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Effect of Retention Practices on Interest Payment Among Non-Withdrawable Deposit Taking Saccos in Kenya: A Machine Learning Approach

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Abstract

Non-Withdrawable Deposit Taking Sacco's (NWDT's) play a critical role of financial intermediation for socio-economic development in a Country. The objective this study was to examine the effect of retention practices on interest payment among NWDT Saccos in Kenya. The study applied a positivism research philosophy and a cross-section approach to descriptive research design. The sampling frame and unit of analysis was the 185 licensed NWDT Saccos in Kenya as at December 2020. The unit of response was 280 managers from a proportionate sample of 56 NWDT Saccos. A closed ended questionnaire was used to collect primary data for the retention practices and a secondary data collection sheet for interest payment. A pre-test for the questionnaire was carried out using managers of three NWDT Saccos in Nairobi, Kenya. The Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's Chi-Square from Confirmatory Factor Analysis were used to enhance construct validity. The data was tested for Gaussian distribution, linearity and autocorrelation. Ordinary Least Squares was used for testing hypothesis. The study found that 35.1% of the variations in interest payment was explained by retention practices and that there is a statistically significance influence of these practices on interest payment among NWDT Saccos. Despite the challenges within the Sacco sector and the wider external environment influencing its performance, consistency in application of retention policies might be a best practice. This is because the same can instil within the management and the board, the discipline of prudent investment that yield a minimum return in every investment decision. Additionally, the reserves rate can be a great score card for the management of these NWDT Saccos in Kenya.

Keywords: Kenya, interest payment, machine learning, ordinary least squares, retention practices, Sacco

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1 Introduction

1.1 Background of the Study

Globally, the co-operative movement encounters substantial and fundamental obstacles that occasionally impede its growth and development. These challenges encompass the fundamental concepts pertaining to the nature and objectives of the co-operative movement, as well as its structure and operating principles. Consequently, there have been calls to regulate the movement. The World Council of Credit Unions (WOCCU) is the primary global organization and development agency for credit unions. It provides co-operatives with the necessary resources and strategies to enhance their financial management and offer affordable financial services to a significant number of individuals with low to moderate incomes (WOCCU, 2017). Furthermore, WOCCU facilitates the achievement of higher levels of efficiency and cost-effectiveness for secure and stable institutions. It accomplishes this by collaborating closely with credit union leaders, national government officials, and policy makers to establish suitable and efficient regulatory frameworks for credit unions on a global scale. Further, WOCCU fosters the development of national credit union networks. The WOCCU Statistical Report (2018) states that there are 101 nations that have credit unions, with a total of 56,000 credit unions and around 200 million members globally. The cash deposits of the members amounted to USD 1.2 trillion, with loans totalling USD 1 trillion. Additionally, the assets and reserves were valued at USD 1.6 trillion and USD 1 trillion correspondingly. Financial co-operatives own several of the world's major banks, such as Dutch Rabobank, Credit Agricole and Credit Mutuel in France, and DG Bank in Germany. Presently, the number of co-operative organizations in the United Kingdom was at over 5900 in the year 2018, which was an increase from 4800 three years earlier. The categories of cooperative enterprises varies from large-scale organizations such as the Co-operative society, which has a revenue of approximately £15bn in various sectors including food retailing, travel, pharmacy, banking, and medical care, to smaller-scale cooperatives owned by freelancers, taxi drivers, bar owners, and football clubs, among others (WOCCU, 2017).

In Africa, cooperatives play a crucial role in offering financial services to underrepresented groups and should be utilized to effectively reduce poverty. SACCOs, similar to other commercial enterprises in Africa, encounter obstacles in their pursuit of sustainability and expansion, hence necessitating regulation. In most African nations, the regulation and supervision of SACCOs are carried out by the Central Bank's Supervisory Authority. However, South Africa and Kenya have separate regulatory frameworks expressly designed for SACCOs (SASRA, 2017). Cooperatives also facilitate the fulfilment of the financial and social requirements of numerous workers in both urban and rural regions. Additionally, they serve as a platform that unites countless small-scale producers and customers. The SACCO sub-sector is part of the broader cooperative movement in Kenya and is classified as a financial cooperative commonly referred to as Savings & Credit Co-operative Societies (SACCOS). The Sacco Societies Act Cap 490b (2018) created the Sacco Societies Regulatory Authority, which is responsible for licensing, supervising, and regulating the operations of deposit-taking SACCOs as well as the specified and regulated Non-Withdrawable Deposit Taking Saccos in Kenya. The regulatory authority has set up a comprehensive framework of prudential regulatory standards to

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guide the growth and development of the deposit-taking and specified non-withdrawable deposit-taking SACCOs in the country. SACCOs are present in nearly all the counties in the country and are classified by SASRA into four categories: Government-based SACCOs, Farmers-based SACCOs, Private institutions-based SACCOs, and Community-based SACCOs (SASRA, 2019). SACCOs therefore operate on the trichotomy of member-owned, member-managed, and member-customer concept and the more members a SACCO has, the more customers it will have. The 185-NWDT-SACCOs reported their membership at 475,270 members representing a paltry 7.40% of the total membership of Regulated SACCOs as at 31st December 2022 against a targeted membership of about two million and targeted number of regulated non-withdrawable deposit taking SACCOS at about 1200 NWDTs. The low number of regulated non-withdrawable deposit taking Saccos is brought about by the fact that a majority of the current and potential regulated NWDTs are lowly capitalized and hence rendering them unable to meet the regulatory and licensing threshold. Low capitalization could be attributed to low retention of surplus fund as a result of uncontrolled distribution of the surplus in form of payment of interest on members' deposits held by the said NWDT Saccos.

1.2 Problem Statement.

The Microfinance sector is one of the five priority areas of social economic transformation of Kenya by 2027. Equally, it is considered to enhance financial sector deepening for achievement of Kenya Vision 2030 "transforming the County in key social, economic and political spheres". Across the globe, the SACCOS attract more investors who keep track of entity practices that foster better interest payment on members deposits (Kiprotich & Zipporah, 2021). Interest payments is a dynamic process (Bailey,2017). NWDT Saccos develop strategies that favor members investment interests. The rate of interest payments on members deposit has often been used as a yardstick to measure the performance of SACCOS through the eyes of the members, amid being cited as a hindrance to compliance with the legal and prudential regulatory standards for the sustainability of the NWDT SACCOS (Ntoiti & Jagongo, 2021). NWDT Saccos develop strategies that could determine the interest payments on members deposits, income generating strategy, operational costs, loan provisioning strategy and retention strategy. However, it is not clear as to whether retention practices are actually a strategic determinant of interest payment. Pursuit of one strategy could hurt the overall sustainability of the Sacco and as such, a delicate balance is required (Mohammed, Njuguna & Maende, 2022; Mursoi, Muturi & Ndegwa, 2021). The members seek to pay low interest on loans but expect high interest on their deposits (Yitayaw, 2021). In most instances when SACCOs yield to the pressure of paying high interest on member's deposit, the adverse consequences of non-conformance to the prudential regulatory guidelines are not followed adequately (SASRA, 2019). Most studies previously carried out on interest payments mainly delved on more stable financial institutions, their financial performance and the financial intermediation. Thus, none of these studies has addressed the interest payments on member deposits in NWDTs. This study seeks to fill this gap in the body of knowledge. Ordinarily, members of NWDT play a significant role in respect to the appropriation of profit of the SACCO. Payment of interest on members' deposits is the major factor that determines the trajectory of income generation, earnings retention, provisioning for loan losses or even operational expenditures. These are all possible strategic determinants of the payment of interests

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on members' deposits. The study analyzed the effect of retention practices on interest payments among NWDT Saccos in Kenya. The purpose was to inform whether these practices are strategic determinants of interest payment among these Saccos. The outcome would inform member-investors in the financial sector.

1.3 Literature Review

1.3.1 Agency Theory

The agency theory, proposed by Jensen and Meckling in 1976, advocates for a distinct division of duties between principals and agents. Roshan (2016) contends that a decline in equity ownership lead to widening disparity between ownership and governance in major corporations. This scenario presents a chance for the managers to prioritize their personal interests, such as seeking greater rewards for their expertise, which in turn leads to increased operational costs. However, this approach may not align with the goal of maximizing returns for the shareholders, which can be achieved by generating high total income that can be distributed through revenue reserves and interest payments on members' deposits. Top managers enhance the worth of the firms by making decisions, as they frequently possess shares in the firm employing them. In addition, the managers are recruited and kept by the board of directors, who are elected by the stockholders (Berk & DeMarzo, 2017). Aboagye – Otchere et al (2018) posited that the fundamental agency conflict in contemporary organizations stems from the division between ownership and management. The theory posits that managers may prioritize their personal interests over those of the owners, rather than always acting in the owners' best interest. The situation is worsened by the lack of complete and balanced information between the principal and the agent (Urquiza et al, 2018). Members are financiers of these Saccos and might put pressure on return on their deposits to management. As such, the decision to pay high interest might be influenced by the need to appear as performing well by management at the expense of the long-term returns and sustainability of these Saccos. In order to even out interest payments, management could develop retention strategy, informed by practices that even out and grow interest payment in a gradual manner and minimise huge fluctuations. This can occur in an environment where there is balance of interest among stakeholders, members, management, directors, shareholders and regulator, financiers. This theory supported the objective that analyzed the influence of retention practices on interest payment among non-withdrawable deposit taking Saccos in Kenya.

1.4 Empirical Literature

Melessse (2019), in a study on the financial sustainability and outreach performance of SACCOs in Ethiopia found that organizations accumulate savings and provide credit to their members at an interest rate that is fair and acceptable. The study utilized a combination of descriptive and causal research design. Otwoko (2023) conducted a study on the factors (monetary policy, inflation, credit risk, liquidity risk) influencing interest rates and their impact on the financial performance of deposit-taking SACCOs. The study concluded that the size of Sacco had a significant impact on the relationship between interest rate drivers and the financial performance of deposit taking SACCOs. Olando (2019) focused on evaluating the impact of financial

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practices on the increase of SACCOs' wealth in Meru County, Kenya. The study revealed that SACCOs which did not fully comply with their expenses had a higher level of performance compared to those that implemented low-cost management methods. Owino (2017) examined the competitive strategies implemented by SACCOs in Mombasa County, Kenya, to ensure the long-term viability of their operations. The researcher's results revealed that the most significant obstacles to strategy design and implementation were the government policies and reluctance to change. Additional obstacles encountered included limited financial resources and ineffectiveness of management in steering competing strategies in the appropriate direction. Ademba (2018) found that cash management practices were crucial for the functioning of SACCO, being the most significant aspect of its operations. While it is largely known that interest payment and performance of Saccos is critical for their sustainability, strategic determinants of interest payment among NWDT Saccos remain largely unknown in Kenya. Agency theory however point that the determinants on interest rate could be influenced by varied interest of stakeholders within the business model of NWDT Saccos. This study evaluated the effect of retention practices on interest payment among non-withdrawable deposit taking savings and credit co-operatives in Kenya.

1.5 Conceptual Framework of the Study

Retention practices among the NWDT Saccos was conceptualized as the predictor for weighted interest payment. Interest payment was measured using secondary data (average interest payments) and also primary data (customer perspective, internal business process, learning and growth practices) for triangulation purposes.

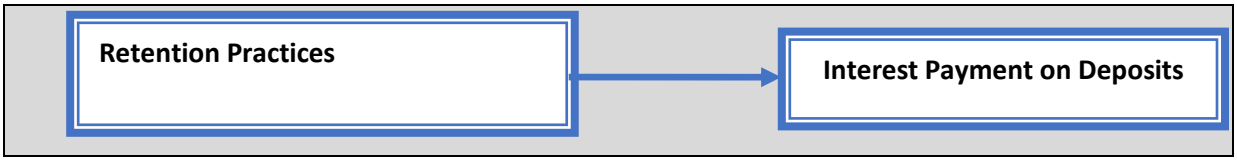

Figure 1: *Conceptual Framework for Retention Strategy and Interest Payment among NWDT Saccos*

1.6 General Objective

To examine the effect of retention strategy on interest payment among NWDT Saccos in Kenya

1.7 Research Hypothesis

This study examined the null hypothesis ($H_0 1$): retention strategy does not have a statistically significant influence on interest payment among NWDT Saccos in Kenya.

1.8 Research Gaps

Most of the studies carried out in Kenya focused on County-wise approach and largely focused on performance of Saccos as the predictand. While this is useful, studies focusing on a narrow

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region present an incomplete view of the sector's issues and may not be generalized in a Country. This study applied a machine learning model from python libraries to train and test the stats models and applied ordinary least squares to test the hypothesis. This study examined the influence of retention strategy on interest payment among NWDT Saccos in Kenya.

2.0 Method

2.1 Philosophy, Design and Instrumentation and Data collection

This research used a theory testing approach and cross-sectional research design. The unit of response was chief executive officer, finance manager, compliance manager, internal auditor and credit officers. Population of the study was 185 registered NWDT Saccos in Kenya (SASRA, 2022). A proportionate sample of 56 saccos was selected from 55 community-based Saccos, 36 from public-founded Saccos and 94 privates founded Saccos (Bryman, 2012, Cooper & Schindler, 2011). Primary data was collected using a structured questionnaire and a secondary data collection sheet in the case of secondary data. A five-point ordinal scaled tool was used with the equivalences of strongly disagree, disagree, neutral, agree and strongly agree (Charandrakandan, Venkatapirabu, Sekar & Anandakumar 2011). Interest payment by NWDT Saccos was measured using a secondary data in addition to a primary measure. The study utilized the Statistical Package for Social Sciences (Porter & Gujarat, 2009); Bonett and Wright; 2015).

2.2 Internal Consistency and Validity of Instrumentation

Stability of the instrument was assessed using the Cronbach alpha coefficient and the results are presented in Table 1. The results indicate that the measures had a Cronbach alpha coefficient of 0.777, Kaiser-Meyer-Olkin (KMO) coefficient of 0.818, Chi-Square of 1914.717 and associated p-value of .000. This indicated a satisfactory level validity and sampling adequacy for factor analysis. Confirmatory Factor Analysis (CFA), varimax rotation generated four (4) components with Rotations Sums of Squared Loadings (Mertens, (2010; Koshy, 2010, Tabachnik & Fidell, 2014).

Table 1: Reliability and Validity Test Results

Variable	**Before CFA**	**After CFA**	**KMO**	**Chi-Square & P-value**	**P-value**	**Cronbach Alpha Coefficient**
	Number of Items					
Retention Practices	12	7	0.777	1914.717	0.000	0.818

2.3 Data Analysis and Presentation of Results

Descriptive analysis (mean and standard deviation), confirmatory factor analysis, test of regression assumptions and inferential analysis were carried out. The composite mean of the twelve (12) parameters' was 3.3367 and standard deviation of 1.4272. Hypothesis testing was done using simple OLS linear model. The equation used in this study was in the form; IP = **α** +

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$\beta_1 X_1 + €$; where interest payment (IP) is (predictor) and β_1 is coefficient for retention strategy (target variable). This equation is supported by Montgomery, Peck, & Vining, 2001; Garson, 2012; Argyrous, 2011).

3.0 Results and Discussions

3.1 Response Rate

Table 2: Response Rate

Category of NWDT SACCO	No. of NWDT SACCO	Questionnaires Distributed	No. of NWDT Responding	Questionnaires Received	% Response
Community-Based [17]	17	85	16	76	89.40
Private Based [28]	28	140	24	121	86.43
Government Based [11]	11	55	10	50	90.91
Total	**56**	**280**	**50**	**247**	**88.21**

Out of the 280 questionnaires distributed to the 56 NWDT Saccos, 247 questionnaires were filled and returned giving a satisfactory composite response rate of 88.21%. Each of the three categories of the Saccos achieved adequate response rates of 89.4%, 86.43% and 90.91% for the community based saccos, private based saccos and government saccos respectively. This response rate was regarded good for this study. This high response rate was attributed to anonymity and self-administration of the instrument (Charandrakandan, Venkatapirabu, Sekar & Anandakumar, 2011).

3.2 Test of Regression Assumptions

Chatterjee & Simonoff (2013) point that before testing hypothesis for ratio-scaled data, it is important that statistical assumptions should be evaluated. Test of gaussian distribution, test of independence and test of linearity were carried out.

3.2.1 Test of Gaussian Distribution for Interest Payment

Interest payment was assessed using primary data, and also using secondary data for the years 2021-2023. Primary data was weighted for the seven sub-constructs used to measure them. Average interest payment measures were computed for the three (3) years and termed as “interest payment-secondary measures”. The weighted scores of the interest payment were also weighted. Finally, a composite measure incorporating the primary measures and the secondary measures was computed and labelled interest payment-weighted measure. The Kolmogorov-Smirnov and Shapiro-Wilk statistics for numerical tests of normality for
SOE are presented in Table 3.

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Table 3: Normality Test for Interest Payment Measures

Measure	Kolmogorov-Smirnov[a] Statistic	Df	Sig.	Shapiro-Wilk Statistic	Df	Sig.
Interest Payment: Primary	.155	49	.200*	.964	39	.135
Interest Payment: Secondary Data	.064	49	.200*	.988	39	.903
Interest Payment: Weighted	.062	49	.200*	.983	41	.677

Table 3 shows that the statistics are not significant with p-values of Kolmogorov–Smirnov coefficients of .200* for all the three (3) measures of interest payment, that is, primary data measures, secondary data measures and the weighted scores, respectively. Similarly, the Table shows that the coefficient of the Shapiro–Wilk statistics were .964 for the case of primary data measures, .988 in the case of secondary data measures and .983 in the case of weighted scores for interest payment. These three statistics indicate that the three measures of interest payment were normally distributed in general, implying that the data was adequate for a Structured Equation Modelling using OLS. (Garson, 2012; Shapiro & Wilk, 1965)

3.2.2 Test of Autocorrelation for Retention Practices

The test of independence for retention practices was done using Durbin-Watson *d* statistics. A Durbin-Watson *d* statistics of 1.582 was extracted. This coefficient was within the range of 1.5 and 2.5 for an acceptable level of no autocorrelation in a variable measure. Based on this statistic, the assumption of absence of autocorrelation in the parameters measuring the study variables was achieved (Argyrous, 2011).

3.2.3 Test of Linearity for Retention Practices

Retention practices and interest payment were subjected to a pair-wise linearity test using Pearson's correlation coefficient (r). A correlation coefficient of 0.556** was generated at p-value of .000. This confirmed a linear relationship between retention practices and interest payment. Based on this, OLS bivariate linear model was considered suitable for testing the hypothesis. (Chatterjee & Simonoff 2013).

3.3 Inferential Results

This study tested the null hypothesis *$H_0$1: Retention practices do not have a statistically significantly effect interest payment among NWDT Saccos in Kenya*. The weighted measures retention practices were processed using python libraries that is, pandas, statsmodels.api, statesmodels.formula.api, statsmodel.api and statsmodel. stats. Anova. This study applied a .80 to 0.20 proportions for the train and test respectively. Simple OLS output was generated and the results are presented in Table 4.

The R-Squared coefficient of 0.351 confirm that an estimated 35.1% of the variations in interest payment of NWDT Saccos can be explained by retention practices with an Adj. R-Squared is 0.334. This further means that addition of other random variables would not significantly

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improve the predictive power of retention practices. In addition, the Table shows that the F-statistics of 20.05 and an associated Prob (F-statistic) of 6.994e-05. These statistics point simple linear measures in the restricted model of retention practices and weighted interest payment is not a random occurrence. This study rejects the null hypothesis that *retention practices do not have a statistically significant effect on interest payment among NWDT Saccos in Kenya.* The Table shows that coefficient (β) for retention practices was 0.5763 and an associated, p>|t| value of 0.000 which was less than a p-value of 0.05, implying that retention practices are statistically significant in the model. These OLS regression model coefficients show that a 0.5763 change in retention practices is associated with a unit change increase in interest payment among NWDT Saccos in Kenya. The results further shows that while the estimated beta coefficient is 0.5763, there is a 95% confidence that the true value will always be in the confidence interval (0.316, 0.837). The reviewed model for retention practices and interest payment is;

***IP = 1.1217 + 0.5763 (Retention _Strategy*) ± (*0.2605) ……..**

Table 4: OLS Regression Summary for Retention Practices

Statsmodels Linear Regression Summary:

OLS Regression Results

Dep. Variable:	IntPay_Weighted_Measure	R-squared:	0.351
Model:	OLS	Adj. R-squared:	0.334
Method:	Least Squares	F-statistic:	20.05
Date:	Thu, 30 Jan 2025	Prob (F-statistic):	6.99e-05
Time:	19:17:46	Log-Likelihood:	4.0569
No. Observations:	39	AIC:	-4.114
Df Residuals:	37	BIC:	-0.7867
Df Model:	1		
Covariance Type:	nonrobust		

	coef	std err	t	P>|t|	[0.025	0.975]
const	1.1217	0.381	2.942	0.006	0.349	1.894
Revenue_Ret_Strategy	0.5763	0.129	4.478	0.000	0.316	0.837

These results are consistent with findings by Melesse (2019) who found that Saccos that are stable in capital base are likely to have better performance and hence have better and equally stable interest payments. On the other hand, Owino (2017), identified retention strategy as one of the competitive strategies by Saccos in Mombasa County. Sacco's profit distribution patterns over years, Sacco retention patterns and structure as well as reserve rates are said to be a function of the capital base and annual performance of Saccos. Ademba (2018) found that there was a relationship between capital deficiencies and interest payment among Saccos. Vesperman

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(2019) found that protection of profit distribution and stability of capital can have a positive outcome on performance of a Sacco over time.

4.0 Conclusions and Recommendations

4.1 Conclusions

The OLS model generated F-statistic of 20.05 and associated Prob (F-statistic) p-value of 6.99e-05, that is, ≈ 0. Based on these two statistics, this study concluded on the study hypothesis (H01); retention practices do not have a statistically significant influence on interest payment among NWDT Saccos in Kenya was rejected, and the study confirmed that indeed, there is a positive and statistically significant influence of retention practices on interest payment among NWDT Saccos in Kenya. The study further concluded that the measures of retention practices of could be deemed as one of the strategic determinants on interest payment among these Saccos in Kenya.

4.2 Recommendations

This study recommends a focussed approach to review of policy/ies driving the reserve rates among the respective saccos. It appeared that among the three drivers of retention strategy, reserve rates appeared to have a low uniformity in practice/consensus in practice. Despite the challenges within the Sacco sector and the wider external environment influencing its performance, a policy on reserve rate and possibly its compliance might be a great practice. This is because the same can instil in management and the board the discipline of prudent investment approach, that yield a minimum return in every investment decision taken. Additionally, the reserve rate can be a great score card for the management of these NWDT Saccos in Kenya.

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