527674	.0448715	.0078959	.0095545
Purchased Funds	-.1295308	-.0909570	-.0383928	.0173777
Core Deposits	.0031808	-.0224202	.025601	.0120308

b = consistent under H_o and H_a; obtained from xtreg
B = inconsistent under H_a; efficient under H_o; obtained from xtreg

Test: H_O : difference in coefficients not systematic
$chi^2 (5)$ = (b-B) '[(V_b-V_B)^ (-1)] (b-B)
$\quad\quad$ =$\quad\quad$ 18.22
Prob>chi^2 =$\quad$ 0.0027
(V_b-V_B is not positive definite

Note. From the test results, the chi-square for the Hausman test was 18.22 with a probability of chi^2 of less than 0.05 (p= 0.0027). The null hypothesis that the fixed-effect model is not the best fit was therefore rejected, thus the fixed effect model was adopted to analyse the effect of liquidity management on the financial performance of deposit-taking Saccos.

4.2.7 Fixed Effect Panel Regression Results

Table 6 shows the regression analysis where the dependent variable, interest on deposits was regressed on the independent variables, cash position indicator, capacity ratio, total deposits ratio, purchased funds ratio and core deposits ratio using fixed effects panel regression.

The econometric form of the model was implicitly specified as:

$Y_{it} = \beta_0 + \beta_1 X1_{it} + \beta_2 X2_{it} + \beta_3 X3_{it} + \beta_4 X4_{it} + \beta_5 X5_{it} + \varepsilon_{it}$ …………………………(4.1)

Table 6 presents the results of the Fixed Effect Panel Regression

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Table 6: Fixed Effect Panel Regression Results

Fixed Effects (within) regression Group variable: SACCO SOCIETIES			Number of obs	=	144	
			Number of groups	=	18	

R-sq: within = 0.3304			Obs per group: min =		8	
between = 0.1438			avg =		8.0	
overall = 0.2487			max =		8	

			F (5,121)	=	11.94	
corr (u_i, Xb) = -0.1575			Prob > F	=	0.0000	

Interest on Deposits	Coef.	Std.Err	t	P> |t|	[95% Conf. Interval]	
Cash Position Indicator	-.0513656	.0753684	-0.68	0.497	-.2005772	.0978461
Capacity Ratio	.0534622	.021133	2.53	0.013	.011624	.0953005
Total Deposit Ratio	.0527674	.0350753	1.50	0.135	-.0166735	.1222082
Purchased Funds Ratio	-.1293508	.0388757	-3.33	0.001	-.2063155	-.052386
Core Deposit Ratio	.0031808	.0333911	0.10	0.924	-.0629256	.0692873
_cons	.0050648	.0097602	0.52	0.605	-0.142581	.0243878
sigma_u	.0227591					
sigma_e	.02688281					
rho	.41750022	(fraction of variance due to u_i)				

Note. The estimation results reported depicted that, The R-squared and Adjusted R-squared values of 0.3304 and 0.2487 respectively is an indication that the model is a good fit.

This means more than 24.87 % of variations in the financial performance of Teachers DT Saccos in Kenya were explained by independent variables, core deposit ratio, purchase funds ratio, total deposit ratio, capacity ratio and cash position indicator included in the model. However, the remaining 75.13% of changes in the financial performance of Teachers DT Saccos in Kenya are caused by other factors that are not included in the model. Furthermore, the F-statistic was 11.94 and the probability of not rejecting the null hypothesis that there is no statistically significant relationship existing between the dependent variable and the independent variables is 0.0001 which was not greater than 0.05 thus implying that the model was significant and best suited for the regression analysis and that all the independent variables are jointly significant in causing variation in return on asset.

Cash position indicator had a negative and insignificant effect on interest on deposits (β = -0.05, p = 0.497). Capacity ratio had a positive and significant effect on interest on deposits (β = 0.053, p = 0.013). Total deposit ratio had a positive and insignificant effect on interest on deposits (β = 0.052, p = 0.135). Purchased funds ratio had a negative and significant effect on interest on deposits (β = -0.12, p = 0.001). Core deposit ratio had a positive but insignificant effect on interest on deposits (β = 0.003, p = 0.924).

The panel fixed effect estimation regression result in the above table 4.7 shows that coefficient intercept (α) is 0.0051. This means, when all explanatory variables took a value of zero, the average value interest on deposits would be 0.0051 unit and statistically significant at 5% level of significance. The results lead to the following general model that explains the effect of liquidity management on the financial performance of Teachers DT Saccos in Kenya.

Y = 0.0051 – 0.0514 X1 + 0.5346 X2 + 0.5277 X3 – 0.1294 X4 + 0.0032 X5 +ε ……… (4.2)

4.2.8 Fixed Effects After Moderation

To establish the moderating effect of DT SACCO size on liquidity management and the financial performance, the researcher generated new values in STATA and conducted a fixed effect panel regression. Table 7 presents the results of the Fixed Effect Panel Regression after Moderation.

Table 7: Fixed Effects Model After Moderation Results

Fixed Effects (within) regression Group variable: SACCO SOCIETIES			Number of obs = 144 Number of groups = 18			
R-sq: within = 0.3363 between = 0.1755 overall = 0.2630			Obs per group: min = 8 avg = 8.0 max = 8			
corr (u_i, Xb) = -0.1816			F (5,121) = 12.26 Prob > F = 0.0000			

Interest on Deposits-z	Coef.	Std.Err	t	P> |t|	[95% Conf. Interval]	
CPI-z	-.0060362	.0079827	-0.76	0.451	-.0218401	.0097678
CR-z	.0041975	.0018888	2.22	0.028	.0004582	.0079368
TDR-z	.007029	.0037055	1.90	0.060	-.000307	.014365
PFR-z	-0128454	.0042953	-2.99	0.003	-.021349	-.0043418
CDR-z	0.0009893	.0037746	0.26	0.794	-.0064835	.0084622
_cons-z	0.0029871	.0098504	0.30	0.762	-.0165143	.0224884
sigma_u	.02248586					
sigma_e	.0267639					
rho	.4137864	(fraction of variance due to u_i)				

Note. According to the results, the r-squared after moderating the independent variables with the size of the SACCO was 0.2630, implying that after moderation the independent variables explain 26.3 % changes in the dependent variable.

The f statistic f (5,121), probability value was 0.0001 was less than 0.05 indicating that after moderation the independent variables have a significant joint effect on the dependent variable which was interests on deposits.

Cash position indicator had a negative and insignificant effect on interest on deposits (β = -0.006, p = 0.451). Capacity ratio had a positive and significant effect on interest on deposits (β = 0.004, p = 0.0283). Total deposit ratio had a positive and insignificant effect on interest on deposits (β = 0.007, p = 0.06). Purchased funds ratio had a negative and significant effect on interest on deposits (β = -0.13, p = 0.003). Core deposit ratio had a positive but insignificant effect on interest on deposits (β = 0.009, p = 0.762). The results lead to the following general model that explains the effect of liquidity management on the financial performance of Teachers DT Saccos in Kenya after moderation by size.

$$Y = 0.0030 - 0.006\ X1 + 0.004\ X2 + 0.007\ X3 - 0.13\ X4 + 0.009\ X5 + \varepsilon \dots\dots\dots\dots.. (4.3)$$

4.3 Hypotheses Testing

This section presents the results of the hypothesis testing at 5 percent (5%) significance level, which were based on the p-values as shown in Table 4.7 and Table 4.8.

H_{01} Cash Position has no significant effect on the financial performance of Teachers DT Saccos in Kenya.

The coefficient of Cash position indicator which is measured by total cash and deposits due from other financial institutions divided by total assets is -0.006 and its P-value is 0.451. Holding other independent variables constant at their average value, when cash position indicator decreases by 6 %, interest on deposits of sampled Teachers DT Saccos increased by 5% and statistically insignificant at 5% of significant level. The null hypotheses stated that there is no significant effect of cash position indicator on interest on deposits. From the results, cash position indicator had a negative and insignificant effect on interest on deposits hence the study fails to reject the null hypotheses.

The result is consistent with Nedunchezhian and Premalatha (2015) who found no significant relationship between cash at bank and financial performance as well as Ibe (2013) who concluded that management of cash and short-term fund contributes negatively to the financial performance of banks. The study, however, varies with Ismail (2016) whose study found that the current ratio has a significant positive impact on financial performance.

H_{02} Capacity has no significant effect on the financial performance of Teachers DT Saccos in Kenya.

The coefficient of Capacity Ratio which is measured by Net Loans divided by total assets is 0.053 and its P-value is 0.013. Holding other independent variables constant at their average value, when capacity ratio increased by 5.3%, interest on deposits of sampled Teachers DT Saccos increased by 5% and statistically significant at 5% of significant level. The null hypotheses stated that there is no significant effect of capacity ratio on interest on deposits. From the results, capacity had a positive and significant effect on interest on deposits, hence the study rejects the null hypotheses and concludes that capacity ratio has a significant effect on interest on deposits.

The relationship is as expected and is consistent with previous studies of (Okumu and Oyugi 2016; Salim and Bilal, 2016; Zidan, 2020) which established a significant relationship between Net Loans to Total Assets and bank's profitability. This relationship between capacity ratio and interest on deposits could be attributed to the fact that a DT Sacco with a higher capacity ratio has a stronger ability to meet immediate cash needs and results in better financial performance.

H_{03} Total deposit has no significant effect on the financial performance of Teachers DT Saccos in Kenya.

The coefficient of Total Deposit ratio which is measured by Total member deposits divided by total assets is 0.052 and its P-value is 0.135. Holding other independent variables constant at their average value, when total deposit ratio increased by 5.2%, interest on deposits of sampled Teachers DT Saccos increased by 5% and statistically insignificant at 5% of significant level. The null hypotheses stated that the total deposit ratio on interest has no significant effect on deposits. From the results, the total deposit ratio had a positive and insignificant effect on interest on deposits hence the study fails to reject the null hypotheses and concludes that total deposit ratio has no significant effect on deposits.

The result is consistent with previous studies by (Okun, 2012; Trujillo, 2013; Hubarieva, Lebid, and Zuieva, 2017; Zidan, 2020) that established a significant relationship between Deposit Asset Ratio and profitability.

H_{04} Purchased funds has no significant effect on the financial performance of Teachers DT Saccos in Kenya.

The coefficient of Purchased Funds ratio which is measured by the sum of short term borrowings and purchased funds divided by total assets is -0.12 and its P-value is 0.001. Holding other independent variables constant at their average value, when purchased funds ratio decreases by 12% percent, interest on deposits of sampled Teachers DT Saccos increased by 5% and statistically significant at 5% of significant level. The null hypotheses stated that purchased funds ratio on interest has no significant effect on deposits. From the results, purchased funds ratio had a negative and significant effect on interest on deposits hence the study rejects the null hypotheses and concludes that purchased funds ratio has a significant effect on interest on deposits.

The relationship is as expected and is in tandem with Salim and Bilal (2016) who study explains that there a significant relationship between the bank's loans/ total assets and return on assets. This relationship between purchased funds ratio and interest on deposits could be attributed to the fact that a DT Sacco with a high ratio of purchased funds has a higher risk of liquidity resulting in lower financial performance.

H_{05} Core deposit has no significant effect on the financial performance of Teachers DT Saccos in Kenya.

The coefficient of Core Deposit measured by Core deposits divided by the Total assets is 0.003 and its P-value is 0.924. Holding other independent variables constant at their average value, when core deposit increase by 3%, interest on deposits of sampled Teachers DT Saccos increased by 5% and statistically significant at 5% of significant level. The null hypotheses stated that core deposits ratio on interest has no significant effect on deposits. From the results,

core deposits had a positive but insignificant on effect on interest deposits hence the study fails to reject the null hypotheses and concludes that core deposit ratio has no significant effect on deposits.

The result indicating a positive influence of deposits on performance is consistent with (Okun, 2012; Trujillo, 2013; Hubarieva, Lebid, & Zuieva, 2017) which concluded that a high proportion of customer deposits appears to have a positive effect on profitability. The results, however, are in variance with finding that the relationship is significant. The study findings were also inconsistent with those of Ibe (2013) regarding the impact of liquidity management on the profitability of banks in Nigeria.

H_{06} Size of Teachers DT Saccos has no significant moderating effect on liquidity management and the financial performance of Teachers DT Saccos in Kenya.

From table 4.8, the R-square before moderation was 0.2487 implying that liquidity management 24.87 percent of the financial performance of Teachers DT Saccos in Kenya. After moderation, the R-square it increased to 0.2630 implying that liquidity management explained 26.3 percent of changes in the financial performance of Teachers DT Saccos in Kenya. In that regard, the size of the Teachers DT Saccos increases the effect of liquidity management on the financial performance of Teachers DT Saccos. The null hypotheses stated that there is no significant moderation effect of total assets on the relationship between independent and dependent variables. The F-statistic is significant at 0.00001 and therefore, the study rejects the null hypotheses and concludes that there is significant moderation effect of total assets on the relationship liquidity management and financial performance of Teachers DT Saccos in Kenya. The result is consistent with the previous studies of (Dietrich and Wanzenried, 2011; Naceur and Omran, 2011; Kinyua, 2013; Banerjee and Majumdar 2014) that suggested that the relationship between the bank size and profitability may be positive or negative.

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

This study aimed to assess the effect of liquidity management on the financial performance of Teachers DT Saccos in Kenya. Liquidity has a significant effect on the financial performance of firms and where there exists a mismatch between assets and liabilities this will expose the Teachers DT Sacco to financial losses. The ability of the Teachers DT Sacco to fulfil the needs of its members is negatively affected by low liquidity which ultimately leads to decreased levels of income generation on account of low loan disbursements which is subsequently a significant cause of failure of many DT Saccos

The analyses were made in line with the specific research objectives and stated hypotheses formulated in the study. Thus, panel data of eighteen Teachers DT Saccos for eight years was used for the analysis purpose. Data used for analysis was obtained from regulatory reports of each DT Sacco submitted to SASRA. Before making regression analysis, the data went through all diagnostic tests, including multicollinearity, heteroskedasticity, normality and autocorrelation for the classical linear regression model by using STATA software. The descriptive statistics revealed the data to be normally distributed. Also, the assumptions needed to be fulfilled for

OLS were tested; the data was found to be homoskedastic, free of autocorrelation and free of Multi-collinearity.

The general objective of the study was to assess the effect of liquidity management on the financial performance of Teachers DT Saccos in Kenya. One objective of the study was to determine the effect of Cash position on the financial performance of Teachers DT Saccos in Kenya as proxied by interest on deposits. Against the hypothesis Cash Position has no significant effect on the financial performance of Teachers DT Saccos in Kenya, the regression analysis result indicated that the explanatory variable, Cash Position had a negative relationship of 6 % with interest on deposits and statistically insignificant at 5% significance level based on P-value of 0.451. The study concluded that although cash position influences the performance of Teachers DT Saccos in Kenya the effect is insignificant and in that regard, Teachers DT Saccos need not focus too much on monitoring Cash Position as this may not have a significant effect on their financial performance.

The second objective of the study was to determine the effect of Capacity on the financial performance of Teachers DT Saccos in Kenya as proxied by interest on deposits. Against the hypothesis Capacity has no significant effect on the financial performance of Teachers DT Saccos in Kenya, the regression analysis result indicated that the explanatory variable, Capacity has a significant impact on interest on deposits based on P-value of 0.013 with a positive relationship of 5.3%. This means that any increase/decrease in the value of Capacity leads to an increase/decrease in the financial performance of Teachers DT Saccos. A declining capacity ratio means that the Teachers DT Saccos is less loaned up, thus more liquid and better able to absorb additional loan demand. Managers of the Teacher Based DT SACCOs should aggressively mobilise resources to improve their capacity to improve their financial performance.

The third objective of the study was to establish the effect of total deposit on the financial performance of Teachers DT Saccos in Kenya. Against the hypothesis total deposit has no significant effect on the financial performance of Teachers DT Saccos in Kenya, the regression analysis result indicated that the explanatory variable, the total deposit had a positive relationship of 5.2 % with interest on deposits and statistically insignificant at 5% significance level based on P-value of 0.135. The study concluded that although total deposit influences the performance of Teachers DT Saccos in Kenya the effect is insignificant and in that regard, Teachers DT Saccos need not focus too much on monitoring total deposit as this may not have a significant effect on their financial performance.

The fourth objective of the study was to establish the effect of purchased funds on the financial performance of Teachers DT Saccos in Kenya. Against the hypothesis purchased has no significant effect on the financial performance of Teachers DT Saccos in Kenya, the regression analysis result indicated that the explanatory variable, purchased has a significant impact on interest on deposits based on P-value of 0.001 with a negative relationship of 12%. This means that any increase/decrease in the value of purchased funds leads to a decrease/increase on the financial performance of Teachers DT Saccos respectively. A decline in this ratio is a pointer to lower liquidity risk because less of the Teachers DT Sacco is financed with volatile purchased funds. The managers of Teachers DT Saccos should build upon their respective loan books to improve their financial performance.

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The fifth objective of the study was to establish the effect of core deposits on the financial performance of Teachers DT Saccos in Kenya. Against the hypothesis core deposits has no significant effect on the financial performance of Teachers DT Saccos in Kenya, the regression analysis result indicated that the explanatory variable, core deposits had a positive relationship of 3 % with interest on deposits and statistically insignificant at 5% significance level based on P-value of 0.924. The study concluded that although core deposits influence the performance of Teachers DT Saccos in Kenya the effect is insignificant and in that regard, Teachers DT Saccos need not focus too much on monitoring core deposits as this may not have a significant effect on their financial performance.

The final objective was to establish the moderating effect of size of DT Saccos as proxied by the log of total assets on liquidity management and the financial performance of Teachers DT Saccos in Kenya. Against the hypothesis Size of Teachers DT Saccos has no significant moderating effect on liquidity management and the financial performance of Teachers DT Saccos in Kenya, the panel fixed effect estimation regression results indicated that R-square before moderation was 0.2487. This implies that the explanatory variables explained 24.87 percent of the financial performance of Teachers DT Saccos in Kenya. After moderation, the R-square increase to 0.2630 implying that the explanatory variables explained 26.30 percent changes in the financial performance of Teachers DT Saccos in Kenya. The study concluded that the size of the Teachers DT Saccos significantly moderates the relationship between liquidity management and financial performance. This shows that a Teachers DT Sacco that is large in size performs better in contrast with DT Saccos of smaller size due to the existence of economies of scale.

Conclusions

From the conclusions of the study, some new knowledge has emerged which can assist Kenyan policymakers and industry regulators guide the Sacco sector in the desired direction. The substantive body of previous studies on financial intermediaries demonstrating the influence of liquidity on financial performance have focused on the mainstream banking sector using the theoretical framework on regulation provided by Central Banks. Secondly, this study has contributed towards expanding empirical literature on the financial performance of DT Saccos using the regulatory framework provided by DT Sacco regulator. In the study, liquidity is constructed from both the asset and liability side of the balance sheet and the contribution of this paper offers these additional metrics. The study findings and recommendations will be of importance to policymakers in the Department of Cooperatives and the industry regulator, SASRA in guiding the sector in the desired direction. Finally, the study has extended existing empirical literature on liquidity management by financial intermediaries. It will be interesting to link our findings to other categories of DT Saccos as well as similar industry players such as non-deposit taking Saccos and Deposit-taking Microfinance institutions.

Recommendations

Policy: SASRA and the Department of Cooperatives should develop a more robust liquidity monitoring policy. This will ensure greater attention is paid in particular to the variables of Capacity and Purchased funds which have a link with financial performance and subsequently enhance liquidity management practices beyond the 15% statutory minimum liquidity requirement. SASRA and the Department of Cooperatives should enhance the oversight on

liquidity management practices to help reduce risks. DT Saccos should establish Asset-Liability management committees to proactively manage their assets and liabilities. The regulator should ensure mandatory training of the board members and management on liquidity. This will enable the DT Saccos to pay great attention to ratios to compare themselves with their peers and ultimately improve the market share of DT Sacco movement.

Practice: Teachers DT Saccos should strive to reduce the provisions of loan losses. This reduction would translate to an increase in net loans leading to an improved capacity ratio leading to improved financial performance. Teachers DT Saccos should reduce their reliance on external borrowing to fund their assets and instead rely on a large base of retail deposits. External borrowing is expensive and a reduction in borrowed funds improves the purchase ratio. This would lead to improved financial performance due to the relatively cheaper deposits from member savings.

Finally, the managers of Teachers DT Saccos should have consideration for the size of DT Sacco as they seek to grow their market share. The size of the DT Sacco based on the peer grouping affects financial performance. The larger the Sacco, the greater the benefit of economies of scale leading to improved financial performance.

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