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Abstract

Financial performance of Kenya's deposit-taking savings and credit co-operative societies has been a source of concern, as evidenced by declining indicators over time. According to the SASRA study, profitability has declined significantly, as evidenced by a drop in Return on Assets (ROA) from 2.65% in 2020 to 1.59% in 2021. The purpose of this study was to investigate the effect of prudential requirements imposed by Kenya's Savings and Credit Cooperative Societies Regulatory Authority (SASRA) on the financial performance of Deposit Taking Savings and Credit Cooperative Organisations (SACCOs). The objectives of the study were to investigate the effect of liquidity, asset quality and capital sufficiency on and financial performance of deposit taking saving and credit co-operative societies in Kenya. The study was based on public interest theory, buffer theory and agency theory. The study employed a comparative research design and positivist research theory. The population studied in this study consisted of 175 licenced Deposit Taking SACCOs. Secondary data was used in the study, which was then analysed using descriptive and inferential statistics. Stata was used to conduct the analysis in this study. A multiple linear regression model was used to forecast financial performance. Diagnostic tests were performed to ensure that the linear regression model assumptions are not violated. The correlation results showed that liquidity has a negative correlation (-0.0497) with ROA. Capital adequacy showed a positive correlation (0.6710) with ROA. Similarly, asset quality had a positive correlation with ROA (0.5663). Panel regression results confirmed the importance of capital adequacy and asset quality in driving financial performance, as evidenced by highly significant coefficients (0.7140 and 0.2087, respectively) with p-values of 0.0000. The liquidity coefficient, on the other hand, was found to be -0.0008 with a p-value of 0.7380, indicating that changes in liquidity have a negligible impact on ROA. The study discovered that liquidity, capital adequacy, and asset quality explain 62.65% of the variation in financial performance (ROA). The study recommended that deposit-taking savings and credit co-operative societies (SACCOs) should take a balanced approach to liquidity management in order to optimise financial resources and potentially increase returns, and employ a solid capital base to improve stability.

Keywords: *Micro Finance Institutions, Non-performing loans, Net Interest margin, portfolio at risk, capital adequacy.*

1.0 Introduction

A Co-operative is an organization formed by people whose primary objective is to support their economic, social, cultural demands and desires in a properly regulated organization (WOCCU, 2015). Globally Co-operative sector in developed countries is a key enterprise that highly contributes to the understanding of the sustainable economic development goals with 9.09% penetration rate. Statistics show that there are 89,026 Credit Unions (SACCOs) across 6 continents in the 117 countries. These Credit Unions have total savings and deposits of US Dollars 1.7 trillion, assets base of US Dollars 2.115 trillion, loan book of US Dollars 1.5trillion with 260,164,742 members. Co-operatives worldwide are estimated to have employed 250 million people with an estimated global turnover of US Dollars 2.2 trillion (WOCCU, 2017). Co-operatives history date back in year 1852 in Germany whereby two pilot projects where merged to a credit union (Ondieki, Okioga, Okwena & Onsase, 2013). Raiffeisen in 1864 found the first Credit Union to serve financial demands of local communities who were unbanked due to low seasonal cash flows and little human resources (WOCCU, 2015). From then, there has been expeditious development of Credit Unions worldwide based on Raiffeisen organizational model (Diekmann, 2012).

Co-operative societies in East Africa have gained ground in the past decade following the passing of EAC Co-operative Societies Bill 2014 as a legal framework that oversees SACCOs' functions within the region (Oliech & Owoko,2018). This was in line to the EAC treaty as well as the Kenyan National Legislations on Co-operatives that advocates for the strengthening the private sector (Altman,2017). The bill ratifies that all states within the EAC bear the responsibility of efficiently using their available resources to develop the capacity of organisations in the private sector to take active part in different economic activities. In addition, the bill acknowledges that state parties play a significant role in taking part in coming up with national legislations that promote the day-to-day operations of SACCOs within the region (Barus, Muturi, Kibati & Koima,2017).

In Kenya SACCOs are the fastest growing within the Co-operatives accounting for over 50 per cent of the registered Co-operatives. There are over 14,000 registered Co-operatives,5,000 are SACCOs with 175 being licensed as Deposit Taking SACCOs (SASRA, 2020). SACCOs have mobilized savings of over kshs.430billion accounting for 33% of national savings and 40% of gross domestic product helping 63 percent of Kenyan residents through direct, indirect employment and financing small businesses. Further SACCOs have advanced loans to the tune of kshs.473billion and assets base of kshs.627billion (SASRA,2020). The SACCO Societies Act 2008, along with its prudential regulations provides the minimum core capital required for a Deposit taking SACCOs as kshs. 10 million, 10 per cent of Core capital to total assets,8 per cent of Core capital to deposits and 8 per cent institutional capital to total assets (SASRA,2015). Capital increases SACCO liquidity that is a buffer in times of adverse situations as deposits are prone to bank runs. Further it cushions a SACCO against operational, market and credit risks as it absorbs losses and protects debtors. It has a relationship on SACCO profits as it is a key determinant in expansion and investments which bring more revenue to the SACCO (SASRA,2014).

The investments regulation requires SACCOs not to invest in property or equipment and non-earning assets more than 10 percent of total assets of which buildings and land should not be more than 5 percent except where a waiver has been granted from the authority (GOK,2008). Corporate governance is the ways organizations are governed and managed. A SACCO must have elected Board of Directors and senior management who are vetted by SASRA. The board responsibility is

to establish appropriate SACCO policies and decision making. There is clear separation of duties of the management and board to ensure accountability and transparency. It is more than ten years since SASRA introduced Deposit Taking SACCOs prudential regulations but the effect of these prudential directives on SACCOs has not been established. SASRA is the sole licensing authority for DTS as mandated by the SACCOs Societies Act 2008 and prudential regulations 2010. The regulatory authority ensures that the DTS provide both easy-to-withdraw and non-withdrawable deposits for all members. According to Odero, Egessa & Oseno (2020), SACCO members can use the non-withdrawable deposits as collateral for securing credit facilities and they can withdraw their funds only after they terminate their membership. Non-deposit taking SACCOs are not legalized to obtain withdrawable deposits or present themselves to the public as deposit-taking institutions (Njenga & Jagongo, 2019).

1.1 Statement of the Problem

According to a report from SASRA, the Return on Assets (ROA) decreased from 2.65% in 2020 to 1.59% in 2021, indicating a significant drop in profitability (SASRA, 2022). Furthermore, the capital adequacy, measured by Institutional Capital/Total Assets, declined from 11.39% in 2020 to 9.15% in 2021, reflecting a reduction in the capacity of these institutions to absorb potential losses (SASRA, 2022). The decline in Net Income after Tax is also evident, with a decrease from 17.59% in 2020 to 11.20% in 2021, further highlighting the financial challenges faced by these co-operatives (SASRA, 2022). These statistics indicate a worrisome trend in the financial performance of this SACCOs, calling for comprehensive investigation into factors contributing to this decline and the potential remedies to improve their financial stability and sustainability.

Previous studies have explored prudential regulations and their impact on financial performance of SACCOs. However, none of them, especially in Kenya, have directly explored the influence of liquidity, capital adequacy, and asset quality on the financial performance of DTSs. Muriithi and Waweru (2017) investigated the degree to which liquidity risk influences the financial performance of the 43 Commercial banks. Onyango (2018) states that the two main functions of capital are that it works as an incentives function and a risk-sharing function. Since most liabilities of SACCOs are debt-like in nature, SACCOs use capital adequacy as a policy tool that allows them to take more risks so that they don't shift them to depositors.

Ngeno (2019) examined how the capital adequacy framework is associated with Kenyan DTS financial performance. Magomere and Otinga (2019) investigated factors that determine microfinance institutions (MFIs) financial performance in the region. Musyoka (2017) explored the influence of capital adequacy on financial performance of financial institutions. A study carried out by Kamande (2017) investigated degree to which particular aspects affected financial performance of Kenyan financial institutions within a term of 5 years. Kamau (2017) investigated the extent to which regulations affected the SACCOs' financial performance in Eldoret, Kenya. The findings from the current research can serve as a basis for policymakers, regulators, and the SACCO industry to optimize financial management strategies and promote greater financial stability and sustainability for these co-operatives. Moreover, the study can act as foundation to future researchers to delve deeper into the intricacies of financial performance analysis within the SACCO sector and explore other potential factors that may influence their success in the dynamic financial landscape of Kenya.

1.2 Research Objectives

The study was guided by the following research objectives;

i. To establish the effect of liquidity on the financial performance of **DTSs** in Kenya

ii. To explore the effect of capital adequacy on the financial performance of **DTSs** in Kenya

iii. To analyse the effect of asset quality on the financial performance of **DTSs** in Kenya

1.3 Hypotheses

The study tested the following hypotheses;

i. **$H0_1$:** Liquidity does not have a significant impact on financial performance of DTs in Kenya.

ii. **$H0_2$:** Capital adequacy does not have a significant impact on financial performance of DTs in Kenya.

iii. **$H0_3$:** Asset quality does not have a significant impact on financial performance of DTs in Kenya.

2.0 Literature Review

2.1 Theoretical Literature

2.1.1 Public Interest Theory

This theory was developed by Arthur Cecil Piguo (1932) and postulates that financial regulations try to develop a second-best market to enhance the strength of financial systems and safeguard depositors (Hantke-Domas, 2003). Regulatory bodies are supposed to address underlying issues in such a way that the solutions are beneficial to the entire society, instead of the vested interests of individuals. This forces regulators to bear the responsibility of implementing procedures that are well defined and all inclusive. This theory is relevant to this study since it describes the rationale of why government introduces regulations through different state departments. To regulate the conduct of SACCOs, SASRA publishes prudential guidelines and circulars that are, in essence, rules that guide how SACCOs operate their businesses. The theory identifies that regulations are meant to ensure that public interest is safeguarded and is always upheld. This is why SASRA is so stringent about following and adhering to these rules. Hence the theory is consistent with the objectives that are being sought by this study.

2.1.2 Buffer Theory of Capital Adequacy

Calem and Rob (1996) invented this concept which helps financial institutions that are at risk of violating the regulatory minimum capital ratio to increase their capital and minimize risks associated by any impending breaches. To keep their legal capital requirements in check, most financial institutions usually hold a buffer capital when they are experiencing volatile capital adequacy ratio (Ikpefan, 2013). Banks with poorly capitalized ratios are always encouraged to take additional risk with the expectation of gaining higher returns that will lead to a boost in their capital. Since most banks hold more than the suggested capital, regulations aimed at creating acceptable capital buffers (Adamgbo, Toby, Momodu & Imegi, 2019). In SACCO context, the capital buffer refers to the surplus amount of capital held beyond the required minimum. As

expounded by Onyango (2018) if a SACCO has low capital buffers, they can raise more capital, but firms with sufficient or higher capital only need to sustain their buffer. The reasoning behind this is that firms with more capital are less likely to fail because they are protected from adverse financial shocks. Therefore, if the portfolio at risk of a SACCO increases, it responds by raising capital because capital adequacy is a key determinant of SACCO performance.

2.1.3 Agency Theory

Meckling and Jensen (1976) invented this theory and postulated that in modern day enterprises, most managers fail to maximize the returns of shareholders unless they are held accountable by effective governance structures. In large firms, owners (known as principals) usually employ managers (known as agents) to protect shareholder interests. In most cases, the actions taken by the managers play a key role in resolving the issues arising from various business transactions affecting shareholders. In agency theory, principal-agent conflict may occur when miscommunication and discrepancies from both parties deviate from the best interests of other stakeholders leading to an agency loss (Vitolla, Raimo & Rubino, 2020).

2.2 Empirical Literature

Muheebwa (2018) did a study on liquidity of SACCOs in Uganda and level to which it relates to financial performance of microfinance institutions. Researcher used modern portfolio theory to provide rationale behind the study. The target population was 135 SACCOs. Stratified sampling was used to choose sample size of 19 SACCOs. Data was gathered by questionnaires and analysed using SPSS. According to the findings there was significant link between SACCOs financial performance and liquidity. Researcher conclusion was liquidity helps SACCOs to stay financially afloat since they will have enough cash to meet their financial commitments and plan for future investments promptly. However, the study did not examine the SACCOs' capital adequacy and asset quality which are important in determining the exact amount of cash inflows and outflows, which affects liquidity.

Gweyi, Olweny and Oloko (2018) performed research to explore level in which liquidity risk influenced 164 DTS financial performance. Through a census method, the study sampled 135 SACCOs. The secondary data was gotten from firms audited financial reports and results were analysed utilising inferential and descriptive statistics. Research showed that liquidity negatively influenced SACCOs financial performance, because majority of the SACCOs failed to prioritize the need to manage their liquidity using their own resources besides deposits from the members. Most of the SACCO members frequently withdrew their deposits to seek better investment options provided by commercial banks, and this negatively affected the liquidity of the DTS. However, the study did not consider capital adequacy and asset quality which are important in determining a SACCO liquidity ability to settle existing debt obligations without the DTS raising external capital. Ngeno (2019) established the extent to which capital adequacy framework is associated with Kenyans DTS financial performance. The study used a census survey to select 111 DTS to collect data from respondents using questionnaires. The study found out that risk management, credit management, internal financing, capability of management, and portfolio selection has a positive influence on SACCOs financial performance. Other finding was that fund allocation had a moderating influence on capital adequacy and financial performance. Recommendation was that SACCOs ought to seek external financing and use it as leverage for achieving better performance. However, the researcher heavily relied on primary data sources.

A study by Nguyen et al (2018) investigated factors influencing profits of 13 banks in Vietnam to help understand the existing financial situation of the banking industry and launch suitable policies. The results were based on panel data that was gathered and analysed. The independent variables were the rates of ROA, ROE, and net interest margin. 19 domestic banks were included as independent variables, along with macroeconomic indicators and bank-specific metrics. Size, liquidity, capital sufficiency, ownership framework, credit risk, and the cost to income ratio are some of bank-specific characteristics that were analysed. GDP and inflation variables were studied. Study found out that capital framework was connected to NIM and liquidity was positively associated to ROE. Income to cost ratio was seen to have an adverse significant impact on profits, where a negative association indicates productiveness and increased income. Profitability was hampered by concerns about defaulting on payments and foreign ownership. Capital framework negatively affected ROE and liquidity negatively affected both NIM and ROE measures. There were no glaring correlations between profits and factors like government ownership, asset size, GDP, or inflation.

Magomere and Otinga (2019) performed study in Kakamega County and investigated factors that determine micro finance institutions (MFIs) financial performance. The researchers sampled 94 Senior Managers from 17 MFIs operating in Kakamega County and used questionnaires to collect data both manually and electronically. According to the results, it was revealed that adequate capital base, minimum capital requirements and relative capital significantly influenced the ROI of MFIs in Kakamega County. To realize an increase in ROI, the study recommended that MFIs have a duty to implement appropriate loan provisions for bad debts and adequate loan loss reserve. A study by Said (2018) analysed effect of asset quality on profitability of small banks in US from 2010 to 2017. The Researcher examined commercial banks with assets size from $100M to $300M. Researcher applied the Pearson Product Moment Correlation for measuring correlation between the ROA and ROE and the total non-current assets, and 90 days' leases and loans in non-accrual status. According to the findings, both ROA and ROE had a negative association with all independent variables. The increased rules and control over interest rates are evidence of this study's findings. However, the researchers only focussed on small commercial banks in the US.

Hamdillah, Purwanto, & Ermawati (2021) state that a substantial risk component of SACCO depends on the quality of its assets because its main task is extending credit to members. Default happens when a debtor breaches the debt contract or fails to pay the loan instalments. Among the main causes of SACCO poor performance in Kenya is poor asset quality (loans) especially insiders non-performing loans. According to Kamande (2017), asset quality evaluated by net NPLs to gross loans ratio has grown over the last 5 years. This can be linked to the risk management programs executed by banks that improved credit appraisal and management quality. SASRA and CBK directives on asset quality are same and grant SACCOs asset quality ratios that should be maintained for enhanced performance. SASRA regulates the level of asset investment but in few instances, some assets are worth investing and provide good pay back if properly regulated (Masika & Simiyu,2019).

2.3 Conceptual Framework

The framework provides a proposed diagrammatic relationship of the study variables. Independent variables consist of Liquidity, Capital Adequacy, Asset Quality (Loan Provisioning) while the dependent variable (DV) is financial performance of DTs evaluated by ROA.
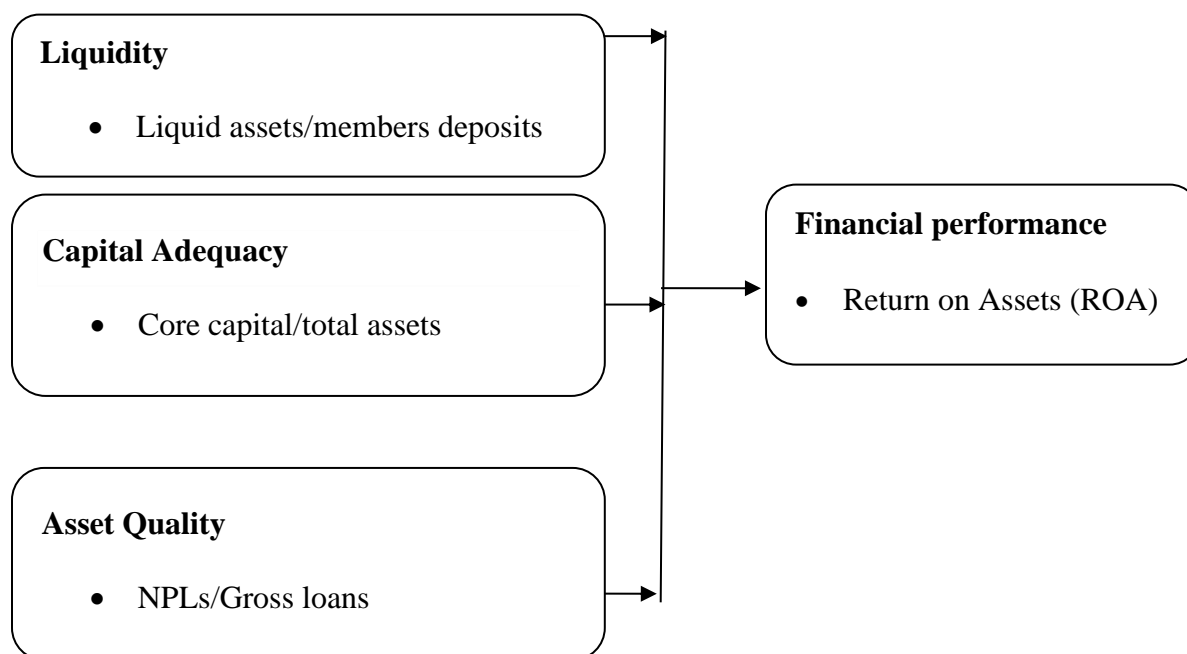
Figure 1: Conceptual Framework

3.0 Research Methodology

The study employed a descriptive research design. A multivariate regression model was used in the study to determine the relationship between independent and dependent variables. Due to the small size of the population, a census sampling technique was used in this study (Mugenda and Mugenda, 2013). A total of 175 licenced Savings and Credit Cooperative Organisations (SACCOs) provided data. Because financial statements contain cross-sectional and time series information, panel data was used to reduce bias in parameter estimators (Baltagi, 2005). For eight (8) years, the researcher collected data from 175 DTS. A descriptive analysis was performed (mean, standard deviation, minimum, and maximum). Multiple correlation was used to investigate the relationship between variables. The impact of SASRA prudential regulation on DTS financial performance was assessed using a multiple linear regression model. Data was analysed using Stata Version 17 and advanced MS Excel, and findings were presented in the form of tables and graphs. Normality and multicollinearity tests were performed as diagnostics. To check for heteroscedasticity in the data, the Breusch-Pagan test was used.

4.0 Results and Findings

4.1 Descriptive Analysis

The study collected research data from 175 SACCOs spread across the country. This information was obtained from audited financial reports submitted to SASRA by these SACCOs. Table 1 summarises key indicators such as liquidity, capital adequacy, asset quality, and ROA.

Table 1: Summar of Descriptive Analysis

Variable	Mean	Std. Dev.	Minimum	Maximum
Liquidity	0.19476	0.16223	-0.30018	1.18411
Capital Adequacy	0.12044	0.09317	-0.59885	0.83486
Asset Quality	0.52907	7.77117	0.00000	286.68070
ROA	0.00109	0.02635	-0.01382	0.90092

The mean value for liquidity is approximately 0.19, indicating that on average, about 19% of a SACCO's assets can be quickly converted into cash. The standard deviation of 0.16 implying that there is a relatively small variability in the liquidity ratios across SACCOs. The range from -0.30 to 1.18 reveals some SACCOs with negative liquidity ratios, which could be a cause for concern as it might suggest issues with short-term financial obligations. This highlights the importance of effective liquidity management among SACCOs. Those with higher liquidity may be more financially stable and able to meet their obligations. On the other hand, SACCOs with negative liquidity may struggle with cash flow and could face operational challenges.

The mean value for capital adequacy is approximately 0.12, implying that the average capital adequacy ratio for SACCOs is 12%. The standard deviation of 0.09 indicates that the spread in capital adequacy ratios across SACCOs is narrower when compared to liquidity. The range of -0.60 to 0.83 suggests that some SACCOs may have negative capital, indicating that their liabilities outnumber their assets. The capital adequacy ratio measures the financial stability of a SACCO from the perspective of the regulator. SACCOs with high capital adequacy are more likely to weather financial storms. SACCOs with negative values, on the other hand, may be at risk of insolvency, necessitating regulatory intervention. The average asset quality ratio is around 0.53, with a standard deviation of 7.77. This indicates that asset quality varies significantly across SACCOs. The maximum value (286.68) is unusually high, which could be due to outliers or extreme values. SACCOs with high asset quality have a lower risk of loan default, implying sound financial health. The wide range, on the other hand, suggests inconsistency in the quality of assets held by different SACCOs, which could have an impact on their overall financial performance.

The average ROA is 0.00109, which is quite low, indicating that SACCOs generate a small return on their assets on average. The standard deviation of 0.02635 and the range of -0.01382 to 0.90 indicate that SACCO profitability varies significantly. ROA is an important indicator of financial performance. A higher ROA indicates that SACCOs are making better use of their assets to generate profits. The low average ROA among SACCOs, on the other hand, may indicate difficulties in achieving optimal financial performance. Furthermore, a negative minimum value indicates that some SACCOs are losing money, which could indicate issues with operational efficiency or financial management. These findings can help both SACCOs and regulators identify areas of strength and potential improvement in the pursuit of improved financial performance. The identified variations necessitate customised strategies to effectively manage each SACCO's unique financial situation.

4.2 Diagostic Analysis

The research utilized panel quantitative data to investigate the research problem. Employing panel data necessitates adherence to certain standard requirements for the observations to be viable for use in panel regression analysis. This ensures the validity and reliability of the findings. Diagnostic tests undertaken in the research encompassed a Multicollinearity test, which checks for high correlation among independent variables, Normality tests, to determine if the data follows a normal distribution, a Heteroscedasticity test, to ensure constant variance in the error terms, a Stationarity test, to confirm that the time series data properties do not change over time, an Autocorrelation test, which checks the correlation of a time series with its past and future values, and finally, a Hausman test, which assists in choosing among fixed effects and random effects models. All these tests contribute to a robust panel regression analysis, reinforcing the reliability and validity of the study results.

4.2.1 Multicollinearity

The purpose of the multicollinearity test performed was to determine whether there was a high relationship between predictor variables. Research utilized VIF test on the data. Results are displayed in Table 2

Table 2: Multicollinearity Results

Variable	VIF	1/VIF
Capital Adequacy	1.27	0.789546
Asset Quality	1.26	0.790846
Liquidity	1.00	0.998139

Source: Research Data (2023)

Upon evaluation of the VIF values, the study found no evidence of multicollinearity. This is because this values for all the variables were below 10, the commonly accepted threshold indicating high correlation among predictor variables. Alin (2010) poised that VIF values more than 10 indicates presence of multicollinearity. Therefore, each variable provides a unique and independent information in the model.

4.2.2 Normality Tests
This test was done using skewness and kurtosis. Logarithmic transformation was applied to any variable that did not fit the normal distribution. Results are shown in Table 3
Table 3: Normality Results

Variable	Pr(Skewness)	Pr(Kurtosis)	adj chi2(2)	Prob>chi2
ROI	0.0482	0.04701	11.31	0.0601
Liquidity	0.0433	0.0319	6.91	0.1474
Capital Adequacy	0.0007	0.0064	4.77	0.1308
Asset Quality	0.0845	0.0081	8.04	0.8502

Source: Research Data (2023)

The results in Table 3 show that the data was normally distributed because the p values for all variables were greater than 0.05. The data appears to have a normal distribution. The importance of having normally distributed data is that the results obtained are unbiased, efficient, and consistent.

4.2.3 Heteroscedasticity Test

Study findings are outlined in Table 4.

Table 4: Heteroscedasticity Test

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity		
chi2(1)	=	2.0702
Prob > chi2	=	0.0618

Source: Research Data (2023)

The results in Table 4 show that the p-value is more than 0.05. Therefore, the null hypothesis is not rejected at the 0.05 level of significance since the reported value is 0.0618>0.05. We found no indication of heteroscedasticity in the data. Because no problems with the linear regression model's assumptions were found, it follows that the obtained results would be fair, powerful, and consistent in the absence of heteroscedasticity.

4..4 Stationarity Test

A Levi-Lévi test for a unit root was used to investigate whether or not the used variables are stationery and results are in Table 5

Table 5: Panel Unit Root Test

Variable name	Statistic(adjusted)	P-value	Comment
ROA	7.0147	0.000	Stationary
Liquidity	4.0612	0.000	Stationary
Capital Adequacy	4.8425	0.012	Stationary
Asset Quality	2.9538	0.000	Stationary

Source: Research Data (2023)

The study established that the p-values for all variables were below 0.05. As such, all variables can be considered stationary, implying lack of unit roots at a 5% significance level. Therefore, none of the variables utilized in the research exhibited a unit root problem. The conclusion is crucial, as it ensures that the results obtained from this research are reliable and not spurious, thereby bolstering the validity of any subsequent analysis and conclusions drawn from the study.

4.2.5 Autocorrelation Test

Wooldridge test was employed and the findings are provided in Table 6

Table 6: Autocorrelation Test

Wooldridge test for autocorrelation
H0: no first-order autocorrelation
Prob > F = 0.3961

Source: Research Data (2023)

The null hypothesis for this autocorrelation test was the assumption that there was no autocorrelation in the study's panel data. The P-value was 0.3961, which is greater than the standard significance level of 0.05. It reveals that the F-test is not statistically significant at a 5% significance level. As a result, the lack of autocorrelation cannot be ruled out as a null hypothesis. This suggests that there isn't enough evidence to conclude that autocorrelation exists in the panel data. The conclusion was reached that the residuals are not autocorrelated. The absence of autocorrelation in the residuals implies that the error terms are independent, which validates the reliability of the regression model used.

4.3.6 Hausman Test

In analyzing panel data, a crucial decision researchers have to make is which model to apply. This decision hinges on the specific characteristics and assumptions about the data set in question. To help decide between these two models, the researcher conducted Hausman test. This test is used to analyze whether the variations in coefficients between these models are systematic. If they are, the fixed effects model is typically preferred. Conversely, if there's no significant difference, the random effects model is more appropriate as it allows for individual effects to be correlated with the predictors. Table 7 presents findings of Hausman test performed in this study. These results inform which model - fixed or random effects - is most suitable for analysis of this specific panel data set.

Table 7: Hausman Test

Column	(b)	(B)
	Fixed	Random
Liquidity	-0.0021052	-0.0008262
Capital Adequacy	0.6908707	0.7140279
Asset Quality	0.1658181	0.2086526

$chi2(3) = (b-B)'[(V\_b-V\_B)^{(-1)}](b-B) = 152.4200$
$Prob>chi2 = 0.1091$

Source: Research Data (2023)

Table 7 indicated a p-value of 0.1091, which is more than the significance level of 0.05. Hence, research failed to reject null hypothesis, suggesting that the random effects model was indeed the most suitable for this particular analysis. The choice of random effects model carries certain benefits over fixed effects model. Importantly, it allows for the examination of both time-variant and time-invariant variables, while a fixed effects model only looks at variables that change over time. The random effects model estimates the variables concurrently, an advantage over the fixed effects model, which tends to increase the standard errors of the coefficient estimates due to estimating a parameter for each unit. Consequently, for a multiple regression analysis aiming to examine the variables simultaneously, random effects model seemed most appropriate choice for this research.

4.3 Correlation Analysis

Correlation analysis was utilized to scrutinize relationship between liquidity, capital adequacy, asset quality, and ROA. This is a statistical method utilized to evaluate the strength and direction of the relationships between two or more variables. Correlation analysis provided insight into how changes in liquidity, capital adequacy, and asset quality may be related to changes in the return on assets of the SACCOs. This method assisted in elucidating potential causal relationships and also guided the selection of variables in the subsequent regression analysis. Understanding these relationships is critical in financial management because it can help SACCOs optimize their financial performance strategies.

Table 8: Correlation Analysis

Variable	ROA	Liquidity	Capital Adequacy	Asset Quality
ROA	1.0000			
Liquidity	-0.0497	1.0000		
Capital Adequacy	0.6710	0.0424	1.0000	
Asset Quality	0.5663	0.0125	0.4573	1.0000

Source: Research Data (2023)

Table 8 indicates correlation matrix between liquidity, capital adequacy, asset quality and ROA. The correlation between Liquidity and ROA is -0.0497, indicating a very weak negative correlation. This suggests that increases in liquidity do not significantly contribute to improving the ROA of SACCOs in Kenya. It may be inferred that overly emphasizing liquidity might not necessarily translate into improved returns. SACCOs should aim for a balance, ensuring they have enough liquidity to meet obligations without unnecessarily tying up assets that could be invested more positively elsewhere. Capital adequacy has a strong positive correlation of 0.6710 with ROA. This shows that SACCOs with bigger capital adequacy ratios tend to have higher ROA. This is indicative of the importance of maintaining a good capital buffer for SACCOs as it not only helps in absorbing potential losses but also contributes to higher returns. Lastly, Asset Quality has a moderately strong positive correlation of 0.5663 with ROA. This shows that higher asset quality contributes to higher ROA. SACCOs with a higher proportion of performing loans (lower Non-

performing Loans ratio) are likely to have higher returns. This underscores the need for good credit risk management in SACCOs. These insights can help SACCOs prioritize their strategies to enhance their financial performance.

Results conforms to findings of Shah, Khan and Tahir (2018) who determined that liquidity insignificantly affect profitability. Further, Gweyi, Olweny and Oloko (2018) showed that liquidity negatively influence SACCOs financial performance and Muriithi and Waweru (2017) noted a negative association between commercial banks financial performance and liquidity. Ngeno (2019) established that credit management, risk management, internal financing, managerial capability, and portfolio selection has a positive influence on SACCOs financial performance. Magomere and Otinga (2019) revealed that adequate capital base, minimum capital requirements and relative capital significantly influence ROI of MFIs in Kakamega County. A study carried out by Kamande (2017) determined that management efficiency, earnings ability, liquidity, asset quality, and capital adequacy had substantial effect on ROA which was in line with findings.

4.4 Panel Regression Analysis

The panel regression analysis in Table 9 shows the relationship between the variable.

Table 9: Panel Regression Results

ROA	Coef.	Std. Err.	z	P>z
Liquidity	-0.0008	0.0025	-0.3300	0.7380
Capital Adequacy	0.7140	0.0241	29.6400	0.0000
Asset Quality	0.2087	0.0184	11.3200	0.0021
Cons	0.1360	0.0056	24.3000	0.0000

R squared=	**0.6265**
Wald chi2 (3) =	**1351.62**
Prob=	**0.0000**

Source: Research Data (2023)

According to the findings, therefore, regression model becomes;

$FP_{it} = 0.1360 - 0.0008 Liq_{it} + 0.7140 Ca_{it} + 0.2087 Aq_{it}$

Where: FP_{it} = SACCO financial performance measure using return on assets (ROA).

Liq_{it} = SACCO i Liquidity in period t.

Ca_{it} = Capital adequacy for SACCO i in period t.

Aq_{it} = Asset Quality of the asset for SACCO i in period t.

The R^2 value of 0.6265 reveals that 62.65% of the variation in financial performance (ROA) can be explained by liquidity, capital adequacy and asset quality. Wald chi2 value of 1351.62 with a

probability of 0.0000 suggests that overall model is statistically significant. Coefficient for Liquidity is -0.0008, with a p-value of 0.7380, which is not statistically significant, indicating that changes in liquidity have a negligible impact on ROA for DTSs. Implication of this finding is that while liquidity management remains crucial for SACCOs' financial stability, it may not be a primary driver of their financial performance in terms of generating higher returns.

Coefficient for capital adequacy is 0.7140, with a highly significant p-value of 0.0000, suggesting a strong positive relationship between Capital Adequacy and ROA. As SACCOs maintain higher capital adequacy ratios, they are likely to experience higher ROA. This highlights the critical role of adequate capital reserves in enabling SACCOs to absorb potential losses and capitalize on profitable opportunities, leading to improved financial performance. Coefficient for asset quality is 0.2087, with a highly significant p-value of 0.0000, indicating a positive association between Asset Quality and ROA. SACCOs with better asset quality, characterized by lower Non-Performing Loans (NPLs) ratios, tend to achieve higher ROA. This emphasizes the essence of effective credit risk management and prudent lending practices in enhancing financial performance.

The constant term (Cons) is 0.1360, with significant p-value of 0.0000. Constant term represents the expected value of ROA when all independent variables are set to zero. In this case, it represents the base level of ROA, which is significantly different from zero, indicating that other factors beyond the examined variables also contribute to the financial performance. Results of Panel Regression Analysis underscore the significance of Capital Adequacy and Asset Quality in driving the financial performance of DTSs. Strong capital base and robust asset quality management are crucial for enhancing ROA. While liquidity management remains essential for financial stability, it may not be the primary driver of financial performance in terms of generating higher returns. The results call for SACCOs to prioritize prudent credit risk management and capital adequacy to maximize their financial performance. Policymakers and regulators can also use these findings to formulate effective regulations and policies to promote a stable and profitable SACCO sector in Kenya.

4.4.1 Discussion of Hypotheses

Hypothesis testing was performed by using the panel regression model and ascertained utilizing the p-value.

H0₁: Liquidity does not have a significant effect on financial performance of Deposit taking SACCOs in Kenya

The p-value was 0.7380, according to the results in table 9. As a result, the study failed to reject the null hypothesis. Thus, liquidity does not have a significant impact on financial performance of DTSs. Study findings are supported by Shah, Khan, and Tahir (2018) who determined that liquidity insignificantly affect profitability among the commercial banks. The study findings were however contrary to Muheebwa (2018) who performed study on liquidity of SACCOs in Uganda and the extent to which it relates to the financial performance of the banks and noted that there was significant association between SACCOs financial performance and liquidity. Study findings were further not in line with Gweyi, Olweny and Oloko (2018) who revealed that liquidity negatively affected the SACCOs financial performance since the majority of SACCOs failed to prioritize the need to manage their liquidity using their own resources besides deposits from the members. The

results are further not in agreement with Muriithi and Waweru (2017) who noted a negative and substantial link between commercial banks financial performance and liquidity.

H0₂: Capital adequacy does not have a significant effect on financial performance of Deposit taking SACCOs in Kenya

The p value in Table 9 was found to be 0.0000. As a result, the null hypothesis is rejected, indicating that capital adequacy has a significant impact on the financial performance of DTSs. Ngeno (2019) established that credit management, risk management, internal financing, managerial capability, and portfolio selection all have a positive influence on SACCO financial performance. Magomere and Otinga (2019) revealed that adequate capital base, minimum capital requirements and relative capital significantly influenced the ROI of MFIs in Kakamega County. The study findings were however not supported by Nguyen et al (2018) who determined that capital adequacy was favourably and significantly associated to ROE and insignificantly related to ROA and the size of assets. Further, studies by Mehta and Bhavani (2017) also contradicted the current study since they established an insignificant effect of Capital Adequacy across all the measures of profitability. Musyoka (2017) examined the impact of capital adequacy on financial performance of banks and noted a negative significant link between bank size, capital adequacy and ROA which were contrary to the current study findings.

H0₃: Asset quality does not have a significant effect on financial performance of Deposit taking SACCOs in Kenya

The p value was recorded as 0.0021 in Table 9. As a result, the null hypothesis is rejected. Thus, asset quality has a significant impact on DTS financial performance. Results corroborate with Kadioglu, Telceken and Ocal (2017) who confirmed that NPLs had a significant relation with banks profit as evaluated by ROA and ROE. Study carried out by Kamande (2017) on the level to which particular aspects affected financial performance of Kenyan financial institutions determined that management efficiency, earnings ability, liquidity, asset quality, and capital adequacy, had a favourable significant impact on ROA. In Indonesia, Pelealu & Worang (2017) also revealed that provisioning of loan loss had a positive insignificant impact on bank profitability. Kamau (2017) also investigated the extent to which regulations affected the SACCOs financial performance in Eldoret Kenya and found out that the SACCOs formulated loan provision requirement which enabled them to optimize their long-term financial performance. Results from the research did not conform to study by Said (2018) which established that both ROA and ROE had a negative correlation with all the asset quality.

5.0 Conclusion

The study concluded that both the correlation analysis and the panel regression analysis revealed a very weak negative correlation between liquidity and ROA. Coefficient for liquidity in the regression model was non-significant. These results suggest that changes in liquidity levels have minimal effect on the profitability of SACCOs. While liquidity management remains crucial for ensuring financial stability and meeting short-term obligations, the study's results imply that maintaining excessively high liquidity levels may not be an effective strategy for maximizing returns. Instead, SACCOs should focus on striking a careful balance between liquidity and investment, considering their specific financial objectives and risk appetite.

In addition, it is concluded that findings from the correlation analysis and panel regression analysis indicated a strong positive relationship between capital adequacy and ROA. Regression model demonstrated a highly significant coefficient for capital adequacy, implying that SACCOs with higher capital adequacy ratios tend to achieve higher financial performance. This underscores the critical role of maintaining a strong capital base for SACCOs. Adequate capital reserves not only enhance financial stability by providing a buffer against potential losses but also enable SACCOs to capitalize on profitable opportunities, leading to improved financial performance. Policymakers and regulators should emphasize the importance of adhering to capital adequacy requirements to ensure the overall health and resilience of the SACCO industry.

Further, it is concluded that results from both the correlation analysis and the panel regression analysis indicated a moderately strong positive relationship between asset quality and ROA. Regression model presented a significant coefficient for asset quality, suggesting that SACCOs with better asset quality, characterized by lower Non-Performing Loans (NPLs) ratios, tend to achieve higher financial performance. This underscores the critical importance of effective credit risk management in SACCOs. By prioritizing asset quality and maintaining a healthy loan portfolio, SACCOs can minimize credit losses and enhance their financial performance.

6.0 Recommendations

Liquidity has a very weak negative relation with ROA and its coefficient is non-significant in the regression model, it is recommended that SACCOs focus on striking a balanced approach to liquidity management. While maintaining sufficient liquidity is essential for meeting short-term obligations and ensuring financial stability, overly emphasizing liquidity may not necessarily lead to improved financial performance. SACCOs should consider their specific financial objectives, risk appetite, and market conditions when determining their liquidity levels. It is advisable for SACCOs to assess their liquidity needs regularly and invest excess funds in profitable opportunities or interest-earning assets. By adopting a more dynamic approach to liquidity management, SACCOs can optimize their financial resources and potentially enhance their returns.

Considering the strong positive relationship between capital adequacy and ROA and the highly significant coefficient for capital adequacy in the regression model, it is recommended that SACCOs prioritize maintaining a robust capital base. Adequate capital reserves not only enhance financial stability but also position SACCOs to capitalize on profitable opportunities and withstand potential losses. SACCOs should conduct regular capital planning assessments to make sure that they have enough capital to aid their growth objectives and risk profile. Additionally, SACCOs should work closely with regulatory bodies to comply with capital adequacy requirements and implement best practices in capital management. Policymakers should also consider tailoring capital adequacy regulations to the specific needs and risk profiles of SACCOs, thereby supporting their financial resilience and sustainable growth.

Given the moderately strong positive correlation between asset quality and ROA and the significant coefficient for asset quality in the regression model, it is recommended that SACCOs prioritize effective credit risk management. Maintaining a healthy loan portfolio with a lower Non-Performing Loans (NPLs) ratio can positively impact the financial performance of SACCOs. SACCOs should conduct thorough credit analysis and assessment of borrower creditworthiness before extending loans. Implementing rigorous monitoring and reporting systems can help detect potential credit risks and take timely corrective actions. SACCOs should also establish proactive

measures, such as appropriate provisioning for potential credit losses, to safeguard their financial position. Regular reviews and updates of credit policies and risk management practices are essential to adapt to changing market conditions and to ensure the long-term sustainability of SACCOs.

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