EFFECT OF WORKING CAPITAL MANAGEMENT ON FIRM VALUE OF COMPANIES LISTED AT THE NAIROBI SECURITY EXCHANGE, KENYA

BY

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DECLARATION

This research project is my original work and it has never been presented in any other university for the award of any degree

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DEDICATION

This work is dedicated to my dear brother Ilyas Ahmed, my mother Asho Dahir, my father Ahmed Mohamed and all my family members for their assistance in terms of financial and love.

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ABBREVIATIONS

ACP	Average Collection Period
APP	Average payment period
ARP	Account Receivable Period
CA	Current Asset
CL	Current Liabilities
CMA	Capital Market Authority
DIO	Days inventory outstanding
DPO	Day's payable outstanding
DSO	Days sales outstanding
ICP	Inventory collection period
KCB	Kenya Commercials Bank
KNBS	Kenya National Bureau of Statistics
MPS	Market price per share
NSE	Nairobi Securities Exchange
NTC	Net trade cycle
SMEs	Small and Medium Enterprises
TA	Total Asset
WC	Working Capital
WCM	Working Capital Management

ABSTRACT

Proper managing of working capital enhances the value of the shareholders. Indeed, the key cause for the failure of most firms, partnerships and small firms is poor working capital management, which entails inventory, receivables, and payables management. The objective of this research is to establish the effect of working capital management on firm value of firms listed at the Nairobi Securities Exchange, Kenya. It also aimed at reviewing the increasing body of theoretical and empirical studies that have endeavored to examine the range of magnitude and effects of the working capital management on corporate value. The target population was all the listed firms at the Nairobi Securities Exchange. Secondary sources of data were employed. Panel data was utilized, data was collected for several units of analysis over a varying time periods. The research employed inferential statistics, which included correlation analysis and panel multiple linear regression equation with the technique of estimation being Ordinary Least Squares (OLS) and so as to establish the relationship of the working capital management and corporate value while incorporating the control effect of firm size, leverage, and sales growth. The study findings were that average collection period, average payment period, firm size, and leverage are negatively significantly associated with firm value. Additionally study findings revealed that the various working capital management practices, firm size, leverage, and sales significantly influenced firm value and they can be utilized to significantly predict firm value. The final study finding was that only firm size had a significant relationship with firm value, t has a significant negative influence on firm value. Policy recommendations were made to the CMA and NSE, and by extension, the National Treasury, to formulate and enforce rules and regulations on working capital management since it has been established that it influences the value of quoted firms. Further recommendations were made to firm management and consultants to implement working capital management in order to boost firm value. Additional recommendations were made to other capital markets' stakeholders like investment banks, equity analysts, and individual investors to search for firms with good working capital management to invest or recommend to invest. Final recommendations were made to firm management and consultants not to concentrate on any one WCM component in isolation but to employ wholesomely good working capital management practices.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The working capital management performs a critical part for the success and failure of the firm since it controls the profitability and liquidity position of the firms. Proper managing of working capital constituents enhances the value of the shareholders. Indeed, the key cause for the failure of most firms, partnerships and small firms is poor working capital management including inventory, receivables and payables management. In order to avoid liquidity risk, it is vital for a firm to have efficient mechanisms of managing the constituents of working capital (Mweta 2018). Rendering to the Kenya National Bureau of Statistics (KNBS), the recent failure of companies such as Nakumatt supermarkets, tuskys supermarkets and Athi river mining has been traced to how liquidity occasioned by poor Working Capital Management(WCM). Insufficient WCM leads to the firm's cash flow being poor causing the company to inability to meet day to day activities (Kiganda, 2016). The value of the firm determines the overall equity and debt position of the enterprise based on the market indicators. The value of the firm incorporate the equity and the liability portion of the balance sheet of the firm as determined by the market forces (Tauringana & AdjapongAfrifa, 2013).

The liquidity preference theory provides the rationale as to why people should have cash at their disposal. Some of the reasons why people hold cash are to act as a precaution against future price increase and to meet the current expenditures. In essence, holding on cash would create liquidity which is key component of working capital management. In fact, cash itself is a component of WCM (Keynes, 1936). The conservative theory of WCM on the hand argue that firm leverage on long term sources of funds to finance its permanent assets (Weston & Eugene, 1975). Conversely, the aggressive theory of working capital provides the explanation as to why firms anticipate

investing in high risk with high use of short term funding in finance of fixed and current assets (Belt, 1979). Thus, a conservative WCM policy focuses on reduction of return and possible risk while the essence of the aggressive policy is to generate more returns to the shareholders and greater risk.

The stock and financial market play a crucial role in the economic growth of the country. The most important function of financial sector is to promote economic development. It is clear that a well-functioning capital and stock market enhance economic efficiency, investment and growth (Olweny, 2014). This means the performance of listed firms at Nairobi security exchange (NSE) is important to the economic growth of country. Working capital presents a big opportunity for listed companies at NSE to release cash from their balance sheet and operate more effectively. Actually well-managed working capital elements provide firms with growth without need for additional funding (Olweny, 2014).

1.1.1 Working Capital Management

Working capital management is a strategic decision that relates with the assets and liabilities that extent for a short period of less than a year. This is a significant decision because it effects extends to the liquidity, solvency and profitability position of the firm (Oluoch, 2017). Working capital management relates with the decisions concerning how the firm optimally balances amongst the current assets and the current liabilities which are the obligations arising in the course of the business. This is a significant decision, because it influences the company's view of liquidity risk. Apart from the current assets and liabilities, the cash conversion cycle is another important component of WCM (Nzioki, Kimeli, Abudho & Nthiwa, 2013). Net trade cycle is another proxy that can be used to measure WCM and this is as same as the CCC (Shin & Soenen, 1998). In NTC,

the three building blocks of WCM (account payable, receivables and inventories) are expressed in proportion to turnover in percentage form (Shin & Soenen, 1998). Thus, WCM management must also recognize the difference between the liquidity and the need to create value for shareholders that is a delicate deliberation (Makori & Jagongo, 2013).

Current assets include inventories, trade receivables, prepaid expenses, cash and the bank balances and the associated equivalents. Holding too much cash would limit the investment prospects of the firm and this would affect its value (Gorondutse, Ali, Abubakar & Naalah, 2017). On the other hand, if an organization maintains a lot of cash into the inventories, it may increase the built up capital which represents an opportunity costs as such funds would have been utilized to finance investment prospects of the firm. On the other hand, firms that have limited level of current assets for instance inventories would face a challenge of meeting unexpected changes in demand as well as other unforeseen risks (Kaur & Sing, 2013).

Current liabilities include the trade payables, accruals and short term loan facilities that mature in less than a year like the bank overdraft. They represent the short term sources of finances for the firm (Majeed, Makki, Salem & Aziz, 2013). A firm should be able to pay off these current liabilities on a timely basis. Sound management of the current liabilities aims to ensure that the cash outflow from the firm does not adversely affect its liquidity position. The CCC is a time frame from the point the outputs are purchased and when cash is collected from the sale (Arunkumar & Ramanan, 2013). Longer CCC requires an organization to invest a huge amount of WC and they can maximize the sales generated by the firm hence the value. The components of CCC include days inventory outstanding (DIO), the days sales outstanding (DSO), and the days payable outstanding (DPO) (Enqvist, Graham & Nikkinen, 2014).

Thus, Working capital management strives to establish a balance amongst current assets and current liabilities as the key components. WCM require an organization to put in place a plan and control for both current assets and liabilities (Naser, Nuseith & Al-hadeya, 2013). This should be done effectively to limit the possibility of failure to meet the obligations on time. However, finance managers can negotiate with the trade payables to extent repayment period while collecting account receivable at a faster pace. According to Arbidane & Ignatjeva, 2013), the best way of gauging the level of efficiency of WCM is through use of ratio analysis including quick ratio and current ratio. Thus, this study will adopt ratios in operationalizing WCM and these will include the current ratio, liquidity ratio and asset tangibility.

1.1.2 Value of the Firm

The firm value is market based measures that determine how much a business would fetch if its assets were to be disposed. It is the sum total of all the equities and debts in the firm including the preferential shares. The value of the firm is closely related with the concept of shareholder wealth maximization. Being a market based indicator, firm of the firm is the most objective gauge of the wealth of the shareholders of an entity (Ogundipe et al., 2012).

The main goal of managing organizational funds is accomplishing the objective of shareholder wealth maximization. Shareholders wealth, which is synonymous with firm value, it factors in all the benefits that a firm derives in the future be it short-term or long-term. Market value can be used to measure the performance of publicly listed firms since it requires information on the current stock prices. This gets rid of the challenge of approximating the time lag between implementation and increased productivity or profitability. Other accounting ratios like the price to earnings ratio (P/E) ratio and market-to-book value ratio suffer from a number of flaws in that

accounting rules change, shifted reported earnings without any real change in the underlying business. Further, numerous loopholes in accounting ease the ability of executives to misinform investors (Cheng, Liu & Tzeng, 2011; Boyd, 2010; Chowdhury & Chowdhury, 2010; McConnel & Servaes, 1990).

Different measures have been adopted in measuring the value of the firm. These include the use of Tobin's Q (Arachchi, Perera&Vijayakumaran, 2017 & Vijayakumaran, 2019) and market capitalization. Nyoro (2013) operationalized the value of shareholders in terms of market price per share (MPS). Previous research (Florackis, Kostakis & Ozkan, 2009; Agrawal & Knoeber, 1996; Thomsen, Pedersen & Kvist, 2006 & Himmelberg, Hubbard & Palia, 1999) concur that the value of the firm is represented by the ratio of market based value of equity and debts expressed in the book value which is divided by the book value of the total assets in place. This study will measure firm value using Tobin's Q as adopted from past related studies.

1.1.3 Working Capital Management and the Value of the Firm

Theoretically, the conservative WC theory favors the firm to adopt a longer CCC unlike the aggressive WC theory that advocates for a shorter CCC. However, there exists mixed empirical evidence on short and longer CCC and their influence on the value of the firm. Arachchi, Perera and Vijayakumaran (2017) focused on the frontier market to bring out the link amongst WCM and the firm value. The study operationalized WCM into CCC and its associated components whereas firm value was measured using Tobin's Q. The control variables that were adopted in this inquiry included growth in sales, leverage and the size of the firm. An inverse link was established between CCC and Tobin Q.

While focusing on Indonesian listed entities, Sianipar and Prijadi (2018) explored the link between WC and the firm value. The study noted that the net trade cycle (NTC) and the firm value are negatively and significantly related with each other. In Egypt, Moussa (2018) was interested in bringing out the link between WCM and on the ability of the firm to perform and its overall value. The study noted that CCC as a dimension of WCM and the firm value are positively and significantly related with each other. A study conducted among the listed Chinese firms by Vijayakumaran (2019) focused on the efficiency of WCM and the firm's value. NTC was used as a proxy of WCM while Tobin Q was used in place of firm value. A negative link was noted between NTC and the firm's value.

1.1.4 Firms Listed at the Nairobi Securities Exchange

In the year 1954, the Nairobi Securities Exchange (NSE) was founded by stockbrokers as a voluntary association and was given the responsibilities to regulate the trading activities and also develop the securities market. It has developed to be one of the leading African Exchanges and more even it acts as an iconic trading facility not only to local investors but also international investors who aims of gaining entrance to the economic growth of Kenya and Africa at large. It deals with both variable and fixed income securities and has 64 listed companies, an Income Real Estate Investment Trust (I-REIT), an Exchange Traded Fund (ETF) and a futures derivatives market (CMA, 2016).

The exchange performs a vital part in the Kenyan economy through promoting savings and investments and also assisting both local and foreign companies obtain cost effective capital. Capital Markets Authority of Kenya (CMA) is the regulator of NSE. NSE is also an associate of World Federation of Exchange and it is the founding partner of both the East African Securities

Exchanges (EASEA) and the African Securities Exchange Association (ASEA). In addition it an associate of the Association of Futures Market and is a partner exchange in the United Nation-led sustainable stock exchanges (SSE) initiative (Mutai, 2014). From 1950s when the NSE started operation of organized stock markets there has been a tremendous growth in the stock market over the years both in terms of the services and product offered and the number of listed firms in the exchange with the current number of listed firms being over sixty firms (CMA, 2016).

The stock and financial market play a crucial role in the economic growth of the country. The most important function of financial sector is to promote economic development. It is clear that a well-functioning capital and stock market enhance economic efficiency, investment and growth (Olweny, 2014). This means the performance of listed firms at Nairobi security exchange (NSE) is important to the economic growth of country. Working capital presents a big opportunity for listed companies at NSE to release cash from their balance sheet and operate more effectively. Actually well managed working capital elements provide firms with growth without need for additional funding (Olweny, 2014).

1.2 Research Problem

Working capital management represents an internal and short term source of financing which can enhance the value of the firm if well utilized. Working capital management is a delicate decision to make since it has an effect on liquidity risk of the firm (Gorondutse, 2017). It requires an organization to maintain a balance amongst the current assets and liabilities that would maximize the value of the firm. Working capital management and its associated components like CCC and NTC as well as the current assets and liabilities should be well planned and managed for the firm to maximize its value (Nzioki et al., 2013).

The working capital management performs a critical part for the success and failure of the firm since it controls the profitability and liquidity position of the firms. Proper managing of working capital constituents enhances the value of the shareholders (Mweta, 2018). In Kenya, a concern has been raised about the listed firms pertaining their working capital components as these firms have been put under statutory management of working capital, bailouts by government or subsidizing on collapsing firms such as Uchumi supermarkets, Nakumatt supermarkets, tuskys supermarkets and Athi river mining.This circumstance has resulted to loss of both the confidence and wealth of investors in the stock market (KNBS, 2017).

Studies conducted on WCM include Arachchi et al. (2017) who focused on the frontier market to bring out the link between WCM and the firm value. An inverse link was established between CCC and Tobin Q ratio while focusing on Indonesian listed entities, Sianipar and Prijadi (2018) explored the link between WC and the firm value and noted that CCC as a dimension of WCM and the firm value are positively and significantly related with each other. A study conducted among the listed Chinese firms by Vijayakumaran (2019) focused on the effectiveness of WCM and the firm's value and a negative link was noted between NTC and the firm's value.

Locally in Kenya, Mwangi and Obwogi (2018) focused on Kenyan listed manufacturing firms to bring out the link between WCM and their profitability. The study noted mixed results between the components of WCM represented by CCC and the ability of the firms to perform. Kiptoo (2017) focused on firms that engage in processing of tea to bring out the link between WCM and their financial performance. A significant link was registered between WCM and the ability of the firm to perform in financial terms.

As indicated by the studies reviewed, it is shown that some of them were conducted in different countries and contexts like Indonesia and not in Kenya. Other studies were done focusing on WCM and performance or financial performance of the firm and not firm value. This create contextual and conceptual gap, which the present study seeks to fill through responding to the following research question: what is the effect of Working capital management on firm value of firms listed at the Nairobi security exchange, Kenya?

1.3 Research Objective

To establish the effect of working capital management on firm value of firms listed at the Nairobi security exchange, Kenya.

1.4 Value of the Study

This study will be advantageous to many stakeholders ranging from scholars, researchers, government and its agencies, manager of listed firms, lawmakers, stock market official and many others. Additionally, this study will contribute much to the current knowledge body and aid in predicting firm value basing on working capital management. More so, other scholar may use this study in future to reference their work. The study will also contribute in enlarging the breadth as well as quality of the research works and publications. Findings from the study will be of assistance in furtherance of the knowledge base on the study parameters

The policy makers including the Capital Market Authority (CMA) will be able to formulate sound policies that will enhance and support maximization of the value of the listed firms. Practitioners in the field of corporate finance including the finance managers will be able to have an understanding of the role played by WCM with respect to the value of the firm. Scholars and researcher will be able to review material of this study in future.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The theories guiding the study will be reviewed in this chapter. The chapter will look at the determinants of the working capital and the past related studies with the gaps being indicated. The conceptual framework will be presented with the variables and how they are interlinked with each other.

2.2 Theoretical Review

The section looks the theories that will inform the present study.

2.2.1 Keynesian Liquidity Preference Theory

The theory was formulated by Keynes (1936) and it indicate that it is good for the firm to effectively manage its cash reserve. The theory raises three reasons why it is of essence for the firm to management its cash; transaction, precautionary and speculative motives. The safety supply of the reserves and cash in the firm inform the precautionary motive. The desires for the firm to participate in the opportunities of investment inform the precautionary motive of requiring cash. For transaction motive, the firm is required to maintain cash so as meet the bills including the need to pay for wages and salaries, dividends to owners, trade payables and the taxes.

According to Pandey (2010), a firm cannot ignore a need for cash to ensure that the day to day operations are maintained for smoothness. Thus, it is important that organizations invest a reasonable amount of cash into their current assets. In essence, the management of cash is a component of WCM, which cannot be ignored by the firm. Therefore, the theory provides the need for firms to operationalize their WCM through sound management of their cash.

2.2.2 The Conservative Theory of Working Capital

The origin of this theory can be linked to Weston and Eugene (1975). The theory argues that a firm leverages on long term sources of funds to finance its fixed assets with some portion of the current assets. This is a WCM approach that is characterized by lower levels of productivity and risk. With the level of risk being low, it follows that the level of return from this aggressive WCM dimension would be low. WCM aims at realizing two key objectives in the firm, profitability and the solvency.

Solvency requires a firm to have some level of liquidity (Pandey, 2006). The theory argues that firms should hold a huge buildup of inventories and cash so as to meet the obligations as they arise. This is too risky because they increase the opportunity cost of tied up capital that would have otherwise been utilized ion financing investment projects which can maximize the value of the firm. The theory will be used to underpin the need for the firm to embrace WCM so as to enhance the value of the shareholders. The theory incorporates an element of risk and return in the WCM, which determine the firm value. Based on this theory, a negative association is predicted amongst WCM and the value of the firm.

2.2.3 Aggressive Theory of Working Capital

Attributed to Belt (1979), this theory argues that a firm leverages on short term sources of funds to finance the current as well as the fixed assets in place. The theory is ideal to the firms that are characterized by high risk which automatically translate into greater returns. Since the funds are borrowed on a short period, the interest rates on these funds in the aggressive theory are very low. However, there are higher risks linked with such short term debt facilities in the aggressive WCM perspective.

The aggressive theory of WCM is more ideal to those firms operating in an economy that is characterized by a greater degree of stability with certainty of the future cash flows. The aggressive WCM theory advocates the firm should offer shorter credit periods to trade receivables, with minimal amount of inventories held in stock and a relatively smaller quantity of cash held at hand. There are higher risks of default on the company on account of inadequate funds to meet the obligations. However, these higher risks are associated with greater returns to the firm. On the basis of this theory, a positive association is anticipated amongst WCM and the value of the firm.

2.3 Determinants of the working capital

This section will bring out the key factors that shape the value of the listed firms in Kenya.

2.3.1 Working capital management

WCM has different associated components like the current assets, current liabilities and the cash conversion cycle as well as the net trade cycle. Proper management of these components is a key driver of profitability and ultimate value creation to the firm. In fact, one of the basic functions of the finance managers of the corporation is to enhance the working capital of the firm. WCM has both desirable and undesirable influence on profitability position of the firm and ultimately on its value (Makori & Jagongo, 2013).

Excellent WCM is critical for profitability of the firm which maximizes the wealth of the firm. A firm that has good WCM practices will have limited chances of external borrowing which maximizes the overall firm value. Furthermore, good WCM practices require the firm to prudently utilize the borrowed funds to avoid liquidity and cash flow challenges which may hurt the overall position of the firm (Kaur & Sing, 2013). In essence, WCM aims at ensuring that there are adequate cash flows in the firm so as to meet the obligations arising in the course of the operations

2.3.2 Nature of business

Nature of business is a very significant aspect as long as establishing the required WC is concerned for different kind of companies. Mostly, huge amount of working capital will be needed by manufacturing or trading firms as a result of fixed investment in raw materials, work in progress inventory and finished products. Therefore, nature of business is one of the key factors. Normally, working capital requirements in trade firms are greater since many investments are centered in inventory or stock in order to satisfy production needs, manufacturing firms do require a great amount of work capital. While, companies that offer services and not products need less working capital in cash, since they do not have to maintain large inventories (Elbadry, 2018).

In other companies with large fixed investment for instance large companies and public utilities, they normally require very minimal current assets partially due to cash, partially due to fact that they deal with services as opposed to products and also due to the nature of business. Equally, the fundamental and mail industries or manufacturers of goods are typically less involved in working capital than those of the consumer goods manufacturing industries (Alehegne, 2019).

2.3.3 Firm Size

Firm size is a multidimensional concept that has traditionally been operationalized as a logarithm of the total assets of the firm, the overall staff, the sales revenues and the number of branches of the firm. Smaller firms have limited assets to be pledged as securities in case they aspire to have access to long term sources of funds. This is as opposed to larger firms that are deemed to have excellent relationship with capital markets and can access funds (both equities and debts) at the market rates more easily. These two items are the basic components of the value of the firm (Naser, Nuseith & Al-hadeya, 2013).

According to Whited (1992), and Petersen and Fazzari (1993) the relatively smaller entities are associated with more financial related challenges. Ideally, smaller firms may have low amount of capital invested in their current assets. This may be an explanation as to why such smaller firms are characterized by low levels of inventories and receivables. At the same time, the operations of smaller firms are largely supported by short term credit obtained from the trade payables. Therefore, the size of the firm will have an influence on the value of the firm. The study will operationalize firm size as a natural logarithm of the overall value of assets in the firm.

2.2.4 Terms of credit

Credit terms is another determining factors of working capital. Credit terms allow the company to decide the amount and length of credit earned by its suppliers. Where suppliers of raw materials offer long-term credit, the company can afford less working capital, while suppliers only offer a short-term loan, the company needs additional working capital to pay the creditors (Nuryana, 2017). According to Nuryana (2017) more working capital will be needed by companies that normally buys its raw materials for cash and sells its products on credit. On the contrast, less working capital will be required for companies that normally sell for cash and purchase on credit. The duration of the credit affects working capital directly.

Credit policy denotes the average time that it takes to collect cash of the sales made on credit. There are a number of factors, which determine the credit policy comprising of clients credit rating, industry practices among others. The requirements for working capital will certainly be higher when longer credit period and extended to all customers regardless of the reliability of the customers. It is because the debtors' balance would be higher, and therefore a comparatively longer duration, which would naturally take more capital (Holmstrom & Tirole, 2000)

2.2.5 Seasonal requirements

The requirement for working capital is constant for companies that sell products during the entire season, however for companies that sell seasonal goods, a higher amount is needed in the peak season a there is more demand, more stock needs to be maintained and a quick supply needs to be provided, whereas the demand is extremely small during off-season or slack season, and less capital is needed (Leeson, 2016).

According to Leeson (2016) there are raw materials which are found only during particular season though they are needed all year round. Therefore, an organization is required to purchase and store raw material in bulk for use during the year. In this scenario, more working capital will be needed. Also there are products which are highly marketed during a certain season, in this case, more working capital during the season and less working capital during the off season is required.

2.4 Empirical Literature Review

Borrowing evidence from the context of Turkey, Şamiloğlu and Akgün (2016) sought to bring out the link between WCM and the ability of firms to remain profitable. The measures of WCM included the ARP, APP and CCC and the specific focus of the inquiry was on listed firms. A ten year time horizon was taken covering 2003 all through to 2012. The returns generated on the values of the assets and the equities of the entities were used as proxies of financial performance. An inverse but significant link was noted between WCM and the ability of the firms to perform. A related inquiry in Turky by Samet and Nazan (2017) focused on WCM and the ability of the firms to remain profitable. A total of 41 entities were covered with the time horizon covering 2005 all through to 2016. The study noted existence of an inverse link between WCM and the profitable prospects of an entity. A study conducted among the listed Chinese firms by Vijayakumaran

(2019) focused on the efficiency of WCM and the firm's value. In effort to operationalize WCM, the inquiry used NTC which was found to have an inverse link with the Tobin's Q of the entity.

While focusing on Indonesian listed entities, Sianipar and Prijadi (2018) explored the link between WC and the firm value. The focus of the study was on the non-monetary but listed entities where a total of 167 of them were covered. With adoption of the panel data methodologies, the period of consideration of the inquiry was from 2006 all through to 2016. The inquiry noted that WCM and the firm value are inversely but significantly linked with other. Another investigation among non-money entities listed in Pakistan was done by Hassan, Imran, Amjad and Hussain (2014) with a focus on WCM and its link with the ability of the firm to perform. The period of consideration of the inquiry was from 2007 all through to 2010 with information sought from auxiliary sources. The inquiry documented a direct and significant link between the ability of the firm to manage receivables and performance. As control indicators, the size of the entity was seen to have a direct interaction with the ability of the firm to perform.

Sudiyatno, Puspitasari and Sudarsi (2017) focused on Indonesian entities to bring out the link between WC and the ability of the entity to perform with some elements of its value. The period covered by this inquiry was 2010 all through 2013. Ratios were used as proxies of WC which included current assets against the overall assets and current liabilities to overall assets. The capital structure was taken as a control indicator in the inquiry. The firm's value was measured using Tobin's Q. While CA/TA resulted into a direct link with ability of the firm to perform, CA/TA had an inverse link.Arachchi, Perera and Vijayakumaran (2017) focused on the frontier market to bring out the link between WCM and the firm value. The specific focus of the inquiry was on listed entities on Colombo Security market. The period of consideration was from 2011 all through to 2015. WCM and its efficiency were examined using CCC while Tobin's Q was applied to gauge

firm value. The size of the entity, the growth in turnover and the leverage were taken as control indicators. An inverse link was noted between CCC and the firm value.

Akoto, Awunyo and Angmor (2013) looked at WCM and the ability of Ghanaian entities to remain profitable. A total of 13 listed manufacturing entities were covered with the time frame ranging from 2005 all through to 2009. By leveraging ion panel data methodologies, it was shown that ARD and the level of firm performance are inversely linked. On the other hand, CCC and performance had a direct and significant link with each other. An inquiry into WCM and the ability of the firm to create wealth was reviewed by Oseifuah and Gyekye (2017) with reference to the South African context. The adopted methodologies were panel data and the time frame was from 2003 all through to 2012. The results of the inquiry were mixed based on the individual components of WCM. The conversion period of inventories and the receivables were directly and significantly linked with the value of the entity. CCC and the firm value had a direct but insignificant link with each other. In Egypt, Moussa (2018) was interested in bringing out the link between WCM and on the ability of the firm to perform and its overall value. The adopted methodologies of the inquiries were panel data with the time horizon taken as 2000 all through to 2010. A direct and significant link was noted between CCC and the value of the firm.

Mwangi and Obwogi (2018) focused on Kenyan listed manufacturing firms to bring out the link between WCM and their performance. The adopted design was quantitative that entailed gathering of information from auxiliary sources. The period of consideration of the inquiry was ten year frame covering 2007 all through to 2016. The ability of the entity to perform financial was analyzed with the aid of ROE and Tobin's Q. It was shown that while CCC and the ability of the firm to perform in financial terms are inversely but significantly linked with each other, the link with Tobin's Q was direct but not significant. Kiptoo (2017) focused on firms that engage in

processing of tea to bring out the link between WCM and their financial performance. The adopted design was cross sectional descriptive with 54 respondents being the target. Information was gathered from first hand data sources. A significant link was documented between WCM and the ability of the entity to perform.

Likalama (2016) did an assessment of WCM and its role as much as the profitability of the entity is concerned. The specific focus of the inquiry was on agro- firms with their operations with Eldoret. Gathering the views from first hand sources, it was shown that WCM and the profitable ability of the firm are significantly linked with each other. Nyoro (2013) looked at WCM and its link with the ability of the entity to create the value for its shareholders. CA and CL were the specific indicators used to gauge WCM while value creation was operationalized as MPS. Mixed results were obtained by this inquiry.

Mwirigi, Wambugu and Maina (2018) focused on the small and medium enterprises (SMEs) to bring out the interaction between WCM and their ability to perform. The adopted designs were cross sectional and correlational in nature. The information for the inquiry was obtained from questionnaire. Mixed results were obtained between the WCM components and the ability of the firm to perform. Mwangi, Makau and Kosimbei (2014) focused on the non-monetary listed entities in Kenyan context to bring out the link between WCM and their ability to perform. A total of 42 entities were covered with the time frame covering 2006 all through to 2012. The adopted methodologies were panel data. A direct and significant link was noted between aggressive, conservative policy of financing and the ability of the firm to perform financially.

2.6 Conceptual Framework

Independent Variables

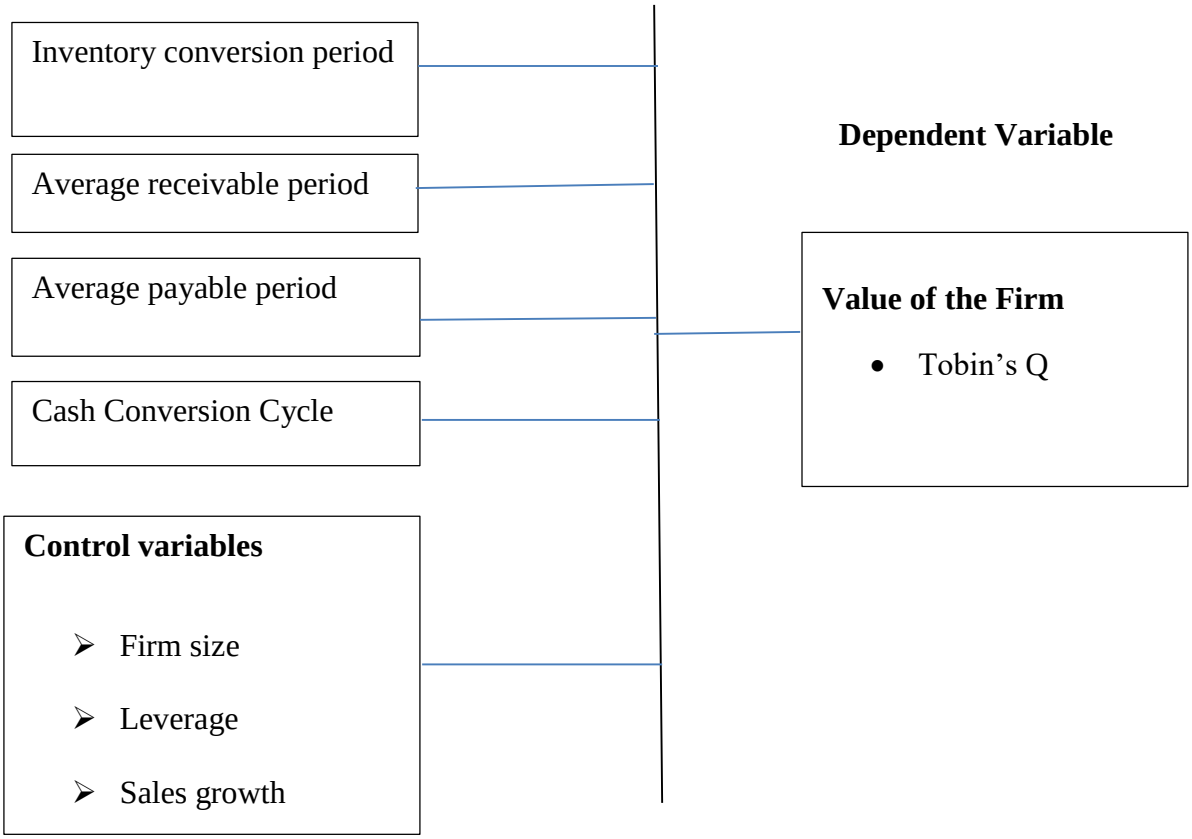

Figure 2.1: Conceptual Framework

2.5 Summary of Literature and Research Gaps

Generally, from almost all surveys reviewed in the literature, it is clear that working capital management is a key aspect in optimizing the profits of a firm. In summary, all through the literature a most researchers have concluded that the working capital management is related with reduction in cash conversion cycle that affects firm value.

In terms of gaps, several gaps were unearthed, which warranted this study. There was a conceptual gap in the studies conducted by Mwangi and Obwogi (2018), Samet and Nazan (2017), Kiptoo (2017) because they focused on financial performance and profitability not firm value.

There is also a conceptual gap in the study conducted by Şamiloğlu and Akgün (2016) because it utilized financial performance as dependent variable but the current study will look firm value. Finally, the study conducted by Mwangi et al (2014) presents a contextual gap because not all firms listed at the NSE were used as the population in the study and thus the findings can vary if the excluded sectors are included.

There is a contextual gap in the studies conducted by Vijayakumaran (2019), and Sianipar and Prijadi (2018), because they were not conducted in the Kenyan context. There is a methodological gap in the study conducted by Mwirigi et al. (2018), because it employed primary data, which was cross-sectional, the current study will utilize secondary panel data.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The design that will be adopted and the targeted population in the study are detailed in this chapter. The means gathering information and how the processing will be done are also detailed in this chapter. All these contents are aligned with the overall topic of the inquiry.

3.2 Research Design

The study embraced a descriptive correlational design. It aided in summarizing the WCM and firm value of firms quoted at the NSE, Kenya. On the other hand, the correlational design was used to support regression analysis in establishing the cause effect relationship between WCM and firm value (Kothari, 2012).

3.3 Target Population

Grabich (2012) posits that a set of people, events or elements that are studied with an aim of providing answers to the research questions is referred to as a study population. All the 67 listed firms at the NSE, whose list is provided in Appendix I, formed the population in this study. The study is a census because the entire population was examined.

3.4 Data Collection

The study collected five years secondary data for the time frame 2015 to 2019. Data on firm market value, liabilities total assets, cash-flows from operations, market value of equity, accounts receivable, inventory, accounts payable, tax payable, and other assets, was collected for the period. This data was collected from publications by the NSE, CMA and respective financial statements

of the listed firms. The data was gathered on the annual basis. A data collection sheet was applied in collecting of the secondary data in this study.

3.5 Data Analysis

Data collected was organized, tabulated and simplified so as to make it easier to analyze, interpret and understand. Because panel data was employed for the study, STATA version 13 was the statistical analysis program utilized for the study because it is able to perform panel multiple linear regression. Inferential statistics covering correlation and regression analysis were used to test the effect of WCM on firm value.

3.5.1 Model Specification

The regression model to be adopted by the study took the following form:

$$\mathbf{Y = \beta_0+\beta_1X_1+\beta_2X_2+\beta_3X_3 +\beta_4 X_4+ \beta_5 X_5 +\beta_6 X_6+ \beta_7 X_7 +\varepsilon}$$

Where:

Y = Tobin Q ratio

β_0 = constant

β_0, β_1, β_2, β_3, β_4, β_5, β_6, β_7= beta coefficients

X1 = Average collection period

X2 = Average payment period

X3 = Inventory conversion period

X4 = Cash Conversion Cycle

X5= Firm size

X6= Leverage

X7= Sales growth

ε = Error term

The results were presented using tables and graphs for trend analysis on the variables.

3.5.2 Operationalization of Variables

Table 3.1 shows how the variables of the study were operationalized

Table 3.1: Operationalization of Study Variables

Variables	Measurement
Dependent variable	
Tobin's Q ratio	(Total Market Value + Liabilities)/(Total Book Value + Liabilities) (Tobin, 1969)
Independent variables	
Inventory conversion period	Inventory/cost of goods sold* 365
Average collection period	Account receivable / net sales*365
Average payment period	Account payable/ purchases*365
Cash conversion cycle	ACP + ICP – APP
Control variables	
Firm size	Natural logarithm of total assets
Leverage	Total debt/ total equity
Sales growth	Current period sales – prior period sales/ prior period sales*100

3.5.3 Test of Significance

The p-values aided in determining the overall significance of the study variables. To interpret p-values, the threshold was 0.05 or 5%. In this regard, the p-values less than 0.05 denoted that the link between the study variable is significant.

3.5.4 Diagnostic Tests

For the validity of regression analysis, a number of assumptions are done in conducting linear regression models. These are; no multi-collinearity, observations are sampled randomly, conditional mean ought to be zero, linear regression model is "linear in parameters", spherical errors: there is homoscedasticity and no auto-correlation, and the optional assumption: error terms ought to be distributed normally. According to the Gauss-Markov Theorem, the first 5 assumptions of the linear regression model, the regression OLS estimators, are the Best Linear Unbiased Estimators (Grewal *et al*., 2004).

The aforementioned assumptions are of great importance since when any of them is violated would mean the regression estimates will be incorrect and unreliable. Particularly, a violation would bring about incorrect signs of the regression estimates or the difference of the estimates would not be reliable, resulting to confidence intervals that are either too narrow or very wide (Gall et al., 2006).

The diagnostic tests are conducted so as to guarantee that the assumptions are met to attain the Best Linear Unbiased Estimators. Regression diagnostics assess the model assumptions and probe if there are interpretations with a great, unwarranted effect on the examination or not. Diagnostic examinations on normality, linearity, multicollinearity, and autocorrelation were done on the collected data to establish its suitability in the formulation of linear regression model. Normality was tested by the Shapiro-Francia test, which is suitable for testing distributions of Gaussian nature which have specific mean and variance. Linearity indicates a direct proportionate association amongst dependent and independent variable such that variation in independent variable is followed by a correspondent variation in dependent variable (Gall et al., 2006). Linearity was tested by determining homoscedasticy, which was determined by the Breusch-Pagan Cook-Weisberg Test for Homoscedacity.

Tests for multicollinearity of data was carried out using variance inflation factors (VIF) to determine whether the predictor variables considered in the research are significantly correlated with each other. According to Grewal *et al*. (2004) the main sources of multicollinearity are small sample sizes, low explained variable and low measure reliability in the independent variables. Auto-correlation test was carried out through the Durbin-Watson Statistic.

Additionally, to avoid spurious regression results unit root test was carried out on the panel data. The aim of conducting unit root test is to check whether the macroeconomic variables under study are integrated of order on (1, 1) or not before estimation procedure can be proceeded into. Unit root test was conducted through the Fisher-type unit root test. The study also utilized the Hausman specification test to ascertain if the variables used in the study possess fixed influence overtime or if they have varying and random influence over time. The null hypothesis is that that the variables have a random effect and the alternate hypothesis is that the variables have a fixed effect. If the significance value is less than α (0.05), the null hypothesis will consequently rejected and if the significance value is greater than α (0.05), the null hypothesis will not be rejected.

CHAPTER FOUR: DATA ANALYSIS, RESULTS, AND FINDINGS

4.1 Introduction

This chapter entails of the data analysis, interpretation and the discussions of the outcomes. The section hence is fragmented to three sub sections, which entail; diagnostic tests, inferential statistics, and the interpretation and the discussion of findings. Precisely this chapter summarizes the platform for data presentations, analysis, interpretations, and discussions.

4.2 Diagnostic Tests

Diagnostic tests that are a precursor to conducting linear regression were conducted. Diagnostic tests done in this study included; normality tests, homoscedacity tests, multicollinearity tests and autocorrelation tests. Normality test was carried out using the the Shapiro-Francia test and the homoscedacity test was conducted through the Breusch-Pagan Cook-Weisberg Test for Homoscedacity. Test on Multicolinearity of data was carried out using Variance Inflation Factors (VIF) while the autocorrelation test was done through the Durbin-Watson statistic. Unit root test was conducted through the Fisher-type unit root test. Additionally, the Hausman test was conducted to determine whether fixed or variable effects panel regression should be conducted.

4.2.1 Normality Test

The normality tests for all the variables employed in the study are highlighted in Table 4.1.

Table 4.1: Shapiro-Francia Test for Normality

Variable	Obs	W'	V'	z	Prob>z
TobinQRatio	277	0.15569	181.865	10.988	0.00001
Inventoryc~d	277	0.82181	38.382	7.703	0.00001
Averagecol~d	274	0.96748	6.94	4.088	0.00002
Averagepay~d	274	0.97483	5.371	3.548	0.00019
Cashconver~e	274	0.79132	44.528	8.011	0.00001
FirmSize	277	0.97645	5.074	3.43	0.0003
Levearage	277	0.37537	134.546	10.352	0.00001
Salesgrowth	277	0.12609	188.242	11.061	0.00001

In the test, the null hypothesis holds that the data has a normal distribution. The level of significance adopted in the study is 5%. Since the significance values in tests for all the variables are less than α (0.05), the null hypothesis is rejected. Hence, the data series of the variables employed in the study are not normally distributed.

4.2.2 Homoscedacity Test

The homoscedacity tests for all the predictor variables employed in the study are enlisted in Table 4.2.

Table 4.2: Breusch-Pagan/Cook-Weisberg Test for Homoscedacity

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of TobinQRatio
chi2(1) = 967.74
Prob > chi2 = 0.0000

The null hypothesis is that there is homoscedacity. The level of significance adopted in the study is 5%. Since the significance value is less than α (0.05), the null hypothesis is rejected. Hence, the data series of all the predictor variables are heteroscedastic.

4.2.3 Test for Multicollinearity

Results on Test for Multicolinearity of data carried out using Variance Inflation Factors (VIF) are displayed in Table 4.3.

Table 4.3: VIF Multicollinearity Statistics

Variable	VIF	1/VIF
Cashconver~e	72.22	0.013847
Inventoryc~d	70.95	0.014095
Averagepay~d	5.91	0.169138
FirmSize	5.75	0.174057
Levearage	1.2	0.830493
Salesgrowth	1.01	0.990525
Mean VIF	26.17	

The common rule in statistics is that the VIF values should be less than 10 and greater than 1. The findings indicate that the VIF of cash conversion cycle and inventory conversion period fall out of the range of 1 to 10. Thus, the variables exhibit multicollinearity. The findings also indicate that the VIF values of average collection period, firm size, leverage, and sales growth fall below 10 and are greater than 1. Hence, there is no presence of multicollinearity amongst those predictor variables.

4.2.4 Tests for Autocorrelation

Test for Autocorrelation of data was carried out using the Durbin Watson statistic. The findings displayed that Durbin-Watson d-statistic (7, 274) = 1.6599943. The Durbin-Watson statistic ranges from point 0 and point 4. If there exist no correlation between variables, a value of 2 is shown. If the values fall under point 0 up to a point less than 2, this is an indication of an autocorrelation and on the contrast a negative autocorrelation exist if the value falls under point more than 2 up to 4. As a common rule in statistics, value falling under the range 1.5 to 2.5 is considered relatively

normal whereas values that fall out of the range raise a concern (Shenoy & Sharma, 2015). Field (2009) however, opines that values above 3 and less than 1 are a sure reason for concern. Therefore, the data used in this panel is not serially autocorrelated since it meets this threshold.

4.2.5 Unit Root Test

The results for the unit root test conducted for the data series firm value is displayed in Table 4.4.

Table 4.4: Unit Root Test for Firm Value

Fisher-type unit-root test for TobinQRatio

Based on augmented Dickey-Fuller tests

Ho: All panels contain unit roots		Number of panels	= 58
Ha: At least one panel is stationary		Avg. number of periods	= 4.78
AR parameter: Panel-specific		Asymptotics: T -> Infinity	
Panel means: Included			
Time trend: Not included			
Drift term: Not included		ADF regressions: 0 lags	
		Statistic	p-value
Inverse chi-squared(114)	P	633.2738	0.0000
Inverse normal	Z	-9.3955	0.0000
Inverse logit t(269)	L*	-19.9377	0.0000
Modified inv. chi-squared	Pm	34.3898	0.0000

The null hypothesis is that firm value has a unit root and the alternate hypothesis is that the variable is stationery. Since the significance values for the P, Z, L* and Pm tests are all less than the critical value (α) at the 5% confidence level, then the null hypothesis is rejected. Thus, the panel data series is stationery.

The results for the unit root test conducted for the data series inventory conversion period are displayed in Table 4.5.

Table 4.5: Unit Root Test for Inventory Conversion Period

Fisher-type unit-root test for Inventoryconversionperiod			
Based on augmented Dickey-Fuller tests			
Ho: All panels contain unit roots		Number of panels =	58
Ha: At least one panel is stationary		Avg. number of periods =	4.78
AR parameter: Panel-specific		Asymptotics: T -> Infinity	
Panel means: Included			
Time trend: Not included			
Drift term: Not included		ADF regressions: 0 lags	
		Statistic	p-value
Inverse chi-squared(114)	P	306.2887	0.0000
Inverse normal	Z	-3.5336	0.0002
Inverse logit t(184)	L*	-9.7531	0.0000
Modified inv. chi-squared	Pm	12.7346	0.0000

The null hypothesis is that inventory conversion period has a unit root and the alternate hypothesis is that the variable is stationery. Since the significance values for the P, Z, L* and Pm tests are all less than the critical value (α) at the 5% confidence level, then the null hypothesis is rejected. Thus, the panel data series is stationery.

The results for the unit root test conducted for the data series average collection period are displayed in Table 4.6.

Table 4.6: Unit Root Test for Average Collection Period

Fisher-type unit-root test for Averagecollectionperiod			
Based on augmented Dickey-Fuller tests			
Ho: All panels contain unit roots		Number of panels =	58
Ha: At least one panel is stationary		Avg. number of periods =	4.72
AR parameter: Panel-specific		Asymptotics: T -> Infinity	
Panel means: Included			
Time trend: Not included			
Drift term: Not included		ADF regressions: 0 lags	
		Statistic	p-value
Inverse chi-squared(114)	P	343.7647	0.0000
Inverse normal	Z	-2.9271	0.0017
Inverse logit t(269)	L*	-7.3543	0.0000
Modified inv. chi-squared	Pm	15.2165	0.0000

The null hypothesis is that average collection period has a unit root and the alternate hypothesis is that the variable is stationery. Since the significance values for the P, Z, L* and Pm tests are all less than the critical value (α) at the 5% confidence level, then the null hypothesis is rejected. Thus, the panel data series is stationery.

The results for the unit root test conducted for the data series average payment period are displayed in Table 4.7.

Table 4.7: Unit Root Test for Average Payment Period

Fisher-type unit-root test for Averagepaymentperiod			
Based on augmented Dickey-Fuller tests			
Ho: All panels contain unit roots		Number of panels =	58
Ha: At least one panel is stationary		Avg. number of periods =	4.72
AR parameter: Panel-specific		Asymptotics: T -> Infinity	
Panel means: Included			
Time trend: Not included			
Drift term: Not included		ADF regressions: 0 lags	
		Statistic	p-value
Inverse chi-squared(114)	P	167.1332	0.0009
Inverse normal	Z	1.5985	0.9450
Inverse logit t(269)	L*	0.1720	0.5682
Modified inv. chi-squared	Pm	3.5188	0.0002

The null hypothesis is that average payment period has a unit root and the alternate hypothesis is that the variable is stationery. The significance values for the P and Pm tests are less than the critical value (α) at the 5% confidence level while the significance values of the Z and L* are more than the critical value (α) at the 5% confidence level. In case of any conflict in the tests, the inverse chi-squared and modified inv. chi-squared tests take precedence. Thus, the null hypothesis is rejected. Thus, the panel data series is stationery.

The results for the unit root test conducted for the data series cash conversion cycle are displayed in Table 4.8.

Table 4.8: Unit Root Test for Cash Conversion Cycle

Fisher-type unit-root test for Cashconversioncycle			
Based on augmented Dickey-Fuller tests			
Ho: All panels contain unit roots		Number of panels	= 58
Ha: At least one panel is stationary		Avg. number of periods =	4.72
AR parameter: Panel-specific		Asymptotics: T -> Infinity	
Panel means: Included			
Time trend: Not included			
Drift term: Not included		ADF regressions: 0 lags	
		Statistic	p-value
Inverse chi-squared(114)	P	369.0689	0.0000
Inverse normal	Z	-1.8877	0.0295
Inverse logit t(269)	L*	-7.3398	0.0000
Modified inv. chi-squared	Pm	16.8923	0.0000

The null hypothesis is that cash conversion cycle has a unit root and the alternate hypothesis is that the variable is stationery. Since the significance values for the P, Z, L* and Pm tests are all less than the critical value (α) at the 5% confidence level, then the null hypothesis is rejected. Thus, the panel data series is stationery.

The results for the unit root test conducted for the data series firm size are displayed in Table 4.9. The null hypothesis is that firm size has a unit root and the alternate hypothesis is that the variable is stationery. Since the significance values for the P, Z, L* and Pm tests are all less than the critical value (α) at the 5% confidence level, then the null hypothesis is rejected. Thus, the panel data series is stationery.

Table 4.9: Unit Root Test for Firm Size

Fisher-type unit-root test for FirmSize			
Based on augmented Dickey-Fuller tests			
Ho: All panels contain unit roots		Number of panels =	58
Ha: At least one panel is stationary		Avg. number of periods =	4.78
AR parameter: Panel-specific		Asymptotics: T -> Infinity	
Panel means: Included			
Time trend: Not included			
Drift term: Not included		ADF regressions: 0 lags	
	Statistic	p-value	
Inverse chi-squared(114) P	485.5789	0	
Inverse normal Z	-2.4752	0.0067	
Inverse logit t(264) L*	-10.9101	0	
Modified inv. chi-squared Pm	24.6084	0	

The results for the unit root test conducted for the data series levearage are displayed in Table 4.10.

Table 4.10: Unit Root Test for Leaverage

Fisher-type unit-root test for Levearage			
Based on augmented Dickey-Fuller tests			
Ho: All panels contain unit roots		Number of panels =	58
Ha: At least one panel is stationary		Avg. number of periods =	4.78
AR parameter: Panel-specific		Asymptotics: T -> Infinity	
Panel means: Included			
Time trend: Not included			
Drift term: Not included		ADF regressions: 0 lags	
	Statistic	p-value	
Inverse chi-squared(114) P	311.9052	0	
Inverse normal Z	-2.1663	0.0151	
Inverse logit t(239) L*	-6.5607	0	
Modified inv. chi-squared Pm	13.1066	0	

The null hypothesis is that levearage has a unit root and the alternate hypothesis is that the variable is stationery. Since the significance values for the P, Z, L* and Pm tests are all less than the critical value (α) at the 5% confidence level, then the null hypothesis is rejected. Thus, the panel data series is stationery.

The results for the unit root test conducted for the data series sales growth are displayed in Table 4.11.

Table 4.11: Unit Root Test for Sales Growth

Fisher-type unit-root test for Salesgrowth				
Based on augmented Dickey-Fuller tests				
Ho: All panels contain unit roots			Number of panels =	58
Ha: At least one panel is stationary			Avg. number of periods =	4.78
AR parameter: Panel-specific			Asymptotics: T -> Infinity	
Panel means: Included				
Time trend: Not included				
Drift term: Not included			ADF regressions: 0 lags	
		Statistic	p-value	
Inverse chi-squared(114)	P	738.3643	0	
Inverse normal	Z	-11.8366	0	
Inverse logit t(274)	L*	-24.9263	0	
Modified inv. chi-squared	Pm	41.3495	0	

4.2.6 Test for Random and Fixed Effects

The study carried out the Hausman test to determine if the variables have fixed influence overtime or if the variables have varying and random influence over time. Before the Hausman test was conducted, the variables had to be transformed because they did not meet the conditions of normality, homoscedacity. Thus, a logarithmic function was introduced to all the variables to transform them. Since you cannot transform a negative value with a logarithmic function, negative values were considered as missing values. The variables cash conversion cycle and inventory conversion period exhibited multicollinearity, thus, they were dropped from the analysis. The finding on the Hausman test of specification is presented in Table 4.12.

Table 4.12: Hausman Test of Specification

----	Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fe	re	Difference	S.E.
LogA~nperiod	.67745	1.195233	-.5177829	.2905153
LogA~tperiod	-.7912266	.2023631	-.9935897	.4374121
LogFirmSize	-8.891879	-4.95462	-3.937258	1.194127
LogLevearage	-.0010837	-.0015794	.0004957	.0004819
LogSalesgr~h	.0003223	-.0007484	.0010707	.

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(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)

21.76

Prob>chi2 = 0.0006

(V_b-V_B is not positive definite)

The null hypothesis assumed that variables have a random effect and alternate hypothesis was that the variables have a fixed effect. If the p value is less than 0.05 then the null hypothesis will be rejected and if greater than 0.05 then the null hypothesis will not be rejected. When the Hausman chi-square test statistic is negative, the alternate hypothesis is adopted because asymptotically, the p value is equal to 1. The significance value obtained in the hausman test conducted (0.0006) is less than 0.05. Thus, the variables have a fixed effect and a fixed effect panel model was utilized.

4.3 Inferential Statistics

Inferential statistics were used in determining the direction, relationship, and strength of the association between the predictor variables and the response variable. The section entails the inferential statistics employed in the study, which included correlation and fixed effects panel multiple linear regression analysis.

4.3.1 Correlation Analysis

Correlation analysis establishes whether there exists an association among two variables. The association falls between a perfect positive and a strong negative correlation. The study used Pearson Correlation. This study employed a Confidence Interval of 95% and a two-tail test. The correlation test was done to ascertain the association between financial risk and financial performance.

Table 4.13: Correlation Analysis

	LogTob~o	L~coll~d	L~paym~d	LogFir~e	LogLev~e	LogSal~h
LogTobinQR~o	1.0000					
LogA~nperiod	-0.2447*	1.0000				
	0.0000					
LogA~tperiod	-0.3028*	0.9424*	1.0000			
	0.0000	0.0000				
LogFirmSize	-0.4041*	0.8586*	0.8959*	1.0000		
	0.0000	0.0000	0.0000			
LogLevearage	-0.1753*	0.3616*	0.3513*	0.2949*	1.0000	
	0.0034	0.0000	0.0000	0.0000		
LogSalesgr~h	-0.1051	-0.0068	-0.0119	0.0098	0.0181	1.0000
	0.0809	0.9103	0.8440	0.8708	0.7644	

Table 4.13 displays that average collection period, average payment period, firm size, and leverage are significantly correlated at the 5% significance level to firm value. They all have a negative significant association with firm value. Sales growth however, does not have a significant association with firm value at the 5% significance level.

4.3.2 Multiple Linear Regression

The fixed effects panel regression model assessed the effect of WCM and firm size on firm value. The regression analysis was established at the 5% significance level. The significance critical value

exhibited from the Analysis of Variance and Model Coefficients were compared with the values obtained in the analysis. The findings are displayed in Table 4.14.

Table 4.14: Fixed Effects Panel Multiple Linear Regression

Fixed-effects (within) regression		Number of obs = 277				
Group variable: Number		Number of groups = 58				
R-sq: within = 0.1699		Obs per group: min = 2				
between = 0.1750		avg = 4.8				
overall = 0.1661		max = 5				
		F(5,214) = 8.76				
corr(u_i, Xb) = -0.8038		**Prob > F = 0.0000**				
LogTobinQRatio	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
LogAveragecollectionperiod	.67745	.6395273	1.06	0.291	-.5831295	1.93803
LogAveragepaymentperiod	-.7912266	.798521	-0.99	0.323	-2.3652	0.782747
LogFirmSize	-8.891879	1.582221	-5.62	0.000	-12.01061	-5.77315
LogLevearage	-.0010837	.0020639	-0.53	0.600	-.0051517	0.002984
LogSalesgrowth	.0003223	.0026664	0.12	0.904	-.0049334	0.005578
_cons	10.86074	1.711141	6.35	0.000	7.487891	14.23359
sigma_u .48008992						
sigma_e .11151105						
rho .9488117		(fraction of variance due to u_i)				
F test that all u_i=0: F(57, 214) =		29.62		Prob > F = 0.0000		

The overall R^2 indicates deviations in response variable as a consequence of differences in predictor variables. The overall R^2 value is 0.1661, a discovery that 16.61% of the deviations in firm value are caused by the various working capital management practices, firm size, leaverage, and sales growth. Other factors not incorporated in the model justify for 83.39% of the variations in firm value.

The null hypothesis is that the various working capital management practices, firm size, leaverage, and sales growth do not significantly influence firm value. The significance value obtained in the study (Prob>F=0.0000) is less than the critical value of 0.05. Consequently, the null hypothesis is

rejected. Thus, the various working capital management practices, firm size, leaverage, and sales growth do influence firm value. Thus, they can be utilized to significantly predict firm value.

The null hypothesis was that there was no significant relationship between each aspect of working capital management employed in the study, firm size, leverage, and sales growth with firm value. The study findings exhibited that only firm size had a significant relationship with firm value. This is because its significance value is less than the critical significance value (α) of 0.05 and thus the null hypothesis is rejected. It has a significant negative influence on firm value. Average collection period, average payment period, leverage, and sales growth however do not have significant effects on firm value. This is because their significance values are greater than the critical significance value (α) of 0.05. The following model was thus developed;

$$\mathbf{Y = 10.86074 - 8.891879X_1}$$

Where;

Y = Firm Value

X_1 = Firm Size

This implies that when firm size is equal to zero, the firm value is 10.86074. Subsequently, when firm size increases by one unit, there is a decrease in firm value by 8.891879 units.

4.4 Interpretation and Discussion of Findings

The study endeavored to establish the effect of working capital management on firm value of firms listed at the Nairobi security exchange, Kenya, with firm size, leverage, and sales growth acting as the control variables. The variables had to be transformed because they did not meet the conditions of normality, homoscedasticity. Thus, a logarithmic function was introduced to all the

variables to transform them. The variables cash conversion cycle and inventory conversion period exhibited multicollinearity, thus, they were dropped from the analysis.

The study findings established that average collection period, average payment period, firm size, and leverage are significantly correlated at the 5% significance level to firm value. They all have a negative significant association with firm value. Sales growth however, does not have a significant association with firm value at the 5% significance level. Additionally, the study findings revealed that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value. Thus, they can be utilized to significantly predict firm value. The study findings also exhibited that that only firm size had a significant relationship with firm value. It has a significant negative influence on firm value. Average collection period, average payment period, leverage, and sales growth however do not have significant effects on firm value.

The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the Conservative Theory of Working Capital proposed by Weston and Eugene (1975). The theory incorporates an element of risk and return in the WCM which determine the firm value. Based on this theory, a negative association is predicted amongst WCM and the value of the firm. with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional

finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the Aggressive Theory of Working Capital attributed to Belt (1979). According to the theory, there are higher risks of default on the company on account of inadequate funds to meet the obligations. However, these higher risks are associated with greater returns to the firm. Based on this theory, a positive association is anticipated amongst WCM and the value of the firm. However, the current study also established that none of the working capital component individually significantly affected firm value.

The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings of the study conducted by (Mweta, 2018). The study established that proper managing of working capital constituents enhances the value of the shareholders. Indeed, the key cause for the failure of most firms, partnerships and small firms is poor working capital management including inventory, receivables and payables management. In order to avoid liquidity risk, it is vital for a firm to have efficient mechanisms of managing the constituents of working capital.

While focusing on Indonesian listed entities, Sianipar and Prijadi (2018) explored the link between WC and the firm value. The study noted that the net trade cycle (NTC) and the firm value are negatively and significantly related with each other. In Egypt, Moussa (2018) was interested in bringing out the link between WCM and on the ability of the firm to perform and its overall value. The study noted that CCC as a dimension of WCM and the firm value are positively and significantly related with each other. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with

firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

A study conducted among the listed Chinese firms by Vijayakumaran (2019) focused on the efficiency of WCM and the firm's value. NTC was used as a proxy of WCM while Tobin Q was used in place of firm value. A negative link was noted between NTC and the firm's value. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

Arachchi et al. (2017) focused on the frontier market to bring out the link between WCM and the firm value. An inverse link was established between CCC and Tobin Q ratio while focusing on Indonesian listed entities, Sianipar and Prijadi (2018) explored the link between WC and the firm value and noted that CCC as a dimension of WCM and the firm value are positively and significantly related with each other. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

Locally in Kenya, Mwangi and Obwogi (2018) focused on Kenyan listed manufacturing firms to bring out the link between WCM and their profitability. The study noted mixed results between the components of WCM represented by CCC and the ability of the firms to perform. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

Kiptoo (2017) focused on firms that engage in processing of tea to bring out the link between WCM and their financial performance. A significant link was registered between WCM and the ability of the firm to perform in financial terms. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

Excellent WCM is critical for profitability of the firm which maximizes the wealth of the firm. A firm that has good WCM practices will have limited chances of external borrowing which maximizes the overall firm value. Furthermore, good WCM practices require the firm to prudently utilize the borrowed funds to avoid liquidity and cash flow challenges which may hurt the overall position of the firm (Kaur & Sing, 2013). The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices,

firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

According to Whited (1992), and Petersen and Fazzari (1993) the relatively smaller entities are associated with more financial related challenges. Ideally, smaller firms may have low amount of capital invested in their current assets. This may be an explanation as to why such smaller firms are characterized by low levels of inventories and receivables. This is in contrast to the current study finding that firm size has a statistically significant negative relationship with firm value.

Şamiloğlu and Akgün (2016) sought to bring out the link between WCM and the ability of firms to remain profitable. The measures of WCM included the ARP, APP and CCC and the specific focus of the inquiry was on listed firms. A ten year time horizon was taken covering 2003 all through to 2012. The returns generated on the values of the assets and the equities of the entities were used as proxies of financial performance. An inverse but significant link was noted between WCM and the ability of the firms to perform. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

A related inquiry in Turkey by Samet and Nazan (2017) focused on WCM and the ability of the firms to remain profitable. A total of 41 entities were covered with the time horizon covering 2005 all through to 2016. The study noted existence of an inverse link between WCM and the profitable

prospects of an entity. A study conducted among the listed Chinese firms by Vijayakumaran (2019) focused on the efficiency of WCM and the firm's value. In effort to operationalize WCM, the inquiry used NTC which was found to have an inverse link with the Tobin's Q of the entity. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

Another investigation among non-money entities listed in Pakistan was done by Hassan, Imran, Amjad and Hussain (2014) with a focus on WCM and its link with the ability of the firm to perform. The period of consideration of the inquiry was from 2007 all through to 2010 with information sought from auxiliary sources. The inquiry documented a direct and significant link between the ability of the firm to manage receivables and performance. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value. As control indicators, the size of the entity was seen to have a direct interaction with the ability of the firm to perform. This is in agreement to the current study finding that firm size has a statistically significant relationship with firm value.

Sudiyatno, Puspitasari and Sudarsi (2017) focused on Indonesian entities to bring out the link between WC and the ability of the entity to perform with some elements of its value. The period covered by this inquiry was 2010 all through 2013. Ratios were used as proxies of WC which included current assets against the overall assets and current liabilities to overall assets. The capital structure was taken as a control indicator in the inquiry. The firm's value was measured using Tobin's Q. While CA/TA resulted into a direct link with ability of the firm to perform, CA/TA had an inverse link. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

Arachchi, Perera and Vijayakumaran (2017) focused on the frontier market to bring out the link between WCM and the firm value. The specific focus of the inquiry was on listed entities on Colombo Security market. The period of consideration was from 2011 all through to 2015. WCM and its efficiency were examined using CCC while Tobin's Q was applied to gauge firm value. The size of the entity, the growth in turnover and the leverage were taken as control indicators. An inverse link was noted between CCC and the firm value. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

Akoto, Awunyo and Angmor (2013) looked at WCM and the ability of Ghanaian entities to remain profitable. A total of 13 listed manufacturing entities were covered with the time frame ranging from 2005 all through to 2009. By leveraging ion panel data methodologies, it was shown that ARD and the level of firm performance are inversely linked. On the other hand, CCC and performance had a direct and significant link with each other. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

An inquiry into WCM and the ability of the firm to create wealth was reviewed by Oseifuah and Gyekye (2017) with reference to the South African context. The adopted methodologies were panel data and the time frame was from 2003 all through to 2012. The results of the inquiry were mixed based on the individual components of WCM. The conversion period of inventories and the receivables were directly and significantly linked with the value of the entity. CCC and the firm value had a direct but insignificant link with each other. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

In Egypt, Moussa (2018) was interested in bringing out the link between WCM and on the ability of the firm to perform and its overall value. The adopted methodologies of the inquiries were

panel data with the time horizon taken as 2000 all through to 2010. A direct and significant link was noted between CCC and the value of the firm. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

Mwangi and Obwogi (2018) focused on Kenyan listed manufacturing firms to bring out the link between WCM and their performance. The adopted design was quantitative that entailed gathering of information from auxiliary sources. The period of consideration of the inquiry was ten year frame covering 2007 all through to 2016. It was shown that while CCC and the ability of the firm to perform in financial terms are inversely but significantly linked with each other, the link with Tobin's Q was direct but not significant. The current study finding that none of the working capital component individually significantly affected firm value is in agreement with the study findings.

Kiptoo (2017) focused on firms that engage in processing of tea to bring out the link between WCM and their financial performance. Information was gathered from first hand data sources. A significant link was documented between WCM and the ability of the entity to perform. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

Likalama (2016) did an assessment of WCM and its role as much as the profitability of the entity is concerned. The specific focus of the inquiry was on agro- firms with their operations with Eldoret. Gathering the views from first hand sources, it was shown that WCM and the profitable ability of the firm are significantly linked with each other. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

Mwangi, Makau and Kosimbei (2014) focused on the non-monetary listed entities in Kenyan context to bring out the link between WCM and their ability to perform. A total of 42 entities were covered with the time frame covering 2006 all through to 2012. The adopted methodologies were panel data. A direct and significant link was noted between aggressive, conservative policy of financing and the ability of the firm to perform financially. The current study finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

CHAPTER FIVE: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Introduction

This section shows the study findings summary, offered conclusions, and recommendations on the effect of working capital management on firm value of firms listed at the Nairobi Security Exchange. Additionally, the research limitations and further research suggestions are also outlined.

5.2 Summary of Findings

The study endeavored to assess the effect of the effect of working capital management on firm value of firms listed at the Nairobi Security Exchange, with firm size, leverage, and sales growth acting as the control variables. The study employed the use of correlation and regression analyses. The correlation analysis employed in the study established that average collection period, average payment period, firm size, and leverage are significantly correlated at the 5% significance level to the value of firms listed at the NSE. They all have a negative significant association with firm value. Sales growth however, does not have a significant association with the value of firms listed at the NSE at the 5% significance level.

The fixed effects of panel multiple linear regression revealed that the various working capital management practices, firm size, leaverage, and sales growth do influence the value of firms listed at the NSE. Thus, they can be utilized to significantly predict firm value. The analysis also revealed that only firm size had a significant relationship with the value of firms listed at the NSE. It had a significant negative influence on firm value. Average collection period, average payment period, leverage, and sales growth however do not have significant effects on the value of firms quoted at the NSE.

5.3 Conclusion

In this section, the conclusion of the study is given; the conclusion is affiliated to the study objective, which was to establish the effect of working capital management on firm value of firms listed at the Nairobi Security Exchange. The study concluded that working capital management with the control factors entailing firm size, leaverage, and sales growth do influence the value of listed firms. The study also concluded that the WCM aspects of average collection period and average payment were significantly negatively associated with the value of listed firms. The study concluded that however none of the components of WCM had an individual significant effect on firm value.

The current study conclusion that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leaverage, and sales growth do influence firm value concurs with the Conservative Theory of Working Capital proposed by Weston and Eugene (1975). The theory incorporates an element of risk and return in the WCM which determine the firm value. Based on this theory, a negative association is predicted amongst WCM and the value of the firm. with the study findings. However, the current study also established that none of the working capital component individually significantly affected firm value.

The conclusion also concurs with the Aggressive Theory of Working Capital attributed to Belt (1979). According to the theory, there are higher risks of default on the company on account of inadequate funds to meet the obligations. However, these higher risks are associated with greater returns to the firm. Based on this theory, a positive association is anticipated amongst WCM and

the value of the firm. However, the current study also established that none of the working capital component individually significantly affected firm value.

Similarly, the conclusion concurs with the study conclusions of the study conducted by (Mweta, 2018). The study established that proper managing of working capital constituents enhances the value of the shareholders. Indeed, the key cause for the failure of most firms, partnerships and small firms is poor working capital management including inventory, receivables and payables management. In order to avoid liquidity risk, it is vital for a firm to have efficient mechanisms of managing the constituents of working capital.

The current study conclusion that none of the working capital component individually significantly affected firm value is in agreement with the study conclusion by Mwangi and Obwogi (2018) on a study focusing on Kenyan listed manufacturing firms to bring out the link between WCM and their performance. The adopted design was quantitative that entailed gathering of information from auxiliary sources. The period of consideration of the inquiry was ten year frame covering 2007 all through to 2016. It was shown that while CCC and the ability of the firm to perform in financial terms are inversely but significantly linked with each other, the link with Tobin's Q was direct but not significant.

5.4 Recommendations

The study findings will aid in further researches to be conducted on the field of working capital management and its impact on corporate value. Later scholars keen in research on working capital management and its impact on corporate value will use the study findings as referral. Policy recommendations are made to the CMA and NSE, and by extension, the National Treasury, to formulate and enforce rules and regulations on working capital management since it has been

established that it influences the value of quoted firms. The recommendation will guide government regulators in making policies and practices to boost the capital markets and in extension, the financial system, to mitigate collapse of listed companies and ensure lack of stability in value of financial securities issued in the capital markets.

The finding that the average collection period and average payment period components of WCM are significantly negatively associated with firm value and the additional finding that the various working capital management practices, firm size, leverage, and sales growth do influence firm value generates conclusions to firm management and consultants to implement accrual quality in order to boost firm value. Other stakeholders like investment banks, equity analysts, and individual investors should search for firms with good working capital management to invest or recommend to invest. This is because there is a significant link between the ability of the firm to manage working capital and performance (Amjad & Hussain, 2014). The finding that none of the components of WCM had an individual significant effect on firm value calls for recommendations to firm management and consultants not to concentrate on any one WCM component in isolation but to employ wholesomely good working capital management practices.

5.5 Recommendations for Further Study

Exploring the influence of working capital management on corporate value is of great importance the policy makers in the National Treasury, CMA, and NSE, practitioners in the capital markets, and consultants. However, the current study was carried out in the capital markets context, the same study could be carried out across other firms like Small and Medium-Sized Enterprises (SMEs) establish if the study findings would hold. The study was only carried out in the Kenyan context, further studies can be conducted out of Kenyan context, they can be conducted in the African or global jurisdictions to establish whether the study findings would hold.

The study only considered firm size, leverage, and sales growth as the only factors moderating the relationship between working capital management and corporate value. A study can be conducted to ascertain there are factors that moderate on the relationship between WCM and corporate value. This study used secondary data, a subsequent research should be undertaken applying primary data to ascertain if the study findings would hold and either complement or criticize the finding of this study. Multiple linear regression and correlation analysis were applied in the study; Other analysis technique for example cluster analysis, discriminant analysis, granger causality and factors should be incorporated in the subsequent research.

5.6 Limitations of the Study

The study was conducted only in the capital markets context, due to time and cost and also availability of data constraints, which does not give clear indication of findings if firms in other sectors like Over the Counter (OTC) markets and SMEs or all the firms in the economy were also incorporated in the study. More uncertainties would occur if similar studies were replicated in firms outside the realm of capital markets. Although the research engaged secondary sources of data, there were some major challenges like some of the data being not readily available; especially data on the accruals quality and it took great lengths and costs to obtain it. The data was not utilized in their raw form and further calculations and manipulations of the data were required. Impending delays were experienced due to data processing and further editing before the compilation by the researcher.

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APPENDICES

Appendix 1: Companies Listed at the Nairobi Securities Exchange

Agricultural	
Ticker	**Company Name**
EGAD	Eaagads Limited
KUKZ	Kakuzi Limited
KAPC	Kapchorua Tea Company Limited
LIMT	Limuru Tea Company Limited
SASN	Sasini Tea and Coffee
WTK	Williamson Tea Kenya Limited
Automobiles and Accessories	
Ticker	**Company Name**
G&G	Car & General Kenya

Banking	
Ticker	**Company Name**
BBK	Barclays Bank of Kenya
CFC	CfC Stanbic Holdings
DTK	Diamond Trust Bank Group
EQTY	Equity Group Holdings Limited
HFCK	Housing Finance Company of Kenya
I&M	I&M Holdings Limited
KCB	Kenya Commercial Bank Group
NBK	National Bank of Kenya
NIC	National Industrial Credit Bank
SCBK	Standard Chartered of Kenya

COOP	Cooperative Bank of Kenya
Commercial and Services	
Ticker	**Company Name**
XPRS	Express Kenya Limited
KQ	Kenya Airways
LKL	Longhorn Kenya Limited
EVRD	Eveready East Africa
SCAN	Scangroup
NMG	Nation Media Group
SGL	Standard Group Limited
FIRE	Sameer Africa Limited
TPSE	TPS Serena
UCHM	Uchumi Supermarkets

Construction and Allied	
Ticker	**Company Name**
ARM	ARM Cement Limited
BAMB	Bamburi Cement Limited
BERG	Crown-Berger (Kenya)
CABL	East African Cables Limited
PORT	East Africa Portland Cement Company
Energy and Petroleum	
Ticker	**Company Name**
KEGN	Kengen
KENO	KenolKobil
KPLC	Kenya Power and Lighting Company
TOTL	Total Kenya Limited

UMME	Umeme
Insurance Segment	
Ticker	**Company Name**
BRIT	British-American Investments Company
CIC	CIC Insurance Group
CFCI	Liberty Kenya Holdings Limited
JUB	Jubilee Holdings Limited
KNRE	Kenya Reinsurance Corporation
PAFR	Sanlam Kenya Plc
Investments	
Ticker	**Company Name**
ICDC	Centum Investment Company
OCH	Olympia Capital Holdings
HAFR	Home Afrika Ltd
TCL	TransCentury Investments

Investment Services	
Ticker	**Company Name**
NSE	Nairobi Securities Exchange
Manufacturing and Allied	
Ticker	**Company Name**
BOC	BOC Kenya Limited
BAT	British American Tobacco Limited
CARB	Carbacid Investments Limited
EABL	East African Breweries
EVRD	Eveready East Africa
ORCH	Kenya Orchards Limited

MSC	Mumias Sugar Company Limited
UNGA	Unga Group
Telecommunication and Technology	
Ticker	**Company Name**
SCOM	Safaricom

Source: Nairobi Securities Exchange Website (2020)

Appendix II: Data Collection Sheet

Name of Company	**Sector**				
Data	**2015**	**2016**	**2017**	**2018**	**2019**
Total Market Value					
Total Book Value					
Liabilities					
Tobin's Q Ratio					
Net Income					
Cash flows from operations					
Conservative Accounting					
Accounts Receivables					
Inventory					
Accounts Payable					
Tax Payable					

Other Current Assets					

Appendix III: Research Data

Number	Year	Tobin Q Ratio	Average collection period	Average payment period	Firm Size	Leverage	Sales growth
1	2017	0.532075	14.64973	15.20284	17.56969	0.375744	-0.52486
1	2016	0.604281	15.34577	15.46973	17.74849	0.420559	-0.12935
1	2015	0.640816	15.0784	15.36669	17.76554	0.717293	0.373451
2	2019	0.696413	14.73778	15.71088	17.70906	0.281437	0.012364
2	2018	0.966313	14.7912	15.87156	17.73465	0.154973	0.011894
2	2017	1.296207	15.34048	15.62314	17.66997	0.089848	0.09897
2	2016	1.333233	15.52552	15.74457	17.52446	0.067948	0.061078
2	2015	1.395332	14.89562	15.73287	17.55389	0.072909	0.066721
3	2019	0.460549	14.26871	14.47038	16.25644	1.452633	0.242449
3	2018	0.443872	14.34423	14.415	16.1353	1.72923	0.313401
3	2017	0.438984	14.18912	14.3559	16.04203	1.432575	0.14162
3	2016	0.466826	14.41983	14.62442	16.08817	0.766942	0.200802
3	2015	0.504916	14.49287	14.73486	16.01141	0.613065	0.134322
4	2019	0.623718	12.07106	11.57347	15.06927	0.101529	0.133257
4	2018	1.153631	11.8955	11.34582	15.03079	0.054327	0.07407
4	2017	1.388878	11.9028	11.73177	15.01154	0.049495	0.06991
4	2016	2.36821	12.09079	11.88986	14.94101	0.030542	0.047807

4	2015	9.879083	12.03563	11.59743	14.90364	0.007259	0.011673
5	2019	0.933686	13.69318	14.27963	15.44602	1.081396	0.029809
5	2018	1.022045	14.03833	14.42992	15.51583	0.106201	0.030647
5	2017	0.982262	14.38348	14.58021	15.58564	0.051999	0.040331
5	2016	0.75813	14.19999	14.42543	15.43669	0.08252	0.078079
5	2015	0.974486	14.04683	14.27874	15.32825	0.048342	0.01375
6	2019	0.458548	12.65622	13.56677	15.65206	3.788866	0.992768
6	2018	0.494692	13.18386	13.63185	15.70313	1.019622	-0.38478
6	2017	0.536082	13.71149	13.69694	15.76689	0.864841	-0.49119
6	2016	0.518172	14.11849	13.92297	15.83685	1.110736	-0.39412
6	2015	0.581371	14.51549	14.00299	15.94185	0.7748 6	0.068828
7	2018	0.287612	13.35721	15.57442	17.45382	3.707 25	5.420182
7	2017	0.34096	12.90359	14.86423	17.124 5	1.757281	-0.43448
7	2016	0.318261	13.17225	14.74646	17.14206	2.332501	1.956107
7	2015	0.41679	13.90119	14.4799	16.95589	1.316 13	1.704675
8	2019	0.954719	11.29668	11.62382	12.423 3	0.038299	-1.31404
8	2018	1.23985	11.95222	11.5987	13.25998	0.011891	-0.15013
8	2017	0.991688	11.91328	11.91572	13.55758	0.011574	0.356883
8	2016	0.781289	11.45958	11.87831	13.89507	0.012363	-0.27378
8	2015	0.562564	12.31821	12.68818	14.22872	0.099789	0.856369
9	2019	1.020657	12.90344	12.11017	15.681 3	0.151118	0.107059
9	2018	1.018711	12.04047	12.80154	15.597 4	0.145096	0.079763
9	2017	1.097943	12.58281	13.04405	15.56404	0.125177	0.092019
9	2016	1.157895	12.49182	12.89612	15.43775	0.132326	0.093845
9	2015	1.770737	12.45173	12.33281	14.92246	0.119439	0.074787

10	2019	0.392505	17.22999	#NUM!	19.76092	4.896953	0.165172
10	2018	0.414017	16.90123	14.27689	19.75398	3.647397	0.15744
10	2017	0.438603	16.57247	15.16608	19.74704	3.082489	0.150359
10	2016	0.410927	16.05061	16.1121	19.72016	4.864435	0.178029
10	2015	0.376584	15.98075	15.88525	19.65184	10.21166	4.213366
11	2017	0.904817	15.82841	15.1644	16.99768	0	0.110045
11	2016	0.940552	15.5535	15.19479	17.00193	0	0.142614
11	2015	0.875011	15.52602	14.79997	16.67066	0	0.127045
12	2018	0.460333	17.49449	18.08169	19.63457	20.92422	0.297349
12	2017	0.476786	17.75279	17.80402	19.61834	10.64705	0.452487
12	2016	0.473479	17.29881	17.37934	19.48395	11.32332	0.288515
12	2015	0.465837	17.06679	17.08616	19.43407	5.894268	-1.09029
13	2019	0.551038	16.42903	17.23928	19.09196	12.20822	-0.14582
13	2018	0.692478	16.4853	17.21797	18.73282	0.185423	-0.36034
13	2017	0.639902	16.4095	17.01296	18.81017	4.6663	-3.39306
13	2016	0.576614	16.52915	16.99523	18.86335	13.52586	-4.66295
13	2015	0.528904	16.51142	16.6564	19.01986	14.6039	0.049515
14	2019	5.445398	16.71286	17.17255	19.07548	0.001482	0.062161
14	2018	4.422449	16.57912	17.09141	18.93613	0	0.045201
14	2017	5.215441	16.69659	17.41466	18.90117	0	0.049663
14	2016	4.015833	16.84192	17.50611	18.88556	0	0.048803
14	2015	3.366494	16.14781	17.53937	18.87149	0.000751	-0.73658
15	2019	0.80469	12.83297	13.28206	14.24133	0.486579	-1.34351
15	2018	0.487678	13.28915	13.07725	14.76633	0.038158	0.103114
15	2017	0.465975	13.59296	13.19005	14.90403	0.045114	-0.51892

15	2016	0.470876	13.48208	13.34307	15.00666	0.008444	-0.00417
15	2015	0.459593	13.4473	13.14606	15.13759	0.004381	0.482635
16	2019	0.342782	13.01836	12.60084	16.50161	0.349159	0.066539
16	2018	0.423037	13.50124	12.9278	16.37748	0.259682	0.046538
16	2017	0.570953	13.81273	13.21311	16.39543	0.174832	0.176428
16	2016	0.329861	13.03042	13.09611	16.63799	0.268166	0.218631
16	2015	0.337779	13.14237	12.96954	16.59088	0.220591	-0.21498
17	2019	0.721084	13.87445	14.28606	15.24963	0.201658	0.108368
17	2018	0.693828	14.29058	14.03138	15.35798	0.223192	-0.06972
17	2017	0.796519	14.22748	14.017	15.31058	0.126336	0.147208
17	2016	0.546115	14.41013	13.64763	15.29824	0.457471	-0.12655
17	2015	0.697508	14.2226	13.42626	15.28698	0.301857	0.1464
18	2019	0.600918	16.24268	15.75881	17.44158	0.122773	0.133579
18	2018	0.607058	15.98638	15.91073	17.48569	0.068662	0.185087
18	2017	0.574819	16.0937	15.90949	17.45342	0.090522	0.208769
18	2016	0.51938	15.98045	15.87014	17.40417	0.133284	0.140568
18	2015	0.552886	16.05817	15.92519	17.34847	0.108331	-2.40159
19	2019	0.355725	16.13588	15.98024	17.29277	17.50215	-2.68121
19	2018	0.575302	14.53365	15.80013	16.62901	5.104564	-1.73667
19	2017	0.561372	15.0269	15.72815	16.74622	2.006012	-0.44858
19	2016	0.499964	15.13315	15.40493	16.75528	1.943669	-1.08501
19	2015	0.55359	15.67052	15.26799	16.75528	1.918888	-3.46202
20	2016	0.705777	12.31462	15.3598	15.42539	0.462975	-0.98356
20	2015	0.800053	13.73539	15.166	15.67384	0.123538	0.211652
21	2019	0.47023	14.9198	14.95078	16.1807	0.457265	0.30048

21	2018	0.486109	14.84992	14.77542	16.11134	0.477294	-0.0022
21	2017	0.560497	14.7078	15.1524	16.06209	0.252878	0.214278
21	2016	0.495808	14.54423	14.6416	15.93796	0.408989	0.513486
21	2015	0.377666	14.52275	14.51242	15.97559	0.837562	0.115825
22	2019	0.716436	15.10281	14.88229	16.30844	0.097416	0.081819
22	2018	1.118274	14.96497	14.81963	16.23125	0.002323	0.061767
22	2017	1.729293	14.63194	14.78746	16.24211	0.001184	0.093228
22	2016	1.342616	14.72405	14.76105	16.31482	0.000867	0.057512
22	2015	2.418206	14.89341	15.00524	16.35685	0.004218	0.01892
23	2019	0.662137	12.83297	13.20969	14.50497	0.005789	0.017798
23	2018	0.882105	12.63209	13.27415	14.57713	0	0.009371
23	2017	1.085523	12.46691	13.29389	14.61692	0	0.027074
23	2016	1.223845	12.67696	13.17278	14.61475	9.33E-05	0.030892
23	2015	0.964078	12.79275	13.31604	14.65749	0	0.093946
24	2019	1.22475	15.92244	17.14285	18.28217	0.30392	0.02971
24	2018	2.099421	15.88824	17.01945	18.08166	0.15719	0.032832
24	2017	2.389841	16.11087	16.85114	18.01522	0.138938	0.045209
24	2016	2.394013	16.26411	16.89961	17.93856	0.119725	0.031626
24	2015	2.53938	16.0253	16.46467	18.01931	0.113814	0.008149
25	2019	0.404943	9.206031	9.23171	13.7561	0.230721	-0.13409
25	2018	0.558493	9.267571	9.07738	13.71668	0.163356	2.018756
25	2017	0.810203	9.329111	8.92305	13.73517	0.115346	0.050439
25	2016	0.964874	9.390651	8.76872	13.54261	0.080715	0.001072
25	2015	1.852875	9.452191	8.61439	12.97139	0.086773	-0.07055
26	2019	0.430017	12.81159	13.31713	15.92838	0.515303	0.191393

26	2018	0.43449	14.55432	13.78111	16.06734	0.545419	-0.09395
26	2017	0.475303	14.12858	13.54781	15.93946	0.527513	0.154863
26	2016	0.47848	14.06826	13.20457	16.00508	0.513501	-0.1354
26	2015	0.347134	13.94877	12.49055	15.96244	1.010597	-0.20077
27	2019	0.458464	11.84044	11.93373	14.52511	0.594533	0.28358
27	2018	0.42469	13.55086	12.50892	14.72741	0.75294	-0.10102
27	2017	0.426174	12.96527	12.27842	14.5237	0.755243	0.374364
27	2016	0.452724	13.04819	11.93987	14.57846	0.67113	-0.02912
27	2015	0.527005	12.8926	11.54847	14.50024	0.563799	0.001759
28	2019	4.044671	11.74006	9.721426	12.37019	0.023123	0.002123
28	2018	3.71342	11.8327	10.72657	12.49969	0.024649	-0.01845
28	2017	3.789647	11.67645	10.58251	12.47613	0.028993	-0.015
28	2016	3.759629	11.70243	10.2371	12.55035	0.038177	0.001532
28	2015	5.540048	11.94842	9.8816	12.65641	0.02629	-0.09565
29	2019	0.748756	9.557399	10.41021	13.06418	1.615865	-0.42817
29	2018	0.815185	9.469854	10.75419	12.67902	1.897181	-0.68052
29	2017	0.69797	9.993055	11.38589	12.83477	1.996212	-0.77025
29	2016	0.655024	10.06358	10.60105	12.84681	1.922755	-0.37657
29	2015	0.629973	10.89217	10.0436	12.99883	1.413556	0.056846
30	2019	0.447577	13.94626	14.4711	16.70513	1.844591	0.042722
30	2018	0.485464	14.05273	14.40651	16.6833	0.855722	0.020178
30	2017	0.551856	14.1025	14.40123	16.67696	0.991243	0.03463
30	2016	0.45704	13.96285	14.24391	16.64773	1.437133	-0.06161
30	2015	0.486862	13.97304	14.30127	16.57652	0.855472	0.066111
31	2019	0.670823	15.10167	14.9279	16.3652	0.03437	0.085136

31	2018	0.588674	15.5449	15.3571	16.48449	0.083482	0.071131
31	2017	0.646386	15.68748	15.28794	16.4372	0.000817	0.05973
31	2016	0.636097	15.66025	15.26728	16.41719	0.000678	0.024222
31	2015	0.932496	15.51473	15.0851	16.33871	0.016343	0.15794
32	2019	0.54432	14.44399	14.92663	18.68364	0	-0.62482
32	2018	0.577944	14.14929	14.74753	18.55318	0.025165	0.013273
32	2017	0.628811	13.89307	14.50639	18.46916	0.018126	0.017673
32	2016	0.616693	14.03148	14.463	18.32161	0	0.003166
32	2015	0.630207	13.85048	14.64281	18.22683	0	1.130116
33	2019	0.528569	14.04493	14.37498	17.18393	0	0.180546
33	2018	0.54194	14.07263	14.14724	17.1863	0	0.13915
33	2017	0.535458	14.06392	14.2084	17.2104	0	0.178901
33	2016	0.538334	13.59086	13.08433	17.1634	0	0.157208
33	2015	0.633666	12.31144	13.53544	17.11539	0	0.133535
34	2019	0.298554	13.19636	13.46732	17.73477	0	0.079519
34	2018	0.426726	12.32299	13.52231	17.60791	0	0.103215
34	2017	0.483978	12.42371	13.37449	17.57047	0	0.089123
34	2016	0.569666	12.1338	13.10968	17.46602	0	0.07046
34	2015	0.574687	11.63325	13.10968	17.39775	0	0.155985
35	2019	0.522338	14.11099	14.62055	17.45892	0	-0.08759
35	2018	0.547316	14.04887	14.64682	17.41499	0	0.01827
35	2017	0.543293	13.57159	14.11434	17.42963	0	0.12795
35	2016	0.558606	12.7136	13.62667	17.36858	0	-0.04006
35	2015	0.616652	12.98438	13.66915	17.35745	0	0.064895
36	2019	0.536285	14.30051	14.87544	18.64577	0	0.080972

36	2018	0.572301	14.48057	14.81869	18.45659	0	0.024105
36	2017	0.599987	14.31322	15.08298	18.41088	0	-0.00416
36	2016	0.569912	14.41058	14.70897	18.24206	0	0.04823
36	2015	0.61892	14.31799	14.7529	18.16749	0	0.07143
37	2019	0.549129	12.7362	14.00494	17.37949	0	-0.04152
37	2018	0.595055	12.34013	13.83015	17.31342	0.022845	0.277486
37	2017	0.70288	12.42782	13.76397	17.23341	0	0.130123
37	2016	0.63426	12.406	13.38546	17.10491	0	-0.15391
37	2015	0.792814	12.82635	13.57085	17.03119	0	0.20989
38	2019	0.214972	11.72173	11.78981	14.302	1.6976	0.143438
38	2018	0.219097	12.03066	12.03359	14.32166	1.499464	0.285449
38	2017	0.249173	11.76943	11.80376	14.30947	1.034336	0.404025
38	2016	0.259074	12.11488	11.90528	14.23916	1.793114	0.256679
38	2015	0.292912	11.99075	12.10492	14.2417	0.462698	-3.65534
39	2019	0.459478	15.75015	15.48338	18.43816	2.556622	-1.22041
39	2018	0.457761	15.58661	15.42488	18.38286	2.332024	-0.31979
39	2017	0.534376	15.31645	15.50868	18.29722	1.336561	-0.3464
39	2016	0.526515	14.46366	15.02073	18.17291	1.413216	-0.37022
39	2015	0.609924	14.42527	14.93968	18.09689	1.091871	0.0194
40	2019	0.614108	12.91907	14.30419	15.28518	0	0.049623
40	2018	0.580525	11.15635	14.1807	15.32013	-0.00229	0.042801
40	2017	0.581645	11.28283	13.89018	15.31465	0.082624	0.048335
40	2016	0.573281	11.08445	13.38165	15.18415	0.384681	0.084616
40	2015	0.638356	11.34025	13.29928	15.16678	5.34E-07	0.078119
41	2019	1.417476	11.11935	11.36031	14.62306	0.011431	-2.12498

41	2018	1.665241	11.29634	11.44967	14.61229	0.000718	0.367507
41	2017	2.362609	11.4333	11.11154	14.56135	0.001433	-0.72043
41	2016	1.826089	11.16932	11.68871	14.51551	0.003394	0.096384
41	2015	1.821649	11.24548	11.65677	14.46692	0.003217	0.137996
42	2019	1.821595	15.10297	15.87926	16.90366	0.037413	0.080633
42	2018	3.341582	14.85381	15.50946	16.7245	0.039274	0.133967
42	2017	2.827525	14.84622	15.37532	16.69502	0.114232	0.144589
42	2016	2.555516	14.74843	15.32844	16.73327	0.130489	-45.9473
42	2015	2.328434	14.73137	15.29355	16.74303	0.045604	-1.94845
43	2018	0.515811	11.58839	16.40094	16.57144	-4.47871	0.081802
43	2017	0.414993	13.99283	16.22915	16.99735	-1.68797	0.065267
43	2016	0.369338	13.86335	15.89861	17.10395	-0.38323	0.022012
43	2015	0.476723	14.24331	15.84766	16.83266	-1.14402	0.019978
44	2019	0.859789	13.73218	13.61015	14.66747	0	0.078203
44	2018	0.694258	13.5844	13.58938	14.69411	0	0.089878
44	2017	0.860176	13.57321	13.22347	14.43541	0	0.007497
44	2016	0.600022	13.37666	12.96168	14.43981	0	0.007052
44	2015	0.746357	12.63043	12.44947	13.44346	0	0.000657
45	2017	0.549921	11.84436	13.26151	14.25559	0	0.102827
45	2016	0.506507	12.36214	13.34707	14.64042	0	0.12469
45	2015	0.590558	13.18399	12.67294	14.72621	0	0.132828
46	2019	0.545626	13.37214	13.20085	14.6402	0.484898	0.149696
46	2018	0.893763	13.50873	13.29841	14.42488	0.023021	0.113729

46	2017	1.117539	13.57259	13.17102	14.33476	0.032562	0.149187
46	2016	1.143203	13.57697	13.03753	14.23501	0.030706	0.135633
46	2015	1.320295	13.55578	13.14709	14.09808	0.051565	0.147263
47	2019	5.131419	11.17662	10.6654	11.82044	0.050019	0.163676
47	2018	6.590566	10.93296	10.21984	11.6489	0.04466	0.110838
47	2017	43.8636	10.99475	10.3505	11.59246	0.006446	0.23853
47	2016	51.13795	10.72424	9.946693	11.3991	0.006582	0.161848
47	2015	58.72219	10.37866	9.687202	11.2738	0.00638	0.128997
48	2019	0.571028	19.08797	19.12679	19.73972	4.534379	0.234235
48	2018	0.561285	18.99366	19.1502	19.6003	4.718474	0.126226
48	2017	0.602972	18.94183	19.04113	19.41974	5.391105	0.12069
48	2016	0.568361	18.94251	18.9983	19.37511	4.602224	0.150738
48	2015	0.622186	18.79801	18.92196	19.2998	2.723217	0.126117
49	2019	0.566888	19.40168	19.60897	19.94021	3.926674	0.146652
49	2018	0.577317	19.31844	19.53948	19.84058	3.652899	0.114789
49	2017	0.559206	19.47629	19.46998	19.77357	4.068379	-0.04432
49	2016	0.5728	19.37678	19.37416	19.67865	3.750327	-0.28075
49	2015	0.627353	19.15579	19.39674	19.65178	2.77624	0.034726
50	2019	0.497484	19.10926	19.52099	19.77194	10.55611	0.185009
50	2018	0.520514	19.07859	19.46046	19.74966	7.285111	0.153837
50	2017	0.539932	19.09387	19.39993	19.71075	5.76868	0.200298
50	2016	0.516478	19.04289	19.28822	19.60866	8.552342	0.093241
50	2015	0.565621	18.99473	19.08364	19.41987	4.462092	0.06918
51	2019	0.551361	19.71935	19.98715	20.32827	1.871907	0.104285
51	2018	0.554113	19.51001	19.86231	20.16707	3.175445	0.086409

51	2017	0.608217	19.44705	19.73747	20.07789	2.875418	0.151993
51	2016	0.58345	19.39926	19.63618	19.97611	3.460261	0.208972
51	2015	0.646531	19.41354	19.5265	19.87478	2.357954	0.150336
52	2019	0.47432	17.46752	17.30621	17.84895	18.5996	0.223739
52	2018	0.472596	17.58688	17.36285	17.91897	23.56762	0.146288
52	2017	0.483094	17.7203	17.41949	18.02825	15.43265	-0.64123
52	2016	0.494354	17.81315	17.47153	18.09121	12.38545	-0.0471
52	2015	0.51861	17.7862	17.54517	18.08744	7.844595	0.247833
53	2019	0.565944	18.87028	19.40784	19.42874	5.698581	0.029087
53	2018	0.63322	18.81018	19.17746	19.33151	3.381498	-0.21616
53	2017	0.688126	18.84607	18.94708	19.29661	1.838913	0.166306
53	2016	0.643247	18.71838	18.80263	19.1652	2.2984 7	0.216069
53	2015	0.688147	18.66616	18.70571	19.07157	1.910183	0.191899
54	2019	0.564591	20.09847	20.17551	20.61632	4.740737	0.260222
54	2018	0.544103	19.93774	20.10236	20.38683	5.231063	0.162041
54	2017	0.565768	19.86214	20.02922	20.28735	4.125167	0.143001
54	2016	0.536444	19.77069	19.92069	20.20447	5.657151	0.173577
54	2015	0.590357	19.66186	19.86617	20.14004	3.554786	0.134583
55	2019	0.509191	17.64136	18.45681	18.53427	81.22649	0.158542
55	2018	0.492439	17.68209	18.40927	18.55913	59.85092	0.150418
55	2017	0.497886	17.77367	18.36173	18.51484	32.401	0.118411
55	2016	0.492911	17.8232	18.35742	18.53478	42.6922	0.121222
55	2015	0.499205	18.03213	18.52163	18.64734	21.4364	0.096768
56	2018	0.504401	18.57643	18.7888	19.15501	8.820969	0.094685
56	2017	0.511225	18.601	18.74938	19.14422	7.938933	0.110838

56	2016	0.504759	18.55579	18.53244	18.94812	8.359618	0.23853
56	2015	0.547524	18.55746	18.53726	18.92622	5.037844	0.161848
57	2019	0.544092	18.84473	19.28494	19.49468	5.894799	0.128997
57	2018	0.535235	18.80325	19.07084	19.4537	6.867158	0.234235
57	2017	0.523797	18.68716	18.85674	19.33191	6.444407	0.126226
57	2016	0.520039	18.56554	18.59739	19.18467	6.262675	0.12069
57	2015	0.535483	18.43632	18.48127	19.15522	5.21515	0.150738
58	2019	0.582082	18.67292	19.27841	19.5264	3.656897	0.126117
58	2018	0.582975	18.5917	19.22843	19.46942	3.573626	0.146652
58	2017	0.592467	18.65413	19.17844	19.47054	3.359809	0.114789
58	2016	0.593394	18.62534	19.04447	19.3389	3.171086	-0.04432
58	2015	0.60865	18.56153	18.96321	19.27068	2.876991	0.094685