EFFECT OF FINANCIAL RISK MANAGEMENT PRACTICES ON FINANCIAL PERFORMANCE OF DEPOSIT TAKING SAVINGS AND CREDIT COOPERATIVES IN NAIROBI COUNTY, KENYA

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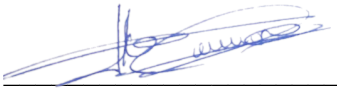
DECLARATION

I, the undersigned, declare that this is my original work and has not been presented to any institution or university other than The University of Nairobi for examination.

Signed:  Date: November 18, 2021

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This research project has been submitted for examination with my approval as the University Supervisors.

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DEDICATION

This research project is dedicated to my family for their love, support and encouragement.

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
CEDF	County Enterprise Development Fund
CRM	Credit Risk Management
DT-SACCOs	Deposit Taking Savings and Credit Cooperative Societies
FOSA	Front Office Service Activity
FP	Financial Performance
MFI	Micro Finance Institution
NIM	Net Interest Margin
NPL	Non- Performing Loans
ROA	Return on Assets
ROE	Return on Equity
ROS	Return on Sales
SACCOs	Savings and Credit Cooperative Societies
SASRA	SACCO Society Regulatory Authority
SPSS	Statistical Package for Social Sciences
VIF	Variance Inflation Factors

ABSTRACT

Deposit taking-SACCOs play a role in financial intermediation. Despite this, some of them lack prudent financial risk management practices as evidenced by unremitted deductions by employer institutions or borrowers' default and unskilled staff. This renders them susceptible to de-licensing for having financial vulnerabilities thereby, putting the 341 billion shillings' member funds at risk. Even with the government's investment in a regulatory authority to ensure that DT-SACCOs follow regulations and are financially viable, this remains an issue. The main aim of this study was to determine the effect of financial risk management practices on ROA of deposit-taking SACCOs in Nairobi County, Kenya. The independent variables for the research were credit risk management, liquidity risk, liquidity risk management, operating risk management and interest rate risk management. Capital adequacy and SACCO size were the control variables while the dependent variable was financial performance measured as ROA. The study was guided by information asymmetry theory, shiftability theory and financial intermediation theory. Descriptive research design was utilized in this research. The 43 DT-SACCOs in Nairobi County, Kenya as at December 2020 served as target population. The study collected secondary data for five years (2016-2020) on an annual basis from SASRA and individual DT-SACCOs annual reports. Descriptive, correlation as well as regression analysis were undertaken and outcomes offered in tables followed by pertinent interpretation and discussion. The research conclusions yielded a 0.645 R square value implying that 64.5% of changes in DT-SACCOs ROA can be described by the six variables chosen for this research. The multivariate regression analysis further revealed that individually, both credit risk and liquidity risk have a negative effect on ROA of DT-SACCOs as shown by (β=-157, p=0.000) and (β=-0.160, p=0.000) respectively. Operating risk and interest rate risk displayed non-statistically significant influence on ROA. Capital adequacy and firm size exhibited a positive and significant influence on ROA as shown by (β=0.739, p=0.000) and (β=0.293, p=0.000) respectively. The study recommends that DT-SACCOs should implement effective measures of managing financial risk. Specifically, the DT-SACCOs should work at reducing their liquidity risk and credit risk as these two adversely affects ROA. Future research ought to focus on other SACCOs in Kenya to corroborate or refute the conclusions of this research.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

One major area in the aftermath of the global financial crisis is financial risk among financial intermediaries. This risk if not managed may threaten the survival and success of a commercial bank. Several risk factors such as credit, liquidity, operational and interest risks have been identified as critical to ensure that the bank enhances its profitability amid intense competition in the industry (Angote, Malenya & Musiega, 2015). The survival and success of a commercial bank depends critically on the efficiency of managing these risks (Khan & Ahmed, 2001). More importantly, good risk management is highly relevant in providing better returns to the shareholders (Akkizidis & Khandelwal, 2008).

The information asymmetry theory by Akerlof (1970) was the anchor theory of this study as it expounds on instances where banks cannot separate the safe from risky borrowers. The study utilized the information asymmetry theory in order to understand how financial risk management influences the performance of a firm. The study utilized the Shiftability theory by Mouton (1918) in order to understand the liquidity risk management influence on value of commercial banks. The study was also supported by financial intermediation theory by Diamond (1984) which states that through intermediation, financial institutions may create and provide customized financial solutions to meet the needs of each client and by doing so, the financial intermediaries enhance credit reach but this may also contribute to increase in credit risk.

The study focused on Deposit-Taking Savings and Cooperative Societies (DT SACCOs) in Kenya; this is because the level of financial risk in these institutions has

been a major concern for SACCOs in Kenya (SASRA, 2018). Additionally, Moody's 2019 report stated that increasing Non-performing loans (NPLs) among banks and SACCOs in Kenya reflected weak financial sector health. The credit risk, liquidity risk and operating risk for SACCOs has increased but focus has mostly been on the banks. It would be necessary to also investigate financial risk management among DT SACCOs in Kenya as they play a key role in financial intermediation and inclusion. A study of how financial risk influences performance of DT-SACCOs in Kenya was hence required.

1.1.1 Financial Risk Management Practices

According to Tapiero (2004), financial risk management refers to the practice of creating economic value in a firm by using financial instruments to manage exposure to risks, particularly risks such as credit and market risk. Managing financial risk involves setting appropriate risk environment, identifying and measuring the banks risk exposure, mitigating risk exposure, monitoring risk and constructing controls for protecting the bank from financial risks. According to Ngalawa and Ngare (2013), financial risk management is defined as an order of four procedures: The first one involves identifying the events of one or more wide-ranging categories of market, operational, liquidity, credit, and other risks into precise sub-categories; The second one involves accessing the risks using data and risk models; The third one involves the examination and reporting of the assessments of the risk on a regular and timely basis; The fourth one and last one involves controlling risks by the senior management. Financial risk management has also been defined as the systematic use of organization-wide processes of identify, assess, manage, and monitor risks such that aggregated information can be used to protect, release, and create value (Shahbaz, Tabassum, Muhammad, Mansoor , Hafiz & Yasir, 2012)

Risk is the primary factor driving financial behaviour (Shukla, 2016). In its absence, the system will be greatly simplified. It is however ever-present in the realistic world. It is therefore the responsibility of Financial Institutions to manage it efficiently to ensure their survival in a world full of uncertainty. The future of banking certainly stems on the dynamics of risk management. It is only the institutions that have efficient risk management systems that will ensure their survival in the long term (Ahmed, 2015). According to Diffu (2011), the crisis that affected worldwide financial steadiness and the economy in 2007-2009 has strengthened the need to reconsider some of the methods implemented by the financial community in evaluating the performance of banks.

Different researchers have operationalized financial risk management differently. Most of them however agree that the main elements of financial risk management include credit, liquidity, interest rate and operating risks (Eckles, Hoyt & Miller, 2014). Credit risk is the likelihood that a debtor or borrower will default and hence not repay the lender. The risk is given by the ratio of nonperforming advances to total loan (Julie & Rebert, 2015). Liquidity risk is the inability of a bank to manage a bank's changes in funds on the financing of credit and the portfolio investment often measured as total assets to liquid assets ratio (Greuning & Bratanovic, 2019). Operational risk refers to the financial loss to business as a consequence of conducting it in an improper or inadequate manner and is operationalized as operating expense to net operating income ratio (Al-Tamimi, Hussein, Miniaoui & Elkelish, 2015). Interest rate risk is the probability of obtaining losses in and off-balance-sheet situations arising from changes in interest rates and it is usually presented as a ratio of interest expense to interest income (Ngalawa & Ngare, 2013). The current study

operationalized financial risk management practices in terms of liquidity risk, credit risk, operating risk and interest rate risk.

1.1.2 Financial Performance

Almajali, Alamro, and Al-Soub (2012) describe financial performance as a company's capacity to meet a set of financial objectives, like profitability. The magnitude by which a company's financial standards have been fulfilled is referred to as financial performance. It displays how well financial goals have been met (Nzuve, 2016). Financial performance, as per Baba and Nasieku (2016), indicates in what manner a firm utilizes assets in generating revenue and hence helps stakeholders in making their decisions. According to the current study, a company's financial position is defined as its ability to generate income out of its assets.

Financial performance is vital to shareholders, investors, and, by extension, the entire economy. The return on investment is completely worthwhile to investors, and having a good firm can provide greater and long-term revenue to individuals who invest (Fatihudin & Mochklas, 2018). Financial performance of a corporation is significant to its health as well as its existence. As per Karajeh and Ibrahim, (2017) company's excellent performance demonstrates its financial performance and effectiveness in managing its assets throughout operations, investments, as well as financial transactions.

Various methods of evaluating financial performance are used and should be harmonized. Asset returns (ROA), size of company, equity returns (ROE) and sales return (ROS) are factors recognized as measures of financial performance. ROA and ROE are the most recognized ways of measuring financial performance. The ROA evaluates the company's profitability using its total assets, whereas the ROE examines

the way a company is using shareholder's equity (Mwangi & Murigu, 2015). Baba and Nasieku (2016) posit that market based metrics like earnings per share, dividend yield, market to book value of equity and market capitalization can too be employed in financial performance measure. The current study utilized ROA as a metric of financial performance as it is the most recognized measure (Fatihudin & Mochklas, 2018).

1.1.3 Financial Risk Management Practices and Financial Performance

Financial risk in the financial sector is the result of moral hazards and adverse selection owing to asymmetric information. Financial institutions' profitability is influenced by the firm's financial risk because most of their revenue is from loans which attract interest. Nonetheless, financial risk has an effect on the institutions' financial performance. As a result, the risk must be effectively controlled (Bhattarai, 2016). From prior studies, risk is a financial institutions' financial performance predictor in finance. For example NPL which is a proxy for credit risk can destabilize a bank's general system of credit lowering its value (Afriyie & Akotey, 2012).

Loanable funds theorists believe that higher saving through lower consumption and lower deficits would lead to a higher credit supply, lower interest rates, more investment and thus a higher capital stock and higher future income (Lindner, 2013). They explained the rate of interest in terms of the demand for money and supply of loanable funds. The demand comes from firms wishing to invest. As the rate of interest gets low the number of profitable projects increase. Thus, the demand curve for funds will slope downwards from left to right (Mishkin, 2004).

Financial risk is a major factor among financial institutions. Savings and Credit Cooperatives (SACCOs) should make sure that their exposure to risks is lowered because they influence their main goal which is to lend credit and enable owners to save funds efficiently (Kariuki, 2017). Mohammed (2017) posits that financial risks determine the capability a company to realize high efficiency which leads to superior performance and sustainability of a firm. The basis is that in order to diversify business and to enhance efficiency, companies should be knowledgeable of risks involved (Naz & Naqvi, 2016).

1.1.4 Deposit Taking SACCOs in Nairobi County, Kenya

SACCOS are divided into two; deposit taking and non-deposit taking. Deposit-taking SACCOs accepts to undertake business of depositing and withdrawing monies on daily basis like what banks do. Non-Deposit taking SACCOs normally operate at the back office only and have not obtained licensing from SASRA to have operations at a front office. According to Mudibo (2015), deposit taking SACCOs highly impact Kenya's economy. These institutions are responsible for approximately 45% of Kenya's GDP. This is in spite of the fact that they had not been formally recognized into the financial system. In 2010, the SACCO Societies Act No.14 of 2008 was enacted where these institutions have registered tremendous growth. The SASRA Annual report (September, 2021) at the end of 2020 stated that they had grown to 175 from 110 DTS in 2011 a growth of 59%. In 2020, these institutions' total assets under their management totaled over 393 billion, up from 167 billion in 2011, a 135 percent increase in ten years.

Availing members with credit and availing saving products are the main goals of SACCOs and these are threatened by financial risk hence the need to manage them.

The main cause of failures in SACCOs is poor management of financial risk (Mugo et al., 2019). The returns from making investments in a business are the reward for risk taken by business owners. Proper financial risk management practices can assist SACCOs in lowering their general exposures to finance risks. This ensured they can compete in the sector (Odhiambo, 2019).

1.2 Research Problem

Financial risk can lead to firm failure in their quest to realize expected performance. This is due to uncertainties that make it difficult to execute financial plans effectively. Equally the existence of possible defaults on credit commitments, volatile interest rates, liquidity problems and variations in foreign exchange rates negatively affect use of the available assets and hence financial performance (Sadgrove, 2016). Mohammed (2017) posit that financial risks determine the capability a company to realize high and sustainable profitability. The basis is that in order to diversify business and to escalate returns, companies should be knowledgeable of risks involved that significantly impact on measures of profitability (Naz & Naqvi, 2016).

DT-SACCOs play a role in financial intermediation which has included 6.3% Kenyans and approximately 60% of Kenyans are dependent on them (FinAccess, 2019). Despite this, 30% lack prudent financial risk management practices as evidenced by unremitted deductions by employer institutions or borrowers' default and unskilled staff (SASRA, 2018). This renders them susceptible to de-licensing for having financial vulnerabilities thereby, putting the 341 billion shillings member funds at risk (FSD, 2017). Even with the government's investment in a regulatory authority to ensure that DT-SACCOs follow regulations and are financially viable, this remains an issue. This is because members can lose value for their hard-earned

money because their deposits lack protection. This can in turn cause panic and reduced confidence in the subsector (SASRA, 2018).

Although there have been international studies in this field, they have mostly focused on certain elements of financial risk management practices and how they correlate to performance. In addition, most of the previous studies have arrived at inconsistent findings making it an ongoing debate. Studies by Oluwafemi, Israel, Simeon and Olawale (2014); Mahmoud and Ahmed (2014); Akindele (2012); Ariffin and Kassim (2009) established that there is a positive relationship between financial risk and financial performance. However, a study by Yousfi (2012) on financial risk and financial performance revealed that financial risk; credit risk, liquidity risk, operational risks have a negative and significant statistical impact on financial performance.

Locally, several studies have been carried on this area, they include; effect of enterprise risk management determinants on financial performance of listed firms in Kenya (Yegon, 2015); Influence of risk management practices on financial performance of life assurance firms in Kenya: A survey study of Kisii County (Amaya & Memba, 2015); Effect of enterprise financial risk management on Performance in Kenya Commercial Bank, Western Region (Angote, Malenya & Musiega, 2015); The impact of financial risks on the firms' performance (Noor & Abdalla, 2014); Effects of risk management practices on the performance of insurance firms in Kenya (Wanjohi & Ombui, 2013); Relationship between risk management practices and the profitability of Kenyan insurance companies (Muraguri, 2013); Effects of financial risk management on the growth of Microfinance sector in Kenya

(Njuguna, Gakure, Anthony & Katuse, 2013); and the effect of risk management on financial performance of insurance companies in Kenya (Omasete, 2012).

This study was motivated by the fact that despite the existence of prior studies shows that there exists contextual, conceptual and methodological gaps that need to be filled. Conceptually, prior studies have operationalized financial risk management practices differently hence findings depend on the operationalized method. Contextually, prior studies have mostly focused on commercial banks whose operations are different from those of SACCOs. Methodologically, the research methodologies adopted have not been uniform hence explaining variance in results. The current study was based on these gaps and attempts to answer the research question; how does financial risk influence financial performance of deposit-taking SACCOs in Kenya?

1.3 Research Objective

The objective of this study was to determine the effect of financial risk management practices on financial performance of deposit-taking SACCOs in Kenya.

1.4 Value of the Study

This study's results will contribute to the existing theoretical and empirical literature on financial risk and financial performance. The findings will also help in theory development as they will offer insights on the shortcomings and relevance of the current theories to the variables of the study. Subsequent studies may also be carried out based on the recommendation and suggestions for further research.

To government and the regulator SASRA, they may find the insights of the study useful in the development of regulations for the population under study. The study results will inform investors investing in the population under study as it will provide

informative facts on risk and return tradeoff inherent in such institutions and their effect on financial performance.

The conclusions will aid investors as well as practitioners understand the relationship between the two variables, that is important for ensuring strong management team with diverse viewpoints and competences streamlining operations as well as managing financial risk, as well as for building confidence among corporate stakeholders, which will ultimately optimize financial performance.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter explains the theories on which financial risk management and financial performance is based. It further discusses the previous empirical studies, knowledge gaps identified and summarizes with a conceptual framework and hypotheses showing the expected relationship among the study variables.

2.2 Theoretical Framework

This segment examines the theories that underpin the study of financial risk and financial performance. Theoretical reviews covered are information asymmetry theory shiftability theory and financial intermediation theory.

2.2.1 Information Asymmetry Theory

Information asymmetry was propounded by Akerlof (1970), Spence (1973), and Stiglitz (1976) and in 2001 they were awarded by Nobel Memorial Prize in Economics for their analyses of markets with asymmetric information (Ledyard, 2008). Asymmetric information means that one party has more or better information than the other when making decisions and transactions. The imperfect information causes an imbalance of power. For example, when you are trying to negotiate your salary, you will not know the maximum your employer is willing to pay and your employer will not know the minimum you will be willing to accept. Accurate information is essential for sound economic decisions. When a market experiences an imbalance it can lead to market failure (Schrand, 2007).

Financial theories have proposed several reasons for corporate risk management in an imperfect world. Convex tax schedules (Mayers & Smith, 1982), costly financial

distress (Smith & Stulz, 1985), (costly external finance (Froot, Scharfstein & Stein, 1993) are some major arguments that support corporate risk management activities, even though shareholders may diversify on their own. Managerial risk aversion (Tufano, 1996) provides yet another reason for why managers may choose to hedge in order to increase their own welfare. While these theories of risk management focus on reasons firms might hedge (i.e., use contracts in order to reduce some measure of risk). There are a number of arguments that can be made in support of the idea that some managers use derivatives to speculate, where speculation is defined as the actively taking derivatives positions based on a market view.

The study utilizes the information asymmetry theory in order to understand credit risk management influence on performance of commercial banks. The commercial banks are financial intermediaries and therefore they risk giving loans to clients which may not been honored as a result of moral hazard on the part of the borrower and adverse selection on the part of the commercial bank. The study hypothesizes that credit risk management enhances profitability which leads to increase in the financial performance of a DT-SACCO.

2.2.2 Shiftability Theory

Shiftability theory was developed by Mouton (1918) and published on his article named ‘Commercial banking and capital formation’. The theory revolves around the following central themes: A bank must arrange portfolio in such a way that it can have desired liquidity; Most investment is made in secondary money market securities so that liquidity can be achieved at a little/very insignificant amount of loss of value; Here investment money market securities includes, treasury bill, commercial paper

and securities issued by reputed companies; Bank can also get cash from central bank in case of difficulty simply by keeping the instruments as security (Ngwu, 2009).

This theory has certain elements of truth. Banks now accept sound assets which can be shifted on to other banks. Shares and debentures of large companies are accepted as liquid assets along with treasury bills and bills of exchange. This has encouraged term lending by banks. The Shiftability theory has reduced the necessity of holding reserve of huge amount of idle cash balance. It has presented an alternative way of real bill doctrine/theory where there is possibility of risk because of economic depression in the case of buying and selling of commercial goods and raw material. With the help of Shiftability theory the probability of income can be increased and the probability of risk can be reduced (Cai & Anjan, 2008).

The study utilizes the Shiftability theory in order to understand the liquidity risk management influence on performance of DT-SACCOs. It can be argued that liquidity of a SACCO is guaranteed when it has assets which can be shift before maturity when needed for example to pay member deposits to those exiting, pay loans and even call deposits (Acharya & Naqvi, 2012).

2.2.3 Financial Intermediation Theory

The theory by Diamond (1984) and Levine et al. (2000), plays a central role in the financial intermediation process particularly in the banking industry to overcome information asymmetry that lies between borrowers and lenders, hence their constant interaction assists lenders in producing credit worthy information to borrowers. Information that is provided gives creditors and loan officers a strong incentive in assessing and appraising credit to those that require it. Modern theories state that the business of financial intermediation is pegged on economic imperfections arising in

the 1970s with limited contributions (Jappelli & Pagano, 2006). The existence of the intermediaries is based on their ability to lower transaction and information costs from asymmetries (Tripe, 2003). Different market sector participants such as banks, SACCOs, fund managers, insurance companies and other agents contribute valuable credit information that determines market value of assets and securities (Klein, 1992).

The biggest criticism of the financial intermediation theory is its inability to give recognition to the role of lenders in the process of risk management (Levine et al., 2000). Scholtens and Van Wensveen (2000) stated that they don't recognize risk management as an important element in the financial industry and emphasizing the participation costs concept. They suggested future developments in the financial intermediation theory to understand challenges in the financial services sector.

The theory is useful in examining SACCO performance because they take a number of risk measurements using modern technology in credit which involves the efficient collection of private details, treating, screening and monitoring borrowers (Jappelli & Pagano, 2006). Financial intermediaries are useful in lowering transactional costs brought about by information asymmetry. They hence play a central role in effective functioning of financial markets. The theory is useful in understanding how financial risk management, profitability and value relate.

2.3 Determinants of Financial Performance

There are several financial performance determinants of a firm; these factors are found either within or outside the firm. Internal factors are firm-specific and can be manipulated internally. They are credit risk management, liquidity risk management, operating risk management, interest rate risk management asset base and capital

adequacy. Factors outside a firm that influence financial performance includes; inflation, GDP, political stability and interest (Athanasoglou et al., 2005).

2.3.1 Credit Risk Management

This indicates a SACCO's asset risk and stability. It estimates the asset quality magnitude among the characteristics that impact banks' health. The value of assets under the control of a SACCO is heavily dependent on credit risk, and the quality of the assets owned by the SACCO heavily relies on specific risks, level of NPLs, and debtors cost to the SACCO. This ratio should be at the lowest level. If lending is susceptible to risk in a well-functioning bank, the indicator in this case would be the applied interest margins. A low ratio shows an insufficient risk cover by the margins (Athanasoglou et al., 2009).

A Sacco's assets primarily consist of a loan portfolio, current as well as fixed assets, and other investments. The quality of assets mostly improves with the age and bank size (Athanasoglou et al., 2005). The primary assets that generate income for Saccos' are loans. The loan portfolio quality hence determines bank performance. Good quality assets reduce losses arising from NPLs, and this subsequently impacts performance (Dang, 2011).

2.3.2 Liquidity Risk Management

Liquidity is used to denote the capability of a firm in this case a SACCO to settle its debt obligations that are incurred within twelve months by the use of cash and short-lived assets that are rapidly convertible into cash. It hence occurs as a result of the ability to settle financial demands owed to creditors without liquefying their other assets (Adam & Buckle, 2013).

Liargovas and Skandalis (2008) argued that sufficient proportions of liquid assets assist firms to finance their activities and to invest in cases where they cannot obtain external funds. Firms with that high liquidity can meet unforeseen liabilities and obligations that need to be settled. Almajali et al. (2012) argued that a bank's liquidity can significantly affect the amounts it can afford to lend out to clients; thus saccos should hold more liquid assets and lower short term obligations. Jovanovic (1982) noted that an increase in SACCO liquidity may harm the firms.

2.3.3 Operating Risk Management

The operating risks facing a firm influence its financial performance. An increase in operating risk which is often measured as the ratio of operating expenses to income implies a decline in financial performance as more expenses are being incurred relative to the revenues generated. Management of operating risk is a critical requirement in all firms as failure to address this might lead to bankruptcy as uncontrolled expenses might exceed the revenues generated (Ongore & Kusa, 2013).

Operating risk need to be effectively managed for a firm to achieve the desired level of financial performance as there is a significant negative influence of the risk on financial performance of firms (Athanasoglou, Sophocles & Matthaois, 2009). Failure to manage operating risk leads to a reduction in gross profit margin which essentially leads to losses. These losses are attributed to low financial performance in converting inputs to outputs (Ongore & Kusa, 2013).

2.3.4 Interest Rate Risk Management

The interest rate is regarded as funds outlay and an increase or decrease in the rate of interest may affect the financiers' savings decisions (Olweny & Omondi, 2016). Consequently, due to high production cost as well as hazards rate, as per Rehman,

Sidek, and Fauziah (2009), the interest cap implementation drives banks to reduce loans and forces several of these basics to abandon rural zones. As a result, the banks' growth will be delayed. To stop the situation from worsening, banks might raise fees and other taxes dramatically. According to Barnor (2014), an unexpected shift in interest rate increases the default rate.

As per Khan and Sattar (2014), the interest rate has a positive or negative impact on NPLs, based on its movement. Savings are discouraged by a fall in depositor interest rates and a rise in spread. An increase in the depositor's interest rate has a negative impact on the investment. In comparison to other sectors, the banking sector is the most vulnerable to interest rate swings because the majority of bank earnings derives from the interest rate differentials that banks charge and repay to savers.

2.3.5 SACCO Size

Firm size determines by how much legal as well as financial elements affect a SACCO. Since large companies collect cheap capital and produce huge income, SACCO size is closely linked to capital adequacy (Amato & Burson, 2007). The book value of the bank's total assets is usually used to determine its size. Additionally ROA is positively associated with bank size showing that large banks can accumulate economies of scale hence reducing operational costs while increasing loan volumes (Amato & Burson, 2007). SACCO size is related to capital rations, according to Magweva and Marime (2016), and profitability rises with size.

Amato and Burson (2007) mentioned that a firm’s size is dependent on the assets owned by the organization. It can be argued that the more the assets owned by a SACCO the more the investments it can make which generate bigger returns compared to smaller firms with less assets. Additionally, a larger firm can have more

collateral which can be used as security for more credit facilities compared to smaller ones (Njoroge, 2014). Lee (2009) argued that the assets being controlled by an entity impacts profitability level of the firm from one period to another.

2.3.5 Capital Adequacy

Also called the capitalization ratio, the adequacy ratio shows how equity and total assets are related. It shows the ability of a bank to remain solvent by regulating risks. Berger and DeYoung (1997) in an investigation showed a negative relation between capital adequacy and performance. In imperfect capital markets, institutions with sufficient capital ought to reduce borrowing to back a specific asset class, hence lowering the predicted bankruptcy costs hence incur less financing costs.

A financial institution with sufficient capital signals the market that a superior performance is to be expected. The results of Athanasoglou et al. (2005) revealed that capital holdings are positively related to bank profitability, indicating that Greek banks are in a stable financial position. Also, Berger et al. (1987) showed a positive causality between capital contributions and profitability.

2.4 Empirical Review

Local and global studies have determined the relation between financial risk management and financial performance, the objectives, methodology and findings of these prior studies have been discussed in this section.

2.4.1 Global Studies

Festus and Fatoki (2015) studied on how operational risk management influences financial development and economic growth in Nigeria. A descriptive survey design was used during the study. Quantitative analysis was done on the variables so as to achieve the objectives of the project. To obtain information from the respondents,

convenience method was used. The study used descriptive statistics to conduct the study. Data from 150 employees was collected from different financial institutions. The hypothesis of the study was tested using Analysis of Variance (ANOVA). The primary data from the employees was coded and analyzed using SPSS. Findings showed that operational risk management is positively related to financial economic growth and development in the financial sector. This study focused on one aspect of financial risk and it did not address its relationship with financial performance.

Ahmad (2017) did a study on how credit, liquidity and market risks impact profitability of Indonesian foreign exchange banks. He adopted the causal method of research in the study. The Population in the study included all banking shares private foreign exchange category for public banks quoted on the Indonesian Stock Exchange and the sample was selected through purposive sampling to obtain a qualified research data. Through an analysis made using the SPSS 21 software, results showed that NPL variable has no substantial effect on ROE variable but the NIM variable showed a substantial impact on ROE. This study did not address operating risk and interest rate risk as measures of financial risk. In addition, it was conducted in a developed context.

Dayasagar (2019) analyzed the impact of credit risk practices on performance of mahila cooperative banks in Kalaburagi district, India. The objectives were establishing how credit risk identification, analysis, monitoring and reduction impacted the performance of women cooperative banks. Based on the results, credit analysis, mitigation and identification had substantial positive impact on performance. It was hence recommended that women cooperative banks should implement stricter credit analysis techniques and adopt credit-monitoring practices. The study was

conducted in India whose economic and social cultural environment is different from Kenya where the current study will be conducted.

Gadzo et al. (2019) did an examination of how credit and operational risk impact the performance of Ghanaian banks. Data was obtained from 24 universal banks with no missing variables. Findings showed that credit risk is negatively related to performance compared to prior studies following the information asymmetry assumption of lemon theory. Additionally, operational risk had a negative relation to performance of the banks. In other findings, bank specific factors (asset quality, bank leverage, cost to income ratio and liquidity) were positively and significantly related to credit risk, operational risk and performance. Although the study took into account credit risk, how the risk was managed and its effect on financial performance was not investigated.

Orichom and Omeke (2020) examined how capital adequacy, financial performance, CRM and performance of microfinance institutions (MFIs) in Uganda were related with a focus on the agency theory. A cross–sectional was used in examining 64 MFIs in the country. Correlation and multiple regression were employed in the analysis of the data. Findings showed that CRM improves performance. Second, capital adequacy and financial performance were not significant to performance. Hence, credit risk appraisal, monitoring and mitigation were crucial in the achievement of performance of the institutions. It was however noted that capital adequacy did not substantially impact performance. The recommendation was that managers should institute risk preventive and control methods to lower credit risks and achieve positive performance among MFIs.

2.4.2 Local Studies

Wanjohi, Wanjohi and Ndambiri (2017) studied how financial risk management and financial performance of Kenyan banks relate. The study was based on a five year period between 2008 and 2012. Primary data was collected by use of questionnaires from different employees on the banks. The data was analysed using multiple regression analysis so as to obtain results. The findings of the study showed that financial risk management's impact on this was positive. This study relied on primary data which might not be as objective as secondary data.

Maniagi (2018) did a study to investigate the effect financial risk had on the financial performance of commercial banks in Kenya. The study used both secondary and primary data to collect information. Descriptive survey research design was used during the study. The study targeted all the 44 Kenyan banks, in that year, two were placed in receivership and one in statutory management. The study was conducted for a 10 year period between 2006 and 2015. The data was obtained from the CBK and the banks website. The methods used for analyzing data were correlation analysis, descriptive statistics and the data was coded using SPSS so as to obtain results. The findings of the study were that credit risk had a negative impact on the performance of Kenyan banks, and interest rate risk and market risk showed a positive impact. This study did not consider liquidity risk and operating risk as financial risk measures.

Mamet (2018) examined how CRM impacted the performance Uasin-Gishu registered SACCOs. He utilized a descriptive survey to study one official from the 320 registered SACCOs with 9 additional from the CEDF board. The study combined both primary and secondary which were collected using questionnaires and interviews. Data was then processed using inferential and descriptive statistics.

Findings showed that: credit policy, management of rates of interest, financial review and debt recovery had a profound impact on SACCO performance. This study operationalized CRM differently and relied on primary data as a result of the measures used while this study will use secondary data. Financial performance was also not considered.

Bwire and Omagwa (2019) examined the relation between credit risk and FP of DT SACCOs in Nairobi. The study followed a descriptive design in which data was obtained from 40 deposit taking SACCOs. The researchers administered Questionnaires to 120 respondents in Nairobi City County using purposive sampling. Credit monitoring had a substantial impact on performance of the SACCOs. Additionally, it was determined that credit appraisal and credit risk control had a substantial impact on performance. Hence, the conclusion was that credit risk management is critical in the FP of DT SACCOs in Nairobi.

Gitau (2021) investigated the influence that financial risk had on FP of Dairy cooperatives in Kenya. The study adopted a descriptive panel design in which secondary data was utilized. Census sampling was chosen as a method of obtaining a sample and secondary data from a period spanning ten years from 2009 to2018 obtained. A secondary data collection sheet was used in collecting data which was analyzed using multiple panel regression models. Results indicated that credit management significantly impacted the return on investment, which measured performance of dairy marketing cooperatives tests for significance also indicated that the variables were statistically significant.

2.5 Summary of the Literature Review and Research Gaps

The theoretical reviews showed the predicted relation between financial risk management practices and the financial performance of financial institutions. Major influencers of financial performance have been discussed. From the reviewed studies, there is a knowledge gap that needs to be filled. From the studies reviewed, there are varied conclusions regarding the relation between financial risk management and performance. The differences from the studies can be explained on the basis of different operationalization of financial risk by different researchers thereby indicating that findings are dependent on operationalization model.

Additionally, many studies done employed different designs for which some relied on empirical review to conclude while others relied on existing literature in measuring how the variables relate. Researchers showed varied inconclusive findings and failed to indicate the exact relationship that financial risk as measured by liquidity risk, operating risk and credit risk has on financial performance. This shows the need for more research in future studies to close the gap by conceptualizing the effect of credit risk on financial performance.

2.6 Conceptual Framework

Figure 2.1 shows the predicted relation between the variables. The predictor variable was financial risk management given by credit risk management, liquidity risk management, operating risk management and interest rate risk management. The control variables were SACCO size given by natural log of total assets and capital adequacy by core capital to risk weighted assets. Financial performance was the response variable given by the ROA.

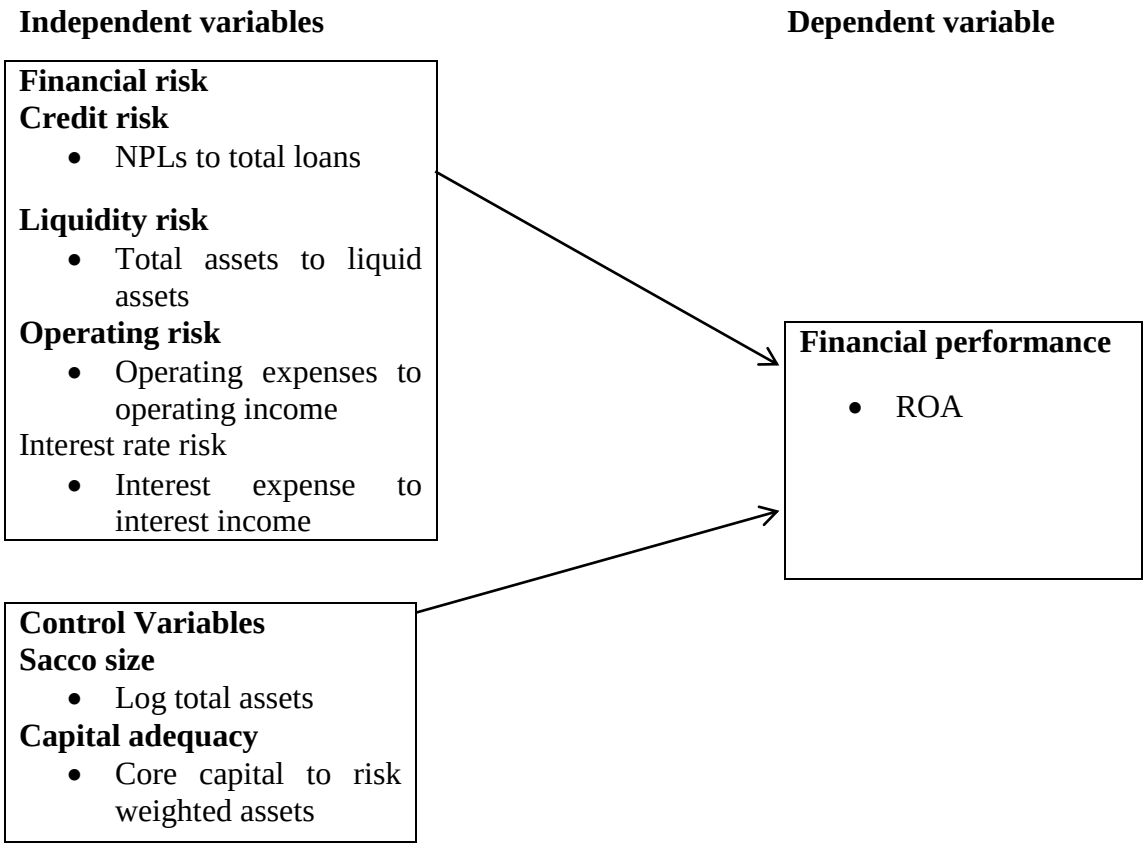

Figure 2.1: The Conceptual Model

Source: Researcher (2021)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The chapter describes the approaches utilized in accomplishing the study objective which was to determine how financial risk management affects financial performance of DT SACCOs. In particular, the study highlights the; the design, data collection, and analysis.

3.2 Research Design

A descriptive design was adopted to determine how financial risk management and financial performance of DT SACCOs related. This design was appropriate since the nature of the phenomena is of key interest to the researcher (Khan, 2008). It was also sufficient in defining the interrelationships of the phenomena. This design also validly and accurately represented the variables thereby giving sufficient responses to the study queries (Cooper & Schindler, 2008).

3.3 Population

A population is all observations from a collection of interest like events specified in an investigation (Burns & Burns, 2008). This study's population comprised of the 43 DT SACCOs in Nairobi as at 31st December 2020 (see appendix I).

3.4 Data Collection

Secondary data was relied on in this investigation which was extracted from annual published financials of the DT SACCOs from 2016 to 2020 and captured in data collection forms. The reports were extracted from the SASRA financial publications of the specific DT-SACCOs. The specific data collected included members deposits and borrowings, interest/dividends on members deposits, staff costs, other operating

expenses, loans to members, interest income, other incomes, total loan installments past due, gross outstanding loans, total loans, total assets, net operating income, interest income, interest expense, liquid assets, core capital, risk weighted assets.

3.5 Diagnostic Tests

To ascertain the model viability, a number of diagnostic tests were done, like normality, stationarity, multicolinearity, homogeneity and autocorrelation. The assumption of normality was that the dependent variable's residual was normally distributed and closer to the mean. This was accomplished by use of the Shapiro-wilk test or Kolmogorov-Smirnov test. In instances where one of the variables had no normal distribution, it was adjusted using the logarithmic adjustment methodology. Stationarity test was utilized in determining if the statistical characteristics such as variance, mean, as well as autocorrelation change with the passage of time. This property was ascertained via the Levin-Lin Chu unit root test. In the event the data did not meet this property, the data was transformed using natural logarithm. Robust regression was also be used as it provides better regression coefficients than ordinary least square (Khan, 2008).

Autocorrelation is a measure of how similar one time series was when compared to its lagged value across successive timings. The measure of this test was done using the Wooldridge test and in the event that the presumption was breached the robust standard errors were used in the model. Multicollinearity exists when a perfect or near perfect linear relation exist between a number of independent variables. Variance Inflation Factors (VIF) as well as tolerance levels were utilized. Heteroskedasticity confirms if the errors variance in a regression lies among the independent variables. This was tested using the Breuch Pagan test and if data does not meet the

homogeneity of variances assumption, robust regression analysis would be employed as it provides better regression coefficients when outliers exist in the data (Burns & Burns, 2008).

3.6 Data Analysis

SPSS software version 24 was used to analyze the data. Tables and graphs presented the findings quantitatively. Descriptive statistics were employed in the calculation of measures of central tendency and dispersion and combined with standard deviation for every variable. Inferential statistics relied on correlation and regression. Correlation determined the magnitude of the relation between the study variables and a regression determined cause and effect among variables. A multivariate regression linearly determined the relation dependent and independent variables.

3.6.1 Analytical Model

The following equation was applicable:

$$Y= \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} + \beta_6 X_{6t} + \varepsilon$$

Where: Y = Financial performance given by the ratio of net income to total assets on an annual basis

β_0 =y intercept of the regression equation.

β_1, β_2, β_3, β_4, β_5, β_6=are the regression coefficients

X_1 = Credit risk management as measured by the ratio of NPLs to total loans outstanding on an annual basis

X_2 = Liquidity risk management as measured by the ratio of total assets to liquid assets on an annual basis

X_3 = Operating risk management as measured by the ratio of operating expenses to operating income on an annual basis

X_4 = Interest risk management as measured by the ratio of interest expense to interest income on an annual basis

X_5 = Capital adequacy as given by the ratio of total core capital to risk weighted assets

X_6 = SACCO size as measured by the natural logarithm of total assets

ε =error term

3.6.2 Tests of Significance

Parametric tests determined the general model and variable's significance. The F-test determined the model's relevance and this was achieved using ANOVA while a t-test determined the relevance of every variable.

CHAPTER FOUR: DATA ANALYSIS RESULTS AND FINDINGS

4.1 Introduction

This chapter focuses on data analysis. The objective of the research was to establish the relationship between financial risk management practices and ROA among DT-SACCOs in Nairobi County. Patterns were studied by descriptive and inferential analysis, that were then analyzed and conclusions drawn on them, in accordance with the specific objectives.

4.2 Descriptive Statistics

The research sought to describe the data in terms of their mean and standard deviations. The descriptive analysis was necessary as it helps in understanding the characteristics of the collected data before conducting inferential analysis. Table 4.1 summarizes the findings.

Table 4.1: Descriptive Results

	N	Minimum	Maximum	Mean	Std. Deviation
ROA	215	.002	.365	.11252	.086596
Credit risk	215	.000	.570	.08953	.089840
Liquidity risk	215	1.024	10.089	2.37153	1.450252
Operating risk	215	.007	3.296	1.09529	.550741
Interest rate risk	215	.025	1.139	.45599	.214874
Capital adequacy	215	.023	1.962	.26200	.251624
SACCO size	215	6.072	8.730	7.77254	.576136
Valid N (listwise)	215				

Source: Field data (2021)

Table 4.1 shows the descriptive analysis, with 215 observations for each variable based on the product of the number of cross-sectional units and the number of periods studied (43*5 =215). The dependent variable was ROA while the independent

variable was financial risk management practices (credit risk management, liquidity risk management, operating risk management and interest rate risk management). Finally, the control variables were capital adequacy and size.

4.3 Diagnostic Tests

To ascertain the model viability, a number of diagnostic tests were done, like normality, stationarity, Multicollinearity test, homogeneity of variance and autocorrelation.

4.3.1 Normality Test

To test whether the collected data assumed a normal distribution, normality test was conducted using the Shapiro-Wilk Test. The threshold was that, if the p value is above 0.05, then the data assumes a normally distribution.

Table 4.2: Test for Normality

	Shapiro-Wilk		
	Statistic	Df	Sig.
ROA	0.869	215	0.178
Credit risk	0.918	215	0.202
Liquidity risk	0.881	215	0.194
Operating risk	0.874	215	0.191
Interest rate risk	0.892	215	0.201
Capital adequacy	0.923	215	0.220
SACCO size	0.874	215	0.194
a. Lilliefors Significance Correction			

Source: Field Data (2021)

The outcomes of normality test yielded a p- value above 0.05 thus the null hypothesis rejection and acceptance of the alternate hypothesis meaning the normality test revealing normal distribution in the data.

4.3.2 Multicollinearity Test

Multicollinearity exists when a perfect or near perfect linear relation exist between a number of independent variables. Variance Inflation Factors (VIF) as well as tolerance levels were utilized.

Table 4.3: Multicollinearity

	Collinearity Statistics	
Variable	**Tolerance**	**VIF**
Credit risk	0.618	1.618
Liquidity risk	0.602	1.661
Operating risk	0.697	1.434
Interest rate risk	0.703	1.422
Capital adequacy	0.661	1.513
SACCO size	0.634	1.577

Source: Field data (2021)

The outcomes in Table 4.3 specify that all the variables had a VIF values <10 and tolerance values >0.2 suggesting that Multicollinearity did not exist.

4.3.3 Heteroskedasticity test

To check for heteroskedasticity, the Breusch-Pagan test is used. The null hypothesis was that the variance of error terms is constant. Heteroskedasticity Test Results are shown in Table 4.4.

Table 4.4: Heteroskedasticity Results

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity

Ho: Constant variance

Variable: fitted values

chi2(1)	=	0.8346
Prob > chi2	=	0.6119

Source: Field data (2021)

The null hypothesis of Homoskedastic error terms is not rejected, according to the results in Table 4.4, which are supported by a 0.6119 p-value

4.3.4 Autocorrelation Test

Autocorrelation is a measure of how similar one time series was when compared to its lagged value across successive timings. The measure of this test was done using the Wooldridge test.

Table 4.5: Test of Autocorrelation

Wooldridge test for autocorrelation in panel data **H0: no first-order autocorrelation**
F(1, 214) = 0.336 Prob> F = 0.5189

Source: Field data (2021)

From the results of Table 4.5, the null hypothesis of no serial correlation is not rejected given that the p-value is significant (p-value = 0.5189).

4.3.5 Stationarity Test

Stationarity test was utilized in determining if the statistical characteristics such as variance, mean, as well as autocorrelation change with the passage of time. Table 4.6 shows Levin-Lin Chu unit root test outcomes.

Table 4.6: Levin-Lin Chu unit-root test

Levin-Lin Chu unit-root test			
Variable	**Hypothesis**	**p value**	**Verdict**
ROA	Ho: Panels contain unit roots	0.0000	Reject Ho
Credit risk	Ho: Panels contain unit roots	0.0000	Reject Ho
Liquidity risk	Ho: Panels contain unit roots	0.0000	Reject Ho
Operating risk	Ho: Panels contain unit roots	0.0000	Reject Ho
Interest rate risk	Ho: Panels contain unit roots	0.0000	Reject Ho
Capital adequacy	Ho: Panels contain unit roots	0.0000	Reject Ho
SACCO size	Ho: Panels contain unit roots	0.0000	Reject Ho

Source: Field data (2021)

The null hypotheses that: Panels contain unit roots were rejected for all variables since the p values were below 0.05, derived from the outcomes in Table 4.6. This meant that all of the variables' panel data were stationary.

4.4 Correlation Results

Correlation analysis was performed to establish the strength and direction of association between each predictor variable and the response variable. Summary of the findings are in Table 4.7.

Table 4.7: Correlation Results

		ROA	Credit risk	Liquidity risk	Operating risk	Interest rate risk	Capital adequacy	SACCO size
ROA	Pearson Correlation	1						
	Sig. (2-tailed)							
Credit risk	Pearson Correlation	-.477**	1					
	Sig. (2-tailed)	.000						
Liquidity risk	Pearson Correlation	-.485**	-.140	1				
	Sig. (2-tailed)	.000	.057					
Operating risk	Pearson Correlation	.111	-.234**	-.146*	1			
	Sig. (2-tailed)	.085	.001	.048				
Interest rate risk	Pearson Correlation	.057	-.057	.046	.184*	1		
	Sig. (2-tailed)	.438	.441	.534	.012			
Capital adequacy	Pearson Correlation	.357**	-.049	.114	-.113	.155*	1	
	Sig. (2-tailed)	.000	.508	.124	.126	.036		
Size	Pearson Correlation	.495**	-.147*	-.545**	.268**	-.034	-.174*	1
	Sig. (2-tailed)	.000	.046	.000	.000	.643	.018	

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
c. Listwise N=215

Source: Research Findings (2021)

The conclusions in Table 4.7 show the nature of correlation between the research variables in terms of magnitude and direction. The outcomes disclose that credit risk and ROA have a negative as well as significant correlation (r=-0.477) at 5 %

significance level. The relationship between liquidity risk and ROA was also negative and significant (r=-0.485) at 5 % significance level. The results also reveal that operating risk and interest rate risk are positively but not significantly correlated with ROA at 5% significance level. Both capital adequacy and size had positive as well as significant relation with ROA as depicted by p values below 0.05.

4.5 Regression Results

Regression analysis was carried out to establish the extent to which ROA is influenced by the variables selected. The regression results were presented in Table 4.8 to 4.10.

Table 4.8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.803[a]	.645	.634	.052358

a. Predictors: (Constant), SACCO size, Capital adequacy, Operating risk, Interest rate risk, Credit risk, Liquidity risk

Source: Research Findings (2021)

From the conclusions as represented by the adjusted R^2, the studied independent variables explained variations of 64.5% in ROA among DT-SACCOs in Nairobi County, Kenya. This therefore means the six variables contributed 64.5% of the variations in ROA among DT-SACCOs in Nairobi County, Kenya whereas other factors not researched contribute 35.5%.

Table 4.9: ANOVA Analysis

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.035	6	.172	62.900	.000[b]
	Residual	.570	208	.003		
	Total	1.605	214			

a. Dependent Variable: ROA
b. Predictors: (Constant), SACCO size, Capital adequacy, Operating risk, Interest rate risk, Credit risk, Liquidity risk

Source: Research Findings (2021)

ANOVA statistics in Table 4.9 show that the data had a 0.000 significance level hence this indicates that the model is ideal for making conclusions on the variables.

Table 4.9: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.368	.052		7.038	.000
	Credit risk	-.157	.042	-.150	-3.376	.000
	Liquidity risk	-.160	.003	-.162	-3.587	.000
	Operating risk	.003	.007	.021	.480	.632
	Interest rate risk	-.010	.017	-.026	-.610	.542
	Capital adequacy	.739	.014	.695	16.630	.000
	SACCO size	.293	.006	.286	6.723	.000

a. Dependent Variable: ROA

Source: Research Findings (2021)

The coefficient of regression model was as below;

$$\mathbf{Y = 0.368 - 0.157X_1 - 0.160X_2 + 0.739X_3 + 0.293X_4}$$

Where:

Y = ROA X_1 = Credit risk; X_2=Liquidity risk X_3= Capital adequacy; X_4 = SACCO size

4.6 Discussion of Research Findings

The objective of this research was to establish the effect of financial risk management practices on ROA of DT-SACCOs in Nairobi County, Kenya. The study utilized a

descriptive design while population was the 43 DT-SACCOs in Nairobi County. Data was obtained from all the 43 DT-SACCOs in Nairobi County and which were considered adequate for regression analysis. The research utilized secondary data which was gotten from SASRA and individual DT-SACCOs annual reports. The specific attributes of financial risk management considered were; credit risk management, liquidity risk management, operating risk management and interest rate risk management. The control variables were firm size and capital adequacy. Both descriptive as well as inferential statistics were used to analyze the data. The results are discussed in this section.

Multivariate regression results revealed that the R square was 0.645 implying 64.5% of changes in ROA of DT-SACCOs are due to five variables alterations selected for this study. This means that variables not considered explain 64.5% of changes in ROA. The overall model was also statistically significant as the p value was 0.000 which is less than the significance level of 0.05. This implies that the overall model had the required goodness of fit.

The multivariate regression analysis further revealed that individually, both credit risk and liquidity risk have a negative effect on ROA of DT-SACCOs as shown by (β=-0.157, p=0.000) and (β=-0.160, p=0.000) respectively. Operating risk and interest rate risk exhibited a positive but not statistically significant influence on ROA. The control variables which were capital adequacy and firm size exhibited a positive and significant ROA influence as shown by (β=0.739, p=0.000) and (β=0.293, p=0.000) respectively.

These findings agree with those of Maniagi (2018) who did a study to investigate the effect financial risk had on the financial performance of commercial banks in Kenya.

The study used both secondary and primary data to collect information. Descriptive survey research design was used during the study. The study targeted all the 44 Kenyan banks, in that year, two were placed in receivership and one in statutory management. The study was conducted for a 10 year period between 2006 and 2015. The data was obtained from the CBK and the banks website. The methods used for analyzing data were correlation analysis, descriptive statistics and the data was coded using SPSS so as to obtain results. The findings of the study were that credit risk had a negative impact on the performance of Kenyan banks, and interest rate risk and market risk showed a positive impact.

The research findings also concur with Gadzo et al. (2019) who did an examination of how credit and operational risk impact the performance of Ghanaian banks. Data was obtained from 24 universal banks with no missing variables. Findings showed that credit risk is negatively related to performance compared to prior studies following the information asymmetry assumption of lemon theory. Additionally, operational risk had a negative relation to performance of the banks. In other findings, bank specific factors (asset quality, bank leverage, cost to income ratio and liquidity) were positively and significantly related to credit risk, operational risk and performance.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter summarizes the findings from the preceding chapter, as well as the conclusions and limitations discovered during the research. Moreover, it provides recommendation for policy makers and offers suggestions on areas requiring further research.

5.2 Summary of Findings

The objective of this research was to assess how financial risk management practices influence ROA of DT-SACCOs. The selected variables for investigation included credit risk management, liquidity risk management, operating risk management, interest rate risk management, capital adequacy and firm size. A descriptive research design was selected to complete the research. Secondary data was gathered from SASRA and an analysis made using SPSS. Yearly data for 43 DT-SACCOs for five years from 2016 to 2020 was obtained from their annual reports.

The first objective was to establish the effect of credit risk on ROA among DT-SACCOs in Kenya. The correlation results at 5 % significance level show that credit risk had a negative association correlation with ROA. Implying a rise in credit risk would lead to decrease in ROA. Regression results (β=-0.157, p=0.000) show that there was a negative and significant impact of credit risk on ROA among DT-SACCOs in Kenya.

The second objective was to assess the effect of liquidity risk on ROA among DT-SACCOs in Kenya. The correlation results at 5 % significance level show that liquidity risk had a negative correlation with ROA. This implies that increase in

liquidity risk would lead to decrease in ROA. Regression results (β=-0.160, p=0.000) show that there was a negative and significant effect of liquidity risk on ROA among DT-SACCOs in Kenya.

The third objective was to examine the effect of operational risk on ROA among DT-SACCOs, Kenya. The correlation results at 5% significance level show that operating risk had a positive association with ROA. The affiliation was however not statistically significant. Regression results (β=0.003, p=0.632) depict presence of a positive but not significant effect of operating risk on ROA among DT-SACCOs in Kenya.

The fourth objective was to examine the effect of interest rate risk on ROA among DT-SACCOs, Kenya. The correlation results at 5% significance level show that operating risk had a negative association with ROA. The affiliation was however not statistically significant. Regression results (β=-0.010, p=0.542) depict presence of a negative but not significant effect of operating risk on ROA among DT-SACCOs in Kenya.

The fifth objective was to examine the effect of capital adequacy on ROA among DT-SACCOs in Kenya. The correlation results at 5% significance level show that capital adequacy had a positive correlation with ROA. The correlation was also statistically significant. Regression results (β=0.739, p=0.000) show that there was a positive and significant effect of capital adequacy on ROA among DT-SACCOs in Kenya.

The sixth objective was to examine firm size effect on ROA amongst DT-SACCOs in Kenya. The correlation results at 5% significance level show that firm size possessed a positive link with ROA. This implies that improvement in firm size might yield a rise in ROA. Regression results (β=0.293, p=0.000) show presence of a positive as well as significant effect of firm size on ROA among DT-SACCOs, Kenya.

5.3 Conclusions

The study intention of the research was to find out the correlation between financial risk and ROA. The findings indicated that credit risk had a negative as well as significant impact on ROA. This may imply that DT-SACCOs with high credit risk have low levels of ROA. Credit risk management is therefore necessarily to achieve the targeted performance.

Additionally, the outcomes revealed that liquidity risk has a significant negative effect on ROA. This implies that firms with low levels of liquid assets compared to their assets end up having a lower ROA. This can be explained by the inability of illiquid firms to take advantage of investment opportunities when they arise. Further, the study revealed that operating risk has a positive effect on ROA although not substantial impact.

The study conclusions revealed that capital adequacy had a positive as well as significant effect on ROA. This may mean that the DT-SACCOs that have adequate capital are able to meet their obligations when they fall due and are also able to take advantage of investment opportunities that might arise in the course of doing business and therefore high levels of ROA compared with firms that has less capital adequacy.

The research outcomes further depicted that SACCO size possessed a positive as well as significant effect on ROA which might mean that an increase in asset base of a DT-SACCO leads to enhanced ROA. This can be explained by the fact that bigger DT-SACCOs are likely to have developed structures to monitor the internal operations of a firm leading to better ROA. Bigger DT-SACCOs are also likely to have better governance structure which can also explain the high ROA associated with firm size.

5.4 Recommendations for Policy and Practice

The research findings reveal that credit risk had a negative as well as significant impact on ROA. The research therefore commends that the administrators of DT-SACCOs should work on reducing the level of non-performing loans. This can be achieved by coming with effective credit risk management methods that will enable the SACCO distinguish between good and bad borrowers.

Further, liquidity risk was discovered to possess a significant and positive impact on ROA. The research therefore commends that management of DT-SACCOs in Kenya should ensure that they do not over commit their assets by giving excess loans as this will likely lead to reduced ROA. The DT-SACCOs should come up with effective liquidity risk management strategies. Regulators should ensure that the SACCOs do not led beyond a certain set limit of their asset base.

From the study findings, capital adequacy was found to enhance ROA of DT-SACCOs, this study recommends that DT-SACCOs should keep adequate capital levels to sustain their obligations when they fall due whereas simultaneously time enjoying short term investment chances which may arise. The policy makers should set a limit of the capital adequacy level that SACCOs should have as too much capital adequacy is also disadvantageous as it comes with opportunity costs.

5.5 Limitations of the Study

The focus was on various factors which are thought to influence ROA of Kenyan DT-SACCOs. The research focused on six explanatory variables in particular. However, in certainty, there is presence of other variables probable to influence ROA of firms including internal like corporate governance attributes and management ROA

whereas others are beyond the control of the firm like interest rates as well as political stability.

The study was quantitative in nature and therefore did not take into account qualitative information that might clarify other factors influencing the link between financial risk and ROA of DT-SACCOs in Kenya. Qualitative methods like focus groups, open-ended surveys, and interviews can aid in the development of more definite outcomes.

The research focused on a five-year period (2016 to 2020). It's unclear if the conclusions will last for a longer period of time. It's also uncertain if identical results will be achieved after 2020. The research ought to have been conducted over a longer period of time to account for key economic events.

A multivariate regression model was utilized in the study to analyze the data. Owing to the limitations of employing regression models, like erroneous and misleading results which cause the value of the variable to change, it was not possible to generalize the research outcome with accuracy. Furthermore, if more data was included in the regression, the outcome could be varied. As a result, the model constituted still another constraint.

5.6 Suggestions for Further Research

This study focused on DT-SACCOs in Nairobi County. Further studies can focus on a wide scope by covering other SACCOs in Kenya to back or criticize the results of the current study. Further, this study focused on two measures namely; credit risk, and liquidity risk. Future studies should focus on other financial risk measures that were not considered in this study.

Due to the readily available data, the focus of this research was drawn to the last five years. Future research may span a longer time period, such as ten or twenty years, and might have a significant impact on this research by either complementing or contradicting its conclusions. A longer research has the benefit of allowing the researcher to detect the effects of business cycles like booms and recessions.

Lastly, this research relied on a regression model, that has its own set of limitations, such as errors and misleading results when a variable is changed. Future academics should investigate the many relationships between financial risk management practices and ROA using other models.

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APPENDICES

Appendix I: Deposit-Taking SACCOs in Nairobi County, Kenya

1. AFYA SACCO SOCIETY LTD
2. AIRPORTS SACCO SOCIETY LTD
3. ARDHI SACCO SOCIETY LTD
4. ASILI SACCO SOCIETY LTD
5. CHAI SACCO SOCIETY LTD
6. CHUNA SACCO SOCIETY LTD
7. COMOCO SACCO SOCIETY LTD
8. ELIMU SACCO SOCIETY LTD
9. FUNDILIMA SACCO SOCIETY LTD
10. HARAMBEE SACCO SOCIETY LTD
11. HAZINA SACCO SOCIETY LTD
12. JAMII SACCO SOCIETY LTD
13. KENPIPE SACCO SOCIETY LTD
14. KENVERSITY SACCO SOCIETY LTD
15. KENYA BANKERS SACCO SOCIETY LTD
16. KENYA POLICE SACCO SOCIETY LTD
17. KINGDOM SACCO SOCIETY LTD
18. MAGEREZA SACCO SOCIETY LTD
19. MAISHA BORA SACCO SOCIETY LTD
20. METROPOLITAN NATIONAL SACCO SOCIETY LTD
21. MWALIMU NATIONAL SACCO SOCIETY LTD
22. MWITO SACCO SOCIETY LTD
23. NACICO SACCO SOCIETY LTD

24. NAFAKA SACCO SOCIETY LTD

25. NATION SACCO SOCIETY LTD

26. NSSF SACCO SOCIETY LTD

27. NYATI SACCO SOCIETY LTD

28. SAFARICOM SACCO SOCIETY LTD

29. SHERIA SACCO SOCIETY LTD

30. SHIRIKA SACCO SOCIETY LTD

31. SHOPPERS SACCO SOCIETY LTD

32. STIMA SACCO SOCIETY LTD

33. TAQWA SACCO SOCIETY LTD

34. TEMBO SACCO SOCIETY LTD

35. UFANISI SACCO SOCIETY LTD

36. UKRISTO NA UFANISI WA ANGLICANA SACCO SOCIETY LTD

37. UKULIMA SACO SOCIETY LTD

38. UNAITAS SACCO SOCIETY LTD

39. UNITED NATIONS SACCO SOCIETY LTD

40. USHURU SACCO SOCIETY

41. WANAANGA SACCO SOCIETY LTD

42. WANANDEGE SACCO SOCIETY LTD

43. WAUMINI SACCO SOCIETY LTD

Source: SASRA (2020)

Appendix II: Research Data

DT-SACCO	Year	ROA	Credit risk	Liquidity risk	Operating risk	Interest rate risk	Capital adequacy	SACCO size
1	2016	0.083	0.160	3.970	0.753	0.513	0.172	8.216
1	2017	0.114	0.060	3.951	0.779	0.456	0.165	8.218
1	2018	0.147	0.150	3.932	0.900	0.676	0.153	8.251
1	2019	0.195	0.040	3.912	1.219	0.745	0.156	8.269
1	2020	0.174	0.050	3.892	0.781	0.723	0.184	8.317
2	2016	0.241	0.140	3.912	1.535	0.274	0.159	8.338
2	2017	0.159	0.150	3.892	1.254	0.325	0.164	8.424
2	2018	0.064	0.120	3.871	1.855	0.289	0.162	8.414
2	2019	0.060	0.090	3.850	1.632	0.295	0.158	8.456
2	2020	0.031	0.110	3.829	3.296	0.275	0.160	8.486
3	2016	0.028	0.010	4.394	0.621	0.643	1.880	8.207
3	2017	0.025	0.020	4.382	0.612	0.666	1.962	8.288
3	2018	0.014	0.020	4.369	1.114	0.664	0.305	8.377
3	2019	0.002	0.040	4.357	1.036	0.653	0.323	8.425
3	2020	0.105	0.060	4.344	1.537	0.637	0.347	8.452
4	2016	0.084	0.130	3.178	1.493	0.116	0.160	7.558
4	2017	0.133	0.120	3.135	1.101	0.132	0.184	7.620
4	2018	0.171	0.130	3.091	0.751	0.166	0.179	7.588
4	2019	0.057	0.170	3.045	0.879	0.147	0.180	7.565
4	2020	0.123	0.220	2.996	1.135	0.127	0.164	7.541
5	2016	0.089	0.040	2.079	0.590	0.701	0.394	8.058
5	2017	0.094	0.050	1.946	0.620	0.691	0.423	8.124

DT-SACCO	Year	ROA	Credit risk	Liquidity risk	Operating risk	Interest rate risk	Capital adequacy	SACCO size
5	2018	0.099	0.010	1.792	0.599	0.702	0.457	8.166
5	2019	0.100	0.010	1.609	0.708	0.650	0.540	8.229
5	2020	0.151	0.070	1.386	0.524	0.538	0.439	8.329
6	2016	0.061	0.100	3.584	1.824	0.733	0.273	8.577
6	2017	0.297	0.080	3.555	1.577	0.661	0.283	8.628
6	2018	0.232	0.020	3.526	1.112	0.595	0.264	8.651
6	2019	0.230	0.390	3.497	1.275	0.608	0.256	8.699
6	2020	0.166	0.060	3.466	1.344	0.550	0.276	8.730
7	2016	0.011	0.040	3.970	0.983	0.383	0.179	8.002
7	2017	0.057	0.150	3.951	1.062	0.355	0.179	8.051
7	2018	0.013	0.310	3.932	1.740	0.403	0.185	8.049
7	2019	0.091	0.020	3.912	1.201	0.573	0.173	8.143
7	2020	0.019	0.110	3.892	0.941	0.561	0.157	8.160
8	2016	0.186	0.350	3.912	1.321	0.289	0.110	7.982
8	2017	0.095	0.180	3.892	0.760	0.551	0.094	8.026
8	2018	0.153	0.390	3.871	0.688	0.431	0.079	8.077
8	2019	0.107	0.190	3.850	0.992	0.765	0.051	8.189
8	2020	0.010	0.050	3.829	1.070	0.580	0.028	8.282
9	2016	0.018	0.100	4.394	0.268	0.248	0.188	8.020
9	2017	0.004	0.110	4.382	0.349	0.241	0.155	8.044
9	2018	0.142	0.120	4.369	0.332	0.358	0.229	7.973
9	2019	0.155	0.040	4.357	0.266	0.228	0.148	7.974
9	2020	0.168	0.050	4.344	0.312	0.221	0.145	7.995

DT-SACCO	Year	ROA	Credit risk	Liquidity risk	Operating risk	Interest rate risk	Capital adequacy	SACCO size
10	2016	0.030	0.020	3.178	1.118	0.514	0.217	8.188
10	2017	0.038	0.020	3.135	1.110	0.530	0.213	8.236
10	2018	0.042	0.190	3.091	0.990	0.587	0.228	8.271
10	2019	0.028	0.020	3.045	0.850	0.693	0.023	8.329
10	2020	0.057	0.030	2.996	1.061	0.607	0.162	8.351
11	2016	0.040	0.090	2.079	0.853	0.535	0.235	8.390
11	2017	0.042	0.090	1.946	0.936	0.592	0.244	8.480
11	2018	0.230	0.100	1.792	0.141	0.508	0.251	8.528
11	2019	0.214	0.040	1.609	0.104	0.693	0.236	8.572
11	2020	0.161	0.020	1.386	1.153	0.763	0.246	8.626
12	2016	0.144	0.020	2.357	0.262	0.795	0.229	7.206
12	2017	0.122	0.020	2.297	0.223	0.785	0.146	7.199
12	2018	0.096	0.030	2.681	0.248	0.697	0.185	7.224
12	2019	0.279	0.040	2.348	0.287	0.668	0.190	7.319
12	2020	0.279	0.030	2.620	0.280	0.683	0.211	7.355
13	2016	0.110	0.060	1.316	0.853	0.307	0.423	7.723
13	2017	0.059	0.190	1.196	0.936	0.229	0.457	7.677
13	2018	0.244	0.190	1.174	1.153	0.033	0.540	7.537
13	2019	0.124	0.020	1.206	0.599	0.810	0.701	7.499
13	2020	0.126	0.040	1.228	0.833	0.746	0.299	7.479
14	2016	0.117	0.300	1.056	0.912	0.156	0.318	7.687
14	2017	0.087	0.240	1.096	1.041	0.174	0.250	7.724
14	2018	0.085	0.200	1.112	0.697	0.336	0.194	7.561

DT-SACCO	Year	ROA	Credit risk	Liquidity risk	Operating risk	Interest rate risk	Capital adequacy	SACCO size
14	2019	0.077	0.170	1.160	1.042	0.322	0.160	7.625
14	2020	0.062	0.140	1.123	0.905	0.377	0.166	7.619
15	2016	0.067	0.000	4.511	0.593	0.393	0.212	8.216
15	2017	0.052	0.200	6.296	1.153	0.444	0.202	8.218
15	2018	0.023	0.010	10.089	0.694	0.384	0.197	8.251
15	2019	0.023	0.020	4.258	0.715	0.328	0.204	8.269
15	2020	0.284	0.120	8.843	0.576	0.270	0.204	8.317
16	2016	0.002	0.020	1.107	1.174	0.142	0.269	7.392
16	2017	0.034	0.030	1.146	0.983	0.104	0.144	7.391
16	2018	0.140	0.130	1.382	1.327	0.090	0.208	7.427
16	2019	0.082	0.380	1.536	1.191	0.188	0.199	7.495
16	2020	0.306	0.010	1.464	1.296	0.295	0.195	7.609
17	2016	0.169	0.050	1.283	2.606	0.582	0.113	7.709
17	2017	0.292	0.050	1.168	1.987	0.529	0.115	7.793
17	2018	0.214	0.070	1.305	1.757	0.569	0.140	7.796
17	2019	0.004	0.050	1.197	1.574	0.462	0.153	7.809
17	2020	0.004	0.050	1.161	1.555	0.507	0.091	7.739
18	2016	0.118	0.070	1.585	1.307	0.437	0.234	8.142
18	2017	0.262	0.060	1.946	1.222	0.465	0.265	8.216
18	2018	0.103	0.050	1.085	2.680	0.486	0.255	8.248
18	2019	0.134	0.040	1.024	2.262	0.495	0.239	8.287
18	2020	0.092	0.030	1.469	0.631	0.615	0.260	8.293
19	2016	0.005	0.210	1.984	1.251	1.006	0.171	7.027

DT-SACCO	Year	ROA	Credit risk	Liquidity risk	Operating risk	Interest rate risk	Capital adequacy	SACCO size
19	2017	0.053	0.050	1.334	1.057	0.797	0.176	7.000
19	2018	0.054	0.050	1.540	1.244	0.966	0.190	6.977
19	2019	0.074	0.080	1.259	0.942	0.366	0.202	6.937
19	2020	0.020	0.030	1.115	1.048	0.446	0.228	6.934
20	2016	0.048	0.570	4.144	1.013	0.419	0.135	6.858
20	2017	0.088	0.530	7.954	1.156	0.867	0.158	6.861
20	2018	0.124	0.080	8.475	1.596	0.520	0.187	6.961
20	2019	0.018	0.060	3.345	1.315	0.475	0.162	7.039
20	2020	0.018	0.000	1.951	1.081	0.466	0.187	7.118
21	2016	0.161	0.060	1.097	1.153	0.381	0.202	8.338
21	2017	0.107	0.070	1.422	0.784	0.383	0.321	8.424
21	2018	0.005	0.060	1.486	1.019	0.394	0.391	8.414
21	2019	0.023	0.040	1.736	0.853	0.471	0.170	8.456
21	2020	0.040	0.120	1.237	0.936	0.279	0.153	8.486
22	2016	0.040	0.130	1.950	1.116	0.285	0.391	8.338
22	2017	0.042	0.160	1.935	0.007	0.295	0.181	8.424
22	2018	0.119	0.200	1.968	1.299	0.266	0.177	6.761
22	2019	0.047	0.230	1.224	1.110	0.280	0.170	6.794
22	2020	0.066	0.020	1.643	0.801	0.277	0.153	8.288
23	2016	0.111	0.060	1.032	0.987	0.240	0.189	8.207
23	2017	0.080	0.060	1.923	0.748	0.261	0.202	8.288
23	2018	0.047	0.100	1.897	0.757	0.240	0.182	8.377
23	2019	0.076	0.080	1.157	0.702	0.216	0.186	8.425

DT-SACCO	Year	ROA	Credit risk	Liquidity risk	Operating risk	Interest rate risk	Capital adequacy	SACCO size
23	2020	0.228	0.120	1.502	0.698	0.820	0.179	8.452
24	2016	0.221	0.160	1.465	0.677	0.888	0.261	8.486
24	2017	0.365	0.140	1.563	0.992	0.801	0.163	8.338
24	2018	0.056	0.110	1.400	0.856	0.855	0.201	8.424
24	2019	0.017	0.110	1.063	0.321	0.868	0.193	6.072
24	2020	0.124	0.170	1.624	1.153	0.078	0.192	6.505
25	2016	0.115	0.050	1.740	2.576	0.091	0.210	7.511
25	2017	0.136	0.010	4.394	2.284	0.148	0.154	7.538
25	2018	0.040	0.090	4.382	0.254	0.191	0.180	7.508
25	2019	0.020	0.100	4.369	0.226	0.239	0.166	7.640
25	2020	0.011	0.030	2.205	0.206	0.265	0.196	7.651
26	2016	0.287	0.050	2.524	0.853	0.221	0.195	8.390
26	2017	0.027	0.010	3.374	0.936	0.229	0.427	8.480
26	2018	0.004	0.090	2.833	0.753	0.253	0.393	8.528
26	2019	0.160	0.030	3.020	2.074	0.303	0.571	8.572
26	2020	0.160	0.050	4.402	0.853	0.294	0.449	8.626
27	2016	0.197	0.010	2.328	1.327	0.280	0.458	7.673
27	2017	0.263	0.070	1.771	1.191	0.284	0.350	7.797
27	2018	0.032	0.090	1.895	1.296	0.382	0.387	7.617
27	2019	0.071	0.070	2.131	2.606	0.283	0.332	7.675
27	2020	0.104	0.080	1.955	1.987	0.271	0.309	7.686
28	2016	0.100	0.010	1.219	1.757	0.267	0.139	7.125
28	2017	0.077	0.000	1.156	1.153	0.236	0.140	7.092

DT-SACCO	Year	ROA	Credit risk	Liquidity risk	Operating risk	Interest rate risk	Capital adequacy	SACCO size
28	2018	0.072	0.080	1.116	1.146	0.241	0.072	7.102
28	2019	0.075	0.070	1.078	1.306	1.139	0.054	7.169
28	2020	0.037	0.250	1.524	1.568	0.939	0.037	7.165
29	2016	0.064	0.140	1.488	1.642	0.728	0.210	7.469
29	2017	0.028	0.160	1.277	1.486	0.673	0.206	7.421
29	2018	0.088	0.000	1.300	0.912	0.587	0.230	7.434
29	2019	0.033	0.010	1.100	0.796	0.476	0.223	7.441
29	2020	0.033	0.000	1.630	0.619	0.437	0.187	7.458
30	2016	0.228	0.030	1.595	1.049	0.388	0.255	7.102
30	2017	0.327	0.010	1.487	0.796	0.347	0.241	7.097
30	2018	0.223	0.030	1.285	0.650	0.346	0.274	7.090
30	2019	0.221	0.040	1.410	0.685	0.348	0.295	7.118
30	2020	0.228	0.030	1.078	0.827	0.347	0.285	7.125
31	2016	0.218	0.020	1.524	0.621	0.310	0.168	7.198
31	2017	0.272	0.040	1.488	1.249	0.357	0.173	7.279
31	2018	0.284	0.060	1.098	0.998	0.369	0.222	7.338
31	2019	0.246	0.230	1.086	1.424	0.683	0.225	7.416
31	2020	0.269	0.030	2.369	1.520	0.679	0.373	7.426
32	2016	0.319	0.030	2.271	0.553	0.594	0.206	6.505
32	2017	0.328	0.100	1.838	0.735	0.763	0.247	7.511
32	2018	0.313	0.030	2.358	0.548	0.754	0.233	7.538
32	2019	0.060	0.040	2.522	0.832	0.369	0.165	7.508
32	2020	0.064	0.040	1.310	1.234	0.683	0.144	7.640

DT-SACCO	Year	ROA	Credit risk	Liquidity risk	Operating risk	Interest rate risk	Capital adequacy	SACCO size
33	2016	0.038	0.100	1.175	0.853	0.679	0.172	7.651
33	2017	0.041	0.000	1.170	0.936	0.906	0.187	8.390
33	2018	0.105	0.030	1.167	0.704	0.889	0.181	8.480
33	2019	0.125	0.080	1.138	1.576	0.530	0.168	8.528
33	2020	0.120	0.030	2.564	1.539	0.526	0.172	8.572
34	2016	0.236	0.000	1.042	2.212	0.537	0.198	8.626
34	2017	0.187	0.000	1.059	2.227	0.452	0.212	7.673
34	2018	0.160	0.110	1.112	2.267	0.403	0.209	7.797
34	2019	0.125	0.100	1.125	3.011	0.046	0.185	7.617
34	2020	0.137	0.090	1.061	1.263	0.075	0.195	7.675
35	2016	0.066	0.160	1.159	1.153	0.075	0.107	7.686
35	2017	0.076	0.190	1.144	1.068	0.084	0.175	7.125
35	2018	0.072	0.230	1.145	0.722	0.364	0.163	7.092
35	2019	0.080	0.190	1.094	0.520	0.560	0.127	7.102
35	2020	0.080	0.260	1.033	1.152	0.524	0.220	7.169
36	2016	0.087	0.270	1.271	0.998	0.526	0.277	7.165
36	2017	0.094	0.230	1.278	0.828	0.555	0.216	7.469
36	2018	0.022	0.220	1.172	0.831	0.025	0.223	7.421
36	2019	0.096	0.060	1.166	0.625	0.718	0.291	7.434
36	2020	0.056	0.230	1.533	0.904	0.710	0.211	7.441
37	2016	0.081	0.120	1.623	0.695	0.636	0.586	7.458
37	2017	0.091	0.050	1.638	0.759	0.567	0.238	7.102
37	2018	0.051	0.060	1.605	1.151	0.491	0.387	7.097

DT-SACCO	Year	ROA	Credit risk	Liquidity risk	Operating risk	Interest rate risk	Capital adequacy	SACCO size
37	2019	0.074	0.050	1.505	0.499	0.492	0.388	7.090
37	2020	0.058	0.090	1.265	0.616	0.448	0.332	7.118
38	2016	0.065	0.130	1.287	0.918	0.423	0.291	7.125
38	2017	0.054	0.170	1.278	1.343	0.437	0.172	7.198
38	2018	0.047	0.120	1.222	1.610	0.486	0.255	7.279
38	2019	0.014	0.040	1.169	1.804	0.392	0.227	7.338
38	2020	0.014	0.030	1.125	1.646	0.280	0.211	7.416
39	2016	0.348	0.040	1.100	1.357	0.530	0.159	7.426
39	2017	0.254	0.050	1.042	0.588	0.468	0.164	8.216
39	2018	0.083	0.039	1.240	1.054	0.450	0.162	8.248
39	2019	0.085	0.039	2.262	1.592	0.442	0.158	8.287
39	2020	0.099	0.036	2.933	2.182	0.341	0.160	8.293
40	2016	0.221	0.028	3.534	1.610	0.283	1.880	7.027
40	2017	0.365	0.050	2.500	1.804	0.400	1.962	7.000
40	2018	0.056	0.039	3.145	0.853	0.318	0.305	6.977
40	2019	0.017	0.039	2.506	0.936	0.399	0.323	6.937
40	2020	0.124	0.036	2.500	1.111	0.400	0.347	6.934
41	2016	0.091	0.028	2.985	1.424	0.335	0.160	6.858
41	2017	0.138	0.045	3.067	1.520	0.326	0.184	6.861
41	2018	0.111	0.045	2.959	0.553	0.338	0.179	6.961
41	2019	0.078	0.047	2.660	0.735	0.376	0.180	7.039
41	2020	0.067	0.028	2.967	0.548	0.337	0.164	7.118
42	2016	0.066	0.037	2.174	0.832	0.460	0.394	8.338

DT-SACCO	Year	ROA	Credit risk	Liquidity risk	Operating risk	Interest rate risk	Capital adequacy	SACCO size
42	2017	0.066	0.042	1.473	1.234	0.679	0.423	8.424
42	2018	0.067	0.041	2.415	0.853	0.414	0.457	8.414
42	2019	0.055	0.043	1.357	0.936	0.737	0.540	8.456
42	2020	0.055	0.039	1.832	0.704	0.546	0.439	8.486
43	2016	0.042	0.036	2.564	1.576	0.390	0.273	8.338
43	2017	0.294	0.014	2.941	1.539	0.440	0.283	8.424
43	2018	0.113	0.007	2.381	2.212	0.420	0.264	6.761
43	2019	0.188	0.010	2.632	2.227	0.380	0.256	6.794
43	2020	0.205	0.001	4.348	2.267	0.230	0.276	8.288