

**THE DETERMINANTS OF CORPORATE LIQUIDITY:
EVIDENCE FROM NAIROBI STOCK EXCHANGE**

BY

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DECLARATION

This Management Research Project is my original work and has not been presented for award of a degree in any other University

Signed  Date 6/11/2009

Samuel Kinyua

This is a management research project submitted with my approval as University Supervisor.

Signed  Date 10-11-09

J.L. Lishenga

DEDICATION

To my father, Mr. Geoffrey Kinyua Gatere, mother Mrs Magdaline Wangui Kinyua, brothers and sisters. It was through your support and prayers that this was possible. I will forever remain indebted to you all.

ACKNOWLEDGEMENTS

The success of this project is not entirely my own. I would therefore like to acknowledge the following persons without whom it would not have been possible.

First and foremost, to the Almighty God through Whom all things are possible and Who has been the source of strength and inspiration.

I want to sincerely thank my supervisor, J.L. Lishenga who supervised this work to its final completion. I want to thank him so much for his patience, useful advice and ideas. His willingness to meet me at short notice is highly appreciated.

My colleagues at KPMG Kenya were a great source of encouragement. I must thank the entire Partnership for granting me enough time for the studies. Of special mention is my mentor Jacob Gathecha, Partner KPMG, who sacrificed his time out of the very busy schedule to offer great career and academic advice. Your effort will forever be remembered.

My gratitude goes to all those I have not mentioned due to constraints of space and time. Thank you for your genuine support and contribution that have made me realize my dreams.

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ABSTRACT

Liquidity level is one of the critical policy decision that management of companies has to make on a day to day basis. The decision made has great implications on the success of the company because it involves a trade off between costs and benefits of maintaining liquid cash. The benefit includes ability to take advantage of any unexpected profitable business opportunities. On the other hand, liquid cash has lower return as compared to other physical assets.

In this study, I model the firm's decision to invest in liquid assets when external financing is costly. The optimal amount of liquidity is determined by the trade off between the low return earned on liquid assets and the benefit of minimizing the need for costly external financing. The model predicts that the optimal investment in liquidity is increasing in the cost of external financing, the variance of future cash flows, and the return on future investment opportunities, while decreasing in the return differential between the firm's physical assets and liquid assets.

An empirical investigation on 26 firms listed on Nairobi Stock Exchange supported the models predictions. The data for the 26 firms was collected from the Capital Market Authority Library and analyzed through the use of Regression and Correlation analysis.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Mainelli (2007) defined liquidity as the probability that an asset can be converted in to an expected amount of value within an expected amount of time. It is the ability to realize the value in money, the most liquid of assets. Cash is the most liquid because of the certainty of the value. An electronic bank account is a little, only a little less, liquid than cash. Corporate liquidity can be defined as the ability of a firm to meet its short term and long term financial obligations as they fall due.

According to the Commercial Banks perspective. The Bank of Mauritius (1988) defines liquidity as the availability of funds or assurance of the availability of funds to honor a bank's cash flow commitment including the off balance sheet cash flow items as they fall due. According to Central Bank of Kenya, liquid assets comprise of notes, coins (local and foreign, balances with the Central Bank of Kenya, balances with domestic Commercial banks, balances with banks abroad, balances with financial institutions, balances with mortgage finance companies, balances with building societies, treasury bills, treasury bonds, Certificates of deposits or Government bearer bonds, foreign currency and bearer certificates of deposits.

Research has established that liquidity is an important determinant of financial distress (Merwin, 1942, Beaver, 1966). Consequently, it is used by a variety of persons to evaluate the risk ness of firms. The concept of liquidity has contemporary significance in Kenya today. Amongst many institutions, some quoted banks such as the National Bank of Kenya experienced significant growth in non-performing loans during the 1990s. This essentially signifies the inability of the borrowing party to honor a financial obligation within the stipulated period of time. As such, it is possible to view the had debt crises primarily as a liquidity problem even though, particularly in Kenya then, other significant factors such as the use of political patronage to obtain credit without following the normal credit procedures can not be ignored. It is also apparent that liquidity in one sector can be transmitted to another sector, for example, the had debts being recognized in many

sectors in the developed world during the current global crisis (credit crunch) have arisen from defaulters in other sectors such as the industrial sector and this has affected the financial institutions to an extent that the governments have to devise rescue packages to keep some of these institutions afloat. For example, the US government in partnership with the private sector, has devised a package of \$1 trillion to buy off toxic assets from the banks to enable them resume lending. These toxic assets arose from the troubled mortgage sector whereby borrowers were unable to service their mortgage. The US government has also offered rescue packages during this crisis to improve liquidity position of several corporations such as the City group, the auto industry (GM and Chrysler), AIG, etc.

Anecdotal evidence suggests that liquidity problems experienced by firms are closely influenced by economic cycles such that more firms experience liquidity problems during economic down turns than during upswings. Argenti (1976) suggests that the level of management of the firm in question mitigates the impact of the economy on the liquidity of the firm. He notes further that the level of regulation of the government tends to play a part in insulating a sector from economic down turns. As money will not manage itself, the regulation of money will be debated for years to come (Stals, 1999).

A firm usually becomes insolvent because it is unable to either generate sufficient cash internally or to obtain needed cash from external sources to sustain operating, investing and financing activities. Liquidity analysis therefore generally focuses on the relationship between the demand for, and the supply for cash and near cash items. For this reason, financial ratios have been widely used to estimate the liquidity of the firms. It is also important to note that demand for and supply of cash and cash equivalent is highly dependent on prevailing economic circumstances, e.g. interest rates will be high when the economy is in recession and this will tend to place heavier burden on firms with outstanding obligations which will, holding other factors constant, lead to worsening liquidity position. Thus, we can see that in an economy where firms compete with each other, economy exerts a similar impact on all firms. However, since some firms are

healthier financially than others, they are able to withstand the rigors of economic downturns whereas less healthy firms fail.

According to Brealey and Myers (1996), determining the value of liquidity is one of the ten unresolved problems in finance. In practice, firms invest large sums of money in very liquid financial securities. Kester (1986) reports that the average ratio of cash plus marketable securities to total assets is 8.6% in 1983 for a sample of 452 US manufacturing firms in 27 different industries. Chang-Soo Kim et al (1998) analysis showed a ratio of 8.1% during the period from 1975 to 1994.

Mureithi (2003) finds evidence that provides strong support for the hypothesis that growth options, size and cash flow of firms exert a positive impact on firms' liquidity holding decisions and that firms with other liquid assets tend to hold less cash. However, there is less support for the view that firm use high debt capacity as a substitute for liquidity. Further, he find that the maturity structure of debt does not play a significant role in firm's liquidity decisions where source of debt matters. Finally, he suggests that unobserved firm heterogeneity and endogeneity problems are crucial are crucial in analyzing firm's liquidity decisions.

The level of liquidity can be an indicator of the success or failure of the firm. Kiragu (1991) finds that most firms in Kenya fail due to poor funds management and unwise debt policies and the implications are that firms must maintain sufficient liquidity to avoid insolvency problems.

Institutions ability to access to access markets for new funding or unwind specific measures is a function of their liquidity strategies, market conditions as well as their financial conditions. The liquidity strategy must outline specific policies on key areas of liquidity management. Such areas include the composition of assets and liabilities, management of liquid currencies, reliance on certain financial instruments, liquidity and marketability of the assets. Ross (2001) argues that deregulation and globalization of the financial market has made liquidity risk management, credit risk and market risk more diverse and complex because firms have to succumb to the existing market forces that are

typical of the market kind of an economy. Amid changes in the financial environment and forecasted trends market conditions are in a situation of constant fluctuations. .

A formal analysis requires a careful consideration of both the costs and benefits of holding liquid assets. Investment of liquid assets is costly because the firm foregoes investment in less liquid assets but more productive assets, because the firm incurs transaction costs when buying and selling financial securities and because they lead to higher taxation (relative to stockholders holding such securities directly according to Miller (1988)). In addition, liquid assets may lead to more severe agency problems than less liquid assets

1.2 The Statement of the Problem

As noted in the foregoing, holding of liquid assets involves costs and benefits. Chang-Soo Kim (1998) however notes that firms will generally maintain some cash and cash equivalents for business transaction needs. In addition, they maintain liquidity for precautionary and speculative motives. The precautionary argues that firms maintain excess cash to meet unexpected contingencies while the speculative motive argues that firms maintain excess liquidity to take advantage of future profitable business opportunities. However, in the absence of significant market frictions, neither of the motives is compelling since external funds for investment in production or to meet temporary operating cash flow shortfalls can always be obtained at a fair price. The implication is that the firm should optimally maintain a zero excess liquidity.

However, the existence of market imperfections provides a rationale for significant and predictable amount of excess liquid asset holdings by the firms. In particular, if external financing is costly, then the investment in liquid assets is an optimal response to having to seek costly external financing to fund future production needs. The cost of external financing include out-of-pocket expense to issue securities, the cost arising from potential agency conflicts and the costs arising from adverse selection problems attributable to asymmetric information, Smith(1986). Thus, investing in liquid assets can be viewed as a

sensible way of reducing firm's dependence on costly external financing. Any such benefits must be balanced against the holding costs that liquid assets impose on the firm.

This study is intended to establish the various factors that determine the optimum liquidity held by firms in Kenya. Various proxies are used to determine the effect of various factors on the liquidity position of various firms. For example, Size and information symmetry are used in the determination of the effect of the cost of external financing on the level excess liquidity among firms.

In this study, investment in liquidity is considered costly since liquid assets earn a low rate of return. However, given uncertain future internal funds and costly external financing, the firm may nevertheless decide to hold a positive amount of liquid assets. There is therefore a trade off between the holding cost of liquid assets (low return) and benefits of minimizing the need to seek costly external financing if internally generated funds are insufficient to finance future investment opportunities.

Maore (2006) analyzed the determinants of corporate liquidity of the commercial banks in Kenya using multiple linear regression models. The findings from cross sectional analysis indicated that there is strong evidence that significant factors that determine the liquidity of the commercial banks in Kenya are liquid liabilities, growth and maturity. Liquid liabilities and maturity have positive impact whereas growth has a negative impact. The other factors such as liquid assets and cash flows have positive but insignificant effect on the liquidity of commercial banks. In my study, I exclude the financial institutions such as banks since their stock of trade is cash and hence there are other exclusive factors that determine the level of liquidity for such institutions.

Ouma (2001) did a survey of cash management approaches employed by companies quoted at NSE. This study mainly dwelt on policies employed by firms in controlling their cash position. The findings were that quoted companies make a deliberate effort to control their cash position because the NSE keeps a close watch of their liquidity position. Majority of the firms have set a minimum cash balance level below which cash

balance are not allowed to fall. My study, however, deals with factors considered in setting up of the cash policy of the quoted companies with special emphasis on the effect of cost of external financing on the level of liquidity of a company. The purpose of this study is to provide an empirical investigation of the firm's decision to invest in liquid assets.

1.3 Research Objective

The overall objective is to identify the determinants of Corporate Liquidity at the Nairobi Stock Exchange.

1.4 Importance of the study

To the Corporate world - It will enable the firms to determine the optimum level of investment in liquid assets that maximizes return to the shareholders.

To the academia - It forms the basis for future studies in this field involving other players outside this study.

Commercial banks - Determining the correct liquidity level is a major policy decision which also has a major effect on profitability. This study will come in handy in determining the correct level of liquidity.

Investment Practitioners - the study should be of use to security analysts, stock brokers, investors and other parties whose knowledge of the relationship between cash holding and other factors to analyze specific firms.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction of the Chapter Content

This Chapter will have several subsections covering theories and literature by various authors and researchers. Subsection 2.2 reviews various factors determining the level of liquidity as considered in the current study. It also has literature on the findings of other studies on the same topic but outside the scope of the current study. Subsection 2.3 covers the reasons for holding cash/cash equivalent while subsection 2.4 details the empirical evidence on Cash holding. Subsection 2.5 gives various models that can be used in the determining target cash balance.

2.2 Review of Factors Determining the Level of Liquidity under consideration in this study.

‘Market liquidity is a business, economics or investment term that refers to an assets ability to easily be converted through an act of buying and selling without causing significant movement in the price and with minimum loss in value. It is the probability that an asset can be converted into an expected amount of value within an expected amount of time’ Mainelli (2007). Corporate liquidity on the other hand refers both to that quality of a business which enables it to meet its payment obligations, in terms of possessing sufficient liquid assets, and to such assets themselves. A liquid asset has some or more of the following features: - It can be sold rapidly, Minimum loss of value and it can be sold anytime within the market hours.

The essential characteristic of a liquid market is that there are willing buyers and sellers at all times. The problem is that liquidity is a matter of degree. A treasury bill is less liquid than cash, but it is still a highly liquid security because it can be sold and turned into cash easily and almost instantaneously. Corporate bonds are less liquid than treasury bills, trucks are less liquid than corporate bills, specialized machinery is less liquid than trucks, and so on. The broad question is therefore not ‘How much cash should the firm hold?’ but ‘how should it hold its investment between relatively liquid and relatively illiquid assets?’ (Bradley and Myers, 1991)

Factors under review in this study include the following:

Cost of external financing

In a cross section of firms, we would expect a positive relation between the costs of external financing and investment in liquid assets. In my study, I am using two proxies for the cost of external financing. Recent studies show that small firms are more likely to face borrowing constraint than large firms e.g. Gertler and Hubbard (1988), Whited (1992) and Fazzari (1993). In addition, Barclay and Smith (1996) argue that the cost of external financing is smaller for large firms because of scale economies resulting from a substantial fixed component of security insurance costs. Thus, we expect a negative relation between firm size and investment in liquid assets.

The literature on asymmetric information argues that the firms with more information asymmetry between insiders and outsiders face higher costs of external financing. In particular, Myers and Majluf (1984) argue that firms whose value is largely determined by growth opportunities face more severe asymmetric-induced financing constraints

Growth opportunities are proxied by the ratio of the market value of the firm's assets to the book value of its assets, and as such, the theory would predict that liquid assets holdings are positively related to the market-to-book ratio. Smith and Watts (1992) and Stohs and Mauer (1996) use the market value of the firm's assets to the book value of its assets as a proxy for growth options in the firm's investment opportunity set. They reason that since the book value of assets does not reflect intangible assets such as growth options, the more growth options in the firm's opportunity set, the higher will be the firm's market value in relation to its book value. Similarly, Shleifer and Vishny (1992) argue that financial distress will be more costly for firms with a large proportion of assets that are intangible or linked to the value of the firm as a going concern i.e. firms with high market-to-book value ratios. Their analysis predicts that these types of firms will maintain a larger proportion of liquid assets to minimize the cost of financial distress.

Cash flow uncertainty

The second empirical prediction is that the greater the firm's cash flow variability, the larger the investment in liquid assets. I investigate this prediction by computing the variability of both operating cash flow and free cash flow (operating cash flow minus capital expenditures). If capital expenditures are highly variable and are primarily financed with internally generated funds, then the variability of free cash flow may provide a better proxy for liquidity risk.

Current and Future investment opportunities

Third prediction is that the investment in liquid assets is negatively related to the current rate of return on investment in production and positively related to the return on liquid assets. I use the difference between the return on firm's current assets and the return on short term treasury bills to measure the relative attractiveness of investment in production vs. investment in liquid assets. I predict that investment in liquid assets will be negatively related to this return spread measure.

Chang-soo Kim et al (1998) developed a model of optimal corporate investment in liquid assets based on a cost-benefit tradeoff between the holding cost of liquid assets (a low return) and the benefit of minimizing the need to fund profitable future investment opportunities with costly external financing. The model predicted that the optimal investment in liquidity increased with the cost of external financing, the variance of future cash flows, and the return on future investment opportunities, while it is decreasing in the return differential between physical assets and liquid assets. They tested these predictions using a large panel of U.S. industrial firms over the period from 1975 to 1994.

They found that firms with larger market-to-book ratios have significantly larger positions in liquid assets. In addition, firm size tends to be negatively related to liquidity. These results supported the model's prediction of a positive relation between liquidity and the cost of external financing to the extent that the market-to-book ratio and firm size are reasonable proxies for the cost of external financing. They also found that firms with more volatile earnings and lower returns on physical assets relative to those on liquid assets

tend to have significantly larger positions in liquid assets. Finally, they found a positive and significant relation between liquidity and measures of future economic conditions, which supported the model's prediction that firms build liquidity in anticipation of promising future investment opportunities.

2.3 Reasons for holding cash/Cash equivalent

Cash itself earns no interest. Thus the goal of the cash manager is to minimize the amount of cash the firm must hold for use in conducting its normal business activities yet at the same time have enough cash to take trade discounts, maintain credit rating meet unexpected cash needs. Firms hold cash for several motives:

2.3.1 Transaction motive:

'Cash balances are necessary in business operations. Payments must be made in cash, and receipts are deposited in the cash account. Cash associated with the routine payments and collections are known as transaction balances' Brigham (2004). According to Deloof (2008), this is the most basic reason for holding cash. Cash is the most acceptable form of settling transactions because other modes such as barter suffered from more disadvantages. The cash assets and marketable securities provide low cost financing for the firm. The transaction motive predicts that firms with higher transaction demand will hold relatively less readily available cash.

2.3.2 Compensation to banks for providing loans and services:

Bank makes money by lending out cash that has been deposited with it, so the larger its deposits, the better the banks profit position. If a bank is providing services to a customer, it may require the customer to leave a minimum balance on deposit to help offset the costs of providing the services. Also, banks may require the borrowers to hold deposits at the bank. Both types are referred to as compensating balances. Brigham (2004).

2.3.3 The Precautionary Motive:

This refers to the predictability of cash inflows and out flows. If the predictability is high, then less cash must be held against an emergency or any other contingency. Kim et al

(1998) finds that firms that face higher external financing costs, that have more volatile earnings, and those having lower returns on physical assets relative to those on financial securities tend to have significantly larger proportions of liquid assets to total assets. This is perhaps to ensure that such firms have more of cash which is more secure and cheap source of financing. The precautionary motive of holding cash is based on the firm's inability to raise funds. In particular, while firms may have access to capital markets to raise the necessary financing, they may not have to do so at a particular point in time because the securities that they are planning to issue are undervalued. Myers and Majluf (1984) Argue that firms can overcome this problem by building up financial slack, which they define as cash, cash equivalents and unused risk free borrowing capacity.

2.3.4 Speculative motive:

This is to enable the company to take up any profit making opportunities arising. For large corporations with huge daily inflows of cash, such cash is invested in short term deposits or is even lent to other companies or banks for overnight lending.

2.4 Empirical evidence on Cash holding.

The two most prominent points of view in literature on the optimal amount of liquidity conclude that the firm should either hold large amount of liquid assets or no liquid assets. Myers and Majluf (1984) argue that because of information asymmetry-induced financing constraints, firms should stock up on liquid assets to finance future investment opportunities with internal funds. Since there are no offsetting costs to liquid assets in their model, the optimal amount of liquidity is a corner solution. In contrast,

Jensen (1986) argues that firms should be forced to pay out funds in excess of the amount necessary to finance all positive NPV investments to minimize the agency cost of free cash flow. In the absence of a benefit from liquid assets, Jensen's analysis implies that the firm should carry no liquid assets. My analysis includes both benefits and costs of holding liquid assets to develop predictions about the determinants of corporate liquidity in Kenya.

Almeida (2001) contends that cash holdings are valuable because they increase the likelihood that the firm will be able to fund new investments. However, increasing cash may be costly to a firm if it decreases the quantity of current investments that the firm can make. Cash yields a lower return than that associated with the firm's physical investments whenever the firm foregoes positive NPV projects in order to hold cash. In contrast to a firm facing constraints in accessing capital markets, an unconstrained firm has no use for cash and faces no cost of holding cash.

Dittmar (2002) tested whether financially unconstrained firm whose managers are likely to have little or no incentives to adopt value maximizing policies (i.e. have low ownership) manage firm liquidity as if they were financially constrained. He finds weak evidence in support of the agency view of corporate liquidity management.

Opler et al (1999) report that the short run impacts of excess cash holding on the capital expenditures, acquisition spending and pay outs to shareholders is small. Further, the main reason that the firms experience large changes in excess cash is the occurrence of operating losses. There is however no evidence that risk management and cash holdings are substitutes.

Schure (1998) finds that cross sectional regressions that suggest that cash holdings be positively correlated with proxies for agency problems and those firms can not borrow easily. This forces firms to hold cash stocks as a precaution to prevent shortfalls in cash flows from impinging on investments.

Almeida et al (2002) looked at agency problems associated with over investment by managers. Previous studies have argued that to the extent that ownership is not perfectly set, managers with lower ownership could be more prone to value destroying overinvestment. Accordingly, increases in ownership might lead to sub optimal managerial behavior, which translates to a decreased propensity to save cash flows.

Huberman (1984) also develops a model that can yield an interior optimal level of investment in liquid assets. He assumes that firms can not use external financing to fund investment in production, requiring instead that such investment be financed with cash on

hand. There are no costs, however, to issuing securities to finance investment in liquid assets. Not surprisingly, in this setting, he finds that firms invest in liquid assets to fund future investment opportunities. The critical difference between my model and Huberman's model is that we allow the firm to fund investment in production with external financing.

Similar to my model, Martin and Morgan (1988) examine optimal investment in liquid assets in a model where liquid assets earn a low return, but given uncertain future funding needs and costly external financing, may nevertheless be held. Adopting a cost minimization objective, they derive conditions under which corner solutions result i.e. the firm either holds no liquid assets or holds more than enough liquid assets to cover any future funds shortfall.

I umhasyo (1976) carried out a study on cash management in Kenyan firms. He found out that before a cash model could be introduced in Kenyan firms certain conditions needed to be fulfilled for it to work as an efficient management policy corporate level. He found out that the basic objective of holding cash in most of the Kenyan firms was to avoid cash out and hence emphasize minimum balance. They did not consider costs related to to cash balances. The firms did not have formal policies for making cash balance decisions and cash was viewed as residual from other plans. He also found out that Kenyan firms were financing their cash needs through the use of external short term financing such as overdraft and credit extension from the parent companies. The study, having been carried out in 1976 considered the practices up to that time. There enormous changes that have taken place since then, mainly computerization of information systems leading to better cash management models. In addition, firms have grown in size since then and so is the liquidity requirement.

Mugera (1998) studied cash management practices in small scale enterprises. He found out that small scale enterprises had inherent characteristics that accounted for poor management of cash. The small-scale enterprises had inefficient management and weak internal controls leading to poor cash management. My study on the other had

concentrates on the firms listed on the NSE; hence they are big with strong systems of internal control and efficient management.

2.5 Advantages of holding Cash

Brigham (2004) identified a number of advantages of holding adequate cash and near cash. It is essential that the firm have sufficient cash and near-cash assets to take trade discounts. Suppliers often offer customers discounts for early payment of bills. The cost of not taking discounts is very high, so firms should have enough cash to permit payment of bills in time to take discounts. Adequate holding of cash and near-cash assets can help the firm maintain its credit rating by keeping its current and acid test ratios in line with those other firms in the industry. A strong credit rating enable the firm both to purchase goods from suppliers on a favorable terms and to maintain an ample line of low-cost credit line with its bank. Cash and near-cash assets are useful for taking advantage of favorable business opportunities, such as special offers from suppliers or opportunities to acquire another firm. The firm should have sufficient cash and near-cash assets to meet such emergencies as strikes, fires, competitors marketing campaign and to weather seasonal and cyclical downturns.

2.6 Determining the target cash balance

Finance literature has shown that firms must have some target cash. This is the preferable level of cash that the firm holds to meet its day to day liquidity needs. Any decision made aims at ensuring that the target cash ratio is achieved at all times

2.6.1 The traditional Cash Budget

This is used to determine the expected cash inflows and outflows of cash for a particular period. These are usually done on a monthly and annual basis. Excess cash and cash deficiencies are identified early and planning is thus initiated either to utilize the excess cash or to seek for sources to cover cash deficits.

2.6.2 The Baumol Model

This model may be used for determining target cash balance. It assumes constant flow of cash disbursements and assumes that the firm only receives cash at the end of a specified period. It assumes that the timing of inflows is at the end of the period. With the inflows and outflow patterns determined, then the firm is able to set average cash balance which is the target cash (Ross, 1990). Weston (1998) noted that this model assumes that the firm's cash balance takes a saw-tooth pattern over time. It also assumes that the receipts come in at periodic intervals while expenditures occur continuously throughout the periods. If a firm does not need to use the entire amount received at a time the firm can decide on a specific minimum amount of cash to hold and invest the rest in marketable securities to mature at various intervals when required.

Most firms try to minimize the sum of the cost of holding cash and the cost of converting marketable securities to cash

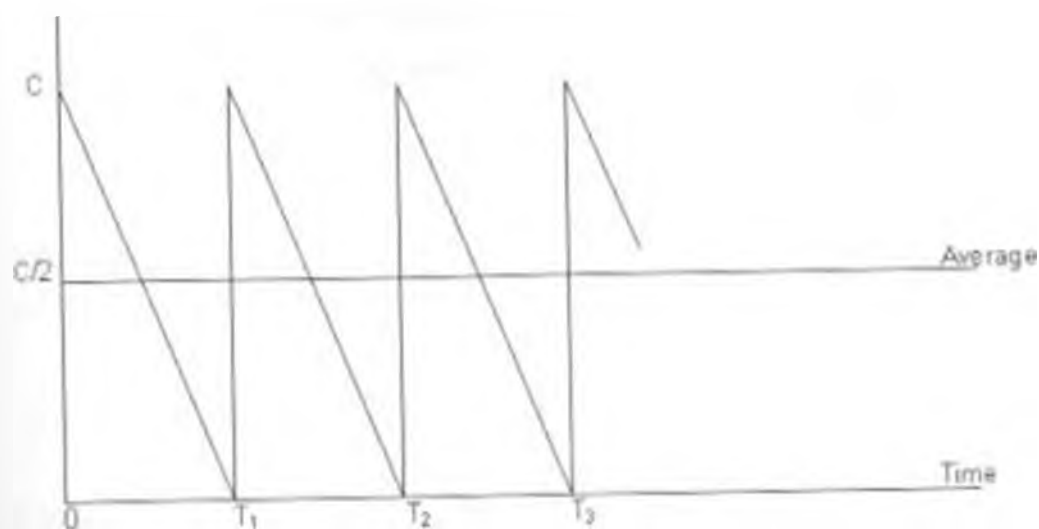
Baumol's cash management model helps in determining a firm's optimum cash balance under certainty. As per the model, cash and inventory management problems are one and the same.

There are certain assumptions that are made in the model. They are as follows:

1. The firm is able to forecast its cash requirements with certainty and receive a specific amount at regular intervals.
2. The firm's cash payments occur uniformly over a period of time i.e. a steady rate of cash outflows.
3. The opportunity cost of holding cash is known and does not change over time. Cash holdings incur an opportunity cost in the form of opportunity foregone.
4. The firm will incur the same transaction cost whenever it converts securities to cash. Each transaction incurs a fixed and variable cost.

For example, let us assume that the firm sells securities and starts with a cash balance of ₹C rupees. When the firm spends cash, its cash balance starts decreasing and reaches zero. The firm again gets back its money by selling marketable securities. As the cash balance

decreases gradually, the average cash balance will be: $C/2$. This can be shown in following figure:



The firm incurs a cost known as holding cost for maintaining the cash balance. It is known as opportunity cost, the return inevitable on the marketable securities. If the opportunity cost is k , then the firm's holding cost for maintaining an average cash balance is as follows:

$$\text{Holding cost} = k (C/2)$$

Whenever the firm converts its marketable securities to cash, it incurs a cost known as transaction cost. Total number of transactions in a particular year will be total funds required (T), divided by the cash balance (C) i.e. T/C . The assumption here is that the cost per transaction is constant. If the cost per transaction is c , then the total transaction cost will be:

$$\text{Transaction cost} = c (T/C)$$

The total annual cost of the demand for cash will be:

$$\text{Total cost} = k (C/2) + c (T/C)$$

Optimum level of cash balance

As the demand for cash, 'C' increases, the holding cost will also increase and the transaction cost will reduce because of a decline in the number of transactions. Hence, it can be said that there is a relationship between the holding cost and the transaction cost

The optimum cash balance, C^* is obtained when the total cost is minimum.

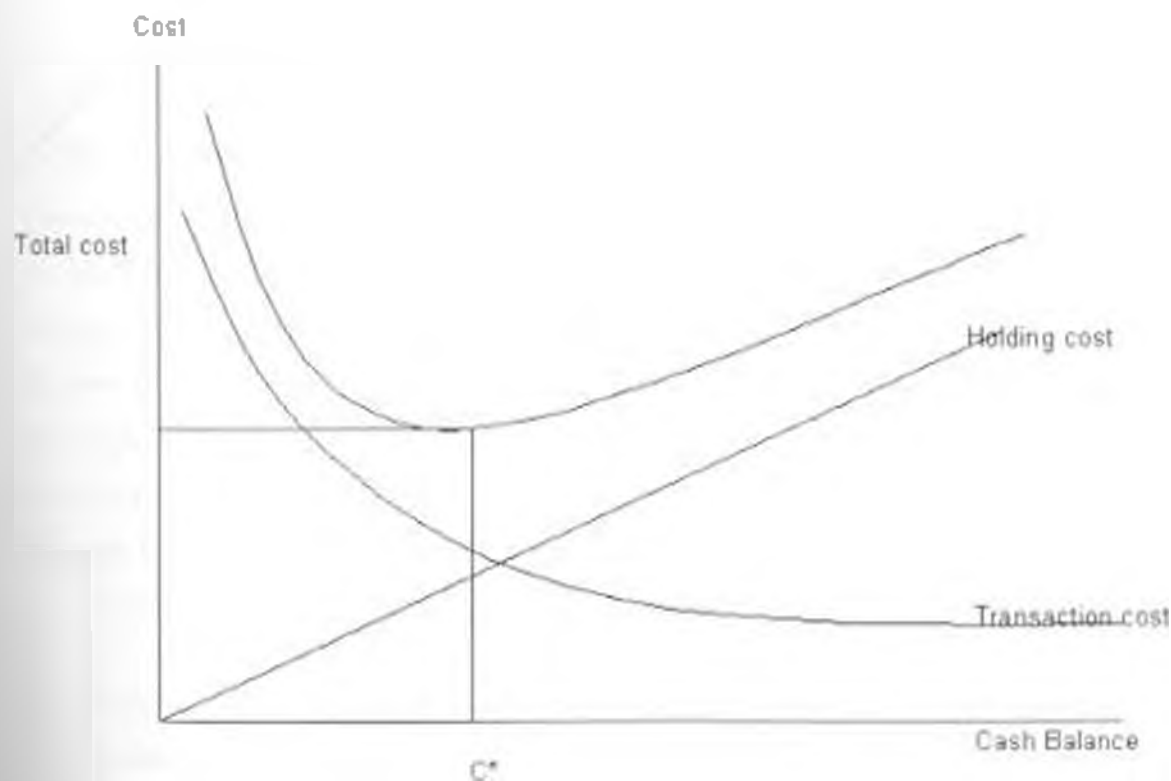
$$\text{Optimum cash balance } (C^*) = \sqrt{2cT/k}$$

Where, C^* is the optimum cash balance.

T is the total cash needed during the year.

k is the opportunity cost of holding cash balances.

With the increase in the cost per transaction and total funds required, the optimum cash balance will increase. However, with an increase in the opportunity cost, it will decrease.



Limitations of the Baumol model:

1. It does not allow cash flows to fluctuate.
2. Overdraft is not considered.
3. There are uncertainties in the pattern of future cash flows.

2.6.3 Lockyer's Model

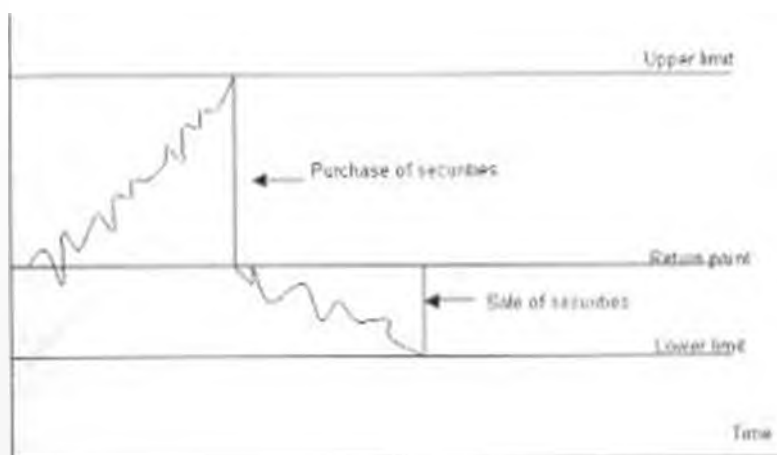
Lochyer (1973) developed Baumol model further by bringing in the idea of bank overdrafts. He, however, like Baumol assumed that receipts are instantaneously converted into interest earning assets. This model assumes the availability of overdraft facility as an extra source of cash. The minimum cost of financing will thus be determined by comparing overdraft interest any short term interest income. One of the drawbacks of the model is that it assumes the availability of overdraft while the actual fact is that the firm has no control over the facility since the bank can recall it any time

2.6.4 The Miller-Orr Model

The essence of this model assumes that firms set a lower limit on cash holdings based on the likelihood of a cash short fall and the firms' willingness to tolerate the risk of a short fall, and then an upper limit is set by applying this model. This is a better model than the Baumol model because it recognizes the fact that cash flows are uncertain. This model is also advantageous in that it can also be adjusted for seasonal trends by construction of cash flow distributions that take into account probabilities of increases and decreases in the cash balance. Chastain (1987) reports that the model performed extremely well in companies that adopted it.

Most firms don't use their cash flows uniformly and also cannot predict their daily cash inflows and outflows. **Miller-Orr Model** helps them by allowing daily cash flow variation

Under the model, the firm allows the cash balance to fluctuate between the upper control limit and the lower control limit, making a purchase and sale of marketable securities only when one of these limits is reached. The assumption made here is that the net cash flows are normally distributed with a zero value of mean and a standard deviation. This model provides two control limits – the upper control limit and the lower control limit as well as a return point. When the firm's cash limit fluctuates at random and touches the upper limit, the firm buys sufficient marketable securities to come back to a normal level of cash balance i.e. the return point. Similarly, when the firm's cash flows wander and touch the lower limit, it sells sufficient marketable securities to bring the cash balance back to the normal level i.e. the return point.



The lower limit is set by the firm based on its desired minimum "safety stock" of cash in hand. The firm should also determine the following factors:

1. An interest rate for marketable securities, (i)
2. A fixed transaction cost for buying and selling marketable securities, (c)
3. The standard deviation of its daily cash flows, (s)

The upper control limits and return path are then calculated by the Miller-Orr Model as follows:

Distance between the upper limits and lower limits is $3Z$.

$$(\text{Upper limit} - \text{Lower limit}) = (3/4 C \text{ Transaction Cost } C \text{ Cash Flow Variance/Interest Rate})^{1/3}$$

$$Z = (3/4 C \text{ } \sigma^2/i)^{1/3}$$

If the transaction cost is higher or cash flows shows greater fluctuations, than the upper limit and lower limit will be far off from each other. As the interest rate increases, the limits will come closer. There is an inverse relation between the Z and the interest rate. The upper control limit is three times above the lower control limits and the return point lies between the upper and lower limits. Hence,

$$\text{Upper Limit} = \text{Lower Limit} + 3Z.$$

$$\text{Return Point} = \text{Lower Limit} + Z.$$

So, the firm holds the average cash balance equal to:

$$\text{Average Cash Balance} = \text{Lower Limit} + 4/3 Z.$$

The Miller-Orr Model is more realistic as it allows variation in cash balance within the lower and upper limits. The lower limit can be set according to the firm's liquidity requirement. To determine the standard deviation of net cash flows the pasty data of the net cash flow behaviour can be used. Managerial attention is needed only if the cash balance deviates from the limits.

2.6.5 The Simulation Models.

Archers (1972) and Gibbs (1978) have used Monte Carlo simulation to develop models that incorporate uncertainty in setting the target cash balance. In drawing the cash budget, sales are subject to a probability distribution about the expected value. This contrast with traditional cash budget which use expected values (the mean values of probability distribution of sales). The greater uncertainty faced by an enterprise means the greater is the risk of running out of cash and a higher cash balance. Archers model incorporates the precautionary balances and calls for plotting of cash inflows and outflows on a graph to be able to determine the maximum and minimum cash required. Gibbs (1976) suggested

that the pattern of determination of optimal cash balances involves a combination of investment and financing decisions.

2.6.5 The Ozkan's Dynamic Cash Holding model

The above three models are static in that they assume that firms can instantaneously adjust towards their target cash structure after changes in firm specific characteristics. Ozkan (2000) proposes a dynamic cash holding model which recognizes the fact that firms can in reality automatically adjust their cash holding. Instead, there will be time lags between the event and actual cash holding adjustment. In this case then, the target cash changes over time and across firms.

Comment on the Models

Ouma (2001) find that firms in Kenya use a combination of any of the above models discussed to determine the cash holding levels. She did not find evidence of any single firm using purely a single model.

2.7 Conclusion

According to Kallberg (1993) in the book 'Corporate Liquidity: Management and Measurement', corporate liquidity issues are greatly influenced by a number of key factors which include Technology i.e. the pervasiveness of computer has allowed for a more complete analysis and development of the internal and external databases, permitting a firm to make decisions based on timely and accurate information. One of the most technological advances is Electronic Data interchange (EDI) – the evolving ability of business entities to exchange business documents in a standardized form. This has had a broad impact across inventory, credit and cash management. The huge shifts in banking have radically altered the corporate banking relationship. This greatly influences corporate borrowing and also no-credit services such as cash management, as cut back on non-profitable operations and generally downsize. The growing linkages and radical changes in the world economy influence corporate borrowing and investment and the overall business environment. The 80's produced an overwhelming variety of financial

tools for investment, borrowing and risk shifting. Darwinism has pared down this population somewhat, but an incredible diversity is available to the corporate manager

As noted in the literature review, most of the studies done so far relating to liquidity are in the developed world. This study concentrates on the firms listed in NSE which represents a developing market

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction of the Chapter Content.

This Chapter will have subsection 3.2 covering Research Design, 3.3 detailing the population while 3.4 will cover sample selection. Data collection and analysis will be covered in subsection 3.5 and 3.6 respectively.

3.2 Research Design

This study will be carried out through the use of secondary data as detailed in the listed companies' annual reports. Questionnaires will not be necessary. Through the use of a table, the researcher will obtain the data for various variables included in the study from the financial statements in the annual report of the listed companies. This data will then be analyzed through the use of regression analysis to determine the effect of the various factors identified on the level of liquidity held by a company.

3.3 The Population

The population will be composed of all the publicly quoted firms in the main segment sector at the Nairobi Stock Exchange between 2000 and 2006. Unlisted firms will be excluded as their annual reports are not publicized. There are a total of 55 listed firms at the Nairobi Stock Exchange currently

3.4 Sample Selection

In order to obtain a representative sample from the population, the researcher will select all firms in each sector but exclude the firms in the financial services sector to contribute to the sample. Firms in the financial services sector will be excluded because their stock of trade is cash itself and hence they have other exclusive factors influencing the liquidity level they hold such as regulation by Central Bank among others. I also exclude firms listed in between the study period. This is due to incomplete data. The sample will therefore consist of 26 firms as detailed in the table below. Data for each of 26 firms will be obtained. The period of analysis for the study will be between 2000 and 2006 (6years).

Table 1 Sector and Number of Firms

Sector	Number of Firms	Sample
Agriculture	4	4
Commercial and Services	12	7
Industrial and Allied	18	15
Total	34	26

3.5 Data Collection

Data will be obtained from annual reports submitted to the NSF and Capital Markets Authority. Annual reports of all listed companies in the NSE will be obtained between 2000 and 2006 which is the study period. The company annual accounts will be obtained from the NSE library and the Capital Markets Authority. All companies that were continually listed between 2000 and 2006 will be included to ensure that the sampling frame is current and complete.

The table below list variables that will be collected for use in this study:

Variable Name		Source
Cash	Cash or bank	Balance sheet
Marketable securities	Or cash equivalent	Balance sheet
Fixed Assets	Non current assets	Balance sheet
Current Assets	Current assets	Balance sheet
Profit	Net profit	Income statement
Economic Growth Rate	Annual economy growth rate	Economic surveys

3.6 Model and Data Analysis Method

Regression analysis will be used to analyze the data that will be collected. On the basis of sample data, we will estimate the value of a variable Y corresponding to a given value of a variable X. This can be achieved by estimating the value of Y from a least squares curve that fits the data. The resulting line is called a regression curve of Y on X because

Y is estimated from X. In this study, for each firm in the sample and for each year during the sample period, we measure liquidity, the dependent variable, (LIQRAT) as the ratio of Cash to the book value of total assets. We then relate LIQRAT to the following independent proxies for the hypothesized determinants of liquidity:

3.6.1 Cost of External Financing

Firm Size – Firm size (SIZE) is measured by the natural logarithm of the market value of the firm's assets, where the market value of the assets is estimated as the book value of the assets plus the difference plus the difference between the book value and the market value of the equity. I expect a negative relation between LIQRAT and SIZE.

Growth Opportunities (GROW) – The ratio of my estimate of the market value of the firm's assets to the book value of its assets (MV/BV). I expect a positive relation between LIQRAT and MV/BV.

3.6.2 Cash flow Uncertainty

Variability of the operating Cash flow (VARCF) - Variability of the operating cash flow is measured as the standard deviation of the difference in earnings before the interest, depreciation, and taxes minus non operating income. VARCF is expected to be positively related to LIQRAT.

3.6.3 Current and Future investment opportunities

Return Spread – The attractiveness of investment in physical assets vs. liquid assets is measured by the difference between the return on the firm's assets and the return on Treasury Bills (RSPREAD). The return on assets is measured by the ratio of earnings before interest, depreciation and taxes minus non operating income to the book value of assets. I expect a negative relation between LIQRAT and RSPREAD.

Forecast of future economic conditions – Future economic conditions are proxied by the projected economic growth rate. The model predicts a positive relation between LIQRAT and projected economic growth rate.

The regression analysis will analyze the relationship between the Liquidity and the factors influencing Liquidity as follows.

$$LIQRAT_i = \beta_0 + \beta_1 SIZE + \beta_2 GROW + \beta_3 VARCF + \beta_4 RSPREAD + \varepsilon_i$$

Where LIQRAT is the Liquidity factor of a firm. SIZE, GROW, VARCF and RSPREAD are the factors influencing liquidity as explained above. β_0 , β_1 , β_2 , β_3 and β_4 are constants representing the direction and the extent to which each variable influences liquidity of a firm.

To complement the regression analysis, I will also use correlation analysis where results are not as elaborate as needed to make a conclusive argument.

CHAPTER FOUR

FINDINGS

4.1 Introduction

This study aimed at establishing the determinants of corporate liquidity using data from the Nairobi Stock Exchange. Data for this study was obtained from the financial statements of a sample of 26 firms that have continuously been listed at the Nairobi Stock Exchange between 2000 and 2006 and are in Main Segment Sector (Agriculture, Industrial and Allied and Commercial Services). Firms in the financial sector and those listed in between 2006 and 2006 were excluded from this analysis.

Data analysis for this study was done using Statistical Package for Social Science (SPSS version 17). Descriptive statistics, correlation analysis and regression model was applied to determine the relationship between liquidity (dependent variable) and the independent variables (firm size, growth opportunities, variability of operating cash flow, return spread and GDP).

4.2 Summary of Statistics

The figures in table 1 give the number of companies by sector disaggregated by year. The table shows that there were four firms sampled from the agricultural, seven (7) from Commercial and Services and 15 from the Industrial and Allied Sector.

Table 2 Sampled Companies by Sector and Year

Sector	Year						
	2000	2001	2002	2003	2004	2005	2006
Agriculture	4	4	4	4	4	4	4
Commercial & Services	7	7	7	7	7	7	7
Industrial & Allied	15	15	15	15	15	15	15
Total	26	26	26	26	26	26	26

Table 2 shows the summary statistics of the variables used in the study. The summary statistics gives the descriptive statistics of the variables such as the minimum, maximum, mean and standard deviation.

Table 3 Summary Statistics of the variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
LIQRAT	181	0.0012	5.3118	0.479429	0.8063224
Size	181	17.7293	25.3104	21.297594	1.6406284
GROW	181	22.7801	5096.2025	909.675577	1024.0429
VARCF	181	244,029.53	724,117.22	466,802.65	164,091.89
RSPREAD	181	-7.9555	0.7352	-1.106766	2.7720706
GDP	181	0.6125	5.85	3.30221	2.1988824

The result in figure 1, 3 and table 3 compares the mean of explanatory variables across the sectors. According to the table, commercial and services sector has the highest mean liquidity ratio (0.5520). This implies that Commercial & Services sector maintains highest level of liquidity compared to other sectors in the stock exchange. They are followed closely by the Industrial & Allied (mean 0.5109) and lastly by the Agriculture sector.

Table 4 Summary Statistics by Sector

Variable	Sector		
	Agriculture	Commercial & Services	Industrial & Allied
LIQRAT	0.2355	0.5520	0.5109
Size	20.7039	20.9666	21.6134
GROW	485.3165	896.8930	1,029.9490
RSPREAD	-1.1682	-1.1516	-1.0691
VARCF	468,216.47	468,216.47	465,755.88

Figure 1 Liquidity Ratio by Sector

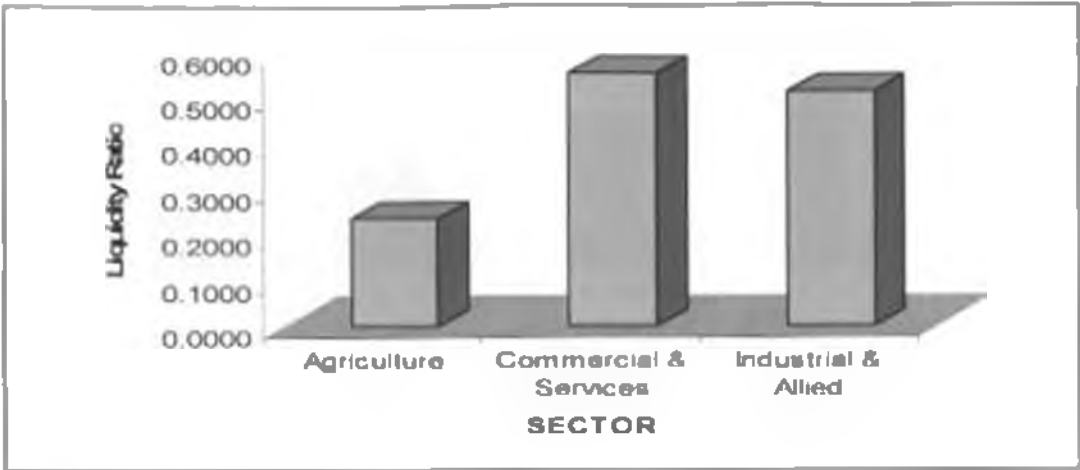
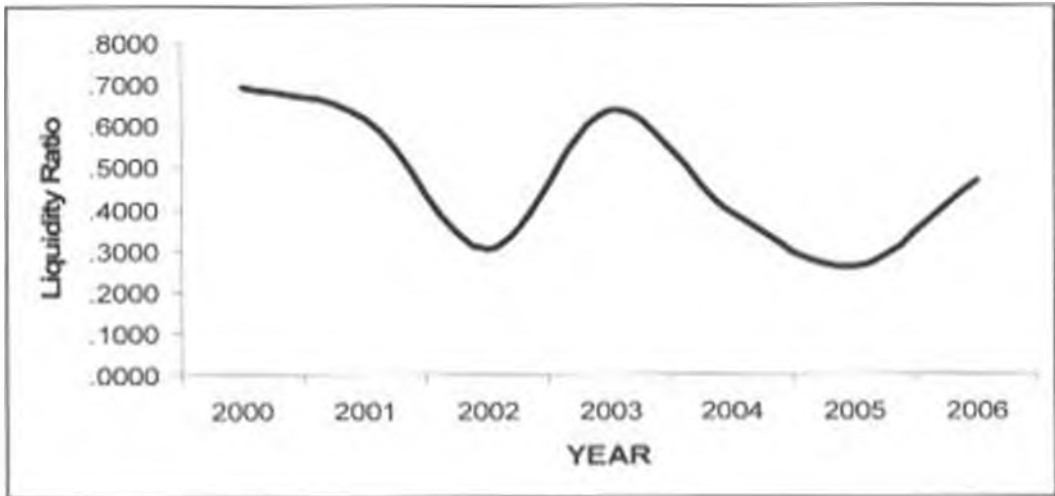


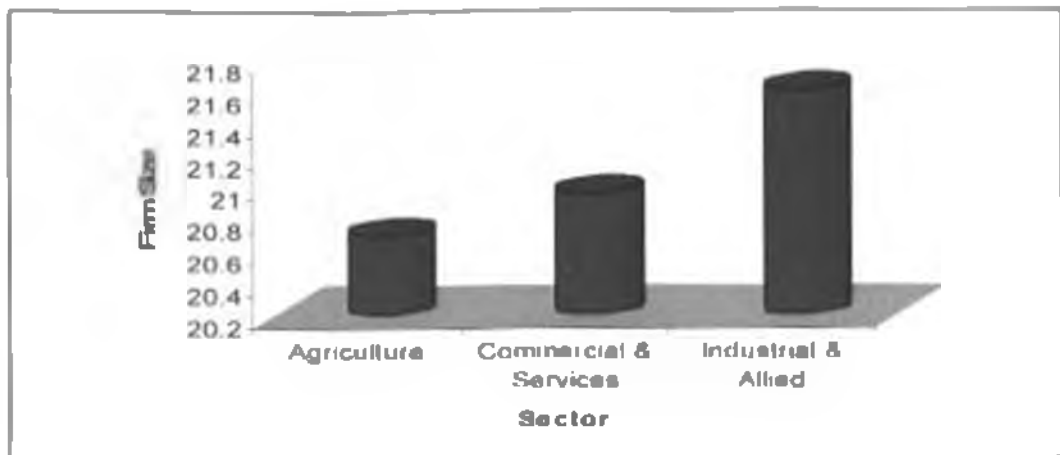
Figure 2 shows the trend of firms' liquidity ratio for the sampled firms from 2000 to the year 2006. The figure shows a general downward trend in firm's liquidity ratio over the years.

Figure 2 Trend of firms' Liquidity Ratio



The result in figure 3 shows the comparison between firm sizes organized by sector. Firms in the Industrial & Allied sector are bigger in size compared to firms in the other sectors. They are followed closely by firms in the commercial & services sector. Firms in the agricultural sectors have the least size.

Figure 3 Firm Size by Sector



4.3 Correlation Matrix

The result in table 4 shows a correlation matrix among the hypothesized determinants of liquidity. According to the table, there exists a positive and significant correlation between firm size (Size) and forecasts of future economic conditions (GDP) at 5% level of significance (Pearson Correlation Coefficient (R) = 0.427, p -value = 0.000). This implies that firm size is likely to increase when the prospects of future economic conditions are expected to rise.

There also exists a significant and positive correlation between firm size and growth opportunities (GROW) at 5% level of significance (R = 0.628, p -value = 0.000). GROW was defined as the ratio of the market value of the firm's assets to the book value of its assets. This indicates that firm size increase with increase in growth opportunities.

The findings also established a significant positive correlation between growth opportunities (GROW) and forecasts for future for economic growth (GDP) (R = 0.442, p -value = 0.000) and between GROW and Return Spread (R =0.160, p -value=0.032) and at 5% level of significance. However, contrary to our expectation, there is a negative correlation between GROW and LIQRAT. This can be explained by the fact that as the firm's assets are viewed favorably by potential investors as explained by higher market vs. book value, it tends to invest more in physical assets compared to liquid assets.

As earlier expected, the findings indicated a positive correlation between liquidity ratio (LIQRAT) and variability of the operating cash flow (VARCF) though statistically insignificant ($R = 0.105$, $p\text{-value}=0.160$). This finding is in line with the prediction on cash flow uncertainty that the greater the firm's cash flow variability, the larger the investment in liquid assets.

Study findings in table 4 shows a significant negative relationship between liquidity ratio (LIQRAT) and firms size at 5% level of significance ($R=-0.464$, $p\text{-value}=0.000$). This finding is in line with earlier literature by Gertler and Hubbard (1998), Whited (1982) and Fazzari (1993) and Barclay and Smith (1996) which argued that small firms are more likely to face borrowing constraint than large firms and that the cost of external financing is smaller for large firms because of economies of scale resulting from a substantial fixed component of security insurance costs.

The results in the table also shows a negative correlation between investment in liquid assets (LIQRAT) and return spread measure (RSPREAD) ($R=-0.079$, $p\text{-value}=0.290$). This finding agrees with the prediction that investment in liquid assets is negatively related to the return spread measure. This may be explained by the fact that firms will prefer investing in physical assets which return higher yields as compared to the liquid assets.

There also exists a statistically significant negative correlation between return spread measure and variability of the operating cash flow ($R=-0.596$, $p\text{-value}=0.000$). This implies that as the return on physical assets increases, there is tendency to reduce investment in liquid assets leading to lower levels of cash variability.

Table 2 Correlation Matrix of the variables used in the study

Variable		LIQRAT	Size	GDP	GROW	RSPREAD	VARCF
LIQRAT	Pearson Correlation	1	-.464 ^{**}	-.120	-.029	-.079	.105
	Sig. (2-tailed)		.000	.108	.696	.290	.160
	N	181	181	181	181	181	181
Size	Pearson Correlation	-.464 ^{**}	1	.427 ^{**}	.628 ^{**}	.118	.068
	Sig. (2-tailed)	.000		.000	.000	.112	.361
	N	181	181	181	181	181	181
GDP	Pearson Correlation	-.120	.427 ^{**}	1	.442 ^{**}	.387 ^{**}	-.137
	Sig. (2-tailed)	.108	.000		.000	.000	.066
	N	181	181	181	181	181	181
GROW	Pearson Correlation	-.029	.628 ^{**}	.442 ^{**}	1	.160 [*]	.066
	Sig. (2-tailed)	.696	.000	.000		.032	.374
	N	181	181	181	181	181	181
RSPREAD	Pearson Correlation	-.079	.118	.387 ^{**}	.160 [*]	1	-.596 ^{**}
	Sig. (2-tailed)	.290	.112	.000	.032		.000
	N	181	181	181	181	181	181
VARCF	Pearson Correlation	.105	.068	-.137	.066	-.596 ^{**}	1
	Sig. (2-tailed)	.160	.361	.066	.374	.000	
	N	181	181	181	181	181	181

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

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

4.4 Regression Analysis

Multiple regression analysis was also used to assess the relationship between the liquidity and the factors influencing liquidity as follows.

The regression equation is as below:

$$LIQRAT = b_0 + b_1Size + b_2Grow + b_3VARCF + b_4RSPREAD + \varepsilon_i$$

The results of the regression analysis summarized in table 6 below shows that there exists a significant negative relationship between firms' liquidity and firm size (SIZE). This supports earlier literature by Gertler and Hubbard (1998), Whited (1982) and Iazzari (1993) and Barclay and Smith (1996) who argued that small firms are more likely to face borrowing constraint than large firms and that the cost of external financing is smaller for large firms because of economies of scale.

There is a significant positive relationship between firm's liquidity and growth opportunities (GROW) and variability in operating cash flow (VARCF). The regression model shows that all the explanatory variables positively explain the firm's liquidity.

The Adjusted R-square shows that the regression model explains about 32.7% of the dependent variable (liquidity). The Durbin-Watson test for serial correlation of the residuals and case wise diagnostics for the cases meeting the selection criterion shows that there is no serial correlation among the regression residuals since the value of Durbin Watson is below 7.0. Collinearity (or multicollinearity) is the undesirable situation where the correlations among the independent variables are strong. Tolerance is a statistic used to determine how much the independent variables are linearly related to one another (multicollinear). Very small values of tolerance (closer to zero) are an indicator of multicollinearity. Our value of tolerance is almost equal to 1.0 implying that there is no multicollinearity in the independent variables.

Therefore, to explain liquidity, our regression equation, based on our analysis, can then be expressed as;

$$LIQRAT = 7.669 - 0.3684Size + 0.0003Grow + 0.00001VARCF + 0.0050RSPREAD + \varepsilon_i$$

Table 6 Overall Regression Analysis of Profitability vs. size and Book-to-market

Variables	B	t-statistic	P-value	Adj. R ²	Durbin-Watson	Tolerance	VIF
Intercept	7.6699	9.533	0.000	0.3271	1.570	.575	1.741
Size	-0.3681	9.533	0.000			.562	1.781
GROW	0.0003	9.293	0.000			.614	1.627
VARCF	0.0000	5.101	0.000			.545	1.835
RSIPREAD	0.0050	1.830	0.069			.667	1.498

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Findings

The findings indicated a positive correlation between liquidity ratio (LIQRA1) and variability of the operating cash flow (VARCF) though statistically insignificant ($R=0.105$, $p\text{-value}=0.160$). There exists a significant negative relationship between liquidity ratio (LIQRA1) and firms size (SIZE) at 5% level of significance ($R=-0.464$, $p\text{-value}=0.000$). The results in the table also shows a negative correlation between investment in liquid assets (LIQRAT) and return spread measure (RSPREAD) ($R=-0.079$, $p\text{-value}=0.290$).

The results of the regression analysis showed that there exists a significant negative relationship between firms' liquidity and firm size (SIZE). There is a significant positive relationship between firm's liquidity and variability in operating cash flow (VARCF). In the case of CROW and RSPREAD, the analysis shows a positive relationship with liquidity unlike the correlation analysis. However, since the Adjusted R- square shows that the regression model explains about 32.7% only of the dependent variable (liquidity), I give more weight to the correlation analysis results. The regression model shows that all the explanatory variables positively explain the firm's liquidity.

5.2 Conclusions

In this study, I develop a model of optimal corporate investment in liquid assets based on cost-benefit trade off between the holding cost of liquid assets (low return) and the benefit of minimizing the need to fund profitable future investment opportunities with costly external financing. The model predicts that the optimal investment in liquid assets is increasing in the cost of external financing, the variance of future cashflows, and the return on future investment opportunities, while it is decreasing in the return differential between physical assets and liquid assets. I test these predictions using a large sample of listed companies in the NSE over the period 2000 to 2006.

I find that firms with larger market-to-book ratios have significantly smaller positions in liquid assets. In addition, firm size tends to be negatively related to liquidity. These results supports the model's prediction of a positive relation between liquidity and the cost of external financing to the extent that the market-to-book ratio and firm size are reasonable proxies for the cost of external financing. I also find that firms with more volatile earnings and lower returns on physical assets relative to those on liquid assets tend to have significantly larger positions in liquid assets.

Limitations

This study was however faced by several limitations:

- 1) The proxies may not be the best representatives of the variable they purport to represent
- 2) Different sectors in the NSE are guided by different accounting rules and regulation. i.e financial statements are not standard and hence it was difficult to analyze data from the different sectors due to the difficulties in matching data.

5.3 Recommendations for further research

This study has considered just a few factors that influence liquidity. There are many more factors that influence the same, both internal and external. Therefore, more studies may be carried out to find out other factors that play a role in deciding on the liquidity levels. In addition, the same study may be carried out with different variables as proxies for the factors identified as determinants of liquidity. It is worthy noting that very few firms in Kenya are listed in the stock exchange. Therefore, a study can be carried out on the unlisted sector of the Kenyan market which might be more representative of the Kenya business environment.

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APPENDIX 1

NSE Listed Firms used in the analysis

Agriculture

1. Rea Vipingo Ltd.
2. Sasini Tea & Coffee Ltd.
3. Kakuzi Ltd.
4. Unilever

Commercials

1. Marshalls E.A. Ltd.
2. Car & General Ltd.
3. Kenya Airways Ltd.
4. CMC Holdings Ltd.
5. Nation Media Group Ltd.
6. TPS (Serena) Ltd.
7. Standard Group Ltd.
8. Marshalls E.A. Ltd.
9. Car & General Ltd.

Industrial and Allied

1. Athi River Mining Ltd.
2. BOC Kenya Ltd.
3. British American Tobacco Kenya Ltd.
4. Olympia Capital Holdings Ltd.
5. E.A. Cables Ltd.
6. E.A. Breweries Ltd.
7. Sameer Africa Ltd.
8. Kenya Oil Ltd.
9. Mumius Sugar Company Ltd.
10. Unga Group Ltd.
11. Bamburi Cement Ltd.
12. Crown Berger (K) Ltd.
13. E.A Portland Cement Co. Ltd.
14. Kenya Power & Lighting Co. Ltd.
15. Total Kenya Ltd.

APPENDIX 2

SAMPLE DATA USED

Company	Sector	LIQRA T	Size	GDP P	GROW	RSPRE AD	VARCF
Unilever	Agri	0.18597 1642	22.2807 7421	0.6 25	720.053 9614	7.706439 756	724117. 2244
Unga Group	Ind	0.05619 6196	20.4029 1127	0.6 25	161.272 1194	7.876631 952	724117. 2214
Tourism Promotion Services	Comm	0.71499 6847	20.2335 9284	0.6 25	323.912 5939	7.730647 912	724117. 2244
Total Kenya	Ind	0.08162 0003	21.8513 7007	0.6 25	306.727 5622	7.754045 054	724117. 2244
Standard Group Ltd	Comm	2.68991 8073	18.3721 4653	0.6 25	183.592 8511	7.935541 109	724117. 2244
Sasini Tea and Coffee Ltd	Agri	0.48461 4922	21.0033 0551	0.6 25	518.708 8974	7.731121 036	724117. 2244
Samcer Africa (formerly Firestone)	Ind	0.39466 8774	21.8867 7162	0.6 25	1168.16 654	7.667811 467	724117. 2244
Rea Vipingo	Agri	0.39475 7906	19.2206 6031	0.6 25	261.962 9143	7.814578 602	724117. 2244
Olympia Capital Holdings Formerly Dunlop	Ind	5.31176 2664	17.9759 0651	0.6 25	436.339 0471	7.762291 971	724117. 2244
Nation Media Group	Comm	0.43882 1514	21.6245 5345	0.6 25	843.704 0665	7.704966 832	724117. 2244
Marshalls F. A. Ltd	Comm	1.11289 1743	19.6427 0291	0.6 25	273.959 3562	7.858681 525	724117. 2244
KPLC	Ind	0.02221 8767	22.1340 0104	0.6 25	160.734 9182	7.899695 608	724117. 2244
Kenya Airways	Comm	0.00587 3932	21.9710 8751	0.6 25	151.819 8836	7.653185 385	724117. 2244
Kenol (Kenya Oil Company)	Ind	0.38875 5074	20.5229 6116	0.6 25	395.636 1307	7.700753 405	724117. 2244
Kakuzi	Agri	0.34620 5977	20.8013 5155	0.6 25	326.317 6421	7.783078 425	724117. 2244
E. A. Breweries	Ind	0.03573 0337	22.5595 6484	0.6 25	445.045 6067	7.686997 446	724117. 2244
E. A. Portlands	Ind	0.12674 2021	20.8198 334	0.6 25	139.001 5691	7.826437	724117. 2244

						795	
E. A. Cables	Ind	1.32509 5611	19.0496 7241	0.6 25	520.199 0892	7.690252 774	724117. 2244
Crown Refracer	Ind	0.28038 7809	19.0882 9616	0.6 25	208.259 3929	7.753736 423	724117. 2244
CMC Holdings	Co mm	0.12240 4936	19.7891 965	0.6 25	85.4272 0756	7.747880 608	724117. 2244
Car and General Ltd	Co mun	1.63617 6708	19.8650 1197	0.6 25	605.298 77	7.780666 959	724117. 2244
British American Tobacco	Ind	0.14805 6453	22.5243 4121	0.6 25	816.236 0142	7.693122 496	724117. 2244
BOC (K)(formerly E. A. O)	Ind	0.13037 2528	20.5497 8599	0.6 25	679.355 8357	7.714171 941	724117. 2244
Bamburi Cement	Ind	0.05199 7524	23.2371 3673	0.6 25	871.781 8101	7.754102 645	724117. 2244
Athi River Mining Ltd	Ind	0.87341 7367	19.5222 7396	0.6 25	236.811 5617	7.751021 357	724117. 2244

APPENDIX 3
RAW SPSS RESULTS

Descriptive

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
LIQRAT	181	.0012	5.3118	.479429	.8083224
Size	181	17.7293	25.3104	21.297584	1.8408284
GROW	181	22.7801	5098.2025	909.875577	1.0240428E3
VARCF	181	2.44028525	7.241172243	4.6880265181	1.840918872814
		249E5	71E5	072E5	00E5
RSPREAD	181	-7.9555	7352	-1.106788	2.7720706
GDP	181	.8125	5.8500	3.302210	2.1988824
Valid N (listwise)	181				

Custom Tables

	Sector		
	Agri	Comm	Ind
	Mean	Mean	Mean
LIQRAT	2355	5520	5109
Size	20 7039	20 9668	21 8134
GDP	3 2875	3 2875	3 3131
GROW	485 3165	896 8928	1029 9488
RSPREAD	-1 1682	-1 1516	.1 0691
VARCF	4 68216468	4 68216468	4 857558839
	143E5	143E5	49E5

Custom Tables

	Year						
	2000	2001	2002	2003	2004	2005	2006
	Mean	Mean	Mean	Mean	Mean	Mean	Mean
LIQRAT	6944	8163	3040	6365	3891	2574	4665
Size	20 6780	20 4428	20 4625	21 3498	21 6601	22 0614	22 4148
GDP	6250	8125	1 7750	3 0000	5 3500	5 8000	5 8500
GROW	434 8931	333 4063	379 3594	1110 9173	1078 0145	1383 1158	1629 7617
RSPREAD	.7 7599	.0238	3375	5956	3461	-1 7702	2712
VARCF	7 24117224	4 08985392	3 41692814	4 586874708	2 440295252	4 082213903	6 918014593
	371E5	716E5	100E5	41E5	49E5	59E5	69E5

Correlations

		Correlations					
		LIQRAT	Size	GDP	GROW	RSPREAD	VARCF
LIQRAT	Pearson Correlation	1	-.464	-.120	-.029	-.079	.105
	Sig. (2-tailed)		.000	.108	.698	.280	.160
	N	181	181	181	181	181	181
Size	Pearson Correlation	-.464	1	.427	.628	.118	.068
	Sig. (2-tailed)	.000		.000	.000	.112	.361

	N	181	181	181	181	181	181
GDP	Pearson Correlation	-.120	.427**	1	.442**	.387**	-.137
	Sig. (2-tailed)	.108	.000		.000	.000	.088
	N	181	181	181	181	181	181
GROW	Pearson Correlation	-.029	.628**	.442**	1	.160	.088
	Sig. (2-tailed)	.696	.000	.000		.032	.374
	N	181	181	181	181	181	181
RSPREAD	Pearson Correlation	-.079	.118	.387**	.160	1	.598**
	Sig. (2-tailed)	.290	.112	.000	.032		.000
	N	181	181	181	181	181	181
VARCF	Pearson Correlation	.105	.088	-.137	.088	-.598**	1
	Sig. (2-tailed)	.160	.361	.066	.374	.000	
	N	181	181	181	181	181	181

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

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

Regression

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	GDP, VARCF, Size, GROW, RSPREAD ^a		Enter

a. All requested variables entered

Model Summary^b

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.588 ^a	.346	.327	6614151	1.570

a. Predictors: (Constant), GDP, VARCF, Size, GROW, RSPREAD

b. Dependent Variable: LIQRAT

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	40.471	5	8.094	18.502	.000 ^a
	Residual	76.557	175	.437		
	Total	117.028	180			

a. Predictors: (Constant), GDP, VARCF, Size, GROW, RSPREAD

b. Dependent Variable: LIQRAT

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	7.670	.805		9.533	.000
	Size	-.368	.040	-.750	-9.293	.000
	GROW	.000	.000	.416	5.101	.000
	VARCF	7.012E-7	.000	.143	1.830	.069
	RSPREAD	.006	.024	.017	.206	.837
	GDP	.011	.027	.029	.391	.694

a. Dependent Variable: LIQRAT

Coefficients^a

Model		Collinearity Statistics	
		Tolerance	VIF
1	Size	.575	1.741
	GROW	.562	1.761
	VARCF	.614	1.627
	RSPREAD	.545	1.835
	GDP	.667	1.498

a. Dependent Variable: LIQRAT

Collinearity Diagnostics^a

Model	Dimension	Collinearity Statistics	
		Eigenvalue	Condition Index
1	1	4.389	1.000
	2	1.018	2.078
	3	.386	3.371
	4	.156	5.208
	5	.047	9.636
	6	.002	49.502

a. Dependent Variable: LIQRAT

Collinearity Diagnostics^a

Model	Dimension	Variance Proportions					
		(Constant)	Size	GROW	VARCF	RSPREAD	GDP
1	1	.00	.00	.01	.00	.00	.01
	2	.00	.00	.03	.00	.35	.02
	3	.00	.00	.58	.00	.11	.01
	4	.00	.00	.09	.02	.24	.82
	5	.01	.01	.01	.97	.29	.01
	6	.99	.99	.29	.00	.00	.03

a. Dependent Variable: LIQRAT

Collinearity Diagnostics^a

Model	Dimension	Variance Proportions					
		(Constant)	Size	GROW	VARCF	RSPREAD	GDP
1	1	.00	.00	.01	.00	.00	.01
	2	.00	.00	.03	.00	.35	.02
	3	.00	.00	.58	.00	.11	.01
	4	.00	.00	.00	.02	.24	.92
	5	.01	.01	.01	.97	.29	.01
	6	.99	.99	.29	.00	.00	.03

Residuals Statistics^a

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-.615814	1.668858	.479429	.4741706	181
Residual	-.10019453	.36451070	.0000000	.6521641	181
Std. Predicted Value	-.2310	.2604	.000	1.000	181
Std. Residual	-.1615	.5511	.000	.986	181

a. Dependent Variable: LIQRAT