

**EFFECT OF RISK ON FINANCIAL PERFORMANCE OF AGRICULTURAL
COMPANIES LISTED ON NAIROBI SECURITIES EXCHANGE**

BY

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MASTER OF SCIENCE IN COMMERCE (FINANCE AND INVESTMENT)

KCA UNIVERSITY

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE AWARD OF MASTER OF SCIENCE IN COMMERCE (FINANCE AND INVESTMENT)
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OCTOBER, 2019

DECLARATION

I declare that this dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this contains no material written or published by other people except where due reference is made and author duly acknowledged.

Sign:

Reg. No. 17/02749

Date:

I do hereby confirm that I have examined the master’s Dissertation of

Omogi Daniel Okello

And I have certified that all revisions that the dissertation panel and examiners recommended have been adequately addressed.

Sign:

Date:

Dr. Peter Kariuki

Dissertation Supervisor

ABSTRACT

Agricultural sector in Kenya is exposed to various risks which originate from both the internal and external environment. Long term sustainability and financial viability of agricultural firms is threatened by risk exposure. Key categories of risks such as operational, liquidity and credit risks possess a major challenge despite the steady growth recently experienced in the Kenyan agricultural sector. In line with the challenges experienced, the study sought to establish the extent to which operational risk, liquidity risk and credit risk affect the financial performance of agricultural firms listed on Nairobi Securities Exchange. The target population were the six agricultural firms listed on NSE for the period between the year 2009 and 2018. A descriptive research design was adopted for the study and data obtained was edited and coded for the purposes of data analysis. Data was further summarized using descriptive statistics such as measure of central tendency, measures of variability, and measures of reliability and frequency among others. Diagnostic tests such as Wooldridge test, Modified Wald test and Hausman tests were also run to specify the regression model to be run. STATA software was used in analysis of the panel data. Panel data was analysed and data obtained from Nairobi Securities Exchange and published annual report and financial statements of the six agricultural firms listed on NSE and the individual firms' website. Data was analysed using panel data regression model. The results of the analysis indicated that the null hypothesis that operational risk, liquidity risk and credit risk have negative effect on financial performance on agricultural companies listed on NSE was rejected at 5 percent significance. The study recommends that proper guidelines and procedures to be put into place to ensure operational risk is well mitigated and effective lease arrangements also be instituted in order to curb risk associated with agricultural produce. In addition, the management should maintain assets which can be easily converted into cash and cash equivalents when need arises in order to curb cash flow constraints and the management should maintain lower inventory levels. Further, the companies should come up with proper credit risk transfer mechanisms and policies to curb credit risk. The study therefore concludes that operational risk, liquidity risk and credit risk negatively affects financial performance of agricultural companies listed on NSE.

Key Words: NSE, Operational Risk, Liquidity Risk, Credit Risk, Financial Performance and Agricultural Firms.

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DEDICATION

This research work is dedicated to my mother, Mrs. Millicent Omogi, to my dear wife, Emmah Kaling'a, to my dear daughter, Shantel Kamaria, to my brothers and sisters for their un-ending love, support and encouragement during the study period. You are indeed a true reflection of a family!

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ACRONYMS AND ABBREVIATIONS

ADF:	Augmented Dickey-Fuller
CA:	Current Assets
CAMEL:	Capital adequacy, Asset quality, Management quality, Earnings and liquidity
CAPM:	Capital Asset Pricing Model
CBK:	Central Bank of Kenya
DSE:	Dar-es-Salaam Stock Exchange
EPS:	Earnings per Share
FAO:	Food and Agriculture Organisation
GDP:	Gross Domestic Product
GLS	Generalised Least Square
GoK:	Government of Kenya
IMES	Institute for Monetary and Economic Studies
MFI:	Monetary Financial Institutions
MPT:	Modern Portfolio Theory
NPL:	Non-performing Loan
NSE:	Nairobi Securities Exchange
OLS:	Ordinary Least Square
P-P:	Probability-Probability
PWC:	PriceWaterHousecoopers
ROA:	Return on assets
ROE:	Return on equity
ROS:	Return on sales
SWOT:	Strengths, Weaknesses, Opportunities and Threats
USA:	United States of America

OPERATIONAL DEFINITION OF TERMS

Agriculture	Agriculture is the science of cultivating the soil, producing crops, and raising livestock in various degrees by preparing and marketing of the resulting products (FAO, 2010).
Credit Risk	Credit risk is the potential that a bank borrower or counterparty will fail to meet the obligation in accordance with the agreed terms and conditions (Kolapo & Dapo, 2015).
Financial Performance	Financial Performance is a measure of how well a firm can use assets from its primary mode of business to generate revenues (Bessis, 2010).
Liquidity Risk	Liquidity risk is the potential for loss to an institution, arising from either its inability to meet its obligations or to fund increases in assets as they fall due without incurring unacceptable cost or losses (Ahmed & Ahmed, 2012).
Operational Risk	Operational risk is the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events (Basel Committee on Banking Supervision, 2004).
Risk	Risk is defined as the uncertainty associated with a future outcome or event (Banks, 2004).

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Risk for long has been disregarded by key decision makers but due to the recent changes in the field of finance mainly as a result of the recently experienced financial crisis, emphasis has been turned to risk management. Iqbal and Mirakhor (2007) therefore argue that a risk management system that is effective will go a long way in helping organizations reduce their risk exposure, and in enhancing profitability of firms. Consequently; selection a risk management tool is associated with measurable attitude and the calculative culture that is displayed towards the use of risk management models that is displayed by decision makers. It is also argued that risk function focus should focus on risk based performance management and extensive risk measurement, although others argue that the focus should instead be on collection of opinions of experts in concerning risk management issues that are currently emerging and on qualitative discourse (Mikes & Kaplan, 2014).

In USA, agricultural sector is a prime industry contributing to the country's GDP and is a net exporter of both agricultural products and food. During the 2007 census of agriculture, there were about 2 million farms covering an estimated area of 920 million acres. According to American Farm Bureau Federation 97% of the US farms are individually or family owned and one in every three acres is planted for export. The number of people fed by small scale farmer has been in an increasing trend since the 1940s. As at 2011, one farmer fed 155 people annually (American Farm Bureau Federation, 2015).

In Africa, agriculture forms a significant portion of the economies. Many African countries practice agriculture and as a sector agriculture has and continues to contribute heavily towards major continental's building blocks such as foreign direct investment, job creation, economic diversion and increased market size. For example, all the three east African countries (Kenya, Ethiopia and Uganda) are agriculture-based economies. The contribution of farmers has been understated for long, but it is estimated that in all the three countries, farmers produce over 75% of agricultural output and over 75% of employment (African Development Bank, 2010). The

Nairobi Securities Exchange is the largest in East Africa. There are several numbers of agricultural companies using various product lines in Kenya but firms listed on the Nairobi Securities Exchange; present high profits for purpose of making their shares very attractive to investors (Lazardias & Tryfonidis, 2006).

1.1.1 Risk

Risk if not effectively managed may result to collapse of many institutions, hence integrating risk management systems should be of great concern to all agricultural companies in Kenya. Risk is defined as the uncertainty associated with a future outcome or event (Banks, 2004). Rejda (2008) defines risk management as the process through which an organization identifies loss exposures facing it and selects the most appropriate techniques for treating such exposures. Risk management is mostly concerned with controlling risk and not eliminating risk exposures notes (Banks, 2004). Kimball (2000) further notes that management of risk is an activity of human nature which emanates from risk identification, risk assessment, coming up with risk management mechanisms and finally developing measures for mitigating risk with the use of management resources. According to Boermans (2011), in case a firm does not hold enough cash, it will always experience difficulties in paying external parties on time. Miles (2010) further states that taking into account corporate financial risk analysis, the following ratios may be of importance Z- prime, debt ratio, debt-to-equity ratio and current ratio.

Resnick (2008) states that assessment and measurement of risk are critical to stakeholders of various institutions who will guide decision making in the determination of the volume and types of investment, helps in forecasting of future occurrence, and provides warning signs to risk assessors. Khan (2003) asserts that the prominent quantitative risk measurement methods are regression, statistical distribution of risk, probability, value at risk, correlation, and standard deviation.

The study contemplated the following risk types; strategic risk, credit risk, liquidity risk, market risk, operational risk, currency risk, reputational risk compliance risk, information risk and transfer risk but only credit risk, liquidity risk, and operational risk were considered due to their relevance and frequency of occurrence in the agricultural sector hence the study employed both financial and non-financial risk. Operational risk falls under the category of non-financial risk whilst both liquidity risk and credit risk are categorized as financial risk.

Credit risk is the potential that a bank borrower or counterparty will fail to meet the obligation in accordance with the agreed terms and conditions (Kolapo & Dapo, 2015). Liquidity risk is the potential for loss to an institution, arising from either its inability to meet its obligations or to fund increases in assets as they fall due without incurring unacceptable cost or losses (Ahmed & Ahmed, 2012). Operational risk is the risk of loss resulting from inadequate or failed internal processes, people and systems, or from external events (Basel Committee on Banking Supervision, 2004).

1.1.2 Financial Performance

Financial performance is key to the success of a particular company as an appraisal of the feasibility, solidity, and prosperity of a company (Rebbington, 2001); financial performance is also considered as the overall financial health of a given company for a particular time frame. Profitability can be measured through analyzing the liquidity, efficiency and profitability of a given firm over a given period of time. Commonly used measures of financial performance are ROA, ROS and ROE. The study however used return on assets to measure financial performance. Solvency measures a company's ability to settle all its financial obligations through selling of its assets and also provide information on ability of a company to continue as a going concern in the foreseeable future. Financial measures on the other hand measures how effective and efficient a firm can utilize its assets to generate revenue. it is possible to establish the financial performance of a given firm through measuring its level of profitability.

According to Quach (2005) solvency measures debt capital invested in the business relative to equity capital employed in the firm which thereafter acts as an indicator of how safer account payables are in the firm. According to Memba and Amaya (2015) establishing a firm's profitability requires one to conduct a SWOT analysis identify financial strengths, weaknesses of an institution and also putting into consideration the available opportunities and threats in the environment in which the firm operates in regards to the financial statement items. Insurance companies have always been used a tool of mitigating risk through spreading firms financial risk by pooling all the risks and cumulatively using the amount contributed by each firm to pay all the insurance claims by the different insurers. The study states that establishing insurance firms' financial

performance is and continues to be critical as the insurers act as intermediaries between the insured and the insurer in the industry.

According to Darzi (2011) financial intermediation enabled amassing of capital in the economy of a country as funds which are sourced by the insured is invested in long term viable projects which further make it possible for pooling of risks and resources together thereby enabling borrowers to access their money as and when need arises, mostly done in security exchange market where both savers and borrowers directly meet thus the risk involved is reduced. Liquidity measures the ability of a firm to off-set its financial and contractual obligations on time without interfering with the day-to-day activities of the firm. It is possible to categorize liquidity into either operational or structural (Quach, 2005). He further states that operational liquidity is explained as cash-flow measure whereas structural liquidity is a balance sheet composition.

The relative magnitude and incidence of both external and internal interference with operations of firms from risk related activities differs from organisation to organisation due to nature and complexity of mechanisms of control together with the standards of risk measurement. Zsidison (2003) argues that even though firms should internally generate enough income to cover up expected risk, adequate capital reserves need to be held for covering up losses that are not expected. The study used return on assets to measure financial performance.

1.1.3 Risk and Financial Performance

According to Banks (2004) financial performance is mainly concerned with regulatory compliance and controlling and not with improving the profitability levels. As a risk management mechanism financial risk management helps in controlling of risk and in regulatory compliance thus helping firms in cost reduction. Management is in a better position to enhance the value of a firm through enabling continued increase in profitability levels of a firm by effectively managing risk (Banks, 2004). Standard and Poor's (2013) highlights the main causes of failures and financial distress in insurance firms as a high tolerance for investment risk, poor liquidity management, underpricing and under-reserving, complexity as a result of rapid growth of a firm as key sources of failures in insurance firms as a result of financial distress. Further, it is critical that the

aforementioned factors effectively be handled by the insurance firms in order to avoid firm's financial failure and bankruptcy.

Recently firms have witnessed tremendous efforts towards management of risk. Babbel and Santomero (2006) recommend insurance companies to critically analyse the different risk types that the companies are exposed to thereafter come up with mechanisms to adequately manage the identified risk. They further opine that the insurance companies should accept only risks which are part of the services that they offer and manage those risks and this will go a long way in reducing the exposure of risk. Stulz (2003) further suggest that management of risk acts as a key economic factor as to why managers of companies may consider distributing firm's returns around the return's expected value and the expected profit therefore acting as a basis for aligning an institution's objective functions so as to help in risk avoidance.

Effective management of risk is key in the routine activities of companies more specifically insurance companies to reduce the extent financial losses and solvency. The idea is also supported by Jolly (2007) who asserts that reducing financial losses by the use of precautionary measures is a key element of risk mitigation and consequently, a key driver of profitability. The efficiency and effectiveness in managing risk by insurers will mainly impact their financial performance. Gold (2009) continues to argue in support that insurance firms might not continue as a going concern due to increase in financial losses together with increase in expense ratios. In most instances, firms' operations are greatly affected by risk exposure and if not well managed the institutions' profitability will continue to decline. Firms that have put into place effective mechanisms for management of risk normally perform better than their competitors because they are prepared better for periods ahead after the occurrence of the similar risks in the past.

1.1.3 Agricultural Sector in Nairobi Securities Exchange

Agriculture is the science of crop production, livestock rearing and cultivation of soil by preparing and marketing of the products (FAO, 2010). Development of agriculture has been witnessed in many of the Sub-Saharan African nations in the recent past mainly due to the importance of agriculture in terms of poverty

eradication and food security and also creation of jobs. Development of agricultural sector however has declined in the recent years considering fluctuation in prices of agricultural products.

In Kenya, agriculture has been for a long time and still remains to be the vital industry of the Kenyan in the economy, contributing an approximate of 25 per centum. According to Economic survey (2015) the Kenyan agricultural industry is equated to approximately 9% of GDP valued at about Kshs 1.39 trillion and employing about 60% in informal sector and 18% in the formal sector according to the economic survey (2014). According to Foltz (2016) agricultural sector doubles up by contributing to an estimated 27% to the gross domestic product via linkages with both service and production sectors, and it further accounts for approximately 65% of the country's net export.

Agricultural sector though the back bone of the Kenyan economy still struggles to effectively compete with other sectors. This trend is attributed to the fact that the sector is faced with various challenges such as decrease in productivity, limited or inability to access the market of their products, inability to access finance, changing climatic conditions and ineffective risk management procedures and mechanisms. The decline was mainly witnessed in the year 2015 when Rea Vipingo plantation limited, the largest sisal fiber producer in Africa, was delisted from Nairobi Securities Exchange due to poor performance which was mainly as a result of decline in prices of sisal. The decline in financial performance of the agricultural sector was further witnessed with Eaagads limited in the year 2013 and the following year and the year 2018 when it realized negative net income which negatively affected the operations of the firm. In the year 2014, 2016 and 2017 Limuru Tea company limited which is mainly involved in manufacturing tea was also faced with the same problem of negative net income. In addition, Williamson Tea Kenya limited in the year 2013, 2014 and 2018 when it realized negative net income which negatively affected the operations of the firm.

According to Nyoro et.al, (2012) asserts that performance of agricultural companies positively impacts the economy thus agriculture must grow at a higher rate for economic development to be witnessed. Therefore, agricultural firms are in a better position through availing raw materials and market to enhance economic development. Wang (2008) continue by adding that a firm's general performance in terms of profitability usually

indicates the level of development. One of the concerns of the managers of business is to grow and enhance the shareholder's wealth and profitability. This can be achieved by formulating strategies to enable the company offset its financial commitments on time hence achieve their business goals. Liquidity therefore plays a key role in effectively operating a business when preferred level of financial dependency is attained (Eljelly, 2004; Bhunia, 2010; Safdar, Awan, Ahmed, Qureshi & Hasnain, 2016).

Agriculture's importance is not only manifested in the African economies but also in many economies all over the world (Wang, 2008). Wang explains that the Chinese focus is to increase the farmers' income by supporting the agricultural activities in the rural areas. This is corroborated by Cao and Birchenall (2013), who explain the circumstances under which agriculture contributes immensely towards the economic development of China. They also state that the productivity of agricultural sector was a key driver in reallocation of both output and input, and in job creation in the non-agricultural industry and that China has a considerable fraction of its labour in agriculture.

In Africa, Uganda, in its strategy for 2014/15 includes the successful implementation of a policy with a desired objective of enhancing the living standards of her people through prioritizing agricultural sector amongst the critical industries key to economic growth (Republic of Uganda, 2010). According to the Kenya national bureau of statistics (2011), the agricultural industry is a key industry to the economy of Kenya because the agricultural companies contribute immensely to the economy of Kenya through food productions and creation of employment.

Nairobi Securities Exchange is the only Securities Exchange in Kenya and was established in the year 1954 with the core mandate of facilitating exchange in securities by the Kenyan government and the listed companies which currently stand at sixty-one companies. Currently the agricultural firms listed on NSE are seven in number i.e., Eaagads Limited, Kakuzi Limited, Kapchorua Tea Company Limited, Limuru Tea Company Limited, Rea Vipingo plantation limited, Sasini limited and Williamson tea Kenya limited (NSE, 2018). These firms were however selected due to reliability and availability of their annual reports and financial statements.

1.2 Statement of the Problem

The agricultural sector contributes an approximate of 27% to Kenya's gross domestic product through linkages with both the service and production sectors. The sector also accounts for about 65% of Kenya's total exports (Foltz, 2016). In Kenya, agriculture has been for a long time and still remains to be the backbone of the Kenya's economy. Agriculture stabilizes the industrialization framework through supplying raw materials for industries, it generates foreign exchange through both the import and export processing of agricultural produce, it is also an avenue through which jobs are created, agriculture itself is also a market for industrial goods, and key to all, agriculture ensures a constant food supply and security. Previous research shows that growth in the agricultural sector in Africa is more effective, compared with similar growth in other sectors, more specifically concerning poverty reduction (Christiaensen, Demery, & Kuhl, 2011).

Despite the Kenyan government registering positive economic growth, the performance of the agricultural industry has continued to decline. This decline is as a result of the sector facing various challenges such as decrease in productivity, limited or inability to access the market of their products, inability to access finance, changing climatic conditions and ineffective risk management procedures and mechanisms (FAO, 2010). The decline was mainly witnessed in the year 2015 when Rea Vipingo plantation limited, the largest sisal fiber producer in Africa, was delisted from Nairobi Securities Exchange due to poor performance which was mainly as a result of decline in prices of sisal (NSE, 2015). The decline in financial performance of the agricultural sector was further witnessed with Eaagads limited in the year 2013 and the following year and the year 2018 when it realized negative net income which negatively affected the operations of the firm. In the year 2014, 2016 and 2017 Limuru Tea company limited which is mainly involved in manufacturing tea was also faced with the same problem of negative net income. In addition, Williamson Tea Kenya limited in the year 2013, 2014 and 2018 when it realized negative net income which negatively affected the operations of the firm (NSE, 2018).

The challenges facing the agricultural sector have mainly been attributed to factors such as high tolerance for investment risk, the decreasing size of landholdings, poor liquidity management, limited access to productivity-

enhancing technology, declining soil health, underpricing and under-reserving, inability to access credit financing, poor access to markets, complexity as a result of rapid growth of a firm as key sources of failures in the agricultural firms as a result of financial distress.

Relevant studies states that effective management of risk will result to increase in the financial performance of the agricultural companies listed in Nairobi Security Exchange. According to Aduda and Kalunda (2012), there is a very close relationship between agriculture and the economy as agriculture contributes a greater percentage to countries GDP. Nyoro et. al (2012) asserts that performance of agricultural firms positively affects the economic performance hence the rate of growth in agricultural firms must be high in order to enhance economic growth. However, for agricultural firms to grow as expected, adequate investments must be done in areas with potential of growth though this kind of investment has never been realized.

Most governments have not taken into consideration the importance of the agriculture and thus have not made serious investments into the sector something that is affecting their economies (Akoto, 2011). Niv (2005) highlights that survival of most firms in the Kenyan economy is not easy due to the current unpredictable economic environment which mostly depends on ability to generate revenue from day to day activities. NSE (2015) confirm that recently most agricultural firms are under performing mainly due to the reduction in their earnings per share which resulted to Nairobi Securities Exchange delisting Rea Vipingo plantation limited, one of the oldest Kenyan sisal producers, in the year 2015.

According to Aduda and Kalunda (2012), there is a very close relationship between agriculture and the economy as agriculture contributes a greater percentage to countries GDP. Nyoro et. al (2012) asserts that performance of agricultural firms positively affects the economic performance hence the rate of growth in agricultural firms must be high in order to enhance economic growth. However, for agricultural firms to grow as expected, adequate investments must be done in areas with potential of growth though this kind of investment has never been realized. Most governments have not taken in consideration the importance and thus have not made serious investments into the sector something that is affecting their economies (Akoto, 2011). Niv (2005) highlights that survival of most firms in the Kenyan economy is not easy due to the current

unpredictable economic environment which mostly depends on ability to generate revenue from day to day activities. The NSE Market data (2015) explores on the fact that recently most agricultural firms are performing below par this is as a result of the reduction in earnings per share. For example, one of the oldest regional sisal producer, Real Vipingo being delisted in NSE in 2015.

Key to mention is that risk and profitability analysis is a tool for analysing stakeholders interested in analysing the organisation current and future financial performance and also evaluating a company's internal operations. Blach (2010) analysed the different financial ratio averages in the past, current and future. According to Lin and Tseng (2006) many companies are not willing to disclose their information to external stakeholders, the return-risk analysis also in most cases not availed. Analysis of relationship between risk and financial performance of agricultural firms have not been thoroughly researched on in Kenya, this study therefore seeks to bridge the gap by undertaking on the same. This is because most studies have been done in both banking and insurance sectors such as Muriithi (2016) and Maniagi (2018) both who researched on financial risk effect on banks' performance in Kenya. Waweru (2018) suggested that further study be conducted on quantitative data as qualitative data as the use of interviews is quite limited.

In Kenya, several authors have researched on the effect of risk on the financial performance of agricultural companies listed on NSE and found that market risk, liquidity risk, and operational risk to have an inverse effect to financial performance of agricultural firms (Mahfoudh, 2013) and (Iyakaremye, 2015). Other authors found contradicting results, a direct relationship between risk and financial performance (Musima, 2012). Many companies' key objective is to increase wealth of their stakeholders and also to maximize profit. This leads to the need to highlight the key variables that affect financial performance among agricultural firms in the sector. In view of the above developments, the study seeks to study the effect of risk on financial performance of agricultural companies listed on Nairobi Securities Exchange.

1.3 Objectives of the Study

1.3.1 General Objective

To study the effect of risk on financial performance of agricultural companies listed at the Nairobi Securities Exchange.

1.3.2 Specific Objectives

- i To establish the effect operational risk on the financial performance of agricultural companies listed on Nairobi Securities Exchange.
- ii To examine the effect of liquidity risk on the financial performance of agricultural companies listed on Nairobi Securities Exchange.
- iii To determine the affect credit risk on the financial performance of agricultural companies listed on Nairobi Securities Exchange.

1.4 Research Hypotheses

- H₀₁ Operational risk has no significant effect on the financial performance of agricultural companies listed on Nairobi Securities Exchange.
- H₀₂ Liquidity risk has no significant effect on the financial performance of agricultural companies listed on Nairobi Securities Exchange.
- H₀₃ Credit risk has no significant effect on the financial performance of agricultural companies listed on Nairobi Securities Exchange.

1.5 Justification of the Study

The research will be significant to stakeholders, government, investors, community and academicians.

1.5.1 Management

The management of the agricultural firms and related firms have been using the findings to better run their firms. Shareholders have also been using the findings to decide whether to continue investing in the company

or to sell off the shares. The study has provided the management of the agricultural companies with the understanding of risk and associated characteristics and how they affect the firms' operations. The finding has further enabled the firms to come up with competitive strategies to have competitive edge on their competitors.

1.5.2 Government

The government has used the findings to come up with the regulatory procedures on how to best manage the risks that affects the agricultural sector. The government has also come up with ways of relaxing the regulatory procedures that tend to inhibit financial performance of agricultural firms as this will positively impact the growth of the country's Gross Domestic Product.

1.5.3 Investors

The findings of the study have helped potential investors in making decision on whether to invest in the firm. They have to analyse the risk-return characteristics before investing in the company, this is possible by analyzing the probable risks and potential return arising from the firms. The existing investors have also used this information to gauge on their investment-risk exposure, and the categories of risk their investments are exposed to or likely to be exposed to. The existing investors have used the findings to decide whether to continue investing in the company or to sell off the shares.

1.5.4 Academicians

Academicians are some of the key beneficiary to the study findings. Academicians will use the findings to build into the already existing body of knowledge to enrich the knowledge bank by providing insightful recommendations. The findings have also been used by scholars as reference point and as a basis of further study in coming up with appropriate principles and theories more specifically in the field of finance and investment.

1.6 Scope of the Study

The population for the study was the agricultural firms listed on Nairobi Securities Exchange. This research aimed at collecting views of the annual financial reports, journals, and NSE annual report. The study was done in the agricultural companies listed at the NSE due to the ease of accessing information. The research focused on the six agricultural companies listed at the NSE between the year 2009 and 2018 and used the secondary data on internal analysis of credit risk, operational risk, and liquidity risk.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter explores literature available on financial risk together with financial performance of agricultural firms. It is a summary of theoretical review, empirical review, knowledge gap, conceptual framework and operationalization of variables.

2.2 Theoretical Review

2.2.1 Modern Portfolio Theory

Modern Portfolio Theory was advanced by Markowitz in 1952. It is among the critical theories of economics that has and continues to be used in finance and investments. According to Markowitz (1952) Modern Portfolio Theory is a finance and investment theory that attempts to maximize return and minimize risk through critically selecting various financial assets. He continues to state that MPT is a mathematical formulation of the diversification concept in investment in order to select a group of asset that collectively has lower risk than any individual asset. This concept is only possible in theory but not in practice because the value of different assets changes in value in opposite direction. Decrease in stock market prices implies that bond market prices will increase and the opposite is true. According to (Mandelbrot & Hudson, 2004) when two assets are combined together they can have lower risk as opposed to an individual risk.

According to Chandra et al. (2007) MPT lies upon the random walk theory which states that the movement of asset prices follows an unpredictable path. This path is subject to long-run EPS nominal growth. Modern portfolio theory has positive impact on risk minimization through considering portfolios with lower overall risk for investment. The management of the pension schemes acts as agents while investing in the scheme on members' behalf hence the investors should try to invest in a pool of assets that will minimize hence maximizing returns. According to Barton et al. (2002) MPT helps enterprise risk management of firms in risk identification

and risk management in order to improve firm's shareholders value. According to Olsson (2008) modern portfolio theory supports the fact that management of risk continues to evolve through coming up with strategies that will better help in risk management especially in the current complex agricultural industry.

Despite modern portfolio theory being a very important theory in finance and investment it continues to face criticisms from various scholars most of which are based on the assumptions of the MPT. The liquidity assumption continues to be criticized and this is proven by the 2008 financial crisis that some financial markets are not liquid. Academicians have also critique the definition of modern portfolio theory on the concept of volatility. According to Morien (2011) Volatility is measured by the use of standard deviation and variance which most scholars argue that variance is not always constant. He also continues to state that option market is an illustration where option traders do not quote the same volatility on a day to day basis. MPT has also been criticized for being theoretical that is not being realistic as it does not have real life situation as it assumes that there are no taxes and transaction costs. In reality investors pays taxes on the trades they invested into. In real life a trader must incur some trade related costs in both the long run and short run.

The Modern Portfolio theory was found on the premise of risk reduction and maximization of return. The modern portfolio theory provides for a non-biased perspective on the relationship between financial risk and financial performance variables used in the research. Through availing information that the financial risk has an inverse relationship with financial performance, the theory offers a platform for undertaking analysis of the effect of financial risk on financial performance in agricultural industries in Kenya.

2.2.2 Capital Asset Pricing Model

Capital Asset Pricing Model was advanced by Sharpe and Lintner in 1964. CAPM is a very key theory in the field of finance and investment. Capital asset theory is one of the simplest and highly revered models in finance. The model explains changes in the rate of return on a security as a function of the rate of return on a portfolio consisting of all publicly traded stocks, which is called the market portfolio. Sharpe (1964) and Lintner (1965) developed CAPM model. CAPM is an extension of Markowitz's (1952) model that was the first to model the

risk return combination. In this model, there exist many efficient portfolios as risk preferences. According to Gossy (2008) for investors to get higher return through accepting higher risk, all efficient portfolios must lie on the mean variance frontiers. He further states that capital asset pricing model propose that investors will hold the market portfolio despite an individual risk preferences. This model is capable of establishing the market price for both appropriate risk measures and risk for an asset.

Bettis (1983) suggests that CAPM has numerous anomalies which has been the basis of key deliberations on the importance of the model in the field of strategic risk management. He continues to point out risks concerned with business are related to firm particular competencies and resources. The CAPM theory implies that companies should select efficient portfolios that offers minimum risk and maximum return. Vincent-Lorente (2001) continues by pointing out the importance of management of strategic management of risk and highlights critical areas of argument between finance and strategy. He goes on to question the consequences of capital asset pricing model on strategic risk management more specifically on risk management of corporations and that CAPM should not be concerned about firm's specific risks.

The model emanates from the capital market theory which give way for investors to ascertain the risk-return tradeoff of an asset and a diversified portfolio which is made possible by CAPM redefining the key risk measures of risk and volatility. The capital asset pricing model continues to define risk measures which are relevant from non-systematic risk to systematic. According to Brown and Reilly (2012) beta coefficient is considered a new measure of risk, and it computes level of s financial asset's systematic risk in comparison to that of the market. Further, they state that expected risk premium in unit terms is also redefined by the capital asset price model by the use of beta coefficient.

Both Lintner (1965) and Sharpe (1964) goes ahead to add the following assumptions to Markowitz model (1) investors are able to lend at a risk-free rate and (2) investors jointly select asset returns distribution between time $t-1$ and t . this assert that both Markowitz and CAPM have similar assumptions. The capital asset pricing model continues to be criticized due to its unrealistic assumptions such as being single period tool and risk-free rate of both lending and borrowing. In any case, it is generally utilized and numerous industries and

investors and portfolio managers rely on upon this model in decision-making. Moyer et al. (2001) further asserts that despite of existence of empirical evidence that highlights the failure of capital asset pricing model together with issues in line with the assumptions, the model still stands out as an instrumental tool for analyzing performance of investment and cost estimation. Capital asset pricing model therefore holds that different investors irrespective of their individual risk appetite will hold similar efficient portfolio. On the above consideration, capital asset pricing model will be key in the determination of appropriate measure of risk and in market price of risk establishment. This model is therefore relevant in establishing the relationship between financial risk and financial performance in agricultural firms listed at Nairobi Securities Exchange as it explains the variation of a financial asset's rate of return as a subject of a portfolio's rate of return.

Capital asset pricing model states that irrespective of individual investors risk preference, all investors will hold the same efficient portfolio. In this regard, capital asset pricing model is relevant in establishing market price for both risk and effective risk measure for an asset. This model is therefore relevant in establishing the relationship between financial risk and financial performance in agricultural firms listed at NSE in Kenya as it explains the variation in the rate of return on a security as a function of the rate of return on a portfolio.

2.2.3 Finance Distress Theory

Proponent of finance distress theory Wiggins (1984) relates sales decline and generation of negative profits to financial distress. When assessing the causes of bankruptcy during crisis exogenous effects are to be considered, catalyst in times of bankruptcy, poor asset efficiency, loss generation, insolvency and in times of credit crunch. Financial distress is linked to liquidity risk and credit risk. Financial literature has noted two types of financial distress which include indirect and direct costs. Warner (1977) asserts that indirect financial distress costs are consequence of running a company that cannot meet its financial obligation; such costs are unobserved in nature and include opportunity costs. Financial distress is accompanied by many factors including failure to pay debts when due, reduction or failure to pay dividends, current liabilities maturing faster than current assets, these activities may occur just before the payments due for outstanding debts (Whitaker, 1999). Boritz (1991) asserts that financial distress is characterised with bad economic conditions coupled with

poor financial risk management. Liquidity risk in agricultural firms is as a result of failure to pay suppliers when due as a result of inability to convert assets to cash.

According Baldwin and Mason (1983) a company enters into financial distress when its operation deteriorates to a position where it is unable to service its debt obligation. They further asserts that both decrease in dividend payouts and violations of debt repayments are key signals of financial distress. Further Whitaker (1999) adds that when debt obligations is greater than cash-flows hence a firm has adequate resources to off-set debts. Inability to meet contractual obligation is vital in determining a country financial distress. Many firms enter into a position of financial distress due to decline in their operation coupled with lack of adequate management (Wruck, 1990).

This theory is a product of both credit risk and liquidity risk affecting a particular company. It does not provide for a biased perspective in determination of the correlation between profitability and financial risk especially the three types of risk put into use in this project. This theory being in a better position in provision of key information to a condition of financial difficulty provides a platform for studying the effect of financial risk on financial performance of listed agricultural firms at Nairobi Securities Exchange.

2.3 Empirical Review

2.3.1 Operational risk and financial performance

Operational risk is defined as risk of loss resulting from failure of operations. It involves many events such as failure of systems, policy violations, error execution and acts of nature such as natural fire and flood. Carey (2001) argues that management of operational risk is key to operations of each and every organisation mainly in incorporating activities related to management of risk into systems and processes. Operational risk if inadequately handled can lead to performance which is not consistent and to surprises in terms of stakeholders earnings. Therefore, exposures as a result of risk from operations negatively affect cash inflows from

agricultural firms. The exposure to financial risk therefore results to losses generated as costs of agricultural firm's operations.

Lyambiko (2015) researched on the effect of operational risk on the financial performance of commercial banks in Tanzania. The total population consisted of all 36 commercial banks in Tanzania by December 31, 2013. Since the study's target population was small there was no need for sampling hence the whole population was used for the study. The research used a descriptive survey of Tanzanian commercial banks. Secondary data used in the study was collected from financial reports of commercial banks in Tanzania from 2009 to 2013. Regression analysis was employed in evaluating the impact of operational risk management on profitability of commercial banks in Tanzania. These variables included the Credit risk, the Insolvency risk and the Operations efficiency usually provided by the Bank of Tanzania. The dependent variable of the research was profitability of the Tanzanian commercial banks and this was evaluated using ROE as a percentage. Findings from the research confirmed that the independent variables such as Credit risk, Insolvency risk and Operation efficiency had varying degrees of relationship with the financial performance of the commercial banks in Tanzania. This research also found out that management of operational risk directly influence profitability of Tanzanians banks. This study also established that Operations efficiency directly affects financial performance of commercial banks in Tanzania while credit risk together with solvency risk rate negatively influence the bank's profitability in Tanzania. Therefore, this research recommended that banks should handle their risk factors appropriately as the risk factors changes as in the case of risk arising from operations may about currency devaluation hence affecting performance of the commercial banks listed in the DSE.

Muriithi (2016) established the relationship between financial risk and the performance of commercial banks in Kenya. This research was carried out in 43 banks in Kenya and the risks covered were market, credit, liquidity and operational risks. The target population for the study was 43 commercial banks and the study employed research design known as quantitative design. The data type used was panel data due to existence of many banks with a period of more than one year. Secondary data was also used due to reliability of its data. Financial ratio

analysis was used together with panel data techniques such as fixed and random effects. The study concluded that the following risk types negatively impact profitability; operational, liquidity and credit risk. Further it asserts that Kenyan commercial bank profitability and financial risk are negatively related and that cost to income is the financial risk component that mostly affect financial performance.

Omasete (2014) studied the impact of management of risk on Kenyan insurance companies' financial performance. Research design used was exploratory, together with both secondary and primary data where secondary source of information was extracted from financial reports together with desk search techniques, primary data on the other hand was extracted questionnaires. The target population was 49 insurance firms licensed to operate in the country by the end of 2014. Quantitative data used was analyzed using SPSS, whereas qualitative data was analyzed by content analysis. The finding of the study was that most Kenyan insurance firms had employed into their day to day activities financial risk management mechanisms and that these mechanisms positively impacted on the risk management hence the insurance firms' profitability. He recommended that a multifaceted approach of managing risk to be put into practice to improve risk management benefits.

Kimani (2011) studied on the impact of fraud risk on the performance of commercial banks; a case study of Barclays Bank of Kenya. The study employed a descriptive research design with the use of secondary data. Data was collected through the use of data collection sheet and ratio analysis was also employed in analysis of the collected data. Quantitative data was analysed by the use of STATA and SPSS. The finding of the study is that statistics of banks indicates that in most cases commercial banks incur losses that mostly are as a result of the banks internal fraud. The study further asserts that dishonest bank staff and management team colluded with external parties to embezzle funds from the bank. Its further confirmed that the internal fraud seldom occur though once it occurs it results to a greater loss to the bank.

Muthuya (2009) studied the effect of cost income ratio and capital adequacy on Kenyan commercial banks' profitability. The research was conducted between the year 1998 and 2007 on 41 licensed Kenyan commercial banks where panel data technique was used to analyse the secondary data collected. The secondary data was

extracted from the commercial banks annual audited financial reports. Secondary data was collected by the use of data collection sheet and data analysis was done by the use of ratio analysis. Both ROE and ROA were the considered as measures of profitability of the banks. The study finding was that there is an inverse relationship between cost- income ratio and both ROE and ROA. It also concluded that globally Kenyan banks are not competitive taking in consideration efficiency.

Awojobi et al. (2011) researched on key determinants of commercial banks risk management efficiency in Nigeria. The study was done on the nine largest banks in Nigeria considering asset base in the banking sector and was done between the year 2003 and 2009. The study employed the used of secondary data together with panel data technique considering the different number of years and number of commercial banks covered. Data collection sheet was employed in collecting secondary data thereafter the data collected was analysed through the use of ratios. STATA was also used together with descriptive research design. The study also panel data regression was put into practice for macro determinants and micro determinants. The study finding was that bank size is insignificant and that market risk, liquidity risk, bank size and capital adequacy have strong relationship.

Muli (2003) researched on management of property risks in Kenyan insurance industry. The study employed the use of primary data together with cross-sectional data. Both qualitative data and exploratory research design were used to determine management of property risk. A questionnaire was employed to collect primary data whereby out of 36 insurance companies only 18 companies where engaged in the interview. Data was coded using frequency tables and simple percentage was employed in data analysis of the already collected data. It was concluded that there is no effective and efficient means of retrieving and storing risk management information for insurance firms and also that there is no clear understanding on the idea of the management of risk especially in insurance sector. Therefore, the research recommended on measure to enhance management of information system (MIS) such as computerization of systems.

Yusuwan et al. (2008) studied on risk awareness of risk management practices in construction companies in Malaysia. The study employed both primary and secondary data whereby the collection of primary data was

through survey, interviews and questionnaire whereas data collection sheet for secondary data. The study also used exploratory method of research design to establish the management practices to be used in risk measurement and quantitative data was also adopted. A total of twenty-seven (27) companies were sampled out for the study which include both private and public companies in the Klang Valley, Malaysia. The study found out that practices related to the management of risk contributes to profitability of the construction companies and the research arrived into a conclusion that 11.1% of the respondents have never heard of risk management, 14.8% have put into practice risk management, 29.6% have heard and went ahead to attend training on risk management and finally 44.4% have occasionally heard of risk management.

2.3.2 Liquidity Risk and Financial Performance

According to Ahmed and Ahmed (2012) liquidity risk is a loss as a result of inability to meet financial obligations for a firm as and when they fall due with no possibility of incurring a loss. Eckles, Hoyt and Miller (2014) further asserts that in banking firms, liquidity risk is considered more threatening than in agricultural firms, this is due low frequency of exchange of money in agricultural firms as opposed to the banks.

Maniagi (2018) conducted a research on the impact of financial risk on financial performance of Kenyan commercial banks. The research used a descriptive research design, the data used was secondary data together with primary data. Panel data technique was also employed due to existence of more than one year and more than one unit of study. the target population constituted 30 commercial banks in a span of ten years as from the year 2006 to the year 2015. For secondary data, information was extracted from individual banks' website together with CBK website and data collection sheet employed in collection of data. Ratio analysis was used in data analysis. For primary data, questionnaire and surveys were employed whereby 220 respondents were considered for interviews. Both E-views and SPSS software were used in data analysis and interpretation. The study found out that the relationship between credit risk and banks performance is inverse. Both market and interest risks are however positively related to banks financial performance. The study recommends that banks should come up with strategies to help in controlling debt relative to total capital.

Maaka (2013) researched on the relationship between liquidity risk and Kenyan commercial banks financial performance. Exploratory design was employed in the study. Quantitative secondary data was also used whereby data collection sheet was incorporated in collecting information. Panel data technique was utilised whereby a sample of thirty-three banks were taken to represent the entire population between the year 2008 and 2012 was considered for the study. The study concluded that liquidity risk negatively affects profitability of commercial banks. Further, the study concluded that commercial banks' performance is positively affected by level of customer deposits. It recommended that commercial banks should open up more branches to enhance profitability of banks. Limitation existed as only profitability was considered as a measure of financial performance for banks, and the sampling also excluded 14 banks from the study.

Iyakaremye (2015) studied analysis of financial performance and financial risk in agricultural companies listed on NSE. Research design used to describe variables of interest in the study is a descriptive research design. Quantitative data together with secondary data were put into use in the research. The sample size was 5 agricultural companies which also acted as the target population. Microsoft Excel was used for tables and figures presentation to analyze the quantitative data. STATA package was used for multivariate regression analysis of quantitative data while SPSS package involved determining the relationship existing between the two variables. It was established that the driving forces for agricultural companies' financial health determination were both profitability and financial risk. ROE, ROS and ROA were used as the most important determinants of profitability of a firm. The finding was that there exists a very strong correlation between financial risk and profitability of agricultural firms.

Mahfoudh (2013) researched on the effect of firm selected characteristics on firm's financial performance. Correlational design together with quantitative data were used. Correlational research design was used together with secondary data. The population of study was restricted to only 6 out of the 7 listed agricultural firms in Kenya between 2007 and 2012. The study found out that both board size and liquidity have positive effect on firm's financial performance while leverage, firm size and firm age negatively affect firm performance. The study recommended to the management to focus efforts on those variables that positively affect their long run

financial performance such as increase firm sizes, use of more leverage up to a point when net costs are suffered as a result of excessive leverage, reduction of firm and product lifecycle, extending more credit sales to customer and paying of suppliers promptly as per terms and reduction of board size as it results in more expenses.

Waweru and Muriithi (2017) studied the impact of liquidity risk on financial performance of Kenyan commercial banks. Study used descriptive design whereby quantitative data was employed in analyzing data. Study was conducted on 43 registered Kenyan banks for the year 2005 to the year 2014. The secondary data used and data collected through data collection sheet and data extracted from CBK website plus the individual banks website. The independent variable was liquidity that was measured by both liquidity coverage and stable funding ratios, dependent variable, financial performance was measured by ROA and ROE. The study found out that profitability was inversely affected by liquidity risk. Further the study found that both liquidity coverage ratio and net stable funding ratio are negatively associated with profitability of commercial banks.

Kim (2015) studied on the impact of liquidity risk on commercial banks in European Union countries. The study employed the use of descriptive design. Secondary data was used due to its reliability and panel data technique was also employed in the study. The study was conducted between the year 2007 to 2009 and a sample of 23 European Union countries was selected for the research. Secondary data was extracted from the individual banks website whereby each banks annual financial reports was evaluated using ratio analysis technique and results conveyed through the use of graphs and charts. The study finding was that liquidity risk is inversely related to commercial banks' profitability. They further found out that loans to deposits ratio as a measure of liquidity has a positive relationship with net interest margin.

Wambui (2013) studied the impact of liquidity levels on the financial viability of banks. Descriptive research design was employed together with quantitative data; secondary data was also put into use. Panel data technique was employed whereby between the year 2008 and 2012 the forty-four (44) commercial banks which were operational in Kenya were involved in the research. The secondary data was collected by the use of data analysis sheet for the five-year period. Profitability of commercial banks was measured using return on assets

while liquidity risk was measured using both current ratio and coverage ratio. Data was extracted from annual financial reports uploaded on banks websites and CBK website. The study found out that liquidity risk strongly affects profitability of Kenyan commercial banks.

Ogol (2011) explored on effect of liquidity risk management practices on monetary financial institutions in Nairobi. Descriptive design was employed. Quantitative was taken into consideration in addition to primary and secondary data. The secondary data was collected from annual audited financial reports of MFI while the primary data was collected by the use of surveys and questionnaire. Panel data analysis was employed in analyzing data from the forty-one (41) MFI for a period of five years between the year 1998 and 2002. Ratio analysis was used in analyzing data collected. The findings were that most MFI have put into place risk management practices.

2.3.3 Credit Risk and Financial Performance

According to Kolopo and Dapo (2015) credit risk is the potential inability of a borrower to meet contractual obligation as and when due as per the agreed upon conditions. Agricultural companies mainly face problems in financing; they do not have adequate security to secure loans from banks this exposes the firms to credit risk.

Maniagi (2018) established the impact of financial risk on performance of Kenyan commercial banks. Descriptive design was adopted for the study. Qualitative and quantitative data were both employed through the use of secondary and primary data. Primary data employed the use of questionnaire whereas secondary data used data collection sheet. A sample of 30 out of the forty-four registered commercial banks were considered for the study. Panel data technique was used whereby 30 banks for a period of 10-year from 2006 to 2015 was considered for research. The software used in data analysis were E-views and SPSS. the independent variable, financial risk is measured using credit risk, interest rate risk and market risk while the dependent variable, was measured using ROA and ROE. This research found that credit risk negatively affects performance of commercial banks whereas both interest risk and market risk positively affects banks

performance. the recommendation was that banks to come up with measures to control loan issued relative to total capital.

Muriithi (2016) studied the relationship between financial risk and financial performance of Kenyan commercial banks. Descriptive design was employed. Secondary data used was collected from annual financial reports of the forty-three licensed commercial banks. Panel data techniques were employed for the 43 commercial banks for a ten-year period from 2005 to 2014. The independent variable, financial risk, was measured using return on equity and return on assets whereas the dependent variable, financial performance, was measured using market, credit, liquidity and operational risks. Together with panel data techniques financial ratio analysis was also used. The study concluded that financial risk is negatively related to financial performance of commercial banks.

Iyakaremye (2015) studied analysis of financial performance and financial risk in agricultural companies listed on NSE. Research design used to describe variables of interest in the study is a descriptive research design. Quantitative data together with secondary data were put into use in the research. The sample size was 5 agricultural companies which also acted as the target population. Microsoft Excel was used for tables and figures presentation to analyze the quantitative data. STATA package was used for multivariate regression analysis of quantitative data while SPSS package involved determining the relationship existing between the two variables. It was established that the driving forces for agricultural companies' financial health determination were both profitability and financial risk. ROE, ROS and ROA were used as the most important determinants of profitability of a firm. The finding was that there exists a very strong correlation between financial risk and profitability of agricultural firms.

Fan and Yijun (2014) researched on impact of management of credit risk on profitability of commercial banks in Europe. Profitability of commercial banks was determined by return on equity and return on assets whereas credit risk was determined by NPL and CA ratio. This study used a sample of forty-seven largest banks in Europe. Panel data technique was used due to existence of firms and across a 6-year period from 2007 to 2012. The data used was collected from annual financial reports of the selected financial banks. In analysis, panel

data and ratio analysis. The study concluded that credit risk and profitability of banks are positively correlated. They recommended that management should control the NPL and that management should evaluate the bank ability to pay back when borrowing.

Fredrick (2012) studied the effect of credit risk management determinants on commercial banks financial performance. Causal design put into use together with quantitative data also used. The secondary data was collected from CBK portal and surveys on banking sector, and also from the website of the individual commercial banks. Panel data technique was used considering the target population of 42 banks in a period of five years. Both financial ratio and panel data techniques were employed in data analysis. The study finding was that CAMEL components such as capital adequacy, asset quality, management efficiency and liquidity positively affects commercial banks financial performance.

Mutua (2014) researched on credit risk management practices on the financial performance of commercial banks in Kenya. A descriptive design was employed. Primary data was used whereby questionnaire was the tool for data collection. The target population was the 43 registered commercial banks in Kenya where mostly auditors and credit controllers were the major target. The study found out that risk identification is regarded as a key component of risk management especially in regards to credit risk management. Risk analysis was also considered a key element of credit risk management as it enables banks to identify risk elements earlier. The study recommended banks to explore how to curb risky ventures as this can impact negatively on their profitability.

Simiyu (2008) studied the credit risk management techniques in MFI in Kenya. The research design used was a descriptive design which helps in generalizing the entire population. Both secondary and primary data collection methods were used whereby interviews, surveys and questionnaire were considered for primary data and data analysis sheet for secondary data. A sample of thirty micro-finance institutions was employed. Self-administered questionnaire was used whereas information concerning secondary data was extracted from both CBK and MFI websites. The study found out that 6C is a critical tool in management credit risk and that MFI are mostly faced with CBK operational regulations.

2.4 Knowledge Gap

The Kenyan agricultural sector has for years known to contribute an average of 27 percent to the GDP through liaison with manufacturing and production sectors (Foltz, 2016). He continues to asserts that the sector also accounts for about 65% of Kenya's total exports. In Kenya, agriculture has been for a long time and still remains to be the backbone of the Kenya's economy. Agriculture stabilizes the industrialization framework through supplying raw materials for industries, it generates foreign exchange through both the import and export processing of agricultural produce, it is also an avenue through which jobs are created, agriculture itself is also a market for industrial goods, and key to all, agriculture ensures a constant food supply and security. Previous research shows that growth in the agricultural sector in Africa is more effective, compared with similar growth in other sectors, more specifically concerning poverty reduction (Christiaensen, Demery, & Kuhl, 2011).

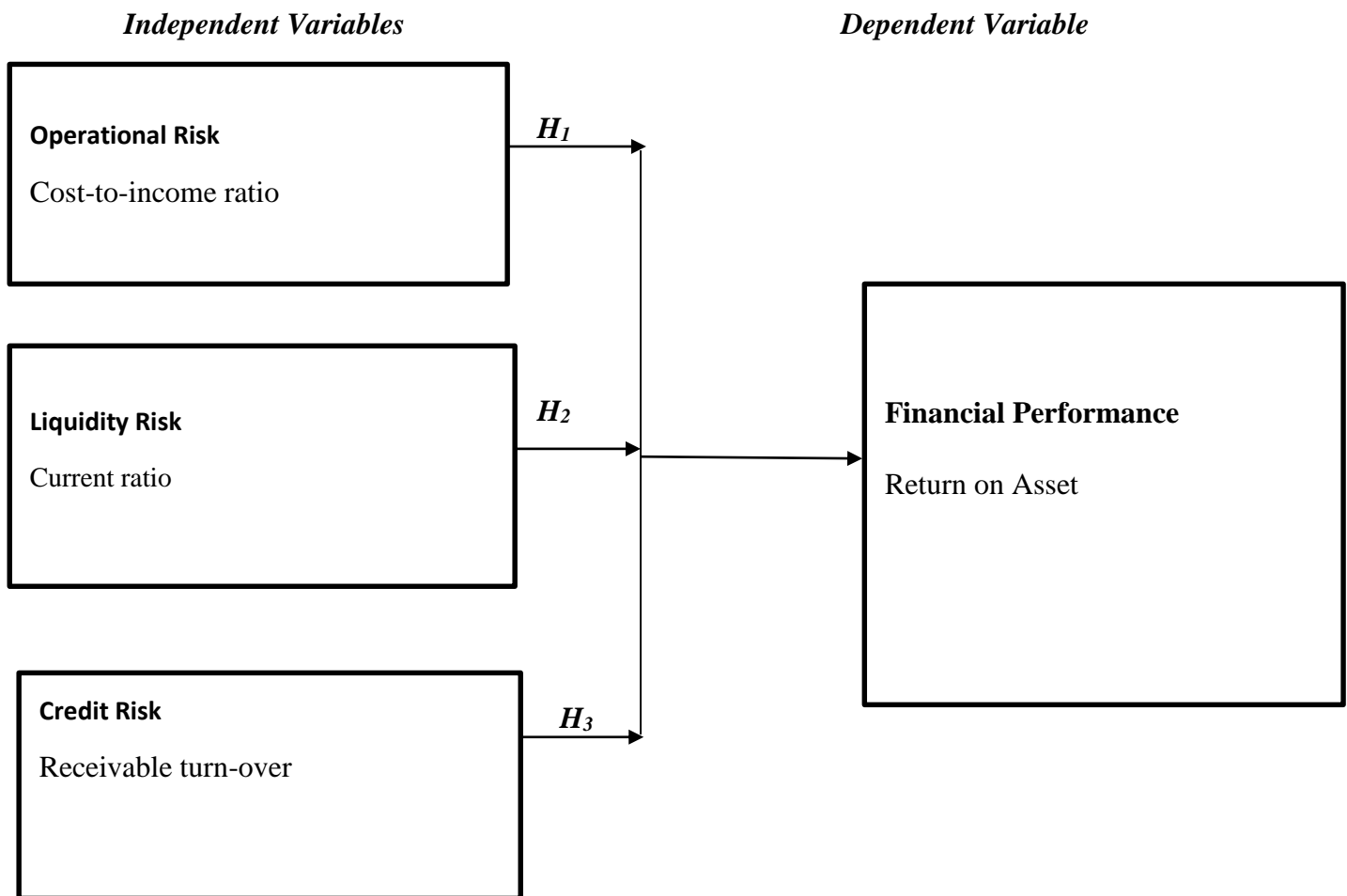
In Kenya, several authors have researched on the effect of risk on financial performance of agricultural companies listed on NSE and concluded that credit risk, liquidity risk, and operational risk to have an inverse effect to financial performance of agricultural firms (Mahfoudh, 2013) and (Iyakaremye, 2015). However, some came into a different conclusion that there is a direct relationship between risk and financial performance of agricultural firms listed at NSE (Musima, 2012). The authors recommended further research to be done for a longer period to capture periods of various trade cycles in order to give broader dimension for the problem. This study therefore intends to fill the knowledge gap by researching on a ten-year period.

2.5 Conceptual Framework

Borg (2005) defines conceptual framework as a graphical link between variables in a study basing from ideas developed from the researchers' perception of the research. The dependent variable is financial performance which will be measured by return on equity and return on asset. The independent variables on the other hand are liquidity, operational and credit risks.

FIGURE 1

Conceptual Framework



Source: Author (2019)

Maniagi (2018) in analyzing influence of financial risk on banks' performance in Kenya used ROA and ROE to measure financial performance. Liquid assets to total deposits ratio and liquid assets to total assets ratio were both employed in measuring liquidity risk. Capital adequacy ratio and NPL to total loan ratio for credit risk.

Muriithi (2016) while studying the effect of financial risk on financial performance of commercial banks in Kenya used return on equity to measure financial performance. Cost income ratio was used to measure operational risk, liquidity coverage ratio and net stable funding for measuring liquidity risk while asset quality, loan loss provision, and capital to risk weighted asset to measure credit risk.

Iyakaremye (2015) while analyzing financial performance and financial risk in agricultural firms listed on the NSE employed ROA, ROS, and ROE to measure financial performance. Current ratio was used to measure liquidity risk, both debt ratio and debt to equity ratio for credit risk, Altman's Z Score was also used in measuring operational risk and credit risk.

Mahfoudh (2013) while studying the effect of selected firm characteristics on financial performance of firms listed in agricultural sector at Nairobi Securities Exchange used return on assets to measure financial performance. Total debt to total assets ratio was employed in measuring firm leverage, current ratio for liquidity risk.

2.6 Operationalization of Variables

TABLE 1

Operationalization of Variables

Variables Type / Variable		Specific Measure	Formula	Scale
Independent Variable	Operational Risk	Cost-to-Income ratio	$\frac{\textit{Operating costs}}{\textit{Net income}}$	Ratio
	Liquidity Risk	Current ratio	$\frac{\textit{Current assets}}{\textit{Current liabilities}}$	Ratio
	Credit Risk	Receivable turn-over	$\frac{\textit{Credit sales}}{\textit{Accounts receivable}}$	Ratio
Dependent variable	Financial Performance	Return on Assets	$\frac{\textit{Net income}}{\textit{Total assets}}$	Ratio

Source: Author (2019)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Chapter describes in brief procedure which were used in providing answers to research hypothesis in the first chapter of the study. The following aspects were discussed under research methodology; research design, target population, sampling procedure, data collection instrument, data collection, data analysis and research ethics.

3.2 Research Design

Research design is a structure and plan put into place to answer a given research question (Kerlinger, 1986). The study employed a descriptive research design to determine the effect of risk on financial performance of agricultural firms listed on Nairobi Securities Exchange. According to Churchill and Brown (2007), descriptive research design which helps in accurate estimation of data. This design also enables quantitative description of variables in the form of who, what, when, where and how of the topic (Burns & Bush, 2010).

3.3 Target Population

According to McColl and Easton (2012) population is a group of animal, plants, people, or things from which data can be collected. According to Mugenda and Mugenda (2003) target population is defined as a specific population about which information is desired. The target population comprised of all the six agricultural firms listed on Nairobi Securities Exchange for the period between the year 2009 and 2018 as per appendix 1. These firms were chosen because of the reliability and availability of their annual reports and financial statements.

3.4 Sampling Procedure

Hussey and Collins (2006) considers sampling procedure as a basic selection method from a population that will represent the population. The study considered census of all the six agricultural firms listed on Nairobi Securities Exchange because of its high accuracy and due to existence of few elements in the target population.

Mohadjer, Krenzke and Kerckhove (2013) went further to define a sampling frame as the list where samples are selected. The research employed a census of all the six agricultural for the period between 2009 and 2018.

3.5 Data collection Instrument

Secondary data collection sheet was used in the collection of secondary data. According to Mugenda and Mugenda (2013) secondary data was defined as any publication by an author who is an indirect observer or participant in the events described in the publication. Scholars mainly put into use secondary type of data due to wide breadth of available information. Secondary data collection sheet was used to collect data from annual reports and financial statements of the six agricultural companies listed on NSE between the year 2009 and 2018.

3.6 Data Collection

Secondary data was collected from the annual reports and financial statements of the agricultural firms listed on Nairobi Securities Exchange between the year 2009 and 2018 using the data collection sheet. The researcher extracted data from the Nairobi Securities Exchange, Capital Market Authority and the individual firms' websites. The researcher wrote to NSE seeking consent to access the audited reports and financial statements for the period between 2009 and 2018. The secondary data was mainly extracted from statement of financial position, statement of income, statement of cash flow and statement of financial performance. According Gujarati (2003) and Baltagi (2005), panel data is mainly used because it assists in the study of features of agricultural firms over a given time period. According to Beck and Polit (2010) analysis of secondary data is economical and efficient hence reduces time wastage during data collection as opposed to primary data.

3.7 Data Analysis

Data analysis explores data analysis tools used in the study for instance financial ratios. The panel data collected was quantitatively analysed putting into use multivariate regression. STATA was the mainly analysis tool used by the researcher.

The following regression model was used by the researcher:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \varepsilon_{it} \quad (1)$$

Where: Y_{it} = Dependent variable (Financial Performance)

X_{1it} = Change in financial performance resulting from influence in operational risk.

X_{2it} = Change in financial performance resulting from influence in liquidity risk.

X_{3it} = Change in financial performance resulting from influence in credit risk.

$\beta_1 - \beta_3$ = Regression coefficient for each Independent variable

β_0 = Intercept (value of dependent variable when all independent variables are zero)

ε_{it} = Error Term.

i = Entity

t = Time

3.7.1 Estimation of Panel Data Regression Model

Regression Model Estimation of panel data can be done by models such as Seemingly unrelated regression, fixed effects model and pooled ordinary least square. These models are explained as follows: Seemingly unrelated regression is a set of regression equations that seem unrelated but in reality they are actually related. They are regression equations in which the independent variables are the same but the dependent variables are different. With this model, the error term will be correlated across separate but related regressions. In this way the regression procedure can cause the correlation between the error term to improve the estimates. Fixed Effects Model is a panel data model with a constant slope which differs as per the cross-section. This means that the intercept is different for each entity but each intercept stays constant over time. This model works by using dummy for the intercept. Each cross-sectional entity in the model has its own intercept and dummy variable. The research work may have differences in agricultural firms taking consideration model type. As much as

cross-section intercept may be different in every firm this does not mean it will differ over time. According to Greene (2008) random effect model are meant to correct error by making assumption that the intercept is a random outcome variable. In this model each firm is allowed to have a different intercept but the intercepts are now random variables. It does not assume both autocorrelation and heteroscedasticity in panels to curb instances of covariance matrix being complicated.

3.7.2 Diagnostic Tests

Diagnostic tests are applicable in establishing model and data relevant for study, and ensure efficiency and consistency of the model chosen (Yihua, 2010). The study carried out relevant diagnostic tests on violation of panel error assumptions on normality, heteroscedasticity, autocorrelation and multicollinearity.

3.7.2.1 Test for Normality

Normality is one of the ordinary least square assumptions which asserts that check if the residuals are normally distributed (Oscar, 2007). This study used the probability-probability (P-P) plots for checking if the residuals are normally distributed. In case the P-P plot shows an element of an “S” shape showing that the return on assets is normally (symmetrically distributed) hence okay for further analysis.

3.7.2.2 Test for Multicollinearity

Multicollinearity is a condition in which the explanatory variables are highly correlated (Kumari, 2008). He further states that in a situation of multicollinearity, one of the predictor variables should be dropped as this condition may result in difficulty in model regression due to forecasting error. The study used a correlation matrix to check for high correlation between any pair of independent variables.

3.7.2.3 Test for Stationarity

Levin–Lin–Chu unit-root test is used to test for stationarity. The Levin-Lin-Chu (2002) test assumes that all panel data have the same autoregressive parameters, but allows for both time trend and effect and that the test is done by using the autoregressive process. If the p-value is less than 1, the AR process is stationary and

therefore the series does not contain a unit root. The null hypothesis is that the panel data contain unit root while the alternate hypothesis is that the panel data is stationary. According to Im, Pesaran and Shin (2003) null hypothesis of a unit root is tested against the alternative of at least one stationary series and that transformation is necessary if there is no Stationarity.

3.7.2.4 Hausman Test

Hausman test is used to choose between random effect model and fixed effect model further it distributes itself asymptotically under the null hypothesis. The key concept is that GLS and OLS are in line under null hypothesis and the reverse is not true. It tests for the absence of correlation on regressors and specific tests on individuals. This test is done by comparing critical value to Hausman statistic and the null hypothesis is rejected if the Hausman statistic exceed the critical value. Random effect model is employed if p-value is greater than 0.05.

3.7.2.5 Test for autocorrelation

Autocorrelation is a situation in which the predictor variable is correlated with the error term. The study will employ the use of Wooldridge test to detect the presence of autocorrelation in the model. According to Wooldridge (2002), the test is very attractive as it requires relatively few assumptions and is easy to implement. Further, simulation is performed for various equations as the Wooldridge test is flexible. The test can be used for balanced data and unbalanced data, and for random and fixed effect models. Wooldridge (2002) also asserts that the test has power properties and better size. The presence of serial correlation in a model is indicated by a p-value of less than 0.05 level of significance.

3.7.2.6 Test for Heteroscedasticity

Heteroscedasticity implies the non-constant variance in errors. Heteroscedasticity is mainly due to the presence of outlier in data and also due to omission of variables from the model. It means that the observations that are large or small in line with the observations are present in the sample. Modified Wald test will be conducted for heteroscedasticity test which requires determination of optimal lag. According to Orme and Yamagata (2014)

the condition of heteroscedasticity in a model leads to incorrect conclusion due to model overestimation and the test statistic becoming smaller.

3.7.2.7 Cross-Sectional dependency

According to Baltagi (2005) cross-sectional dependence is a problem in macro panels with long time series and not always a problem in micro panels. The null hypothesis in the Breusch-Pagan Lagrange Multiplier test of independence is that residuals across entities are not correlated. Null hypothesis is accepted when the p-value is greater than 0.05 implying that residuals across entities are not correlated while alternative hypothesis is true when p-value is less than 0.05.

3.7.2.8 Testparm Test

Testparm test was used to confirm if time fixed effects are required when running a fixed effects model. Testparm test is also used to establish if all the years' dummies are equal to zero. The null hypothesis is that coefficient for all the years are jointly equal to zero. If p-value is less than 0.05 the null hypothesis is rejected while if the p-value is greater than 0.05 the null hypothesis is accepted.

3.8 Data Presentation

Data was presented by the use of tables, figures and graphs to enhance clarity and impact. The study also gave a summary of the regression results in form of tables and figures to enhance findings interpretation.

3.9 Ethical Consideration

The study put into consideration ethical standards. The researcher before collecting data obtained authorization from the parent ministry and thereafter registered with Nairobi Securities Exchange and Capital Market Authority in order to access the annual financial reports and financial statements.

CHAPTER FOUR

DATA ANALYSIS, FINDINGS AND CONCLUSION

4.1 Introduction

The chapter presents data analysis, findings and conclusion on the effect of risk on the performance of liquidity risk, operational risk and credit risk in agricultural firms listed on Nairobi Securities Exchange for a period of 10 years between 2009 and 2018. Exploratory data analysis which helped in trend analysis, descriptive statistics such as the measures of central tendency, dispersion, skewness, and kurtosis, and finally the diagnostic tests. the interpretation and discussion of the study findings are also presented in this chapter.

4.2 Exploratory Data Analysis

Exploratory data analysis involves checking if the dependent variable is normally distributed; and if the variables have linear relationships. Cross-sectional analysis requires that the dependent variable should be normally distributed and all the independent variables should not have very high correlations. The exploration involves within firm and between firms' analysis.

4.2.1 Growth Plots

Growth plots was considered in determination of whether time-related fixed effects would be incorporated in the model. Growth plots were drawn for a period of 10 years on the six agricultural firms listed on Nairobi Securities Exchange and the results presented in figure 4.1. The firms yielded positive returns in most cases. The financial performance of the agricultural firms putting into consideration the return on assets reflected varies from firm to firm, the performance is consistent. Firm 1 and firm 4 however, shows a relatively inconsistent financial performance.

FIGURE 4.1

Growth Plots



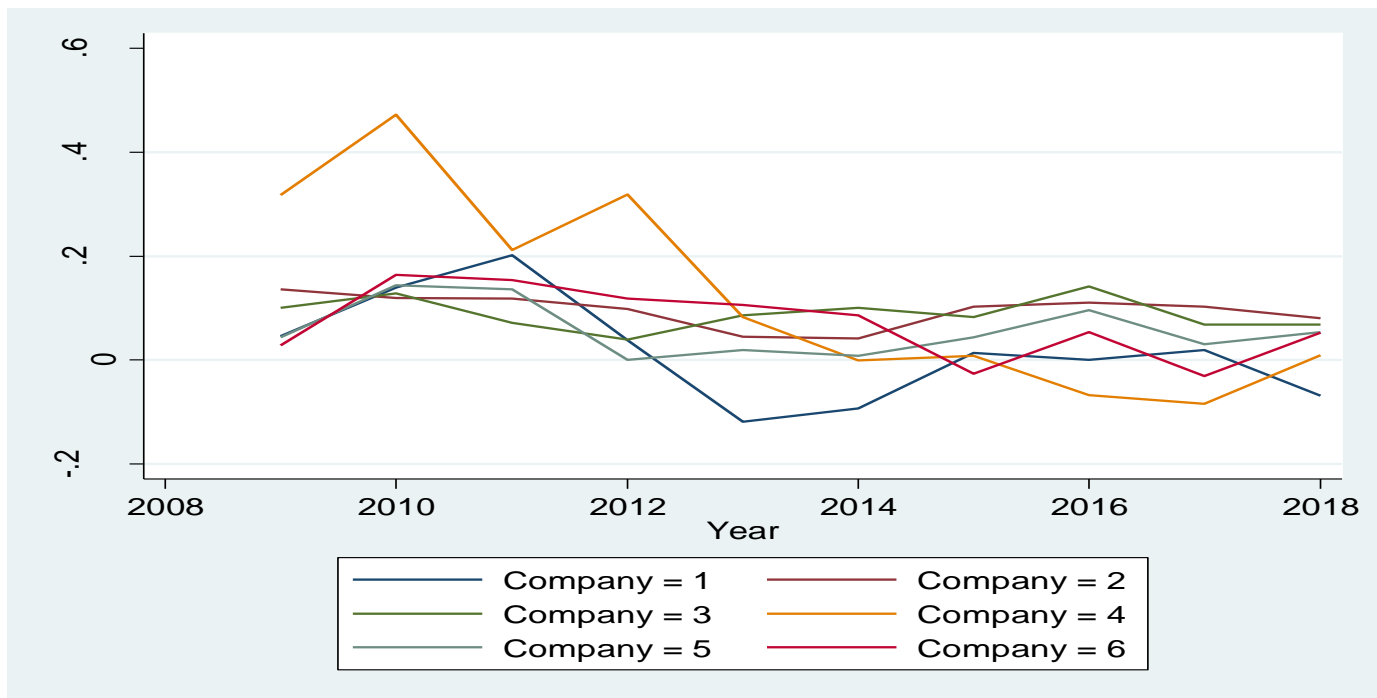
Source: Author (2019)

4.2.2 Overlain Plots

Overlain plots were also considered in determination of whether entity-related fixed effects would be incorporated in the model. They were used to check whether the intercept is the same for firms or varies over firms. Generally, if the plots suggest that the firms have different intercepts, then fixed effects exist hence fixed effects model would be appropriate for the analysis. If the plots show that the variables tend to have same intercept, then random effects exist hence random effects model is appropriate. Overlain plots were equally drawn for the six agricultural firms. The result from figure 4.2 indicates the variables tend to have different intercepts especially company 1 and company 4 hence fixed effects exist thus fixed effects model is preferable.

FIGURE 4.2

Overlain Plots



Source: Author (2019)

4.3 Descriptive Statistics

Descriptive statistics gave a snapshot of the various measures of central tendency, dispersion, skewness, and kurtosis. According to Torres (2009), descriptive statistics are a collection of measurements which determine the location and variability of the variables used in a study. The findings were based on minimum and maximum values which gave the lowest and highest values respectively, standard deviation which established study data spread and mean which determined the central value. The data was strongly balanced as all the six companies had the data for all the ten years of study and had overall, between and within statistics in the findings.

Table 4.1 findings show an average of 7.359438, 0.3320688 and 0.3677859 for operational risk, liquidity risk and credit risk respectively and 7.62278 per cent for return on assets showing there is competition among agricultural firms in terms of profit making. The table in addition shows a fixed number of observations per variable at 60 because of the balanced data. The overall standard deviation for both the dependent and independent variables is higher than the standard deviation between and within the variables as in the case with

return on assets where the overall standard deviation, between standard deviation and within standard deviation is 9.81926 per cent, 3.71298 per cent and 9.20514 per cent respectively. On average the companies are exposed to an operational risk of 7.359438 with a standard deviation of 14.0663. In addition, the companies are exposed to operational risk between -1.197309 and 35.43649. The agricultural companies listed on Nairobi Securities Exchange are also exposed to an average liquidity risk of 0.3320688 with a standard deviation of 0.1127655. The companies are exposed a minimum liquidity risk of 0.1636354 and a maximum liquidity risk of 0.4747609. Further, the companies are exposed to an average credit risk of 0.3677859 with a minimum credit risk of 0.0644805 and a maximum credit risk of 1.095925.

TABLE 4.1

Summary Statistics for study variables

. xtsum Returnonassets Operationalrisk Liquidityrisk Creditrisk

Variable	Mean	Std. Dev.	Min	Max	Observations
Return~s overall	.0762278	.0981926	-.1185341	.4727583	N = 60
between		.0371298	.0177739	.1268325	n = 6
within		.0920514	-.1350827	.4221536	T = 10
Operat~k overall	7.359438	44.49383	-17.85801	339.5041	N = 60
between		14.0663	-1.197309	35.43649	n = 6
within		42.56785	-27.62655	311.4271	T = 10
Liquid~k overall	.3320688	.2576292	.0533023	1.149602	N = 60
between		.1127655	.1636354	.4747609	n = 6
within		.235789	-.0663094	1.091131	T = 10
Credit~k overall	.3677859	.3727489	.0285974	1.465298	N = 60
between		.375589	.064805	1.095925	n = 6
within		.1392601	-.1111522	.7371591	T = 10

Source: Author (2019)

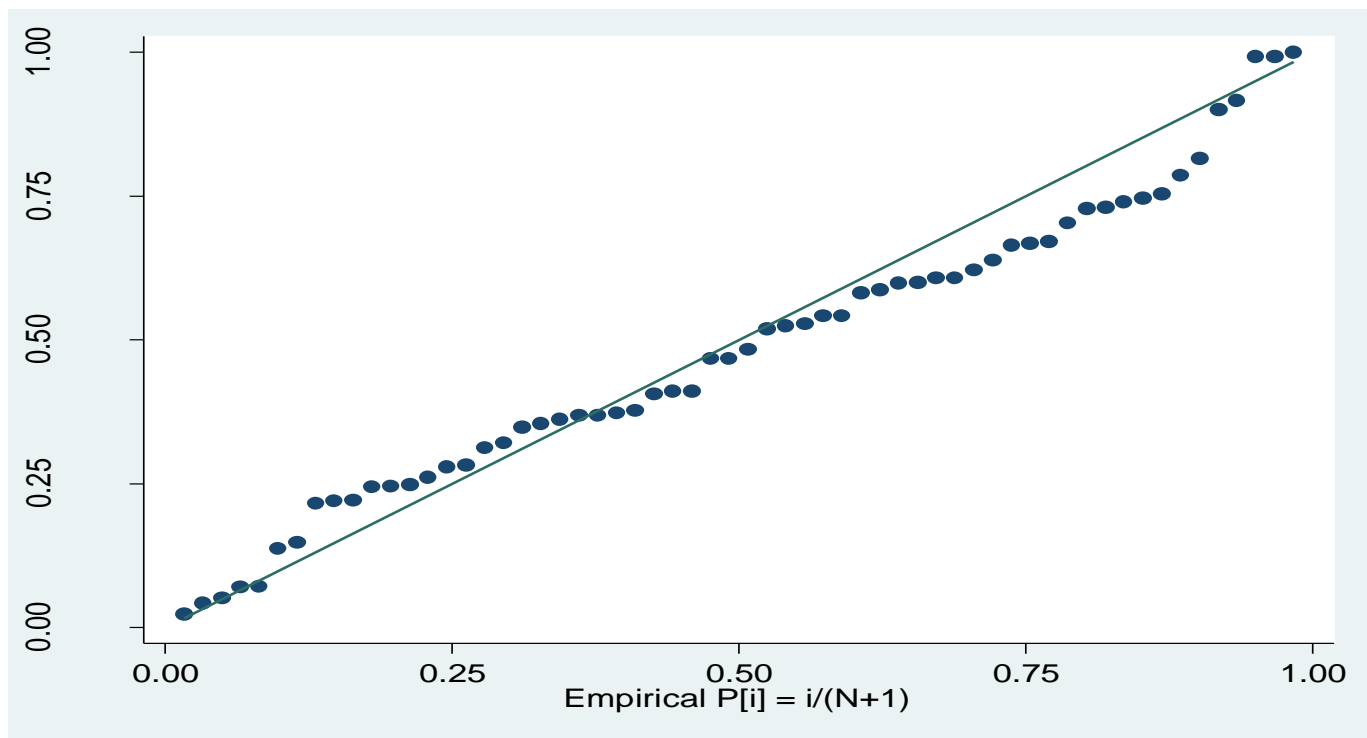
4.4 Diagnostic Tests

4.4.1 Test for Normality of Residuals

Normality test was done to check whether the residuals of the dependent variable are normally distributed. Probability-Probability (P-P) plot was employed in the test. In case the dependent variable had extreme outliers, the form should be changed or the variable should be dropped from the analysis. Test for normality of residuals was carried out and the results as shown in figure 4.3 conclude that the residuals were normally distributed. The S-shape plots showed that the dependent variables were symmetrically distributed.

FIGURE 4.3

P-P Plots



Source: Author (2019)

4.4.2 Test for Multicollinearity

Multicollinearity is a condition in which the explanatory variables are highly correlated and the correlation between any pair of independent variables should not be high as greater than 0.8 (Kumari, 2008). The study

adopted correlation matrix in testing for multicollinearity. Table 4.2 results confirms absence of multicollinearity condition in the fixed effects model. Therefore, all the explanatory variables were used in fitting the fixed effects regression model as all the variables had low standard deviation.

TABLE 4.2

Correlation of Variables

. pwcorr ROA operational Liquidity credit, sig star(0.05)

	ROA	operat~l	Liquid~y	credit
ROA	1.0000			
operational	0.0539 0.6826	1.0000		
Liquidity	-0.2447 0.0595	0.0672 0.6098	1.0000	
credit	-0.0117 0.9293	-0.5854* 0.0000	-0.2018 0.1220	1.0000

Source: Author (2019)

4.4.3 Test for Stationarity

Levin–Lin–Chu unit-root test was used to test for stationarity and assumed that each individual unit in the panel shares the same AR (1) coefficient, but allows for both time trend and time effect and that the test was done using the autoregressive process (Lin & Chu, 2002). The null hypothesis was that all the panel data contain unit root. The table 4.3 below shows an p-value of less than 0.05 implying that the null hypothesis is rejected and the study conclude that the panel data does not contain unit root thus the panel data is stationary.

TABLE 4.3

Levin-Lin-Chu test for Stationarity

```
. xtunitroot llc Returnonassets
```

```
Levin-Lin-Chu unit-root test for Returnonassets
```

```
Ho: Panels contain unit roots          Number of panels =      6  
Ha: Panels are stationary              Number of periods =    10
```

```
AR parameter: Common                  Asymptotics: N/T -> 0  
Panel means:  Included  
Time trend:   Not included
```

```
ADF regressions: 1 lag  
LR variance:      Bartlett kernel, 6.00 lags average (chosen by LLC)
```

	Statistic	p-value
Unadjusted t	-5.6049	
Adjusted t*	-3.9540	0.0000

Source: Author (2019)

4.4.4 Hausman Test

Hausman test was used to determine the regression model between random effect model and fixed effect model. The null hypothesis in Hausman test is that random effect model is preferred over fixed effect model. The null hypothesis is accepted if the p-value is less than 0.05. The random effect model tests the absence of correlation between regressors and individual effects. Table 4.4 below presents a p-value less than 0.05 indicating that the null hypothesis is rejected. The test therefore concludes that fixed effects model is preferred over random effects model implying that the study will adopt a fixed effects model.

TABLE 4.4**Hausman Test Result**

```
. hausman fixed random
```

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fixed	(B) random		
Operationa~k	-.0002621	-.0001838	-.0000783	.
Liquidityr~k	-.0308605	-.0809109	.0500505	.
Creditrisk	-.4622387	-.0954402	-.3667985	.0455133

b = consistent under Ho and Ha; obtained from xtreg

B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

```
chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
          = 63.89
Prob>chi2 = 0.0000
(V_b-V_B is not positive definite)
```

Source: Author (2019)

4.4.5 Test for autocorrelation

Wooldridge test was used to detect the presence of serial correlation in the fixed effects model. Wooldridge test requires relatively few assumptions, is easy to implement and has power properties and better size. The null hypothesis is no of first-order autocorrelation in the fixed effects model. The presence of serial correlation in a model is indicated by a p-value of less than 0.05 significance level. Table 4.5 presents a p-value greater than 0.05 implying that the null hypothesis is accepted. The study therefore, conclude absence of first-order autocorrelation in the fixed effects model. The results on table 4.5 clearly indicate that fixed effects model estimated gives better estimates.

TABLE 4.5

Wooldridge Test for Autocorrelation

. xtserial Returnonassets Operationalrisk Liquidityrisk Creditrisk

Wooldridge test for autocorrelation in panel data

H0: no first-order autocorrelation

$$F(1, 5) = 0.695$$

$$\text{Prob} > F = 0.4425$$

Source: Author (2019)

4.4.5 Test for Heteroscedasticity

Modified Wald test was conducted for heteroscedasticity test which requires determination of optimal lag. Heteroscedasticity test was done to establish variability of error term and to test the presence of outlier in the fixed effects model. Heteroscedasticity condition in a model leads to incorrect conclusion which is due to model overestimation and the test statistic becoming smaller. The null hypothesis is the presence of homoscedasticity in the fixed effects model which also implies a constant variance. Table 4.6 findings show a p-value of 0.0000 which is less than 0.05. The null hypothesis is rejected and the test concludes that there exists a condition of heteroscedasticity. This meant that the model could lead to incorrect conclusion. Robust standard errors test was used to correct the presence of heteroscedasticity in the fixed effects model.

TABLE 4.6

Modified Wald Test for Heteroscedasticity

```
. xttest3
```

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: $\sigma(i)^2 = \sigma^2$ for all i

```
chi2 (6) = 59.41  
Prob>chi2 = 0.0000
```

Source: Author (2019)

4.4.7 Cross-sectional Dependency

Breusch-Pagan Lagrange Multiplier test was used to test for cross-sectional dependency in the fixed effects model. Cross-sectional dependency is mainly a problem in macro panels with long time series and panel data. The null hypothesis in the Breusch-Pagan Lagrange Multiplier test of independence is that residuals across entities are not correlated. Table 4.7 below shows a p-value of greater than 0.05. This imply that the null hypothesis that the residuals across entities are not correlated is accepted.

TABLE 4.7**Cross-sectional Dependency**

Correlation matrix of residuals:

	__e1	__e2	__e3	__e4	__e5	__e6
__e1	1.0000					
__e2	0.5920	1.0000				
__e3	-0.0347	0.1204	1.0000			
__e4	0.1986	0.1689	-0.2672	1.0000		
__e5	-0.1270	-0.7386	-0.3666	0.4040	1.0000	
__e6	0.3526	0.1627	0.3660	0.5492	0.1740	1.0000

Breusch-Pagan LM test of independence: $\chi^2(15) = 19.816$, Pr = 0.1791

Based on 10 complete observations over panel units

Source: Author (2019)**4.4.8 Testparm Test**

Hausman test established existence of fixed effects in in the fixed effects regression model. Testparm test was used to confirm if time fixed effects are required when running a fixed effects model. Testparm test was also used to establish if all the years' dummies are equal to zero. The null hypothesis is that coefficient for all the years are jointly equal to zero. If p-value is less than 0.05 the null hypothesis is rejected. Table 4.8 presents a p-value greater than 0.05 implying that the null hypothesis is not accepted. Therefore, the test established that the coefficient for all the years are not jointly equal to zero hence no time fixed effects are needed in running the fixed effect model.

TABLE 4.8

Testparm Test

(1) 2010.Year = 0
(2) 2011.Year = 0
(3) 2012.Year = 0
(4) 2013.Year = 0
(5) 2014.Year = 0
(6) 2015.Year = 0
(7) 2016.Year = 0
(8) 2017.Year = 0
(9) 2018.Year = 0

F(9, 42) = 2.07
Prob > F = 0.0541

Source: Author (2019)

4.5 Model Fitting

This section presents the output after empirical data analysis. From exploratory data analysis, descriptive statistics, diagnostic tests and model specification tests run, pooled ordinary least square was chosen. Hausman test carried out confirmed the presence of fixed effects in the model. Post estimation tests done however, revealed that the model was affected by heteroscedasticity which violates the ordinary leaner regression assumptions. Robust standard errors test was therefore run to correct the presence of heteroscedasticity in the model as presented in table 4.9 below.

Model:

Financial Performance_{it} = 0.2584095 - 0.0002621 Operational_{it} - 0.0308605 Liquidity_{it} - 0.4622387 Credit_{it}
(0.0527146) (0.000039) (0.0631379) (0.1128804)

The overall objective of the study was to determine the effect of risk on financial performance of agricultural companies listed at the Nairobi Securities Exchange. Table 4.9 results shows p-value of 0.0000 indicating that the fixed effects model was statistically significant. In this case the p-value is less than 0.5 hence we accept the

null hypothesis and conclude that operational risk, liquidity risk and credit risk have a significant effect on the financial performance of the agricultural firms. The study also presents R-squared of 0.1 per cent implying that only 0.1 per cent variations in the financial performance as measured by return on assets are due to operational risk, liquidity risk and credit risk. Holding all other independent variables constant, one unit change in the constant leads to 0.2584095 increase in the financial performance.

The first objective was to establish the effect operational risk on the financial performance of agricultural companies listed on Nairobi Securities Exchange. Table 4.9 findings present the coefficient for operational risk at -0.0002621 with a p-value of 0.001. This suggest that we reject the null hypothesis and conclude that operational risk has significant effect on financial performance of agricultural firms listed on Nairobi Securities Exchange. The result indicates a negative effect of operational risk on financial performance, this implies that an increase in operational risk will lead to a decrease in financial performance of agricultural firms listed on NSE. This result is consistent with Lyambiko (2015) who established that operational risk has a significant negative effect on the financial performance of the banking industry. Further, the findings concur with Kimani (2011) who found out that operational risk negatively affect the financial performance of commercial banks in Kenya. The study contradicts Kimani (2011) that operational risk has a significant effect on financial performance of agricultural companies listed on NSE.

The second objective was to examine the effect of liquidity risk on the financial performance of agricultural companies listed on Nairobi Securities Exchange. The study results show a coefficient for liquidity risk is -0.0308605 with a p-value of 0.646. This suggest that we accept the null hypothesis and conclude that liquidity risk is not significant to financial performance of agricultural firms listed on NSE as the p-value is greater than the significance level of 5 percent. The findings also show that liquidity risk has a negative effect on the financial performance of agricultural companies listed on Nairobi Securities Exchange. The negative relationship implies that an increase in liquidity risk results to a decrease in financial performance of the agricultural firms in Kenya. The finding is consistent with Mahfoudh (2013) which established that liquidity risk has a negative effect on financial performance of agricultural companies listed on NSE. The study also concurs with Mahfoudh (2013)

in concluding that liquidity risk is not statistically significant to financial performance of agricultural companies listed on Nairobi Securities Exchange. The finding further, agrees with Muriithi (2017) who established that liquidity risk has a negative effect on financial performance of agricultural companies listed on Nairobi Securities Exchange. The finding was also in line with Kim (2015) who established that liquidity has a positive impact on financial performance.

The last objective of the study was to determine the affect credit risk on the financial performance of agricultural companies listed on Nairobi Securities Exchange. The findings presented coefficient of -0.4622387 with a p-value of 0.009. The findings show that we reject the null hypothesis and conclude that credit risk has significant effect on financial performance of agricultural companies listed on Nairobi Securities Exchange. The significance of the variable was shown by the p-value of 0.009. The result established that the relationship between credit risk and financial performance is a negative relationship. This implies that an increase in credit risk leads to a decrease in financial performance of the agricultural firms in Kenya. The finding is consistent with Maniagi (2018) who concluded that credit risk has a significant negative effect on the financial performance of commercial banks in Kenya. The finding also agrees with Mutua (2014) who found out that credit risk management practices positively affects financial performance of commercial banks in Kenya. The result is also consistent with Fredrick (2012) all who found out that credit risk negatively affect performance.

TABLE 4.9

Fixed Effect Regression Results

. xtreg Returnonassets Operationalrisk Liquidityrisk Creditrisk, fe robust

```

Fixed-effects (within) regression      Number of obs      =      60
Group variable: Company                Number of groups   =       6

R-sq:  within = 0.5118                 Obs per group: min =      10
      between = 0.5051                               avg =     10.0
      overall = 0.0010                               max =      10

                                          F(3,5)            =     873.31
corr(u_i, Xb) = -0.9142                 Prob > F           =     0.0000
  
```

(Std. Err. adjusted for 6 clusters in Company)

Returnonassets	Robust				
	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
Operationalrisk	-.0002621	.000039	-6.72	0.001	-.0003624 - .0001618
Liquidityrisk	-.0308605	.0631379	-0.49	0.646	-.1931617 .1314408
Creditrisk	-.4622387	.1128804	-4.09	0.009	-.7524071 -.1720703
_cons	.2584095	.0527146	4.90	0.004	.1229023 .3939167
sigma_u	.19868906				
sigma_e	.06917939				
rho	.89187867	(fraction of variance due to u_i)			

Source: Author (2019)

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of major findings of the study, discussions, conclusions, and recommendations together with the areas that require further research. The key objective of the study was to establish the effect of risk on financial performance of agricultural companies listed at the Nairobi Securities Exchange. The study further aimed at determining the effect of operational risk, liquidity risk and credit risk on the financial performance of agricultural companies listed on Nairobi Securities Exchange.

5.2 Summary of Findings

The summary section highlights summary of the findings after data was analysed and diagnostic tests run. The chapter also discuss findings of each research objective and presentation of answers to the research questions.

5.2.1 Operational risk and Financial performance

The first objective was to establish the effect operational risk on the financial performance of agricultural companies listed on Nairobi Securities Exchange. Operational risk was measured by cost-to-income ratio. Operational risks mainly faced by the agricultural companies in Kenya include production risk, marketing risks and human resource management risks. These risks can however be mitigated through a drip irrigation, tile drainage, resistant crop varieties, developing a marketing plan with realistic sales forecasts and target prices and maintaining equipment in good working conditions. The finding of the study was that operational risk has a significant effect on the financial performance of agricultural companies listed on Nairobi Securities Exchange hence the rejection of the null hypothesis. The study, therefore, conclude that operational risk negatively affects the financial performance of agricultural companies listed on Nairobi Securities Exchange hence an increase in operational risk decreases the financial performance of the agricultural firms. The study also concludes that operational risk has a significant effect on financial performance of agricultural firms listed on Nairobi Securities Exchange as the p-value is less than 0.05.

5.2.2 Liquidity risk and Financial performance

The second objective was to examine the effect of liquidity risk on the financial performance of agricultural companies listed on Nairobi Securities Exchange. The study established key liquidity risk to be lack of adequate cash or credit reserves and higher cash demand for personal needs. This risk can be mitigated by monitoring financial ratios and enterprise benchmark and control on unnecessary personal expenditures. The study established that liquidity risk has a negative effect on financial performance of agricultural companies listed on Nairobi Securities Exchange implying that an increase in liquidity risk will result to a decrease in financial performance of the listed agricultural firms. The study however failed to reject the null hypothesis that liquidity risk has no significant effect on the financial performance of agricultural companies listed on Nairobi Securities Exchange.

5.2.3 Credit risk and Financial performance

The last objective of the study was to determine the affect credit risk on the financial performance of agricultural companies listed on Nairobi Securities Exchange. Credit risk facing agricultural companies mainly include counter party risk and default risk. Measures to mitigate credit risk include minimizing exposure through operating on a limited volume and cash and carry basis and having written credit covenants. The null hypothesis was rejected hence the study concluded that credit risk has a negative significant effect on financial performance of agricultural companies listed on Nairobi Securities Exchange. This implies that increase in credit risk leads to a decrease in financial performance of the agricultural firms listed on NSE.

5.3 Conclusions

The conclusions arrived at by the study were based on hypothesis and findings thereafter. The study concluded that generally risk has a significant effect on the financial performance of agricultural companies listed on Nairobi Securities Exchange. The study further concludes that both operational risk and credit risk have significant effect on the financial performance of agricultural companies listed on Nairobi Securities Exchange thus if both operational risk and credit risk are not effectively handled inconsistencies and surprises in agricultural firms' net income may arise. Further, the study concludes that liquidity risk has an insignificant

negative effect on the financial performance on the listed agricultural companies implying that as much as an increase in liquidity risk leads to decrease in financial performance the effect is not statistically significant. In addition, if credit risk is not adequately addressed mainly due to lack of adequate security for funds, the agricultural firms may experience an inverse economic growth.

5.4 Recommendations

The following were recommended taking into consideration the specific objectives and hypothesis of the study.

5.4.1 Operational risk

The study recommends proper guidelines and procedures to be put into place by the agricultural companies' management on operational risk management to ensure risk is well mitigated. Effective lease arrangements also be instituted in order to curb reduction of risk associated with agricultural produce such as the arrangement will enable cost and benefit sharing. The internal audit department should also come up with guidelines on how to curb operational risk such as instituting safety measures and measures of reducing expenditure and operational costs.

5.4.2 Credit risk

The study recommends agricultural companies to come up with credit risk transfer mechanisms such as guarantee scheme, insurance companies and hedging agencies. Credit risk transfer requires effective and efficient arrangements and should be done within the prescribed framework. Further, credit risk in agricultural companies arises mainly due to longer periods of receivables and writing-off of bad debts, the study therefore recommends that receivable time frame be reduced. The agricultural companies should also embrace risk mitigation through adequate internal controls, policies and systems. This can be done through the use of risk matrix and imagining situations without having internal controls into place and also that credit facility should be offered in a cautionary manner. Agricultural company managers to establish the effect of banks credit policies on the firms' profitability in order to ensure proper operationalization and management of credit risk.

5.5 Limitation of the Study

Limitation on scope as the study was only conducted on agricultural firms listed on Nairobi Securities Exchange. Most agricultural firms were therefore not covered especially unlisted agricultural firms. The study was also limited to only six agricultural firms listed on Nairobi Securities Exchange. One firm was delisted from Nairobi Securities Exchange hence not incorporated for the study. Finally, the study was also limited to the secondary data extracted from the annual reports and financial statements for the individual agricultural firms and from Nairobi Securities Exchange. Further research should therefore focus on primary data for agricultural companies. Further

5.6 Areas for Further Research

Return on asset was used as a measure of financial performance. In the future another study should be conducted incorporating other measures of performance such as return on equity to investigate whether the relationship will hold. The study was only done on agricultural companies listed on Nairobi Securities Exchange for a period of only ten years i.e., between 2009 to 2018. The study therefore recommends that further research be done on unlisted agricultural firms for a time period longer than ten years using primary data. Further studies should also be done on risk management practices employed by agricultural companies in Kenya. Finally, the study only concentrated on internal analysis of risk listed agricultural firms in Kenya are exposed to. The study therefore recommends that future research should be on external analysis of listed agricultural firms in Kenya.

REFERENCES

- Abid, F., & Mseddi, S. (2004). *The impact of operating and financial leverages and intrinsic business risk on firm value*. Available at SSRN 942029
- African Development Bank (2010). *Agriculture & Agro-Industries*, Retrieved from <https://www.afdb.org/en/topics-and-sectors/sectors/agriculture-agro-industries/>
- Aduda, J. & Kalunda E. (2012). Financial inclusion and financial sector stability with reference to Kenya. *Applied Finance and Banking*. 2(1792-6580), 95-120.
- Ahmed, A., A., & Nauman, A., A. (2012). Liquidity risk and performance of banking system. *Journal of Financial Regulation and Compliance*, 20(2), 182-195.
- Ahmed, M. B. (2009). Measuring the Performance of Islamic Banks by Adapting Conventional methods: *Journal of Financial Regulation and Compliance*.
- Awojobi, O. (2011). Analysing risk management in banks: Evidence of bank efficiency and macroeconomic impact. *Journal of Money, Investment and Banking*, (22).
- Babbel, D.F. & Santomero, A.M. (2006). *Risk Management by Insurers: An Analysis of the Process, Portfolios*.
- Baldwin, C. Y., & Mason, S. P. (1983). The resolution of claims in financial distress the case of Massey Ferguson. *The Journal of Finance*, 38(2), 505-516.
- Baltagi, B. (1995). *Econometrics analysis of panel data*. England: John Wiley and Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex PO19 8SQ.
- Baltagi, B.H. (2005). *Econometric Analysis of Panel Data*. England: John Wiley and Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex PO19 8SQ.

- Banks, E. (2004). *Alternative Risk Transfer: Integrated Risk Management Through Insurance, Re-insurance and the Capital Markets*, John Wiley & Sons Ltd.
- Barton, T. L., Shenkir, W. G., and Walker, P. L. (2002), *Making Enterprise Risk Management Pay Off: How Leading Companies Implement Risk Management*, Financial Times/Prentice Hall, Upper Saddle River, NJ.
- Basel Committee on Banking Supervision, (2004), *Principles for the Home-Host Recognition of AMA Operation Risk Capital*.
- Bessis, J. (2010). *Risk Management in Banking*, New York: John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex PO19 8SQ.
- Bettis, R. (1983), *Modern Financial Theory, Corporate Strategy and Public Policy: Three Conundrums*, *Academy of Management Reviews*, 8,406-414
- Bhunia, A. & Khan, I.U. (2011). *Liquidity Management Efficiency of Indian Steel Companies: A Case Study*.
- Boermans, M. A. (2011). *Firm Performance under Financial Constraints and Risks: Recent Evidence Micro Finance Clients in Tanzania*, HU University of Applied Science Utrecht.
- Borg, W. R., & Gall, M. D. (2003). *Educational Research: An Introduction* (Fifth ed.). New York: Longman.
- Boritz, J.E. (1991). *The Going concern assumptions. Accounting and Auditing complications*: Toronto: Canadian Institute of Chartered Accountants.
- Breitung, J. (2000). *The local power of some unit root tests for panel data*. In *Advances in Econometrics*, Volume 15: Nonstationary Panels, Panel Cointegration, and Dynamic Panels, ed. B. H. Baltagi, 161-178. Amsterdam: JAI Press.
- Breusch, T.S. & A.R. Pagan (1980). "The Lagrange Multiplier Test and Its Applications to Model Specification in Econometrics," *Review of Economic Studies*, 47(1), 239-253

- Burns, N., & Grove, S. (2003). *Understanding nursing research* (3rd ed.). Philadelphia, Pennsylvania: W.B. Saunders Company.
- Cao, K.H., & Birchenall, J. A. (2013). Agricultural productivity, structural change, and economic growth in Capital Budgets. *Review of Economics and Statistics*, 47 (1), 13-37.
- Carey, A. (2001), Effective Risk Management in Financial Institutions: The Turnbull Approach, *Balance Sheet*, 9 (3), 24-27.
- Clarke, R., Davies, S., & Waterson, M. (1984). *The profitability-concentration relation: market power or* College of Business, Massey University.
- Davidson, Russell; MacKinnon, James G. (2004). *Econometric Theory and Methods*. New York: Oxford
- Eckles, D. L., Hoyt, R. E., & Miller, S. M. (2014). *The impact of enterprise risk management on the marginal cost of reducing risk*. Evidence from the insurance industry. *Journal of Banking & Finance*.
- Economic survey. (2014). Leading Economic Indicators 2014. Retrieved from efficiency? *The Journal of Industrial Economics*, 435-450.
- Epetimehin F. M., & Obafemi F. (2015). *Operational risk management and the financial sector development: An overview*. *International Journal of Economics, Commerce and Management*. United Kingdom Vol. III (3), <http://ijecm.co.uk/>
- Fan, L. & Yijun, Z. (2014). *The Impact of Credit Risk Management on Profitability of Commercial Banks*, London: Umeå School of Business and Economics
- FAO, 2010b, Greenhouse gas emission from dairy sector: A life cycle assessment, Food and Agriculture Far East Journal of Psychology and Business, 3(3), 3-13.

- Foltz, J. (2016). Credit market constraints and profitability in Tunisian Agriculture: University of Connecticut.
- Fredrick, O. (2012). The impact of credit risk management on financial performance of commercial banks in Kenya. *DBA Africa Management Review*, 3(1), 22-37.
- Gachua, N. F. (2011). *The effect of foreign exchange exposure on a Firm's financial performance: a case of listed companies in Kenya* (Doctoral dissertation, KCA University).
- Gatsi, J. G., Gadzo, S. G., & Akoto, R. K. (2013). Degree of Financial and Operating Leverage and Profitability
- Gold, G. (1999). The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and return maximization
- Gossy, G., (2008), *A Stakeholder Rationale for Risk Management: Implications for Corporate Finance Decisions*, Google Books.
- Government of Kenya (2011). Kenya National Assembly Official Record (Hansard). GoK
- Government of Kenya (2010). Agricultural Sector Development Strategy 2010-2020. GoK
- Greene, W.H. (2012). *Econometric analysis*, (7th ed.) Prentice hall, Upper Saddle River, NJ.
- Gujarati, D. N. (2003). *Basic Econometrics*. 4th. New York: McGraw-Hill.
- Im, K. S., M. H. Pesaran, and Y. Shin. 2003. Testing for unit roots in heterogeneous panels. *Journal of Econometrics* 115: 53-74.
- Iqbal Z. & Mirakhor A. (2007). *An Introduction to Islamic Finance: Theory and Practice*, 2nd Edition. Issues. In print. Nairobi, KE: Acts Press.

- Iyakaremye, A. (2015). *Analysis of financial performance and financial risk in agricultural companies listed on the Nairobi Securities Exchange*. Unpublished master's thesis, United States International university, Africa
- Jolly, K. (2007). *Counterparty Credit Risk Modelling: Risk Books*. Incisive Media, London. *Journal of Risk of Nairobi*.
- Kadi, A.M. (2003). Basic Conditions and Procedures in Insurance. *The Accountant*, 13 (3), 16-19.
- Kenya National Bureau of Statistics (2011). "The Agricultural Sector in Kenya"
- Kim, C. (2015). Liquidity risk regulation and bank performance. Evidence from European bank. *Global Economy and Finance Journal*, 8 (1), 11 – 33.
- Kiochos, P. (2007). *Principles of Risk Management and Insurance*. 8th Edition, Pearson Education, New York.
- Koch, T., & MacDonald, S. (2014). *Bank management*. Nelson Education.
- Kolapo, T., & Dapo, F. (2015). The influence of interest rate risk on the performance of deposit money banks in Nigeria. *International Journal of Economics, Commerce and Management*, 3(5), 1219- 1229.
- Levin, A., Lin, C., & Chu C. (2002). Unit root tests in panel data: Asymptotic and nite-sample properties. *Journal of Econometrics*, 108, 1-24.
- Lin, C. & Tseng, H. (2006), "Identification the pivotal role of participation strategies and Information technology application for supply chain excellence", *Industrial Management & Data system* (Vol. 106 No. 5, pp. 739-56).
- Lyambiko, M. (2015). *The effect of operational risk management practices on the financial performance in commercial banks in Tanzania*. Unpublished MBA thesis, Nairobi: University of Nairobi.

- Maaka, A. (2013). *Relationship between liquidity risk and financial performances of commercial banks in Kenya*. unpublished MSc thesis, Nairobi: University of Nairobi.
- Magezi, J.K. (2003). A New Framework for Measuring the Credit Risk of a Portfolio. *Institute for Monetary and Economic Studies (IMES)*, 1-45.
- Mahfoudh, O. (2013). *Effect of selected firm characteristics on financial performance of firms listed in the agricultural sector at the Nairobi Securities Exchange*. Unpublished MSc thesis, Nairobi: University of Nairobi.
- Maniagi, G. (2018). *Influence of financial risk on financial performance of commercial banks in Kenya* (Doctoral Dissertation, Jomo Kenyatta University of Agriculture and Technology).
- Mbubi, A. M. (2013). The effect of foreign exchange rates on the financial performance of firms listed at the McGraw-Hill, Irwin.
- Merton, R.C. (2005). A Functional Perspective of Financial Intermediation, *Financial Management Journal*, 24-26
- Mikes A. & R.S Kaplan. (2014). Towards a contingency. Theory of Enterprise Risk Management. *Working Paper* 13-063.
- Miles A., 2010. Risk factors of business models: Understanding the five forces of entrepreneurial risk and causes of business failure, Boca- Raton, USA.
- Mugenda, O., & Mugenda, A. (2003). *Research Methods: Quantitative and Qualitative Approaches*. Nairobi: Acts Press.
- Muriithi, J. (2016). *The effect of financial risk on financial performance of commercial banks in Kenya*, (Doctoral Dissertation, Jomo Kenyatta University of Agriculture and Technology).
- Mutua, J. M. (2015). Effect of Mitigating Credit Risk on Performance of Commercial Banks in Kenya: A Case of Chuka Town. *European Journal of Business and Social Sciences*, 4(7), 113 – 125

- Nairobi Securities Exchange (NSE). (2018). *Listed Companies*. Retrieved September 20, 2028, from Nairobi Securities Exchange web site: <https://www.nse.co.ke/listed-companies/list.html>
- Nairobi Securities Exchange (NSE). (2015). *The 2014 –2015 handbook*. Nairobi: Government Printers.
- Niv, S. (2005). The Effect of Capital Structure on Profitability: An Empirical Analysis of Listed Firm in Ghana.
- Nyoro J.K, Wanjala, M. & Awour, T. (2012). Increasing Kenya’s Agricultural Competitiveness: Farm Level of Insurance Firms in Ghana. *International Business and Management Journal*, 7(2), 57-65.
- Ogol, G.O. (2011). *Liquidity Risk Management practices in Microfinance Institutions in Kenya*. (Unpublished Doctoral dissertation). University of Nairobi, Kenya.
- Olsson, R., (2008), Risk Management in a Multi-Project Environment: An Approach to Manage Portfolio Risks, *International Journal of Quality & Reliability Management*, 25 (1), 60–71.
- Okoth, H. (2006). Corporate Risk Management: Costs and Benefits. *Global Finance Journal*, 13 (1), 29-38.
- Omaseti, C. (2014). *The effect of risk management on financial performance of insurance companies in Kenya*. Unpublished MSc thesis, Nairobi: University of Nairobi.
- Orme, C., & Yamagata, T. (2014). Heteroskedasticity-Robust F-Test Statistic for Individual Effects. *Econometric Reviews*, 33(5-6), 431-471.
- Oscar, T. (2007). *Panel data analysis fixed and random effects using Stata (V. 4.2)*. Princeton University: Data and Statistical Services.
- Phillips, P., & Perron, P., (1988). Testing for a unit root in time series regression. *Biometrika*, 75, 335–346.

- Polit, D. F., & Beck, C. T. (2010). Generalization in quantitative and qualitative research: myths and strategies. *International journal of nursing studies*, 47(11), 1451-1458.
- PriceWaterHousecoopers PWC (2011). The Heat Online: Agricultural Companies in Kenya, Retrieved from <http://www.pwc.com/ke/en/Industries/agriculture.jhtml>.
- Quach, M. (2005). Problems in Managing Internal Development Projects in Multi-Project Environments, *International Journal of Project Management*, 21, 395-402
- Rejda, G. E. (2008). Principles of Risk Management and Insurance, Prentice Hall, 10th Ed.
- Republic of Uganda (2010). Ministry of Agriculture, Animal Industry & Fisheries. Agriculture for Food and
review, 20(2), 174-182.
- Runo, F. N. (2013). Relationship between foreign exchange risk and profitability of oil Companies listed in the Nairobi Securities Exchange. *Unpublished MBA Project*, University of Nairobi.
- Safdar, M.Z., Awan, M.Z., Ahmed, Z., Qureshi, M.I., & Hasnain, T., (2016). *International Journal of Economics and Financial Issues*, 6(2) 144-15.
- Santomero, A. M. (1997). Commercial Banking Risk Management: An Analysis of the Process. *Journal of Financial Services Research*, 12(2),83-115
- Saunders, A. & Cornett, M.M. (2008). Financial Institutions Management: *A Risk Management Approach*,
Services Research, 12(2), 83-115.
- Sharpe, W. F. (1964), Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk, *The Journal of Finance*, 19(3), 425-442.
- Simiyu, R.S. (2008) A Survey of Techniques of Credit Risk Management in Micro-Finance Institutions in Kenya, *Unpublished MBA Project*, University of Nairobi.

Standard & Poor's (2013). Ratings services EU Group of Credit Rating Agencies Transparency Report.

Stulz, R., (2003), *Rethinking Risk Management: The Revolution in Corporate Finance (4th Edition)*, Blackwell Publishing: 367-384.

Tripe, D. (1998). *Cost to income ratios in Australasian banking*. Department of Finance, Banking and Property, College of Business, Massey University.

Wachiaya, J. (2011). *A survey of market risk management techniques by commercial banks in Kenya and their suitability in mitigating financial loss* (Doctoral dissertation, University of Nairobi, Kenya).

Walker, D. (2001). *Exploring the Human Capital Contribution Production, Profitability and the Market Evaluation of the Firm*, Retrieved from lib.Umi.com: [http:// www.lib.Umi.com/ dissertations](http://www.lib.Umi.com/dissertations).

Wang, P. (2008). *How to Evaluate Performance of Government Agency: A manual for Practitioners*. World Bank.

Whitaker, R. B. (1999). The early stages of financial distress. *Journal of Economics and Finance*, 23(2), 123-132.

Wong, T. C., Wong, J., & Leung, P. (2009). The foreign exchange exposure of Chinese banks. *China economic review*, 20(2), 174-182.

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data*. Cambridge, MA: MIT press.

Worzala, E. (1995). Currency risk and international property investments. *Journal of Property valuation and Investment*, 13(5), 23-38.

Wruck, K. H. (1990). Financial distress, reorganization, and organizational efficiency. *Journal of financial economics*, 27(2), 419-444.

APPENDICES

APPENDIX I: LISTED AGRICULTURAL FIRMS AT NSE

1. Eaagads Limited
2. Kakuzi Limited
3. Kapchorua Tea Company Limited
4. Limuru Tea Company Limited
5. Sasini Limited
6. Williamson Tea Kenya Limited

APPENDIX II: INTRODUCTION LETTER

NAIROBI SECURITIES EXCHANGE

P.O. BOX 43633-00100

NAIROBI, KENYA

Dear Respondent,

RE: EFFECT OF RISK ON FINANCIAL PERFORMANCE OF AGRICULTURAL COMPANIES LISTED ON NAIROBI SECURITIES EXCHANGE.

I am masters of science commerce degree student at KCA University currently undertaking a research thesis on the **Effect of Risk on Financial Performance of Agricultural Companies listed on Nairobi Securities Exchange**. The research thesis is a requirement for partial fulfillment for the award of the master's degree.

Your institution has been selected as one of the respondents. The purpose of this letter is to request for the annual reports and financial statements of agricultural firms listed on your institution from the year 2009 to 2018. The information collected will be purposely for academic research and confidentiality requirements will be adhered to while handling the information.

I wish your institution all the best and I look forward for a positive response.

Yours sincerely

Daniel Okello Omogi

Email: domogidan@gmail.com

Cell: 0715475134

APPENDIX III: DATA COLLECTION FORM

Variable	Description	Years									
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Operational Risk											
Cost-to-income ratio	Operating Costs										
	Net Income										
	$\frac{\text{Operating Costs}}{\text{Net Income}}$										
Liquidity Risk											
Current Ratio	Current Assets										
	Current Liabilities										
	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$										
Credit Risk											
Receivable turn-over	Credit Sales										
	Account Receivable										
	$\frac{\text{Credit Sales}}{\text{Accounts receivable}}$										
Financial Performance											
Return on Assets	Net Income										
	Total Assets										
	$\frac{\text{Net Income}}{\text{Total Assets}}$										

Company	Year	Revenue	Op. costs	N.I	C.A	Receivables	T.A	C.L	T.E
Eaagads Ltd	2018	83,696	30,488	(62,527)	118,928	10,589	905,895	13,554	816,165
Eaagads Ltd	2017	140,224	41,746	18,107	147,539	9,220	922,802	11,500	850,586
Eaagads Ltd	2016	126,012	31,428	477	116,384	8,608	761,165	20,317	691,936
Eaagads Ltd	2015	101,468	30,068	8,163	43,178	7,851	615,426	48,375	534,200
Eaagads Ltd	2014	95,635	30,921	(41,684)	33,001	7,094	445,793	37,938	360,452
Eaagads Ltd	2013	68,025	19,027	(59,215)	47,242	6,087	499,561	35,475	402,136
Eaagads Ltd	2012	157,075	20,557	21,805	84,987	6,566	573,356	4,530	481,449
Eaagads Ltd	2011	184,597	17,528	71,784	86,803	5,279	354,922	14,604	266,245
Eaagads Ltd	2010	142,593	24,897	42,987	65,037	5,039	308,184	9,578	235,116
Eaagads Ltd	2009	120,298	18,645	11,838	41,887	4,896	260,061	6,250	194,461
Kakuzi Ltd	2018	3,152,831	942,568	481,594	2,316,917	360,786	5,941,042	389,964	4,669,476
Kakuzi Ltd	2017	2,823,926	597,948	591,643	2,407,204	291,505	5,746,126	616,900	4,322,036
Kakuzi Ltd	2016	2,651,199	620,635	562,425	2,049,347	266,150	5,064,414	416,738	3,846,258
Kakuzi Ltd	2015	2,481,844	655,224	459,714	1,640,706	255,692	4,458,075	369,210	3,375,897
Kakuzi Ltd	2014	1,689,917	487,376	160,205	1,181,085	129,888	3,857,454	177,421	2,984,728
Kakuzi Ltd	2013	1,384,375	355,387	165,028	1,170,655	173,147	3,717,543	147,181	2,904,028
Kakuzi Ltd	2012	1,564,792	417,975	349,466	1,237,473	274,505	3,571,700	146,023	2,801,225
Kakuzi Ltd	2011	1,560,149	355,981	453,567	1,174,645	97,483	3,817,320	351,157	2,756,765
Kakuzi Ltd	2010	2,113,774	443,270	385,379	795,570	122,557	3,218,591	383,679	2,210,504
Kakuzi Ltd	2009	2,008,157	337,596	390,295	618,438	128,116	2,873,255	304,131	1,964,609
Kapchorua	2018	1,429,341	179,292	169,567	1,096,632	767,474	2,489,043	375,599	1,671,619
Kapchorua	2017	1,292,123	123,086	138,351	788,704	427,311	2,030,309	227,766	1,415,502
Kapchorua	2016	1,209,133	122,292	302,941	895,577	464,255	2,144,587	210,298	1,514,215
Kapchorua	2015	1,073,989	107,997	163,340	644,264	397,960	1,983,239	114,444	1,427,679
Kapchorua	2014	1,192,489	110,585	194,936	621,620	263,775	1,929,161	121,855	1,380,665
Kapchorua	2013	1,353,206	113,566	179,718	823,337	314,439	2,078,475	388,985	1,284,013
Kapchorua	2012	1,406,794	112,620	77,968	751,690	427,509	1,962,397	456,395	1,133,635
Kapchorua	2011	1,246,636	93,647	113,196	575,942	277,585	1,570,203	274,093	976,397
Kapchorua	2010	1,130,108	82,812	192,842	678,761	387,771	1,498,931	413,617	818,732
Kapchorua	2009	743,079	64,744	117,774	347,641	139,227	1,167,797	206,571	689,260
Limuru Tea	2018	108,768	7,659	2,548	159,521	137,682	268,255	45,550	193,126

Limuru Tea	2017	80,370	5,606	(22,134)	140,277	117,766	262,009	39,439	187,778
Limuru Tea	2016	103,915	7,248	(19,074)	144,218	120,865	282,193	27,920	205,712
Limuru Tea	2015	122,374	7,456	2,547	163,565	154,573	313,768	28,187	229,868
Limuru Tea	2014	92,250	5,911	(331)	132,008	123,983	307,654	16,331	227,822
Limuru Tea	2013	104,192	5,496	28,513	138,682	127,565	342,917	8,131	260,346
Limuru Tea	2012	116,012	4,215	101,833	130,762	123,507	320,023	10,537	242,233
Limuru Tea	2011	102,504	6,029	40,484	100,341	90,400	191,242	5,487	149,710
Limuru Tea	2010	123,859	4,482	74,840	89,227	82,993	158,305	11,196	119,327
Limuru Tea	2009	91,130	3,829	26,969	65,751	56,226	84,794	17,138	55,963
Sasini Ltd	2018	1,076,088	397,706	417,625	1,526,576	253,451	7,719,419	116,604	7,197,797
Sasini Ltd	2017	1,705,553	392,702	235,057	1,502,070	541,917	7,742,374	289,487	7,064,333
Sasini Ltd	2016	1,296,513	377,079	749,180	1,534,142	140,863	7,753,027	200,241	7,169,666
Sasini Ltd	2015	723,897	388,806	306,181	847,294	205,944	7,077,764	177,972	6,694,519
Sasini Ltd	2014	478,897	287,102	73,962	766,965	292,425	8,708,766	623,231	7,426,195
Sasini Ltd	2013	478,897	287,102	73,962	758,926	234,541	3,936,553	666,157	2,708,642
Sasini Ltd	2012	859,636	288,918	851	528,033	183,392	3,705,119	378,114	2,780,348
Sasini Ltd	2011	753,657	251,886	559,130	511,243	121,619	4,090,598	385,755	3,003,066
Sasini Ltd	2010	564,553	254,220	551,383	639,053	116,885	3,834,665	351,056	2,619,695
Sasini Ltd	2009	597,384	250,179	139,801	523,617	108,260	3,223,522	223,905	2,152,847
Williamson	2018	3,984,971	651,555	502,769	3,657,136	2,093,446	9,505,074	1,224,956	6,847,357
Williamson	2017	3,416,340	472,628	(261,593)	3,013,119	1,367,623	8,364,127	867,813	6,094,272
Williamson	2016	3,386,015	471,365	482,747	3,380,625	1,287,562	8,931,395	682,091	6,714,337
Williamson	2015	2,590,416	407,086	(227,636)	2,749,449	1,142,542	8,558,558	320,264	6,583,036
Williamson	2014	3,512,086	443,537	740,721	2,719,443	860,011	8,558,558	322,353	6,580,527
Williamson	2013	3,460,681	416,745	855,659	2,684,364	873,471	8,023,834	738,619	5,858,257
Williamson	2012	3,607,409	423,442	854,740	2,447,223	1,215,558	7,243,227	1,017,203	4,945,056
Williamson	2011	3,284,909	374,862	884,385	2,031,964	830,866	5,737,928	687,396	4,271,228
Williamson	2010	2,723,187	304,202	876,055	1,929,587	997,081	5,328,706	948,494	3,470,481
Williamson	2009	1,489,982	255,809	109,870	915,042	498,190	3,921,165	490,105	2,629,451

Company	Year	Operational risk	Liquidity risk	Credit risk	Return on equity
Eaagads Limited	2018	0.0337	0.1140	0.1265	(0.0690)
Eaagads Limited	2017	0.0452	0.0779	0.0658	0.0196
Eaagads Limited	2016	0.0413	0.1746	0.0683	0.0006
Eaagads Limited	2015	0.0489	1.1204	0.0774	0.0133
Eaagads Limited	2014	0.0694	1.1496	0.0742	(0.0935)
Eaagads Limited	2013	0.0381	0.7509	0.0895	(0.1185)
Eaagads Limited	2012	0.0359	0.0533	0.0418	0.0380
Eaagads Limited	2011	0.0494	0.1682	0.0286	0.2023
Eaagads Limited	2010	0.0808	0.1473	0.0353	0.1395
Eaagads Limited	2009	0.0717	0.1492	0.0407	0.0455
Kakuzi Limited	2018	0.1587	0.1683	0.1144	0.0811
Kakuzi Limited	2017	0.1041	0.2563	0.1032	0.1030
Kakuzi Limited	2016	0.1225	0.2034	0.1004	0.1111
Kakuzi Limited	2015	0.1470	0.2250	0.1030	0.1031
Kakuzi Limited	2014	0.1263	0.1502	0.0769	0.0415
Kakuzi Limited	2013	0.0956	0.1257	0.1251	0.0444
Kakuzi Limited	2012	0.1170	0.1180	0.1754	0.0978
Kakuzi Limited	2011	0.0933	0.2989	0.0625	0.1188
Kakuzi Limited	2010	0.1377	0.4823	0.0580	0.1197
Kakuzi Limited	2009	0.1175	0.4918	0.0638	0.1358
Kapchorua Tea Company LTD	2018	0.0720	0.3425	0.5369	0.0681
Kapchorua Tea Company LTD	2017	0.0606	0.2888	0.3307	0.0681
Kapchorua Tea Company LTD	2016	0.0570	0.2348	0.3840	0.1413
Kapchorua Tea Company LTD	2015	0.0545	0.1776	0.3705	0.0824
Kapchorua Tea Company LTD	2014	0.0573	0.1960	0.2212	0.1010
Kapchorua Tea Company LTD	2013	0.0546	0.4724	0.2324	0.0865
Kapchorua Tea Company LTD	2012	0.0574	0.6072	0.3039	0.0397
Kapchorua Tea Company LTD	2011	0.0596	0.4759	0.2227	0.0721
Kapchorua Tea Company LTD	2010	0.0552	0.6094	0.3431	0.1287
Kapchorua Tea Company LTD	2009	0.0554	0.5942	0.1874	0.1009
Limuru Tea Company LTD	2018	0.0286	0.2855	1.2658	0.0095
Limuru Tea Company LTD	2017	0.0214	0.2812	1.4653	(0.0845)
Limuru Tea Company LTD	2016	0.0257	0.1936	1.1631	(0.0676)
Limuru Tea Company LTD	2015	0.0238	0.1723	1.2631	0.0081
Limuru Tea Company LTD	2014	0.0192	0.1237	1.3440	(0.0011)
Limuru Tea Company LTD	2013	0.0160	0.0586	1.2243	0.0831
Limuru Tea Company LTD	2012	0.0132	0.0806	1.0646	0.3182
Limuru Tea Company LTD	2011	0.0315	0.0547	0.8819	0.2117
Limuru Tea Company LTD	2010	0.0283	0.1255	0.6701	0.4728
Limuru Tea Company LTD	2009	0.0452	0.2607	0.6170	0.3181
Sasini LTD	2018	0.0515	0.0764	0.2355	0.0541
Sasini LTD	2017	0.0507	0.1927	0.3177	0.0304
Sasini LTD	2016	0.0486	0.1305	0.1086	0.0966
Sasini LTD	2015	0.0549	0.2100	0.2845	0.0433
Sasini LTD	2014	0.0330	0.8126	0.6106	0.0085
Sasini LTD	2013	0.0729	0.8778	0.4898	0.0188
Sasini LTD	2012	0.0780	0.7161	0.2133	0.0002
Sasini LTD	2011	0.0616	0.7545	0.1614	0.1367
Sasini LTD	2010	0.0663	0.5493	0.2070	0.1438
Sasini LTD	2009	0.0776	0.4276	0.1812	0.0434
Williamson Tea Kenya LTD	2018	0.0685	0.3349	0.5253	0.0529
Williamson Tea Kenya LTD	2017	0.0565	0.2880	0.4003	(0.0313)
Williamson Tea Kenya LTD	2016	0.0528	0.2018	0.3803	0.0541
Williamson Tea Kenya LTD	2015	0.0476	0.1165	0.4411	(0.0266)
Williamson Tea Kenya LTD	2014	0.0518	0.1185	0.2449	0.0865
Williamson Tea Kenya LTD	2013	0.0519	0.2752	0.2524	0.1066
Williamson Tea Kenya LTD	2012	0.0585	0.4157	0.3370	0.1180
Williamson Tea Kenya LTD	2011	0.0653	0.3383	0.2529	0.1541
Williamson Tea Kenya LTD	2010	0.0571	0.4916	0.3661	0.1644
Williamson Tea Kenya LTD	2009	0.0652	0.5356	0.3344	0.0280