THE EFFECT OF INFLATION RATE ON LIQUIDITY OF MANUFACTURING FIRMS LISTED IN NAIROBI SECURITIES EXCHANGE

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DECLARATION

I declare that this Research Project is my original work and has not been submitted for examination in any other university or institution of higher learning .

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DEDICATION

I dedicate this study to my mother Ruth Nyakiamo and Father Pius Nyakiamo for having believed in me and supported me through their prayers. A special dedication to my best friend and Brother Eric Odoyo and his wife Beryl for their support during this period. My brother Christopher Miniga receives special thanks for supporting me during the research and finally my kid brothers Brian Warner, Robert Mugeni, Gregory Oliech, Nelson Gwadi. My sisters Valarie Brenda and Telly Nyakiamo who challenged me to go for greater heights.

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ABBREVIATIONS

CCC   Cash Conversion Cycle

CMA   Capital Markets Authority

KAM   Kenya Association of Manufactures

NSE   Nairobi Stock Exchange

WCM   Working Capital Management

ABSTRACT

The paper was commissioned to find out the effect of inflation rate on the CCC of listed Manufacturing firms at the NSE for a period of five years between 2010 -2014.A two tail non-directional hypothesis test of statistical significance at 95% confidence interval shows that the model is statistically significant and persistent in explaining the variation of CCC. The Pearson correlation shows a negative relationship among the variables with the size of the company, inflation rate and interest rate accounting for 7.34%, 0.22% and 0.068% of the variation in the CCC respectively. The log-log random effects regression model established a negative statistically significant relationship between size and CCC,a negative statistically insignificant relationship between CCC and inflation, a positive statistically significant relationship with CCC and a positive constant which is statistically different from zero. The significance of the constant is consistent with prudent working capital management practices which require that manufacturing firms maintain an optimal level of liquidity that is necessary for honoring maturing obligations. The explanatory variables were tested for statistical significance using the P-test, at 95% confidence level. The results demonstrated that a 1% increase in the size of the firm leads to a decrease of CCC by 21.5%, 1% increase in inflation decreases the CCC by 24.5% indicating that inflation and CCC has a negative relationship, however an increase in interest rate leads to an increase in CCC by 8%, as interest rates increase the opportunity cost of money increases and traders get motivated to shift to credit transactions. The results also shows that every company need to finance 8 days of the CCC, this is the autonomous CCC that is independent of any event.

CHAPTER ONE: INTRODUCTION

1.1 Background of Study

The effect of macro-economic factors on liquidity of companies is profound yet little efforts have been made towards studying them. Inflation not only erodes the value of money but also reduces the aggregate demand. According to Keynes (1936) inflation reduces the aggregate marginal propensity to consume of households in an economy because baskets of goods and services become more expensive when too much money chase too few goods. Leo (1983) documents that the most drastic effect of inflation is the huge wealth shift from lenders to borrowers. Borrowers gain and lenders lose from repayments. Fisher (1911) concluded that the rate of interest charged on monetary investments characteristically fails to compensate the investor for inflation, thus debtors gain and creditors lose during inflation. Consequently lenders tighten the credit terms to shield themselves from the wealth transfer, this explains the negative relationship between Inflation and liquidity.

The conflict theory assume that money supply is endogenous, fiscal and monetary policies are passive and key agents (organized workers and monopoly capitalists) can set the price of their goods and services independent of demand; they have market power, inflation arises because the claims (after tax wage or salary income, after tax profits and government transfer payments) is greater than the real income available. Kotz (1982) postulates that inflation can only be sustained if the demand for money and credit is satisfied. Inflation is therefore a positive function of the size of overlapping claims, the frequency of price and wage changes and the degree of capital utilization and a negative function of the rate of productivity growth. Inflation arises because the sum of claims

over the national product (which depends on target real income levels, shares of the national product, or income growth rates) is greater than the real income available, if the demand for money and credit is always satisfied. According to the Quantity Theory of Money by David Hume, inflation is caused by the deterioration of the value of money and not the value of goods. The theory is supported by the findings of Mankiw and Mark (2011) who found out that quantity of money available in the country determines the value of money and the growth in the quantity of money is the primary cause of inflation. The theory views Price levels as a measure of the value of money, a rise in price level therefore means a lower value of money because each unit of money now buys smaller quantity of goods and services. The demand pull inflation postulates that an increase in aggregate demand which results from an increase in the supply of money, increase in autonomous consumption, investment and net exports without a corresponding increase in output leads to an increase in the general prices, this normally occurs in an economy operating in full capacity because the presence of spare capacity will crowd out the effects of inflation.

1.1.1 Inflation Rate

Moynihan and Titley (2000) defines inflation rate as the continuous increase in price of a particular basket of goods over time, this may be caused by an increase in government spending which increases the supply of money without necessarily increasing output. This increases money in circulation leading to too much money chasing for too few goods. Griffiths and Wall (2007) defines inflation rate as the change in the purchasing power of money as is represented by the persistent tendency for general prices to rise. The purchasing power of money decreases as inflation increases, price increase implies

that more money is needed to purchase fewer goods hence what a unit of money could buy this year may change next year. Yet Kotz (1982) infers that inflation arises when the claims over the national product is greater than the real income.

The importance of studying inflation rate is underscored by the influence it has on key parameters of shareholders wealth maximization such as return on equity, profitability, liquidity and the tax burden. Boyd and Champ (2006) finds a negative relationship between rate of inflation and profitability, in a bid to reduce inflation central banks employs contractionary monetary policies by increasing the base lending rate this encourages credit rationing which in turn decreases aggregate demand and real investment. Consequently stock returns are impacted negatively. Bodie (1976) found a negative relationship between stock returns and inflation. Yet Feldstein (1982) postulates that inflation increases the real taxable burden of the firms. Finally Faria and Carneiro (2001) reiterates that economic growth is retarded by inflation.

Froyen (2009) measured inflation rate by consumer price index. The index measures the aggregate price levels of a bundle of goods and services purchased by households relative to a base year which assumes the value of 100 %, the percentage change for a given year measures the inflation rate in that year. CPI = (Total dollar expenditure on market basket in current year/Total Dollar expenditure on market basket in base year)*100. However Cunningham (1996) noted four bias which causes the CPI to overstate inflation the first bias is the substitution bias which arises from consumers choosing relatively cheaper goods and services over time, the second bias is new outlet bias; the price quotes that are taken form a wide range of outlets are unlikely to reflect on the short term changes in retailing patterns which might cause consumers to move to

cheaper outlets and the quality improvement bias; the index does not include the quality gains overtime. Cunningham concludes that these bias overestimate inflation by at least 0.35% to 0.8% per annum. The biases are eliminated by using chained consumer price index which uses changing weights. On the other hand Fair and Oster (2009) recommends the use of Producer Price Index/wholesale price index. These are prices that producers receive for products at all stages of in the production process from crude materials, intermediate materials and finally to the finished products. The PPI detects prices early in the production process, they are therefore leading indicators of future consumer prices as they foreshadow future changes in consumer prices.

1.1.2 Liquidity

Brealy et al. (2001) defines liquidity as the ability of a firm to meet its financial obligations in a timely manner. If the assets owned by a firm can be quickly and cheaply turned into cash then they are liquid. Emery, Finnerty, and Stowe (2004) also reiterates that liquidity management is the maintenance of optimal cash flow that will enable the firm to service long-term debt and satisfy both maturing short term obligation and operational expenses. The bank of international settlement defines liquidity as the ability of the bank to fund increases in assets and meet obligation as they become due without incurring unacceptable losses (Bank for International Settlements, 2008).

It is important for a firm to maintain liquid assets in its books to meet its maturing obligation and protect itself from bankruptcy. However Sanger (2001) reports that high liquidity is seen as a restraint to financial performance because the current assets held to maintain liquidity do not contribute to return on equity. The finance manager must therefore strike the balance between profitability and liquidity, an optimal mix will

maximize shareholders wealth. Shin, Soenem, and Hyun-Han (1998) found a strong negative relationship between the cash conversion cycle and corporate profitability for listed American firms for the period 1975- 1994.Deloof (2003) also confirms that liquidity and profitability has a negative relationship. Eljelly (2004) postulates that liquidity is an important concept to study because it affects the company profits directly, the need for a company to borrow to finance its working capital requirements and cash gaps eats directly into the profit. Yet according to Smith (1980) liquidity is an economically sensible way of reducing the firm's dependence on costly external financing, during inflation lenders adjust the interest rates to compensate for the loss of real value of money, and this makes external financing extremely expensive. Lazaridis and Tryfonidis (2006) also studied the relationship between liquidity and profitability on a sample of 131 companies listed on the Athens stock exchange for the period 2001 to 2004, the regression analysis on SPSS shows that there is a statistically significant relationship between profitability measured through gross operating and cash conversion cycle. Despite the importance of liquidity Summers, Barbara and Wilson (2000) find out that companies usually do not improve liquidity management until when they are on the verge of collapse.

Liquidity has been traditionally measured using the ratios however modern measurements put more emphasis on the quality of the assets. Finnerty (1993) criticizes the use of traditional current and quick ratios on grounds that their calculations contains both liquid financial assets and operating assets, According to him the inclusion of operating assets impairs the reliability of the ratios because from the going concern concept operating assets are tied up in operation and as such cannot be included in the prediction of

liquidity. Kamath (1989) faults the use of current and quick ratios on grounds of their static nature, which makes them incapable of predicting future liquidity and cash flow requirements. CCC is found to be a superior measure of liquidity, a study conducted by Eljelly (2004) found out that at an industry level cash conversion cycle or cash gap is of importance as a measure of liquidity more than the current ratio. Cash gap measures the length of time between actual expenditure on productive resources and actual cash receipts from the sale of goods and services, this implies that a shorter period is better since the longer the cycle the greater the need for external financing which comes with additional interest expense. According to Richards and Laughlin (1980) the superiority of CCC as a measure of liquidity is premised on the fact that it recognizes the extent to which production, sales collection and payments creates flows that are non-instantaneous and unsynchronized. Shin and Soenen (1998) however argues that the net Trade cycle is a more superior method of measuring liquidity than the cash conversion cycle because it takes into the account the number of days of sales that the company has to finance its working capital hence helping in estimating the additional liquidity needs of a company.

1.1.3 Inflation Rate and Liquidity
Inflation is expected to have a positive relationship with liquidity, this is because an organization requires more money during inflationary moments for the same level of stock holding (Pandey 2010). Moreover access to short term financing during inflationary moments become difficult because lenders tighten the credit terms to protect themselves from inherent loses of holding monetary assets during inflation. According to the liquidity preference theory inflation rate has a positive relationship with liquidity. This is because inflation makes investment in monetary items unattractive, Fisher (1911)

in his theory of wealth transfer found out that the rate of interest charged on monetary investments characteristically fails to compensate the investor for inflation thus debtors gain and creditors lose during inflation. Consequently lenders tightens credit terms by shortening the credit period, this explains the positive relationship between inflation rate and CCC.

However the transaction cost theory is in conflict with both the liquidity preference theory and the theory of wealth transfer, the theory postulates that inflation increases the transaction costs this motivates traders to transact on credit terms to flee from the increased transaction costs, to this extent trade credit reduces the precautionary need for holding cash for both sellers and buyers. The underlying assumptions proves that inflation and CCC exhibits a negative relationship, this theory is supported by the findings of Ferris (1981). His Results shows that Creditors Deferral Period increased more than the Accounts Receivable Period and this reduced the CCC period.

The studies that have been done show mixed results on the relationship that subsist between the rate of inflation and liquidity. Moosa (2014) finds that firms employ conservative policies during inflationary moments and hence the negative relationship between inflation and liquidity, Ferris (1981) finds a positive relationship between the rate of inflation and liquidity this is because firms substitute cash transactions for trade credit when the financial market tightens. Gyu and Yungsan 2005 also finds out that during inflation both accounts receivable and payables increases, but investment in accounts receivable increases more than the increase in accounts payables hence increasing the net trade credit and thus increasing the cash conversion cycle. Oliner and Rudebusch (1996) also finds a positive relationship between net trade credit and inflation

this is to say that as the rate of inflation increase accounts receivable period increase more than credit deferral period. The mixed results obtained warrants investigations to find out the results in listed manufacturing firms in NSE.

1.1.4 Nairobi Securities Exchange

NSE offers a platform for raising of funds and liquidation of shares, it is regulated by the capital markets authority of Kenya which provides the regulatory framework necessary for protecting the interest of the investors. The word securities exchange connotes an objective and organized trading platform with a pricing mechanism which is free from bias and fair to all. Inflation and liquidity affects the listed firms in different ways.in the recent past some firms have suffered heavy losses because of mismanagement of their liquidity yet others have fallen to the heavy yoke of inflation. However manufacturing firms have longer production cycles than service based concerns, this means that they have to hold more inventory in their stock to help them satisfy their normal orders and also to take advantage of abrupt orders, consequently the precautionary need for inventory increases. According to Pandey (2010) inflation increases the liquidity requirement of manufacturing firms because the same level of stock holding will require more money as the rate of inflation increases, inflation also reduces the aggregate demand of goods and services this reduces the sales volume, Manufactures react to these adverse changes by increasing their credit sales through increased investments in accounts receivable. Petersen and Rajan (1997) confirms that firms with more inventory give more credit to increase sales and reduce the cost of inventory holding. The findings of Malitz and Ravid (1993) also proves that firms with long production cycle extend more credit than firms with short production cycle.

The justification for choosing manufacturing firms listed in NSE is premised on the reliability of their financial statements, public firms are regulated, supervised and monitored by an independent CMA. The Authority protects the interest of investors by monitoring the quality of financial statements reported, they also ensure that accurate and reliable information are published on a quarterly basis, this provides the investors with relevant information which enable them to liquidate or acquire shares through NSE. Listed firms are expected to disclose more information than unlisted firms because they are financed by the public, they are also expected to perform statutory audits where an independent opinion is given as to the truth and fairness of the financial statements, this increases the reliability of their financial statements and hence the justification for choosing the listed firms.

1.2 Research Problem

Empirical studies has shown that inflation affects the main drivers of shareholders wealth maximization negatively. Return on equity, stock prices, stock returns and value of the firm are negatively correlated with inflation. Consequently liquidity and profitability are negatively correlated, moreover suboptimal liquidity may lead to bankruptcy and liquidation. The research problem is premised on the conflicting theories and the disagreeing results of the empirical studies. The transaction cost theory postulates that inflation increases the transaction costs therefore rational buyers and sellers resort to credit transactions. Suppliers support their buyers by extending the creditors deferral period, this view is supported by the redistribution hypothesis and financial assistance hypothesis which postulates that large firms give more credit more credit to support their less liquid customers during inflation. Meltzer (1960) finds out that large firms finance

the CCC because they want to establish long-term business relationship with their customers. Their capacity is supported by the fact that they can issue commercial papers and get short term financing (Longstaff, Mithal & Neis, 2004).

However Keynes (1936) disagrees with the transaction cost theory. Liquidity preference theory discourages the holding of monetary assets such as accounts receivable. According to the theory lenders lose and borrowers gain during inflation and as a result firms will tighten their credit policy during inflation by reducing the creditors' deferral period and hence increasing the CCC. Moreover the Miller and Orr (1966) theory proposes that an increase in inflation increases the liquidity requirements of a firm since it increases the cost and uncertainty of liquidating marketable securities, firms end up holding suboptimal cash balances as precautionary measures .The studies conducted by Oliner and Rudebusch, (1996) and Choi and Kim (2001) the positive relationship between inflation and liquidity.

The existing literature on the relationship between inflation and liquidity shows mixed results. Ferris (1981) and Gyu and Yungsan (2005) found a positive relationship between inflation and trade credit, Yet Choi and Kim (2005) and Ben-Horim and Levy (1982) found a negative relationship between inflation and accounts receivable period. These studies looked at accounts receivable period without incorporating inventory conversion period and credit deferral period. Eiteman (1970) and Moosa (2014) incorporated both accounts receivable period and credit deferral period in their study but left out inventory conversion period, they investigated the effects of inflation on net credit period and found a positive relationship. Meaning the investment in accounts receivable was more than that of accounts payable. Both the studies have left out inventory conversion period which is

an important determinant of CCC.I believe inventory conversion period is an important variable to be studied because it is sensitive to changes in aggregate demand. Therefore the study is designed to answer the following question. What is the relationship that subsist between inflation and liquidity (CCC) of listed manufacturing firms at the NSE?

1.3 Research Objective

The objective study is to establish the effect of inflation rate on the liquidity of manufacturing firms listed in Nairobi Securities Exchange.

1.4 Value of the Study

The study will contribute immensely to scholars of finance considering that no study has been exclusively dedicated to the find out the effects of inflation on the CCC of listed Kenyan manufacturing firms. The study will help the credit rating agencies in Kenya to determine the weight to assign to inflation in their credit risk model. Credit rating in Kenya is relatively a new concept in Kenya and no doubt this study will improve immensely on their work.

It will also help the credit risk insurance companies to monitor their credit risk exposures. Inflation increases the business risk because it reduces the aggregate demand for goods, this increases the probability of default because the cash inflows may not be sufficient to repay the credit which therefore increases the claims made against an underwriter. The study will therefore help the underwriters to determine the optimal premiums given the expected macroeconomic condition. Moreover the findings of the study will also help in the formulation of objective and informed working capital policy. Manufactures can use the findings of the study to structure and price their credit policies. They can design an

optimal mix between credit period and cash discount incentives given the future expectations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The chapter contains review of theories explaining the relationship between inflation and liquidity, the determinants of liquidity and review of scholarly articles about the effects of inflation rate on liquidity of manufacturing firms listed in the NSE, the chapter will be concluded by a summary of literature review.

2.2 Theoretical Review

The theoretical review helps to understand the logical relationship between inflation and liquidity.

2.2.1 Transaction Cost Theory

The Transaction Cost Theory was proposed by John Commons (1931).The theory postulates that inflation increases the transaction costs and therefore rational buyers and sellers resort to credit transactions. During inflation large firms increase the credit deferral period to support and establish long-term relationships with their clients. Given these assumptions inflation and liquidity has a negative relationship because it reduces the CCC period. Trade credit reduces the precautionary need for holding cash for both sellers and buyers because trade credit reduces cash flow uncertainty. Inflation pushes the cost of cash holding which is an incentive for both the buyers and sellers to increase credit transactions to cushion against cash flow uncertainty. Ferris (1981) finds results which support the transaction cost theory, he argues that both the accounts receivable and accounts payable increase during inflation but the credit deferral period increases more

than accounts receivable period hence a reduction in the CCC period; transaction costs increases as the financial market tightens trade credit therefore help reduce the transaction cost of paying the bills, the sellers and buyers therefore get optimal results out of their trade by separating payment cycles from delivery schedules.

2.2.2 Liquidity Preference Theory

This theory was proposed by Keynes (1936) . The demand for money as an asset was theorized to depend on the interest forgone by not holding the bonds. Interest is hereby seen as the reward for parting with liquidity. Liquidity is the rate with which an asset can be converted into money, it is an attribute of an asset. As a result of inflation, interest rate increases thus increasing the cost of holding money. A person would be worse off if they held money during inflation because that money would lose value with time. Inflation therefore discourages credit transactions because the lenders will be worse off when they are paid at later dates (Fisher 1911), given these assumptions inflation therefore has a positive relationship with liquidity. Consequently manufacturing firms will tighten their credit policy and reduce Creditors Deferral Period, however the distributors will have to increase investments in Accounts receivable in order to push sales. (Moosa 2014)

2.2.3 The Optimum Cash Balance under Uncertainty Miller –Orr Model

The Miller and Orr (1966) theory provides a formal approach for determining the optimal cash balance under uncertainty, the theory sets two control limits- upper and lower contol limit plus a return point (optimal cash balance).If the cash flow fluctuate randomly and hit the upper limit the firms buys sufficient marketable securities to come back to the optimal level and if the cash flow hits the lower limit the firms sell the marketable securities to return to optimal level.The control limits plus the optimal cash

balance are determined by the transaction cost of liquidating marketable security,intrest rate and the standard deviation of net cashflows.An increase in the inflation rate not only increases the transaction cost of liquidating marketable securities but also impairs the liquidity of marketable securities,corporations take precautinary measures by maintaining more than the optimal levels of cash becouse of increased uncertanty.

Given these assumptions a rise in the inflation rate will increase the liquidity requirement of the firm, the increased uncertainty of the liquidity of marketable securities increases the precautionary demand for money and hence the positive relationship between inflation and liquidity. Moreover Pandey (2010) supports the idea that inflation has a positive relationship with liquidity, because a firm will need more cash to maintain the same level of current assets. Similarly Johnson and Aggarwal (1988) supports the treasury approach to cash management which postulates that cash collection and payment cycles must be broken into constituent's parts, these links include granting of credit, managing accounts receivable and collection of the cash.

2.3 Determinants of Liquidity in Listed Manufacturing Firms

The section will discuss the various determinants of liquidity in the manufacturing firms.

2.3.1 Inflation Rate

A study by Vodová (2011) on the determinants of liquidity of Czech commercial banks reveals a negative influence of inflation on the liquidity of the banks. According to banks for international settlements, financial institutions struggled to maintain liquidity during global crisis, even with the substantial support they received from the central banks, a number of banks were closed and others forced to marge to wither the effects of inflation.

Kim, Mauer, and Sherman, (1998) reports that inflation increases interest rates and hence the cost of financing. A firm has to balance the tradeoff between low returns earned on liquid assets and the benefit of minimizing the need for costly external financing. choi and Kim (2001) also finds evidence that support inflation as a determinant of liquidity, their study documents that large firms increase their monetary holding upon monetary tightening.

2.3.2 Size of the Company

Chan and Chen (1991) studied the differences in structural and return characteristics that makes firms of different sizes react differently to the same economic stimulus. The research found out that small firms have high financial and cash flow problems. Opler, Pinkowitz, Stulz, and Williamson (1999) also confirms that large firms with high credit ratings tend to hold lower ratios of cash to non-cash assets, this is because these firms can get access to cash easily when they need it thus they have no impetus to hold cash. The study conducted by Gertler and Gilchrist (1994) supports the fact that tighter monetary policy has a greater impact on the smaller firms' liquidity than on the bigger counterparts this is because of the flight to quality in banks, banks view small firms as risky and hence they reduce their funding during inflation. Lang and Nakamura (1995) reveal that banks tighten their credit terms towards small firms during inflation which worsens their liquidity position. The studies reviewed above clearly demonstrate that the size of a firm is a determinant of liquidity.

2.3.3 Nature of Business

The liquidity requirement of a firm may be influenced by the nature of business; sometimes tradition and nature of business set the working capital requirement within an

industry. As a result of these practices some industries will have high level of working capital requirements and large cash gaps while other industries will have shorter or even negative cash gaps which indicate their ability to get cost free capital from their suppliers in terms of longer payables period.

Hawawini, Viallet, and Vora (1986) investigated a sample of 1181 American firms from thirty six industries over a period of 19 years and found a statistically significant and persistent industry effect on the firms' liquidity requirements. This study proves that the nature of business and type of industry is a determinant of liquidity. Emery (1984) also argue that firms with more variable demand offers more trade credit relative to sales than their counter parts with predictable constant demand. Variability was measured by the standard deviation of sales from normalized average sales. This is then regressed with trade credit, the results shows that there is a statistically significant positive relationship. Long, Malitz, and Ravid (1993) postulates that firms with long production cycles will extend more credit that those with short production cycle. A comparative regression done on high tech industry shows a higher positive statistically significant coefficient of accounts receivable compared to control industry. This is because it takes more time to confirm the quality of the high-tech products and as a results the industry extend more credit period to their clients to allow them to confirm the quality. Finally Petersen and Rajan (1997) found out that firms with more inventory give more credit than firms with less inventory. This increases their liquidity requirements therefore they will need additional funding to support the investment in accounts receivable. They find out that inventory has a positive relationship with credit sales and as such credit sales is seen as part of inventory management.

2.3.4 Interest Rate

Interest rate determines the rate of cash holding for companies however empirical studies have shown conflicting results. Baumol (1952) showed that companies benefit by keeping cash in hands than borrowing or withdrawing from investments when interest rates are low. Tobin (1956) expanded on Baumol (1952) and showed theoretical evidence that demand for cash has an inverse relationship with interest rate. Keynes's (1936) transactions motive for holding cash suggests that liquid assets decrease with intrest rates. As interest rates fall corporations would hold more cash due to lower opportunity cost, lower interest rates reduces the incentives to invest the money in the financial institutions, these firms tend to reduce their creditors deferral period and increase the accounts receivable period because they are more liquid hence increasing CCC, on the other hand if intrest rate rates increase firms will invest more in marketable securities,negociate for more credit lines and pay their creditors later than usual,thus an increase in inrest rate decreases the CCC.

2.4 Empirical Review

Moosa (2014) used qualitative techniques to study measures taken by Australian firms to manage cash, accounts receivable and accounts payable during the global financial crisis. The study found out that during inflationary moments firms adopt conservative policies in by tightening credit controls and improving the credit risk monitoring systems. The results shows that during the period firms tend to reduce expenditure on inventory to preserve cash. These changes are geared towards reducing risk and shortening the cash conversion cycle,

Mutua (2014) investigated the determinants of cash conversion cycle on a sample of 33 non-financial firms listed in Nairobi stock exchange for the period 1993-2008. A target adjusted models was designed to examine significant determinants of CCC. The Regression analysis established a positive relationship between inflation and CCC. The study shows that apart from internal firm specific factors, inflation which is an external macroeconomic factor influences CCC. Inflation has a multiplier effect on the determinants of CCC hence the positive correlation. Because inflation reduces the real purchasing power of households, aggregate demand is reduced and firms are forced to increase investments in accounts receivable in order to improve their sales.

Gyu and Yungsan (2005) used disaggregated data of quarterly panel from 1975 to 1977 on two distinct groups 500 S&P firms and 500 Non- S&P United States firms. Panel regression was estimated on a reduced form approach. The results shows that both accounts receivable and accounts payable increase during inflation for both S&P and non-S&P firms, the results also shows that tighter monetary policy increases accounts receivable more than accounts payable thereby increasing net trade credit and the cash conversion cycle. Inflation increases inter-firm trading which also comes with redistributive effect. In this case the companies finance credit during inflation, this is because manufacturers tightened their credit policy which resulted in reduced creditors deferral period, but since the aggregate demand decreased the companies distributing the products had to offer more credit in order to increase sales, the net effect is that inflation has increased the CCC period.

Choi and Kim (2001) finds out that financially stronger firms use trade credit in the event of monetary tightening to protect their balance sheets, they also become more concerned

about the default risk on their accounts receivable and as a result they tighten the credit policy to minimize credit risk. Thus the flow of credit from financially strong companies to financially weak companies exhibits the same pattern of flight to quality in bank loans when financial market tightens (Lang & Nakamura, 1995).The extensive reliance on Credit Defferral Period and the tightening of credit policy shortens the CCC and to this extent inflation has a negative relationship with liquidity.

shrorkley and Thakor (1997) postulates that companies rely heavily on credit lines during inflation this is because inflation reduces the real value of money and as a result more money is needed to purchase the same bundle of goods and services. Firms borrow mainly to fulfil the increased aggregate demand created by inflation. Inflation increases the interest rate of bank loans this is because the risk of uncertainty increases with inflation the lenders therefore demand for higher return given that risk has increased. Most firms therefore resort to utilizing the trade credit lines that they have because it is generally cheaper. The use of credit lines means that the Credit Deferral Period increases and as a result the CCC reduces, inflation therefore exhibits a negative relationship with liquidity.

Oliner and Rudebusch (1996) found out that both accounts receivable and accounts payable increase in response to monetary tightening. The increase in accounts receivable to assets ratio signals that manufacturing firms increases trade credit offer when inflation increases. At the same time firms use more of accounts payable to finance investment in accounts receivable. These results imply that inter-firm financing increases in response to inflation hence supporting the view that trade credit substitute bank loan as it enhances transaction efficiency. The regression results shows that there is a positive relationship

between inflation and net trade credit (Accounts receivables – Accounts payables).this study left out the inventory conversion period which is an important component of the CCC.

Ben-Horim and Levy (1982) studied the effects of the inflation on trade credit period, they found out that when firms are faced with inflation risk the firm extending the credit will shorten credit period in response to inflation. They run a simple regression model on Israeli textile firms and found out a negative relationship between inflation and trade credit period. Firms responded to inflation by shortening the credit period. However the research done by Norrbin and Reffett (1995) shows conflicting results, the study reveals that treade credit is positively related with intrest rate this is becouse money is substituted with credit during inflation,companies use more trade credit during inflation becouse the cost of money is high.

Kassel (1974) reports that between 1943 – 1948 when inflation rose from 50.2 to 72.1 the equity value of a sample of 15 creditors firms declined by 13% while that of 15 debtors firms increased in real value by 81%, in addition the 1942 year end ranking of monetary positions explained about 22 percent of the of the cross sectional variations in the ranking of stock returns. Equally convincing results were obtained during the deflationary period 1929 to 1933 when inflation decreased from 51.2 to 38.8 in this case creditors share rose by 6 percent and debtors shares declined by 34 percent in real terms. In both the cases inflation is assumed to be largely unanticipated. This study provides the rationale behind tightening credit terms which results in reduction of Creditors Deferral Period and an increase in the CCC.

Eiteman (1970) studied the effect of inflation on working capital management. A sample of 50 listed manufacturing companies in Argentina was taken for the study between 1956 to 1967, comparative statistics shows that it was becoming increasingly difficult for manufacturing firms to get working capital loans form financial institutions during inflation than during non-inflationary periods. Inflation eats into the real income by reducing aggregate demand hence forcing the companies to operate under stare capacity, the industry responded by increasing investment in accounts receivable. This increase was funded by creditors because the payables period increased from 152 days in 1955 to 330 days in 1960 however inventory turnover remained fairly stable with a slight decline from 149 days in 1956 to 122 days in 1966.In this case where the creditors financed the increased liquidity requirements caused by inflation. They found a negative relationship between inflation and CCC because the Creditors Deferral Period increased.

Fisher (1911) examined the financial market relationships and concluded that the rate of income charged on monetary investments characteristically fails to compensate the investor for inflation-thus debtors gain and creditors lose during inflation. As a result of this theory many companies tend to reduce the credit period during inflation and this increases the cash conversion period and hence putting an extra strain on the resources of the company to finance the working capital needs. To this extent inflation has a positive relationship with the CCC

2.5 Summary of Literature Review

There is a conflict in the theories explaining the relationship between inflation and liquidity, empirical studies also show mixed results some conform to the theories yet others show conflicting results. The transaction cost theory postulates that inflation

increases the transaction cost of cash dealings and hence encourages trade credit .Yet the liquidity preference finds a negative relationship between inflation and CCC. This is because the rising interest rates dilutes the value of money which encourages most businesses to tighten their credit policy. Moreover the liquidity theory proposes a negative relationship between inflation and liquidity since most firms prefer to remain liquid in the face of inflation.

The Empirical review shows mixed results with (Fisher, 1911; Mutua, 2014;Gyu and Yungsan, 2005) finding a positive relationship between inflation and CCC, during inflation inter-firm transactions increase but accounts receivable increase more than accounts payable hence widening the CCC period. On the other hand (Ben-Horim and Levy, 1982; Eiteman, 1970 ; Moosa, 2014) finds a negative relationship between inflation and CCC, this occurs when the creditors agree to finance investment in trade credit by extending more days to the companies. It also occurs when firms generally tighten their credit policy and their inventory management. This will result into a reduction of investment in accounts receivable and inventory hence reducing the investment in accounts receivable.

From the foregoing it is clear that both the studies and the theory are not in agreement. Some studies show that there is a negative relationship yet others shows a positive one. Moreover no study known to me was particularly dedicated to CCC. The existing studies focused on the effect of inflation on the individual components of CCC (Accounts payable period, receivables period and inventory conversion period). Consequently the empirical results are also not in agreement with the theory, some agree some disagree.

The disagreements both in theory and in the empirical research justifies the need for doing the research.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The chapter discusses the research methodology and research approaches that were used in the study. Specifically the chapter looks at the research design, the sample and sampling procedures, data collection instruments, data collection methods and data collection techniques that will be used to conduct the study.

3.2 Research Design

Research design is the way a study is designed or the methodology used to carry out the research. Research design involves planning, organizing, collection and analysis of data to provide solution to existing research problems.

A descriptive research design was adopted to conduct the study. Mugenda and Mugenda (1999) describes descriptive statistics as a systematic, Empirical inquiry in which the researcher has no direct control of independent variable because the manifestation has already occurred or because it cannot just be manipulated by its nature. This design is appropriate because the study looked at the effect of inflation rate on the CCC. All the dependent and independent variables in this case had occurred by the time of research.

3.3 Population of the Study

According Kothari and Garg (2014) all items in any field of inquiry constitute a universe or a population, a complete enumeration of all the items in the population is called a census inquiry or a census survey. While a collection of observation representing only a

portion of the population is a sample (Danscombe 2008). The Target population for the research comprised of all the 18 listed manufacturing firms at NSE at June 30th 2015

(List attached at the appendix). The study used the census because the population was small and manageable.

3.4 Data Collection Methods

The study used secondary data from the financial statements of all the listed manufacturing firms and statistical abstract published by the Kenya national bureau of statistics; this was reviewed for a complete business cycle of five years running from 2010 to 2014 all years inclusive. The study analyzed the statement of financial positions, statements of comprehensive income and statements of cash flow of listed manufacturing concerns. Listed firms were chosen for chosen for the study because of the reliability of their financial statements which are audited for factual accuracy. Companies listed in the stock market have an incentive to present true and fair figures because they are open to scrutiny and the penalties for earnings management are stiff, on the contrary non listed firms have less incentive to present true operational results because in most cases they tend to hide profits to minimize their tax liability thus making them less suitable sample for analysis where one can draw reliable inferences.

3.5 Data Analysis

The study used both descriptive statistics and log-log random effects regression model to analyze the relationship between the dependent and the independent variable through the Statistical Package for social sciences (SPSS) and Stata software.

$Y_i = Lo + \beta_1 I_i + \beta_2 S_i + \beta_3 I_{ii+} e_i$

Where

$Y_{i} =$ Liquidity of a firm measured by the cash conversion cycle. The CCC is the net time interval between cash collection from sale of product and cash payment for the resources acquired by the firm.it represent the time interval over which additional funds should be obtained to in order to curry out the firms operations.

The cash conversion cycle is = Inventory Conversion Period +Debtors Conversion Period – Creditors Deferral Period

Derived as follows

Inventory conversion period = (Inventory*365)/cost of sales; this is the total time needed for producing and selling the goods.

Debtors conversion period = (Debtors*365)/Credit sales; this is the total time required to collect the outstanding amount from customers.

Creditors Deferral Period = (Creditors*365)/Credit Purchases; this is the length of time the firm is able to defer payments of of various resource purchases.

Lo is the autonomous liquidity that is not dependent on any factor.

$\beta_{1} =$ the expected change in liquidity given a unit change of inflation

$\beta 2 =$ a unit change in liquidity given a unit change in the size of the firm.

B3= a unit change in liquidity given a unit change in interest rate

$I_{i} =$ rate of inflation measured by Consumer Price index

$I_{ii} =$ interest rate measured by the 91 Day T bill.

$S_{i=}$ size of the firm; Measured by the logarithm of the total assets

$e_{i=}$ error term

Test of significance

Two tailed P-test was used to test statistical significance of the individual explanatory variables on the variability of CCC. The F-statistics was used to test the overall validity of the model in explaining the variation in CCC at 95% confidence level and 5% level of significance.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

Data was collected from the financial statements of the 18 NSE listed manufacturing companies as at 30th June 2015. The combination of cross sectional data from different companies over a time period of five years from 2010 to 2014 formed a panel data. A log-log random effects model was run to accommodate the natural logarithm of sales used as a proxy of size. Panel data allows a researcher to control for non-measurable variables such as differences in credit policy, differences in risk appetite and business practices. That is it accounts for individual heterogeneity.

The analysis of panel data employs the use of fixed effects or the random effect model, fixed effect model assumes a correlation between the entity error term and the independent variables. The model controls for the impact of these unique characteristics that bias the independent variable thus allowing for the analysis of net effects of the predictors on the outcome variable. On the other hand the random effects model assumes that variation across entities is random and uncorrelated with the independent variables thus allowing for time invariant characteristics to influence the dependent variable.ie act like explanatory variables.

4.2 Descriptive Statistics

Table 4.1: Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
CCC	73	315.09	-127.04	188.05	55.4797	65.58235	4301.045
size	74	8.00	17.00	25.00	21.8243	1.75451	3.078
Inflation	74	10.00	4.00	14.00	8.4459	3.41689	11.675
Interest Rate	74	16.00	2.00	18.00	10.1081	4.97822	24.783
Valid N (list wise)	73						

Source; Research Findings

CCC has a mean of 55 with a minimum of -127 days and a maximum of 188 days, this means that it takes averagely 55 days for the listed manufacturing firms to convert raw materials into finished goods, to sell them on credit and receive cash from the debtors. The minimum value of -127 represents the companies which collect their debts faster than they pay their creditors, this figure is representative of manufactures who have market power and as such they can control the terms of trade within their sector. Hawawini, Viallet, and Vora (1986) found results which prove industry effect is both a statistically significant and persistent variable in the determination of CCC. On the other hand the maximum value of 188 days represents firms which pay their creditors faster than they can collect their debts. Emery (1984) finds evidence that support the findings of the maximum value of 188,the study concludes that with more variable demand offers more trade credit relative to sales than their counter parts with predictable constant demand. Inflation has a mean of 8.5% with a maximum of 14% and a minimum of 4%,

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yet interest rate has a mean of ten with a minimum of 2% and a maximum of 18% indicating a high standard deviation of 5%

Table 4.2: Trend Analysis

Trend analysis					
Details	2010	2011	2012	2013	2014
CCC	100%	0%	3%	6%	1%
Inflation	100%	254%	137%	44%	74%
Size	100%	-2%	-1%	-2%	-1%
Interest Rate	100%	703%	264%	318%	276%

Source; Research Findings

Figure 4.1: Trend Analysis
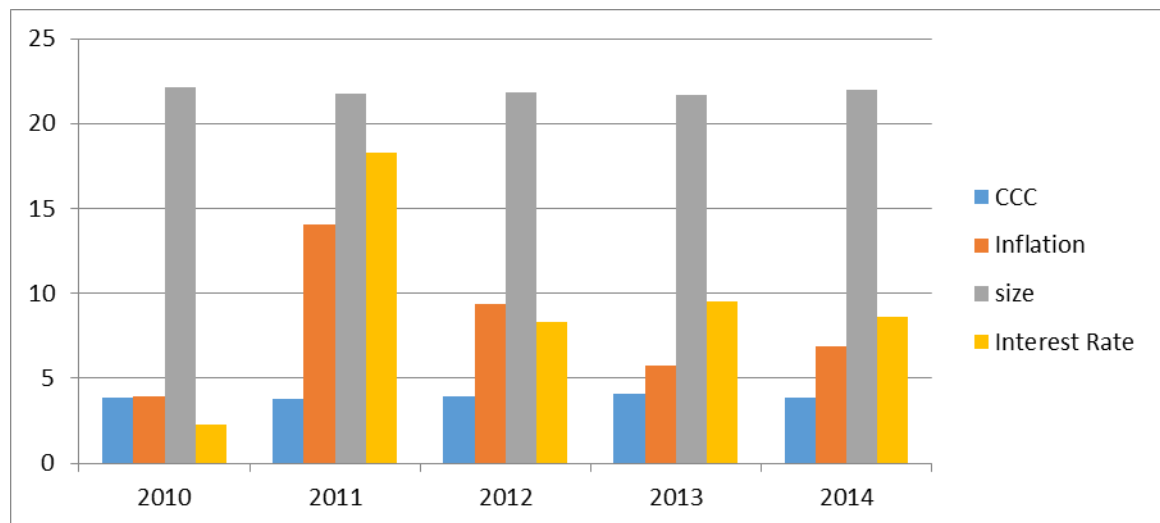
Source; Research Findings

The graphical representations and trend analysis shows that the average CCC has been fairly stable with a marginal growth of 3%,6% and 1% in 2012,2013 and 2014.The size has equally been stable with a marginal decrease of 2%,1%,2% and 1% for 2010,2011,2012,2013 and 2014 respectively. This shows that there is a negative relationship between size and CCC, as the size of a company increase CCC decreases. Yet the macroeconomic variables has experienced a great increase from 2010 through to

2014, there is a positive relationship between inflation and CCC, the trend analysis shows that inflation and CCC moves in the same direction as inflation increases CCC also increases though marginally.

4.3 Pearson Correlation

Table 4.3: Pearson Correlation

		Correlations			
		CCC	Size	Inflation	Interest Rate
CCC	Pearson Correlation	1	-.271[*]	-.047	-.026
Size	Pearson Correlation	-.271[*]	1	-.038	-.057
Inflation	Pearson Correlation	-.047	-.038	1	.899[**]
Interest Rate	Pearson Correlation	-.026	-.057	.899[**]	1

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Source; Research Findings

Table 4.4: Summary of the Pearson Correlation

Independent	Correlation Coefficient	R2	Significance	Comment
Size	-27.10%	7.34%	0.02	Significant
Inflation	-4.70%	0.22%	0.690	Not significant
Interest rate	-2.60%	0.068%	0.824	Not significant

Source: Research Findings

Using a two tail non- directional hypothesis that CCC increases or decreases as Inflation increases or decreases, we perform a two tail Pearson correlation. The null hypothesis is

set as; there is no relationship between the variables. The results shows that CCC is negatively correlated with size of the company with a Pearson correlation coefficient of 27.1% and a significance value of 0.02.The null is rejected since 0.02 is less than 0.05, 0.02 represent the probability of getting a Pearson correlation coefficient of – 0.271 in a sample of 74 observations, since 0.02 is low we gain confidence that there is a genuine relationship between CCC and the size of the company. The output also shows that CCC is negatively correlated with both inflation and interest rate with a Pearson coefficient of -0.047 and -0.026 and significance of 0.69 and 0.824 respectively; in this case we fail to reject the null hypothesis and conclude that the relationship is not statistically significant since there is a 69% and a 82.4% probability of getting a Pearson correlation coefficient of -0.047 and -0.026 for both inflation and interest rate respectively, these probabilities are highly likely to occur and as such we fail to reject the null and conclude that the correlation is not statistically significant. In summary the size of the company accounts for 7.34% variation in the CCC, while inflation rate and interest rate accounts for 0.22% and 0.068% of the variation in the CCC.

4.4 Regression Analysis and Hypothesis Testing

Fixed effects and random effect models are run sequentially then a Hausman test is conducted to determine the most suitable model to be applied.

4.4.1 Fixed Effect Model

The fixed effect model is appropriate for analysis of variables that change over time; the model eliminates the effects of time invariant characteristics of the company on the CCC, thus allowing for the analysis of net effects of the predictors on the outcome variable.

Table 4.5 Fixed Effect Model

Fixed-effects (within) regression			Number of obs			=	74
Group variable: Company			Number of groups			=	17
R-sq: within = 0.1968			Obs per group:		min	=	2
between = 0.0497					avg	=	4.4
overall = 0.0752					max	=	5
			F(3,54)			=	4.41
corr(u_i, Xb) = -0.6747			Prob > F			=	0.0076
CCC	**Coef.**	**Std. Err.**	**t**	**P>t**	**95% Conf.**	**Interval**	
Inflation	-.2128958	.2064952	-1.03	0.307	-.6268937	.2011021	
Size	-.4844176	.1505084	-3.22	0.002	-.7861687	-.1826665	
Interest rate	.078822	.1408261	0.56	0.578	-.2035175	.3611614	
Constant	14.14407	3.350772	4.22	0.000	7.426173	20.86196	

Source; Research Findings

4.4.2 Random Effect Model

Random effects, the variation across entities is assumed to be random and uncorrelated with the independent variables thus allowing for time invariant characteristics to influence the dependent variable.ie act like explanatory variables.

Table 4.6 Random Effect Model

Random-effects GLS regression			Number of obs		=	74
Group variable: Company			Number of groups		=	17
R-sq: within = 0.1703			Obs per group: min		=	2
between = 0.0476				avg	=	4.4
overall = 0.0769				max	=	5
Random effects u_i ~ Gaussian			Wald chi2(3)		=	8.88
corr(u_i, X) = 0 (assumed)			Prob > chi2		=	0.0309
CCC	**Coef.**	**Std. Err.**	**z**	**P>z**	**95% Conf.**	**Interval**
Inflation	-.2445495	.2090268	-1.17	0.242	-.6542345	.1651356
Size	-.2153338	.0860015	-2.50	0.012	-.3838936	-.046774
Interest rate	.0803024	.1430311	0.56	0.575	-.2000333	.3606381
Constant	8.199466	1.928655	4.25	0.000	4.419372	11.97956

Source; Research Findings

4.4.3 The Hausman Test

The Hausman test is performed to determine the most appropriate model that will suit a particular data set using the following hypotheses.

Ho; Random effects unique errors are not correlated with repressors

HA; Fixed Effects unique errors are correlated with repressors.

Decision rule

If the chi2 < 0.05 the reject the null otherwise accept

Table 4.7 The Hausman Test

	Fixed	**Random**		
Inflation	-.2128958	-.2445495	.0316537	.
Size	-.4844176	-.2153338	-.2690838	.1235172
Interest rate	.078822	.0803024	-.0014805	.

Test: Ho: difference in coefficients not systematic

$$chi2(3) = (b-B)'[(V\_b-V\_B)^{(-1)}](b-B)$$

$$= \quad 4.64$$

Prob>chi2 =   0.2003

(V_b-V_B is not positive definite)

Source; Research Findings

Since the Chi2 = 0.2003 which is greater than 0.05 we fail to reject the null. Therefore, the random effect model is appropriate in explaining our model. This means that there is reason to believe that differences across companies have some influence on the CCC.

Table 4.8 The Final Model

Random-effects GLS regression			Number of obs		=	74	
Group variable: Company			Number of groups		=	17	
R-sq: within = 0.1703			Obs per group: min		=	2	
between = 0.0476				avg	=	4.4	
overall = 0.0769				max	=	5	
Random effects u_i ~ Gaussian			Wald chi2(3)		=	8.88	
corr(u_i, X) = 0 (assumed)			Prob > chi2		=	0.0309	

CCC	Coef.	Std. Err.	z	P>z	95% Conf.	Interval
Inflation	-.2445495	.2090268	-1.17	0.242	-.6542345	.1651356
Size	-.2153338	.0860015	-2.50	0.012	-.3838936	-.046774
Interest rate	.0803024	.1430311	0.56	0.575	-.2000333	.3606381
Constant	8.199466	1.928655	4.25	0.000	4.419372	11.97956

Source; Research Findings

$Y = 8.19 - 0.22\ Si - 0.25\ Ii + 0.08\ Iii$

4.4.4 Hypothesis Testing for the Independent variables

The following hypotheses were tested at 5% level of significance and 95% level of confidence using a two tail P test. The P- value tests the hypothesis that each coefficient is different from zero. To reject the null hypotheses the P-Value has to be lower than 0.05, if this is the case then we conclude that the Independent variable has a significant influence on the variation of the dependent variable.

Ho ; There is no relationship between size of the company and CCC

Ho ; There is no relationship between Inflation and CCC

Ho ; There is no relationship between interest rate and CCC

Ho ; The constant is not statistically different from zero

The results shows that size and the constant has a P-value of 0.012 and 0.000 respectively which is less than 0.05 hence we reject the null and conclude that the coefficient of Size and constant is statistically different from zero, this means that they have a significant

influence on the variation of CCC. On the other hand the exogenous variables i.e. inflation and interest rate have P-Values of 0.242 and 0.575 which is greater than 0.05, we therefore fail to reject the null hypothesis. We cannot conclude that inflation and interest rate has a statistically significant effect on the variation of CCC.

4.4.5 F-Test for the Model

The F statistic was used to assess how well Inflation, interest rate and the size of the company as a group explain the variation in the CCC. The F-statistic is used to test whether at least one of the independent variables explains a significant portion of the variation in CCC. The following hypotheses were tested.

Ho; $\beta_1 = \beta_2 = \beta_3 = O$ Versus HA $\beta_j \neq 0$

Random-effects GLS regression	Number of obs	=	74
Group variable: Company	Number of groups	=	17
R-sq: within = 0.1703	Obs per group: min	=	2
between = 0.0476	avg	=	4.4
overall = 0.0769	max	=	5
Random effects u_i ~ Gaussian	Wald chi2(3)	=	8.88
corr(u_i, X) = 0 (assumed)	Prob > chi2	=	0.0309

The chi2 = 0.0309 which is less than 0.05 we reject the null and conclude that the overall model is significant in explaining the variation in CCC

4.5 Discussion of Research Findings

The results of the study indicates that the model; inflation, interest rate and the size of the firm explains 17.30% of the variation in CCC which means that 82.7% of the variation is determined by other factors such as competition, relationship with the suppliers, the power of buyers and industry practice. The size of the company and the constant is statistically significant yet inflation and Interest rate are insignificant at 95% level of

confidence. The F- statistic however confirms that the model is significant in explaining the variation of CCC.

For every 1% increase in the size of the company CCC decreases by 21.5 % This shows that the bigger the firm the less Debtors Conversion Period offered, The results are in agreement with Moosa (2014).who found out that big firms adopt conservative policies by reducing the accounts receivable period, Yet it deserts the findings of Gyu and Yungsan (2005),who reported thatt net trade credit increases during inflation. For every 1% increase in Inflation CCC decreases by 24.5% this is in conflict with a study done by Mutua (2014).who investigated the determinants of cash conversion cycle on a sample of 33 non-financial firms listed in Nairobi stock exchange for the period 1993-2008 and found a positive relationship between inflation and CCC. A 1% increase in interest rate leads into 8% increase in CCC these results concur with the results of Norrbin and Reffett (1995).their results revealed that trade credit is positively related with intrest rate becouse of the substitution of money with credit during inflationary moments. Finally there are 8 days of the CCC which is not dependent on any factor

CHAPTER FIVE: SUMMARY, CONCLUTION AND RECOMMENDATION

5.1 Introduction

The study was commissioned to establish the relationship between inflation and CCC of Listed manufacturing firms at the NSE. The CCC and Size data was collected from the financial statements of the companies for a period of five years between 2010 and 2014 all years inclusive. Inflation and interest rate data was sourced from the statistical abstract of the Kenya national bureau of statistics. The combination of cross sectional data from different companies over different years forms a panel data, which requires analysis using either the fixed effects model or Random effects model.

5.2 Summary

A two tail non- directional hypothesis test of statistical significance on the coefficients of Pearson correlation between CCC, inflation, size of the company and interest rate shows that CCC is negatively correlated with size of the company with a Pearson correlation coefficient of 27.1% and a significance value of 0.02 which is statistically significant at 95% level of confidence, Inflation and interest rate have a correlation of -4.7% and -2.6% with significance of 0.69 and 0.824 respectively; the significance values represent high probability of 69% and 82.4% hence we accept the null that the coefficients are not statistically different from zero. In summary the size of the company accounts for 7.34% variation in the CCC, while inflation rate and interest rate accounts for 0.22% and 0.068% of the variation in the CCC.

Using a log-log random effects regression model the study established a negative statistically significant relationship between size and CCC, this is in agreement with the findings of Moosa (2014). The results also shows a statistically insignificant negative relationship between CCC and Inflation, which are consistent with the results of Eiteman (1970). The Argentine case documents that CCC decreases with an increase in inflation rate. The decrease in this case was supported by the suppliers of raw materials who increased the credit line to manufacturers from 152 days in 1955 to 330 days in 1960. However the study contrasts the findings of Mutua (2014), who found a statistically significant positive relationship between inflation and CCC of listed firms at the NSE.

The model has a positive constant that is statistically different from zero, the significance of the constant is consistent with prudent working capital management practices which require that manufacturing firms maintain an optimal level of liquidity that is necessary for honoring maturing obligations. Pandey (2010) suggests that manufacturing firms have to find an acceptable balance between liquidity and profitability by maintaining optimal levels of liquid assets necessary for paying the financial obligations.

The positive relationship between intrest rate and CCC this is also in conflict with the findings of Keynes's (1936) transactions motive for holding cash and liquid assets. Keynes showed theoretical evidence that the demand for cash and liquid asset such as Accounts receivable decreases as accounts receivable increases. However the listed manufacturing firms at the NSE responded to increases in interest rate by extending the debtors conversion period in response to a posiible reduction in aggregate demand.

5.3 Conclusions

Even though individually the inflation is statistically insignificant the model as a whole is significant in explaining the variation in CCC. Inflation is negatively correlated with CCC, a 1% increase in inflation leads to a 24.5 % decrease in CCC it is therefore important for management to be sensitive to changes in inflation because it will greatly affect their liquidity requirements.

The results shows that firms tighten their credit policy during inflation hence reducing their Accounts receivable period, this relationship exhibits the same pattern of flight to quality that is experienced in the financial sector during inflation. The results also shows that as size increase CCC decreases which means that large firms are able to negotiate for longer credit lines from suppliers but decrease the debtors conversion period.

5.4 Policy Recommendation

The researcher recommends that companies consider the effects of macroeconomic events such as inflation, interest rate and devaluation in local currency as they design their credit policy this will help them reap optimal results from the macroeconomic shocks. Instead of tightening the credit terms during inflation firms can increase their due diligence and advance favorable and objective terms to their customers.

The results also showed that as size increase by 1% CCC decreased by 21.5%, these results that the companies tightened their credit policy and reduced the accounts receivable period, this is in conflict with the Financial assistance hypothesis which postulates that large firms should give extend the credit period during inflation, the extension is used as a lock in strategy for long-term growth.

The credit rating agencies should the effects of the macroeconomic shocks in their rating methodology, this is because the shocks have a significant impact on an entity's capacity to honor its maturing financial obligation, and consequently the credit risk underwriters should also factor the shocks in their methodology.

5.5 Limitation of the Study

The accuracy of data collected in the financial statements was premised on the facts that listed firms publish financial statements that are free from error and that are compliant with the international financial reporting standards, in some cases there were gross violations of the standards where different figures are reported for the same year. The researcher solved the problem by seeking for clarification from the Auditors on which figures represent true and fair view of the company status.

It is also presumed that the listed firms publish their financial statements however during data collection the researcher noticed that some financial statements were not published in the company websites, the researcher resolved this challenge by retrieving the missing financial statements from the capital markets authority library.

The study was also limited to the listed firms this was because getting financial information from privately run companies is a challenge, the researcher suggest to give incentives to the business for them to voluntarily give data.

5.6 Suggestion for Further Studies

A study should be carried out on the effects of inflation rate on the net trade cycle of listed manufacturing firms not only in Kenya but in east Africa as a whole. According to Shin & Soenen (1998) net trade cycle is a more superior method of measuring liquidity

than the CCC because it takes into the account the number of days of sales that the company has to finance its working capital hence helping in estimating the additional liquidity needs of a company.Net trade cycle will also accommodate the service sectors which are normally left out in the CCC because they lack inventory conversion period.

The study sought to find out the impact of inflation rate on the CCC of manufacturing firms I recommend that other researchers would look at the effect of inflation rate on the individual components of the CCC such as Inventory conversion period, debtors conversion period and creditors deferral period.

A Similar study should studies should be conducted in East Africa this is because most multinationals and indigenous Kenyan firms have cross border interest in east Africa moreover the east African context will provide a rich mix of companies in different level of development and run in different environments.

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APPENDIX 1: Manufacturing Firms listed at N.S.E.; Manufacturing and Allied

1. Kakuzi Ltd
2. Kapchorua Tea Co. Ltd
3. Rea Vipingo Plantations Ltd
4. Sasini Ltd
5. Williamson Tea Kenya Ltd
6. ARM Cement Ltd
7. Bamburi Cement Ltd
8. Crown Paints Kenya Ltd
9. E.A.Cables Ltd
10. E.A.Portland Cement Co. Ltd
11. B.O.C Kenya Ltd
12. British American Tobacco Kenya Ltd
13. Carbacid Investments Ltd
14. East African Breweries Ltd
15. Eveready East Africa Ltd
16. Kenya Orchards Ltd
17. Unga Group LTD
18. Mumias Sugar Co. Ltd

APPENDIX 2: CALCULATION OF CCC

Company	Year	Ln CCC	ICP	DCP	CDP	Size	LN Inflation	Ln Interest Rate
ARM	2010	4.5232	4.6494	4.5733	4.6994	22.5091	-3.2289	-3.7810
ARM	2011	4.2412	4.4290	4.3972	4.5850	22.8251	-1.9647	-1.6983
ARM	2012	4.3851	4.6613	4.1168	4.3930	23.1569	-2.3666	-2.4889
ARM	2013	4.2050	4.5992	4.1160	4.5101	23.3750	-2.8612	-2.3518
Bamburi	2010	2.9736	4.3532	3.1761	4.5558	24.0581	-3.2289	-3.7810
Bamburi	2011	2.6321	4.0094	2.7742	4.1515	24.3036	-1.9647	-1.6983
Bamburi	2012	2.7485	4.1813	2.7386	4.1714	24.3474	-2.3666	-2.4889
Bamburi	2013	2.7937	4.3661	2.8453	4.4177	24.2475	-2.8612	-2.3518
Bamburi	2014	2.8755	4.3153	2.9297	4.3695	24.3076	-2.6766	-2.4557
BOC	2010	4.0854	4.9597	4.5931	5.4675	20.8677	-3.2289	-3.7810
BOC	2011	3.5036	4.5311	4.5311	5.5586	20.9101	-1.9647	-1.6983
BOC	2012	3.5854	4.8145	4.4340	5.6631	20.9814	-2.3666	-2.4889
BOC	2013	3.4048	4.7724	4.4287	5.7963	20.9405	-2.8612	-2.3518
BOC	2014	2.5449	3.4159	3.8179	4.6890	20.9831	-2.6766	-2.4557
Carbacid Investments	2010	4.2806	4.3797	4.2732	4.3723	20.2454	-3.2289	-3.7810
Carbacid Investments	2011	4.2185	4.2680	4.3907	4.4402	20.1718	-1.9647	-1.6983
Carbacid Investments	2012	3.9630	3.3819	4.1856	3.6045	20.6418	-2.3666	-2.4889
Carbacid Investments	2013	3.6535	3.4458	4.1583	3.9506	20.6750	-2.8612	-2.3518
Carbacid Investments	2014	3.3072	3.6493	4.2839	4.6260	20.5325	-2.6766	-2.4557
Crown Paints	2010	4.2410	4.5349	4.1035	4.3973	21.8444	-3.2289	-3.7810
Crown Paints	2011	4.3195	4.4123	4.0271	4.1199	22.0723	-1.9647	-1.6983
Crown Paints	2012	4.1868	4.4446	4.0102	4.2680	22.2123	-2.3666	-2.4889
Crown Paints	2013	4.1903	4.4676	4.1124	4.3897	22.3640	-2.8612	-2.3518
Crown Paints	2014	4.3401	4.6888	4.2059	4.5546	22.5215	-2.6766	-2.4557
EA Cables	2010	5.0603	4.5761	4.6500	4.1658	22.0054	-3.2289	-3.7810
EA Cables	2011	4.6186	4.2289	4.6099	4.2202	22.3270	-1.9647	-1.6983
EA Cables	2012	4.9191	4.6206	5.1613	4.8629	22.1820	-2.3666	-2.4889
EA Cables	2013	4.8944	4.6056	5.2713	4.9825	22.2280	-2.8612	-2.3518
EA Cables	2014	5.0780	4.3866	5.3125	4.6211	22.3522	-2.6766	-2.4557
EABL	2010	3.0336	4.5773	3.8292	5.3729	24.3786	-3.2289	-3.7810
EABL	2011	2.8861	4.1411	3.9408	5.1958	24.5276	-1.9647	-1.6983
EABL	2012	3.1271	3.7042	3.9149	4.4920	24.7400	-2.3666	-2.4889
EABL	2013	3.3089	4.4910	3.9734	5.1555	24.8019	-2.8612	-2.3518
EABL	2014	3.5423	4.6130	3.9084	4.9791	24.8389	-2.6766	-2.4557

EAPC	2010	2.5109	3.3821	2.5676	3.4388	22.9649	-3.2289	-3.7810
EAPC	2011	3.3046	4.1604	3.3796	4.2355	23.0429	-1.9647	-1.6983
EAPC	2012	3.6224	4.3932	3.5467	4.3174	22.8767	-2.3666	-2.4889
EAPC	2013	3.4386	4.6435	3.5061	4.7110	22.9437	-2.8612	-2.3518
EAPC	2014	3.4207	4.7898	3.6813	5.0504	22.9268	-2.6766	-2.4557
Egaads	2011	2.3159	2.1134	1.6523	1.4499	19.0337	-1.9647	-1.6983
Egaads	2012	3.3649	3.0935	2.6219	2.3505	18.8722	-2.3666	-2.4889
Egaads	2013	4.8238	3.3424	3.5248	2.0434	18.0354	-2.8612	-2.3518
Eveready	2010	5.2033	5.1604	3.9533	3.9103	21.2150	-3.2289	-3.7810
Eveready	2011	4.8618	5.2836	4.0492	4.4710	21.0416	-1.9647	-1.6983
Eveready	2012	4.8491	5.2452	3.8807	4.2768	21.0416	-2.3666	-2.4889
Eveready	2013	4.6187	5.1676	3.9124	4.4613	21.0797	-2.8612	-2.3518
Eveready	2014	5.1677	5.2786	4.2279	4.3388	20.9193	-2.6766	-2.4557
Kakuzi	2010	2.3300	3.7169	3.0747	4.4615	21.4717	-3.2289	-3.7810
Kakuzi	2011	2.1378	3.7124	2.8270	4.4017	21.5890	-1.9647	-1.6983
Kakuzi	2012	3.1135	3.9120	3.7701	4.5685	21.1710	-2.3666	-2.4889
Kakuzi	2013	3.4952	3.2884	4.0778	3.8709	21.0485	-2.8612	-2.3518
Kakuzi	2014	2.7787	3.1125	3.4882	3.8220	21.2479	-2.6766	-2.4557
Kapchorua	2011	3.8684	3.9417	4.5789	4.6522	20.9437	-1.9647	-1.6983
Kapchorua	2012	3.6028	3.5137	4.5160	4.4269	21.0646	-2.3666	-2.4889
Kapchorua	2013	3.9489	3.9873	4.6058	4.6442	21.0257	-2.8612	-2.3518
Kapchorua	2014	4.4729	4.2740	4.4829	4.2841	20.8993	-2.6766	-2.4557
Kenya Orchads	2011	4.5903	5.2159	4.9232	5.5489	16.9594	-1.9647	-1.6983
Kenya Orchads	2012	4.5390	4.9208	4.8766	5.2585	17.2061	-2.3666	-2.4889
Kenya Orchads	2013	4.1936	4.1997	4.6605	4.6667	17.6676	-2.8612	-2.3518
Kenya Orchads	2014	3.9749	3.7070	4.8187	4.5508	17.8770	-2.6766	-2.4557
Mumias	2011	3.2480	3.1222	4.4198	4.2941	23.4830	-1.9647	-1.6983
Mumias	2012	4.0934	3.8567	4.5970	4.3603	23.4669	-2.3666	-2.4889
Mumias	2013	4.2905	4.2858	4.8476	4.8430	23.2047	-2.8612	-2.3518
Mumias	2014	3.3620	3.9790	4.4792	5.0961	23.2940	-2.6766	-2.4557
Rea Vipingo	2011	5.0235	5.0021	3.8412	3.8198	21.4726	-1.9647	-1.6983
Rea Vipingo	2012	4.9473	4.8672	3.8794	3.7993	21.6678	-2.3666	-2.4889
Rea Vipingo	2013	5.0362	4.7540	3.9430	3.6608	21.6672	-2.8612	-2.3518
Rea Vipingo	2014	5.1263	4.7015	4.0783	3.6534	21.6867	-2.6766	-2.4557
Unga Group	2011	4.4062	4.1132	3.2602	2.9673	23.3046	-1.9647	-1.6983
Unga Group	2012	4.2621	3.9219	3.4788	3.1386	23.4944	-2.3666	-2.4889
Unga Group	2013	4.6376	4.2412	3.8104	3.4140	21.1564	-2.8612	-2.3518
Unga Group	2014	4.1393	4.1938	3.6863	3.7408	23.5566	-2.6766	-2.4557
Williamson	2011	4.7303	4.0641	4.6206	3.9544	21.9126	-1.9647	-1.6983
Williamson	2012	3.8356	3.8104	4.6399	4.6147	22.0063	-2.3666	-2.4889