FIRM CHARACTERISTICS AND OPERATIONAL EFFICIENCY OF AGRICULTURAL FIRMS LISTED AT NAIROBI SECURITIES EXCHANGE IN KENYA

WAWIRE ABRAHAM KISEMBE

17/00548

A RESEARCH DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER OF SCIENCE IN COMMERCE AT THE COLLEGE OF BUSINESS IN KCA UNIVERSITY

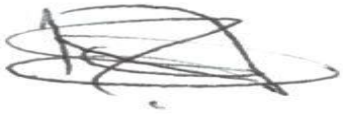
2021

DECLARATION

I declare that to the best of my knowledge; this dissertation is my original work and contains no material previously published by or written by another person except when due reference is made and the author duly acknowledged

ABRAHAM KISEMBE WAWIRE

17/00548



5TH JUNE 2021

Signature..... Date.....

I do here by confirm that I have examined the master's dissertation of

WAWIRE ABRAHAM KISEMBE

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

Name **DR MICHAEL NJOGO**

Signature.....  Date..10/06/2021

Project Supervisor

College of Business

KCA University

ABSTRACT

Operational efficiency is the ratio of average outputs to average inputs and firms streamline their core processes in order to reduce waste and improve the capacity of its resource base in order to produce goods of superior quality and offer better services. Firm characteristics such as capital structure, firm size, firm age, number of employees, liquidity, turnover, growth in sales and assets produce positive effects on operational efficiency. Nairobi securities exchange promotes economic development by mobilising savings and reallocating resources, facilitating long term investments, enhancing foreign direct investments and enabling firms to raise new capital. The agricultural sector is significant in the Kenyan economy because it is the main source of food and is among the leading foreign exchange earners. The study was descriptive and examined the relationship between firm characteristics and operational efficiency of agricultural companies listed at Nairobi securities exchange. Specific objectives were to; ascertain the relationship between firm size and operational efficiency of agricultural companies listed at the Nairobi securities exchange, to evaluate the association amongst liquidity and operational efficiency of agricultural companies listed at Nairobi securities exchange, to evaluate the relationship between cash reserves and operational efficiency of agricultural companies listed at Nairobi securities exchange and to examine the association between asset tangibility and the operational efficiency of firms listed in the agricultural sector of the Nairobi securities exchange. The theories anchoring this study were trade off theory, liquidity preference theory, agency theory, the Baumol inventory model together with Miller& Orr's cash management model. The target population was 7 agricultural companies listed at Nairobi securities exchange from 2011 to 2020. The study used quantitative secondary data collected from audited financial statements. Quantitative data was analysed using the random effects model and correlation analysis, using STATA version 13. Analysed data was presented using tables and pie charts. Test of hypothesis was done at 95% confidence interval. The study found that there was a negative significant relationship between asset tangibility, firm size and operational efficiency of agricultural companies listed at Nairobi securities exchange. There was a positive significant relationship between cash reserves and operational efficiency of agricultural companies listed at Nairobi securities exchange. Based on the findings the study concluded that asset tangibility and firm size have a negative significant relationship with operational efficiency while cash reserves has a positive significant relationship with operational efficiency as measured using total asset turnover ratio and equity turnover ratio. The study recommended that policy makers of the listed agricultural companies at the Nairobi securities exchange should incorporate asset tangibility, firm size and cash reserves in their strategic decision-making processes. Since the study focussed on listed agricultural companies, further studies can explore listed none agricultural companies and incorporate other firm characteristics such as firm age, profitability, growth and number of employees.

Key Words: Operational efficiency, firm characteristics, firm size, liquidity, asset tangibility and cash reserves.

ACKNOWLEDGEMENT

I want to thank, first and foremost the almighty God for granting me the grace to complete this project and for providing resources and soundness of mind. I give Him all the honour and the glory because without Him I could not have made it this far.

My supervisor Dr Michael Njogo for being available and for his continual guidance from inception to the completion of this project.His inspiration, guidance, instructions and corrections were helpful and enabled me to come this far. His efforts were scholarly and included value addition on my part as the researcher.

My lecturers who taught me with a passion during the coursework and consequently enabled me to come up with the research topic and steer through the research with ease.

My family and friends made immense contribution towards this success. They endured my busy schedules and encouraged me to pursue my dreams and I say thank you to them. Their encouragement support and prayers were very evident.

Finally, I give my gratitude to Mr Joshua Gichiri for providing me with the relevant data that was necessary and ensuring that I get help from his colleagues at the CMA resource centre.

God bless you All

DEDICATION

I dedicate this study to my wife Monica and children Triza, Raymond, Michelle, Imani and Emmanuel. Thank you for your support and encouragement throughout this study

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS AND ACRONYMS

ASDS:	Agricultural Sector Development Strategy
CMA:	Capital Markets Authority
CSE:	Colombo Stock Exchange
GDP:	Gross Domestic Product
NSE:	Nairobi Securities Exchange
R&D:	Research and Development
ROA:	Return on Assets
ROE:	Return on Equity
SASRA:	Sacco Societies Regulatory Authority
SRA:	Strategy for Revitalising Agriculture
TATO:	Total Asset Turnover Ratio

OPERATIONAL DEFINITION OF TERMS

Asset tangibility: Asset tangibility is the ratio of property plant and equipment to total assets (Campello & Giambona, 2011).

Capital structure: Capital structure is the composition of debt and equity used by the firm to finance its operations (Ganguli, 2013)

Cash Reserves: Cash reserves refers to the money held by the firm to cater for short term needs and emergencies. Cash reserves include short term investments that generate low rates of return such as treasury bills (Akenga, 2017)

Firm Age: Firm age is a metric for measuring the period that a firm has been operating since formation (Usman & Zahid, 2011).

Firm Size: Approaches for measuring firm size include log of capitalisation, number of employees, sales and natural log of assets. Many studies have used the log of total assets as the proxy for firm size (Irungu, 2019)

Operational Efficiency: Operational efficiency is the ability of the firm to reduce waste and enhance resource capabilities in order to ensure it can deliver high quality goods and services to its customers (Kalluru & Bhat, 2009)

Leverage: Leverage refers to the use of debt in a company's capital structure (Chechet & Olayiwola, 2014).

Liquidity: Liquidity refers to the firm's ability to meet its current obligations when they fall due and is a key success factor (Bhunia, 2010).

Different metrics are used to measure liquidity including the acid test ratio, the cash ratio and the current ratio.

TABLE OFCONTENTS

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Operational efficiency has attracted much interest in corporate finance literature over several decades. However, in the context of the agricultural sector, it has received little attention in developing economies such as Kenya. The objective of this study was to determine the relationship between fundamental firm characteristics and operational efficiency of agricultural firms listed at the Nairobi securities exchange in Kenya. Fundamental firm characteristics such as liquidity, leverage and investments produce a positive effect on the operational efficiency of a firm (Lin & Lin, 2018). One of the main factors that affect the solvency of businesses in the long run is operational efficiency and more so there are firm specific factors that determine operational efficiency. The concept of operational efficiency is attracting a lot of attention because of increasing competition, new technology and dynamic business processes (Ndolo, 2015).

The conceptual relationship between fundamental firm characteristics and operational efficiency can be anchored on stakeholder's theory, stewardship theory, agency theory and wealth maximisation theory (Aluoch, Mwangi, Kaijage, & Ogutu, 2020), trade off theory, liquidity preference theory, economies of scale concept and financial distress theory (Irungu, 2019) and, Baumol inventory model and Miller – Orr Cash management model (Njoroge, 2015).

1.1.1 Firm characteristics

Firm characteristics are distinct features of a firm such as ownership structure, capital structure, firm age, firm size, number of employees and liquidity level (Ganguli, 2013). Kogan and Tian (2012) stated that fundamental factors such as turnover, growth in sales and assets, liquidity,

leverage and firm size constitute a firm's characteristics. Other firm characteristics consist of the structure of ownership, how old the firm is, board characteristics, dividend policy, capital market accessibility, profitability and avenues for growth (McKnight & Weir, 2008).

A firm's ownership structure is critical to its performance because decisions made by top management, policy makers and potential investors influence the overall firm performance (Glen & Pinto, 1998 as cited by Karani, 2018). Capital structure is the composition of debt and equity used by a firm to finance its operations (Ganguli, 2013). Liquidity refers to the firm's ability to meet its current obligations when they fall due and is a key success factor (Bhunia, 2010). Different metrics are used to measure liquidity ratio such as current ratio, quick ratio and the acid test ratio.

Firm age is a metric for measuring the period that a firm has been operating since formation. Older companies are less dynamic and less volatile in growth compared to younger companies. Mature companies enjoy economies of scale, offer competitive prices, have a diversified portfolio and are compliant (Usman & Zahid, 2011). A dynamic competitive environment does not favour old companies. Past studies have shown that the chances of failure, growth and variability in growth decline among ageing firms(Teece, Pisano, & Shuen, 2008).

Mature companies experience steady growth because of lessons learned about cost structures, market positioning and efficiency levels. Time spent by firms operating in the market has a significant impact on firm performance (Karani , 2018).According to McMahon (2001), large firms have a high success rate and firm size has a significant impact on business performance. There is a high correlation between overall profitability, vertical integration, concentration, sunk costs and firm size (Dean, Brown, & Bamford, 1998 as cited by Karani, 2018).

The market share controlled by large firms and their accessibility to capital markets enhances their access to investment opportunities. Large firms enjoy economies of scale, operate at optimal industry performance standards and are less vulnerable compared to small firms (Kaguri, 2013).

Accessibility to capital markets and market power enables large firms to access investment opportunities that are beyond the reach of small firms and as such large firms enjoy economies of scale (Kaguri, 2013). Although leverage has the potential to generate high returns, the related exposure to potential loss is also huge because both the accrued interest and principal amount of the loan must be paid back irrespective of the outcome. This is what constitutes financial risk and it varies depending on the financial structure of the firm. Financial structure refers to the combination of total debt, preferred stock and common stock. Capital structure refers to the financial structure less short-term debt (Naceur & Goaied, 2008).

Liquidity is key in ensuring that the firm has access to an adequate supply of cash and is an important determinant of the financial health of the firm (Clementi, 2001). Firm age refers to the period that the firm has been in existence since inception and is a significant determinant of the firm's financial performance. Firm characteristics that affect firm performance include market power, human capital, unique technology, asset tangibility, board size, liquidity, leverage and firm size (Dogan, 2013);

Fundamental firm characteristics to be used in this study are firm size, liquidity, cash reserves and asset tangibility. Approaches for measuring firm size include log of market capitalisation, number of employees, sales and natural log of assets. This study used the log of total assets to measure firm size. Many studies have used the log of total assets as the proxy for firm size (Irungu, 2019). Bhunia (2010) stated that liquidity refers to the firm's ability to pay its

short-term financial obligations. Liquidity is key in ensuring that a business firm is functioning successfully. Liquidity refers to the ease of converting assets into cash(Mwangi & Iraya, 2014).

Cash is the most liquid asset because of its portability and acceptability. Firms need liquid assets that can be converted into cash easily when need arises. Lack of liquidity occurs when money is tied up in systems where by cashing out and assessing for cash value is difficult (Irungu, 2019). Liquidity ensures that firms have access to an adequate supply of cash and is an important tool for ascertaining the financial health for future investments (Clementi, 2001). Firms can finance their investments using liquid assets when they cannot access external finance. High liquidity enables firms to address emergencies and to meet their obligations when earnings are low (Irungu, 2019).

Liquidity is the ability of the firm to honour short term obligations by changing short term assets into cash without making losses. High quality liquid assets can be readily converted into cash at the least cost (Akenga, 2017). Transaction costs are low in liquid markets thus enabling investors to liquidate their asset holdings and get the money to pay off other commitments. Liquidity and operational efficiency are conflicting objectives that firms strive to achieve by diversifying their asset portfolio and finance managers must ensure there is a trade-off between operational efficiency and profitability (Akenga, 2017). Current ratio is a metric that measures the ability of the firm to meet its current obligations when they fall due and a ratio of 2:1 is an indicator of a strong financial position of the firm (Akenga, 2017).

Current ratio reflects the ability of the firm to pay its liabilities using its assets thereby it is a measure of financial health (Akenga, 2017). A firm with a high current ratio can meet its obligations when they fall due because of the high value current assets compared to the value of its current liabilities. Firms with a current ratio less than one have more current liabilities than

current assets and may not be able to pay for their obligations when they fall due. Such firms depict poor financial health but may not necessarily be bankrupt (Akenga, 2017). A very high current ratio indicates that firms are not using current assets efficiently. A firm's current ratio is a measure of the capacity to turn a product into cash or the efficiency of an entity's operating cycle (Akenga, 2017). Delay in collecting debt or a high inventory turnover ratio is a precursor for liquidity problems. This study used the current ratio to measure liquidity.

Leverage denotes using loans as a source of capital to finance a company(Chechet & Olayiwola, 2014). Leverage involves using debt to buy assets that will generate more income than the interest expense on debt. The risk exposure in such a case is that the cost of debt will be more than the expected cash inflows the asset will generate thus resulting into a loss situation. Leverage enables firms to increase their potential to generate more profits or loss from an investment than it would when using owners' equity (Irungu, 2019). Types of leverage include embedded leverage, economic leverage and balance sheet leverage. Hall and Vila (2002), stated that balance sheet leverage is the most common type of leverage.

Firms finance their investments using either equity and / or debt. Financial leverage refers to the use of a mix of owner's equity, preference capital and debt in its capital structure (Kanu, 2015). Levered firms employ both debt and owner's equity while an all-equity firm is referred to as an unlevered firm. Financial leverage comprises of debt, and firms invest the proceeds of debt expecting to earn a rate of return that exceeds the cost of interest. Leverage is a measure of the extent by which firms use debt to finance growth expressed as a ratio of total debt to total equity (Alkhatib, 2012). The decision to either use equity or debt is a trade-off between financial and business risks (Vatavu, 2014).

Borrowing can cause agency problems including the incentive to underinvest which may result to low profits because of the related costs of control and monitoring. High leverage can enhance firm value because the obligation to honour debt covenants may compel managers to make decisions that will maximise shareholders wealth. Managers can invest in projects that will generate future cash flows to increase profitability and operational efficiency of the firm (Olaosebikan, 2012). Managers should be careful when making decisions between debt and equity because debt affects operational efficiency since it is a source of capital for funding acquisition of new productive assets (Chesang & Ayuma, 2016)

Asset tangibility is the ratio of tangible assets to total assets or the ratio of property plant and equipment to total assets (Campello & Giambona, 2011; Degryse, de Goeij, & Kappert, 2012). Managers of competitive firms mix intangible and tangible assets effectively and efficiently (Herciu, Ogrean, & Belascu, 2012). Trade-off theory have shown that there is a positive relationship between tangibility and leverage (Köksal, Orman, & Oduncu, 2013). Firms can easily collateralise tangible assets and the loss of value for tangible assets during financial distress is small. There is a positive relationship between tangibility and leverage because firms match the maturity of liabilities with the maturity of assets (Köksal, Orman, & Oduncu, 2013). A firm's liquidation value depends on its share of tangible assets because during bankruptcy tangible assets are the collateral for debt.

Cash reserves is the money held by the firm to cater for emergencies and a firm holding a large amount of cash reserve is in a better position to pay for unforeseen emergencies.Cash reserves include short term investments that generate low rates of return such as treasury bills. Firms hold cash reserves to pay for emergencies and other short-term needs. Firms with adequate cash reserves have the necessary liquidity to pay for immediate purchases and invest in potential

investments while firms with insufficient cash reserves must borrow to remain afloat (Akenga, 2017).

1.1.2 Operational efficiency of Agricultural firms

Operational efficiency is a measure of the outputs of a firm's operations and policies in monetary terms (Djiogap & Ngomsi, 2012).Different dimensions such as cost and profitability are used to measure operational efficiency. Operational efficiency is a measure of the adequacy of a firm's liquidity, profitability, dividend per share, return on equity, cash flows and return on assets (Kubai, 2016). Operational efficiency is the ability of the firm to reduce waste and enhance resource capabilities in order to ensure it can deliver high quality goods and services to its customers (Kalluru & Bhat, 2009). Operational efficiency entails identifying wasteful processes affecting productivity and revenue growth.

Operational efficiency aims at redesigning work processes to improve quality and productivity(Darrab & Khan, 2010). Operational efficiency is the ratio of average outputs to average inputs (Charnes, Cooper, & Rhodes, 1978) as cited by (Wachira, 2018). The ratio of actual productivity to the maximum attainable productivity is the real measure of operational efficiency. Desired productivity refers to the maximum possible realisable productivity. Economies of production is the basis of assessing productivity and efficiency and it answers fundamental questions such as how efficient is the production process (Wachira, 2018).

Firms streamline their core processes in order to achieve operational efficiency and thereby respond effectively to the changing market forces (Behn, DeVries, & Lin, 2010). Companies can attain optimal operational efficiency by minimising waste and redundancy while capitalising on resources that make the most contribution to its success and using the best

business processes, technology and manpower at its disposal(Wambugu , 2014). Optimal operational efficiency leads to a reduction in internal costs thereby enabling firms to achieve high profit margins and succeed in competitive markets.

Kuosmanen and Johnson (2010) stated that operational efficiency entails identifying and formulating strategy and knowhow to produce goods and services cost-effectively and on a timely basis while maintaining high quality standards thereby enhancing firm performance. The dynamic business environment and increasing competition has made operational efficiency concept attractive to academic research (Bhagavath , 2009). According to empirical research inefficiencies and process complexities may lock up more than 10% of production capacity thereby affecting profitability because of high investment and operating expenses (Kaplan & Norton, 2008).

Efficient firms utilise their resources to generate new capabilities, gain competitive advantage, adopt new technology and improve financial performance (Santa, Ferrer, Bretherton , & Hyland, 2010). A firm is technically efficient when it attains maximum output with available resources, attains minimum resource utilisation for its output targets, whereas operational efficiency is based on assessing alternative positions on the basis of input prices and outputs, input and output ratios are used as performance indicators for measuring operational efficiency (Rao & Lakew , 2012)

Different metrics are used to measure operational efficiency such as total asset turnover ratio that measures the ability of a company to generate revenue with its total assets computed by dividing net sales by average total assets, fixed assets turnover ratio computed by dividing net sales by average net fixed assets, equity turnover ratio that measures the ability of the firm to generate sales with the investment in shareholders' equity. These metrics measure the ability of

the firm to efficiently manage operational costs and thereby influence its profitability (Rao & Lakew, 2012).

This study used total asset turnover ratio (TATO) and equity turnover ratio to measure operational efficiency.

1.1.3 Agricultural Firms Listed at Nairobi Securities exchange

Nairobi Securities Exchange was established in 1954 and has a long heritage of listing equities and debt securities. Nairobi Securities Exchange plays a vital role in Kenya's economic growth and development by promoting savings and investments as well as helping companies to access capital (NSE, 2021). NSE has various platforms for listing and trading multiple securities. The market is supposed to facilitate trading in derivatives and securities, and promote economic development. Nairobi securities exchange is the barometer of economic growth in Kenya (CMA, 2015, NSE, 2016).

Nairobi Securities Exchange promotes economic development by mobilising savings and reallocating resources from those with excess capital to active agents, by facilitating long term investments, by facilitating privatisation of state corporations, by enhancing foreign direct investments and enabling companies to raise new capital for expansion (NSE, 2021). Challenges facing Nairobi Securities exchange include insider trading, high transaction costs, bureaucratic listing procedures, and implementing trading guidelines (Maina, 2014).

The Agricultural sector is significant in the Kenyan economy being the main source of food in the country and among the leading foreign exchange earners. Agricultural companies practice ethical investing, invest in corporate social responsibility activities and resource management. Firms listed in the Agricultural sector at the Nairobi securities exchange are

Kakuzi Limited, Sasini Limited, Rea Vipingo Plantations Limited, Williamson Tea Kenya Limited, Eaagads Limited, Limuru Tea company Limited and Kapchorua Tea company Limited (NSE, 2021).Agricultural companies contribute to economic growth in Kenya via food processing, export earnings and creating employment (Government of Kenya, 2011)

1.2 Statement of the problem

Agriculture sector is the backbone of the Kenyan economy and it contributes 26% of annual GDP. The sector produces 65% of total exports in Kenya and provides 70% of informal employment in rural areas. The government of Kenya developed the Agricultural Sector development strategy (ASDS) in 2010 to build on the strategy for revitalising Agriculture (SRA) launched by the Narc government in 2004 (GOK, 2010). Despite the government effort to revitalize agriculture, firms in this sector have been performing poorly over the years due to operational inefficiencies, adverse weather patterns, poor sales and increase in operating expenses (Waswa, Ndede, & Jagongo, 2014).

Operational efficiency occurs when businesses combine technology, processes and people in such a way that firms enhance the value and productivity of business operations while minimising routine operation costs to the desired level. When firms are operating efficiently resources are invested in activities that create more capabilities for the firm (Shawk, 2008). Operational efficiency is a reflection of the firm's competitive advantage (Gill, Singh, Mathur, & Mand, 2014). The concept of operational efficiency is attracting a lot of interest because of increasing competition, new technology and dynamic business processes (Ndolo, 2015). Firm characteristics such as firm size, liquidity, leverage, cash reserves and asset tangibility produce effects on the operational efficiency of the firm. A firms capital structure is critical to its performance because decisions made by top management influence the firm's overall performance (Karani , 2018). Liquidity is key in ensuring that the firm has access to adequate supply of cash and is an important determinant of the financial health of the firm (Clementi, 2001). Large firms enjoy economies of scale are less vulnerable than small firms and operate at optimal industry performance standards (Kaguri, 2013). Review of literature has produced mixed

and inconclusive results on the relationship between firm characteristics and operational efficiency

Globally, Gill, Singh, Mathur and Mand (2014) examined operational efficiency and the forthcoming performancemanufacturing firms listed in India. The study found that operational efficiency has a significant effect on the forthcoming performance of manufacturing firms in India. Storto (2013) examined the association between operational efficiency in the integrated water management industry in Italy, the type of service provider and the nature of concession contract. The study found that there is an association between the contract, water service provider and efficiency.

Across Africa, Olanrewaju (2016) studied the consequence of capital base on the operating efficacyof banking institutions in Nigeria by assessing financial ratio analysis as a tool for measuring operational efficiency for banks. The study found that debt to total equity, core capital and bank risk were significant in explaining the effect of capital adequacy on the operational efficiency of deposit taking banks in Nigeria.Lotto (2019), examined factors affecting operational efficiency of commercial banks in Tanzania. The study found a significant positive association between capital adequacy, bank liquidity and operational efficiency.

In Kenya, Odunga, Nyangweso and Nkobe (2013) investigated the effect of capital adequacy and liquidity on operating efficiency of commercial banks in Kenya. The study found that capital adequacy, liquidity and the prior year's operational efficiency affects operational efficiency of commercial banks in Kenya significantly. Kubai (2016) study found that none performing loans have a negative effect on operational efficiency of commercial banks in Kenya. Wanjiru (2018) study found out that size of the university had a significant negative effect on operational efficiency of public universities in Kenya.

The Agricultural sector directly impacts economic performance via its contribution to Gross domestic Product. Periods of high rates of economic growth are identical to periods of high growth rate in the Agricultural sector. The causal nexus between fundamental firm characteristics and operational efficiency in the agricultural sector has not received much attention. Existing literature in the global arena has focused more on the operational efficiency in the financial sector, extractive industries, manufacturing, tourism sector and utilities. It is not clear whether there exists a relationship between firm characteristics and operational efficiency of agricultural companies listed on Nairobi securities exchange and if it does, what nature does it portray? Therefor there exists a gap and to fill this gap, this study sought to determine the relationship between fundamental firm characteristics and operational efficiency of agricultural firms quotedon the Nairobi securities exchange in Kenya.

1.3 Objectives of the study

1.3.1 General objective

To determine the relationship between firm characteristics and operational efficiency of agricultural firms listed at the Nairobi securities Exchange

1.3.2 Specific objectives

i. To evaluate the association between firm size and operational efficiency of agricultural firms listed at Nairobi securities Exchange

ii. To evaluate the relationship between liquidity and operational efficiency of agricultural firms listed at Nairobi securities Exchange

iii. To ascertain the relationship between cash reserves and operational efficiency of agricultural firms listed at Nairobi securities Exchange

iv. To ascertain the relationship between asset tangibility and operational efficiency of agricultural firms listed at Nairobi securities Exchange

1.4 Hypotheses

H_{01}: There is no significant relationship between firm size and operational efficiency of agricultural firms listed at Nairobi securities Exchange.

H_{02}: There is no significant relationship between liquidity and operational efficiency of agricultural firms listed at Nairobi securities Exchange.

H_{03}: There is no significant relationship between cash reserves and operational efficiency of agricultural firms listed at Nairobi securities Exchange.

H_{04}: There is no significant relationship between asset tangibility and operational efficiency of agricultural firms listed at Nairobi securities Exchange.

1.5 Significance of the study

The findings of this study will be beneficial to different stakeholders including; policy makers, regulators, agricultural firms and scholars by enabling them to understand how certain firm characteristics affect operational efficiency in the agricultural sector in Kenya.

1.5.1 Agricultural firms

The findings of this study will help firms in the agricultural sector to monitor key firm characteristics and understand the extend by which firm characteristics influence operational efficiency. Finance managers of quoted agricultural companies will benefit from the findings of this study by gaining insights on how fundamental firm characteristics affect operational efficiency of agricultural companies listed in Kenya.

1.5.2 Policy makers

The results of this research project will be useful to policy makers in Kenya's Agricultural sector in strengthening policies and the regulatory framework. Policies and regulations will incentivise the use of specific techniques that increase efficiency and minimise waste on one hand, and discourage firms from employing techniques that are counterproductive.

1.5.3 Investors

The findings of this study will help investors and other lenders to understand how firm characteristics affect the operational efficiency of firms in the agricultural sectorthereby enable them to make informed investment decision.

1.5.4 Scholars

The study sought to fill the existing gap in literature regarding the relationship between firm characteristics and operational efficiency of agricultural firms in Kenya. The findings add to the existing body of knowledge in the operational efficiency space. Further more the study provides opportunities for further research on operational efficiency of Agricultural firms in Kenya.

1.5.5 Regulators

The findings of this study will be applied by regulators in various jurisdictions in their oversight role to enhance operational efficiency in the agricultural sector. Regulatory frameworks should target firm characteristics thataffect efficiency and sustainability and thereby add value.

1.6 Scope of the study

The study sought to determine the relationship between fundamental firm characteristics and operational efficiency of agricultural firms listed on Nairobi securities exchange. This study focused on financial factors including firm size, liquidity, tangibility and cash reserves. Agricultural firms listed on Nairobi securities exchange were used for the study. A census of the seven agricultural firms with published audited accounts was conducted. The studyconsidered agricultural firms listed between 2011 and 2020 in orderto use the most current available data.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviewed available studiespertinent to the research problem. It starts by reviewing available theoretical framework and their key propositions on fundamental firm characteristics and agricultural firms quoted on the securities exchange in Kenya. It then reviews empirical studies of other global and local scholars.

2.2 Theoretical Review

Trochim (2006) stated that a theory is essential in guiding a study in the selection of variables to measure and the statistical association to look for in the context of the research. A theoretical framework refers to a group of solid concepts. It helps research to identify the variables to measure and the numeric associations to examine (Defee, Williams, Randall, & Thomas, 2010). According to Mentzer, Stank, and Esper (2008), research should be anchored on theory. Theories are logical tools useful in understanding, elucidating and making predictions in specific areas of research. This research project was based on various theories such as trade off theory, liquidity preference theory,agency theory, Baumol inventory model and Miller & Orr's cash management model. These are discussed below.

2.2.1 Trade off theory

Robichek and Myers (1966) introduced the trade-off theory which states that the value of the firm is maximised when the firm's capital structure is optimal. Management set's the target leverage ratio for the firm on the basis of a trade-off between the costs and benefits of increasing leverage. The main factors that influence the selection of the target leverage ratio are agency costs, financial distress costs and tax. Managers select proportion of debt and equity that

optimises the tax advantage of using debt verses the different costs related to debt. Arguments over MM theorem was the genesis of the trade-off theory. Adding corporate income tax to the original significance served to shield earnings from tax thereby creating an advantage for using debt (Hackbarth, Hennessy, & Leland, 2007)

Debt financing has a tax shield benefit and firms that rely on debt realize the maximum possible tax benefit and enhance their profitability. Too much debt is not good for the firm because of the likelihood and consequences of bankruptcy. Firms should choose the optimal leverage ratio by balancing the costs and benefits of debt and equity financing. When firms take on more debt the marginal benefits of debt begin to decline with every increase in the marginal cost of borrowing. Firms should determine the optimal level of debt that will maximise the marginal benefits and minimise the marginal cost of debt (Topal, 2011).

The static trade off theory states that debt capital is associated with other costs despite of the tax shield benefit that accrues on debt. Firms are encouraged to employ more debt than equity because interest chargeable on debt is tax deductible although there are other costs associated with debt such as financial distress costs (Myers, 1977). Firms will trade off the cost and benefit of using debt and equity at the optimal level of the capital structure because at this level the cost of using debt is minimum as compared to the accruing benefit of using the mix of debt and equity (Myers, 1977).

The dynamic trade off theory asserts that a firm's leverage ratio varies within the optimal leverage range. The capital structure is not static under the dynamic trade off theory and firms allow the leverage ratio to vary depending on the costs and benefit of using debt and equity in the capital structure. The dynamic optimal capital structure is appropriate for firms that require recapitalisation (Fischer, Heinkel, & Zechner, 1989). Firms adjust the capital structure when the

leverage ratio touches the boundaries of the of the optimal leverage range. Firm characteristics including bankruptcy costs, interest rate, earning size and cash flow volatility determine the level of boundaries (Davydenko, 2012). Proponents of the static trade off theory stated that the optimal capital structure isachieved when the interest tax shield benefit is offset against the cost of financial distress. Debt is an important source of finance and shareholders wealth is maximised when debt and equity levels of the firm are optimised (Muturi, 2019)

Static trade off theory predicts a negative association between financial leverage and growth opportunity of the firm because when firms are growing, they can sustain high financial distress costs and low agency costs associated with free cash flows. Firms will borrow until when marginal bankruptcy costs are higher than the marginal advantage of additional debt (Muturi, 2019).Borrowing has a tax shield benefit because interest on loan is a tax allowable expense. When firms borrow there is trade-off between tax benefits of debt and financial distress costs until the optimal proportion of debt to equity is achieved (Muturi, 2019). There is a principal agent relationship between shareholders and managers and conflicts arise over dividend pay-out policy, salary increments and business expansion. Managers get bonuses as an incentive to improve the firm's performance and thereby maximise shareholders wealth (Muturi, 2019).

According to Jensen (1986) shareholders incur agency costs to motivate managers to improve operational efficiency and enhance survival of the firm. Using debt to finance businesses is beneficial because interest on loan is tax allowable. Companies incur agency costs due to competing interests between shareholders and creditors, and shareholders and managers (Jensen & Meckling, 1976). Increase in borrowing leads to a high tax shield benefit because interest on loan is a tax allowable expense. M M (1963) noted that firms incur transactional costs, bankruptcy costs and corporate taxes in an imperfect market, which affects borrowing.

Although tax benefits accrue on interest paid on debt such tax benefits don't arise on dividend pay-outs on equity therefore companies with a high proportion of debt in their capital structure are more valuable due to the tax shield benefit. Transaction costs don't affect capital the capital structure decisions (Titman & Wessels, 1988) . This theory states that firms can attain a balance between the interest tax shield benefit, financial distress costs and equity agency costs. Firms can achieve the optimal leverage level by offsetting interest tax shield benefit against the costs of financial distress, bankruptcy and agency costs.

There is a positive relationship between leverage and company size whereas there is a negative relationship between profitability and leverage because large companies are financially stable and enjoy economies of scale. It is difficult for small firms to access external financing because of information asymmetry and high transaction costs (Muturi, 2019). Proponents of trade off theory stated the there is a positive association between leverage and the tangibility of the company's assets. Enterprises that have a large composition ofphysical assets have a high liquidation value and thereby low bankruptcy costs. Firms can reduce the cost of borrowing by issuing secured debt (Myers & Majluf, 1984).Trade off theory was relevant in this study because the theory recognises that loan interest is tax deductible and firms benefit by leveraging within the optimal leverage range until they arrive at the optimal capital structure.

2.2.2 Liquidity preference theory

Keynes (1936) developed the liquidity preference theory which states that there are three motives for holding cash: transaction motive to bridge the gap between receipts and expenditure, the precautionary motive for holding a pool of buying power to finance unforeseen expenditure and the speculative motive to meet the need to hold money in liquid form when expecting the return on alternative assets to increase thereby cause capital losses. Keynes (1936) stated that, because holding cash is less risky, securities with a long maturity period should generate greater returns because they entail higher risks. The theory further holds that, the profit margin on short-term investment holdings is higher than the expected return for long-term investment holdingsbecause short-term interest rates have a high volatility (Amihud & Mendelson, 1991). People hold money to transact current business and as a store of value (Runde, 1994). People forego interest on money held for transaction and precautionary motives whereas they are willing to hold less cash for these motives when interest rates are high (Runde, 1994).

Interest rates are determined by the forces of demand and supply for liquid cash. Liquidity preference or the need for liquid cash refers to the desire to hold money for transactions motive, precautionary motive and speculative motive. Transaction's motive refers to the desire to hold money to pay for current transactions. Precautionary motive refers the desire to hold money to pay for unforeseen occurrences or contingencies. The speculative motive refers to the desire to hold money in order to take advantage of changes in bond prices and interest rates (Runde, 1994). The speculative demand for money is lower at higher interest rates and, higher at lower interest rates (Taylor & O'Connell, 1985)

Liquidity is important because of three reasons; transaction motive, precautionary motive and speculative motive(Keynes, 1936). Speculative motive refers to the need to hold cash in

order to take advantage of favourable fluctuations in exchange rates, and bargain purchases. Firms use marketable securities and reserves borrowing ability to meet speculative motives. Precautionary motive refers to need to hold cash as a monetary reserve. Despite the necessity to hold cash for precautionary purposes, there is no need for holding significant amounts of cash for this purpose because treasury bills are highly liquid and the value for money market instruments is certain. Transaction motive refers to the need to hold cash to pay bills such as salaries and wages, trade creditors, dividends and taxes. This theory implies that firms should hold adequate liquidity that will impact its operational efficiency.

Liquidity preference theory was relevant for this study because it explains the relationship between liquidity and operational efficiency. Firms listed in the agricultural sector of Nairobi securities exchange may prefer holding cash because it entails lesser risk. It is easy to dispose highly liquid assets for their full value. This theory will establish the amount of capital available for spending and investment and thereby affect operational efficiency of the firm. According to this theory firms need to hold sufficient cash for investment and as such, interest rates charged by financial institutions is a key determinant of a firm's investment agenda. Liquidity preference theory informs liquidity which is one of the independent variables.

2.2.3 Agency theory

Jensen and Meckling (1976) developed agency theory. The theory is built on separation of ownership and management and the association between principals and agents. It is built on immediate gains whereby principals delegate the authority to make decisions to their agents who should use resources availed by principals to boost the principal's benefits. Agents may substitute principal's interests with their own thereby commit moral hazards. Principles ensure that agents are acting in the interests of the firms by monitoring their activities. Monitoring costs have an adverse effect on the principal's income because they are expensive (Fama & Jensen, 1983).

When it comes to corporate finance, avoiding agency costs is not easy (Jensen & Meckling, 1976). Managers run companies to achieve selfish interests instead of maximising shareholders wealth. Conflicts of interest arise between creditors and shareholders and between shareholders and management because of separation of ownership and control which leads to agency costs. Firms incur agency cost because of the contractual covenants between principal and agent. Agency costs include monitoring costs, bonding expenses by agents and opportunity cost. Shareholders are concerned that managers will invest free cashflows in unviable ventures as an alternative to paying dividends. Employee share purchase plans and performance-based contracts may be used to motivate managers. The choice of capital structure can be used to resolve the principal agent conflicts arising among managers and shareholders. Loans compel management to channel free cashflows towards loan repayment before investing in new projects. Regular loan repayments control management's investment policies. Shareholders use loan to discipline managers by prohibiting expenditure on luxuries and compelling them to use the free

cash flows to pay back loans. Managers use debt to invest in risky projects that cause share values to appreciate and a drop in firm value. Underinvesting because of the risks associated with debt cause the share values to decline and the company value to increase.

Jensen (1986)found that it is beneficial for firms to invest using debt instead of paying dividend or repurchasing share using free cash flows. The optimal capital structure is attained at the level whereby the interest tax shield benefit is offset by agency costs. Agency cost is one of the main challenges in corporate governance. The separation between ownership and control of the firm may cause managers to indulge in perquisites and make decisions that satisfy selfish interests instead of maximising shareholders wealth. Debt is a disciplinary tool that compels managers to pay dividends instead of pursuing personal interests (Jensen, 1986).

According to the Jensen model, highly profitable companies with surplus cash flows tend to employ more debt and in profitable projects. Proponents of this theory stated that managers of unlevered firms are not incentivised to enhance firm value because without debt there is no exposure to bankruptcy costs. Managers are not affected by financing decisions because they are not shareholders. Debt financing decreases the firms' net present value despite the interest tax shield benefit. Shareholders use debt to discipline managers because defaulting on debt repayments may lead to liquidation of the firm and thereby job losses and bad professional reputation. Firms use short term debts to limit management's ability to invest in risky projects thereby resolve agency problems related to information asymmetry, opportunity cost and the desire to invest in risky projects. The association between the terms of borrowing and firm size is proportionate thus large firms can borrow long term. Proponents of agency theory stated that there is a direct association between high leverage and high profit efficiency (Muturi, 2019).

This theory was relevant for this study because shareholders of agricultural firms listed at Nairobi Securities Exchange expect managers to act in the best interests of the firm when deciding upon the extend by which to borrow or raise owners' equity in firm's capital structure. The level of debt should be optimal in order for the firm to maximise shareholders wealth.

2.2.4 Baumol Inventory model

Baumol inventory model was developed by Baumol (1952). Economic order quantity is the foundation of this model and its objective is to establish the optimal target cash balance. Baumol inventory model was developed to determine the amount of cash the firm should hold and it is based on economic order quantity. The model has five assumptions: firms can accurately forecast cash requirements, can generate a specific amount of cash regularly and disbursements are made uniformly over a specific time period; the opportunity cost for holding cash i.e., the foregone opportunity is fixed; the transaction cost for converting securities to cash is fixed.

The Baumol inventory model has various limitations: although the model assumes a constant disbursement rate, cash outflows are random; although the model assumes no cash inflows during the forecasted period cash inflows and outflows occur frequently. Firms don't hold a safety stock of cash because selling marketable securities doesn't take long. According to this theory, firms should hold target cash balances however holding idle cash has a negative impact on the firms profitability. This model was relevant for this study because it informs cash reserves which is one the independent variables.

2.2.5 Miller and Orr's cash management model

Miller and Orr (1966) developed a cash management model whereby firms let the moneysitting in their vaults to oscillatewithin a threshold range. Companies acquire or dispose of marketable

securities once the cash balance is at the upper limit or lower limit respectively. This model addressed some of the challenges of the Baumol model by incorporating changing cash flow streams of outflows and inflows.

The model was developed to address the problem of random fluctuations in cash inflows and outflows. Proponents of this model stated that a firm's net cashflows has a normal distribution with zero mean and zero standard deviation. According to this model there is a target cash balance (Z) and upper and lower limits of (H) and (L) respectively.

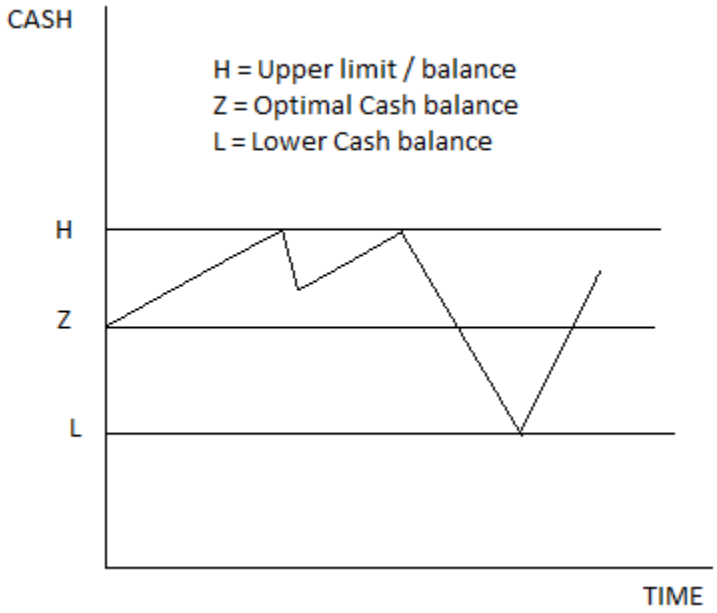


FIGURE 2. 1 CASH MANAGEMENT MODEL

The model states that firm will allow cash balances to fluctuate between the lower and upper control limits and will not sell or buy marketable securities when the cash balance is between H and L. Marketable securities are bought or sold when cash balances are at the control limit lines. When the cash limit is at H, the firm will purchase treasury bills and other money market instruments to reduce their money holdings to point Z. Similarly, when the cash balance is at L, the firm will sell treasury bills and other money market instruments it is holding to raise the cash

balance to level Z. According to this model transaction costs are fixed and the opportunity cost for holding cash is the daily rate of interest for marketable securities. Management decisions will determine the lower limit (L). The model has several implications, management should: determine the lower limit of cash balance to act as a safety margin; estimate the standard deviation for daily cashflows; determine the interest rate and transaction costs. This model was relevant for this study because it informs cash reserves which is one the independent variables.

2.3 Empirical Review

2.3.1 Firm Size and Operational Efficiency

Kingori, Kioko and Shikomo (2017) examined determinants of financial performance of micro finance banks in Kenya. The study used secondary data and focused on seven microfinance banks in Kenya for the years 2011 to 2015 and applied a descriptive research design. Correlation and regression analysis was used in data analysis. The study found that firm size, capital adequacy, and operational efficiency have a significant positive influence on financial performance of microfinance banks in Kenya.

Odalo, Achoki and Njuguna (2016) examined the effect of firm size on the financial performance of agricultural companies listed on Nairobi securities exchange. The study used secondary data for the period 2003 to 2013 and the pooled OLS model was used for data analysis. The study used total assets to measure firm size while the indicators for financial performance were earnings per share, return on equity and return on assets. The study found that total assets as the proxy of firm size has a significant positive effect on financial performance of agricultural companies listed on Nairobi securities exchange.

Nzioka (2013) examined the relationship between firm size and financial performance of commercial banks in Kenya using secondary data. The main focus was on banking institutions in operationfrom 1998 to 2012. Number of employees, total deposits, total loans and total assets were used to measure firm size and return on assets was used to measure performance. The study found a statistically significant relationships between total loans, total assets and total deposits, and return on assets. Furthermore, the effect of number of employees on financial performance of commercial banks was not statistically significant.

Oyelade (2019) investigated the effect of firm size on the performance of firms in the building industry in Nigeria using secondary data for the period 2004 to 2017. The study used accounting and economic measures to measure performance and the fixed effects model for data analysis. The study found that sales and firm age have a positive significant effect on firm performance.

Mesut (2013) examined the effect of firm size on profitability using secondary data for companies listed on Istanbul stock exchange for the years between 2008 and 2011. The study used total assets, total sales and number of employees to measure firm size. Return on Assets was used to measure profitability. Companies operating in the financial sector were not included because their financial structures are different. The study used multiple regression and correlation methods in data analysis. The study found that size indicators (number of employees, total sales and total assets) have a significant positive effect on profitability.

Niresh and Velnampy (2014) explored the relationship between firm size and profitability of manufacturing companies listed on Colombo Stock Exchange (CSE) between years 2008 and 2012. The study focused on 15 manufacturing companies and used multiple regression and correlation models in data analysis. Natural logs of total assets and natural logs of total sales

were used to measure firm size whereas return on assets was used to measure profitability. The study found that firm size does not have a significant effect on profitability.

Pervan and Višić (2012) examined the influence of firm size on the performance of the manufacturing sector in Croatia for a period of 10 years from 2002. The study used secondary data obtained from creation financial agency website and Amadeus database. The study used natural logarithm of fixed assets and natural logarithm of number of employees to measure firm size. The study found that firm size has a weak positive effect on profitability and stated that the weak relationship is because of separation of ownership and management in modern firms that led to a shift in management focus from profit maximisation to managerial utility maximisation.

2.3.2 Liquidity and Operational Efficiency

Lukorito, Muturi, Nyang'au and Nyamasege (2014) examined the effect of internal factors on profitability of commercial banks in Kenya. The study used a descriptive research design including panel data. Target population constituted all the 43 commercial banks and considering availability of five years data a census study was done. Empirical results demonstrated that liquidity has a significant effect on profitability, the study noted similar results for banking risk, deposit liability, liquidity and bank size. These results agreed with (Sufian & Kamarudin, 2012)who found that liquidity level had a significant effect on banks profitability and contradicted a study by (Ongore & Kusa, 2013) which found that the effect of liquidity on financial performance was not significant. The study concluded that the association between liquidity and financial performance is significant however banks should hold liquidity in the form of marketable securities to earn profits.

Waswa, Mukras and Oima (2018) studied factors affecting the performance of sugar companies in Kenya. They examined how ability to meet short term obligations affects financial

performance of sugar firms over a period the period 2002 – 2016. The target population constituted 11 sugar firms registered with Kenya Sugar board 2010 and 5 firms were sampled using purposive sampling technique. The study used the random effects regression model and empirical results revealed that there is a negative insignificant relationship between liquidity management and firm performance. The findings revealed that liquidity negatively affect firm performance indicating that firms in the Kenya sugar industry operate on low cash flows and are highly geared. The firms require asset and liability strategies to improve their performance. The findings contradicted (Eljelly, 2004) who reported a significant negative relationship between liquidity level and firm performance.

Akenga (2017) examined how liquidity affects the financial performance of listed firms at the Nairobi securities exchange by evaluating three liquidity ratios. The target population comprised of all the 66 firms listed on Nairobi securities exchange. A sample size of 30 firms was selected using purposive sampling technique. The study covered the period covering 2010 to 2015 by considering consistency in publishing financial statements. The study used causal research design and multiple regression method to determine how each variable affects financial performance. The study reported that current ratio has a significant effect on financial performance, similar results were noted for cash reserves. These results concurred with (Nyamao, Ojera, Lumumba, Odondo, & Otieno, 2012) who concluded that enhancing working capital management will cause improvement in financial performance.

Cherutich and Irungu (2020) sought to determine the effect of financial distress on financial performance of firms listed at Nairobi Securities exchange. The study investigated how liquidity affect listed manufacturing companies in Kenya from 2009 to 2018. The study reported that the effect of liquidity on financial performance of select firms was positive and significant.

The results contradicted (Waswa, Mukras, & Oima, 2018) who found that liquidity has a negative impact on the financial performance of firms in the sugar sector in Kenya. These results agreed with (Sporta, 2018) who observed that liquidity has a significant positive effect on financial performance.

Kong, Musah and Agyemang (2019) investigated the interactions between liquidity and viability of non-financial companies listed on Ghana stock exchange using a target population of 28 non-financial firms listed on Ghana stock exchange and a sample 15 companies. The study used purposive sampling. Empirical results revealed that current ratio significantly affects the viability of non-financial companies, different results were noted for cash flow ratio, company size, growth, efficiency and tangibility. These results were consistent with Kanga and Achoki (2017), Ali et al (2018), Mulyana and Zuraida (2018), Kanga and Achoki, (2017) Kimondo, Irungu, Obanda and (2016)whose studies concluded that liquidity has a significant effect on firm viability. However, these results contradicted Opoku (2015), Syed (2015), Jepkemo (2017) and Mutwiri (2015) whose studies reported that the effect of liquidity on financial performance was not statistically significant.

Widyastuti (2019) examined the effect of firm characteristics on financial performance and firm value of food and beverage companies listed on Indonesia stock exchange. By using purposive sampling, the sample size was 7 companies dealing in foodstuffs and are quoted on the stock exchange in Indonesia, the period considered was 2015 – 2017. Empirical results revealed that liquidity had a significant positive effect on financial performance and the study found different results for efficiency and leverage. These results concurred with (Lusy, Hermanto, Panjaitan, & Widyastui, 2018), (Widyastuti, Oetomo, & Riduwan, 2017) and(Makori & Ambrose, 2013).

Demirgunes (2016) examined the effect of liquidity on the financial performance of Turkish Retail industry using time series data for the period 1998 Q1 to 2015 Q3. The study sought to examine the relationship between liquidity, growth and profitability. The study employed different diagnostic tests.Empirical results indicated that there is a positive and statistically significant relationship between liquidity and profitability in the Turkish retail industry. This finding contradicted (Adams & Buckle, 2003), (Pottier, 1988) (Adams, 1996)(Myers & Rajan, 1995) who observed that availability of liquid cashcan influence management to invest in projects that satisfy personal selfish interests there by detrimental to profitability. The finding was consistent with (Goddard, Tavakoli, & Wilson, 2005). Deloof (2003) concluded that free cash flows enable managers to make payments easilyand (Goddard, Tavakoli, & Wilson, 2005) concluded that firms with higher liquidity will take advantage of profitable investment opportunities. Results of (Hacker & Hatemi, 2012) bootstrap causality assessmentdid not specify any path of causationamong the time series.

2.3.3 Cash reserves and operational efficiency

Oganda, Mogwambo and Otieno (2018)examined the relationship between cash holdings and the profitability of deposit takingfinancial institutions in Kenya using Pearson correlation matrix. The study sought to evaluate the effect of cash reserves on the performance of commercial banks in Kenya using a comparative analysis approach. The target population was two commercial banks operating in Kenya, the period considered was 2007 to 2010 and the study was a census. The study reported that cash reserves has a negative and insignificant effect on ROA and a positive significant effect on ROE for Equity Bank. For National Bank the study found a significant negative relationship between cash reserves and NIM, ROE and ROA. In conclusion

an increase in cash reserves is not profitable for the banks because cash reserves do not generate income.

Nyangweso, Atambo and Mogwambo (2019) examined the effect of liquidity risk management on the performance of commercial banks in Kenya by evaluating cash reserves, customer deposits and non-performing loans and asset base. The study used a target population of 11 commercial banks quoted on Nairobi securities exchange and conducted a census. The empirical findings revealed that cash reserves, non-performing loans, customer deposits and asset base significantly affect the banks financial performance. In conclusion liquidity risk management factors as measured by cash reserves, non-performing loans, customer deposits and asset base have a significant effect on financial performance of commercial banks quoted on Nairobi securities exchange.

Majakusi (2016) investigated the relationship between liquidity management and financial performance of commercial banks in Kenya. This study examined how liquidity management and capital adequacy affected the financial performance of 43 commercial banks during the period 2010 – 2013 using a descriptive research design. The study established that the relationship between liquidity management and profitability of commercial banks in Kenya is strong and significant. These results concurred with (Kavala, 2016), (Wanjohi, 2013) and (Olongo, 2013) who reported that there is a direct relationship between liquidity management and performance of commercial banks in Kenya, and contradicted (Vintila & Nenu, 2016) and (Molefe & Muzindutsi, 2016) who noted that there is a negative relationship between liquidity management and financial performance of commercial banks in Kenya.

Lozano (2011) studied the effect of holding excess cash on firm value. This study examined how investment, leverage, dividend pay-out and profitability affect firm value by

employing unbalanced nonfinancial listed companies panel data for the period 1992 – 1999. Empirical results revealed that financial decisions affect firm value significantly. The study used three models for data analysis and in the second model, the study assessed the effect of cash accumulation on the major financial decisions of the firm by predicting levels of cash accumulation that is normal, low or high. Results for the second model found that investment decisions have a positive and significant effect on firm value. The study reported similar results for leverage and dividends. In general, findings revealed that the firm's financial decisions namely investment, leverage and dividends and their respective market values depend on the amount of cash available. These results concurred with (Bates, Kahle, & Stulz, 2009) and disclosed the benefits of financial flexibility contrary to the propositions of the agency theory.

Yun, Ahmad, Jebran and Muhammad (2020) examined the moderating effect of firm specific factors on the relationship between cash holdings and firm performance using a sample of 2575 Chinese firms over the period 2003 to 2016. The empirical results revealed that state ownership has a positive moderating effect on the relationship between cash holdings and firm performance. Similar results were reported for corporate governance mechanisms. Lee and Lee (2009) stated that firms with sound governance at the firm level hoard less cash and have less agency problems. Family ownership has a negative moderating effect on the relationship between cash holdings and firm performance implying that a high level of family ownership distorts firm performance largely because family shareholders accumulate excess cash to enhance resources under their control. Similar results were reported for high ownership accumulation. High accumulation of cash in firms with a high ownership concentration weakens firm performance because of agency problems associated with controlling shareholders entrenchment behaviour. In conclusion excess cash in the hands of controlling shareholders

might be used to expropriate minority shareholders through mergers and acquisition decisions for personal gain.

Mikkelson and Partch (2003) sought to examine the relationship between firm characteristics and operating performance of firms that held more than one quarter of their assets in cash and cash equivalents for a period of 5 years from 1986 – 1991. This study sought to evaluate the relationship between policies of holding large amounts of cash balances and firm performance by focusing on nonfinancial firms with an established policy of holding large amounts of cash and cash equivalents using a sample of 89 listed US firms. The study noted that operating performance of large cash firms is greater than the performance of other firms matched by industry and size and, ownership and board characteristics do not have a significant effect on operating performance. The policy of holding large cash reserves supports investment without hindering corporate performance.This study further noted that high cash firms have high ratios of market to book value of assets, undertake higher levels of investment and grow faster. In conclusion firms follow a policy of high cash holdings because of these asset characteristics and, large cash holdings facilitate growth and investment. These findings concurred with (Opler, Pinkowitz, Stulz, & Williamson , 1999) and (Kim, Mauer, & Sherman, 1998) who found that high cash balance holdings influence growth and minimises reliance on external and that holding cash is a reflection of the precautionary financial policy.

2.3.4 Asset tangibility and operational efficiency

Maroa and Kioko (2016) sought to examine the determinants of profitability of firms listed in the agricultural sector of Nairobi securities exchange. The target population constituted 7 agricultural firms quoted at the Nairobi securities exchange, and a census was conducted for the

period 2006 to 2014. Empirical results revealed a negative significant relationship between tangibility and profitability whereas firm size and liquidity have a significant positive relationship with profitability of agricultural firms listed at Nairobi securities exchange. The study concluded that tangibility influences profitability negatively. These results were consistent with (Pratheepan, 2014) who found an inverse significant association between tangible assets and profitability, but contradicted (Nausheen & Arshad, 2013) who reported a positive and insignificant relationship between tangibility and financial performance.

Muritala (2012) studied the association between capital structure and the profitability of quoted companies trading on the capital market in Nigeria from 2006 to 2016. Empirical results revealed that asset tangibility has a negative significant effect of ROA as a measure of financial performance. The study concluded that firms in the sample data did not judiciously utilize the fixed assets component of their total assets to impact their firm's performance positively.

Mehari and Aemiro (2013) examined the relationship between firm specific factors and the financial performance of the Ethiopian insurance sector. The research study evaluated the effect loss ratio, leverage, liquidity, growth company size and age of the company on return on assets of insurance companies. The target population was 14 registered insurance companies in Ethiopia and a purposive sampling was used to select a sample size of 9 insurance companies. Empirical results found that size of the firm, tangibility plus leverage affect performance positively and significantly. In conclusion firm size,tangibility, loss ratio and leverage affect the profitability of insurance firms. These results were consistent with (Ahmed, Ahmad, & Ahmed, 2010), (Malik, 2011) who stated that firm size is an important determinant of financial performance of insurance companies

Iltas and Demigranues (2020) sought to analyse the effect of asset tangibility on the financial performance of the manufacturing sector in Turkey using diagnostic tests together with dynamic ordinary least squares methodology of Stock and Watson (1993). The study found that asset tangibility has a positive and significant effect on financial performance. Similar results were reported for operating efficiency, corporate liquidity and financial leverage. These results concurred with (Rajan & Zingales, 1995) who concluded that tangibility of asset intensive firms can minimise agency costs of borrowing because these assets can be used as collateral and reduction in agency costs of debt will lead to high financial performance.

Xuezhou, Hussain, Saad and Butt (2020) studied the effect of leverage and debt maturity structure on the probability of a firm being financially distressed and analysed the moderating role of asset tangibility on the association between capital structure and financial distress and, the association between debt maturity and financial distress. The target population was 207 non-financial firms listed in the agricultural sector of Pakistan stock exchange. Considering availability of data, the sample size was 187 firms. According to this study asset tangibility has an inverse moderating effect on the association between the probability of financial distress and debt maturity structure. The study concluded firms should rely less on short term debts and use productive assets as collateral for debt without incurring high borrowing costs.

2.4 Conceptual Framework

A concept is a general idea inferred from specific instances (Kombo & Tromp, 2009). A conceptual framework is a set of principles and broad ideas taken from different areas of research and used to formulate subsequent presentations. A conceptual framework is a hypothetical model depicting the model under study and the association between the exogenous and endogenous variables (Mugenda & Mugenda, 2003). According to Kothari (2004), an independent variable is the factor influencing changes in the dependent variable whereas the dependent variable is the variable the study is seeking to explain. The conceptual framework aims at categorising and describing the concepts that are relevant to the study and mapping the relationship between these concepts. (Camp, 2001) stated that the conceptual framework aids the researcher in defining the concepts, mapping the conceptual scope, systematising the relationship between concepts and identifying gaps in existing literature. The figure below presents the variables examined by this research project.

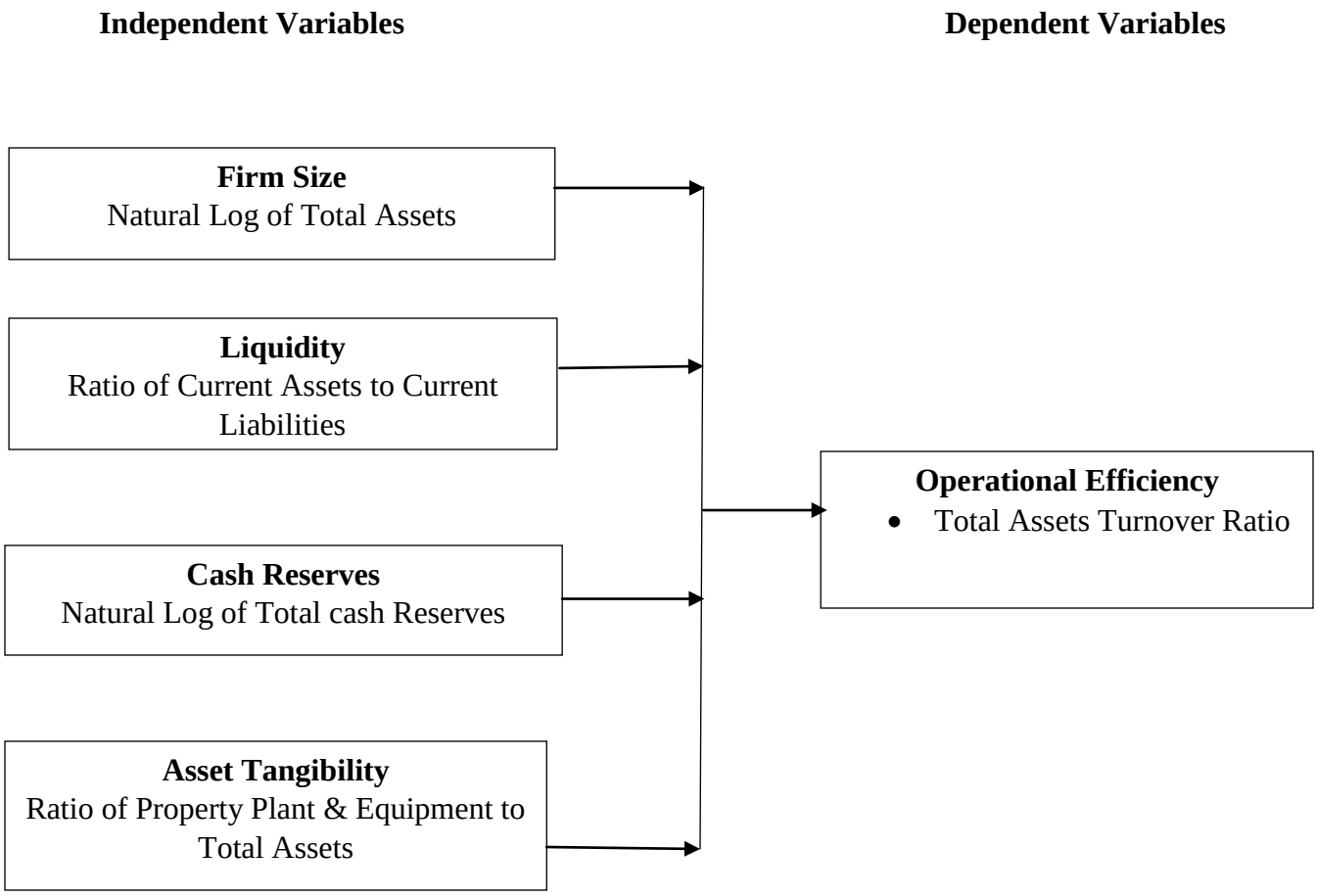


FIGURE 2. 2: CONCEPTUAL FRAMEWORK

2.5 Operationalisation of variables

TABLE 2. 1: OPERATIONALISATION OF VARIABLES

Category of Variables	Variables	Indicators	Measurement
Independent Variable	Firm Size	Total Assets	Natural Log of Total Assets
Independent Variable	Liquidity	Current Ratio	Current Assets ÷ Current Liabilities
Independent Variable	Cash Reserves	Cash and Cash Equivalents	Natural Log of Total Cash and Cash Equivalents
Independent Variable	Asset Tangibility	Asset Tangibility	Property plant and equipment ÷ Total Assets
Dependent Variable	Operational Efficiency	Total Asset Turnover Ratio	Net Sales ÷ Average Total Assets

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Kothari (2004) stated that research methodology entails the methods used in addressing the research problem and an explanation of how to conduct research. This chapter describes the research design, target population, data collection and data analysis.

3.2 Research Design

Kothari (2004) noted that a research design forms the foundation of any study. It is the approach used to examine a specific phenomenon, the strategy or roadmap that will be employed to answer research questions. This research projectusedthe descriptive research designwhich refers to the process of collecting data on prevailing circumstances for the purpose of understanding and explanation. It involves collecting data, tabulating facts, examining in detail, description, contrasting, documenting trends and relationships. This study used a descriptive research design because of the need to tabulate data and use charts and graphs to describe how the data is distributed. Descriptive research design allows the use of multiple variables in data analysis. Theresearcher examined the association between fundamental firm characteristics and operational efficiencyof firms listed under the agricultural sector of Nairobi securities exchange.

3.3 Target Population

According to Rubin and Babbie (2016) target population is the total sum of observations from which to select a sample. Target population refers to a collection of elements in which the researcher has an interest with the intention of making generalizations (Sim & Wright, 2000). The study targeted 7 agricultural firms listed on Nairobi securities exchange and sought to examine the associationbetween firm characteristics and operational efficiency of firms listed

under the agricultural sector of Nairobi securities exchange. This study covered the entire population by applying the census technique. Kothari (2004) stated that a census enables the researcher to include every member of the population in the study. The study collected secondary data from the audited financial statements over a period of 10 years yielding a panel data set.

3.4 Sample Size and Sampling Technique

This study used the census method because the firms were few. All the seven (7) agricultural firms listed on Nairobi securities exchangewere covered in this study. All the member of the target population are used when conducting a census (Kothari, 2004). Conducting a census enhances the confidence interval.

3.5 Data Collection

This study used a data collect form to put togethersecondary data from the audited financial statements of 7 agricultural firms quoted on Nairobi securities exchange. It is mandatory for listed companies to submit and publish audited financial statements on the company web site under section 670 of the companies Act.Data was collected for a period of 10 years (2011 - 2020). The study used a balanced panel data set by ensuring that the time t, is uniform for all units of analysis. The quality and quantity of panel data is enhanced because it varies cross-sectionally and over time (Gujarati & Porter, 2003).The study collected secondary data on: total assets, current assets, current liabilities, total debt, total reserves, property plant and equipment, net sales and equity using data collect forms.

3.6 Data Analysis and Presentation.

Mugenda and Mugenda (2003) stated that data analysis brings meaning, order and structure to a specific data set. This study used STATA software in data analysis and presentation. The study

used panel data and the Hausman test was used to identify the appropriate model for the study by selecting between the fixed effects model and the random effects model, and the Breusch – Pagan LM test was used to decide between the random effects model and the pooled OLS model. Observations in a panel data set varies cross-sectionally and over time (Hsiao, 2007). Panel data is preferable because it reflects changes at the firm level, the order of variables over time and emerging relations (Frees, 2004). This study chose panel data because of various reasons. Firstly, control on individual heterogeneity is possible with panel data thereby enabling the exclusion of biases arising from the presence of individual effects (Hsiao, 2007). Secondly, unlike cross-sectional or time series data panel data is more informative, yields more variability and less collinearity between variables and more degrees of freedom and efficiency (Baltagi, Bratberg, & Holmås, 2005). Thirdly panel data generates consistent estimators in the presence of omitted variables(Wooldridge, 2005). Panel data sets can estimate effects that cannot be detected in pure cross-sectional or pure time series data (Baltagi, Bratberg, & Holmås, 2005). This study focussed on 7 agricultural firms listed at Nairobi securities exchange and by incorporating a time series of 10 years produced 70 observations. Many observations enable a study to satisfy asymptotic requirements (Gujarati & Porter, 2003).

3.7 Diagnostic tests

This study performed diagnostic tests to check for the appropriate model to use and ensure that CLM assumptions are not violated.

3.7.1 Panel Unit Root Test

This study used the levin lin chu (llc) unit root test to determine whether variables are stationary or non-stationary. This test was performed to avoid using non-stationary time series data that generate spurious regression results. The null hypothesis of the unit root test states that all panels

have unit root while the alternative hypothesis states that some panels don't have unit root (Choi, 2001). The researcher used natural logs for variables that had unit roots.

3.7.2 Normality Tests

The study used the normality assumption (ut ~ N (0, σ2)) to conduct hypothesis tests about model parameters. This study used the skewness and kurtosis test to check whether the panel data set has a normal distribution by testing the null hypothesis that the independent variables are not normally distributed and rejected the null hypothesis at 5% level of significance if the p value is less than 5%.

3.7.3 Multicollinearity

Multicollinearity isa phenomenon whereby the degree of association between independent variables is high. This study used a correlation matrix and computed variance inflation factor (VIF) test to check for multicollinearity. Myers (1977) stated that a Vif > 10 indicates that there is high multicollinearity between independent variables.

3.7.4 Heteroscedasticity

Heteroscedasticity is a situation whereby the variance of the error term is not constant. There were concerns about the exitance of heteroskedasticity because the panel data set includes a cross-section of firms. The study used the Breusch pagan / cook – Weisberg test and the generalised white test to test for heteroskedasticity.

3.7.5 Autocorrelation

Including both cross-sectional and time series data in a panel data set raises concerns about the existence of serial correlation. Existence of serial correlation in a data set violates CLM assumptions. Autocorrelation is a systematic relationship between two error terms yet the error terms should be uncorrelated. This study performed the Wooldridge test to test for

autocorrelation in panel data. The presence of serial correlation in a panel data set must be addressed so as to generate the correct model specification. Wooldridge (2005) stated that existence of serial correlation should be identified and treated in order for the panel data model to achieve efficient parameter settings. The null hypothesis for the Wooldridge test for autocorrelation is that the data has no serial correlation.

3.7.6 Test for fixed and random effects

The study performed diagnostic tests to select between the fixed effects model and the random effects model. The fixed effects model assumes that firm specific intercepts exist and captures variable effects that are firm specific and are consistent over time. The random effects model assumes that a single common intercept exists and it varies randomly from one firm to the other (Baltagi et al, 2005). To estimate the models, it is important to determine if a correlation exists between the independent variables. The fixed effects model gives more consistent results if correlation exists between independent variables otherwise the random effects model gives more efficient estimators. The study estimated both the fixed effects and random effects model, stored the fixed and random estimates then used the Hausman specification test (1978) to determine whether to use the fixed effects model or the random effects model and the random effects model was chosen.

3.8 Empirical Model

Model specification tests selected the random effects model to run the regression however this study used the Prais - Weinstein procedure when running the regression model to solve for the problem of first order serial correlation and ensure that the CLM assumptions are not violated. The study used the regression model shown below:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \beta_5 X_{5it} + \varepsilon_i + \varepsilon_{it}$$

Where: Y = Dependent variable (Operational efficiency), β_0 = Constant (Firm characteristics), β_1, β_2, β_3, β_4, β_5 = coefficients of independent variables (Firm size, Leverage, Liquidity, cash reserves and tangibility), X_1 = Firm Size, X_2 = Leverage, X_3 = Liquidity, X_4 = Cash Reserves, X_5 = Tangibility, ε_i = decomposed individual error term, ε = random error term, $_i$ = individual: 1, 2, 3…...N, $_t$ = time index: 1, 2, 3…T.

3.9 Hypothesis testing

The table below presents the summary of hypothesis testing

Table 3. 1 Summary of Hypothesis Testing

Objective	Hypothesis	Method
To determine the relationship between firm size and operational efficiency of agricultural companies listed at Nairobi securities exchange	H_{01}: There is no significant relationship between firm size and operational efficiency of agricultural firms listed at Nairobi securities exchange	Correlation Multiple regression
To explore the associationamongst liquidity and operational efficiency of agricultural companies quoted at Nairobi securities exchange	H_{02}: There is no significant relationship between liquidity and operational efficiency of agricultural companies listed at Nairobi securities exchange	Correlation Multiple regression
To examine the associationamongst cash reserves and operational efficiency of agricultural companiesquoted at the Nairobi securities exchange	H_{03}: there is no significant relationship between cash reserves and operational efficiency of agricultural companies listed on Nairobi securities exchange	Correlation Multiple regression
To investigate the associationamongst asset tangibility and operational efficiency of agricultural companiesquoted at Nairobi securities exchange	H_{04}: there is no significant relationship between asset tangibility and operational efficiency of agricultural companies listed on Nairobi securities exchange	Correlation Multiple regression

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter covers the study findings and discussions, and the hypothesis tests depicted in the study. It provides a general description of the study and the regression analysis tests performed. Finally, this research project carried out hypothesis tests and fitted regression models.

4.2 Response Rate

The study targeted 7 Agricultural firms listed on Nairobi securities exchange and evaluated the association between firm characteristics and operational efficiency. This study covered the entire population by applying the census technique and collected secondary data from audited financial statements over a period of ten years yielding a balanced panel data set. Table 4.1 presents the response rate and the results indicate that the researcher collected data from 7 listed agricultural companies yielding a 100% response rate. Beauvais, Stewart, Denisco, and Beauvais (2014) stated that a response rate in the range of 50% to 70% is good enough there by a response rate of 100% was adequate.

Table 4. 1 Response Rate

Listed Agricultural companies	Response	Response rate
7	7	100%

4.3 Exploratory Data Analysis

Exploratory analysis is a process of summarising data in graphs for ease of understanding and interpretation of results (Yong & Pearce, 2013). It regroups variables into a limited set of clusters

on the basis of shared variances thereby enabling the isolation of constructs and concepts. This study used exploratory tests such as trend plots and spaghetti plots.This study explored operational efficiency as measured by total asset turnover ratio within listed agricultural companies in agricultural companies listed on Nairobi securities exchange before examining the association between firm characteristics and operational efficiency of agricultural companies listed on Nairobi securities exchange.

Figure 4.1 presents the growth plots of total asset turnover ratio and the results indicate that there were variations in operational efficiency among listed agricultural companies on Nairobi securities exchange in Kenya. It can be seen that except for one firm that depicted an increase in the initial stages of the period under study, in general operational efficiency of agricultural companies listed on Nairobi securities exchange has been on a downward trend.

Figure 4. 1 Total Asset Turnover Ratio Growth Plot

This study explored the operational efficiency among different agricultural companies listed on Nairobi securities exchange over a period of 10 years from 2011 to 2020 before examining the relationship between firm characteristics and operational efficiency measured by total asset turnover ratio.Figure 4.2 presents spaghetti plots for total asset turnover ratio. The spaghetti plot is an overlay of each firms trend total asset turnover ratio over time. The plot depicts the general pattern of total asset turnover ratio across entities and portrays the general heterogeneous nature of listed agricultural companies in Kenya. The results indicate that the listed agricultural companies had different intercepts. It can be noted that the slopes are not significantly different from each other although there were differences in operational efficiency as measured by total asset turnover ratio. The preliminary results indicate that fixed effects exist and the panel data fixed effects model may be appropriate. The fixed effects model has non constant slopes and intercept that varies based on the cross-sectional groups.

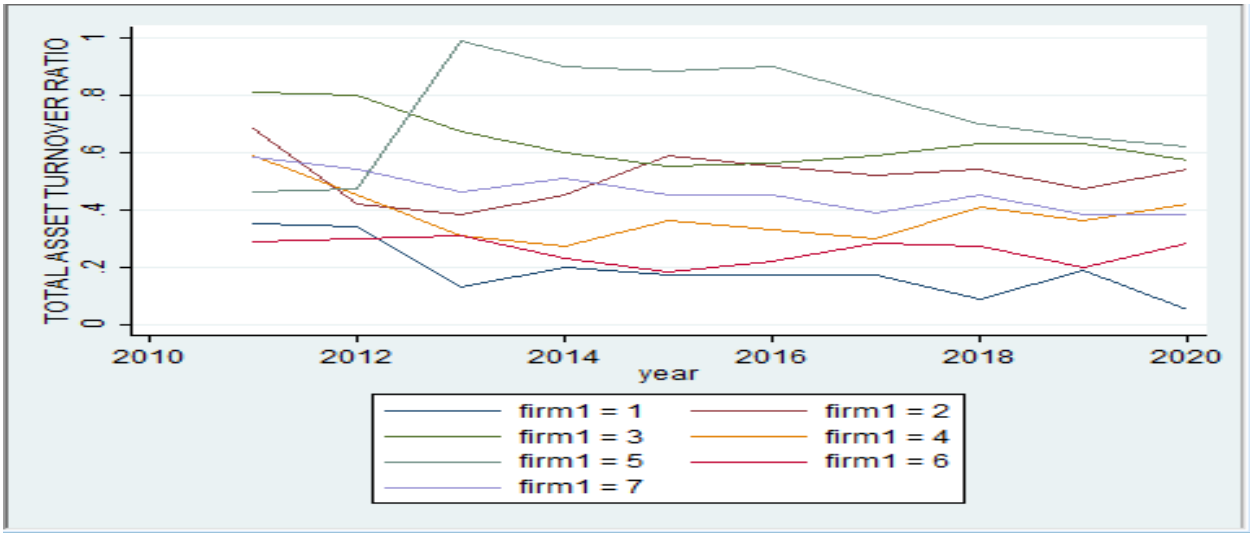


Figure 4. 2 Total Asset Turnover Ratio Spaghetti Plot

This study explored operational efficiency as measured by equity turnover ratio within listed agricultural companies in agricultural companies listed on Nairobi securities exchange before examining the association between firm characteristics and operational efficiency of agricultural companies listed on Nairobi securities exchange. Figure 4.3 presents the growth plots of equity turnover ratio and the results indicate that there were variations in operational efficiency among listed agricultural companies on Nairobi securities exchange in Kenya. It can be seen that except for one firm that depicted an increase in the initial stages of the period under study, in general operational efficiency of agricultural companies listed on Nairobi securities exchange has been on a downward trend.

Figure 4. 3 Equity Turnover Ratio Growth Plot

This study explored the operational efficiency among different agricultural companies listed on Nairobi securities exchange over a period of 10 years from 2011 to 2020 before establishing the association between firm characteristics and operational efficiency measured using equity turnover ratio.Figure 4.4 presents spaghetti plots for e ratio. The spaghetti plot is an overlay of each firms trend total equity turnover ratio over time. The plot depicts the general pattern of equity turnover ratio across entities and portrays the general heterogenous nature of listed agricultural companies in Kenya.

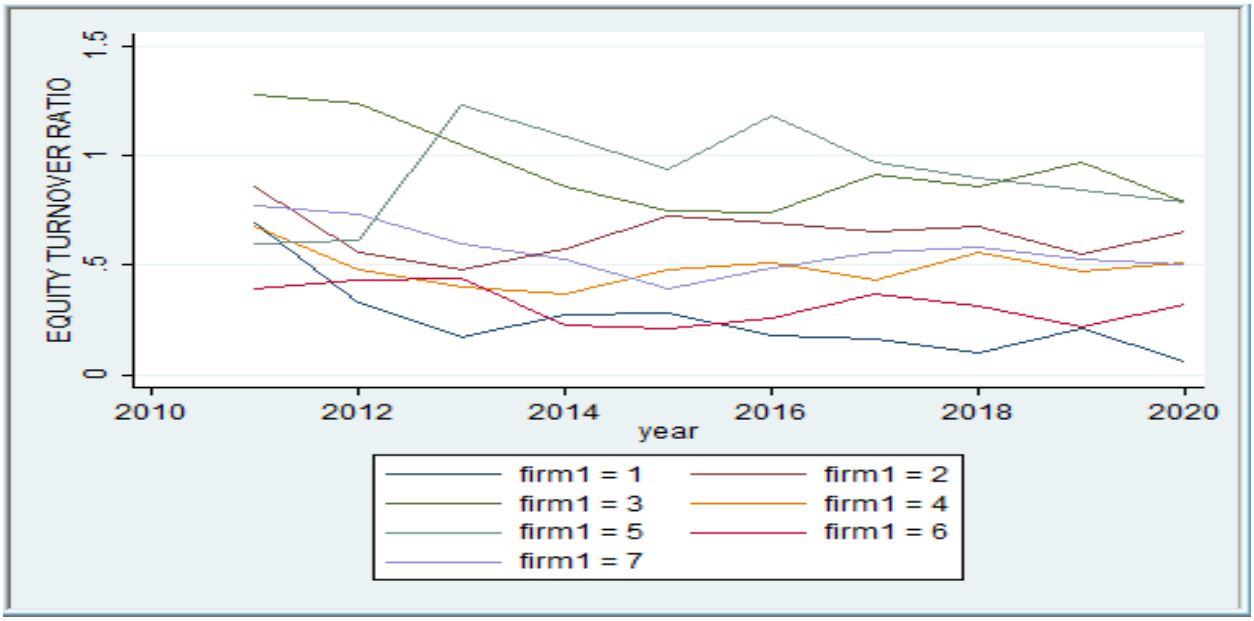


Figure 4. 4 Equity Turnover Ratio Spaghetti Plot

4.4 Descriptive Statistics

Table 4.2 presents the results for descriptive statistics. The overall mean for total asset turnover ratio was 0.4532 with a standard deviation of 0.2096. The minimum total asset turnover ratio was 0.05 while the maximum total asset turnover ratio was 0.99. The between panels and within panels standard deviation for total asset turnover ratio was 0.1979 and 0.0992 respectively indicating that variations in total asset turnover ratio was higher within firms than between firms.The overall mean equity turnover ratio was 0.5887 with a standard deviation of 0.2889. The minimum equity turnover ratio 0.06 while the maximum possible equity turnover ratio was 1.28. Equity turnover ratio has a high standard deviation between panels of 0.2706 than the standard within panels of 0.1415.

Firm size was measured by transforming the nominal values of total fixed asset into natural logs. The overall mean for firm size was 14.74 with a standard deviation of 1.291. The minimum possible firm size 12.16 while the maximum possible firm size was 16.6. The between panels standard deviation for firm size was 1.3601 higher than the within panels firm size standard deviation of 0.24410. These results indicate that variations in firm size was higher between panels than within panels. Liquidity was measured by current ratio and the overall mean for liquidity was 4.8 with a standard deviation 2.06. The minimum liquidity was 0.87 while the maximum possible liquidity was 9.02 higher than the recommended current ratio of 2:1. This indicates that agricultural companies listed on Nairobi securities exchange hold huge balances of liquid assets. The within panels liquidity standard deviation was 1.8644 while the between panels liquidity standard deviation was 0.9394. This can be because liquidity position is largely subject to an entity's cash flow management practices.

This study used the natural log of cash reserves to measure reserves. The overall mean for reserves was 11.5 with a standard deviation of 2.705. The minimum level of reserves was 5.6 while the maximum possible level for reserves was 14.48. This indicates that agricultural companies listed on Nairobi securities exchange hold a lot of cash. Reserves had a high standard deviation between panels than within panels.The overall mean of asset tangibility was 0.3446 with a standard deviation of 0.1716. The minimum level of asset tangibility was 0.01 while the maximum possible level was 0.78. The within panels standard deviation for asset tangibility was high at 0.1449 compared to the between panels standard deviation of 0. 09864.This indicates that variations in asset tangibility was higher within panels than between panels.

Table 4. 2 Descriptive Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations	
TOTALA~O	overall	.4532857	.2096285	.05	.99	N =	70
	between		.1979829	.186	.737	n =	7
	within		.0992953	.1762857	.7062857	T =	10
EQUITY~O	overall	.5887143	.2889758	.06	1.28	N =	70
	between		.2701646	.245	.945	n =	7
	within		.1415571	.2737143	1.033714	T =	10
logFIR~E	overall	14.74512	1.291647	12.16129	16.63799	N =	70
	between		1.360177	12.52994	16.36029	n =	7
	within		.2441008	14.10622	15.15784	T =	10
LIQUID~Y	overall	4.819286	2.060049	.87	9.02	N =	70
	between		.9394587	3.655	5.912	n =	7
	within		1.864494	1.007286	9.010286	T =	10
logCAS~S	overall	11.45276	2.705328	5.605802	14.48567	N =	70
	between		2.747566	7.015333	14.0279	n =	7
	within		.8685328	8.772982	14.7412	T =	10
ASSETT~Y	overall	.3446314	.1716957	.01	.78	N =	70
	between		.0986479	.217	.531	n =	7
	within		.1449735	.0636314	.5976314	T =	10

4.5 Diagnostic Tests

Diagnostic analysis entails testing for the suitability of the model so as to decide on whether to use the robust model. Diagnostic analysis involves tests such as tests for multicollinearity, heteroscedasticity, normality, autocorrelation, serial correlation test, Hausman test and tests for residuals.

4.5.1 Test for Normality

The study tested for normality of the data used in the research using pp plots and skewness and kurtosis test. Skewness is a measure of the lack symmetry in the data being analysed whereas kurtosis examines the shape of the peaks in the probability distribution of the data set.Figure 4.5

presents the PP plots and the results indicate that the data fits in a distribution, it is normally distributed and is close to the line of best fit. This indicates that the data is useful for decision making. The null hypothesis for the normality test is that data has a normal distribution. Based on the results in figure 4.5, we fail to reject the null hypothesis and conclude that the data is normally distributed.

4.5.1.1 PP plots

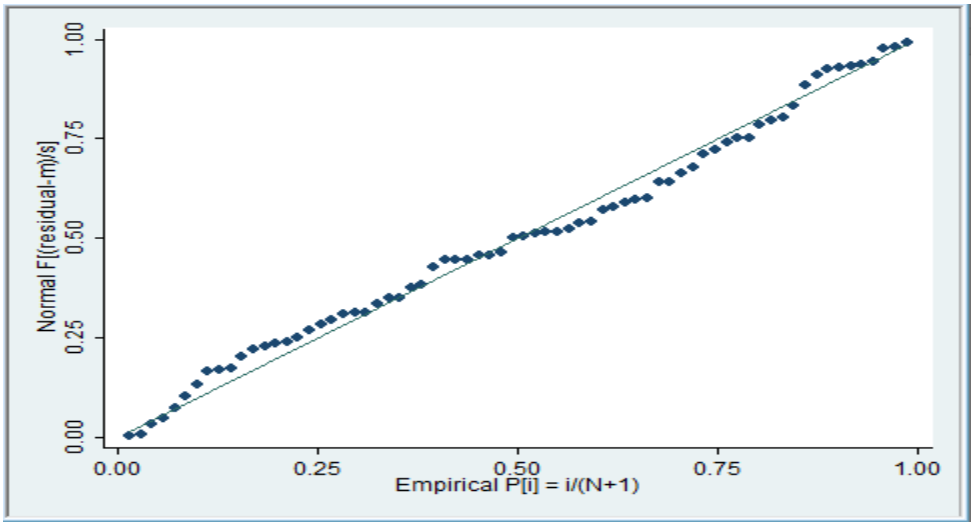


Figure 4. 5 PP Plots

4.5.1.2 Skewness and Kurtosis Test for Normality

The null hypothesis for the normality test is that the data is normally distributed and we fail to reject null hypothesis if the p value is greater than 0.005. Table 4.3 presents the results of the skewness kurtosis test. The results indicate total asset turnover ratio, equity turnover ratio, liquidity, and asset tangibility are normally distributed because p value is greater than 0.05. On the other hand, firm size and cash reserves are not normally distributed because p-values = (0.0152 and 0.0195) for firm size and cash reserves respectivelyare less than 0.05.

Table 4. 3 Skewness and Kurtosis Test for Normality

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint adj chi2(2)	joint Prob>chi2
TOTALASSET~O	70	0.1359	0.8847	2.33	0.3117
EQUITYTURN~O	70	0.1154	0.7601	2.67	0.2625
logFIRMSIZE	70	0.0703	0.0121	8.37	0.0152
LIQUIDITY	70	0.3582	0.1780	2.77	0.2509
logCASHRES~S	70	0.0079	0.1765	7.87	0.0195
ASSETTANGI~Y	70	0.5765	0.6706	0.50	0.7781

4.5.2 Panel Unit root test

This study used the levin lin chu (llc) unit root test to determine whether variables are stationary or non-stationary. The H_0 of the unit root test states that all the panels have unit root while the alternate hypothesis states that some panels don't have unit root (Choi, 2001). The researcher used natural logs for variables that had unit roots. The table 4.4 to table 4.9 present the results for unit root tests.

Table 4. 4 Unit Root Test for Total Asset Turnover Ratio

Levin-Lin-Chu unit-root test for TOTALASSETSTURNOVERRATIO

Ho: Panels contain unit roots	Number of panels = 7
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	-9.7496	
Adjusted t*	-7.6306	0.0000

P value = 0.000 is less than 0.05 therefore the study rejects H_0 and concludes that the panels are stationary

Table 4. 5 Unit Root Test for Equity Turnover Ratio

```
Levin-Lin-Chu unit-root test for EQUITYTURNOVERRATIO
-------------------------------------------------------------
Ho: Panels contain unit roots               Number of panels  =      7
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         -8.6419
 Adjusted t*          -5.3992        0.0000
-------------------------------------------------------------------------------
```

P value = 0.000 is less than 0.05 there for the study rejects H_0 and concludes that the panels are stationary

Table 4. 6 Unit Root Test for Firm Size

```
Levin-Lin-Chu unit-root test for logFIRMSIZE
-------------------------------------------------------------
Ho: Panels contain unit roots               Number of panels  =      7
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         -2.8115
 Adjusted t*          -1.0748        0.1412
-------------------------------------------------------------------------------
```

P value = 0.1412 is greater than 0.05 therefor the study fails to reject H_0 and concludes that the panels for firm size contains unit roots. This was treated by transforming variable firm size from levels to natural logs

Table 4. 7unit Root Test for Liquidity

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

Ho: Panels contain unit roots               Number of panels  =      7
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         -6.3806
 Adjusted t*          -4.4288        0.0000
-------------------------------------------------------------------------------
```

P value = 0.000 is less than 0.05 therefor the study rejects H_0 and concludes that the panels are stationary

Table 4. 8 Unit Root Test for Cash Reserves

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

Ho: Panels contain unit roots               Number of panels  =      7
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         -5.0936
 Adjusted t*          -3.0320        0.0012
-------------------------------------------------------------------------------
```

P value = 0.0012 is less than 0.05 therefor the study rejects H_0 and concludes that the panels are stationary

Table 4. 9 Unit Root Test for Asset Tangibility

Levin-Lin-Chu unit-root test for ASSETTANGIBILITY

Ho: Panels contain unit roots	Number of panels = 7
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	-4.0094	
Adjusted t*	-2.3546	0.0093

P value = 0.0093 is less than 0.05 therefor the study rejects H_0 and concludes that the panels are stationary

4.5.3 Multi-collinearity Test

The study used the correlation matrix of independent variables to establish the level of correlation between independent variables. Two independent variables in a regression model should not be highly correlated. High multi-collinearity reduces the ability of independent variables to predict the dependent variable. Drop highly correlated variables to eliminate the problem of high multi-collinearity. Table 4.10 presents the results of the correlation analysis between firm size, liquidity, cash reserves and asset tangibility. The results indicate that firm size was positively and significantly related to cash reserves (r = 0.8713, p = 0.000), positively and significantly related to asset tangibility (r = 0.3505, p = 0.0029) and negatively and insignificantly related to liquidity (r = -0.1066, p = 0.3798). Liquidity was negatively and

insignificantly related to cash reserves (r = -0.1000, p = 0.9343) and negatively and insignificantly related to asset tangibility (r = 0.0674, p = 0.5793). Cash reserves was positively and insignificantly related to asset tangibility (r = 0.0645, p = 0.4366)

Table 4. 10 Correlation Analysis

	logFIR~E	LIQUID~Y	logCAS~S	ASSETT~Y
logFIRMSIZE	1.0000			
LIQUIDITY	-0.1066 0.3798	1.0000		
logCASHRES~S	0.8713* 0.0000	-0.0100 0.9343	1.0000	
ASSETTANGI~Y	0.3504* 0.0029	-0.0674 0.5793	0.0945 0.4366	1.0000

The study computed the variance inflation factors for all the independent variables. A high mean VIF greater than 5 indicates the presence of high multi-collinearity. The null hypothesis for the VIF test states that there is no multi-collinearity. Table 4.11 presents the variance inflation factors. None of the variables has a VIF > 10 and the mean VIF is 3.52 therefore we fail to reject the null hypothesis and conclude that there is no multi-collinearity.

Table 4. 11 Variance Inflation Factors

Variable	VIF	1/VIF
logFIRMSIZE	6.18	0.161938
logCASHRES~S	5.42	0.184402
ASSETTANGI~Y	1.45	0.690884
LIQUIDITY	1.04	0.957544
Mean VIF	3.52	

4.5.4 Housman test

The Housman test was used to check the model for the presence of random effects or fixed effects. The null hypothesis for the Housman test states that the model has random effects. If the p value is less than 0.05, reject the null hypothesis and use the fixed effects model. If the p value is greater than 0.05 fail to reject the null hypothesis and use the random effects model. The results for the Housman tests are presented in table 4.12 and 4.13 P – value = 0.8006 and P – value = 0.7280 is greater than 0.05. The study failed to reject the null hypothesis and adopted the random effects model. The study performed the tests for heteroscedasticity and serial correlation before fitting the models and deriving the equations.

Table 4. 12 Housman Test for Total Asset Turnover Ratio

	Coefficients			
	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
logFIRMSIZE	-.1199502	-.0880746	-.0318756	.0342625
LIQUIDITY	-.0026448	-.0035366	.0008918	.0014627
logCASHRES~S	.0341561	.0360862	-.0019301	.0038909
ASSETTANGI~Y	-.1091042	-.125571	.0164668	.0168358

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(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 1.65
Prob>chi2 = 0.8006

Table 4. 13 Housman Test for Equity Turnover Ratio

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
logFIRMSIZE	-.2037237	-.1520508	-.0516729	.0453567
LIQUIDITY	-.0138483	-.0154823	.001634	.0018943
logCASHRES~S	.0438783	.0460799	-.0022016	.0049959
ASSETTANGI~Y	-.132324	-.1565446	.0242206	.0216276

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(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 2.04
Prob>chi2 = 0.7280

4.5.5 Heteroscedasticity Test

The variance of the error terms should be constant. The study used the Breusch Pagan Cook-Weisberg test for heteroscedasticity. The null hypothesis states that there is homoscedasticity and a p value > 0.05 indicates that there is homoscedasticity while a p value < 0.05 indicates that there is heteroscedasticity. The results for the test for no homoscedasticity are presented in table 4.14 and 4.15. The results indicate that the error terms are homoscedastic given that the p-value (Total Asset Turnover Ratio = 0.1633, Equity Turnover Ratio = 0.3488) was greater than 0.05.

Table 4. 14: Heteroscedasticity TestforTotal Asset Turnover Ratio

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of TOTALASSETSTURNOVERRATIO

         chi2(1)      =     1.94
         Prob > chi2  =   0.1633
```

Table 4. 15 Heteroscedasticity Test forEquity Turnover Ratio

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of EQUITYTURNOVERRATIO

         chi2(1)      =     0.88
         Prob > chi2  =   0.3488
```

4.5.6 Autocorrelation

The presence of serial correlation leads to small standard errors of the coefficients and a high R Squared. This study used the Wooldridge test for autocorrelation in panel data to test for the presence of first order serial correlation. The null hypothesis is that there is no serial correlation and a p value less than 0.05 indicates that there is first order serial correlation. Table 4.16 and 4.17 presents the results for the serial correlations tests. Based on these results the study rejected the null hypothesis because the p – value (p-value = 0.005 for total asset turnover ratio and p-value = 0.0027 for equity turnover ratio)was less than 0.05 and concluded that there is first order serial correlation.

Table 4. 16 Serial Correlation Test for Total Asset Turnover Ratio

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,        6) =     46.804
           Prob > F =      0.0005
```

Table 4. 17 Serial Correlation Test for Equity Turnover Ratio

```
Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
    F(  1,        6) =     24.130
           Prob > F =      0.0027
```

4.6 Regression Analysis

The study regressed firm characteristics including firm size, liquidity, cash reserves and asset tangibility on the total asset turnover ratio using the XTPCSE command.The panel data set used by this study had first order serial correlation and this was corrected by using the Prais-Winsten procedure to run the regression. Table 4.18 presents the output of the regression analysis. The regressionanalysis model was fitted as follows:

$Y = 0.957565 - 0.0771864X_1 + 0.001394X_2 + 0.0634844X_3 - 0.2898687X_4$

Where: Y = Total Asset Turnover Ratio, X_1= Firm size, X_2= Liquidity, X_3= Cash Reserves and X_4= Tangibility.

Table 4. 18 Regression on Total Asset Turnover Ratio

Linear regression, correlated panels corrected standard errors (PCSEs)

Group variable:	firm1	Number of obs	= 70
Time variable:	year	Number of groups	= 7
Panels:	correlated (balanced)	Obs per group: min	= 10
Autocorrelation:	no autocorrelation	avg	= 10
		max	= 10
Estimated covariances	= 28	R-squared	= 0.3189
Estimated autocorrelations	= 0	Wald chi2(4)	= 59.72
Estimated coefficients	= 5	Prob > chi2	= 0.0000

TOTALASSETSTUR~O	Panel-corrected Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
logFIRMSIZE	-.0771864	.036159	-2.13	0.033	-.1480567	-.0063161
LIQUIDITY	.001384	.0085574	0.16	0.872	-.0153882	.0181562
logCASHRESERVES	.0634844	.0163984	3.87	0.000	.031344	.0956247
ASSETTANGIBILITY	-.2898687	.1326986	-2.18	0.029	-.5499531	-.0297842
_cons	.957565	.3507057	2.73	0.006	.2701943	1.644936

The study used R-squared to determine how well the model fitted the data set. A coefficient of determination R-squared of 0.3189 supported this study. This implies that firm size, liquidity, cash reserves, and asset tangibility explain 31.89% of the variations in total asset turnover ratio.

The constant term 0.9576 was significant with a p – value = 0.006, less than 0.05. This implies that when the level of all firm characteristics is held at zero, the total asset turnover ratio for an agricultural company listed at the Nairobi securities exchange will be 0.9576.

The results revealed that there was a negative significant relationship between firm size and total asset turnover ratio (β = -0.077, p = 0.033).The calculated z statistic of 2.13 which was high compared to the critical z statistic value of 1.645 supported these results.Total Asset turnover ratio will decrease by 0.0771864 units with a 1% increase in firm size all other factors being held constant.

There was a positive insignificant relationship between liquidity and total asset turnover ratio (β = 0.001384, p = 0.872). The calculated z statistic of 0.16 that was less compared to the critical z statistic value of 1.645 supported this observation.Further, there was a positive significant relationship between cash reserves and total asset turnover ratio (β = 0.0634844, p = 0.000).The calculated z statistic of 3.87 which was greater than the z critical of 1.645 supported this finding. Total asset turnover ratio will increase by 0.0634844units with a 1% increase in cash reserves all other factors being held constant.

Lastly there was a negative significant relationship between asset tangibility and total asset turnover ratio (β = -0.2898687, p = 0.029). The calculated z statistic of 2.18 which was greater compared to the critical z statistic value of 1.645 supported this observation. This meant that a rise in asset tangibility would lead to a decline in total asset turnover ratio.An increase in asset tangibility by 1 unit leads to a 28.9% decrease in total asset turnover ratio all other factors being held constant.

The study regressed firm characteristics including firm size, liquidity, cash reserves and asset tangibility on equity turnover ratio using the XTPCSE command. The panel data set used by this study had first order serial correlation and this was corrected by using the Prais-Winsten procedure to run the regression. Table 4.19 presents the output of the regression analysis. The regression model was:

$$Y = 1.582424 - 0.1195466X_1 - 0.0153057X_2 + 0.0851746X_3 - 0.385059X_4$$

Where: Y = Equity Turnover Ratio, X_1 = Firm Size, X_2= Liquidity, X_3= Cash Reserves and X_4= Tangibility,

Table 4. 19 Regression on Equity Turnover Ratio

```
Linear regression, correlated panels corrected standard errors (PCSEs)

Group variable:    firm1                       Number of obs      =        70
Time variable:     year                        Number of groups   =         7
Panels:            correlated (balanced)       Obs per group: min =        10
Autocorrelation:   no autocorrelation                         avg =        10
                                                              max =        10
Estimated covariances      =        28         R-squared          =    0.2803
Estimated autocorrelations =         0         Wald chi2(4)       =     52.17
Estimated coefficients     =         5         Prob > chi2        =    0.0000
```

EQUITYTURNOVER~O	Panel-corrected Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
logFIRMSIZE	-.1195466	.0464917	-2.57	0.010	-.2106686	-.0284245
LIQUIDITY	-.0153057	.0120192	-1.27	0.203	-.0388628	.0082514
logCASHRESERVES	.0851746	.0216151	3.94	0.000	.0428097	.1275396
ASSETTANGIBILITY	-.385059	.1799366	-2.14	0.032	-.7377282	-.0323898
_cons	1.582424	.4387039	3.61	0.000	.7225799	2.442268

The study used R squared to determine how well the model fitted the data set. A coefficient of determination R squared of 0.2803 supported this study. This implies that firm size, liquidity, cash reserves and asset tangibility explain 28.03% of the variations in equity turnover ratio. The constant term 1.5824 was significant with a p – value = 0.000, less than 0.05. This implies that when the level of all firm characteristics is held at zero, the equity turnover ratio for an agricultural company listed at the Nairobi securities exchange will be 1.5824.

The results revealed that there was a negative significant relationship between firm size and equity turnover ratio (β = -0.1195466, p = 0.010).This finding was supported by the calculated z statistic of 2.57 which was greater compared to the critical z statistic value of 1.645. This implies that a 1 % increase in firm size will result to a decrease of 0.1195466 units in equity turnover

ratio. There was a negative and insignificant relationship between liquidity and equity turnover ratio (β = -0.0153057, p = 0.203). This finding was supported by the calculated z statistic value of 1.27 which was small compared to the critical z statistic value of 1.645.

These findingsshowed that theassociation between cash reserves and equity turnover ratio is positive and significant (β = 0.0851746, p = 0.000). This finding was supported by the calculated z statistic of 3.94 which was greater than the critical z statistic of 1.645. This meant that a rise in cash reserves will result into a positive increase in equity turnover ratio.Lastly there was a negative significant relationship between asset tangibility and equity turnover ratio (β = -0.385059, p = 0.032). This finding was supported by the calculated z statistic of 2.14 which was greater than the critical z statistic of 1.645.The implication is that growth in asset tangibility will cause a reduction is equity turnover ratio.

4.7 Hypothesis testing

The study used panel data regression analysis results represented in tables 4.12 and 4.13 to test hypotheses.

H_{01}:There is no significant relationship between firm size and operational efficiency of agricultural firms listed at Nairobi securities Exchange.

The hypothesis was tested using panel data regression and determined using p – value. The acceptance / rejection criterion was that if the p – value is less than 0.05 reject H_{01}, but if p – value is greater than 0.05 fail to reject H_{01}. The results in table 4.18 and 4.19 for total asset turnover ratio and equity turnover ratio respectively indicate that there was a negative significant relationship between firm size and total asset turnover ratio, and equity turnover ratio respectively (β = -0.0771864, 0.033; β = -0.1195466, 0.010). Therefore, the study rejected the null hypothesis and failed to reject the alternative hypothesis that states that there is a significant

relationship between firm size and operational efficiency of agricultural companies listed at Nairobi securities exchange. These findings contradicted that of Kingori, Kioko, and Shikomo (2017) who found that firm size had a positive significant effect on financial performance. The findings also contradicted that of Odalo, Achoki, and Njuguna (2016) whose study found that firm size had positive significant effect on financial performance. The Contradictory results can be attributed to the fact that large farms are less efficient because of rigid hierarchical structures and due to suffering from the agency problem.

H_{02}:There is no significant relationship between liquidity and operational efficiency of agricultural firms listed at Nairobi securities Exchange.

The hypothesis was tested using multiple linear regression and determined using p – value. The acceptance / rejection criterion was that if the p – value is less than 0.05 reject the H_{02} but if p-value is greater than 0.05, fail to reject H_{02}. The results in table 4.18 and 4.19 for total asset turnover and equity turnover ratio indicate that there is a positive insignificant relationship between liquidity and total asset turnover ratio (β = 0.001384, 0.872) and a negative insignificant relationship between liquidity and equity turnover ratio (β = -0.0153057, 0.203) therefore the study failed to reject the null hypothesis that there is no significant relationship between liquidity and operational efficiency of agricultural companies listed at Nairobi securities exchange. These findings agreed with that of Ongore and Kusa (2013) who found an insignificant relationship between liquidity and bank profitability. These findings also agreed with that of Waswa, Mukras, and Oima (2018) whose study found insignificant relationship between liquidity management and firm performance.

H_{03}:There is no significant relationship between cash reserves and operational efficiency of agricultural firms listed at Nairobi securities Exchange.

The hypothesis was tested using multiple linear regression and determined using p – value. The acceptance / rejection criterion was that if the p – value is less than 0.05 reject the H_{03} but if p-value is greater than 0.05, fail to reject H_{03}. The results in table 4.18 and 4.19 for total asset turnover and equity turnover ratio indicate that there is a positive significant relationship between cash reserves and total asset turnover ratio and equity turnover ratio respectively (β = 0.0634844, 0.000; β = 0.0851745, 0.000) therefor the study rejected H_{03} and failed to reject the alternative hypothesis that there is a significant relationship between cash reserves and operational efficiency of agricultural companies listed at Nairobi securities exchange. These findings agreed with Nyangweso, Atambo, and Mogwambo (2019) whose study found that cash reserves had a significant effect on financial performance. These results also supported (Lozano, 2011) who concluded that cash reserves affect firm value significantly

H_{04}:There is no significant relationship between asset tangibility and operational efficiency of agricultural firms listed at Nairobi securities Exchange.

The hypothesis was tested using multiple linear regression and determined using p – value. The acceptance / rejection criterion was that if the p – value is less than 0.05 reject the H_{04} but if p-value is greater than 0.05, fail to reject H_{04}. The results in table 4.18 and 4.19 for total asset turnover ratio and equity turnover ratio indicate that there is a negative significant relationship between asset tangibility and total asset turnover ratio and equity turnover ratio respectively (β = -0.2898687, 0.029; β = -0.385059, 0.032) therefore the study rejected H_{04} and failed to reject the

alternative hypothesis that there is a significant relationship betweenasset tangibility and operational efficiency of agricultural companies listed at Nairobi securities exchange. These findings agreed with that of Maroa and Kioko (2016) whose study found a significant relationship between asset tangibility and profitability. These findings also agreed with Muritala (2012) who found that asset tangibility had a negative significant effect on financial performance.

4.8 Discussion of Key Findings

4.8.1 Relationship between firm size and operational efficiency

The first objective was to examine the association between firm size and operational efficiency of agricultural companies listed at Nairobi securities exchange. Results of the regression analysis found a negative significant relationship between firm size and total asset turnover ratio (β = - 0.0771864, p = 0.033). This was supported by a calculated z statistic of 2.13 which was greater the z critical value of 1.645. There was a negative significant relationship between firm size and equity turnover ratio (β = - 0.1195466, p = 0.010). This calculated z statistic value of 2.57 which was greater than the z critical value of 1.645 supported this finding. This implies that a 1%ge increase in firm size leads to a reduction in total assets turnover ratio by 0.0771864 units and a reduction in equity turnover ratio by 0.1195466 units holding other factors constant.

This contradicted Odalo, Achoki, and Njuguna (2016) who examined the effect of firm size on the financial performance of agricultural companies listed on Nairobi securities exchange. The study used the pooled OLS model for data analysis, total assets to measure firm size and earnings per share, return on earnings and return on assets to measure performance. The

study found that total assets have a significant positive effect on financial performance of agricultural companies listed on Nairobi securities exchange.

4.8.2 Relationship between cash reserves and operational efficiency

The third objective of the study was to determine the relationship between cash reserves and operational efficiency of agricultural companies listed at Nairobi securities exchange. Results of the regression analysis found a positive significant relationship between cash reserves and total asset turnover ratio ($\beta = 0.0634844$, $p = 0.000$). The calculated z statistic value of 3.87 that is large compared to the critical z statistic of 1.645 supported this finding. There was apositive significant associationamongst cash reserves and equity turnover ratio ($\beta = 0.0851746$, $p = 0.000$). The calculated z statistic value of 3.94 that is large compared to the critical z statistic value of 1.645 supported this observation. This implies that a 1%ge increase in cash reserves will result in 0.0634844 units increase in total asset turnover ratio and .0851746 units increase in equity turnover ratio holding all other factors constant.

This was consistent with Lozano (2011), who studied the effect of holding excess cash on firm value. This study examined how investment, leverage, dividend pay-out and profitability affect firm value by employing unbalanced panel data for non-financial companies for the period 1992 – 1999. The study assessed the effect of cash accumulation on major financial decisions of the firm and found that investment decisions have a positive significant effect on firm value.

The results concurred with Nyangweso, Atambo, and Mogwambo (2019) who examined the effect of liquidity risk management on the performance of commercial banks in Kenya by evaluating cash reserves, customer deposits, non-performing loans, and asset base. The target

population was 11 banks quoted on Nairobi securities exchange. The study found that cash reserves affect the banks financial performance significantly.

4.8.3 Relationship between asset tangibility and operational efficiency

The fourth objective was to evaluate the associationamongst asset tangibility and operational efficiency of agricultural companies quoted at the Nairobi securities exchange. Regression analysis results found a negative significant relationship between asset tangibility and total asset turnover ratio (β = -0.2898687, p = 0.029). The calculated z statistic value of 2.18 that is large compared to the critical z statistic value of 1.645 supported this finding. There was a negative significant associationamongst asset tangibility and equity turnover ratio (β = -0.385059, p = 0.032). The calculated z statistic value of 2.14 that is large compared to the critical z statistic value of 1.645 supported this finding. This implies that a unit increase in asset tangibility will lead to a 28.9% reduction in total asset turnover ratio and a 38.5% reduction in equity turnover ratio all other factors held constant

This concurred with Maroa and Kioko (2016) and Muritala (2012). Maroa and Kioko (2016) examined the determinants of profitability of firms listed in the agricultural sector of Nairobi securities exchange. The study found that tangibility influences profitability negatively. Muritala (2012) studied the association between capital structure and profitability of quoted companies trading on the capital market in Nigeria. The study found that asset tangibility has a negative significant effect on return on assets.

Summary of Hypothesis

The table 4.20 presents the summary results of the hypotheses

TABLE 4. 20 SUMMARY OF HYPOTHESES

No of Objective	Objective	Hypothesis	Rule	P - value	Comment
Objective 1	To evaluate the association between firm size and operational efficiency of agricultural firms listed at Nairobi securities Exchange	H_{01}**:** There is no significant relationship between firm size and operational efficiency of agricultural firms listed at Nairobi securities Exchange.	Reject H_{01} if p value < 0.05	$p < 0.05$	The results rejected the hypothesis; therefor there is a significant relationship between firm size and operational efficiency of agricultural firms listed at Nairobi securities exchange
Objective 2	To evaluate the relationship between liquidity and operational efficiency of agricultural firms listed at Nairobi securities Exchange	H_{02}**:** There is no significant relationship between liquidity and operational efficiency of agricultural firms listed at Nairobi securities Exchange.	Reject H_{01} if p value < 0.05	$p > 0.05$	The results failed to reject the hypothesis; therefor there is no significant relationship between liquidity and operational efficiency of agricultural firms listed at Nairobi securities exchange
Objective 3	To ascertain the relationship between cash reserves and operational efficiency of agricultural firms listed at Nairobi securities Exchange	**H_{03}:** There is no significant relationship between cash reserves and operational efficiency of agricultural firms quoted at the Nairobi securities Exchange.	Reject H_{01} if p value < 0.05	$p < 0.05$	The results rejected the hypothesis; therefor there is a significant relationship between cash reserves and operational efficiency of agricultural firms quoted at the Nairobi securities exchange

Objective 4	To ascertain the relationship between asset tangibility and operational efficiency of agricultural firms listed at Nairobi securities Exchange	**H_{04}:** There is no significant relationship between asset tangibility and operational efficiency of agricultural firms listed at Nairobi securities Exchange.	Reject H_{01} if p value < 0.05	$p < 0.05$	The results rejected the hypothesis; therefor there is a significant relationship between asset tangibility and operational efficiency of agricultural firms listed at Nairobi securities exchange

4.8.4 Model optimisation and revised conceptual framework

The study conducted a model optimisation based on the results in table 4.18 and 4.19. The aim of model optimisation was to help in deriving the final model, and in revising the conceptual framework by including the significant variables only for objectivity. The variables were arranged based on the impact of the independent variables. Figure 4.6 presents results of the new conceptual framework

Independent variables **Dependent variable**

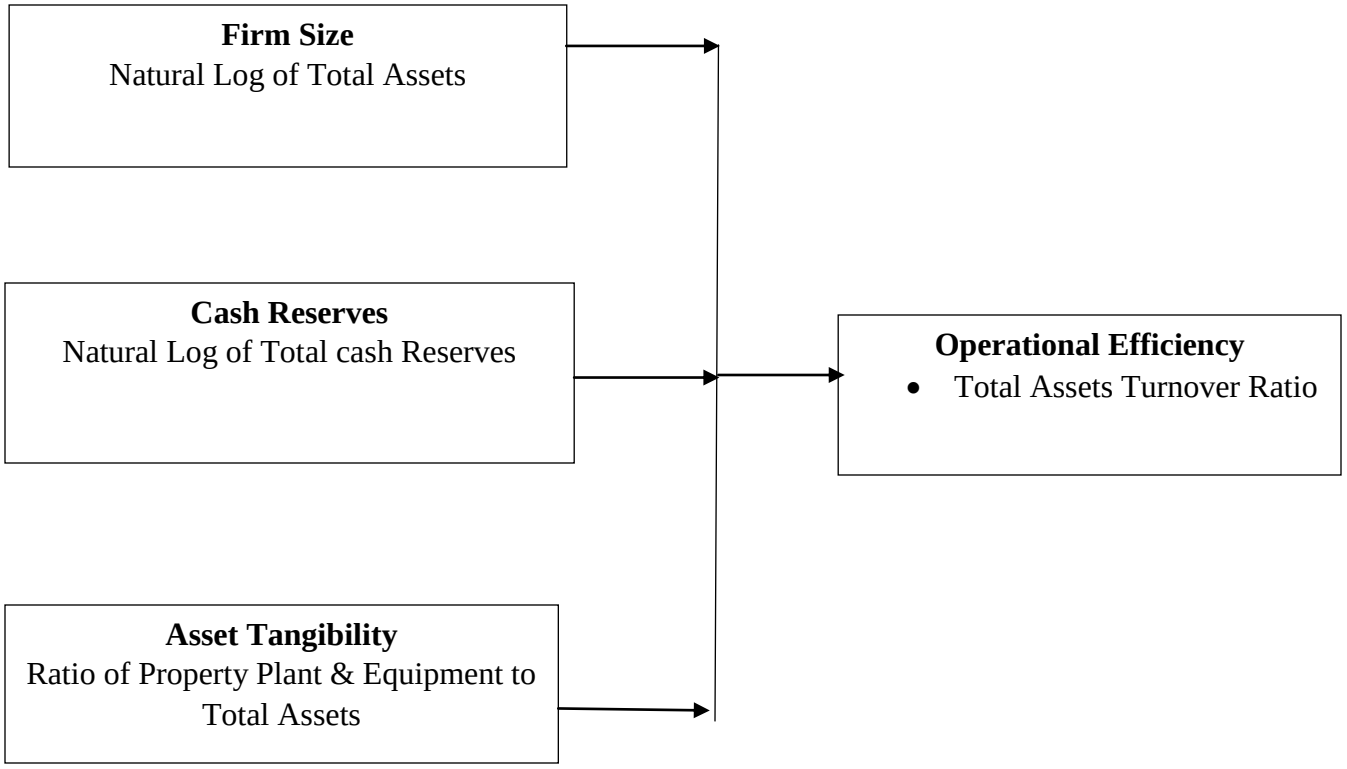


Figure 4. 6: Revised Conceptual Framework

Regression results after including the significant variables only are presented in tables 4.21 and 4.22

Table 4. 21 Regression on Total Asset Turnover Ratio

Linear regression, correlated panels corrected standard errors (PCSEs)

Group variable:	firm1	Number of obs =	70
Time variable:	year	Number of groups =	7
Panels:	correlated (balanced)	Obs per group: min =	10
Autocorrelation:	no autocorrelation	avg =	10
		max =	10
Estimated covariances =	28	R-squared =	0.3188
Estimated autocorrelations =	0	Wald chi2(3) =	46.65
Estimated coefficients =	4	Prob > chi2 =	0.0000

TOTALASSETSTUR~O	Panel-corrected Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
logFIRMSIZE	-.0782337	.0339095	-2.31	0.021	-.144695	-.0117724
logCASHRESERVES	.0639034	.0159094	4.02	0.000	.0327215	.0950853
ASSETTANGIBILITY	-.2888513	.1293888	-2.23	0.026	-.5424486	-.0352539
_cons	.9745281	.3057162	3.19	0.001	.3753355	1.573721

Table 4. 22 Regression on Equity Turnover Ratio

```
Linear regression, correlated panels corrected standard errors (PCSEs)

Group variable:    firm1                       Number of obs      =        70
Time variable:     year                        Number of groups   =         7
Panels:            correlated (balanced)       Obs per group: min =        10
Autocorrelation:   no autocorrelation                         avg =        10
                                                              max =        10
Estimated covariances      =        28         R-squared          =    0.2689
Estimated autocorrelations =         0         Wald chi2(3)       =     42.33
Estimated coefficients     =         4         Prob > chi2        =    0.0000
```

EQUITYTURNOVER~O	Panel-corrected Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
logFIRMSIZE	-.1079641	.0452041	-2.39	0.017	-.1965626	-.0193657
logCASHRESERVES	.0805408	.0214215	3.76	0.000	.0385555	.1225262
ASSETTANGIBILITY	-.3963106	.1784459	-2.22	0.026	-.7460582	-.046563
_cons	1.394824	.3958569	3.52	0.000	.6189591	2.170689

Table 4.23presents the summary of regression coefficients and the fitted regression model was:

$$\boldsymbol{Y = 0.097 - 0.078X_1 + 0.064X_3 - 0.289X_4}$$

Where: Y = Total asset turnover ratio, X_1=Firm size, X_3=Cash reserves and X_4= Tangibility

Table 4. 23 Summary of Findings

	TOTAL ASSET TURNOVER RATIO		EQUITY TURNOVER RATIO	
Variable	Coef.	P>|z|	Coef.	P>|z|
ASSETTANGIBILITY	-0.289	0.026	-0.396	0.026
Log FIRMSIZE	-0.078	0.021	-0.108	0.017
Log CASHRESERVES	0.064	0.000	0.081	0.000

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS & RECOMMENATIONS

5.1 Introduction

This chapter presents a summary of the major findings of this study, sets best practice and suggests areas for further research based on the findings. This study examined the association between firm characteristics and operational efficiency of agricultural firmswho's shares are trading at the Nairobi securities exchange.

5.2Summary of major findings

This section presents a summary of major findings

5.2.1 Relationship between firm size and operational efficiency

The first objective of this study was to determine the relationship firm size and operational efficiency of agricultural companies listed at Nairobi securities exchange. The study found a significant negativerelationship between firm size and operational efficiency. This implies that a percentage rise in firm size leads to a reduction operational efficiency holding all other factors constant.

5.2.2 Relationship between cash reserves and operational efficiency

The third objective was to evaluate the associationamongst cash reserves and operational efficiency of agricultural companies quoted at the Nairobi securities exchange. The study established a significant positive association between cash reserves and operational efficiency implying that a percentage increase in cash reserves will cause a rise in operational efficiency holding all other factors constant.

5.2.3 Relationship between asset tangibility and operational efficiency

The fourth objective of this study was to establish the relationship between asset tangibility and operational efficiency of agricultural companies listed at the Nairobi securities exchange. The study found a significant negative relationship between asset tangibility and operational efficiency. This implies that a unitary increase in asset tangibility leads to a reduction in operational efficiency holding other factors constant.

5.3 Conclusion of the Study

Based on the findings the study concluded that there is a negative significant relationship between firm size and operational efficiency of agricultural companies listed at the Nairobi securities exchange. Firm size can influence the firm's operational efficiency because large firms can be more efficient because of using more specialized inputs and better coordinating of resources. Small firms can be more efficient because they have flexible non-hierarchical structures and do not suffer from the agency problem. Large firms enjoy economies of scale, operate at optimal industry performance standards and are less vulnerable compared to small firms.

There is a positive significant relationship between cash reserves and operational efficiency of agricultural companies listed at Nairobi securities exchange. Cash is the most liquid asset because of its portability and acceptability. Firms need liquid assets that can be converted into cash easily when need arises. Firms should have access to an adequate supply of cash. Accessibility to cash is an important tool for ascertaining financial health of the firm. Firms can finance their investments using cash reserves when they cannot access external finance. Cash reserves enables firms to address emergencies and meet their obligations when earnings are low.

Firms with an adequate supply of cash reserves have the necessary liquidity to pay for immediate purchases and invest in potential investments while firms with insufficient cash reserves must borrow to remain afloat.

There is a negative significant relationship between asset tangibility and operational efficiency of agricultural companies listed at Nairobi securities exchange. Asset tangibility is the ratio of property plant and equipment to total assets. Managers of competitive firms' mix tangible and intangible assets effectively and efficiently. According to trade of theory there is a positive relationship between asset tangibility and leverage. Tangible assets can be collateralised easily and they suffer minimal loss of value when firms are faced by financial distress. Firms with a large proportion of tangible assets have a high liquidation value because tangible assets constitute collateral for loans in the event of bankruptcy. Managers of solvent firms can enhance the value of the firm by allocating assets to better uses. Tangible assets are the cheapest source of funds for firms that are in financial distress. Sale of assets enables a firm to finance the operation of remaining assets without acquiring external debt.

5.4 Recommendations of the Study

This study recommends that management of agricultural companies listed at Nairobi securities exchange should pay attention on asset tangibility, firm size and cash reserves because this study found that they have significant relationship with operational efficiency. This study noted that asset tangibility, cash reserves and firm size have an impact on the operational efficiency of listed agricultural companies at the Nairobi securities exchange. The mix of tangible and intangible assets should be effective and efficient. Managers should ensure that the firms property plant and equipment is in working condition. Mangers of solvent firms can enhance the

value of the firm by ensuring that assets are fully employed. Managers should carefully utilize the fixed assets component of their total assets in order to positively impact the firm's operational efficiency. Firms can utilize productive assets as collateral for debt without incurring high borrowing costs

Firms need access to an adequate supply of cash because accessibility to cash reserves is an important factor for ascertaining the financial health of the firm. Firms require adequate cash reserves to pay for immediate purchases and invest in potential investments. Cash reserves will enable firms to address emergencies and meet their obligations when earnings are low. Firm size can influence the firm's operational efficiency because large firms can improve efficiency by investing in the latest technology and coordinating resources properly. Large firms enjoy economies of scale, operate at optimal industry performance standard and are less vulnerable to shocks compared to small firms. The firm size should be optimal because very large firms are characterised by inefficiencies due to control weaknesses.

This study recommends that government through the ministry of agriculture should formulate policies that incentivise the use of labour-intensive techniques in the Agricultural sector. Quality control processes on the farms require human intervention to examine farm produce for defects. This study found that firm size and asset tangibility have a negative significant effect on operational efficiency of agricultural companies listed at Nairobi securities exchange.Based on this finding firms in the agricultural sector should focus more on enhancing skills of their human capital as opposed to mechanizing their operations.

The study found significant relationships between firm characteristics and operational efficiency of agricultural companies listed at Nairobi securities exchange. Policy makers should incorporate factors such as asset tangibility, firm size and cash reserves in their strategic plans. Government

policy makers should consider the findings of this study when evaluating the operational efficiency of listed agricultural companies in Kenya. This study has contributed to the knowledge on firm characteristics and has advanced further the existing literature on operational efficiency. This study recommends that academicians and scholars should develop theories on operational efficiency that will improve the knowledge of finance in developing countries.

The study has made several contributions to existing literature: the study findings will be useful to managers when evaluating asset tangibility, cash reserves and firm size because this study established significant relationships between these firm characteristics and operational efficiency; this study explored the relationship between firm characteristics and operational efficiency thereby adding value to past findings and has deepened understanding on how asset tangibility, cash reserves and firm size affects operational efficiency. This study has laid the foundation for identifying and testing, indicators and hypothesis to verify theories. The findings of this study will inspire other scholars to conduct researchand add to the presentworks on operational efficiency.

5.5 Areas for further research

This study examined the associationamongst firm characteristics and operational efficiency of agricultural companies trading at the Nairobi securities exchange. Further research can be conducted on other companies in Kenya and compare results to those of the present study.

This study focused on firm size, liquidity, leverage, cash reserves and asset tangibility as independent variables. Further research can incorporate moderating variables and other firm characteristics such as firm age, number of employees, growth, profitability, acid test ratio and

cash ratio.Since the R squared was less than 100%, it implies that the study did not address other firm characteristics that affect operational efficiency. Other studies should include other firm level characteristics such as firm age, number of employees, log of market capitalisation, unique technology, growth and profitability that may affect operational efficiency.

5.6 Limitations of the study

Four of the agricultural firmsquoted at the Nairobi securities exchange did not employ debt during the period of the study. This was a major constraint because the study had to drop leverage as one of the independent variables in order to have a balanced data set.The study collected secondary data from the audited accounts of agricultural companies listed at Nairobi securities exchange. Year 2010 audited accounts for one of the companies was not available because of change in the year end from 31st December to 31st March and the researcher had to change the period of the study from 2010 – 2020, to 2011 – 2020 thereby reduce the number of observations from 77 to 70.

References

Muritala, T. A. (2012). An Empirical Analysis of Capital Structure on Firms' Performance in Nigeria. *International Journal of Advances in Management and Economics 1 (5),* 116 - 124.

Abor, J. (2007). Debt policy and performance of SMEs: evidence from Ghanaian and South African firms. *Journal of Risk Finance 4 (8),* 364 - 379.

Adams, M. (1996). Investment's earnings and the characteristics of life insurance firm: New Zealand evidence. *Australian Journal of Management, 21 (1),* 41 - 55.

Adams, M., & Buckle, M. (2003). The determinants of corporate financial performance in the Bermuda insurance market. *Applied Financial Economics, 13 (2),* 133 143.

Ahmed, N., Ahmad, Z., & Ahmed, I. (2010). Determinants of Capital Structure: A Case of Life Insurance Sector of Pakistan. *European Journal of Economics, Finance and Administrative Sciences, (24).*

Akenga, G. (2017). Effect of liquidity on financial performance of firms listed at the Nairobi Securities Exchange. *International Journal of Science and Research,* 279 - 285.

Akintoye , I. R. (2008). Effect of capital structure on firms' performance: the Nigerian experience. *European Jounal of Economics Finance and Administrative Sciences, 10,* 233 - 43.

Alarcón, S. (2007). Debt Financing and Efficiency in Agricultural Firms. *Adding Value to the Agro-Food Supply Chain.* Barcelona: 1 - 13.

Ali, M., Mahmoud, A., Fadi, A., & Mohammad, O. (2018). Factors affecting the corporate performance: Panel data analysis for listed firms in Jordan. *Academy of Accounting and Financial studies Journal 22(6),* 1-10.

Alkhatib, K. (2012). The Determinants of Leverage of Listed companies. *International Journal of Business and Social Sciences* , 78 - 83.

Aluoch, M. O., Mwangi, C. I., Kaijage, E. S., & Ogutu, M. (2020). The Relationship between Corporate Governance,Financial Characteristics, Macroeconomic Factors and Performance of Firms Listed at the Nairobi Securities Exchange. *European Scientific Journal*, 169 - 194.

Amadi, S. N., & Akani, W. H. (2005). *Interest rate and private domestic investment in Nigeria (1993-2004).* Niger Delta University Press.

Amer, H. H., Moustafa, W., & Eldomiaty, T. (2011). Determinants of Operating Efficiency for Lowly and Highly Competitive Banks in Egypt. *Cambridge Business & Economics Conference*, 1-35.

Amihud, Y., & Mendelson, H. (1991). Liquidity, maturity, and the yields on US Treasury securities. *The Journal of Finance*, 1411 - 1425.

Baltagi, B. H., Bratberg, E., & Holmås, T. H. (2005). A panel data study of physicianslabor supply: the case of Norway. *Health Economics, 14(10)*, 1035-1045.

Bashar, S. M., & Islam, M. I. (2014). Determinants of Profitability in the Pharmaceutical Industry of Bangladesh. *Journal of SUB*, 56 - 76.

Bates, T. W., Kahle, K. M., & Stulz, R. M. (2009). Why do US firms hold so much more cash than they used to? *Journal of Finance, 64*, , 1985–2021.

Baum, R. J., & Wally, S. (2003). Strategic decision speed and firm performance. *Strategic management journal*, 1107 - 1129.

Beauvais, A. M., Stewart, J. G., Denisco, S., & Beauvais, J. E. (2014). Factors related to academic success among nursing students: A descriptive correlational research study. *Nurse Education Today*, 918 - 923.

Behn, B. K., DeVries, D., & Lin, J. (2010). The Determinants of Transparency in Nonprofit Organizations: An Exploratory Study. *Advances in Accounting*.

Berger , A. N., & Mester, L. J. (1997). Inside the black box: what explains differences in the efficiencies of financial institutions . *Journal of Bankinh and Finance* , 895 - 947.

Berger, A. N., Hunter , W. C., & Timme, s. G. (1983). The efficiency of financial institutions : A review and preview of resaerch past , present and future. *Journal of Banking and Finance*, 221 - 249.

Bhagavath , V. (2009). Technical Efficiency Measurement by data envelopment analysis: An Application in Transportation Model. *Alliance Journal of Business Research* , 60 - 72.

Bhagavath, V. (2009). Technical efficiency measurement by data envelopment analysis:An application in Transportation Model,. *Alliance Journal of Business Research*.

Bhunia, A. (2010). A trend analysis of liquidity managment efficiency in selected private sector Indian steel Industry. *International Journal of Research in Commerce and Managment*, 9 - 21.

Blackstone , J. H. (2010). Theory of constraints - A status Report. *International Journal of Production Research*, 1053 - 1080.

Boadi, K. E., Antwi, S., & Lartey, C. V. (2013). Determinants of Profitability of Insurance Firms in Ghana. *International Journal of Business and Social Research*, 43 - 50.

Brigham, E. B., & Davis, P. R. (2018). *Intermediate Financialmanagement, 13th Edition.* Amazon.co.uk.

Camp, W. (2001). Formulating and Evaluating Theoretical frameworks for Career and Technical Education Research. *Journal of Vocational Research.*

Campello, M., & Giambona, E. (2011). Capital structure and the redeployability of tangible assets. *Journal of small business management*, 60.

Carrioni - i - Silvestre, J. L., & Sanso, A. (2006). Testing the null of cointegration with structural breaks. *Oxford Bulletin of Economics and Statistics, 68* , 623 - 646.

Charnes, A., Cooper, W., & Rhodes, E. (1978). Measuring the Efficiency of Decision Making Units. *European Jounal of Operational Research*, 429 - 444.

Chechet, I. L., & Olayiwola, A. B. (2014). Capital structure and profitability of Nigerian quoted firms: The agency cost theory perspective. *American International Journal of Social Science*, 139 - 158.

Cherutich , C. K., & Irungu, A. M. (2020). Liquidity and performance of selected firms listed at Nairobi Securities Exchange. *African Journal of emerging Issues*, 1 - 16.

Chesang, D., & Ayuma, C. O. (2016). Effect of Financial Leverage on Profitability of Listed Agricultural firms at the Nairobi Securities Exchange. *International Journal of Economics Commerce and Managment*, 445 - 493.

Choi, I. (2001). Unit root tests for panel data. *Journal of international money and Finance* , 249-272.

Clementi, D. (2001). *Financial markets: Implications for financial stability, Banca D'Italia conferenc on international banking and financial systems evolution and stability.* Bradford: MCB University Press.

CMA. (2015, 23 June). *CapitalMarkets Authority of Kenya Code Of Corporate Governance Practices for Issuers of Security to the Public.* Retrieved from Capital Markets Authority Website: http://www.cma.or.ke

Cockburn, I. M., & Henderson, R. M. (2001). Scale and scope in drug development unpacking the advantages of size in pharmaceutical research. *Journal of health economics, 20(6),* 1033 - 1057.

Cohen, W. M. (1995). Absorptive capacity: a new perspective on learning and innovation. *innovation. Administrative Science Quarterly, 35(1),* 128 - 152.

Colburn, C., & Talley, W. (1992). A Firm-Specific Analysis of Economies of Size in the U.S. Urban Multiservice Transit Industry. *Transportation Research,,* 195-206.

Coleman, M., & Baidoo, J. M. (2020). The Interaction of Financial Leverage and Firm's Operational Efficiency. *Business and Economic Research, 1 (10),* 235 - 250.

Dalci, I., & Ozyapici, H. (2018). effect of leverage.Working capital management policy in health care: The effect of leverage. *Health Policy, 122 (11),* 1266 - 1272.

Darrab, I. A., & Khan, M. R. (2010). Development of Analytical Relation between Maintenance, Quality and Productivity. *Journal of Quality Maintenance,* 341 - 353.

Daskalakis, N., & Psillaki, M. (2008). Do country or firm factors explain capital structure? Evidence from SMEs in France and Greece. *Applied Financial Economics* , 87 - 97.

Davydenko, S. A. (2012). When do firms default? A study of the default boundary. *Journal of Management Research,* 266 - 289.

Dean, T. J., Brown, R. L., & Bamford, C. E. (1998). Differences in large and small firm responses to environmental context: Strategic implications from a comparative analysis of business formations. *Strategic Managment Journal*, 709 - 728.

Defee, C., Williams, B., Randall, W. S., & Thomas. (2010). An inventory of theory in logistics and SCM research. *The International Journal of Logistics Management*, 404-489.

Degryse, H., de Goeij, P., & Kappert, P. (2012). The impact of firm and industry characteristics on small firms' capital structure. *Small Business Economics*, 431 - 447.

Deloof, M. (2003). Does working capital management affect profitability of Belgian firms? *Journal of Business,Finance and Accounting, 30 (3 4)*, 573 - 588.

Demirgünes, K. (2016). The Effect of Liquidity on Financial Performance: Evidence from Turkish Retail Industry. *International Journal of Economics and Finance; 8 (4)*, 63 - 79.

Djiogap, C. F., & Ngomsi, A. (2012). Determinants of bank long term lending behaviour in the Central African Economic and Monetary Community (CEMAC). *Review of Economics and Finance*, 107 - 114.

Dogan, M. (2013). Does firm size affect the firm profitability? Evidence from Turkey. *Reserch Journal of Finance and Accounting* , 53 - 59.

Donaldson, L., Schoorman, F. D., & Davis, J. H. (1997). Toward a stewardship theory of management. *Academy of Management Review, 22*, 20 - 47.

Ebrati, M., Emadi, F., Balasang, R., & Safari, G. (2013). The Impact of Capital structure on firm performance: Evidence from Tehran Stock Exchange. *Australian Journal of Basic and Applied Scienc, 7(4)*, 1 - 8.

Elangkumaran, P., & Nimalathasan, B. (2013). Leverage and its Impact on Earnings and Share Price, 2(4). 166 - 171.

Eljelly, A. M. (2004). Liquidity-profitability tradeoff: an empirical investigation in an emerging market. *International Journal of Commerce and Management, 14(2)*, 48 - 61.

Evans, D. S. (1987). Tests of Alternative Theories of Firm Growth. *Journal of Political Economy, University of Chicago Press*, 657-674.

Fama, E. F., & French, K. R. (2002). Testing trade-off and pecking order predictions about dividends and debt. *The review of financial studies*, 1 - 33.

Fama, E. F., & Jensen, M. C. (1983). Separation of Ownership and Control. *Journal of Law and Economics, 26(2)*, 301 - 325.

Fischer, E. O., Heinkel, R., & Zechner, J. (1989). Dynamic capital structure choice:Theory and tests. *The Journal of Finance*, 19 - 40.

Freeman, R. E. (1984). *Strategic Management: A Stakeholder Approach.* London: Pitman.

Frees, E. W. (2004). *Longitudinal and Panel Data: Analysis and Applications for social Sciences.* Cambridge University Press.

Galbreath, J., & Galvins, P. (2008). Firm factors, industry structure and performance variation: New empirical evidence to a classic debate. *Journal of Business Research*, 109-11.

Ganguli, S. K. (2013). Capital Structure - Does ownership structure matter? Theory and Indian evidence. *Studies in Economics and Finance*, 56 - 72.

Gill, A. S., & Biger, N. (2013). The impact of corporate governance on working capital management efficiency of American manufacturing firms. *Managerial Finance, 39 (2),*, 116 - 132.

Gill, A., Singh, M., Mathur, N., & Mand, H. S. (2014). The Impact of Operational Efficiency on the Future Performance of Indian Manufacturing Firms. *International Journal of Economics and Finance*, 259 - 269.

Glen, J. D., & Pinto, B. (1998). Debt or Equity? How firms in /developing countries choose. *IFC Discussion Paper* , 1 - 16.

Goddard, J., Tavakoli, M., & Wilson, J. O. (2005). Determinants of profitability in European manufacturing and services: E vidence from a dynamic panel model. *Applied Financial Economics, 15 (18)*, 1269 - 1282.

Goel, S. (2012). The Link between operational efficiency and solvency: the food processing industry in India. *Accountancy Business and the Public Interest*.

Goel, U., Chadha, S., & Sharma, A. K. (2015). Operating liquidity and financial leverage :Evidences from Indian machinery industry. *Procedia Social and Behavioral Sciences , 189*, 344 350.

GOK. (2010). *Agricultural Sector Development Strategy*. Nairobi: Government Printer.

Gomes, C., Kruglianskas, I., & Scherer, F. L. (2009). Company Size Effect in Innovative Performance. *Journal of Technology Management & Innovation, 4 (4)*, 61 - 91.

Government of Kenya. (2011). *Medium-Term Expenditure Framework 2011/12 – 2013/14: Report for the Agriculture and Rural Development Sector*. Nairobi: KE: Government Printers.

Graham, J., Li, S., & Qiu, J. (2012). Managerial attributes and executive compensation. *Review of Financial Studies*, 144 - 186.

Gujarati, D., & Porter, D. (2003). Multicollinearity: What happens if the regressors are correlated. *Basic econometrics*, 363.

Gweyi, M., Minoo, E., & Luyali, N. (2013). Determinants of Leverage of Savings and Credit Co-Operatives in Kenya: An Empirical Approach. *International Journal of Business & Commerce, 2(10)*.

Hackbarth, D., Hennessy, C. A., & Leland, H. E. (2007). Can the trade-off theory explain debt structure. *Review of Financial Studies,20(5)*, 1389 - 1428.

Hacker, S., & Hatemi, J. A. (2006). Test for causality between integrated variables using asymptotic and bootstrap distributions:Theory and application. *Applied Economics, 38,* 1489 - 1500.

Hacker, S., & Hatemi, J. A. (2012). A bootstrap test for causality with endoge nous lag length choice: Theory and application in finance. *Journal of Economic Studies, 39* , 144 - 160.

Hall, S., & Vila, A. (2002). The role of corporate balance sheets and bank lending policies in a financial accelerator framework. *Journal of Finance,* 97 - 155.

Hartley, P. R., & Medlock III, K. B. (2013). Changes in the Operational Efficiency of National Oil Companies. *International Association for Energy and Economics*, 27 - 57.

Hawawini, G., Subramanian, V., & Verdin, P. (2003). Is performance driven by industry- or firm- specific factors? A new look at the evidence. *Strategic Managment Journal*, 1-16.

Herciu, M., Ogrean, C., & Belascu, L. (2012). Leveraging tangible and intangible assets by using a possible firm competitiveness index. *Global business and economics review*, 115 - 124.

Heshmati, A., & Kim, H. (2011). The R&D and productivity relationship of Korean listed firms. *Journal of Productivity Analysis*, 125 - 142.

Hitt, M., & Ireland, R. D. (1987). Peters and Waterman revisited: The un-ended quest for excellence. *Academy of Management Executives, 1 (2)*, 91 - 28. Retrieved from http://dx.doi.org/10.5465/AME.1987.4275812: http://dx.doi.org/10.5465/AME.1987.4275812

Hsiao, C. (2007). Panel data analysis—advantages and challenges. *Test, 16(1),* 1 - 22.

Huang, C. W., Chiù, Y. H., Ting, C. T., & Lin, C. H. (2012). Applying a hybrid DEA model to evaluate the influence of marketing activities to operational efficiency on Taiwan's international tourist hotels. *Journal of the operational research society*, 549 - 560.

Iltas, Y., & Demigranues, K. (2020). Asset Tangibility and Financial Performance: A Time Series Evidence. *Ahi Evran Üniversitesi Sosyal Bilimler Enstitüsü Dergisi (AEÜSBED)*, 345-364.

Irungu, A. M. (2019). Effect of firm level factors on financial performance of listed firms in Nairobi Securities Exchange. *Unpublished PHD Thesis, Nairobi : University of Nairobi*.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance and takeovers. *American Economic Review, 76*, 323 - 329.

Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *American Economic Review, 76 (2)*, 323 - 329.

Jensen, M. C., & Meckling, W. (1976). Theory of the firm: managerial behaviour, agency costs, and capital structure. *Journal of Financial Economics 3*, 305 - 360.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm: Managerial Behaviour, Agency Costs and Ownership Structure. *Journal of Financial Economics, 3*, 305 - 360.

Jepkemoi, E. (2017). Determinants of bank's profitability in Kenya. *Masters Thesis University of Nairobi*.

Kaguri, A. W. (2013). Relationship between firm characteristics and financial performance of life insurance companies in Kenya. *Unpublished PhD project . University of Nairobi*.

Kalluru, S., & Bhat, K. (2009). Determinants of Cost Efficiency of Commercial banks in India. *ICFAI Journal of Bank Management, 8(2)*, 32c-b50.

Kanga, O. S., & Achoki, G. (2017). Liquidity and financial performance in Agricultural firms listed in the Nairobi Securities Exchange in Kenya. *International Journal of Business and Social Science, 7(7)*, 57 - 65.

Kanu, C. C. (2015). The Impact of Capital Structure on Corporate Performance in Nigeria: A Study of Selected Companies, . *Unpublished PhD dissertation, Owerri Federal University of Technology*.

Kaplan , R. S., & Norton, D. P. (2008). Mastering the Management System. *Havard business Review*, 62 - 57.

Karani , J. W. (2018). Business process outsourcing, Operational Efficiency, Firm characteristics an performance of oil and gas distribution firms in Kenya. *Unpublished PhD Thesis, University of Nairobi*.

Kavala, J. (2016). Effects of financing strategies on operational efficiency of deposit taking Saccos and Cooperative Societies in Nairobi county. *Unpublished MSc Thesis Nairobi, University of Nairobi*.

Keynes, J. M. (1936). *The General Theory of employment, interest and money.* London: Macmillan for the Royal Economic Society.

Kim, C., Mauer, D., & Sherman, A. (1998). The Determinants of Corporate Liquidity: Theory and Evidence . *Journal of Financial and Quantitative Analysis, 33*, 335 - 359.

Kimenchu, L. G. (2018). Effects of Capital Structure on finacial performance of Agricultural firms listed in the Nairobi Securities Exchange. *Unpublished MBA Thesis Nairobi, USIU*.

Kimondo, C. N., Irungu, M., & Obanda, M. (2016). The impact of liquidity on the financial performance of the nonfinancial firms quoted on the Nairobi Securities Exchange. *Research Journali's Journal of Accounting, 4 (2)*, 1 - 12.

Kingori, S. N., Kioko, W. C., & Shikomo, H. D. (2017). Determinants of Financial Performance of Microfinance banks in Kenya. *Research Journal of Finance and Accounting, 8 (16)*, 1 - 8.

Kioko, N. P. (2013). The relationship between firm size and financial performance of commercial banks in Kenya. *commercial banks in Kenya. Unpublished Master's thesis, Nairobi: University of Nairobi*.

Köksal, B., Orman, C., & Oduncu, A. (2013). Determinants of capital structure: evidence from a major emerging market economy. *MPRA Paper, 48415*.

Kombo, D. K., & Tromp, D. L. (2009). *Introduction to proposal writting.* Nairobi: Pauline publications.

Kong, Y., Musah, M., & Agyemang, A. O. (2019). Liquidity and Financial Performance: A Correlational Analysis of Quoted Non-Financial Firms in Ghana. *International Journal of Trend in Scientific Research and Development (IJTSRD) 3 (5),* 133 - 143.

Kothari, C. (2004). *Research Methodology: Methods and Techniques.* New Delhi: Wishwa Prakashan.

Kubai, D. K. (2016). The Effect of Non-Performing Loans on Operational efficiency of Commercial Banks in Kenya. *Unpublished MSC Thesis Nairobi, University of Nairobi*.

Kubai, D. K. (2016). The effects of non-performing loans on operational efficiency of commercial banks in Kenya. *Unpublished Master of Science thesis, Nairobi. University of Nairobi*.

Kuosmanen, T., & Johnson, A. L. (2010). Data Envelopment Analysis as non parametric least squares regression. *Operations Research*, 149 - 160.

Lee, K. W., & Lee, C. F. (2009). Cash holdings, corporate governance structure and firm valuation. *Review of Pacific Basin Financial Markets and Policies, 12(3),* 475–508.

Lin, D., & Lin, L. (2018). Corporate governance and firm performance: a study of high agency costs of free cash flow firms. *Journal of Social Science Research*, 2724-2731.

Lotto, J. (2019). Evaluation of factors influencing bank operating efficiency in Tanzanian banking sector. *Cogent Economics & Finance*, 1 - 14.

Lozano, M. B. (2011). Analysing the effect of excess cash accumulation on financial decisions. *Applied economics*, 2687–2698.

Lukorito, S. N., Muturi, W., Nyang'au, A. S., & Nyamasege, D. (2014). Assessing the effect of liquidity on profitability of commercial banks in Kenya. *Research Journal of Finance and Accounting 5 (19)*, 145 - 152.

Lusy, Hermanto, Y. B., Panjaitan, T. W., & Widyastui, M. (2018). Effects Current Ratio and Debt- To- Equity Ratio on Return on Asset and Return on Equity. *International Journal of Business and management Invention 7(12)*.

Maina, W. (2014). Challenges Facing Nairobi Securities Exchange. *Economy & finance Publication*.

Majakusi, J. (2016). Effect of Liquidity Managment on the financial performance of commecial banks in Kenya. *Unpublished MBA Thesis, Nairobi. University of Nairobi*.

Maki, D. (2012). Tests for cointegration allowing for an unknown number of breaks. *Economic Modelling, 29* ,, 2011 2015.

Makori, D. M., & Ambrose, J. (2013). Working capital managment and firm profitability: Empirical evidence from manufacturing and construction firms listed on Nairobi Securities Exchange. *International Journal of Accounting and Taxation 1 (1)*.

Malik, H. (2011). Determinants of insurance companies' profitability: an analysis of insurance sector of Pakistan. *Academic Research International, 1, (3)*.

Margaritis, D., & Psillaki, M. (2007). Capital structure and firm efficiency . *Journal of Business Finance & Accounting, 34*, 1447-1469.

Maroa , J. G., & Kioko, C. W. (2016). Determinants of profitability of Agricultural firms listed on the Nairobi Securities Exchange. *Interntional Journal of Economics Commerce and Mnagment,* 225-235.

Masavi, J. M., Kiweu, M., & Kinyili, J. (2017). Capital Structure and Financial Performance of Agricultural Companies listed in Nairobi Securities Exchange. *International Journal of Economics, Commerce and Management, 5 (11),* 653 - 665.

McMahon, R. G. (2001). Business growth and performance and the financial reporting practices of Australian manufacturing SMEs. . *Journal of Small Business Management*, 152 - 164.

Mehari, D., & Aemiro, T. (2013). Firm Specific Factors the determine insurance companies' performance in Ethiopia. *European Scientific Journal, 9 (10),* 245 - 255.

Melitz, M. J., & Ottaviano, G. I. (2008). Market size, trade, and productivity. *The review of economic studies*, 295 - 316.

Mentzer, J. T., Stank, T. P., & Esper, T. L. (2008). Supply chain management and its relationship to logistics, marketing, production, and operations management. *management. Journal of business logistics*, 31 - 46.

Mesut, D. (2013). Does Firm Size Affect the Firm Profitability: Evidence from Turkey. *Research Journal of Finance and Accounting, 4 (4)*, 53 - 59.

Mikkelson, W. H., & Partch, M. M. (2003). Do Persistant Large Cash Reserves Hinder Performance. *Jounal of Financial and Quantitative Analysis, 38 (2)*, 275 - 294.

Mills, D. E., & Schumann, L. (1985). Industry structure with fluctuating demand. *American Economic Review,*, 75, 758-757.

Modigliani, F., & Miller, M. H. (1963). Corporate Income Taxes and the Cost of Capital: A Correction. . *American Economic Review, 53 (3),* 433 - 443.

Molefe, B., & Muzindutsi, P. (2016). Effect of Capital and Liquidity management on Profitability of Major South African Banks. *Proceedings of the 28th Conference of the South African Institute of Management Scientists.*

Molyneux, P., & Thornton, J. (1992). Determinants of European bank profitability: A Note. *Journal of Bnking nd Finance*, 1173-1178.

Morellec, E. (2001). Asset liquidity, capital structure, and secured debt. *Journal of Financial Economics*, 173 - 206.

Moses, O. G., Edna, M. M., & Newton, C. L. (2013). Determinant of Leverage and Savings of Credit Co-Operatives in Kenya. *International Journal of Business and Commerce 2 (10)*, 58 - 65.

Mugenda, O. M., & Mugenda, A. G. (2003). *Research Methods, Quantitative and Qualitative Approaches.* Nairobi: ACT.

Muller, G. H., Steyn-Bruwer, B. W., & Hamman, W. D. (2009). Predicting financial distress of companies listed on the JSE-a comparison of techniques. *South African Journal of Business Management, 40(1)*, 21 - 32.

Mulyana, A., & Zuraida, M. S. (2018). The influence of liquidity, profitability and leverage on profit managment and its impact on company value in manufacturing company listed on Indonesia Stock Exchange. *International Journal of managerial studies and research 6 (1)*, 8 - 14.

Muturi, J. W. (2019). Financial Leverage and Performance of Agricultural firms listed at Nairobi Securities Exchange. *Unpublished MBA Thesis, Nairobi. Kenyatta University*.

Muturi, J. W. (2019). Financial Leverage and Performance of Agricultural firms listed at the NSE. *Unpublished MBA Thesis Nairobi, Kenyatta University*.

Mutwiri, A. K. (2015). The effect of capital structure decisions on financial performance of firms listed under energy and petroleum sector at the Nairobi Securities Exchange. *Masters Thesis University of Nairobi*.

Mwangi, M. N., & Iraya, C. (2014). The effects of liquidity on financial performance of deposit taking microfinance institutions in Kenya. *Unpublished MBA Research Project, Nairobi: University of Nairobi.*

Myers. (1977). Determinants of corporate borrowing. *Journal of financial economics*, 147 - 175.

Myers, S. (2005). Financing of Corporations. In: Handbook of the Economics and Finance, Constantinides, GM M Harris and R. Stulz (Eds.). *Journal of Finance and Economics*, 215 - 253.

Myers, S. C., & Majluf, N. S. (1984). Corporate Financing and Investment Decisions when Firms Have Information that Investors do not have. *Journal of Financial Economics, 13 (2)*, 187 - 221.

Myers, S., & Rajan, R. G. (1995). *The paradox of liquidity.Working Paper W5143.* Cambridge, MA: National: MA: National Bureau of Economic Research.

Naceur, B. S., & Goaied, M. (2008). The determinants of commercial bank interest margin and profitability: evidence from Tunisia. *Frontiers in Finance and Economics*, 106 - 130.

Nadeem, A. S., & Zongjun, W. (2011). Determinant of Capital Structure, an empirical study of firms in manufacturing industry of Pakistan,. *A journal of Managerial Finance 37 (2)*, 117-133.

Ndolo, P. S. (2015). The relationship between operational efficiency and financial performance of firms listed on the Nairobi Securities Exchange. *Unpublished Msc Thesis University of Nairobi*.

Niresh, A. J., & Velnampy , T. (2014). Firm Size and Profitability: A Study of Listed Manufacturing Firms in Sri Lanka. *International Journal of Business and Management,*, 57-64.

Njoroge, I. M. (2015). Effect of liquidity on the financial performance of construction and allied companies listed on the Nairobi Securities Exchange. *Unpublished Master of science thesis, Nairobi. University of Nairobi*.

Nousheen, T., & Arshad, H. (2013). Impact of firm specific factors on profitability of firms in the food sector. *Open Journal of Accounting*.

NSE. (2016, May 16). *Nairobi Securities Exchange Handbooks.* Retrieved from nse.co.ke: https://www.nse.co.ke

NSE. (2021, February 13). *History of NSE: Nairobi Securities Exchange.* Retrieved from Nairobi Securities Exchange Website: http://www.nsc.co.ke

Nyamao, N. R., Ojera, P., Lumumba, M., Odondo, A. J., & Otieno, S. (2012). Effect of working capital management practices on Financial Performance: A study of small scale enterprises in Kisii South District Kenya. *AfricanJournalofBusinessManagement, 6(18)*, 5807 - 5817.

Nyangweso, G. O., Atambo, W. N., & Mogwambo, V. A. (2019). Effect of liquidity risk managment on the financial performance of commercial banks listed on Nairobi securities Exchange. *International Journal of social sciences and information technology*, 297 - 304.

Nyoro, J. K., Wanjala, M., & Awour, T. (2012). *Increasing Kenya's Agricultural Competitiveness: Firm Level Issues. In Print.* Nairobi : K.E: Acts Press .

Nzioka, P. K. (2013). Firm Size and Financial Performance of Commercial Banks in Kenya. *Unpublished MBA Thesis, Nairobi. University of Nairobi*.

Odalo, S. K., Achoki, G., & Njuguna, A. (2016). Relating Company Size and Financial Performance in Agricultural Firms L isted in the Nairobi Securities Exchange in Kenya. *International Journal of Economics and Finance 8 (9)*, 34 - 40.

Odunga, R. M., Nyangweso, P. M., & Nkobe, D. K. (2013). Liquidity, Capital Adequacy and Operating Efficiency of Commercial Banks in Kenya. *Research Journal of Finance and Accounting*, 76 - 80.

Oganda, J., Mogwambo, V. A., & Otieno, S. (2018). Effect of Cash Reserves on Performance of Commercial Banks in Kenya: Comparative Study between National Bank and Equity Bank Kenya Limited. *International Journal of Academic Research in Business and Social Sciences, 8 (9)*, 685 - 704.

Ogebe, P., Ogebe, J., & Alewi, K. (2013). The Impact of Capital Structure on Firms' Performance in Nigeria.

Oladeji, T., Ikpefan, O. A., & Olokoyo, F. O. (2015). An empirical analysis of capital structure on performance of Firms in the Petroleum Industry in Nigeria. *Journal of Accounting and Auditing: Research*, 1 - 9.

Olaosebikan, O. (2012). *The Determinants of the Profitability of Micro-Life Insurers in Nigeria.* Claverton Down: University of Bath.

Olarewaju, O. M. (2016). Capital base and operational efficiency in Nigerian Deposit Money Banks. *Global Journal of Managment and Business Research*, 1 - 12.

Olongo, O. (2013). The Effects of Financial Fraud and Liquidity management On Financial Performance Of Commercial Banks In Kenya. *Unpublished MBA project Univesity of Nairobi*.

Omondi, M. M., & Muturi, W. (2013). Factors affecting the financial performance of listed companies at the Nairobi Securities Exchange in Kenya. *Research Journal of Finance and Accounting, 4(15),* 99 - 104.

Ongore, V., & Kusa, G. (2013). Determinants of Financial Performance of Commercial Banks in Kenya. *International Journal of Economics and Financial issues, 3 (1),* 237 - 252.

Onyekwelu, L. U., Chukwani, V. N., & Onyeka, V. N. (2018). Effect of Liquidity on Financial Performance of Deposit Money Banks in Nigeria. *Journal of Economics and Sustainable Development, 9 (4),* 19 - 28.

Opala, O. J. (2014). Effect of financial stability on the performance of deposit taking Sacco's in Nairobi County. *Unpublished MBA project Nairobi, University of Nairobi.*

Opler, T. C., & Titman, S. (1994). Financial distress and corporate performance. *The Journal of finance,* 1015 - 1040.

Opler, T., Pinkowitz, L., Stulz, R., & Williamson , R. (1999). The Determinants and Implications of Corporate Cash Holdings. *Journal of Financial Economics, 52,* 3 - 46.

Opoku, W. E. (2015). Liquidity management and its effect on profprofitability in a tough economy: A case of companies listed on the Ghana Stock Exchange. *International Journal of Research in Business Studies and Management, 2(11),* 34 - 66.

Owour, P. O. (2014). The size earnings and the leverage of agricultural companies listed at the Nairobi Securities Exchange. *Unpublished MBA Thesis Nairobi, University of Nairobi*.

Oyelade, A. (2019). The Impact of firm size on firm performance in Nigeria: A comparative study of selected fairms in the building industry in Nigeria. *Asian Development Policy Review, 7 (1),* 1 - 11.

Pandey, I. M. (2005). *Financial management. Vikas Publishing House, PVS LTD.* Vikas Publishing House, PVS LTD.

Pandey, I. M. (2008). *Financial Management.* New Dheli: Vikas Publishing House PVT Limited.

Panzar, J. C., & Willig, R. D. (1981). Economies of scope. *The American Economic Review*, 268 - 272.

Pervan, M., & Višić, J. (2012). Influence of firm size on its business success. *Croatian Operational Research Review*, 213 - 223.

Pervan, M., & Višić, J. (2012). Pervan, M., & Višić, J. (2012). Influence of firm size on its business success. *Croatian Operational Research Review, 3 (1),* 213 - 223.

Pottier, S. (1988). Life insurer financial distress, best's ratings and financial ratios. *The Journal of Risk and Insurance, 65 (2),* 275 - 278.

Prahalathan, B., & Ranjany, R. (2017). The impact of capital structure-choice on firm performance: Empirical investigation of listed companies in Colombo stock exchange, Srilanka. *International Journal of Research in Commerce & Management, 2(4),* 12 - 16.

Pratheepan, T. (2014). A Panel Data Analysis of Profitability Determinants Empirical Results from SriLankan Manufacturing Companies. *International Journal of Economics, Commerce and Management, 2 (12),* 1 - 9.

Rajan, R. G., & Zingales, L. (1995). What do we know about capital structure? Some evidence from international data. *Journal of Finance, 50(5),* 1421 - 1460.

Ramasamy, B., Ong, D., & Yeung, M. C. (2005). Firm Size, Ownership and Performance in the Malaysian Palm Oil Industry. *Asian Academy of Management Journal of Accounting & Finance*, 81 104.

Rao, K. R., & Lakew , T. B. (2012). Determinants of Profitability of commercial Banks in a Developing Country: Evidence from Ethiopia. *International Journal of Accunting and Financial Managment Research*, 1 - 20.

Rao, K. R., & Lakew, T. B. (2012). Determinants of Profitability of Commercial Banks in a Developing Country:Evidence from Ethiopia. *International Journal of Accounting and Financial Management Research* , 1 - 20.

Reid, D. R., & Sanders , R. (2007). Operations strategy and Competitiveness. *Operations managment journal*, 43 - 55.

Reid, D. R., & Sanders, R. (2007). Operations Strategy and Competitiveness. *Operations Management Journal*.

Riportella, C., & Cazorla, P. L. (2001). New approaches to the analysis of the capital structure of SME's: empirical evidence from Spanish firms. *International Journal of Economics*, 159 - 172.

Robichek, A. A., & Myers, S. C. (1966). "Problems in the Theory of Optimal Capital Structure ". *The Journal Financial and Quantitative Analysis*, 1 - 35.

Roy, J. R., & Wilfred, J. E. (2011). Protectionism and Increa sing Returns with Comparative Cost Disadvantage. *PIER Working Paper*, 011 - 027.

Rubin, A., & Babbie, E. R. (2016). *Empowerment series: Research methods for social work.* New York: Cengage Learning.

Runde, J. (1994). Keynesian uncertainty and liquidity preference. *Cambridge journal of Economics*, 129 - 144.

Safdar, M. Z., Awan, M. Z., Ahmed, Z., & Qureshi, M. I. (2016). *International Journal of Economics and Financial Issues*, 144 - 15.

Saleem, Q., & Rehman, U. (2011). Impacts of liquidity ratios on profitability: Case of oil and gas companies of Pakistan. *Interdisciplinary Journal of Research in Business, 1 (7)*, 95 - 98.

Salim, M., & Yadav, R. (2012). Capital Structure and Firm Performance: Evidence from Malaysian Listed Companies. *Procedia - Social and Behavioral Sciences, 65*, 156 - 166.

Santa, R., Ferrer, M., Bretherton , P., & Hyland, P. (2010). Contribution of crossfunctional teams to the improvement in operational performance . *Team Performance Mnagment*, 148 - 168.

Shawk. (2008). *Operational Efficiency a Brand Point Management Perspective.* Retrieved from http://www.schawk.com

Sheikh, N. A., & Wang, Z. (2012). The impact of capital structure on performance: An empirical study of non-financial listed firms in Pakistan. *International Journal of Commerce and Managment, 4 (23)*, 354 - 368.

Sim, J., & Wright, C. (2000). *Research in health care: concepts, designs and methods.* Califonia: Nelson Thornes.

Singh, M., & Faircloth, S. (2005). The impact of corporate debt on long-term investment and firm performance. *Applied Economics 8 (37)* , 875-883.

Sporta, F. O. (2018). Effect of financial distress factors on performance of commercial banks in Kenya. *Unpublished PhD Thesis Nairobi, Jomo Kenyatta University of Agriculture and Technology*.

Stefanou, C. (2006). The Complexity and the Research Area of AIS. *Journal of Enterprise Information Managment*, 9-12.

Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *American Economic Review, 71*, 393 - 410.

Stock, J. H., & Watson, M. W. (1993). A simple estimator of cointegrating vectors in higher order integrated systems. *Econometrica, 61*, 783 - 820.

Storto, C. l. (2013). Benchmarking operational efficiency in the integrated water service provision . Does contract type matter? *Emerald*, 917 - 943.

Sufian, F. (2007). The efficiency of Islamic banking industry: A non-parametric analysis with non-discretionary input variable. *Islamic economic studies,*, 1 -2.

Sufian, F., & Kamarudin, F. (2012, December). "Bank-specific and Macroeconomic Determinants of Profitability of Bangladesh's Commercial Banks". *Bangladesh Development Studies. Vol. XXXV*.

Syed, A. (2015). Impact of liquidity and management efficiency on profitability: An empirical study of selected power distribution utilities in India. *Journal of Entrepreneurship, Business and Economics, 3 (1)*, 31–49.

Taylor, L., & O'Connell, A. S. (1985). A Minsky crisis. *A Minsky crisis. The Quarterly Journal of Economics, 100 (Supplement)*, 871 - 885.

Teece, D., Pisano, G., & Shuen, A. (2008). Dynamic capabilities and strategic managment. *Strategic Managment Journal*, 509 - 533.

Titman, S., & Wessels, R. (1988). The Determinants of Capital Structure Choice. *Journal of Finance 43 (1)*, 1 - 19.

Titman, S., & Wessels, R. (2008). The determinants of capital structure choice. *Journal of finance,* 1 - 19.

Topal, J. L. (2011). Strategies to assist in obtaining an optimal solution for an underground mine planning problem using Mixed Integer Programming. *International Journal of Mining and Mineral Engineering*, 152 - 172.

Trochim, W. M. (2006, October 20). *The Research Methods Knowledge Base, 2nd Ed*. Retrieved from The Research Methods Knowledge Base, 2nd Ed: http://www.socialresearchmethods.net/kb/

Usman, G., & Zahid, M. (2011). Factos influencing performance of microfinance firms in Pakistan: Focus on market orientation. *International Journal of Academic Research,* 125 - 132.

Vatavu, S. (2014). The Determinants of Profitability in Companies Listed on the Bucharest Stock Exchange. *Annals of the University of Petrosani, Economics*, 329 - 338.

Vedran, S. (2012). Capital Structure and Firm Performance in the Financial Sector: Evidence from Australia. *Asian Journal of Finance & Accounting, 4(1).*

Vintila, G., & Nenu, E. A. (2016). Liquidity management and Profitability Analysis on the Romanian Listed Companies. *Journal of Eastern Europe Research in Business& Economics,* 1 - 8.

Wachira, C. W. (2018). Effect of Government funding on operational efficiency of public universities in Kenya. *Unpublished MSC Thesis Nairobi, University of Nairobi*.

Wambugu , E. M. (2014). Influence of Internal controls on operational efficiency of non governmental organisations: A case study of Amref Health Africa in Kenya. *Unpublished M A Thesis, Nairobi. University of Nairobi*.

Wanjiru, C. W. (2018). Effect of Government funding on operational efficiency of public universities in Kenya. *Unpublished Master of science thesis, Nairobi. University of Nairobi*.

Wanjohi, G. (2013). The effect of financial risk management on the financial performance of commercial banks in Kenya. *Unpublished MBA Thesis Nairobi, University of Nairobi*.

Waswa, C. W., Mukras, M. S., & Oima, D. (2018). Effect of Liquidity on Financial Performance of the Sugar Industry in Kenya. *International Journal of Education and Research, 6 (6)*, 30 - 44.

Waswa, C. W., Ndede, F. W., & Jagongo, A. O. (2014). Dividend payout by Agricultural Firms in Kenya: An Empirical Analysis of Firms Listed on Nairobi Securities Exchange. *International Journal of Business and Social Sciences*, 63 - 75.

Widyastuti, M. (2019). Analysis Of Liquidity, Activity, Leverage,Financial Performance And Company Value In Food And Beverage Companies Listed On The Indonesia Stock Exchange. *SSRG International Journal of Economics and Management Studies 6 (5)* , 52 - 58.

Widyastuti, M., Oetomo, H. W., & Riduwan, A. (2017). Working on Capital and Macroeconomic Variables as Value Creation in Indonesian Textile Companies. *International Journal of Business and Finance Management Research, ,* 7 - 16.

Windsor, D., & Boatright, J. R. (2010). Shareholder wealth maximization. *Finance ethics: Critical issues in theory and practice*, 437 - 455.

Wooldridge, J. M. (2005). Fixed-effects and related estimators for correlated random-coefficient and treatment-effect panel data models. *Review of Economics and Statistics, 87(2)*, 385 - 390.

World Bank Group. (2019). Kenya Agriculture Productivity Program, KAPP I and II . *Project Performance Assessment Report*.

Xuezhou, W., Hussain, R. Y., Hussain, H., Saad, M., & Butt, R. S. (2020). Interaction of Asset Tangibility on The Relationship Between Leverage Structure and Financial Distress in Agriculture-Linked Non-Financial Firms. *Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, 649 - 669.

Yazdanfar, D. (2013). Profitability determinants among micro firms: Evidence from Swedish data. *International Journal of Managerial Finance*, 150-160.

Yong, A. G., & Pearce, S. (2013). A Beginner's Guide to Factor Analysis: Focusing on Exploratory Factor Analysis. *Tutorials in Quantitative Methods for Psychology*, 79 - 94.

Yun, J., Ahmad, H., Jebran, K., & Muhammad, S. (2020). Cash holdings and firm performance relationship: Do firm-specific factors matter? *Economic Research-Ekonomska Istraživanja*, 1 - 23.

APPENDIX I

FIRM	FIRM1	YEAR	TOTAL ASSETS TURNOVER RATIO	EQUITY TURNOVER RATIO	FIRM SIZE KSHS '000'	LIQUIDITY	CASH RESERVES KSHS '000'	ASSET TANGIBILITY
EAAGADS	1	2011	0.35	0.69	354922	5.94	605	0.25
	1	2012	0.34	0.33	573356	18.76	524	0.54
	1	2013	0.13	0.17	499561	1.33	512	0.61
	1	2014	0.20	0.27	445793	0.87	450	0.94
	1	2015	0.17	0.28	732548	2.73	3174	0.82
	1	2016	0.17	0.18	761165	5.73	1012	0.85
	1	2017	0.17	0.16	922802	12.83	400	0.84
	1	2018	0.09	0.10	905895	8.77	272	0.87
	1	2019	0.19	0.21	942324	6.98	29845	0.85
	1	2020	0.05	0.06	948581	2.21	3849	0.88
KAKUZI	2	2011	0.68	0.86	3817320	3.35	897332	0.17
	2	2012	0.42	0.56	3571700	8.47	897540	0.15
	2	2013	0.38	0.48	3717543	7.95	904758	0.15
	2	2014	0.45	0.57	3857454	6.66	973690	0.15
	2	2015	0.59	0.72	4555179	4.14	1175434	0.17
	2	2016	0.55	0.69	5064414	4.92	1430576	0.46
	2	2017	0.52	0.65	5746126	3.90	1648749	0.42
	2	2018	0.54	0.68	5941042	5.94	1500935	0.46
	2	2019	0.47	0.55	6461035	11.00	1696130	0.45
	2	2020	0.54	0.65	6906816	11.22	1670124	0.44
KAPCHORUA	3	2011	0.81	1.28	1570203	2.10	88955	0.16

	3	2012	0.80	1.24	1962897	1.65	24884	0.23
	3	2013	0.67	1.05	2078475	2.12	128984	0.20
	3	2014	0.60	0.86	1929161	5.10	134658	0.21
	3	2015	0.55	0.75	1983239	5.63	46844	0.26
	3	2016	0.56	0.74	2329151	4.22	71788	0.20
	3	2017	0.59	0.91	2030309	3.46	132076	0.45
	3	2018	0.63	0.86	2489043	2.92	141961	0.41
	3	2019	0.63	0.97	2033173	4.51	111537	0.45
	3	2020	0.57	0.79	1942002	4.84	56283	0.43
LIMURU TEA	4	2011	0.59	0.68	191242	18.29	6048	0.02
	4	2012	0.45	0.48	320023	12.41	6923	0.01
	4	2013	0.31	0.40	343007	16.87	7767	0.01
	4	2014	0.27	0.37	338601	8.08	7872	0.03
	4	2015	0.36	0.48	342161	5.80	8661	0.01
	4	2016	0.33	0.51	282193	5.17	7409	0.47
	4	2017	0.30	0.43	262009	3.56	7922	0.45
	4	2018	0.41	0.56	268255	3.50	6637	0.39
	4	2019	0.36	0.47	235670	8.37	1219	0.39
	4	2020	0.42	0.51	229696	6.92	307	0.39
REA VIPINGO	5	2011	1.06	1.44	2288740	2.10	32701	0.33
	5	2012	1.10	1.49	2376618	3.41	28301	0.34
	5	2013	0.99	1.23	2797430	4.72	233723	0.30
	5	2014	0.90	1.09	3203131	6.50	241516	0.26
	5	2015	0.88	0.94	4881218	6.77	1177151	0.17
	5	2016	0.90	1.18	4186797	11.55	410680	0.22
	5	2017	0.80	0.97	4609500	14.20	380734	0.42
	5	2018	0.70	0.90	5100213	7.61	635428	0.42
	5	2019	0.65	0.84	5367185	8.49	97142	0.47

	5	2020	0.62	0.79	5831004	9.02	294211	0.44
SASINI	6	2011	0.29	0.39	9462027	2.13	489103	0.25
	6	2012	0.30	0.43	8922980	1.90	268481	0.27
	6	2013	0.31	0.44	9054364	1.77	275364	0.26
	6	2014	0.23	0.23	14929577	2.33	325865	0.56
	6	2015	0.18	0.21	16044527	4.40	1200514	0.55
	6	2016	0.22	0.26	16818463	4.88	1954551	0.52
	6	2017	0.28	0.37	13196025	4.24	1406876	0.67
	6	2018	0.27	0.31	12961380	5.76	1135609	0.67
	6	2019	0.20	0.22	14674359	4.25	429264	0.78
	6	2020	0.28	0.32	14577755	5.74	593689	0.78
WILLIAMSON TEA	7	2011	0.58	0.77	6032743	2.96	840296	0.15
	7	2012	0.54	0.73	7243227	2.41	754517	0.20
	7	2013	0.46	0.60	8023834	3.63	1098343	0.21
	7	2014	0.51	0.53	5819757	8.44	1212045	0.31
	7	2015	0.45	0.39	5809109	8.58	993360	0.38
	7	2016	0.45	0.49	9285306	4.91	1241617	0.22
	7	2017	0.39	0.56	8364127	3.47	949714	0.43
	7	2018	0.45	0.58	9505074	2.99	857518	0.42
	7	2019	0.38	0.53	8271918	4.04	1310543	0.44
	7	2020	0.38	0.50	7900570	3.91	562683	0.49