THE POWER OF FINANCIAL RATIOS IN DETECTING FRAUDULENT FINANCIAL REPORTING: THE CASE OF SAVINGS AND CREDIT CO - OPERATIVE SOCIETIES IN KENYA

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DECLARATION

I certify that this thesis is my original work and has not been presented for a degree in any University.

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Leonard Rang'ala Lari

This thesis has been submitted for examination with my approval as the University supervisor

Signed……..Date……...

Dr. James McFie

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DEDICATION

This thesis is dedicated to my Mum, Dad and Aunt

ABSTRACT

The study aimed at proving that the financial ratios currently computed by Savings and Credit Co-operative Societies (SACCOs) in Kenya may not assist users of the financial reports towards detection of fraudulent financial reports; other ratios can bring to light possible fraud. Unpublished related previous studies in Kenya have dealt with both companies and the co-operative movement from different perspectives. The results at different levels of this study indicate that the best financial ratios able to bring to light fraudulent financial statements are: members' shares and deposits dividend return; members' loan schedule balance/loan ledger balance; financial investment/total assets; (liquid investments + liquid assets - short term creditors)/total assets; non-earning liquid assets/total assets; net loans to members/total assets; gross loans to members/total assets, members' deposits/total assets. Second best are: net profit/total assets ratio; total operating expenses/average total assets ratio; and growth in members' loans rate. The results support the general alternative hypothesis that financial ratios can detect fraudulent financial reporting (FFR) by SACCOs in Kenya. Specific ratios not currently in use, in the SACCOs sector have the power to reveal FFR. The sample of 46 SACCOs (23 of them affected by fraud) were deliberately chosen. The analysis of ratios was conducted on 27 covariates, using the following methods: stepwise logistic regression model, discriminant analysis, and Pearson correlation - a method used to measure and confirm the possibility of earnings manipulation. According to the regulator, fraud poses a threat to the future existence of SACCOs in Kenya. The limitations to this study include: existence of a possibility of having other unidentified ratios that can detect fraud, some financial reports could not be used due to incomplete reporting structure and information,and the sample of fraudulent financial reports and non fraudulent financial reports were limited to reported cases only. Further study is suggested to determine the extent of earnings management and the power of ratios in detection of FFR using a larger sample of SACCOs, beside the multipurpose co-operatives and marketing co-operatives to complete the results of this study.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1
INTRODUCTION

1.1 Background

Financial statement fraud is defined by the Association of Certified Fraud Examiners (ACFE) as ‘‘the deliberate misrepresentation of the financial condition of an enterprise, by intentionally misstating or omitting amounts or disclosures in the financial statements so as to deceive their users’’ (ACFE, 2007).

ACFE goes on to point out that financial statement fraud is usually a means to an end rather than an end in itself: when people manipulate accounting books they may be doing it to ‘‘buy time’’ towards quietly fixing problems that prevent the company from achieving its expected earnings or complying with loan contracts: also, to obtain or renew financing that would not be granted, or would be smaller, if honest financial statements were provided. It can be concluded that the difference between error and fraud is intent; errors are considered to be unintentional, fraud intentional (IFAC, 2006b; Zabihollah, 2002; Wallace, 1995).

Savings and Credit Co-operative Societies (SACCOs) are defined as ‘‘democratic, unique, member driven, self-help, not for profit financial co-operatives; they are owned and governed by members with the same common bond’’ (Afya SACCO, 2005). There are some 12,000 co-operative societies in Kenya, all of which are required to be registered under the Ministry of Co-operative Development and Marketing (MOCDM). Of these approximately 5,000 are registered as SACCOs; in 2006, the co-operative sector as a whole mobilized savings of Kshs.150 billion, approximately 31% of National Savings (MOCDM, 2008).

It is reported that mismanagement and corruption are two most significant challenges facing the co-operative movement in Kenya today; many cases of

fraud in the co-operative sector in Kenya are investigated by the inquiry section of the MOCDM; 37 investigations were carried out in the sector during the financial year ending on 30th June 2007 (MOCDM, 2008).

In 2004, an amendment to the *1997 Co-operative Societies Act, Chapter 490 of the Laws of Kenya*, was passed by Parliament. The main provisions of the amendment, which applied to SACCOs, are as follows: to ensure indemnity to societies in the case of loss or fraud resulting from mismanagement by committee members, it is mandatory for committee members to file individual indemnity forms with the regulator, the MOCDM; prudential standards were set for the operation of co-operative societies operating front office services; management must present a budget at every annual general meeting or special general meeting to be approved by members; and no co-operative is to invest in non-core business, except with the approval of the Commissioner and of members of the co-operative through a special resolution at the annual general meeting. As reported in the Kenya Gazette Supplement (KGS), this fourth regulation is meant to guard against SACCOs investing in projects like housing, instead of keeping to their core objective of giving loans to members (KGS, 2004a).

In 2005 it was realized that further amendments to the Act were necessary. MOCDM presented a bill to Parliament entitled ‘‘*The SACCOs Regulatory Bill, 2005’’* (SRB 2005), which was proposed by stakeholders in the co-operative sector. This bill was considered by Parliament in 2008 (KGS, 2009). SRB 2005 stipulates that SACCOs must not invest more than 5% of their total assets in fixed assets [section 77(2)] and must write off a loan remaining delinquent for more than one year [section 81 (2)]. These two regulations are included in the Table of Ratios laid down by the World Council of Credit Unions Inc. (WOCCU), except that WOCCU has the more stringent limit of zero percent for the ratio of non-financial investments to total assets (see Table I: Effective Financial

Structure: No.4, and Table I: Protection: No.1, respectively). A study by Spathis (2002) concluded that fraudulent financial reporting can be detected by analyzing publicly available financial statements.

1.2 Stating the problem

There is evidence that the financial statements of some SACCOs are fraudulent. The question arises as to whether any accounting ratios can be used to identify which financial statements are fraudulent and which are not fraudulent. This study aims to answer this question.

The *Public Officers Ethics Act, 2003* states that co-operative society committee members are mandated to declare their personal assets, liabilities and incomes, on being elected and later once a year. The Act was passed by Parliament, thus showing that there is a problem of dishonesty in SACCOs. According to a recent Ministerial statement during the International Co-operative Day (MOCDM, 2008; Daily Nation, 2007), the Minister of Co-operative Development and Marketing stated that the Ministry had set up an Ethics Commission to check the excesses of management committees and to improve governance and ethics in the co-operative movement. On the same day the Minister revealed that the Co-operative Tribunal managed to settle 296 disputes, and that during the financial year ending on 30th June 2007, 37 occupational fraud and corruption investigations had been carried out in the co-operative sector. Fraud continued to appear in the media, despite inspections of co-operative societies sanctioned and carried out by the regulator.

Mismanagement and corruption practices in SACCOs are rampant critical problem that impact negatively on the SACCOs' national savings. This problem has recently increased the interest of the regulator to set up the ethics commission for common good of society, investors and other stakeholders who

are likely to be affected by the SACCOs' frauds, including the fraudulent financial reporting.

Spathis (2002) finds that the ratio Net profit / Total assets (WOCCU ratios-Table I, Rates of Return and Costs, No. R12) is the most important ratio in revealing fraudulent financial reporting. SACCOs, however, do not include this ratio in their yearly financial statements; neither does the MOCDM require them to do so. Spathis (2002) reveals that companies with low values of this ratio are more likely to engage in fraudulent financial reporting.

In this study writer's view SACCO officials, wishing to ingratiate themselves with members and ensure re-election at the annual general meeting, borrow from banks to lend to members. But the interest rate they pay on borrowed funds is higher than the interest rate charged to members. As a result, the profits of these SACCOs are reduced.

The Institute of Certified Public Accountants of Kenya (ICPAK) recognizes the importance of ratios computed from audited accounts of SACCOs. If the specific causes of the differences pertaining to loans and shares balances are not disclosed under notes to the audited accounts; this is considered irregular (ICPAK, 2007a). This fact underscores the importance of the ratio of loan ledger/loan listing balance and of shares ledger/ shares listing balance.

According to Spathis (2002), firms with low profitability are prone to fraudulent financial statements (FFS). However, because the income possibilities of SACCOs are restricted, if the ratio net income/total assets is above a certain value, it is also likely that the SACCOs' financial statements are fraudulent, because the profit figure is likely to be manipulated. On the contrary, Kathleen et al. (2004) argue that ratios are less useful in detecting FFS: consensus is lacking over the power of financial ratios towards detecting fraud.

1.3 The research questions:

1. Do specific financial ratios detect fraudulent financial statements of SACCOS in Kenya?
2. Are the financial ratios currently in use the same as the ones identified as potential detectors of fraud?

1.4 Significance of the study

The result of this study will:

- Add knowledge towards improving the detection and prevention of financial fraud;
- Expand existing literature relative to fraud in financial reporting;
- Expose weaknesses in the current Co-operative Societies' Act and by-laws;
- Aid government in monitoring SACCOs;
- Provide new insights for policy makers, regulators, and academia.

1.5 Motivation

A requirement for Kenya SACCOs to compute financial ratios is mandatory. However no conclusion is ever made based on computing these ratios other than the performance contribution conclusion. In fact no one currently seems to know the purpose of these ratios in SACCOs' audited reports. A few prior works say that ratios are ''useless'' [Kathleen et al. (2004)] whereas some say the exact opposite [Spathis (2002), Persons (1995)]. These conflicting studies show that the debate is still on. This paper examines whether financial ratios as currently computed by SACCOS in Kenya detect fraudulent financial reporting (FFR). This writer in particular is convinced that the ratios used may not detect fraud. If this study confirms this, the use of appropriate ratios recommended by this study will benefit Auditors, the Kenya Revenue Authority, Government Regulators and other interested parties.

Prior studies on the use of ratios in detecting FFS have been carried out in other countries but this writer has found no prior pertinent literature in Kenya. Further, the aforementioned studies towards predicting fraudulent financial statements and bankruptcy excluded financial institutions.

1.6 The objectives of the study:

1. The study aims at establishing whether or not the financial ratios currently computed by SACCOs in Kenya for the purpose of measuring performance may assist users of financial reports towards detecting fraud.
2. With much fraud reported within the SACCOs sector, there is need to identify alternative financial ratios towards detecting financial statements fraud.

Fraudulent reporting is a critical problem for external auditors. International Standard on Auditing (ISA) 240 requires an auditor to maintain an attitude of professional scepticism throughout the audit, recognizing the possibility that a material misstatement due to fraud can exist, notwithstanding the auditor's past experience with the entity about the honesty and integrity of management and those charged with governance (IFAC, 2006b).

1.7 Structure of this thesis

Chapter one identifies the rationale of this thesis. It contains a statement of the research questions, the objectives of the study, its significance and motivation. Chapter two reviews the literature. Chapter three discusses development and formulation of testable hypotheses. Chapter four discusses the methods of data collection as well as a description of the research plan and the sampling of SACCOs. Chapter five and six contain the results of the study and the conclusion respectively.

CHAPTER 2

THE LITERATURE REVIEW

This section covers:

- Theoretical development literature on corporate governance theory and occupational fraud theory;
- The characteristics of fraud in financial statements;
- The sample characteristics.

2.1 Theoretical development

Corporate governance theory and occupational fraud theory offer a basis for research into the area of SACCOs' financial misrepresentation or fraudulent financial reporting, and that of sound management.

Failure in corporate governance is a source of various financial misrepresentations. Theoretical motivations are here provided for the study of misrepresentations or lack thereof. Theories are analyzed as follows:

2.2 Corporate governance theories:

2.2.1 Agency theory

Agency economic theory and institutional agency theory were originated by Stephen Ross and Barry Mitnick respectively. Mitnick concludes that institutions revolve around the relation employer-employee, whereas Ross believed that this relation revolves around job incentives to the employees. In a thesis defended at the University of Pennsylvania in an economic meeting in December 1972, Ross argued that the agency problem and incentives are identified as macroeconomic problems besides being microeconomic ones. This paper launched the idea of agency theory. Mitnick, a doctoral student in political science at the University, presented a similar dissertation on agency in 1973. He believed that institutions and social mechanisms guide the agent as well as principal relationship or preferences (Mitnick, 2006).

Owners of firms contract agents to manage their firms on their behalf, thus becoming principals. The agents accept this responsibility with the aim of maximizing their personal utility as well as the owners' wealth. When agency utility and shareholders' wealth converge, the agency problem is considered to be absent (Davis et al., 1997a). Another related prior study Jensen and Meckling (1976) investigates the agency costs that come into being as a result of existence of debt and outside equity claims in a company, and furthermore answers the questions: as to who bears such agency costs? And what type of agency relationship to the separation of ownership and control function exists in the firms? The study concludes that agency costs are the total of bonding costs incurred by the agent, residual loss, and monitoring costs incurred by the principal.

The controversies surrounding agency theory are:

- The variables in the relation agent-principal are not measurable (Bruton et al., 2000 and Busenitz et al., 2001);
- A partial share ownership by the agent in a firm does not motivate the agent to behave as a principal would (Pierce et al., 1991);
- And, the explanatory power of agency theory is reduced if and when the principal decides to divest to a new business. Further, an agent must be motivated and monitored to create wealth; this arrangement portrays agents as potentially fraudulent and principals as policemen enforcing the law (Arthurs and Busenitz, 2003).

Economists level a number of criticisms at co-operatives, agency theory being one of them. They argue that members of many co-operatives do not control management, investments are short term, and accumulated investments are below the economic optimum (Nilsson, 2001).

2.2.2 Stewardship theory

A second theory, considered as filling the gaps left by agency theory, is stewardship theory. It suggests that once the principal has invested in a new venture, stewardship theory explains the behaviour between the principal and the agent better than agency theory (Davis et al., 1997b).

In this section, the roles of the board chairperson and managing director are combined. Such combination ensures a better return on assets (ROA) than that ensured by agency theory. In agency theory the board chair is independent of the managing director. Donaldson and Davis (1991) developed the organizational stewardship theory in 1991 and 1993. They considered the principal agent relationship at one point in time, ignoring the learning curve effect that occurs as agent and principal interact over time (Pastoriza and Arino, 2008).

Prior studies on fraud based on agency theory are: Palliam and Shalhoub (2003), who conclude that owners tend to diversify ownership across various firms, as they are considered to be risk averse. This characteristic makes agents misstate the results of financial statements (i.e. earnings management practices).

Reinstein et al. (2001), conclude that after using the agency theory model, international accounting firms divested from consulting engagements in order to restore public confidence in the profession, thus enhancing auditors' independence. For example, Arthur Andersen divested from Andersen Consulting (changed its name to Accenture) in 2001, and Ernst and Young sold a consulting unit to Cap Gemini in February 2000.

Heminway (2003) describes how complexities in a corporate agency led to Enron's public financial misstatements and omissions.

Robinson and Santore (2008) revealed that the likelihood of fraud is proportional to attractiveness of equity compensation and the value of the firm. Further, equity compensation motivates managers to work hard at the same time as to irregularly inflate the firm's share price. Finally, Matsumura and Tucker (1992) conclude that in a client (manager) - auditor relationship, the auditor must choose whether to audit for unintentional errors or for fraud, whereas the manager must choose whether to commit a fixed level of fraud or not. The study reveals that increasing the auditor's penalty decreases fraud and increasing the auditors' substantive tests, managers committed fraud less frequently. Matsumura and Tucker developed their theory by mixing game-theory analysis and experiment.

In agency theory the manager, as one party, acts as the agent of the principal as the other party (Mallin, 2007). The SACCO managers report to the executive committee (principal). More often, managers are allowed to be members of the SACCO they serve, which may ensure more disclosures and accountability of their actions, but may bring about conflict of interest.

2.3 Occupational fraud theories:

Wells (2003) set forth various fraud theories: first, Sutherland in 1939 defined white collar crime as criminal acts of companies and administrators in corporate capacity. His theory of differential association indicates that crime is learned from fellow group members; second, Donald R. Cressey (Sutherland's student) undertook a separate research into causes of fraud in the 1940s in the US. From interviewing 200 incarcerated embezzlers, he developed what is now called ''Fraud Triangle'' made of a perceived non-sharable financial need or pressure, an opportunity to commit fraud, and a rationalization mechanism to permit it; third, Steve Albrecht: surveyed 212 actual frauds committed in the early 1980s. He developed fraud-scale theory made up of three characteristics: a) situational pressures (financial oriented), b) perceived opportunities (caused by poor controls), and c) personal integrity (individual ethics); fourth, Hollinger Clark in

1983 studied 10,000 cases of American employees, concluding that fraud is caused by a lack of job inspiration and that the actual cost of dissatisfaction is greatly understated. Clark also portends that the higher the position held in a company the bigger the level of fraud. Dissatisfied workers are likely to break rules irrespective of age or position. This theory also emphasizes the contribution of policy development in curtailing theft. Further, Gottfredson and Hirsch in 1990 developed a general theory of crime including murder and shoplifting, arguing that they result from low self-control and desire for gratification. This theory is criticized over its inability to explain those forms of corporate fraud where the entity benefits instead of the offender, and that most frauds are committed by individuals and not by corporate bodies. Another shortcoming is its explanation of much of street crime beside a smaller portion of white collar crime.

In the co-operatives sector a prior study, Lewis (1937) concluded that difficulties that lead to consumer co-operative failures are: a) faults due to poor management in the application of key co-operative principles, and b) faults due to lack of team spirit among co-operative members.

Paradis (2001) concludes that the failures of savings and credit co-operatives are indirectly determined by corporate governance. He further concludes that with a multiple ownership and no secondary market of equity exists, (as in Kenya) the conflict between members and managers causes failures of SACCOs.

2.4 Characteristics of Financial Statements Fraud

According to Rosplock (2001), intent to conceal and take advantage by suppressing the truth of assets, liabilities, cash flow, sales and profitability is creating a new level of risk for organizations. He further reveals that companies in high risk categories of fraud in financial reporting are affected by weak solvency (liquidity ratios), highly leveraged conditions, and overcapitalization. Weak efficiency shows in slow turnover of trade debtors, trade creditors, and

stocks; or in a substantially inadequate cash flow or working capital to sustain growth and/or reinvestment; and minimal or nil profitability.

Beasley et al. (1999) examined 204 cases of financial statement fraud, under investigation at the time by the Securities and Exchange Commission (SEC). Some of the key findings were:

- Most small companies (noted as fraudulent) were not listed on the New York Stock Exchange or the American Stock Exchanges;
- The mean fraud period extended over 23.7 months. Only 14% of 204 companies engaged in fraud over a period of less than a year, meaning that frauds overlapped at least two financial periods;
- Most companies had no audit committees; the audit committee and boards of other companies appeared to be weak,
- Most audit committees rarely met;
- The companies' boards of directors were dominated by insiders, and had outsiders (with special ties to the company or management, also called ''gray'' directors) with significant equity ownership and apparently little experience of serving as directors of companies; whereas audit boards require analytical procedures (AP) to improve the detection of FFS.
- Further, the Committee of Sponsoring Organizations of Treadway Commission (COSO) defined FFS as intentional or reckless conduct, whether by act or by omission, which result in materially misleading financial statements; where the founders and board members own a significant portion of the companies; in nearly 40% of the companies, authorizations for votes by proxy provided evidence of family relationships among directors and/or officers. The founder and current Chief Executive Officer were the same person, or the original Chief Executive Officer/President was still in place in nearly half of the companies; severe consequences resulted when companies committed fraud, including bankruptcy, significant changes in ownership, and suspension from trading in the national exchanges; accounts receivable and

inventory were the two most commonly misstated asset accounts, followed by property plant and equipment, loans or notes receivable, cash, investments, patents, and natural resources. The findings of Beasley et al. indicated under this paragraph, though they involve small companies other than SACCOs, set a basis to this research. Indeed in Kenya, as stated earlier, no single SACCO is currently quoted on the Nairobi Stock Exchange, which ties well with the study of Beasley et al.

Thornhill (1995) pointed out that analytical procedures (AP) were useful tools in identifying fraud like misstatements in financial reports. AP involve the analysis of trends, ratios and reasonableness tests derived from an entity's financial and operating data.

International Standards on Auditing (ISA) No.240, *''The Auditors' Responsibility to Consider Fraud in an Audit of Financial Statements''*, states that two types of intentional misstatements are relevant to the auditor: those resulting from fraudulent financial reporting and those resulting from misappropriation of assets.

Fraudulent financial reporting (FFR) involves intentional omissions of amounts or disclosures in financial statements to deceive their users. FFR may be accomplished by manipulating, falsifying (including forgery), or altering the accounting records or the supporting documentation from which financial statements are prepared; misrepresenting or intentionally omitting events, transactions or other significant information; and intentionally misapplying accounting principles relating to amounts, classifications, manner of presentation, or disclosure.

FFR often involves management override of controls that may otherwise appear to be operating effectively. Fraud can be committed by techniques such as: fictitious journal entries, omitting, advancing or delaying recognition in financial

statements of events and transactions that have occurred during the reporting period, concealing facts that could affect the amounts recorded.

FFR can be caused by the efforts of management to manage earnings in order to deceive financial statement users, influencing their perceptions as to the entity's performance and profitability. Such earnings may start out as small actions or inappropriate adjustment of assumptions and changes in judgments. Pressures and incentives may make these actions increase to becoming fraudulent financial reporting (IFAC, 2006b).

As required by ISA 200, *''Objective and General Principles Governing an Audit of Financial Statements''*, the auditor plans and performs an audit with an attitude of professional scepticism, acknowledging circumstances that may cause the financial statements to be misstated. Owing to the characteristics of fraud, the auditor's professional scepticism is particularly important (IFAC, 2006a).

Nelson et al. (2003) concluded that the most common method of smoothing earnings was by ''recognizing too much or too little reserve in the current year''. Key techniques towards falsifying profits can be divided into 3 broad categories: changing accounting methods, fiddling the managerial estimates of costs, and shifting the period that includes expenses and revenues (Worthy, 1984). False financial reports can also result from manipulating documents, altering test documents, and producing false work reports (Comer, 1998).

Accounting fraud is important in evaluating companies. It is also an important news event (Miller, 2006). At the end of yearly statutory external audits some SACCOs in Kenya do incur expenditures towards publishing or advertisements of audited financial statements. This practice confirms the importance of SACCOs in the eyes of stakeholders, but in case of FFR it is most unlikely that the societies release audited reports to a watchdog press, for fear of losing

shareholders. The advertisement of SACCOs' final reports is optional and is not regulated in Kenya.

2.5 Sample characteristics

The small sample according to Mehran and Schwartz (1998) is usual in accounting and finance literature, where discrete choice variables are involved. Maddala (1991) demonstrates that the sample size used in logit regression affects only the constant term and not the explanatory variables' coefficients. Monte Carlo simulations indicate that for research purposes the logit regression may be preferable to the ordinary least square (OLS) regression, with sample sizes of around 50. Stone and Rasp (1991) also recognize that many studies in accounting literature have employed samples smaller than 50.

There are two categories of co-operatives investigations in Kenya KGS (2004b):

1. The inquiry by the Commissioner of Co-operative Societies (CCS), who sanctions investigations or by at least a third of members' votes at a general meeting;
2. The impromptu inspection, sanctioned by CCS on application by a creditor(s) on failure by the society to meet its obligations.

In the Kenya co-operative movement it is generally agreed that these investigations represent flagrant or egregious violations of International Financial Reporting Standards (IFRS). The narrative disclosures and Co-operative Societies Act provide basic criteria towards developing the research fraudulent financial statements' (FFS') sample.

CHAPTER 3

DEVELOPMENT AND FORMULATION OF TESTABLE HYPOTHESES

3.1 Development of hypotheses

The development of hypotheses is divided into a section dealing with general literature on detection and prevention of fraud in financial statements and the other with special literature about monitoring system or WOCCU ratios.

3.1.1 Detecting and Preventing Fraud in financial statements

ISA 240 requires auditors to attain an understanding of the entity and its environment, including internal controls, when performing analytical procedures (AP). They should consider unusual or unexpected relationships as indicating risk of material misstatement due to fraud (IFAC, 2006b).

Busta and Randy (1998), using Benford's law and neural networks as a review procedure, introduce a new analytical review procedure to measure the degree to which a data set's digit distribution deviates from a Benford digit distribution. This deviation indicates potential falsification and can be used to signal further audit testing. The results show that if financial data have been falsified by 10%, a Benford analytical review will detect falsification 68% of times. If data are not falsified, the test will confirm it 67% of times. The research used simulated data and not actual data.

Spathis (2002) examines published data to develop a model for detecting false financial reports by Greek manufacturing firms. A sample of 76 firms revealed 38 fraudulent financial statements (FFS) (50%). Ten independent financial ratios (debt/equity; sales/total assets; net profit/sales; trade debtors/sales; net profit/total assets; working capital/total assets; gross profit/total assets; stocks/total assets; total debt/total assets; and the Z-score) were selected from an initial sample of 17 as potential predictors of FFS. Univariate and multivariate

statistical techniques were used to identify fraud. The dependent variable involved a dichotomy: FFS=1, non-FFS=0. The model is accurate in classifying the total sample correctly, with an accuracy rate exceeding 84%.

The average association strength between the dependent and independent variables is a medium-efficient relationship (R^2 =49.85%), where R^2 is the coefficient of determination. The result of this study indicates that the model effectively detects FFS.

Beneish (1999) investigates the incentives and the penalties related to earnings overstatements primarily in firms that are subject to accounting enforcement actions by the SEC. He finds that the managers are likely to sell their shares and exercise share appreciation rights in the period when returns are overstated, and that sales occur at inflated prices.

Barth et al. (2007) conclude that earnings that are smoothed are less variable than those that are not. They suggest, among other methods of measuring earnings, the measure of earnings smoothing called Spearman correlation between accruals-ACL (earning less cash flow from operating activities scaled by end of year total assets) and cash flow from operating activities to total assets (CFL). Myers and Skinner (2002) and Land and Lang (2002), argue that a more negative correlation between accruals and cash flows is suggestive of earnings management, because managers appear to respond to poor cash flow by increasing accruals. Barth states that management prefer to report small positive net income rather than negative earnings; if earnings are managed, large losses should be relatively rare and firms that manage earnings have a lower association between earnings and stock returns. She further concludes that International Accounting Standards (IAS) improves accounting quality and reduces the cost of capital, and that firms that adopt IAS show less evidence of earning management.

Abbot et al. (2000) examine and measure the audit committee independence and activity in mitigating the likelihood of fraud. Using the logistic regression analysis they find that firms with audit committees composed of independent directors and which regularly meet, are less likely to be sanctioned for manipulated financial statements.

Song and Windram (2004) indicate that

- board independence promotes audit committee efficacy in financial reporting;
- directors' financial literacy contribute to audit committee efficacy;
- multiple directorships may have a positive effect on audit committee usefulness; and
- incentive mechanisms may not contribute to audit committee efficacy in monitoring financial reporting.

This study used a sample of 54 companies subject of adverse rulings by the United Kingdom Financial Reporting Review Panel, between 1991 and 2000.

Resource allocation decisions by investors are based on quarterly and annual filings with the SEC. With non-transparent information in financial reports, investors end up taking wrong decisions. In the case of Enron, had various mutual and pension funds known the true state of its financial affairs, it is doubtful that many would have invested in its shares. This may have reduced the pressure on Enron's engaging in the smoothing of earnings (Sridharan et al., 2002).

Firth et al. (2005) conclude that revenue related fraud rank before asset related frauds from the Chinese regulator's opinion, and that therefore auditors are responsible for safeguarding clients' assets and reducing biases in financial reporting, by detecting and reporting prominent profit and loss related frauds. Summers and Sweeney (1998a) indicate that organizations with FFS can be

detected by looking at the behaviour of insiders who tend to enhance sales and reduce purchases in their common stocks; that return on assets ratio, and stocks over sales ratio are both positively correlated with fraud; and that insider trading factors, e.g. dollars spent buying shares, and dollars received through selling shares are also positively correlated with fraud.

Kathleen et al. (2004) determined whether the accounting ratios of fraudulent companies differ from those of non fraudulent ones. Fraudulent companies were identified by examining the SEC's Accounting and Auditing Enforcement Releases issued between 1982 and 1999. These fraudulent companies (n=79) were then matched with non fraudulent companies on the basis of their size, time period, and industry (excluding thereby banking and insurance). Using this matched–pairs design, a ratio analysis for a 7-year period (i.e. the fraud year ±3 years) was conducted on 21 ratios. 16 of them were found to be significant. Of these, only two ratios (total liabilities/total assets and working capital/total assets) were significant during the fraud year. Ratios found significant during the second and third year after the fraud year are a) net income/total assets and b) retained earnings/total assets. Using discriminant analysis, the misclassification of fraud companies as non fraud ones ranged from 58% to 98%. The result provides empirical evidence of the limited ability of accounting ratios to detect and/or predict fraud in financial statements. This research further notes that key ratios useful for fraud detection may lead to a fraud detection model similar to Altman's (1968, 1983) bankruptcy prediction model and Z-score.

Kluger (1989) provides evidence that the practice of changing auditors is directly related to managerial falsification of financial data. In the equation for prediction of bankruptcy regression he made use of the ratios (independent variables) cash /total assets; net income/total assets; sales to total assets; and total debt to total assets. Kluger's samples were of companies that changed auditors and those that did not. The result was strongest for the ratio net income/total assets and

weaker for the other three. The rates of misclassification (by which the quality of bankruptcy can be compared) of two groups separately, confirmed that the quality of information by companies that changed auditors was 32%. That for companies that had not changed auditors was 42%. Consistently with prior studies, this study examines the selected financial ratios, particularly the stronger ratio of net income to total assets in their ability to detect FFR.

Persons (1995a) identified 103 frauds in manufacturing and non-financial service firms. These were matched with a non fraud firm on the basis of industry and time period. Ten variables, including eight ratios, were examined and used to develop two predictive logistic models: one for the fraud year and the other for the preceding year. Stepwise logistic models indicate that financial leverage, capital turnover (or sales/total assets), asset composition and firm size are significant factors towards fraudulent financial reporting. The models' coefficient of determination (R^2) which represents the predictive ability to the model averaged 30%.

Moyes et al. (1996) empirically investigated the relative importance of factors potentially able to detect fraud. Based on a survey of 357 auditors, the study reveals that the auditing experience of an auditor and the prior successes of auditing organization in detecting fraud are significant variables in detecting fraud, both for each audit cycle and for combined cycle estimates. The study concludes that the likelihood of fraud detection increases as the auditor acquires more years of auditing experience and the auditing companies more experience in fraud detection. Experienced auditors are more likely to detect fraud than inexperienced ones, more so when using the stock and payroll cycle techniques.

According to Moyes et al (1996), auditors that are Certified Public Accountants (CPAs) are more likely to detect fraud using all 218 audit techniques, especially in the payroll cycle, than auditors who are not CPAs. Certification may imply a

higher professional competence in detecting fraud. Another finding is that internal and external auditors possess equal abilities in detecting fraud and that a peer review process exerts influence over auditors towards being more diligent in incorporating payroll cycle techniques to detect misstatements.

Rick (2001a) studied the effect of lease data on the predictive ability of financial ratios. He attempted to determine whether capitalization of leases would enable the user of financial reports to predict bankruptcy more accurately than with present reporting practice. 28 financial ratios were used in studying 48 bankrupt and 48 non-bankrupt firms. Firms were chosen from within industry classes based on comparable net sales in the 5th year before bankruptcy. Rick does not support the hypothesis that addition of capitalized lease data to a firm's financial reports increases the power of affected ratios to predict bankruptcy.

Singleton et al. (2003) examined the correlation between an ethical environment and fraud in co-operatives in the United States of America. 95% of the co-operatives stated that they had no one in charge of monitoring ethics. On internal controls and environments, the top reason given for fraud was insufficient internal controls. Ranking second was "collusion, management overriding of internal controls and lack of active director control over management." Ranking third was "weak ethics policy or code of conduct." The key risk factors reported are: unusual activity, unexplained losses, poor internal controls and changes in the life style or behaviour of an employee or management. The findings are that co-operatives need to stress ethics, and that their problems are similar to those of all types of organizations.

Morris (2006), KPMG (Audit, Tax and Advisory firm) Australia, in a forensic fraud survey, conclude that the commonest reason for fraud is poor internal controls (that internal control is a key fraud-detection method as tabulated in Table II) as well as greed, disorderly lifestyle and gambling. Morris also found that a typical

fraudster is a man (non-management employee) aged 38, a sole actor with no known dishonesty with a previous employer and with 5 years in employment with the present company. On the other hand Morris concluded that the first two factors that led to unethical behaviour are lack of senior management commitment and poor example by senior management. Further, detective proactive forensic data analysis can uncover fraud and misconduct.

Schilit (2002) states that the warning signs on financial statement of cash flow to watch for are cash generated mainly from the sale of assets, additional borrowing, and stock selling. He portends that an attractive profile should include sufficient net cash flow from operations (CFFO) to cover capital expenditures and debt settlements, and perhaps to retire some of the company's outstanding stock. Additionally, if CFFO materially ''lags behind net income'', the quality of earnings may be suspect, or the expenditure for working capital may have been excessive.

In his study on business failure prediction using discriminant analysis, Keige (1991) concluded that current ratio, fixed charge coverage, retained earnings/total assets, return on net worth, average collection period, and sales/total assets are critical ratios for telling apart bankrupt from non bankrupt companies in Kenya. Keige's chose companies that went under between 1980 and 1990 (in the records of the Registrar of companies in Kenya). The data (15 ratios, plus Z score) from the annual accounts of these companies for four years prior to year of receivership or liquidation were subjected to discriminant analysis.

The schedule summary of related major empirical studies appears in Table VII.

3.1.2 The financial performance monitoring system or set of financial ratios PEARLS (or ratios) measures key areas of SACCO operations: Protection, Effective financial structure, Asset quality, Rates of return and cost, Liquidity and

Signs of growth. Table I has the details. In partnership with World Council of Credit Unions, Inc. (WOCCU) created PEARLS in the late 1980s in the United States. WOCCU has a long history of successful working with multinationals, bilateral and private partners to develop and strengthen member-owned credit unions and their national systems around the world. A partnership case in Kenya is Bandari SACCO limited (David 2002).

This study incorporates, within predictor variables, 12 ratios adopted from WOCCU PEARLS. The WOCCU ratios considered, among other aspects, the importance of core inflation rate in analyzing the performance of SACCOs. A core inflation rate inferior to the rate of growth in total assets and dividend return ratio (DIV) is a sign of good performance. The opposite is true, other independent variables being constant. The core inflation rate in Kenya on 31st December 2006 was 5.9 % (6.4% in January, 2007) CBSK (2006).

In the researcher's opinion, Kenya co-operative sector's ''internal control and environments'' compare fairly to facts as stated by Singleton et al. (2003) and Morris (2006). This fact strength is revealed under the investigation and internal control methods (as shown in Table II). Analytical procedures (AP) are potential key tools for investigation and internal controls.

The MOCDM in Kenya is putting in place measures to prevent fraud and improve performance in the co-operative sector, which means to address matters of good corporate governance. MOCDM (2008) published the following data: major problems facing the Kenya Co-operative today are mismanagement, corruption, under-capitalization, stiff competition, splits in agricultural co-operatives, misunderstood legal frameworks, and unclear development policy; the Ministry has set up an ethics commission to check excesses by management committees and improve governance and ethics in the movement. The Ethics commission for Co-operative Societies was gazetted in the *No.66 of 1st August, 2003, Legal*

Notice No.119. It is reported that in an effort to check improper enrichment, the commission receives annual wealth declarations from societies' committee members as well as from employees; and routine inspections and inquiries have been stepped up towards improving corporate governance in co-operatives with suspect management. Further it is reported that to address the unique needs of the SACCOs, the Ministry drafted SRB 2005, which passed through all Parliamentary Reading Stages in 2008, but is yet to be enacted into law.

This thesis recommends the rarely used ratios in the Kenya SACCOs, as also ratios different from the ones used in past studies. Examples of such accounting ratios are LMS/LLB, DIV and SDS/SLB. Since these accounting ratios are never revealed in audited financial statements, one would expect that SACCO members may not understand their import.

To ensure compliance to the rules, ethical standards and good corporate governance, the Institute of Certified Public Accountant of Kenya (ICPAK) member Kinyori and Associates was reprimanded in accordance with *section 31(1) (b) of the Accountants Act* by the ICPAK Disciplinary Committee for failure to comply with the prescribed standards in violation of section 28(1) (r) under *the Accountants Act*. The member failed to highlight understatement and wrongful classification of expenditure in his SACCO's audit reports for 2001 and 2002. The member replied that he qualified his audit reports for both years on issues relating to expenditure, shares and loan differences. Despite a member's "Except for opinion", the committee concluded that International Standards on Auditing and International Financial Reporting Standards had been weakly applied. Issues under this paragraph indicate the potential importance of the ratio loans listing/ loan ledger control versus shares listing / ledger control of members' shares towards identifying bad or good accounting practices in SACCOs (ICPAK, 2007b).

The 44 quantitative standard financial ratios proposed by the World Council of Credit Unions, Inc. (WOCCU) facilitate an integral analysis of the financial conditions of any financial institutions (David, 2002); twelve such ratios, earlier mentioned, were purposely chosen and incorporated into the study.

SACCOs with 1000 or more members should offer front office services and a closely monitored supervision by the regulator to safeguard depositors' money; front office saving activities, however, attracts small savers who are charged small interest rates compared to commercial banks lending rates (Okal, 2004). Okal's study covered five SACCOs from Kisumu District. The sample consisted of 105 members purposely selected from the five SACCOs offering front office services.

Kalu (2004) says that *Ukaguzi SACCO Kenya Limited* is not seriously affected by non remittances of SACCO funds to it by common bond employers. This study concludes that delay in employers' remittances to the SACCO has no effect on the society's performance; this finding was supported by the steady growth in membership, share capital and loans to members. Kalu's case study covered a sample of 55 members (inclusive of nine management team and the SACCO's four employees) out of a total SACCO membership of 1090.

In *A case of Co-operative Bank of Kenya Limited* on the predictive ability of information contained in financial statements of co-operative societies, Macharia (2003) concludes that financial ratios can be relied upon to separate performing co-operative societies from non performing ones, in terms of the loan portfolio offered by banks to performing and non performing co-operatives. The discriminant analysis was subjected to variables of 24 ratios calculated from a sample of 64 co-operatives studied. Ratios that exhibited significant differences at 95% degree of confidence were: current asset ratio, liabilities/total assets, income/fixed assets, and working capital/total assets.

It should be noted that financial ratios are defined as transformations of financial statement data allegedly made by statement users to aid in decision making (Rick, 2001b). Hence ratio usage is not restricted to FFR detection as examined in this paper.

The instances of falsification of financial statements by SACCOs in Kenya are significant, and therefore detection and prevention of fraud is necessary and mandatory in SACCOs as in any other organization.

3.2 Formulation of testable hypotheses

Based on Spathis, 2002; Kathleen et al. 2004; Persons, 1995; and Keige, 1991, beside the performance indicators or ratios discussed above, the general null hypothesis is:

$H0_1$: Financial ratios do not detect fraudulent financial reporting (FFR) by SACCOs.

The alternative hypothesis is then:

HA_1: Financial ratios do detect FFR by SACCOs.

Specific ratios do have power to reveal FFR. Since SACCOs do not compute these ratios, they will not detect FFR using the ratios they use.

The specific ratios are:

Net profit/total assets-

It is a measure of efficiency in employing total assets. Higher results indicate better efficiency. But this may not be the case in SACCOs, because their income possibility is restricted. A minimal profit acts as incentive to management to overstate income or understate costs. Hence the null hypothesis is:

$H0_2$: A higher net profit/total assets ratios does not reveal FFR.

The alternative hypothesis is then:

HA_2: A higher net profit/total assets ratios reveals FFR.

Dividend return ratio-

A minimal dividend payout (average of 50 %) allows a good portion of profits to be ploughed back into SACCOs to stimulate internal growth. Very high dividend payouts (100 % and above) is not sustainable. It always impacts negatively on the growth potential of a company. The null hypothesis is therefore:

$H0_3$: A higher dividend return ratio reveals FFR by SACCOs.

The alternative hypothesis is then:

HA_3: A higher dividend return ratio does not reveal FFR by SACCOs.

LMS/LLB ratio-

When the ratio of loans to members listing/loan ledger control balance is reconciled, internal controls are known to be working. A ratio of 1:1 is a sign of efficient controls. A key weakness is that members respond faster to shares balance errors than to loan balance errors. This is expected, especially when errors are unfavourable to the society as a whole and not to individual members. Thus the members' independent check for loan errors is in most cases lacking. Furthermore, a higher loan schedule or listing balance is more favourable to the SACCOs than the loan ledger balance. The null hypothesis is:

$H0_4$: A higher balance of loans to members listing/loan ledger control balance is a sign of FFR.

The alternative hypothesis is then:

HA_4: A higher balance of loans to members listing/loan ledger control balance is not a sign of FFR.

Financial investment/total assets ratio-

Measures the level of total assets invested in securities or shares in other institutions and companies. A high financial investment to total assets ratio of

over 10% is uneconomical according to WOCCU standards. Hence the null hypothesis is:

$H0_{5:}$ A higher ratio financial investment/total assets does not indicate FFR.

The alternative hypothesis is then:

$HA_{5:}$ A higher ratio financial investment/total assets indicates FFR.

Non earning liquid assets/total assets ratio-

Measures the percentage of total assets invested in non earning liquid accounts (current and cash accounts). A ratio of 1% or more is uneconomical as per WOCCU ratios standards. A SACCO with too much idle cash compared to total assets is a sign of poor performance, possibly due to mismanagement and cash misuse. The null hypothesis is:

$H0_{6:}$ The higher the ratio the fewer are the cases of FFR.

The alternative hypothesis is then:

$HA_{6:}$ The higher the ratio the more are the cases of FFR.

Liquid investments+liquid assets-short term creditors/member deposits-

This is one of the liquidity indicators in SACCOs. It measures the adequacy of liquid cash to settle immediate obligations of less than one month. A minimum of 15% is acceptable. A member leaving a SACCO, whose deposits are settled or refunded on demand, reaps from a SACCO the performance of good management. The opposite is considered a symptom of fraud. The null hypothesis is:

$H0_{7:}$ A high ratio signifies FFR.

The alternative hypothesis is then:

$HA_{7:}$ A high ratio does not signify FFR.

Net member loans/total assets-

Measures the level of total assets invested in the loan portfolio, after deducting loan losses. An average level of 75% is acceptable; any extreme deviation is not acceptable and points to mismanagement. The null hypothesis is:

$H0_{8:}$ A relative extreme deviation of less than 70% or greater than 80% from the average is not a sign of FFR.

The alternative hypothesis is then:

$HA_{8:}$ A relative extreme deviation of less than 70% or greater than 80% from the average is a sign of FFR.

Gross member loans/total assets-

Loan losses are unproductive. When they are nil and the ratio falls within the average of 75%, it is a sign of very good performance compared to a similar scenario under the E1 ratio (net members loan/total assets) discussed earlier. Non-recovery of loans is a sign of poor loaning policy. Loan losses may well indicate fraud. The null hypothesis is:

$H0_{9:}$ A relative deviation of less than 70% or greater than 80% from the average is not a sign of higher chances of FFR.

The alternative hypothesis is then:

$HA_{9:}$ A relative extreme deviation of less than 70% or greater than 80% from the average is a sign of higher chances of FFR.

Members deposits/total assets-

This ratio measures the percentage of total assets financed by members' deposits. An average rate of 75% is acceptable. An extreme deviation from the average points to fraud. The null hypothesis is:

$H0_{10:}$ A relative extreme deviation of less than 70% or greater than 80% from the average is not a sign of higher chances of FFR.

The alternative hypothesis is then:

$HA_{10:}$ A relative extreme deviation of less than 70% or greater than 80% from the average is a sign of higher chances of FFR.

Total operating expenses/average total assets-

This ratio measures the level of operational efficiency of a SACCO management. A percentage of 10% or more is a sign of inefficiency. The null hypothesis is:

$H0_{11:}$ A higher than 10% ratio does not signify FFR.

The alternative hypothesis is then:

$HA_{11:}$ A higher than 10% ratio is a sign of FFR.

Growth in member loans-

The long term viability of the SACCOs is measured with this rate. According to WOCCU ratio analysis, when growth in member loans (S1) is increasing then the growth in total assets (S11) must be greater than S1. Thus an S1 growth rate, less than S11, holding inflation and defaulting incidence factors constant, is a sign of proper management, and the opposite is also true. The null hypothesis is:

$H0_{12:}$ A higher growth rate signifies FFR.

The alternative hypothesis is then:

$HA_{12:}$ Higher growth rates do not signify FFR.

Working capital/total assets-

In practice lower liquidity is an incentive for managers to commit fraud; to manipulate the accounting records. Companies affected by fraud tend to have low liquidity. The null hypothesis is:

$H0_{13:}$ A higher ratio is a sign of FFR.

The alternative hypothesis is then:

$HA_{13:}$ A higher ratio is not a sign of FFR.

Cash flow/net profit-

According to Schilit (2000), a sufficient net cash flow from day-to-day operations to cover both expenditures and debt repayment is a sign of lack of earnings management, the opposite being also applicable. The null hypothesis is:

$H0_{14:}$ A higher ratio is a sign of FFR.

The alternative hypothesis is then:

$HA_{14:}$ A higher ratio is not a sign of FFR.

As can be seen, there are two schools of thought regarding the power of financial ratios towards detecting fraud in financial reporting: one argues that financial ratios are helpful in such detection (Spathis, 2002; Persons, 1995); the other (Kathleen et al. 2004), that financial ratios are less useful. In this writer's opinion, the method of discriminant analysis (DA) used by Kathleen et al. is inferior to the method of logistic regression used by Spathis and Persons. DA assumes the existence of linearity and normality of functions or financial ratios, but in practice financial ratio or functions behave non-linearly and are not necessarily normally distributed. On the contrary, logistic regression assumes the non-linearity of functions or ratios, and its predictors do not have to be normally distributed. This study has made use of logistic regression and to a lesser extent of DA. McLeay pointed out that failed predictions are not normally distributed and that random sampling is hardly met with under failure prediction. Further, the FFR sample for this study was not randomly but purposely selected, and the matched-pair technique utilized. DA was used to sort out the FFS from non-FFS.

The next chapter four discusses the methods confirming or rejecting the null hypotheses highlighted above and chapter five discuss the hypotheses tests results.

CHAPTER 4
METHODOLOGY

The construction of models can help in detecting fraud. Pragmatic proponents argue that models should be chosen for a specific purpose (Keane and Wolpin, 2006). It is otherwise difficult to identify the number of SACCOs involved in FFR.

4.1 Study design

This study is consistent with the prior work of Spathis (2002), Miller (2006), Kathleen et al. (2004), and Persons (1995). SACCOs' financial information or data are used to calculate the financial ratios of fraudulent financial statements (FFS) and non-FFS. Details are below.

4.2 Data collection

Secondary data were collected from FFS for the year ended on 31st December 2006. In order, they were:

- The financial reports disclosures, plus the qualification of audit reports.
- The inspections and inquiries by the regulator, the MOCDM, over fraud carried out during the years 2006 and 2007. On average, the time between the perpetration of fraud and its discovery is 36.24 months (Summers and Sweeney, 1998b).

The non-FFS control group is for the year 2006, which ended without any audit report qualification or fraud inquiry. The secondary data (audited financial statements) were solicited either from MOCDM or from SACCO management.

4.3 Data analysis and measurement

In Kenya, SACCOs often compute two ratios: current assets/current liabilities and total expenses/turnover. Both form part of the mandatory statistical page of

audited accounts. In this page, the composition of ratios is optional and may differ according to the wishes of a given SACCO.

This study tries to identify statistically significant differences in some final accounts, by making use of a sample t-test to sort out FFS from non-FFS. The sampled SACCOs are further analyzed for earnings quality by using the Pearson correlation test, so as to identify the susceptibility of the two categories of SACCOs in practicing earnings management. It is more likely that a legitimate SACCO practice may develop into unacceptable financial reporting or aggressive earnings smoothing (AES), motivated by meeting debt obligations, management committee claims to honoraria and the cashing of dividend returns.

Thomas et al. (1991) maintain that discriminant analysis (DA) is an appropriate statistical technique for testing the hypothesis that the group fraud is equal to the group non-fraud. Further, multiple or multivariate DA is a method for determining a linear combination of the independent variables that best discriminates between the two classes. It satisfies the assumption that ratios in SACCOs tend to be normally distributed within each group. This is accomplished by computing a linear function for difference between the averages of the variables for each group. A stepwise logistic regression (LG) called forward selection procedure is also used in this research. This method permits to remove variables with the largest p-value (statistical significance criterion).

It may be more natural to use LG (which is not based on the assumption of a normal distribution of financial ratios) when the response variable is dichotomous, and use DA to discriminate between the two groups.

Fraud investigators make use of three information layers in constructing or assessing fraud: a) the law (supporting postulates or principles); b) hypotheses (propositions); and c) evidence (facts). In fraud construction, probabilistic logic is

applied based on the available evidence. According to Leary et al (2003) the relationship between facts and the law is often non-linear, which concurs with preferring logistic regression to ordinary least square (OLS) in this study.

Ward and Foster (1997); Spathis (2002); and Persons (1995), made use of logistic regression; they confirmed the ability of financial ratios to detect FFR or predicting financial distress. Kathleen et al (2004), on the other hand, by using discriminant analysis (DA), supported a limited ability of financial ratios to detect fraudulent financial reporting. This contradiction over the ability of financial ratios to detect fraud in reports offers grounds for further research.

DA assumes that: a) independent variables have multivariate normal distribution; and b) samples are randomly drawn. However, financial ratios used to predict failure are not normally distributed, and the random assumption is hardly met with under failure prediction (McLeay, 1986). This finding supports the inferiority of DA over non-linear probit and logit models (Lennox, 1999).

The 27 financial ratios (predictors or independent variables) identified in Table III have been chosen. In Spathis (2002), ten ratios were found significant. This paper includes them, except the ratios inventories/total assets and gross profit/total assets. The first rarely feature in SACCOs' financial reports. Based on their studies of forward stepwise regression, Bendel and Afifi (1977) suggested that a 0.05 p-value is too low and often excludes important variables from the model. Instead, they recommended that a statistical significance criterion be included in a range from 0.15 to 0.20. In exploratory research, as opposed to theory testing, there tends to be a greater emphasis on finding good predictors than on eliminating bad ones. This researcher appreciates and agrees with the above argument, that variables not significant in the aggregate may still be useful indicators for a particular case.

The logistic regression model [Menard (1995) and Morgan and Teachman (1988)] is formulated using financial ratios (independent variables) from the SACCOs to identify which of them were related to non-FFS and FFS. The dependent variable is dichotomous: FFS may take the value **0** with probability of success (a SACCO with fraudulent accounts) and **1** with probability of failure (non-FFS). The paper then examines how the probability of non-FFS relates to various independent variables.

The model selected (Spathis,2002;Person,1995) is then: p(Non FFS/DIV, ML/TA,TD/TA,Z,…)=exp{bo+b1(DIV)+b2(ML/TA)+b3(TD/TA)+b4(Z)+…..+b27S11 }÷1+exp{bo+b1(DIV)+b2(ML/TA)+b3(TD/TA)+b4(Z)+…….……+b27S11}.
Where: p (Non FFS/ DIV, ML/TA, TD/TA, Z…); is the probability that the non-FFS given independent variables DIV, ML/TA, TD/TA, Z etc., and ‘‘exp’’ is exponential function. Non-FFS= (1-FFS).

The logistic regression model generally is of the form:
Log(NonFFS/DIV,ML/TA,TD/TA,Z,….....)= bo+b1(DIV)+b2(ML/TA)+b3(TD/TA)+b4(Z)+…….....+b27S11+ę.
Where: b_o=the constant; b_i= regression coefficients of independent variables (i.e. in brackets); ę=Error factor*;* z=z-score; FFS=**0**, if FFS discovered group, **1** otherwise.

In this study the Z-score, similar to that in Spathis 2002, is tested under two hypotheses, one incorporating it in the model and the other excluding it. This is because the Z-score is made up of five ratios. It thus correlates from high to low with the five ratios stated below:
Z-Score Altman (1968, 1983) was used to investigate the corporate bankruptcy and corporate financial distress:
Z= 1.20(working capital/total assets) + 1.40(retained earnings/total assets)
+ 3.30(earnings before interest and taxes/total total assets)

+ 0.06(market value of equity or book value of equity/ book value of total debt)
+ 1.00(turnover/ total assets).

The equation for logistic regression does not directly predict that the indicator equals 1. It predicts it for long term observations. The odds of an event are defined as the ratio of the probability of its occurrence to the probability of its failing to occur. Log odds (natural logarithm of the odds) are symmetric and lie in the range $^{-}\infty$ to $+\infty$ Gerard (2001). For example, if the log odds of a FFS equal -1.3994, those of non-FFS equal +1.3994. The importance of logistic regression lies in identifying important predictive variables.

Based on the above-mentioned equation, SACCOs are classified into either FFS or non-FFS after making use of the financial ratios identified in this study. The accuracy level of the statistical product of this study depends on discriminant linear analysis. The result is discussed in next chapter.

4.4 Variable Definition

A purposefully selected sample of 27 ratios is computed out of 46 audited annual accounts for the year ended on 31st December 2006, at times referring to the accounts for 2005. The author purposefully selected a majority of independent variables according to their use in Ward et al. (1997); Spathis (2002); Kathleen et al. (2004); and David (2002) beside the researcher's careful consideration of the sector's operations. The dependent variable for FFS = 0; for non-FFS = 1. This choice follows Spathis (2002) for FFS=1; and Ward, 1997 for DIST=0 as the dependent variable of healthy firms.

4.5 Sample Selection

The MOCDM inquiry and inspection records were reviewed for the periods 2006 to 2007. The original sample indicated 59 SACCOs where fraud was detected without being suspected of being involved in pyramid schemes activities. The

final sample includes 23 SACCOs under FFS group and 23 under non-FFS as shown under Table IX.

The samples were taken from the final accounts of audited SACCOs in Kenya, for the year ended on 31st December 2006. The reports were either qualified (with fraud reporting), or unqualified, or under fraud investigation. This study utilized the matched-pair technique, not the random sample method. The purposive sample of 23 FFS was matched with that of 23 non-FFS.

The sample of non-FFS is carefully selected and matched, to ensure that the SACCOs are of comparable size and for the same year ending on 31.12.2006. Table VIII provides the characteristics of the financial statements elements that support this study. Fraudulent SACCOs with incomplete data, non-accessed financial statements, suspicion of engaging in pyramid schemes, and duplicated data were excluded from the sample. Table VIII summarizes a statistically significant difference in external loan ($t=2.78$, $p\leq0.007$); current asset ($t=2.46$, $p\leq0.017$); share capital ($t=2.40$, $p\leq0.019$); and long term financial investment ($t=2.45$, $p\leq0.017$). Total sales, net profit, members' loans, retained earnings, working capital, and total assets differences are not included for not being statistically significant. Spathis (2002) concludes that the mean differences for manufacturing companies were statistically significant for working capital, equity, sales and net profit; they were not statistically significant for total assets.

The foregoing assessment provides supporting evidence that on average, SACCOs affected by fraud are of a size comparable to that of non affected ones. There are no significant differences in key measures of total assets, members' loans, net profit, and sales. Table VIII reveals a 95% confidence interval: the lack of difference between FFS and non-FFS includes zero. Further, the t- statistics of 0.33, with p-value of 0.741 and 68 degree of freedom-two tailed, indicate lack of difference between the two groups of FFS and non-FFS.

CHAPTER 5

RESULTS

5.1 Introduction

Data analyzed were: two sample t–test difference of the averages in the measure of balance sheet elements; a stepwise logistic regression in the measure of ratios; DA for the dichotomous variables of FFS and non-FFS; and an analysis of the quality of earnings, using accruals and net cash flows.

Table VIII indicates that there is no statistically significant difference between FFS and non-FFS. Statistically significant differences appear in current assets (t=2.46, p≤0.017); external loan (t=2.78, p≤0.007); share capital (t=2.40, p≤0.019); and long term financial investment (t=2.45, p≤0.017). The equity, sales, net profit and working capital have been found to be significantly different in Spathis (2002). Other moderately significant differences in this study are retained earnings, net cash flow from operation, problem assets, and dividend payout. This excluded the non-statistically significant differences where p-values were at least 0.20 (Bendel and Afifi, 1977). Among these were included sales (t=-0.04, p≤0.967); total assets (t=0.33, p≤0.743); member loans (t=-0.35, p≤0.729); working capital (t=0.47, p≤0.643) and net profit (t=0.81, p≤0.423).

The stepwise regression models calculated from the independent variable characteristics are as shown under Table IV and V. The hypotheses tests using stepwise logistic regression; results are as follows:

5.2 Regression tests results

1. DIV (Dividend return ratio): SACCOs with high DIV values (b_1= 0.037, P ≤ 0.055) have a greater probability of being classified with non-FFS SACCOs ($exp^{0.037}$=1.04 or 104%), i.e. a one unit increase in DIV increases the odds of belonging to non-FFS by 104%, other covariates of the model being held under

control. The power of this ratio consists in its ability to uncover earnings management as illustrated under Table VI. The null hypothesis $H0_3$ is therefore rejected.

2. LMS/LLB ratio: SACCOs with a high LMS/LLB ratio (b_{12}= 0.68, P≤ 0.059) have an increased probability of being classified with Non FFS SACCOs ($exp^{0.68}$ =1.97 or 197%), because a one unit increase in LMS/LLB increases the odds of being classified as non-FFS by 197%, other covariates being held under control. The null hypothesis $H0_4$ is therefore rejected.

3. E3 (financial investment/total assets): This ratio (b_{15}=-3.2, P≤ 0.005) has a negative effect: SACCOS with an increased financial investment to total assets have a greater probability of being classified with FFS SACCOS. Here $exp^{-3.2}$ =0.0408 or 4.08%, so that a one unit increase in E3 decreases the odds of non-FFS by 4.08%, other covariates being held under control. The null hypothesis $H0_5$ is rejected.

4. L3 (non earning liquid assets/total assets): SACCOs with a ratio of (b_{19}=-5.0, P≤0.002) have a greater probability of being classified as non-FFS. It has a negative effect: SACCOs with a greater ratio of non-earning liquid assets to total assets have a high probability of being classified as FFS. Here $exp^{-5.0}$=0.0067 or 0.67%, meaning a one unit increase in L3 decreases the odds of non-FFS by 0.67%, other covariates being held under control. The null hypothesis $H0_6$ is rejected.

5. L1 (liquid investment + Liquid assets-short term creditors)/(savings member deposits): SACCOs with a high L1 ratio has a greater probability of being classified as non-FFS (b_{18}=1.3, P≤0.021). For them $exp^{1.3}$ =3.67 or 367%: a one unit increase in L1 increases the odds of being classified as non-FFS by

367%, other covariates being held under control. The null hypothesis $H0_7$ is rejected.

6. NP/TA (net profit to total assets): A SACCO with a high NP/TA ratio has a moderate probability of being classified as non-FFS (b_{11}= -1.4, P≤0.625). Here $exp^{-1.4}$ =0.247 or 24.7%: a one unit increase in NP/TA decreases the odds of non-FFS by 24.7%, other covariates being held under control. This result confirms a SACCO's restricted income possibilities. As mentioned earlier, if this ratio is above a certain number it is likely that the SACCO's financial statements are fraudulent, since the profit figure is likely to be smoothed (see: Table VI for the details). The null hypothesis $H0_2$ is therefore rejected. According to WOCCU, the performance target for this ratio should be at least 10%.

7. ML/TA (members loans to total assets): a SACCO with a high ML/TA ratio has a greater probability of being classified as non-FFS (b_2=2.09, P≤0.001). Its effect is positive ($exp^{2.09}$ =8.08 or 808%): a one unit increase in ML/TA increases the odds of non-FFS by 808%, other covariates being held under control. A gross performing loan portfolio is a productive asset of SACCOs. Subject to the lack of loan defaulting possibility, the null hypothesis $H0_9$ is accepted.

8. E1 (members loans net of provision for bad loans/total assets): a SACCO with a high E1 has a greater probability of being classified as non-FFS (b_{14} = -2.07, P ≤0.001). Its effect is negative ($exp^{-2.070}$=0.126 or 12.6%): a one unit increase in E1 decreases the odds of non-FFS by 12.6%, other covariates being held under control. The level of the SACCOs' ratio net loan/total assets is normally restricted. Loan defaulting possibility is a function of FFS, thus the null hypothesis $H0_8$ is rejected.

9. E5 (savings deposits/total assets): a SACCO with a high E5 has a greater probability of being classified as non-FFS (b_{16} = 0.94, P ≤0.004). The ratio has a

positive effect ($exp^{0.94}$=2.56 or 256%): a one unit increase in E5 increases the odds of non-FFS by 256%, other covariates being held under control. Subject to WOCCU ratio restriction and explanation above, the null hypothesis $H0_{10}$ is accepted.

10. R9 (total operating expenses/average total assets): a SACCO with a high R9 has a moderately greater probability of being classified as non-FFS (b_{17} = -7.5, P ≤0.164). Its effect is negative ($exp^{-7.5}$=0.0006 or 0.06%): a one unit increase in R9 decreases the odds of non-FFS by 0.06%, other covariates being held under control. The null hypothesis $H0_{11}$ is rejected.

11. S1 (growth in member loans): a SACCO with a high S1 has a moderately greater probability of being classified as non-FFS (b_{20}= -0.24, P ≤0.176). Its effect is negative ($exp^{-0.24}$=0.79 or 79%): a one unit increase in S1 decreases the odds of non-FFS by 79%, other covariates being held under control. Loan repayment is a key factor in the management of loans issued to members. Excessive growth in loans may indicate a poor recovery record, subject to a low S11. The null hypothesis $H0_{12}$ is accepted.

12. CFFO/NP and WC/TA: Both ratios have a low significance. SACCOs with a P-value of 0.304 and 0.378 respectively and a t-value of -1.04 and 0.89 respectively, nearly fit into the model. Including or excluding CFFO/NP and WC/TA in a model is largely immaterial. Similarly, the impact of Z score is nil. Given the positive t-value of WC/TA the null hypothesis $H0_{13}$ is rejected. For the CFFO/NP, subject to the restrictions of net profits and a negative t-value, the null hypothesis $H0_{14}$ is accepted.

13. SDS/SLB: It is not clear whether this ratio implies that a SACCO is showing it has a possibility of being classified as non-FFS or not. It indicates no significant manipulation of shares and members' deposits in the balance sheet compared to

loan balances. This is possible because this ratio can easily and independently be checked by members wishing to ascertain the status of their savings at any given time. The dividend return rate is also based on this figure: its likely correctness is relatively high except for the possible manipulation of earnings. A further independent check is possible through the payroll records of a third party employer, especially when the society's record is suspect of manipulation.

5.3 Correlation test results: Table VI

The correlation between ACL and CFL is -0.980 for FFS SACCOs and -0.999 for non-FFS ones, which suggest a greater smoothing of earnings for the non-FFS despite the insignificant difference. Firms with a less smoothing of earnings exhibit a smaller negative correlation between ACL and cash flow. It is argued that a larger negative correlation indicates smoothing of earnings because management respond to weak CFL outcomes by increasing ACL, and vice versa. ACL reverses over time, so that ACL and cash flow tend to be negatively correlated even in the absence of earnings management (Barth et al., 2007).

5.4 Results summary

The result was as follows: log (Non FFS / DIV, LMS/LLB…) = -0.79+ 0.037 DIV+0.68LMS/LLB -3.2E3 -5.0L3 +1.30L1 -1.4NP/TA -2.07E1 +2.09ML/TA +0.94E5 -7.5R9 -0.24S1. The significant ratios were: E3 ($p \leq 0.005$), L3 ($p \leq 0.002$), L1 ($p \leq 0.021$), E1 ($p \leq 0.001$), ML/TA ($p \leq 0.001$), DIV ($p \leq 0.055$), LMS/LLB ($p \leq 0.059$), and E5 ($p \leq 0.004$). Tables IV-V has the details. Out of 27 ratios, eight identified under the study's logistic regression equation can with high probability be used to detect fraud. Two other ratios: Working capital/total assets and net cash flow/net profit are weak in detecting fraud.

As analyzed in Table V, the significance of the ratio net profit before tax to total assets (NP/TA), considered significant in Spathis (2002), was confirmed as being of moderate strength because of possible earnings management and income

restrictions. Ratios seen as moderately able to detect fraud include a) total operating expenses/average total assets (R9), and b) growth in loans to members (S1). Kathleen et al. (2004) reckon that the ratio NP/TA is more significant at 5% level, in the second year after the perpetration of fraud but insignificant during the fraud year; an opposite scenario was reported for the ratio working capital/total assets.

When using discriminant analysis (DA) summarised in Table X, the independent variables or financial ratios of FFS are correctly classified at 100% (95.7% for non-FFS). The higher relative cost of type I to type II error ratio is considered in prior studies as 30:1, and as 1:1 for naive strategy (i.e. classifying all firms as non fraud firms) [Persons, 1995b]. The relative cost of a higher type I than type II error is considered more risky by decision makers and potential investors in any firm. Persons (1995) correctly identified a large percentage of fraud firms and misclassified a relatively small percentage of non fraud firms; the same scenario is reflected in this study.

The univariate two-sample t-tests were also conducted as earlier reported, to determine if the means of the elements of the final accounts' fraud sample differs from the non-fraud ones. Results of t-tests are reported under Table VIII: at 5% level of significance the matched characteristics of FFS and non-FFS were not significantly different at degree of freedom (df) of 68 and ($t=0.33$, $p \leq 0.741$).

CHAPTER 6

CONCLUSION

6.1 General

The purpose of this study was to investigate the fraud detection capabilities of a number of SACCOs' financial statements ratios.

The results provide empirical evidence of the significant ability of financial ratios to detect fraud in financial reporting. Discriminant analysis (DA) on average identified 45 out of 46 (97.85%) financial statements ratios; the probability of correctly classifying fraudulent financial statements (FFS) was higher (23/23 or 100%) than was the probability of correctly classifying non-FFS (22/23 or 95.7%). The prior studies: Kathleen et al.(2004), DA misclassification of fraud firms ranged between 58% and 98%; Spathis (2002),correct classification of the models exceeded 84%; and Persons (1995), 97% type I error correct classification of fraud firms' models was identified.

The ratios identified by this paper as significantly capable of detecting fraud are: members loan schedule balance/loan ledger balance (LMS/LLB); dividend return ratio (DIV); financial investment/total assets (E3); non earning liquid assets/total assets (L3); liquid investment + liquid assets-short term creditors of less than 30 days/total assets (L1); members net loans/total assets (E1); members loans/total assets(ML/TA); savings members deposits/total assets(E5).

Less significant fraud detectors were the ratios net profit before tax/total assets (NP/TA); total operating expenses/average total assets (R9); and growth in member loans (S1). Spathis, 2002 identified five ratios: net profit/total assets, total debt/total assets, z-score, working capital/total assets and inventory/sales-with significant coefficients as being determinants of fraudulent reports. On the other hand Kathleen et al., 2004 conclude that significant ratios for the second

and third year after fraud are: retained earnings/total assets and net income/total assets. Further, during the year of fraud the significant ratios were: total liabilities/total assets and working capital/total assets. Person, 1995 concludes that financial leverage, capital turnover (or sales/total assets), asset composition and firm size were significant factors associated with fraudulent reports. The strength of the ratio of net profit/ total assets is evident in above stated studies except for Persons's study.

The study confirms that out of 27 ratios, the power of financial ratios in detecting fraudulent financial reporting reside strongly in eight and moderately in three ratios, given the coefficient of determination adjusted - R^2 of 68.02% or non adjusted R^2 of 75.84%. This agrees with the accepted alternative hypotheses: HA_1, HA_2 HA_3, HA_4, HA_5, HA_6, HA_7, HA_8, HA_{11}, HA_{13}; and with the rejected alternative ones HA_9, HA_{10}, HA_{12}, and HA_{14}. This indicates that specific financial ratios do detect fraudulent financial statements of SACCOs in Kenya and that they are different from ones currently used on average in measuring performance. Furthermore, it justifies the fact that the utilized ratios can be of important use to auditors, to the Kenya Revenue Authority, to MOCDM, to researchers, other investors and regulators.

A SACCO management is made up of members. This strengthens the application of the stewardship theory against agency theory in most SACCOs. The roles of executive committee chairman and SACCO manager (chief executive) are ''essentially combined'' in the majority of SACCOs. Such structure is likely to encourage the management's fiddling with accounting figures to maintain a high dividend return ratio (DIV) for instance, or a low loan listing (schedule) balance to loan ledger balance (LMS/LLB) ratio.

In the writer's opinion, the agency theory game may continue for as long as the SACCO committee's or top-management's benefits and shareholders' wealth is

maximized. The continuity of such agency theory assumption is likely to be undone, other factors being held constant, often by enlightened members in annual general meetings and through the regulator's oversight role in the sector. Briefly, the internationally recognized co-operatives principles ICA (2009), fraud theory and the earlier stated corporate governance theory are significant in understanding the basis of fraudulent financial statements in SACCOs. Essentially fraudulent financial reporting (FFR) are prepared by top management in order to ingratiate themselves to stakeholders and so stay in power.

6.2 Limitations

The samples of fraudulent and non-fraudulent financial statements of SACCOs are limited to reported cases, either by the regulator or by the auditors. Financial fraud, even if occurred, might not have been detected by the investigators. One cannot conclude that the used ratios are the only ones able to detect FFS. Additionally, some financial reports could not be used because of incomplete information or inadequate financial reporting structure. Such defective structures could not allow rational and practical assumptions for computing specific ratios. Difficulty in accessing some financial statements was another limitation.

6.3 Suggestions for further research

A further study may be carried out using other types of co-operatives' financial reports, for instance marketing co-operative societies and multi purpose co-operative societies. In the area of SACCOs, a further research with a larger sample than the one used in this paper would validate its results. Another study may be carried out covering the prediction of SACCOs' failure, and examining the extent of management earnings practices in the Kenya SACCOs movement. The ratio members' loan schedule balance/loan ledger balance (LMS/LLB) is viewed as key. This researcher suggests a larger sample for a more critical examination.

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APPENDIX:

Table I: WOCCU Ratios:

Protection	**Performance -Goals**
1. Allowances for Loan Losses / Delinquent. >12 Mo.=P1	100%
2. Net Allowance for Loan Losses / Delinquent. 1-12 Mo.=P2	35%
3. Total Write-off of Delinquency > 12 Mo.=p3	100%
4. Annual Loan Write-offs / Average Loan Portfolio=P4	Minimal
5. Accumulated Loan Recoveries/ Accumulated Loan Write-offs=P5	100%
6. Solvency (Net Value of Assets/Total Shares & Deposits)=P6	>=110%

Effective Financial Structure	**Goals**
1. Net Loans / Total Assets=E1	Between 70 - 80%
2. Liquid Investments / Total Assets=E2	Max 20%
3. Financial Investments / Total Assets=E3	Max 10%
4. Non-financial Investments / Total Assets=E4	0%
5. Savings Deposits / Total Assets=E5	Between 70 - 80%
6. External Credit / Total Assets=E6	Max 5%
7. Member Share Capital / Total Assets=E7	10-20%
8. Institutional Capital / Total Assets=E8	Min 10%
9. Net Institutional Capital / Total Assets=E9	Min 10% - Same as E8

Asset Quality	**Goals**
1. Total Loan Delinquency / Gross Loan Portfolio=A1	<= 5%
2. Non-earning Assets / Total Assets=A2	<= 5%
3. Net Zero Cost Funds / Non-earning Assets=A3	>200%

Rates of Return and Costs	**Goals**
1. Net Loan Income / Average(Avg.) Net Loan Portfolio=R1	Entrepreneurial Rate
2. Total Liquid Investment Income(Inv.) /Avg. Liquid Investments=R2	Market Rates
3. Fin. Investment Income / Avg. Fin. Investments=R3	Market Rates
4. Non-fin. Inv. Income / Avg. Non-fin. Investments=R4	> R1
5. Total Interest(Int.) Cost on Savings Deposits / Avg. Savings Dep.=R5	Market Rates > Inflation

6. Total Int. Cost on External Credit / Avg. External Credit=R6	Market Rates
7. Total Int. or (Dividend) Cost on Shares/Average Member Shares=R7	Market Rates >= R5
8. Total Gross Income Margin / Average Total Assets=R8	Variable - Linked to R9, R11, R12
9. Total Operating Expenses / Average Total Assets=R9	5%
10. Total Loan Loss Provision Exp. Assets / Avg. Total Assets=R10	Dependent on Delinquent Loans
11. Non-recurring Income or Expense / Avg. Total Assets=R11	Minimal
12. Net Income / Average Total Assets=R12	Linked to E9

Liquidity	**Goals**
1. ST Inv. + Liquid Assets - ST Payables / Savings Deposits=L1	Minimum 15%
2. Liquidity Reserves / Savings Deposits=L2	10%
3. Non-earning Liquid Assets / Total Assets=L3	< 1%

Sign of Growth (Year-to-Date Growth)	**Goals**
1. Growth in Net Loans=S1	Dependent on E1
2. Growth in Liquid Investments=S2	Dependent on E2
3. Growth in Financial Investments=G1	Dependent on E3
4. Growth in Non-financial Investments=G2	Dependent on E4
5. Growth in Savings Deposits=G3	Dependent on E5
6. Growth in External Credit=G4	Dependent on E6
7. Growth in Member Shares=G5	Dependent on E7
8. Growth in Institutional Capital=G6	Dependent on E8
9. Growth in Net Institutional Capital=G7	Dependent on E9
10. Growth in Membership=G8	Minimum 15%
11. Growth in Total Assets=G9	> Inflation + 10%

Source: World Council of Credit Unions, Inc. (WOCCU), (2002)

Table II: How to detect large frauds:

Years :	2006	2004
	(%)	(%)
Method:		
Internal Control	38	19
Notification by employee	28	19
Investigation	-	27
Notification by external party	15	14
Other	8	3
Accident	-	7
Anonymous letter/call	3	6
External Audit	1	-
	100	100
	===	===
Not answered	1	-

Source: KPMG Australia Fraud Survey (2006).

Table III: Study Ratios:

1. Dividend return ratio=earnings attributable to shareholders/total shares & deposits(DIV)
2. Members gross loans/total assets(ML/TA)
3. Total liabilities/total assets(TD/TA)
4. Net cash flow from operation/net profit before tax (CFFO/NP)
5. Loan defaulters/ equity**** (LD/EQ)
6. Working capital/total assets(WC/TA)
7. Retained earnings/total assets(RE/TA)
8. Book value of equity/ total liability(BVEQ/TL)
9. Net total income or sales/total assets (NI/TA)
10. Net profit before tax/total assets(NP/TA)
11. Members loan schedule balance/loan ledger balance(LMS/LLB)
12. Members shares & deposits schedule balance/ shares & deposits ledger balance(SDS/SLB)
13. Financial distress z-score(bankruptcy prediction system),(Z)
14. Net value of assets*/total shares & deposits(P6)
15. Members loans***/total assets(E1)
16. Financial investment/total assets(E3)
17. Non financial investment/total assets(E4)

18. Savings member deposits/total assets(E5)
19. Total borrowed funds/total assets(E6)
20. Institutional capital**/total assets(E8)
21. Total operating expenses/average total assets(R9)
22. (liquid investment + liquid assets-short term creditors, of<30days)/total assets(L1)
23. Non earning liquid assets/total assets(L3)
24. Growth in member loans(S1)
25. Growth in total assets(S11)
26. Current assets/current liabilities=current ratio(CR)
27. Total expenses/ turnover(TET)

*(Total assets +allowance for risk assets-delinquent long term loans-total liabilities-problem assets to be liquidated +total saving deposits); and short term delinquent loans may be treated as long term in case separation between long term and short term delinquent loans difficulty occurs, given SACCOs reporting structure in Kenya.

**Legal and non distributable reserves, share capital donations and retained earnings.

*** Net loan after deducting allowance for loan losses.

****Share capital+ retained earnings.

Table IV: Stepwise Regression Model (including Z-scores), 27 predictors: R^2 (adj.) =68.02%; N= 46; Dependent variable=Non FFS=1; FFS=0

Independent variables	Coefficient	t-value	P-Value
DIV	0.037	1.98	0.055*
LMS/LLB	0.68	1.95	0.059*
E3	-3.2	-2.97	0.005
L3	-5.0	-3.27	0.002
L1	1.30	2.42	0.021
NP/TA	-1.4	-0.49	0.625
E1	-2.07	-3.47	0.001
ML/TA	2.09	3.64	0.001
E5	0.94	3.11	0.004
R9	-7.5	-1.42	0.164
S1	-0.24	-1.38	0.176

Next two Insignificant independent variables:			
WC/TA	-	0.89	0.378
CFFO/NP	-	-1.04	0.304

Table V: Stepwise regression model (excluding Z-score), 26 predictors: R^2 (adj.) =68.02%; N=46; Dependent variable=Non FFS=1; FFS= 0

Independent variables	Coefficient	t-value	P-value
DIV	0.037	1.98	0.055*
LMS/LLB	0.68	1.95	0.059*
E3	-3.2	-2.97	0.005
L3	-5.0	-3.27	0.002
L1	1.30	2.42	0.021
NP/TA	-1.4	-0.49	0.625
E1	-2.07	-3.47	0.001
ML/TA	2.09	3.64	0.001
E5	0.94	3.11	0.004
R9	-7.5	-1.42	0.164
S1	-0.24	-1.38	0.176
Next two Insignificant independent variables:			
WC/TA	-	0.89	0.378
CFFO/NP	-	-1.04	0.304
Note:* Significant at R^2 (adj.) = 67.19% ;(given, second best Minitab iteration).			

Table VI: The earnings quality analysis of FFS SACCOS and matched non-FFS SACCOS during the year ended 30.12.2006; using ACL and CFL under scenario of FFS and non-FFS:

	FFS N=23	Non FFS N=23
Pearson Correlation of ACL[1] and CFL[1]	-0.980	-0.999

[1]Not significantly different at 95% confidence level, given 44-degree of freedom with p- values being 0.000 and 0.000 of- Accruals (ACL) and cash flow(CFL): under FFS and non-FFS respectively.

Note: ACL= (NP-CFFO)/TA, CFL=CFFO/TA (see: page 42 for correlation results).

Table VII- Research on fraud / bankruptcy or performance detection – outline:

	Scope of study	Objectives of study
Keige (1991)	Involve 10 companies that went bankrupt and 10 non bankrupt. Year-1980-1990.	Examines business failure prediction using DA.
Persons (1995)	103 fraudulent firms: matched with non fraudulent firms on basis of industry and time period. Fraud period covered 1970-1990.	Examines variables for estimating models of fraudulent financial reporting, and assessment of models' predictive ability using logistic regression.

Ward and Foster (1997)	317 firms: 253 healthy, 29 bankrupt and 39 loan defaulters. Period covered 1988 and 1989	Empirical test whether or not using the inability of a firm to pay debts when due (loan default), as response measure produces different results than using legal bankruptcy as response measure.
Rick (2001)	96 firms: 48 bankrupt and 48 non bankrupt – year 1966-1972.	Examines whether the addition of capitalized lease data increases the power of affected ratios for predicting bankruptcy using DA.
Spathis (2002)	76 manufacturing firms: 38 with fraud report and 38 with non fraud report. Year-2000	Demonstrate how financial ratios models function in detecting FFS using logistic regression.
Macharia (2003)	64 Co-operatives: 32 with performing loan with a bank and 32 with non-performing loans. Year- 1994-2002.	Examines power of financial ratios in separating Cooperatives with performing loans from others with non performing loans issued by the bank using DA.
Kathleen et al. (2004)	158 firms: 79 with FFS	Examines whether

	and 79 with Non FFS.Year-1982-1999.	financial ratios of fraudulent firms differ from financial ratios of non fraudulent firms.

Table VIII- Final accounts elements – means differences and t-tests:

Final accounts elements-means differences and t -tests				
Accounts elements-characteristics	FFS	NFFS	t-test	p-value
External loan	145,243,957.00	41,903,777.90	2.78	0.007
Dividend payout value	32,332,710.83	63,007,233.53	-1.34	0.185
Share capital	34,572,426.21	8,828,826.09	2.40	0.019
Retained earnings	-24,215,874.00	5,686,072.03	-1.91	0.061
Net profit	26,455,063.00	12,596,362.33	0.81	0.423
Sales	105,249,639.92	107,303,659.15	-0.04	0.967
Net cash flow from operation	-36,803,378.00	35,178,693.97	-1.58	0.118
Total assets	1,225,327,995.16	1,065,364,268.47	0.33	0.743
Problem assets	127,968,135.74	86,754.04	1.67	0.099
Current assets	600,309,972.54	264,838,347.44	2.46	0.017
Long term financial investment	63,034,910.33	6,717,172.00	2.45	0.017

Working capital	-274,239,178.68	-439,870,903.57	0.47	0.643
Note: Amounts in Kenya shillings, t-test: df=68(two tailed), and t=0.33, p-value≤0.741 for difference of FFS and Non FFS means; significance at 5% level. Assumed equal variance.				

Table IX- Sample FFS selection procedure:

The Ministry inspection/inquiry record of SACCOs investigated during years 2006 -2007	54
SACCOs with qualified audit reports and not among inspected group in the year ended 31.12.2006	17
ORIGINAL SAMPLE	**71**
SACCOs with incomplete information and investigated	(3)
SACCOs under pyramid scheme investigation	(12)
SACCOs with duplicate information	(3)
SACCOs investigated but accounts not available and the accounts not accessed	(25)
SACCOs with qualified audit reports and with incomplete information	(5)
FINAL SAMPLE	**23**

Table X- Discriminant Analysis- Minitab Summary Classification:

Details	Group 0	Group 1
Group 0	23	1
Group 1	0	22
Total Sample(N)	23	23
N correct	23	22
Proportion	1.000	0.957

N=46 N correct=45 Proportion correct=0.978