

DECLARATION

A SURVEY OF THE CASH MANAGEMENT
APPROACHES EMPLOYED BY COMPANIES QUOTED
AT THE NAIROBI STOCK EXCHANGE

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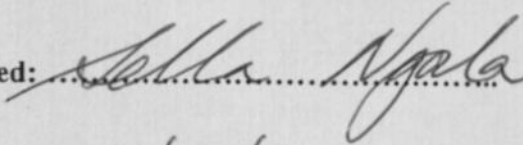
SELLA OGALO OUMA

A Management Research Project Submitted in Partial Fulfillment of the
Requirements for the Masters in Business Administration Degree (MBA):
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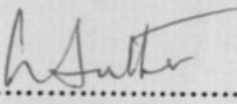
DECLARATION

This Research Project is my original work and has not been presented for a Degree in any other University.

Signed: .....

Date: 26/10/2001.....

The project has been submitted for examination with my approval as the University Supervisor.

Signed : .....

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Date: 26.10.2001.....

DEDICATION

This research project is dedicated to my husband Philip Owidi, my children Emma, Ken, Yvonne and Mumji and to my mother, Ongoche.

ACKNOWLEDGEMENT

A number of individuals made this study possible and I feel indebted to express my sincere gratitude for their support in whatever form.

My greatest appreciation goes to my supervisor, Mr. Luther Otieno Odhiambo, for the advice, suggestions, comments, criticism and encouragement that he patiently gave me throughout the study.

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My sincere gratitude also goes to the Chief Accountants, Finance Managers and Treasury Managers who responded to the questionnaires. Without their co-operation the study would have been impossible.

Profound gratitude goes to Mercy and Leah who patiently typed the document.

I cannot forget my husband and children as well as my parents, sisters and brothers for their love, patience and encouragement that took me through the long hours I spent working on the research project.

Most of all I give glory to God who answered my prayer that I successfully complete the project.

I wish my employer, Kenya College of Communications Technology, prosperity for their devotion to developing their human resources, and most of all for giving me financial assistance to study for the MBA.

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ABBREVIATIONS

- NSE - Nairobi Stock Exchange.
- CMM - Cash Management Models

ABSTRACT

This study was a survey of cash management approaches employed by companies quoted at the Nairobi Stock Exchange.

The objectives of the study were to find out the cash management approaches used by firms quoted at the Nairobi Stock Exchange, the extent to which cash management models are used by firms quoted at the Nairobi Stock Exchange as well as to find out the factors that influence the choice of cash management approaches used.

Primary data was obtained using structured questionnaires. The questionnaires had both open ended and closed questions that were administered to all quoted companies though some did not respond.

The data was analysed by using frequency tables, making cross tabulations to determine relationships between various aspects of cash management cash models and performance.

Tables have been drawn to capture general trends.

The findings indicate that quoted companies have specific policies in the management of their cash balances and plan for their cash balances. They have more than one planning period and the weekly planning period is the most popular. Most of the firms monitor their cash balances using computers and some even have on line connections to their banks. Maximum, minimum and optimum cash levels are determined in an effort to minimise the costs of holding cash and to maximise the gains from cash balances held. The relationship between receipts and expenditure is regarded as important as it influences the way the firms finance their cash balance. Receipts take the pattern and direction of expenditure for many firms.

This could be deliberately planned so that expenditure is financed from internal sources which are cheaper than external sources. However, the study also found extensive use of short-term financing in the form of overdraft facilities which are used for disbursement and cash balance replacement. Most of the quoted companies invest in marketable securities. This is done as a way of minimising opportunity cost of holding cash. Marketable securities of less than 90 days are most popular.

It is unfortunate that inflation and foreign exchange risks are not given as much weight as they should . In a country like Kenya, where inflation rates are high and foreign exchange rates are volatile, ignoring them could result in losses.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Cash availability is regarded as very important for any business. Cash is both the basic input needed to keep the business running on a continuous basis and the ultimate output realized by selling the service or product manufactured by the firm (Pandey, 1999). Cash shortage will disrupt the firm's operations while excessive cash may remain idle without contributing anything toward the firm's profitability. The existence of short-term investments and the relatively high interest rates on such investments has raised the opportunity cost of holding cash balances (Weston, 1998). Inflation devalues idle money and it is important in tracking of cash not immediately required. Such cash can be appropriately invested to reduce the effect of inflation and other risks. Cash is the most vulnerable of all assets of an organisation. It is desirable and has to be safeguarded at all times to avoid fraud.

The term cash refers to coins, currency notes and cheques held by a firm as well as balances in its bank account (Pandey, 1999).

The management of cash is closely related to management of marketable securities which are regarded as near-cash assets, serve as a back up to the cash account and can easily be converted into cash. When a firm has excess cash or cash that is not immediately required the cash is invested in marketable securities maturing when the cash may be required. This contributes some profits to the firm. Marketable securities can be converted to cash at low transaction costs. Decisions on cash and marketable securities require careful analysis in order to approach optimal holding (Weston, 1998).

Cash may be held for a number of reasons. Keynes (1936) identified three motives for holding cash. These are the transaction motive, the precautionary motive and the speculative motive. The transactions motive requires a firm to hold cash to conduct its business in the ordinary course for example to purchase stock, to pay operating expenses, taxes, dividends. The precautionary motive is the need to hold cash to meet contingencies in the future. It is a buffer to take care of unexpected demand for cash. The precautionary amount of cash depends upon the predictability of cash flows and the firm's ability to borrow at short notice. The speculative motive relates to the holding of cash for investing in profitable opportunities that may arise in future, for example when security prices are expected to rise or interest rates are expected to fall. There may also be compensating balance requirements, whereby some balances may be required by the banking system besides the direct fees for banking services given.

Cash management involves a number of areas. The examples are:-

- (a) Cash budgeting for both the short and long run.
- (b) Administration of cash balance and investment in cash like assets.
- (c) Determining the sources of cash to be used and when to use the chosen method.
- (d) Establishing internal controls in the area of cash.

While all these areas are significant in cash management this study will focus on various Cash Management approaches and Models (CMM). CMM touch on areas that a firm may consider in determining the optimal cash levels to hold and the amount to invest in marketable securities. Early studies in this area give more attention to cash budgeting and cash control. The area of deciding the optimal cash levels to hold, at what points to invest in marketable securities and relevant models in Kenya are yet to be looked into. Cash management impacts on the financing problem, the investment decisions and subsequently on profitability.

New techniques, which include computerisation, have been developed which may enable the financial managers to optimise cash management. A number of CMM have been suggested for use to determine the appropriate levels of cash. These contain the major aspects of interest in this study and include the Baumol model, the Miller-Orr model, the Beranek model, Lockyer's model, Archer's model, Gibbs buffer stock model.

1.2. STATEMENT OF THE PROBLEM

In the recent past there have been reports of organisations collapsing and in some cases facing court action due to poor cash management. This has caused Central Bank of Kenya to make more regulations, for example increased capital base required for banks to a minimum of Kshs. 500 million to enhance liquidity. A number of banks have collapsed due to cash flow problems for example Kenya Finance Bank, Trust Bank, Credit Finance Company, Trade Bank to quote just a few. A number of Government ministries have had their water supply disconnected while the Kenya Chamber of Commerce had auctioneers sent to them due to failure to keep payments when due. A lot of firms have also had to restructure, merge or even downsize to improve their cash flow position as well as profitability. Good cash management techniques may enhance the performance of a firm as cash is managed optimally.

It is important that a firm maintains a balance between liquidity and profitability. In doing so the firm has to decide how much to hold as cash and how much to invest in other income generating assets. The firm has also to decide the most profitable way of holding cash. Tobin, 1958, a writer on liquidity preference theory asserts that the choice between cash balance and other forms of assets lies in the field of investment and consumption decisions. Cash balance decisions in order to be optimal should not be made independent of investment and consumption decisions. In deciding the form in which to hold cash a firm has to decided

whether it should be held in form of currency notes and coins, savings account, current accounts, marketable securities and in what proportions these should be held.

Lumbasyo (1976) also carried out a study on cash balance management in Kenyan firms. However since 1976 a number of aspects in the management of firms and their assets have changed. The environment in which firms operate has also changed greatly, for example the decline in Gross Domestic Product has been persistent, the rates of inflation have moved up very fast. As such it is worthwhile carrying out another study to find out what are the cash management practices today considering the relative importance of the asset cash.

This study sets out to establish the cash management approaches used by firms quoted at the Nairobi Stock Exchange and the extent of use of cash management models. It also seeks to ascertain the factors that influence the choice of cash management practices.

The following hypothesis will be tested:

H_{O1} : Cash Management models are not employed by companies in Kenya.

1.3. OBJECTIVES OF THE STUDY

- (a) To find out the cash management approaches used by firms quoted at the NSE.
- (b) To find out the extent to which the cash management models are used by firms quoted at the NSE.
- (c) To find out the factors that influence the choice of cash management approaches.

1.4. IMPORTANCE OF THE STUDY

- (a) This study will enable documentation of the extent to which cash models, as suggested in textbooks and taught in finance courses, are in use in Kenya. It highlights how close practice is to theory.

- (b) The study will sensitise managers about the significance of cash as an asset, its proper management and its contribution to the performance and survival of a firm.
- (c) The results of the study may help managers in deciding appropriate cash levels to hold as well as at what levels to invest in marketable securities. The study will give emphasis to the importance of marketable securities as a profitable way of keeping cash not immediately required.
- (d) The study is hoped will stimulate further research in the area of cash management.

1.5. OVERVIEW OF THE REPORT

The report of this project is composed of five chapters. Chapter one is an introduction to the study and covers background information on the subject matter, statement of the problem, objectives of the study and the importance of the study.

Chapter two is a review of literature relevant to the subject of the study. The literature review covers that definition of cash, why the management of cash is necessary and cash management models. Analytical cash management models covered include the Baumol Model, the Miller-Orr Model, Beranek Model and Lockyers Model, while the simulation models considered are the Stephen Archers Model and Gibbs Model.

The third chapter covers the research design and methodology. It includes the population of interest, the data collection method, and a description of the methods of data analysis.

Chapter four deals with the analysis of data collected, interpretation and discussion of findings.

The fifth Chapter is the last and provides a summary of findings and conclusions, recommendations based on the findings, limitations of the study and suggestions for further research.

CHAPTER TWO

LITERATURE REVIEW

Cash in the broad sense refers to current and deposit accounts as well as currency holdings (Weston, 1998). Sometimes near cash items, such as marketable securities or bank time deposits are also included in the term cash (Pandey, 1999). Optimal utilization of a firm's cash can contribute to the overall objective of the firm (Van Horne, 1992). Optimal utilization of cash can only be possible if a firm is in control to ensure timely collections and can tightly control disbursement. To ensure optimal utilization adequate cash levels need to be held. According to Keynes, 1936 cash is held for three motives: the transaction motive, the precautionary motive and the speculative motive. To these three Weston, 1998 adds the compensating balance requirements, that is, the minimum levels that the banking system requires a firm to maintain.

Cash shortage may disrupt a firm's operations and may even lead to lost profitable opportunities. Excessive cash will simply remain idle and not contribute anything to the firm. Infact in a period of using inflation rates idle cash may loose value. A number of writers therefore cover this area of cash management, which is critical to the organization. Pandey, 1999 defines cash management as the managing of cashflows into and out of the firm, cashflows within the firm and the cash balances held by the firm at a point in time by financing deficit or investing surplus cash.

Firms have been known to fail because of failing to have sufficient cash levels. However, there is no standard appropriate minimum cash level that would apply to all firms and it is important that each firm determines the minimum cash levels suitable for it, considering it's unique needs (Braeley and Myers, 1984).

A number of cash management models have been suggested to help in determining the firm's optimum cash balances. Some models take the analytical while others the simulation approach. These models are discussed below.

2.1 ANALYTICAL MODELS

2.1.1 BAUMOL MODEL

Baumol (1952) came up with a classic model, which applies the Economic Order Quantity (EOQ) to cash. Baumol considered the similarities of stocks and cash from a financial viewpoint. For instance, ordering and stock out costs make it expensive to keep stocks at a zero level, while holding costs may also be brought in when stocks not immediately required are held. Thus stocks have to be held at an optimum level which balances between the ordering and the holding costs.

In the case of cash and marketable securities, order costs take the form of clerical work and brokerage fees required in investing cash in marketable securities while holding costs will be interests foregone when cash is held in excess of what may be immediately required. There are also costs of running out of cash. All these costs can be minimised by holding the optimal cash balance.

The Baumol model assumes that the firms cash balance takes a sawtooth pattern over time (Weston, 1998) as in figure 2.1.1a.

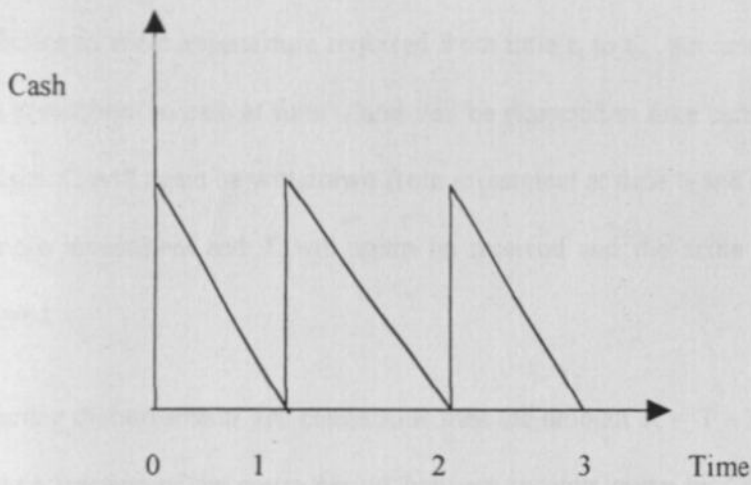


Figure 2.1.1 (a) Baumol's Pattern of Receipts and Expenditure

The model assumes certainty so that 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 remaining in marketable securities to mature at various intervals when required.

This is illustrated in figure 2.1.1b

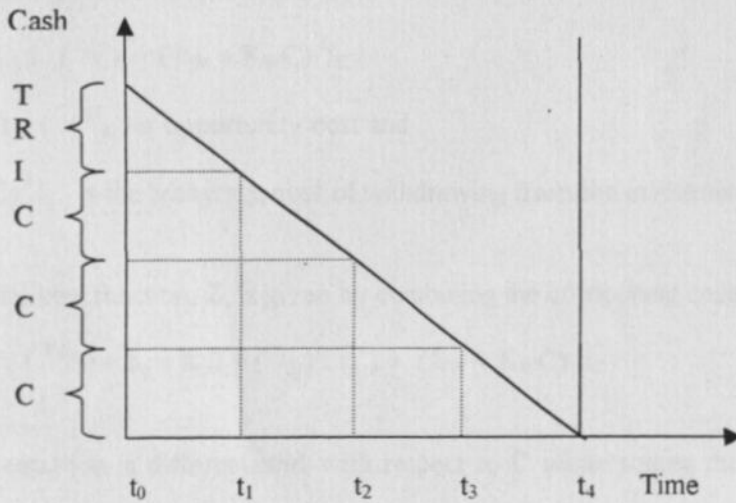


Figure 2.1.1b Baumol's Transfers from securities to cash

Cash equal to T is available at time t_0 . The firm then invests I in marketable securities that earn a rate of return i and retains $T - I = R$ in cash form. The retained cash R is considered

sufficient to meet expenditure required from time t_0 to t_1 . An amount Kshs.C is transferred from investment to cash at time t_1 and will be expected to take care of expenditure from t_1 to t_2 . Kshs. C will again be withdrawn from investment at time t_2 and t_3 . At time t_4 there will be no more investment and T will again be received and the same process as above will be followed.

Assuming disbursements are continuous then the amount $R = T - I$ will be used on payment during a fraction of the entire period between receipts given by T^{-1}/T times the length of the period. The average cash holding during that period will be $T^{-1}/2$. If i is the rate of interest invested on funds then the opportunity cost for holding this average cash will be $\left(T^{-1}/2\right) i \left(T^{-1}/T\right)$

The brokerage fees required to invest the amount Kshs.I will vary with the number of investments and with the size of each investment. The brokerage fees per deposit is equal to $b_d + K_d I$, where b_d is the base cost per deposit and $K_d I$ is the component which varies with the size of the deposit. In the same way, b_w and $K_w C$ are the costs of making withdrawals. The cost of obtaining cash for the rest of the period will therefore be

$$\left(C/2\right) i \left(1/T\right) + \left(b_w + K_w C\right) 1/C$$

Where $\left(C/2\right) i \left(1/T\right)$ is opportunity cost and

$\left(b_w + K_w C\right) 1/C$ is the brokerage cost of withdrawing from the investment account

Thus the total cost function, Z, is given by combining the component costs to get

$$Z = \left(T^{-1}/2\right) i \left(T^{-1}/T\right) + b_d + K_d I + \left(C/2\right) i \left(1/T\right) + \left(b_w + K_w C\right) 1/C$$

When this equation is differentiated with respect to C while setting the derivative equal to zero will get the optimal value for C as

$$C = \sqrt{\frac{2b_w T}{i}}$$

The optimum cash balance R , to withhold from the initial receipt is found by differentiating equation for Z above with respect to I , which gives

$$R = T - I = C + T K_w + K_d / i$$

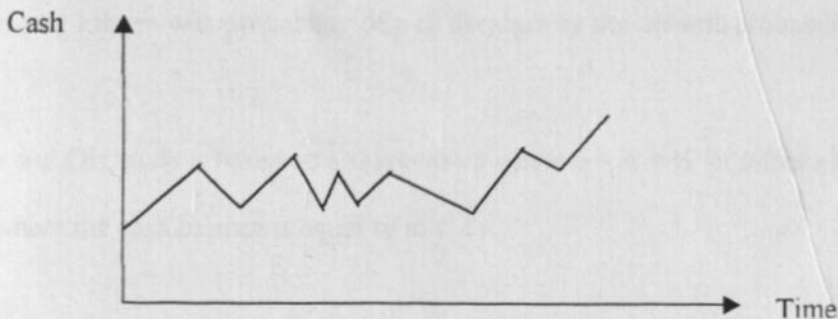
Thus to minimize costs the optimum amount of cash to withhold will be shs. R from the initial receipts while shs. C will be withdrawn from investment portfolio I/C times.

The Baumol model makes a significant contribution as it captures the essential elements of the problem; C , the value of each withdrawal; R , the optimum cash to be withhold from initial receipts; I , the deposit to make from the deposit to make from initial investment; Z , the total cost function. However, the assumption that the cashflows are certain, is restrictive. Such behaviour of cashflow is more applicable to individuals than to business firms where inflows may not be in bulk while outflows may not be smooth and may follow an irregular pattern. Thus a gap is left by the Baumol model.

2.1.2 MILLER-ORR MODEL

Miller and Orr (1966) expanded the Baumol model but in contrast to its deterministic assumptions. Miller and Orr assumed that net cashflows behave as if they were generated by a 'stationary random walk' (uncertain and stochastic factors) in both size and direction forming a normal distribution with the increase in number of periods observed.

Miller and Orr incorporated a stochastic generating process for periodic changes in balances, which takes on a pattern like shown below in figure 2.1.2a



2.1.2a Receipts and Expenditures for a firm.

The model referred to as the Miller and Orr model is designed to help in deciding the time and amount of transfers between an investment account and the cash account as illustrated by the figure 2.1.2b below

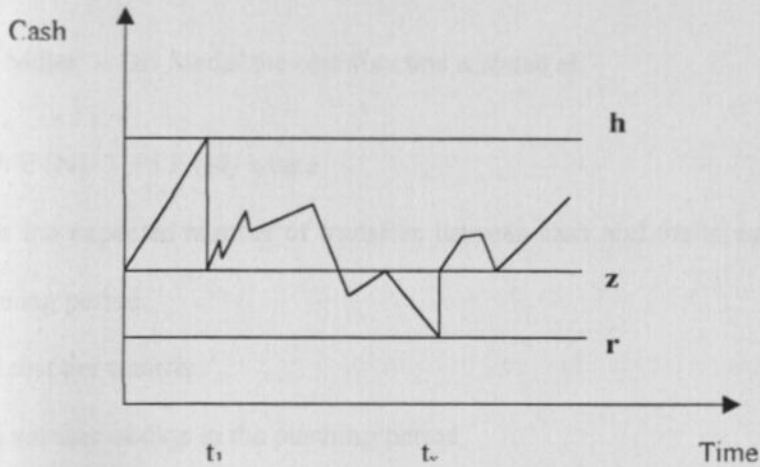


Figure 2.1.2b Miller – Orr Cash Management Model

Cash balances may go up as high as Kshs h and are then reduced to Kshs Z at a time t_1 by investing Kshs $(h-z)$ in the investment portfolio. The balance is then left to wander aimlessly until it reaches the minimum balance r . At this point some investments are sold to bring the balance back to level z at time t_2 .

Miller and Orr take t so that $1/t$ is some very small fraction of a working day or the number of operating cash transaction per day. It is taken that at any time t_1 the cash balance will either increase by kshs m with probability of p or decrease by shs. m with probability of $q = 1 - p$.

Miller and Orr study is based on a relationship where $p = q = \frac{1}{2}$ or rather a special symmetric case where the cash balance is equal to $m^2 t$.

The cost function is similar to the one in Baumol's model, which includes the costs of transfers to and from cash and the opportunity cost of holding cash. The upper limit h and the return point z are computed so as to minimize the cost function. The lower limit r is taken as given for example the minimum balance required for an account by the bank.

For the Miller - Orr Model the cost function is stated as

$$E(c) = b E(N) / T + i E(M) \text{ where}$$

$E(N)$ is the expected number of transfers between cash and the investment portfolio during the planning period.

b is the cost per transfer.

T is the number of days in the planning period.

$E(M)$ is the expected average daily cash balance.

i is the daily rate of interest earned on the investment.

The objective is to minimize $E(C)$ by choice of the variables h and z .

Miller and Orr came up with the formula

$$Z^* = (3b\sigma^2 / 4i)^{1/3} \text{ and } L^* = 3Z^*$$

Where σ^2 is the variance of the daily changes in the cash balance.

A higher transfer cost, b , or variance σ^2 would imply a greater spread between the upper and lower control limits. In the special case where $P = 0.5$, $q = 0.5$ and $r = 0$, the upper limit will always be three times greater than the return point z .

The Miller - Orr model was tested by applying it to nine months of data on the daily cash balances and purchases and sales of short term securities of a large US Industrial company.

The model produced an average daily cash balance of \$160,000, while the treasurer of the

company's decisions produced an average of \$275,000 (that is 40 per cent higher than the model).

Like other inventory control models, the Miller and Orr model's performance depends on how well the conditional predictions conform to actuality as well as how well the parameters are estimated. In the Miller-Orr model, the transfer cost b may not be easy to estimate. Miller and Orr did not rely on their estimate for order cost and instead tested the model through the use of a series of assumed order costs until the model used the same number of transactions as did the treasurer. The order cost implied by the treasurer's action could then be determined. The results could then be used to evaluate the treasurer's performance in managing the cash balance.

2.1.3 BERANEK MODEL

Beranek (1963) also dealt with the issue of the optimal allocation of available funds between the cash balance and marketable securities. Beranek's Model differs from Baumol's model in that he includes a probability distribution for expected cashflow and a cost function for the loss of cash discounts and deterioration of credit rating when the firm is caught short of cash. He however did not think of short costs as the cost of borrowing when cash is used up to take advantage of discount or to avoid deterioration of credit rating.

According to Beranek, in analyzing cash management problems it is more helpful to regard cash disbursement as controllable and continuous. Assuming certainty the pattern of the behaviour of cash balance would be the reverse of the sawtooth pattern in Baumol's model. The Beranek's model is illustrated below:

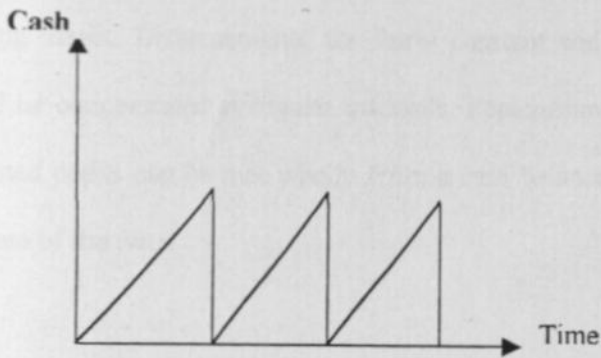


Figure 2.1.3 Beranek's Pattern of Receipts and Expenditures.

This approach considers that cash outflows may be concentrated at periodic intervals for example wages and salary, payment for credit purchases, taxes, dividends. Beranek stated that in so far as cash inflows are controllable and recur in a cyclical manner, the financial manager could predict cash needs over a planning period and can invest the amount considered as surplus not needed during the planning period. Minimization of returns by investment in securities is constrained by transaction costs and the risk of being short of cash.

Though Beranek gave an explanation of what the critical minimum balance is, he did not tell us whether this critical minimum could be taken as the optimum cash balance. Also he made the assumption that cash inflows are partly stochastic and partly deterministic but the uncertain transaction would pose a problem in determining the optimal cash balance.

2.1.4. LOCKYERS MODEL

Lockyer, 1973 further developed Baumol's model. He brought in the idea of overdraft facilities which Kenyan firms can use in financing their demand for cash. Lockyers considers that having determined the net cash inflow pattern should the starting balance be zero, negative or a mixture of the two. Thus besides determining the optimal opening balance it determined the timing of overdraft and short-term financing.

Lockyer's model, like Baumols, assumed receipts are immediately converted to interest earning assets. Disbursements are fairly constant and controllable by management and so could be concentrated at regular intervals. Replenishment of cash can be created instantly if assumed needs can be met wholly from a cash balance, wholly from an overdraft or from a mixture of the two.

The model compared these three alternatives to find out which had the minimum cost unlike Baumol who dealt wholly with the first one. The cost of using an overdraft is taken to be $kshs. I_D$ for each year $kshs. I$ is borrowed, q is the requirements that need to be replenished and is made up of a cash balance plus b , the overdraft. The total annual cash transfer cost is $kshs. \frac{DS}{q}$ where $\frac{D}{q}$ is the number of replenishments.

In Lockyer's model the total annual cash policy, cost A attributable to the use of an overdraft is given by the sum of total annual cash transfer cost, total annual overdraft cost and the total annual holding cost. This is given by

$$A = \frac{DS}{q} + a^2 I_H / 2q + b^2 I_D / 2q$$

Where I_H is the cost of holding $kshs. I$ per year. The value of q , a and b must be found which minimizes A .

According to Lockyers, these values q , a and b that will bring about minimum costs are likely to be at a level where a mixture of overdraft and internally financed cash balance is used. He therefore made a conclusion that it is desirable to swing between a positive and a negative cash balance given the availability of overdraft facilities and cash.

This model can be criticized as it assumes availability of overdraft which in reality is not always obvious and a company has no control over whether they will be allowed the facility

or not. The model also assumes that disbursements are spread over the whole control period while receipts are lumpy and concentrated at the beginning of each period.

This may not always be the case with all firms.

2.2 SIMULATION APPROACH

Simulation is more useful in making decisions as it considers the real life situations under which firms are expected to operate. Simulation approaches may be useful to support the analytical results. However not much has been done in developing simulation models for determining required cash balances for the firm. Simulation models are considered below.

2.2.1 STEPHEN R ARCHERS MODEL

Archers, 1956 in his paper criticized Baumol's model in that it intended to determine the transaction demand for money and did not consider uncertainties in the real world that need to be provided for by precautionary balances. Archers therefore attempted to determine what balance would be required for precautionary purposes.. He did not provide for the balances required for speculative purposes as he argued that a firm is ill advised to attempt to profit by speculative activities unless it is in the business where speculation is part of the business such as financial institutions.

According to Archers planning for liquidity stock at a point in time for transactions and precautionary purposes involves a study of cash inflows and outflows and plotting them as in the figure 2.2.1a. below:

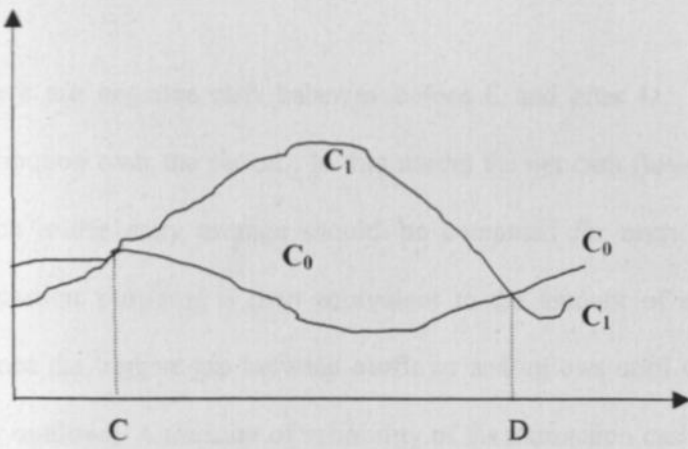


Figure 2.2.1a - Archers pattern of cash inflows and outflows

C_1 Respondents cash inflow

C_0 Respondents cash outflow

There is no need for pure cash balances between times C and D, but before and after precautionary balance would have to be carried. However for seasonal activities or non-normal months a separate cash analysis will be necessary. Archers goes on to say that this balance is determined by plotting a number of points depending on the net cash flows and variability in net cash flows which might be like what is shown below.

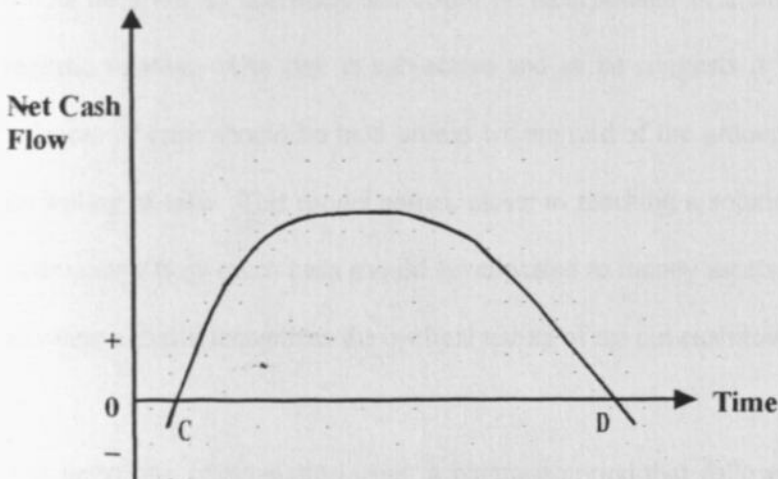


Figure 2.2.1b - Archer's determination of cash balance

There are negative cash balances before C and after D. The dots show the probability distribution over the period. In this model the net cash flows are tabulated and then a mean which is the daily average should be computed for each day. The cash balance for the transaction purposes is then equivalent to the amount of cash that would be required to finance the biggest gap between outflows and inflows until we experience excess of inflows over outflows. A measure of variability of the transaction cash balances required is computed. The mean standard deviation could be a reliable estimate of the true mean and variability of the population if the mean sample is large. According to Archers a firm can choose to arrange a line of credit with a commercial bank and then afford a greater risk of stock out. It would thus be necessary to compare all costs related to the line of credit versus the capital costs of the precautionary balance shared through use of the credit to determine the optimum. Archers suggests that the short costs function is complex considering the variables involved and perhaps it is operationally preferable to leave the choice of risk to be assumed to the subjective choice of management.

Archers Model is superior in that though Archers does not perform any simulation in his model he gives an approach that could be incorporated in a simulation model to give fairly realistic results. Also risk is subjective and as he suggests it is difficult to arrive at what balances of cash should be held unless we are told of the amount of risk management would be willing to take. This model comes closer to reaching a solution to the primary problem of determining how much cash should be allocated to money assets. Archers model also has the advantage that it recognizes the cyclical nature of the net cashflow of many firms.

The technique of simulation using a planning period that follows the firm's unique cashflow cycle seems to be a promising way of solving the cash management problem of a particular firm.

However, Archers divided the cash balance into transactions and precautionary balances. The fact that he recognizes Baumol as dealing with transaction balances shows that he supports Baumol's model for determining transactions model, for determining transactions demand for money which because of the assumptions and the way he perceives the behaviour of cash balances in business firms has been considered by other personalities as unrealistic. However, it could be because of Baumol's deterministic approach that Archers recognizes the need for precautionary balances, given that precautionary balances are subjective to how we react to risks. Determining transaction balances using probabilities takes into account what would be regarded as a precautionary balance. Thus, what Archers determines in his model in any case are transaction balances.

2.2.2 GIBBS MODEL

Professor Gibbs in 1976 suggested that the pattern of determination of optimal cash balances involve a combination of investment and financial decisions. The determination of the buffer money to hold is seen as an investment decision such that an increase in the balance reduces the risk of cash insolvency. These increases are done at the cost of the additional finance required. Gibbs recommends the use of a combination of long and short-term borrowing where the demand for money is cyclical in nature. This is to avoid the use of long-term funds to cover the peaks resulting in an idle balance during periods of low demand for cash.

In order to develop a simulation model Gibbs studied the cash flow patterns of an English firm. He took the planning period as 4 weeks since the cash balance pattern tended to be 4 weeks. The cash pattern was as shown in figure 2.2.2 below.

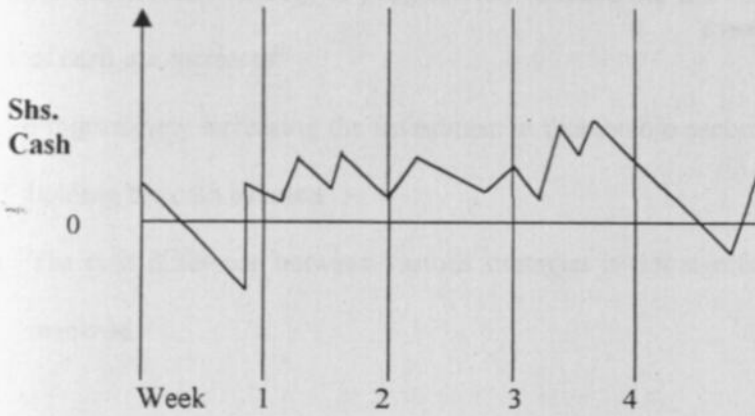


Figure 2.2.2 – Cash flow patterns of an English firm

Gibbs investigation was intended to minimize the cost of holding the desired balances. His was a buffer stock model that takes a simulation approach. He found that cash balances were needed at the beginning of the period and a surplus would be available in the later weeks. He removed all receipts and payments, which were predictable both in timing and amount such as those related to equity or debt issues. The adjusted net cash flows were then used to find the size of the opening balance required to avoid cash outs in each month. The results provided a probability distribution of required opening balances and a mean and standard deviation were calculated using a computer. Any amounts over and above the strategy balance could be used as internal financing for long-term projects or to reduce the investment base without the risk of cash shortages.

Gibbs designed a simulation model to test the effects in terms of costs of various money balance strategies using a four weekly planning cycle coinciding with the firms control period. He simulated using a flow chart calculating the cost of each strategy depending upon parameters set using 100 combined monthly/weekly strategies. He found that the pattern of a firms cash flow was a significant factor in its money demand.

Gibbs observed that:

- (i) As the monthly strategy is progressively reduced the net holding costs fall but the risk of cash out increases.
- (ii) Progressively increasing the investment in marketable securities reduces the net cost of holding the cash balance.
- (iii) The cost difference between various strategies is not significant relative to the amount involved.

The model provides management with the cost/risk of various strategies. It also gives a solution to the problem of allocation of resources between money balance and other productive assets as well as the mix of money balances held.

The model however ignored the cost of holding a balance resulting from price level increases. Gibbs arrived at conclusions based on the findings from one firm and these may not be generally applied to other firms which are different from the firm used.

COMMENT ON THE MODELS

The models above all make useful contributions but each has one weakness or more and may not entirely provide an optimal solution. However when ideas from them are applied a company may get a near optimal solution in respect to appropriate balances to hold and the mix of balances that could be held at least cost. Finance managers require information about the costs and risks of maintaining various cash balances.

The models mainly differ in the emphasis given to various costs. The Baumol and the Miller – Orr Models give critical emphasis to the costs arising from transfers between the cash account and the investment portfolio. They do not give any regard to the alternative of borrowing and concentrate on liquidation to meet the needs for cash outflows. On the other hand, the

Beranek Model gives critical emphasis to the costs arising from the shortage of cash and considers the cost of borrowing. In the later models, transaction costs are only indirectly considered while alternatives of liquidating investments to meet cash needs are ignored. Lockyers Model gives emphasis to transaction costs and the cost of overdraft needed to replenish the cash balance holding costs for precautionary cash balances or alternatively costs related to the line of credit required in the absence of precautionary cash balance. Gibbs Model emphasizes holding costs, costs of long-term or costs of short-term borrowing depending on which is used or how they are combined and the cost of investment in marketable securities.

In the Beranek, Baumol, Gibbs and Lockyers Models, the planning period need to be revised at periodic intervals whereas the Miller – Orr and Archers Models do not need frequent revision as the planning period covers a longer period.

The Miller-Orr, Archer's, Lockyer's and Gibbs Models are all built on the assumption that cash balances behave as if they were generated by an uncertain pattern. The Baumol and Beranek Models both assume a pattern and hence controllability in cash balances.

It should be remembered that the application of cash management models face difficulties in estimating parameters and probabilities. The financial manager often has information that may not directly be incorporated into the model. Thus a model, unaware of other relevant information, might provide completely erroneous advice. On the other hand, despite their restrictive assumptions and errors, models perform effectively if they capture the essential elements in decision problems.

Lumbasyo, 1976 carried out a study on cash management in Kenyan firms. He empirically investigated the cash balance management practices by firms in Kenya. He used a sample of thirty-one firms. He found that before a model could be introduced in Kenyan firms certain conditions needed to be fulfilled for it to work such as efficient management policies at

corporate level. In many Kenyan firms these prerequisite was found to be lacking. Lumbasyo also found out from his research that:

- (a) The basic objective of holding cash in Kenyan firms was to avoid cash out and they emphasize minimum balances. They did not consider costs related to cash balances.
- (b) The firms did not have formal policies for making cash balance decisions and cash was viewed as a residual which results from other plans.
- (c) The major variable that influences the level of cash balance is the level of working capital
- (d) Most of the Kenyan firms finance their cash balance needs by the use of external short-term financing, mainly by overdraft and credit extension from parent companies.
- (e) Majority of Kenyan firms plan for cash for use but hardly plan for cash balances. The planning is to basically identify periods of net cash outflows and negotiate in advance for extra cash.

The study having been carried out in 1976 considered the practices up to that time, but from that time to date many changes may have occurred for example computerization of activities in firms thus improving information systems, people are more enlightened in management practices, a lot of competition exists that did not exist before. All these make it necessary for studies to be carried out now to find out what firms are currently doing in the area of cash.

In 1998 P.M. Mugeru, a student at U.S.I.U –Africa, carried out a study on cash management practices in small-scale enterprises. He found out that small-scale firms had inherent characteristics that accounted for poor management of cash. The small-scale enterprises had inefficient management, internal controls were weak leading to poor cash management. The study on small-scale enterprises cannot be taken to be representative of all firms in Kenya and to get a good picture, on what is happening in Kenya it is necessary to do a study that considers the bigger firms as well.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.0. Introduction

This study is a survey of cash management approaches employed by companies quoted at the Nairobi Stock Exchange, the extent to which the cash management models are used by the firms, the factors that influence the choice of cash management approaches.

This chapter defines the population of interest. It covers the research instrument and procedures for collecting primary data. It also defines the methods used in analysing data.

3.1 Population

The population consisted of all the companies quoted at the Nairobi Stock Exchange (NSE). Since the population was not too large it was considered better to use the entire population in the study. However twenty seven companies responded to the survey, a response rate of 51.9 per cent.

The quoted companies are relatively well structured which could have made them easy to study. They are more likely to have specific policies and procedures in place. They are also more likely to employ these models than small firms.

Paul Mugeru (1998) carried out a case study on Cash Management practices in small-scale enterprises. It adds value to find out what takes place in the large firms in the area of cash management.

Lumbasyo (1976) carried out a Case Study on Cash Management in Kenyan firms. Since then, a lot of factors may have changed. Sales trends, level of expenditure and receipts, inflation rates, foreign exchange rates, level of awareness of the significance of

proper management and levels of computerisation are examples of factors that have changed. Lumbasyo (1976) used a population of 31 firms to represent all sizes of firms. However, the firms we have in Kenya today differ significantly in sizes and characteristics which makes their operations and effectiveness also very different (McComick, 1996).

The names of the companies in the population are listed in Appendix I.

3.2 Data Collection Method

The study was exploratory and employed a survey method to collect primary data on the Cash Management approaches. Similar structured questionnaires (see questionnaire in Appendix 4) were administered personally in some cases or through drop and pick method, depending on which method each respondent felt was appropriate. In each company the questionnaire was addressed to the person in charge of cash management.

The questionnaire was divided into sections A to H. Section A covered questions on cash management approaches that are not specifically covered by any model and those that are common to all or more than one model. These questions were intended to establish the cash management approaches used by the firms quoted on the NSE and the factors that influence the approaches used.

The questions in the Section B were on the issues unique to the Baumol Model, C to Miller-Orr Model, D to Beranek Model, E to Lockyers Model, F to Archers Model and G to Gibbs Model. The questions in each of Sections B to G were intended to establish whether the model covered by each section is used. This part of the questionnaire therefore addressed the extent to which cash management models are used by firms as well as providing more information on the cash management approaches used.

Section H of the questionnaire was on issues of cash management unique to each of the organisations filling out the questionnaire. This part of the questionnaire gave further insight on the cash management approaches used.

3.3. Methods of Data Analysis

To find out the cash management approaches used by firms quoted at the NSE, analysis of frequencies was used. Cross tabulations and factor analysis were also employed.

Cross tabulations were used to determine the extent of the use of cash management models by firms quoted at the NSE. For each firm that uses a particular model we sought to know what other models are used. To determine how many firms use a particular model the unique characteristics of each model were identified and were scored by the respondents. The unique characteristics considered for each cross tabulations were:

<u>Model</u>	<u>Unique Characteristics</u>	<u>Code</u>
Baumol	Specific amount optimal for transfer from cash to marketable securities	OVWCM
Miller-Orr	Uncertain and Random direction of receipts	DRUR
Beranek	Cost of cash being exhausted is deterioration of Credit rating	CCBEDCR
Lockyer	Existence of credit rating	OD
Archers	Cash balance is kept for precautionary purpose	PP
Gibbs	Cash balance is financed using a combination of long and short-term borrowing	FCBLS

Factor analysis was performed to determine factors that influence the choice of cash management approaches. Factor analysis is a statistical technique used to identify a

relatively small number of factors that can be used to represent relationships among sets of many interrelated variables (Kerlinger, 1986). Factor analysis may be used to establish construct validity as it is a multivariate technique which would confirm the dimensions of the concept that have been operationally defined, as well as indicate which of the items are most appropriate for each dimension (Sekaran, 1999). Variables such as minimum or maximum level of cash balance in a survey can be expressed as a function of factors such as sales trends, investment proposals, cash cycle size, benefits foregone, minimum deposits required by banks, inflation, corporate policy and legal requirements. Factor analysis helped to determine the most significant factors. It is a useful tool in identifying underlying, not directly observable constraints.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION OF FINDINGS AND DISCUSSIONS

4.0. Introduction

In this chapter the results of the research are analysed, interpreted and discussed. The data collected from the study was mainly descriptive in nature. Descriptive statistics was basically employed in the analysis. Cross tabulation has been used as it is a useful tool in bringing out the relationships between variables such as the cash balance levels, sales levels, expenditure levels and inflation.

4.1. CASH MANAGEMENT APPROACHES USED BY FIRMS QUOTED AT THE NSE

4.1.1 Specific Policy on Cash Balance Levels

Out of the 27 respondents 18 have a specific policy on cash balance levels. Optimal utilisation of cash can only be possible where a firm is in control of its cash position (Van Horne, 1992). This requires the existence of a deliberate attempt to put in place specific policies for cash management. This results show that sixty seven (67) per cent of the quoted companies are conscious about the need to control their cash position and so have put in place specific policies. The other thirty three (33) percent spend time managing other variables that impact on cash.

4.1.2 Specific Minimum Cash Balance Level

Almost fifty two (52) per cent of the organization study specify the minimum level below which cash balances are not allowed to fall. These are in agreement with the assumption by Baumols (1952), Miller-Orrs (1966) assumptions that there should be a minimum cash balance level. Eleven respondents did not give the specific amount of this balance. This could be because they considered the information to be confidential or that they consider it unimportant. Fourteen firms had a minimum cash balance, level of zero. It could be because of the availability of quick sources of cash to replenish the cash balance, for example easy accessibility to overdraft facilities. Lockyer, 1973 suggest that with the existence of overdraft facilities firms could have a minimum cash balance of zero or negative.

Table 4.1.2 Factors that quoted Companies consider in determining the minimum Cash Balance Levels

Factor	Percentage of Firms
Minimum deposits required by banks	46%
Investment Proposals	43%
Cash Cycle sizes	42%
Sales trends	38%
Benefits foregone (opportunity cost)	38%
Inflation	26%
Corporate Policy and Legal requirements	4%

From the table above we see that the benefits foregone or opportunity cost, cash cycle size, investment proposals, minimum deposits required by banks and sales trends are relatively more important than corporate policy, legal requirements and inflation in deciding on the minimum cash balance levels. Minimum deposits required by banks ranks highest possibly because for some institutions such as banks there is a minimum amount they are required to have due to legal requirements and regulations. Central Bank of Kenya fixes the cash ratio for banks

4.1.3. Specific Maximum Cash Balance Levels

The maximum cash balance is the level above which a firm may be said to be holding excess cash. Seventy (70) per cent of the sampled organizations have a specific maximum level above which they do not allow their cash balances to go. Thus a significant number of firms would be said to behave in accordance with Miller-Orrs (1966) assumption that there should be a maximum cash balance level in an attempt to minimise the opportunity costs of holding excess cash. The factors considered in setting the maximum cash balance level are shown in the table below.

Table 4.1.3 Factors considered in determining the Maximum Cash Balance Levels

Factor	Percentage of Firms
Benefits foregone (opportunity cost)	55 %
Variability of cash cycle size	51%
Sales trend	44%
Unexpected investment opportunities	37 %
Inflation	33%

It can therefore be seen that the organizations consider sales trend, unexpected investment opportunities, variability of cash cycle size, benefits foregone and inflation to set maximum cash balance levels and none of the factors was considered as completely insignificant. The firms possibly give significance to all factors when setting the maximum cash levels to avoid holding uneconomical balances. Miller-Orr (1966) model states that the maximum cash level should be set so as to minimise the cost function.

4.1.4 Specific Optimal Cash Balance Level

The optimum cash balance level is that which minimises costs of holding cash while safeguarding the firm against the danger of cashouts. The firms that said they have a specific cash balance level they regard as optimal for their firms were sixty four (64) per cent.

This finding here is in line with the ideas of Baumol (1952) that there exists an optimum cash balance level for a firm. The figure of 64 per cent shows that a significant number of firms make a deliberate effort to determine this optimal level.

To determine the optimal cash balance level the companies consider various factors as indicated in the table below. The percentage of organizations that consider each factor is also shown.

Table 4.1.4 Factors considered in setting the Optimal Cash Balance Level.

Factor	Percentage of Number of Companies
Possibility of Cashouts	52%
Sales Trend	36%
Benefits Foregone (Interest)	32%
Inflation	28%
Minimum deposits required by banks	16%
Others	4%
Investment Proposals	0%

The findings shown by the table above indicate that the companies consider the possibility of cashouts as relatively more important than other factors in determining the optimal cash balance. This could be because a cashout could be disastrous to a firm in that it may, for instance interfere with a firms ability to finance its sales and therefore lose profits, it may lead to poor credit rating and inability to take advantage of profitable opportunities. Lumbasyo(1976) also found out that the main objective of holding cash in Kenyan firms was to avoid cash out.

We note that investment proposals do not influence the setting of specific optimal cash balance levels. This could be because when investment proposals are made it will also be determined where cash to finance the investment will come from. Investments are rarely a sudden, unexpected event requiring the use of available cash balances. Lumbasyo (1976) found out that the major variable that influences the level of cash balance is the level of working capital rather than investment proposals. Baumol assumed cash balances are required for transaction purposes while Archers divided the cash balance into transactions and precautionary balances.

Sales trends and benefits foregone are given almost equal consideration in setting the optimal cash balance levels. Inflation is the next in significance but considered by only 28 percent of the firms that have optimal cash balance levels. This is surprising considering that in Kenya the rates of inflation are high. In December 1998 the inflation rates were 6.6 per cent, in December 1999, 8.0 per cent and in February 2000, 5.7 per cent. (Kencom Digest Vol 16,17,18). This could have a significant negative effect on the value of cash balances held idle. Minimum deposits required by banks are not given much significance. This could be because overdraft facilities are available in Kenyan banks and for organizations that qualify for the facilities there is no need to keep the minimum deposits.

4.1.5 Cash Balances at the Beginning of Each Period

Only eleven (11) per cent of the organizations sampled said they have a specific cash balance level that they must start off with at the beginning of each planning period. This could be organisations which do not have easy access to overdraft facilities. Eighty nine (89) per cent have access to overdraft facilities (see 4.1.13) and so may not need to have specific opening

balances. The table below shows the factors that are considered in determining the opening cash balance levels.

Table 4.1.5. Factors considered in determining the opening cash balance

Factor	Percentage of Companies
Expected level of expenditure	12%
Expected receipts	12%
Opportunity cost of holding cash	8%
Cash for replenishment	4%

These percentages shown by the table are low and indicate that the whole issue of specific opening cash balances is not regarded as significant by the majority of organisations cash

balances at the beginning of each period would be possible to set if sources of replenishment as well as levels of receipts and expenditure are certain as in the assumption in Baumols and Beranek models. Gibbs (1976) said that the appropriate size of the opening balance is required to avoid cashouts in each month. Given that overdraft facilities are readily available for firms that qualify the problem of cashouts may not be a threat to companies. This could account for the low percentage of firms that have specific opening cash balance.

4.1.6 Pattern of Receipts

The summary of pattern of receipts are on table 4.1.7a below. Where the pattern of receipts are continuous thirty nine (39) per cent this could be because sales are in cash and sales take place continuously. Where the pattern of receipts is concentrated at specific times we have the highest number of firms forty two (42) per cent. It could be because customers have a specific credit period and their payments tend to be concentrated at the end of the period or it could be that the business is seasonal in nature, for example those in the agricultural sector.

This is in agreement with Lockyers model, which assumes that disbursements are spread over the whole control period. Baumol and Beranek made similar assumptions.

The lowest number of companies eight (8) per cent are found under the uncertain pattern of receipts. This contradicts Miller-Orrs assumption that cash receipts tend to be uncertain. The number of companies with certain pattern of receipts is also fairly low nineteen (19) per cent. This also contradicts Baumol's and Beranek's assumptions that receipts are predictable.

4.1.7 Pattern of Expenditure

Table 4.1.7a also shows the pattern of expenditure. The highest number of firms fifty eight (58) per cent have a continuous pattern of expenditure. Baumol's model assumes expenditure is continuous. Beranek also regards them as controllable and continuous. This pattern could be the one that applies to the majority of firms because expenditure items may be are many and varied requiring payment at different times for example we may have payments for cash purchases of stock, payment of fixed assets, payment of expenses. All this may require payment at different times during the period.

Table 4.1.7a Pattern of Receipts and Expenditure

Pattern	Percentage No. of Companies	
	Receipts	Expenditures
Certain	19%	27%
Uncertain	8%	0%
Continuous	39%	58%
Concentrated at specific times	42%	27%

The correlation coefficients for the pattern of receipts and pattern of expenditure are in appendix 9. There is a high positive correlation (0.8039) between certain receipts and certain

expenditures. There is also a positive correlation (0.357) between the continuous pattern of receipts and continuous pattern of expenditure. This could be accounted for by the fact that receipts of a company contribute to the cash that may be used to provide for the expenditure. The higher the receipts expected the more the items of expenditure that can be planned for. Archers (1956) model is based on a study of the relationship between receipts and expenditure. He observed that from a study of this relationship a firm could determine when cash would be needed for precautionary purposes.

There is a negative correlation (of -0.5333) between continuous receipts and certain expenditure. This is not in agreement with Baumol's pattern of receipts and expenditure which assumes that receipts come at periodic intervals while expenditures occur continuously. Expenditure tend to be more controllable and will be made at certain times. However, most receipts come from sales, which occur continuously for most businesses. Sales though continuous may be higher at certain times for products whose demand is seasonal such as in the agricultural sector and in the tourist industry. When expenditure is certain cash from receipts can be used to make payments as it comes in and if not adequate arrangements can be met to get more cash from other sources. This could account for the negative correlation.

There is also a negative correlation (of -0.3443) between the pattern of receipts being concentrated at specific times and expenditure having a certain pattern. This could be accounted for by the fact that when receipts are made expenditure which is a certain pattern can be paid at that time when receipts are concentrated. In Baumol's model receipts are assumed to be concentrated at specific times and are then used to meet expenditure occurring continuously.

The table below shows the description of the direction of receipts and expenditure for firms sampled.

Table 4.1.7b Direction of Receipts and Expenditure

Direction	Percentage No. of Firms	
	Expenditure	Receipts
Concentrated at specific times	58%	42%
Downwards	12%	31%
Uncertain and Random	27%	15%
Upwards	8%	0%
Cannot be described	18%	-

The direction of receipts and the direction of expenditure have the highest percentage showing where they move upwards at certain times and downwards at certain times. This could be because of the credit period customers may be given. Since customers usually find it preferable to pay as late as possible within the credit period, those who get credit at the same time will tend to pay around the same period. Generally certain expenses such as rent, salaries, electricity will also tend to be paid around the same time.

The direction of receipts in this study for the majority of firms fifty eight (58) per cent contradicts Beranek's model, which assumes receipts are continuous and upwards. However it is in agreement with Baumol's assumption that receipts come in at periodic intervals and so there will be a sudden upward direction at the end of the period. This direction of expenditure is common with firms which sell on credit and then send invoices asking for payment at the end of a particular period so that most consumers pay more or less at the same time for example Kenya Power and Lighting Co. Ltd.

While none of the firms indicated their expenditure as going downwards, thirty one (31) per cent indicated their expenditure as going downwards. This could be accounted for by the wave of cost cutting measures that many firms have been taking such as retrenchments, restructuring.

4.1.8 Size of Receipts and Expenditure

The table below shows the description of the size of receipts and expenditure of the firms

Table 4.1.8 Description of Size of Receipts and Expenditure

Description	Percentage No. of Firms	
	Receipts	Expenditure
Certain and continuous	39%	46%
Uncertain and Random	15%	8%
Certain and Concentrated at specific times	35%	26%
Uncertain and Concentrated at specific times	15%	11%

From the table above it can be observed that a total of seventy four (74) per cent of the firms say the size of their receipts are certain while a total of seventy four (74) per cent also say their expenditure is certain. This certainty by the majority of firms sampled could be because many firms plan so that they take into account most of the expected receipts and expenditure. They can therefore work to receive cash as planned. Expenditure is also controllable by management who can make sure it is within planned levels. Such control is necessary to avoid distorting the expected cash balance levels or leading to cashouts. Baumol and Beranek assumed certainty of receipts and expenditure which is confirmed by the results here. Lockyers also assumed disbursements are fairly constant and controllable which is consistent with the findings.

4.1.9 Buffer Money

Buffer money refers to that portion of cash balance kept and is not used unless there is an emergency or an unexpected situation requiring the use of cash. Buffer money is kept by thirty nine (39) per cent of the organizations in the study. The other 61.5 per cent, which are the majority, do not keep buffer money. This may be accounted for by the fact that many

firms are accessible to overdraft facilities. The table below shows the factors that firms consider in determining the amount of buffer money to hold.

Table 4.1.9 *Factors that determine the amount of Buffer money held*

Factor considered	Percentage Number of Firms
Expected levels of Expenditure	36%
Ease of obtaining cash for replenishment	16%
Opportunity cost of holding buffer money	12%
Cost of obtaining cash	8%
Sales levels	4%

The factor considered by the highest number thirty six (36) percent of the firms that keep buffer money is expected levels of expenditure. Little significance is given to other factors. According to Gibbs (1976) the determination of buffer money to hold is seen as an investment decision such that an increase in the balance reduces the risk of cash insolvency. A majority of the quoted firms do not keep buffer money, possibly because they have overdraft facilities. Gibbs investigation was intended to minimise the cost of holding the desired balances but from the table we see that few firms five (5) percent consider opportunity cost.

4.1.10 Cash Planning

Cash planning is carried out by ninety six (96) per cent of the organizations. This high percentage indicates that organizations are conscious about planning for their cash balances.

Out of the organisations that carry out cash planning forty four (44) per cent do it annually, thirty (30) per cent half yearly, nineteen (19) per cent quarterly, forty eight (48) per cent monthly, fifty two (52) per cent weekly and twenty six (26) per cent daily. The firms were found to be having more than one form of planning period and the highest percentage was

found under weekly planning period. Lumbasyo (1976), found out that firms gave more emphasis to cash budgeting than the attention they gave to cash balance. However, in the study we find that companies are now more conscious that they must keep close watch of their cash balance on a very regular basis. Gibbs in his study used a four weekly planning cycle and studied the cashflow patterns of an English firm by observing the daily balances. He found that when a firm establishes its cash flow pattern it may minimise the cost of holding the desired balances.

4.1.11 Investment in Marketable Securities

Investment in marketable securities is done by sixty seven (67) percent of the organisations sampled. This is because it is a safe and profitable way of keeping cash while also ensuring organisational liquidity. Lumbasyo (1976) found out that Kenyan firms do not necessarily invest in short-term assets for the sake of the interest. However, this study found that firms fifty six (56)percent give significance to opportunity costs of holding cash when setting maximum cash balance levels. We conclude that a significant number of firms invest in marketable securities so that they do not lose the opportunity to get interest.

The Baumol Model, Miller-Orr Model, Baranek Model recommend investment in marketable securities to avoid the loss of interest associated with holding excess cash. Gibbs (1976) observed that increasing investments in marketable securities reduces the net cost of holding the cash balance.

While different types of securities are available in the Kenyan market a good number are still not used much. The following table shows the usage of various securities.

Table 4.1.11a Investment in Various Securities

Type of Security	Percentage Number of Firms that Invest
Treasury Bills	33%
Marketable Securities maturing within 90 days	30%
Commercial Paper	11%
Marketable securities maturing within 91-180 days	0%
Any readily available marketable security	0%

None of the organisations invest in marketable securities maturing within 91 to 180 days. This could be because they want to ensure the securities they invest in can be liquidated within shorter periods. They could therefore be interesting in marketable securities simply as a profitable way of holding excess cash not immediately required.

The range of marketable securities that firms invest in is not wide. Treasury bills could be most preferred because they offer a risk free rate and good returns (as high as 20.3 per cent in January 2000). The percentage of firms that invest in commercial paper could still be low because the commercial paper is relatively a new idea in Kenya. The fact that the firms do not just invest in any readily available security means firms make deliberate attempt to choose appropriate securities.

None of the firms sampled said they have a requirement to invest in marketable securities at the beginning of each specific period. The firms therefore have no specific pattern on when to invest in marketable securities. Baumols (1952) Model and the Beraneks (1963) Model, recommend investment in Marketable securities at certain specific times or regular intervals.

Results of the study indicate that 44 percent of the respondents of the invest in marketable securities when receipts exceed expenditures or when a decision is made to do the investment

or both 28 per cent invest in marketable securities when a decision is made to do the investment.

The firms included in the study invest in marketable securities when receipts exceed expenditure. This could be because any cash held over and above the expected expenditure level if held in cash form may lead to opportunity costs or foregoing of interests that the excess cash can earn. Besides it may be subjected to the risk of pilferage if held in cash form.

Table 4.1.11b Timing of conversion from marketable securities to cash

Time	Percentage Number of Firms
When expected payments exceed cash available	28%
When a need arises and a decision is made to do the conversion	16%
On maturity	4%
When either the minimum balance is reached or when the payments to exceed expenditure	4%
When the minimum balance is reached.	0%

Though a good number of firms sixty seven (67) per cent invest in marketable securities the table above shows that there is no specific set time when they have to convert the marketable securities to cash ; firms do so when there is need for it. This contradicts Baumols model, which suggests conversion when cash is exhausted and the need for more cash to take care of expenditure arises. It also contradicts Miller-Orr model, which suggests conversion only when the minimum balance is reached. While fifty two (52) percent of organisations sampled have a specific minimum balance, not all these firms may invest in marketable securities. We find that from the table above the highest percentage of firms convert marketable securities to cash when expected payments of firms exceed cash available.

Brokerage or transfer fees constitute the cost of transfer from cash to marketable securities for forty four (44) percent of the firms in the study. Twelve (12) per cent indicated ordering costs

while only four (4) percent indicated other costs as part of their costs when transferring from cash to marketable securities.

In the case of costs of transfer from marketable securities to cash 44 percent indicated brokerage or transfer fees, 20 percent indicated ordering costs and no organisation indicated other costs. We observe that the brokerage or transfer costs in either cases are considered more significant than other costs. The results indicate that there is no significant difference in the cost of transfer from cash to marketable securities and from marketable securities to cash.

Fifty two (52) percent do not have a specific number of times they transfer cash to marketable securities in a planning period while twenty nine (29) percent of the organizations transfer cash to marketable securities at least once in a planning period. We would therefore say that the timing of the investments in marketable securities for, a significant number of firms, is not usually pre-determined and it will be decided when it is appropriate to do so. This suggests the possibility that they look at the circumstances and may also suggest that there could be lack of forecasting proficiency.

Only thirty two (32) percent of the firms examined said they have a specific amount they regard as optimal for transfer from cash to marketable securities. Therefore a majority sixty eight (68) percent) of the firms, in this respect, do not agree with the inventory models such as Baumol and Miller -Orr which suggest the transfer of an optimum amount that minimises costs of transfer.

The level of expenditure required was indicated by thirty five (35) percent of the firms as considered in determining the optimal value for withdrawal from marketable securities to cash. 26.1 percent indicated interest foregone and none of the organizations gave regard to the

ordering costs. This could be because most of the firms convert marketable securities to cash when they need cash to spend and regard this need as more important than the associated costs.

4.1.12 Costs Associated with the Holding of Cash

Benefits foregone (interest) is considered as the most significant cost associated with holding cash by 96 percent of the respondents. Fifty two (52) per cent consider inflation or devaluation, 28 per cent consider possibility of cashout, while only 4 per cent consider other factors not mentioned above. Lumbasyo (1976) found that Kenyan firms are not interested in interest foregone as they hold cash. Most of the firms today consider what they may lose if they just hold idle cash, for example loss of interest and loss of value, given the high rates of inflation.

4.1.13 Overdraft Facilities

Overdraft facilities are extensively used by firms in this study eighty nine (89) per cent. They use the facility for different purposes. 55 percent use the facility for cash balance replenishment, while sixty nine (69) per cent use the overdraft facility to make disbursements. This could be the reason why only fifty two (52) per cent of companies sampled have a specific minimum cash balance level. Firms with overdraft facilities may not find it necessary to have specific cash balance levels. Lockyer (1973) reported that minimum cash policy costs are at a level where a mixture of overdraft and internally financed cash balance is used. He concluded that it was desirable to swing between a positive and a negative cash balance, given the availability of overdraft.

Overdraft facilities are obtained at the ruling interest rates by 50 per cent of the firms. The large number of firms (89) per cent using overdraft facilities indicates that the market for overdraft facilities is competitive and this could account for the use of the ruling rates by a majority of overdraft providers.

Lumbasyo (1976) found that most of the Kenyan firms finance their cash balance using short term financing, mainly by overdraft and credit from parent companies. The usage of overdraft is confirmed by the findings of this study.

4.1.14 Purposes for which Firms keep Cash Balances

The firms found to keep cash for precautionary purposes were forty seven (47) per cent, for transaction purposes were ninety six (96) per cent for speculative purposes were nineteen (19) per cent. We therefore see that the most significant reason for holding cash is for transaction purposes. Precautionary purposes are the next in importance.

The difficult economic considerations prevailing in the country at this time could account for firms not having enough cash that can even take care of speculative motives. Firms keep cash balances that would ensure their current operations are maintained. This would mean keeping cash for transactions purposes and if there is any extra to precautionary purposes. Archer (1956) divided the cash balance into transactions and precautionary balances. The findings of this project show that this could also be case with the cash balances kept by the organisation today.

Findings on factors that determine the cash balance required for transaction purposes indicate that 80 per cent of organisations consider expected expenditure levels, while 24 per cent

consider expected sales levels. This high percentage that consider expected expenditure could be accounted for by the fact that fifty eight (58) per cent of the companies said that their pattern of expenditure is continuous while forty two (42) per cent said that their pattern of receipts is concentrated at specific times. Thus it would be preferable to plan a cash balance that could take care of the continuous expenditure.

In order to determine the balance to be kept for precautionary purposes forty (40) per cent of the organizations sampled said they consider unexpected increase in demand for products while only 4 per cent said they consider foreign exchange risks. It can be seen that almost all the firms that keep cash balances for precautionary purposes forty six (46) per cent consider unexpected increase in demand for their products (40 per cent). Little significance is given to foreign exchange risks.

The findings here are consistent with Lumbasyo's (1976) findings that cash balance is viewed as a means of facilitating transactions.

4.1.15 Financing of Cash Balances

None of the organizations sampled finances its cash balances entirely through long-term borrowing. Forty two (42) per cent of the firms said they finance their cash balance through short-term borrowing while thirty five (35) per cent use a combination of long-term and short-term borrowing. Thirty one (31) per cent of the organizations indicated that they have other means of financing their cash balances. This could be because of availability of cash from sales. A finance manager in one of the firms had this to say "*I consider cash from sales as the cheapest source for cash balance replenishment as no interest is charged for it. However it may be unreliable where sales are on credit and one may not be able to determine with*

certainty exactly when the receipts may be made. Probably the best way is to combine cash from sales and short-term borrowing to finance the cash balances”.

Gibbs, (1976), recommends the use of a combination of long and short-term borrowing where the demand for money is cyclical in nature. He suggested that this was to avoid the use of long-term funds to cover the peaks resulting in an idle balance during periods of low demand for cash. However the findings from this current study show that the pattern of expenditure for fifty eight (58) per cent of the firms sampled is continuous. Long-term funds may not therefore be appropriate for financing the cash balance for these firms.

4.1.16 Use Of Computers

A substantial number of firms (61 per cent) rely on computer modeling to manage cash. Some firms have online connection to their bank accounts. One manager interviewed said *“the environment in which firms operate today is dynamic and the uncertainties to deal with are so many that it is important to have information on your cash balance at any one moment and therefore know how much you are able to handle situations requiring immediate use of cash.”*

Earlier studies did not find out the position on the use of computers for monitoring cash balances in Kenya.

4.2 EXTENT OF USE OF CASH MANAGEMENT MODELS

The following table shows the percentage of firms that were found to apply the recommendations of various models.

4.2.1 Presence of various models in Quoted Companies

Models	Percentage Number of Firms
Lockyer	89%
Beranek	62%
Gibbs	35%
Baumol	32%
Miller-Orr	27%

Lockyer's model has the highest number of firms. Lockyer brought in the idea of overdraft facilities which Kenyan firms use. Although Lockyer was criticised for assuming availability of overdraft facilities, this study found that eighty nine (89) per cent of respondents have overdraft facilities. This is an indication that many more firms can qualify for overdraft facilities. The firms that offer the facility have also increased in number from the time of Lockyer (1973) and maybe competing to offer the overdraft services. The model may therefore work better today. Lockyer's assumption that disbursements are spread over the whole control period is also true for majority of the firms (58 per cent), which said their pattern of receipts is continuous. The highest percentage of firms (42 per cent) also indicated that their receipts are concentrated at specific times. Lockyer assumes receipts are concentrated at the beginning of the period. But the figure of forty two (42) per cent is not high enough for us to draw a conclusion that this assumption Lockyer made is the case for Quoted companies.

The unique characteristics of Beranek model have also been adopted by sixty two (62) per cent of the firms. Beranek assumes cash disbursements are controllable and continuous. A firm may determine what to spend on and can control the amount spent. Beranek includes a cost function for the loss of cash discounts and deterioration of credit rating when the firm is caught short of cash. Beranek assumes some extent of certainty of inflows. This is not true for most firms in the studies, as only nineteen (19) per cent said their receipts are certain.

The rest of the models also have some of their characteristics adopted by the sampled firms. However none of the models may be said to be completely ignored. The models may not be adopted in entirety because they make assumptions some of which are not realistic for some firms, for example the Beranek model assume certainty of inflows. Yet, only nineteen (19) per cent of the organisations said their pattern of receipts is certain.

The table below shows the results of a cross tabulation of cash management models used.

4.2.2 Extent to which the firms using one model also use others

	Baumol	Miller-Orr	Beranek	Lockyer	Archer	Gibbs
Baumol	32.0%	4.00%	20.0%	24.0%	12.0%	12.0%
Miller-Orr	4.00%	27%	24.0%	24.0%	12.0%	16.0%
Beranek	25.0%	24.0%	62%	50.0%	36.0%	32.0%
Lockyer	24.0%	24.0%	50.0%	89%	44.0%	32.0%
Archer	12.0%	12.0%	36.0%	44.0%	46%	24.0%
Gibbs	12.0%	16.0%	32.0%	32.0%	24.0%	35%

The results indicate that all organizations use a combination of all the models.

From the table we see that for each model there is an organisation that uses certain aspects of one and also the other. We therefore cannot say there is any specific model that is entirely used by any firm but rather that certain aspects of each model have been adopted by firms sampled.

4.3 FACTOR ANALYSIS/PRINCIPAL COMPONENT ANALYSIS

Factor analysis was found useful in making a deeper analysis to determine the significant factors that influence the cash management approaches used. Factor Analysis is aimed at finding a small number of factors that describe most of variation in a large number of concluded variables. Factor analysis procedure was carried out for the factors that influence

the setting of minimum and maximum cash balances in the sampled organisations. The respective results are indicated in table 4.3.1. and 4.3.2. below (Extracted from Appendix 7).

Table 4.3.1. Factors influencing the setting of minimum cash balance levels of companies quoted on the NSE.

Factor	Eigenvalue	Percentage of variance explained by the factor	Cumulative percentage
Opportunity Cost	3.78968	63%	63%
Cash cycle size	1.00728	17%	80%

The Eigenvalue is a measure of variance explained by each factor. An Eigenvalue of greater than one indicates that a factor is significant. Factors with Eigenvalues of less than one have been left out.

The analysis in the table above indicates that benefits foregone (or opportunity cost) and cash cycle size are the principal factors that influence the setting of the minimum cash balance levels in the organisation. These two factors explain 80 per cent of the variability in the setting of the minimum cash balances in the organisations.

Lumbasyo (1976) found out that Kenyan firms did not consider costs related to cash balances. However, this study found that firms now consider opportunity cost as a significant factor in setting their cash balance levels. Lumbasyo's research established that the major variable that influences the level of cash balance is the level of working capital. This is still an important factor today. The factor analysis reveals that cash cycle size is the next in importance to opportunity cost.

Sales trend is the major factor influencing the setting of the maximum cash balances in the organizations (see table 4.3.2 below). Unexpected investment opportunities and variability of cash cycle size are other factors that significantly influence the setting of the maximum cash

balance in the organizations. The table below summarises the results of factor analysis for maximum cash balance levels.

Table 4.3.2 - Factors that influence the setting of maximum cash balance levels for companies quoted on the Nairobi Stock Exchange

Factor	Eigen value	Percentage of variance explained by the factor	Cumulative percentage
Sales trend	3.1982	64%	64%
Unexpected investment opportunity	0.7149	14%	78%
Variability of cash cycle size	0.5266	11%	89%

The three factors, sales trend, unexpected investment opportunities and variability in cash cycle size, explain eighty nine (89) per cent of the variability in the setting of the maximum cash balances.

Lockyer (1973) suggested that minimum costs of cash balance management would be at a level where a mixture of overdraft and internally financed cash balance is used. Internal financing would be from sales receipts and would be a cheaper source than external financing. This could account for the relative importance given to sales trend, as shown in the table above, in determining the maximum cash balance levels.

Lumbasyo (1976) stated that most of Kenyan firms finance their cash balance needs by the use of external short-term financing, mainly by overdraft and credit extension from parent companies. While the current study confirms the extensive use of overdraft facilities, internal financing of cash balance from sales receipts may be more important than credit extension from parent companies. None of the companies indicated that they consider assistance from parent companies in determining cash balance levels. Instead they consider investment opportunities and variability of cash cycle size.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, RECOMMENDATIONS, LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FURTHER RESEARCH

5.1 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This report is on the survey of cash management approaches employed by companies quoted at the Nairobi Stock Exchange. Data was collected by using a questionnaire administered to all the quoted companies which formed the population. Data analysis was mainly through analysis of frequencies, correlation and cross tabulations and factor analysis.

The first objective set to find out the cash the Nairobi Stock Exchange. Most of the companies have a specific policy on cash balance management approaches used by firms quoted at levels. This indicates that quoted firms make a deliberate effort to control their cash position. Firms which are quoted may care for their cash position because the Nairobi Stock Exchange keeps a close watch of their behaviour.

A majority of firms have set a specific minimum cash balance level below which cash balances are not allowed to fall. This helps to guard against liquidity problems. The most important factors considered by firms in establishing the minimum cash balance are opportunity cost, cash cycle size, investment proposals, minimum deposits required by banks and sales trend. It would be advisable for firms to keep this minimum deposit to avoid a cashout rather than rely on the availability of external sources which a firm cannot control, such as overdrafts.

The number of firms which have a specific maximum level above which they do not allow their cash balance to go is also quite large and impressive. The firms are conscious about the opportunity cost of holding idle cash. It is recommended that firms should give a specific

person the responsibility to monitor the cash balance so that profitable opportunities are not lost. Companies, such as Kenya Breweries and Brooke Bond have treasury managers who specifically monitor the cash balance and look for profitable short term investment opportunities. They also ensure the company minimises foreign exchange losses.

Many of the quoted companies have set specific cash balance levels they consider as optimal for their firms. The most significant factors they consider in setting the optimal cash balance level is the possibility of cashouts. This is because the levels of receipts and expenditure may not be the same each month. Besides, sources of cash replenishment as well as the levels of expenditure may not be certain and the same each period. For most of the firms receipts are concentrated at specific times while expenditure are continuous. However, the high positive correlation between the certain receipts and certain expenditure as well as the positive correlation between the continuous pattern of receipts and continuous pattern of expenditure may indicate that firms plan for expenditure after determining expected receipts and vis versa. For most of the companies Receipts and expenditure take on the same direction. The size of receipts and expenditure for most of the firms is also certain and may remain almost the same from period to period. When receipts and expenditure take on the same pattern, direction and size, with receipts being higher each time the problem of cashouts may not arise.

The number of firms that keep buffer money is quite low, possibly because of availability of overdraft facilities. It may be unsafe to have no buffer money where overdraft facilities are suddenly recalled or withdrawn. However, care should be taken to hold cash at levels where the cost of holding the money do not exceed the benefits.

The firms quoted at the Nairobi Stock Exchange carry out cash planning and most of the firms have more than one planning period. The firms have annual, monthly and weekly planning period. Majority of the firms have weekly planning period so that they closely monitor their balance on a regular basis. For firms that have many transactions it is preferable that they do the monitoring on a daily basis, particularly where they may lead to high balances that should be invested to get interest. Also where foreign exchange transactions exist close monitoring will help avoid foreign exchange losses.

The firms quoted at the Nairobi stock exchange, with the exception of a few, invest in marketable securities. The firms mainly invest in marketable securities to minimise opportunity costs, or rather, as a profitable way of holding cash. The range of marketable securities is not wide and the companies prefer those with short-term maturity periods, not exceeding ninety days. Treasury Bills are more popular than other marketable securities, possibly because they offer a risk free rate of return as well as good returns. The commercial paper is not yet used much.

The firms do not have a specific set time when they invest in marketable securities but only do so when receipts exceed expenditure. Most of the firms convert marketable securities to cash when need arises, such as when expected payments exceed cash available. Brokerage or transfer fees are considered as the most significant costs when transferring cash to or from marketable securities.

The firms do not have a specific number of times they transfer cash to marketable securities in a planning period. They do so any time there is need. Majority of the firms do not have a specific amount they regard as optimal for transfer to or from Marketable securities. This

fails to agree with the inventory models, which suggest the transfer of a predetermined optimal amount that minimises costs of transfer.

The quoted companies consider benefits foregone as the most significant cost associated with the holding of cash. Many of them also consider possibility of inflation, which may have a significant affect on the value of money if large amounts of cash are just held idle.

The companies in the study extensively use overdraft facilities, which they basically use for cash balance replenishment and to make disbursements. The availability of overdraft facilities account for the relatively small number of firms that consider it necessary to keep a specific minimum cash balance level or to keep buffer money.

The large number of overdraft users and existence of competition among banks could account for the use of the market rate of interest in most of the cases.

The firms quoted at the stock exchange keep cash balances basically for transaction purposes. Next in importance are precautionary purposes. The firms do not keep cash for speculative purposes. The main factors considered to determine transaction balances to keep are expected expenditure levels and to a lesser extent sales levels. Thus the valances to keep the most important factor considered is unexpected increase in demand for products. Thus the balances, like Lumbasyo (1976) found out, are basically used for working capital requirements.

Firms finance their cash balances either entirely, through short-term borrowing, a combinations of short and long-term borrowing or from sales. Cash from internal sources

such as receipts from sales are preferable and are cheaper than borrowed funds. Borrowed funds should only be turned to where receipts from sales are uncertain.

Computer modelling is used by most firms to manage their cash. Some have online connection to their banks so that at any one time they can tell their balances. This is a useful device in the current dynamic world requiring that each company should know its position at all times.

The second objective of the study was to find out the extent to which the cash management models are used by quoted firms. No specific model is applied in totality. Each model has some of its characteristics adopted by firms and some left out. Firms use a combination of parts of each model, as they think appropriate for them, with aspects of Lockyers and Beranek models being used most.

The third objective of the study was to find out the factors that influence the choice of cash management approaches. Factor analysis indicates that opportunity cost and cash cycle size are the most significant factors that firms consider particularly in determining the lowest cash balance levels a firm should have. Firms should minimise the opportunity cost of holding cash while safeguarding against the possibility of cashouts.

Factor analysis also shows that sales trend is the most significant factor in setting the highest cash balance levels that quoted companies should hold. Next in importance are unexpected investment opportunities and variability of cash cycle size. Sales trend may be considered as most important factor to consider as it provides a cheap source of cash balance.

Maintenance of appropriate cash management approaches is important for each firm as it helps in avoiding the risk of cashouts and the embarrassment or losses it can cause. It may also facilitate maximisation gains from available cash balances.

5.2 LIMITATIONS OF THE STUDY

A number of limitations were encountered in this study which need to be taken into account.

While the population issued with the questionnaire consisted of fifty-two firms, only twenty-seven responded. There was general reluctance to fill out the questionnaire as most of the people targeted to fill it out, who were in finance and accounts departments, claimed to be too busy to have time to fill out the questionnaire. Some had to be visited and contacted several times before filling it out. Some firms outrightly refused to fill out any questionnaire as it is in their policy not to provide information on the firm to outsiders. This is a major limitation because the population frame is small and it also led to time constraints, as a more time than planned had to be taken on data collection.

Issues relating to cash are considered sensitive and confidential in many firms and this further limited the freedom with which respondents could provide information. A number of respondents therefore outrightly said they could not fill out the questionnaire on grounds of confidentiality. Some filled out some parts and left out those they regarded as confidential.

There was also a limitation on the literature review material available particularly those relevant to the situation in Kenya and Africa.

5.3 SUGGESTIONS FOR FURTHER RESEARCH

There is a lot of room for research in the area of cash management. Further research can be done the most appropriate sources of cash that a firm may use. Further research could be done to relate the sources and the appropriate uses for each source.

Further research could be done to establish the most appropriate cash management practices in the Kenyan market for a firm that wishes to maximize gains and minimize losses on the value of cash balances held.

Further study could also be done to establish the internal control measures used in the area of cash and the most appropriate cash control measures for various organizations. This could be a significant area to study, given that for a number of firms that have failed in the past poor cash control has been cited as one of the factors contributing to the failure.

Research could be done to establish how many people understand the issue of marketable securities and its significance as a way of holding idle cash.

It would be also a worthwhile study if research were done on the impact of the use of computers in the management of cash. The study in this paper has indicated that 19 out of the 27 respondents use computers to monitor their cash balances but how much more computers can be used and what impact this will have on efficiency of cash management can be established in a further study.

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APPENDIX 1

List of Companies Quoted on the Nairobi Stock Exchange

(By industrial groupings as at December, 1999).

Agricultural

1. Brooke Bond Kenya Limited
2. Eaagads Ltd.
3. George Williamson Kenya Ltd.
4. Kakuzi Ltd.
5. Kapchorua Tea Co. Ltd.
6. Limuru Tea Co. Ltd.
7. Rea Vipingo Plantations Ltd.
8. Sasini Tea & Coffee Ltd.
9. Theta Group Ltd.

Commercial & Services

1. African Lakes Corp.
2. A. Baumann & Co. Ltd.
3. African Tours & Hotels Ltd. (suspended)
4. Car & General (K) Ltd.
5. CMC Holdings Ltd.
6. Express Kenya Limited
7. Hutchings Biemer Ltd.
8. Kenya Airways Ltd.
9. Lonrho Motors (E.A.) Ltd.
10. Marshalls (E.A.) Ltd.
11. Nation Printers & Publishers Ltd.
12. Pearl Dry Cleaners Ltd.
13. The Standard Newspapers Ltd.
14. T.P.S. (Serena) Ltd.
15. Uchumi Supermarkets Ltd.

Finance and Investment

1. Barclays Bank of Kenya Ltd.
2. CFC Bank Ltd.
3. City Trust Ltd.
4. Diamond Trust Bank (K) Ltd.
5. Housing Finance Co. of Kenya Ltd.
6. I.C.D.C. Investments Co. Ltd.
7. Jubilee Insurance Co. Ltd.
8. Kenya Commercial Bank Ltd.
9. National Bank of Kenya Ltd.
10. NIC Bank Ltd.
11. Pan Africa Insurance Co. Ltd.
12. Standard Chartered Bank (K) Ltd.

Industrial and Allied

1. Athi River Mining Ltd.
2. Bamburi Cement Ltd.
3. B.A.T. Kenya Ltd.
4. BOC Kenya Ltd.
5. Carbacid Investments Ltd.
6. Crown Berger (K) Ltd.
7. Dunlop (K) Ltd.
8. E.A. Breweries Ltd.
9. E.A. Cables Ltd.
10. E.A. Packaging Industries Ltd.
11. Total Kenya Ltd.
12. Unga Group Ltd.
13. Kenya Orchards Ltd.
14. E.A. Portland Cement Ltd.
15. Firestone East Africa (1969) Ltd.
16. Kenya national Mills ltd.
17. Kenya Oil Co. Ltd.
18. Kenya Power & Lighting Co. Ltd.

APPENDIX 2

Numbering of companies that responded to the questionnaire

Agricultural Sector

1. Kakuzi Ltd.
2. George Williamson (K) Ltd.
3. Brooke Bond Ltd.
4. Rea Vipingo Plantation Ltd.
5. Kapchorua Tea Co. Ltd.
5. Limuru Tea Co. Ltd.

Commercial and Services Sector

7. Hutchings Biemer Ltd.
8. Nation Media Group Ltd.
9. Marshals E. A. Ltd.
10. Standard Newspapers Ltd.
11. Tourism Promotion Services
12. CMC Holdings Ltd.
13. Express (K) Ltd.

Finance and Investments Sector

14. Housing Finance Co. Ltd.
15. National Bank of Kenya Ltd.
16. NIC Bank Ltd.
17. Pan Africa Insurance Ltd.
19. ICDC Investments Ltd.

Industrial and Allied Sector

19. Firestone (E.A.) Ltd.
20. Kenya Power & Lighting Ltd.
21. British America Tobacco (K) Ltd.
22. E.A. Packaging Ltd.
23. Dunlop Kenya Ltd.
24. Kenya National Mills Ltd.
25. E.A. Breweries Ltd.
26. Unga Group Ltd.
27. E.A. Portland Cement Ltd.

APPENDIX 3

COVERING LETTER

___ / ___ / 2000

Dear Sir,

RE: REQUEST THAT YOU FILL OUT A QUESTIONNAIRE

I am a postgraduate student at the University of Nairobi studying for a Masters in Business Administration. I am now undertaking a research project, which is part of the requirements for the programme. My research is on the cash management approaches employed by companies quoted at the Nairobi Stock Exchange. Your company is one of the firms I have selected and part of the sample of firms I would like to use for data collection.

I am kindly requesting you to assist me in the data collection by filling out the questionnaire attached.

The information you provide will be treated with utmost confidentiality and the results of the research will be for academic purposes only. However the findings will be availed to you upon request.

If you have any further questions or would like further information please call me on:
02-891201 Ext. 2048.

Thank you for any help you will give.

Yours faithfully,

SELLA OGALO OUMA
MBA STUDENT, UNIVERSITY OF NAIROBI

APPENDIX 4

**CASH MANAGEMENT APPROACHES USED
QUESTIONNAIRE**

Please answer the questions in this questionnaire by inserting an 'X' in the boxes provided against the answer chosen or by filling out the spaces provided as briefly as possible.

The word cash is taken as referring to currency notes and coins held by the firm as well as bank current and deposit account balances. Where marketable securities exist they may also be included as part of the cash balance for a firm.

Name of your Firm

SECTION A

1. Does your organization have a specific policy on cash balance levels?

Yes No

2. Does your organization have a specific minimum level below which cash balances are not allowed to fall?

Yes No

If 'yes' State the amount.

3. If your answer to No. 2 is 'yes' then what do you consider in deciding the minimum balance? Rank the factors considered in order of importance as 1,2,3.....

Factor	Rank
Sales trends	
Investment proposals	
Cash cycle size	
Benefits foregone (i.e. opportunity cost)	
Minimum deposits required by Banks	
Inflation	
Others	

If your answer is 'others' then specify

4. Does your firm have a specific maximum level above which you do not allow your cash balance to go?

Yes No

5. What factors do you take into account in determining the maximum cash balance?

Rank the factors considered in order of importance as 1, 2, 3

Factor	Rank
Sales trend	
Unexpected investment opportunities	
Variability of cash cycle size	
Benefits foregone (i.e. interest)	
Inflation	
Others	

If your answer is 'others' then specify

6. Is there a specific cash balance level you regard as optimal for your firm?

Yes

No

7. If your answer in No. 6 is 'yes', then what factors do you consider in determining this optimal level? Rank in order of importance as 1, 2, 3,

Factor	Rank
Investment proposals	
Sales trend	
Benefits foregone (interest)	
Possibility of cash out (exhaustion)	
Minimum deposit required by Banks	
Inflation	
Others	

If your answer is 'others' then specify

8. How would you describe your pattern of receipts?

Certain	
Uncertain	
Continuous	
Concentrated at specific times	
None of the above	

If your answer is 'None' then specify.

9. How would you describe your pattern of expenditure?

Certain	
Uncertain	
Continuous	
Concentrated at specific times	
None of the above	

If your answer is 'None' then specify.

10. Do you carry out cash planning?

Yes

No

11. What is the length of your cash planning period?

Weekly	
Monthly	
Quarterly	
Half yearly	
Annually	
Others	

If your answer is 'others' then specify

12. Does your company invest in marketable securities?

Yes

No

If 'yes' then list the characteristics of marketable securities your firm can invest in.

13. When does your firm invest in marketable securities?

At the beginning of each period	
When the receipts exceed expenditure	
When either one or the other of the two situations above exist	
When a decision is made to do the investment	
None of the above	

If your answer is 'none' then specify.

14. When do you convert marketable securities to cash?

When the minimum balance is reached	
When the payments expected exceed cash available	
When either one or the other of the two situations above exist	
When a need arises and decision is made to do the conversion	
Others	

If your answer is 'others' then specify

15. What constitutes your cost of transfer from cash to marketable securities?

Cost	
Brokerage fees/transfer fees	
Ordering costs	
Others	

If the answer is 'others' then specify

16. What costs do you regard as associated with conversion from marketable securities to cash (For example transaction costs, inconvenience costs etc)

Cost	
Brokerage fees/transfer fees	
Ordering costs	
Others	

If the answer is 'others' then specify

17. On average, how many times do you make transfers to marketable securities in one planning period?

18. State the costs you consider as associated with your holding of cash.

Benefits foregone (interest foregone)	
Possibility of loss	
Inflation/devaluation	
Others	

If the answer is "others" then specify

SECTION B

1. What proportion of cash balance at the beginning of each period do you invest in marketable securities?

2. Do you have a specific amount you would say is optimal for transfer from cash to marketable securities?

Yes No

If "yes" state the amount

3. Do you have a specific amount you would say is the optimal for withdrawals from marketable securities and transfer to cash?

Yes No

If "yes" state the amount

4. Indicate the factors considered in determining the optimal value for withdrawals from marketable securities to cash

Brokerage costs	
Level of expenditure required	
Interest foregone	
Ordering costs	
Others	

If the answer is "others" then specify

SECTION C

1. How would you describe the direction of your receipts and expenditures?

	Receipts	Expenditures
Certain and upwards		
Certain and downwards		
Uncertain and Random		
Concentrated at specific times		
None of the above		

If your answer is 'None' then specify

2. How would you describe of the size of your receipts and expenditures?

	Receipts	Expenditures
Certain and continuous		
Uncertain and Random		
Certain and concentrated at specific times		
Uncertain and concentrated at specific level		
None of the above		

If your answer is 'None' then specify

3. Do you keep any part of the cash as buffer money?

Yes

No

4. Indicate the factors taken into account in determining the amount of the buffer money to be kept.

Expenditure levels expected	
The ease of obtaining cash for replenishment	
Sales levels	
Cost of obtaining cash	
Opportunity cost of holding cash	
Others	

If the answer is "others" then specify

SECTION D

1. Do you have a specific proportion you consider as optimal for allocation between cash balance and marketable securities given any amount of money?

Yes

No

If 'yes' specify the proportions

Cash balance _____

Marketable Securities _____

2. Specify the costs you regard as associated with cash being exhausted (cash outs).

Rank in order of importance as 1, 2, 3,

Deterioration of credit rating	
Loss of cash discounts	
Cost of borrowing	
Others	

If the answer is "others" then specify

SECTION E

1. Does your firm have overdraft facilities?

Yes No

If 'yes', what is the overdraft facility used for?

Cash balance Replenishment	
Disbursement	
None of the above	

If 'None', please specify

2. What is the cost of overdraft facilities that you use?

SECTION F

1. Your firm plans cash balance for what purpose:

a) Precautionary purpose Yes No
b) Transaction purpose Yes No
c) Speculative purpose Yes No

2. If 'yes' for Q1 (a), then what determines the balance required for precautionary purposes?

3. If 'yes' for Q1 (b), then what determines the Balance required for transaction purposes?

SECTION G

1. How does your firm finance your cash balance?

Long-term borrowing	
Short-term borrowing	
A combination of long and short-term borrowing	
Others	

If the answer is "others" then specify

2. Does your firm have a specific opening cash balance level required at the beginning of each planning period?

Yes No

3. If your answer to (4) is 'yes', state the factors considered in determining the opening balance. Rank in order of importance as 1, 2, 3

Expected expenditure levels	
Expected receipts	
Ease of obtaining cash for replenishment	
Opportunity cost of holding cash	
Others	

If the answer is 'others' then specify

SECTION H

CODED QUESTIONNAIRE

If certain aspects of your cash management practices (eg. use of computers) are not covered in other sections then describe them in the space provided below:

	(DMBS1)
	(DMBIP)
	(DMRCC)
	(DMRCC2)
	(DMRCC3)
	(DMRCC4)
	(DMRCC5)
	(DMRCC6)
	(DMRCC7)
	(DMRCC8)
	(DMRCC9)
	(DMRCC10)
	(DMRCC11)
	(DMRCC12)
	(DMRCC13)
	(DMRCC14)
	(DMRCC15)
	(DMRCC16)
	(DMRCC17)
	(DMRCC18)
	(DMRCC19)
	(DMRCC20)
	(DMRCC21)
	(DMRCC22)
	(DMRCC23)
	(DMRCC24)
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	(DMRCC38)
	(DMRCC39)
	(DMRCC40)
	(DMRCC41)
	(DMRCC42)
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	(DMRCC81)
	(DMRCC82)
	(DMRCC83)
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	(DMRCC86)
	(DMRCC87)
	(DMRCC88)
	(DMRCC89)
	(DMRCC90)
	(DMRCC91)
	(DMRCC92)
	(DMRCC93)
	(DMRCC94)
	(DMRCC95)
	(DMRCC96)
	(DMRCC97)
	(DMRCC98)
	(DMRCC99)
	(DMRCC100)

APPENDIX 5

CODED QUESTIONNAIRE
CASH MANAGEMENT APPROACHES USED

SECTION A

1. Does your organisation have a specific policy on cash balance levels? (SPCB)

Yes **1** No **0**

2. Does your organisation have a specific minimum level below which cash balances are not allowed to fall? (SMinL)

Yes **1** No **0**

If 'yes' state the amount (SMLA)

3. If your answer to No. 2 is 'yes' then what do you consider in deciding the minimum balance? Rank the factors considered in order of importance as 1,2,3.....

Factor		Rank
Sales trends	(DMBST)	
Investment Proposal	(DMBIP)	
Cash cycle size	(DMBCCZ)	
Benefits foregone (i.e. opportunity costs)	(DMBBF)	
Minimum deposits required by Banks	(DMBMDRB)	
Inflation	(DMBINF)	
Corporate Policy & Legal Requirements	(DMB)	

If your answer is 'others' then specify

4. Does your firm have a specific maximum level above which you do not allow your cash balance to go? (SMaxL)

Yes **1** No **0**

5. What factors do you take into account in determining the maximum cash balance?

Rank the factors considered in order of importance as 1,2,3,

Factor		Rank
Sales Trend	(Dmax ST)	
Unexpected investment opportunities	(Dmax BUIN)	
Variability of cash cycle size	(Dmax BVCCZ)	
Benefits foregone (i.e. interest)	(Dmax F)	
Inflation	(Dmax INF)	
Others	(Dmax)	

If your answer is 'others' then specify.

6. Is there a specific Cash balance level you regard as optimal for your firm? (SCOPT)

Yes 1 No 0

7. If your answer in No. 6 is 'yes', then what factors do you consider in determining this

optimal level. Rank in order of importance as 1,2,3,

Factor		Rank
Investment proposals	(OPTIP)	
Sales trend	(OPST)	
Benefits foregone (interest)	(OPBF)	
Possibility of cash out (exhaustion)	(OPPCO)	
Minimum deposit required by Banks	(OPMDR)	
Inflation	(OPINE)	
Others	(OP)	

If your answer is 'others' then specify

8. How would you describe your pattern of receipts?

Certain	(PRC)	
Uncertain	(PRUC)	
Continuous	(PR CON)	
Concentrated as specific times	(PR CST)	
None of the above	(PR NONE)	

If your answer is 'None' then specify.

9. How would you describe your pattern of expenditure?

Certain	(PRC)	
Uncertain	(PRUC)	
Continuous	(PR CON)	
Concentrated as specific times	(PR CST)	
None of the above	(PR NONE)	

If your answer is 'None' then specify.

10. Do you carry out cash planning? (CP)

Yes 1 No 0

11. What is the length of your cash planning period?

Weekly	(LC PPW)	
Monthly	(LC PPM)	
Quarterly	(LC PPQ)	
Half yearly	(LC PP HY)	
Annually	(LC PPA)	
Daily	(LC PP)	

If your answer is 'others' then specify

12. Does your company invest in marketable securities? (IMS)

Yes 1 No 0

If 'yes' then list the characteristics of marketable securities your firm can invest in.

- Treasury Bills (IMS1)
- Readily available (IMS2)
- Maturing within 90 days (IMS3)
- Maturing within 180 days (IMS4)
- Commercial Paper (IMS5)

13. When does your firm invest in marketable securities?

At the beginning of each period	(IMSBP)	
When the receipts exceed expenditure	(IMSREE)	
When either one or the other of the two situations above exists	(IMAE)	
When a decision is made to do the investment	(IMDMT)	
None of the above	(IM)	

If your answer is 'none' then specify.

14. When do you convert marketable securities to cash?

When the minimum balance is reached	(CMSMBR)	
When the payments expected exceed cash available	(CMSPEECA)	
When either one or the other of the two situations above exist	(CMSEO)	
When a need arises and decision is made to do the conversion	(CMSWNA)	

If your answer is 'others' then specify.

15. What constitutes your cost of transfer from cash to marketable securities?

Cost		
Brokerage fees / transfer fees	(CTBF)	
Ordering costs	(CTOC)	
Others	(CT)	

If the answer is 'others' specify

16. What costs do you regard as associated with conversion from marketable securities to cash (For example transaction costs, inconvenience costs etc.)

Cost		
Brokerage fees / transfer fees	(CCBG)	
Ordering costs	(CCOC)	
Others	(CC)	

If the answer is 'others' then specify

17. On average, how many times do you make transfers to marketable securities in one planning period? (TTMSPP)

18. State the costs you consider as associated with your holding of cash?

Benefits foregone (interest foregone)	(CAHCBF)	
Possibility of loss	(CAHCPL)	
Inflation / devaluation	(CAHCI)	
Foreign Exchange Risks	(CAHC)	

If the answer is 'others' then specify

SECTION B

1. What proportion of cash balance at the beginning of each period do you invest in marketable securities? (PCBIMS)

2. Do you have a specific amount you would say is optimal for transfer from cash to marketable securities? (OVWCM)

Yes 1 No 0

If 'yes' state the amount (OVWSMShs)

3. Do you have a specific amount you would say is the optimal value for withdrawals from marketable securities and transfer to cash? (SPOVWMS)

Yes 1 No 0

If 'yes' state the amount (SPOVWMSA)

4. Indicate the factors considered in determining the optimal value for withdrawals from marketable securities to cash.

Brokerage costs	(OVWMSBC)	
Level of expenditure required	(OVWMSLER)	
Interest foregone	(OVWMSIF)	
Ordering costs	(OVFWMSOC)	
Others	(OVFWMS)	

If the answer is 'others' then specify.

SECTION C

1. How would you describe the direction of your receipts and expenditures?

	Receipts	Expenditures	
Certain and upwards	(DRCU)	(DRECU)	
Certain and downwards	(DRCD)	(DECD)	
Uncertain and Random	(DRUR)	(DEUR)	
Concentrated at specific times	(DRCST)	(DECST)	
None of the above	(DR)	(DE)	

If your answer is 'None' then specify

2. How would you describe of the size of your receipts and expenditures?

	Receipts	Expenditures	
Certain and upwards	(SRCC)	(SECC)	
Certain and downwards	(SRUR)	(SEUR)	
Uncertain and Random	(SRCST)	(SECCST)	
Concentrated at specific times	(SRUCCST)	(SEUCCST)	
None of the above	(SR)	(SE)	

If your answer is 'None' then specify

3. Do you keep any part of cash as buffer money? (BF)

Yes 1 No 0

4. Indicate the factors taken into account in determining the amount of the buffer money to be kept.

Expenditure levels expected	(FDBMELE)	
The ease of obtaining cash for replenishment	(FDBMEOCR)	
Sales levels	(FDBMSL)	
Cost of obtaining cash	(FDBMCOC)	
Opportunity cost of holding cash	(FDBMOCHC)	
Others	(FDBM)	

If your answer is 'others' then specify

SECTION D

1. Do you have a specific proportion you consider as optimal for allocation between cash balance and marketable securities given any amount of money? (OACM)

Yes 1 No 0

If 'yes' specify the proportions

Cash balance (OACB)

Marketable Securities (OAMS)

2. Specify the costs you regard as associated with cash being exhausted (cash outs).

Rank in order of importance as 1,2,3,.....

Deterioration of credit rating	(CCBEDCR)	
Loss of Cash discounts	(CCBELCD)	
Cost of borrowing	(CCBECB)	
Others	(CCBE)	

If your answer is 'others' then specify

SECTION E

1. Does your firm have overdraft facilities? (OD)

Yes 1 No 0

If 'yes' what is the overdraft facility used for?

Cash balance replenishment	(ODCBR)
Disbursement	(ODD)
None of the above	(ODNONE)

If your answer is 'None' please specify

2. What is the cost of overdraft facility that you use? (COD)

SECTION F

1. Your firm plans cash balance for what purpose

- | | | | | |
|--------------------------|-----|--------------------------|----|--------------------------|
| a) Precautionary purpose | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| b) Transaction purpose | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |
| c) Speculative purpose | Yes | <input type="checkbox"/> | No | <input type="checkbox"/> |

2. If 'yes' for Q1 (a), then what determines the balance required for precautionary purposes?

- Foreign Exchange Risks (PPBFE)
- Unexpected increase in demand for products (PPBID)

3. If 'yes' for Q1 (b), then what determines the balance required for transaction purposes?

- Expected expenditure (TPBEE)
- Expected Sales levels (TPBES)

SECTION G

1. How does your firm finance your Cash Balance?

Long-term Borrowing	(FCBLB)	
Short-term Borrowing	(FCBSB)	
A combination of long and short-term borrowing	(FCBLS)	
Others	(FCB)	

If the answer is "others" then specify.

2. Does your firm have specific opening cash balance level required at the beginning of each planning period?

Yes 1 No 0

3. If you answer to (2) is "yes" state the factors considered in determining the opening balance in order of importance. Rank in order of importance as 1,2,3,.....

Expected expenditure levels	(SOBEEL)	
Expected receipts	(SOBER)	
Ease of obtaining cash for replenishment	(SOBEOCR)	
Opportunity cost of holding cash	(SOBOCHC)	
Others	(SOBO)	

If the answer is "others" then specify.

SECTION H

1. If certain aspects of your cash management practices (e.g. use of computers) are not covered in other sections then describe them in the spaces provided below.

Computerized monitoring of Cash balance (MCB)

APPENDIX 6
CODED RESULTS OF THE QUESTIONNAIRES

Resp	SECTION A																						
	SPCB	SMinL	SMLA	DMBST	DMBIP	DMBCCZ	DMBBF	DMBMDRB	DMBINF	DMB	SMAXL	DMaxBST	DMaxBUIN	DMaxBVCCZ	DMaxF	DMaxINF	Dmax	SCOPT	OPTIP	OPST	OPBF	OPPCO	OPMDR
1	0	0	0	3	4	2	1	6	5	1	3	5	2	1	4	0							
2	0	0	0													0							
3	1	1					2	1		1			2	1		1	2			1			
4	1	0	0.15m							1	1		2	3		1				3		2	1
5	0	0								0						0							
6	1	1					2	1		0			2	1		1	2			1			
7	0	0								1	1		2		3	1				2	3	1	
8	1	1								1	1				1	1							
9	1	1	0	1	2	3			4	0													
10	0	0	0	2						1	1		2										
11	1	1	0	2	5	4	3		6	1	0												
12	1	1		2	5	3	6	1	4	1	2	4	1	5	3	1	5	3	6	2	1		
13	1	0								1													
14	1	1		3	2	1				1				1		1						1	
15	1	1			1			1	4	1				1		1	1					1	1
16	1	1		3		2		1		1													
17	1	1	0	1	2	1	2	1	2	1	0	1	2	1	2								
18	0	0	0							0													
19	0	0	0							1		2		1	3	1	3			2	1		
20	1	0	0							1	2	3	1	4	5	1	3	2	4	1			
21	0	0	0	1						0										1	2	3	
22	1	1	160m	4	5	2	1	3	6	7	1	4	5	3	1	2	1	6	5	1	2	4	
23	1	0	0							1	1	3	2	5	4	1	4	1	5	2	3		
24	1	1	0		3	2	4	1		1	2	4	1	3		1							1
25	0	0	0							0										2		1	
26	1	1	0		3	2	4	1		1		3	1	2		1						1	
27	1	1		1	1	2	3	3	3	1	2	1	1	2	3	1	2	3	1	1	1	3	

OPINF	OP	PRC	PRUC	PRCON	PRCST	PRNONE	PEC	PEUN	PECON	PECST	PENONE	CP	LCPPW	LCPPM	LCPPQ	LCPPHY	LCPPA	CPPD	IMS	IMS1	IMS2	IMS3	IMS4	IMS5	IMSBP
		0	0	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0	1	1	1	0	0	0	0
		0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0	1	0	0	0
		1	0	0	0	0	1	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
		0	0	0	1	0	0	0	0	1	0	1	0	0	0	1	0	0	1	1	0	0	0	0	0
		0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0	1	0	0	0
		0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
		1	0	0	1	0	1	0	0	1	0	1	1	0	0	0	1	0	1	0	0	0	0	0	0
		0	0	1	0	0	0	0	1	0	0	1	1	1	1	0	1	1	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	1	1	0	0	0	1	1	0	1	0	1	0	0	0	1	1	0	0	1	0	0	0
4		0	0	1	0	0	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0
		0	0	1	0	0	0	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0
		1	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0
		0	0	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	1	0	0	0	0	0	0
		0	0	0	1	0	0	0	0	1	0	1	1	0	0	0	0	0	1	1	1	1	0	0	1
		0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0
	4	0	0	0	1	0	0	0	1	0	0	1	1	0	1	1	1	0	1	0	0	0	0	0	0
		0	0	0	1	0	0	0	1	0	0	1	1	1	1	1	1	0	1	1	0	0	0	0	0
		1	0	1	0	0	1	0	1	0	0	1	1	1	0	0	1	1	0	0	0	0	0	0	0
3		0	0	1	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
6		0	1	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0
		0	0	1	0	0	0	0	1	0	0	1	1	1	0	0	1	1	1	1	0	1	0	0	0
		0	0	1	0	0	0	0	1	1	0	1	1	1	0	0	1	0	1	0	0	1	0	0	0
		1	0	0	0	0	1	0	0	0	0	1	1	1	0	0	1	1	1	1	0	1	0	0	0
3		0	0	1	0	0	0	0	1	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0	0

IMSREE	IMAE	IMDMI	IM	CMSMBR	CMSPEECA	CMSEO	CMSWNA	CMSOP	CMS	CTBF	CTOC	CT	CCBF	CCOC	CC	TTMSPP	CAHCBF	CAHCPL	CAHCI	CAHC
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
1	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	2	1	1	1	0
1	0	1	0	0	0	0	0	1	0	1	0	0	1	0	0	0	1	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	1	0
1	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0		1	0	0	0
1	0	1	0	0	0	0	0	1	0	1	0	0	1	0	0	0	1	0	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26	0	0	0	0
0	0	1	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	1	1	1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0	0	0
1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
1	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0		1	0	1	0
0	0	1	0	0	1	0	1	0	0	1	1	0	1	1	0	5	1	0	1	0
0	0	1	0	0	0	0	0	1	0	1	0	0	1	0	0	52	1	0	0	0
0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	1	1	0	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	2	0
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0
0	0	1	0	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	0	0
0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	2	1	1	0	0
0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	96	1	1	1	0
0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	24	1	1	0	0
0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	2-5	1	0	0	0
0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0		1	0	0	0

SECTION B										SECTION C										
PCBIMS	OVWCM	OVWCM(m)	SPOVWMS	SPOVWMSA(m)	OVWMSBC	OVWMSLED	OVWMSIF	OVFWMSOC	OVFWMS	DRCU	DRCD	DRUR	DRCST	DR	DECD	DECU	DEUR	DECST	DE	SRCC
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1
0	1	5	1	5	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
< 25%	0		0																	
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
0	1	5	1	5	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0
< 25%	0		0																	
> 15m	1	> 1	0	0			1	0	0	0	0	0	1	0	0	0	0	1	0	1
0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1
0	0	5	1	5	0	1	1	0	0	0	0	0	1	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0
0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0
	0		0		0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
10%	0	0	0	0	0	0	0	0	0											
	0	0	1	1	1	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0
80%	1	5	1	5	1	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0
10%	0	0	1		1	1	1	0	0	1	0	0	0	1	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1
0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0
0	1	0.25	1	0.25	0	0	1	0	0	0	0	0	1	0	0	0	0	1	0	0
0	1	80	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	1
0	1	0.25	1	0.25	0	0	1	0	1	0	0	0	1	0	0	0	0	1	0	0
> 50%	1		0		0	1	1	0	0	0	0	0	1	0	0	0	0	1	0	0

																SECTION D						
SECC	SRUR	SEUR	SRCST	SECCST	SRUCST	SEUCST	SR	SE	BF	FDBMELE	FDBMEOCR	FDBMSL	FDBMCOC	FDBMOCHC	FDBM	OACM	OACB	OAMS	CCBEDCR	CCBELCD	CCBECB	CCBE
0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0				1
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				1
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2		3
1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	2			1
0	0	0	1	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0				1
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		1	2	3
1	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1		2	3
1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1			1
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0.33	0.67				
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2			1
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1			
0	0	0	1	1	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1			1
0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	0	0	0	0	2	3		1
0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0				1
0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	3		2
0	0	0	0	0	1	1	1	0	0	1	1	0	0	1	0	0	0	0				1
0	0	0	1	1	0	0	0	0	0													1
0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1			1
1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				1
1	0	0	1	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	1	3		2
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		2	1	
1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	1	4
0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	3	
0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1		
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				1
0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1		
0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	0	1	40%	60%	3	2		1

SECTION E					SECTION F								SECTION G								SECTION H		
OD	ODCBR	ODD	ODN	COD	PP	TP	SP	PPBFF	PPBID	PPBFB	PPBES	FCBLB	FCBSB	FCBLS	FCB	SOB	SOBEEL	SOBER	SOBEOCR	SOBOCHC	SOBO	CMOB	
1	1	0	0	16.50%	0	1	0	0	0	1	0	0	1	0	0	0						0	
1	1	1	0	Ruling	0	1	0	0	0	1	0	0	1	0	0	0						1	
1	1	1	0	20 - 22%	0	1	0	0	0	1	0	0	1	0	1	0	1				2		
1	0	1	0	22%	1	1	0	1	0	1	0	0	1	0	0	0						1	
1	1	1	0	Ruling	0	1	0	0	0	1	0	0	1	0	0	0						1	
1	1	1	0	20 - 22%	0	1	0	0	0	1	0	0	1	0	1	0	1				2		
1	0	1	0	Ruling	0	1	0	0	0	0	1	0	0	1	0	0						1	
1	0	1	0		0	1	1	0	0	0	0	0	1	0	0	1	1					1	
1	0	1	0	Ruling	1	1	0	0	1	0	1	0	0	1	0	0						1	
1	1	1	0	Ruling	1	0	0	0	1	0	0	0	0	1	0	0						1	
0	0	1	0	0	1	1	1	0	1	1	1	0	0	1	1	0						1	
1	1	1	0	Ruling	1	1	0	0	0	1	0	0	1	0	0	0						1	
1	0	1	0	17%	0	1	0	0	0	1	0	0	1	0	0	0						1	
1	0	1	0	Ruling +1%	1	1	0	0	1	1	0	0	0	0	1	1	2	1			3		
1	0	1	0	Ruling	0	1	0	0	0	1	0	0	0	0	0	0						0	
1	1	0	0		0	1	0					0	0	1	0	0						1	
																							0
1	1	0	0	Ruling	0	1	0	0	0	1	0	0	1	0	1	0						0	
1	0	1	0	13%	1	1	1	0	1	1	0	0	0	0	0	0						1	
1	1	0	0	Ruling	1	1	0	0	1	1	0	0	0	1	0	0						0	
1	1	1	0	Ruling	1	1	0	0	1	1	0	0	1	0	0	0						1	
1	1	2	0	24%	1	1	1	0	1	0	0	0	0	1	0	1	2	1		4	3	0	
1	0	1	0	Ruling +3%	0	1	0	0	0	1	1	0	0	1	0	0						0	
0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0						0	
1	0	1	0	Negotiable	1	1	0	0	1	1	0	0	1	0	1	0						1	
0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	1	0						0	
1	1	0	0	21%	1	1	1	0	1	1	0	0	0	1	0	0						1	

APPENDIX 7

----- FACTOR ANALYSIS -----

Analysis number 1 Listwise deletion of cases with missing values

Extraction 1 for analysis 1, Principal Components Analysis (PC)

Initial Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
DMAXBST	1.00000	*	1	3.19823	64.0	64.0
DMAXBUIN	1.00000	*	2	.71498	14.3	78.3
DMAXBVCC	1.00000	*	3	.52660	10.5	88.8
DMAXF	1.00000	*	4	.42092	8.4	97.2
DMAXINF	1.00000	*	5	.13927	2.8	100.0

PC extracted 1 factors.

Factor Matrix:

	Factor 1
DMAXBST	.88182
DMAXBUIN	.88231
DMAXBVCC	.70839
DMAXF	.73586
DMAXINF	.77385

Final Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
		*				
DMAXBST	.77760	*	1	3.19823	64.0	64.0
DMAXBUIN	.77847	*				
DMAXBVCC	.50181	*				
DMAXF	.54149	*				
DMAXINF	.59885	*				

----- FACTOR ANALYSIS -----

Analysis number 1 Listwise deletion of cases with missing values

Extraction 1 for analysis 1, Principal Components Analysis (PC)

Initial Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
DMBBF	1.00000	*	1	3.78968	63.2	63.2
DMBCCZ	1.00000	*	2	1.00728	16.8	79.9
DMBINF	1.00000	*	3	.49437	8.2	88.2
DMBIP	1.00000	*	4	.36992	6.2	94.4
DMBMDRB	1.00000	*	5	.18675	3.1	97.5
DMBST	1.00000	*	6	.15200	2.5	100.0

PC extracted 2 factors.

Factor Matrix:

	Factor 1	Factor 2
DMBBF	.60927	.75164
DMBCCZ	.89916	.12727
DMBINF	.71568	-.40114
DMBIP	.91586	.16925
DMBMDRB	.81727	-.08895
DMBST	.76881	-.47817

Final Statistics:

Variable	Communality	*	Factor	Eigenvalue	Pct of Var	Cum Pct
DMBBF	.93617	*	1	3.78968	63.2	63.2
DMBCCZ	.82468	*	2	1.00728	16.8	79.9
DMBINF	.67310	*				
DMBIP	.86745	*				
DMBMDRB	.67584	*				

APPENDIX 8

CROSS TABULATION OF BAUMOLS MODEL AND OTHER MODELS

OVWM by DRUR

Page 1 of 1

OVWM	Count	DRUR		Row Total
		0	1	
0	17	11	6	68.0
1	8	7	1	32.0
Column Total		18	7	25
Total		72.0	28.0	100.0

Number of Missing Observations: 2

OVWM by CCBEDCR

Page 1 of 1

OVWM	Count	CCBEDCR				Row Total
		0	1	2	3	
0	17	6	6	5		68.0
1	8	3	4		1	32.0
Column		9	10	5	1	25

OVWM by PP

Page 1 of 1

	Count	PP		Row	Total
OVWM	0	8	9	17	68.0
	1	5	3	8	32.0
Column	13	12	25		
Total	52.0	48.0	100.0		

Number of Missing Observations: 2

OVWM by FCBL5

Page 1 of 1

	Count	FCBL5		Row	Total
OVWM	0	12	5	17	68.0
	1	5	3	8	32.0
Column	17	8	25		
Total	68.0	32.0	100.0		

Number of Missing Observations: 2

APPENDIX 9

- - Correlation Coefficients - -

	PEC	PECON	PECST	PENONE	PEUN	PRC
PEC	1.0000 (.26) P= .	-.5333 (.26) P= .005	. (.26) P= .	. (.26) P= .	. (.26) P= .	.8039 (.26) P= .000
PECON	-.5333 (.26) P= .005	1.0000 (.26) P= .	. (.26) P= .	. (.26) P= .	. (.26) P= .	-.3723 (.26) P= .061
PECST	. (.26) P= .	. (.26) P= .	1.0000 (.26) P= .	. (.26) P= .	. (.26) P= .	. (.26) P= .
PENONE	. (.26) P= .	. (.26) P= .	. (.26) P= .	1.0000 (.27) P= .	. (.26) P= .	. (.26) P= .
PEUN	. (.26) P= .	. (.26) P= .	. (.26) P= .	. (.26) P= .	1.0000 (.26) P= .	. (.26) P= .
PRC	.8039 (.26) P= .000	-.3723 (.26) P= .061	. (.26) P= .	. (.26) P= .	. (.26) P= .	1.0000 (.26) P= .
PRCÓN	-.1234 (.26) P= .548	.3570 (.26) P= .073	. (.26) P= .	. (.26) P= .	. (.26) P= .	-.1852 (.26) P= .365
PRCST	-.3443 (.26) P= .085	.1030 (.26) P= .616	. (.26) P= .	. (.26) P= .	. (.26) P= .	-.2203 (.26) P= .279
PRNONE	. (.26) P= .	. (.26) P= .	. (.26) P= .	. (.26) P= .	. (.26) P= .	. (.26) P= .
PRUC	.1502 (.26) P= .464	-.0449 (.26) P= .827	. (.26) P= .	. (.26) P= .	. (.26) P= .	-.1409 (.26) P= .492

(Coefficient / (Cases) / 2-tailed Significance)

" . " is printed if a coefficient cannot be computed