

TESTING THE APPLICABILITY OF THE ALTMAN'S "Z-SCORE
FORMULA" MODEL ON THE KENYA'S COMMERCIAL BANKS

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D53/6085/2003

DEPARTMENT OF ACCOUNTING AND FINANCE

A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF BUSINESS
IN PARTIAL FULFILLMENT FOR THE DEGREE OF MASTER OF
BUSINESS ADMINISTRATION (FINANCE) OF KENYATTA
UNIVERSITY

SEPTEMBER 2005

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*Testing the
applicability of the*



2012/410572

DEDICATION

This project is dedicated to my Dad, Joseph M. Gaha, Mom, Lydia B. Gaha, Sister, Rosalyn and Thomas, Brothers, Jack and Ben for the sacrifices they have made to raise me through education.

DECLARATION

This is my original work and has not been presented for a degree award in any other university.

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DEDICATION

This project is dedicated to my Dad; Joseph M.Githu, Mum; Lydia B.Githu, Sisters; Respher and Damaris, Brothers; Jack and Ben for the sacrifices they have made to see me through education.

ACKNOWLEDGEMENT

I would like to give special thanks to Dr. E. W. Khakame and Prof. Ki-an Park for the guidance they have given throughout this project and also Ms. Farida Abdul with whose discussion and guidance, I was able to choose this Topic to Research on.

Special thanks go to uncle Kibe Kinyanjui, aunty Naomi Kibe and their children Olive, Lynn and Kinyanjui for the immense support they have given. Aunty Peris needs a special thank you for being my mentor and to all the members of the extended family, i say asante for the role you played individually and collectively in this course.

I feel greatly indebted to Professor J.J. Ongong'a and Dr. G. Katana for their advice, guidance and support in my course. I will forever remain grateful to M. Albert and B. Gift for your help when I needed you most. To the entire MBA 2003 group, am so grateful for creating such a conducive learning environment. I must also thank all my lecturers who took me through the various units, as you were always there to lead the way.

To Kenyatta University Christian Postgraduate Fellowship (CPF), thanks you for the spiritual, social and academic nourishment i received. It has been a real home for me where i have belonged. To all the banks which availed to me their financial statements, thanks a lot.

It is impossible to thank all of you individually and i register my appreciation to all my friends who have stood with me through thick and thin. However, Josephine, Julius and Kioko needs' special mention for the extra mile they went.

May God bless you big and enlarge your boundaries. (1st Chronicles 4:10)

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DEFINATION OF TERMS

Total Assets is the total sum of all property owned by the business including permanent assets such as buildings, machinery, and others. It is usually calculated as long term assets plus current assets.

Current Assets are assets that may be converted into cash, sold or consumed within a year or less. Usually they include cash, marketable securities, accounts receivable, inventories and prepaid expenses.

Current Liabilities are what a company currently owes to its suppliers and creditors. These are short-term debts that normally require that the company convert some of its current assets into cash in order to pay them off. They are usually all bills that are due in less than one year. They may include; Accounts Payable, Accrued Expenses, Income Tax Payable, short-term Notes Payable and Portion of long-term Debt Payable.

Retained Earnings is the portion of net income retained for reinvestment in the company rather than being paid in dividends to shareholders which has been accumulated over the period the company has been in operation.

Working capital is given by current assets minus current liabilities. A firm's working capital is the money it has available to meet current obligations (those due in less than a year). A firm with a great deal of working capital is in little danger of failing in the near future, but enormous working capital over a prolonged period could also imply excessively conservative management.

Earnings before interest and taxes (EBIT) - A measure of a company's earning power from ongoing operations, equal to earnings before deduction of interest

payments and income taxes. It is also known as operating profit or operating income.

Book value of equity- This is the original proceeds received by a firm when it issued equity. It can also be said to be a company's common stock equity as it appears on a balance sheet, equal to total assets minus liabilities, preferred stock, and intangible assets such as goodwill. This is how much the company would have left over in assets if it went out of business immediately.

Market value of equity- Since companies are usually expected to grow and generate more profits in the future, most companies' end up being worth far more in the marketplace than their book value would suggest. This is thus what is referred as market value of equity. The amount that the company can fetch in the market was it to be sold out.

ABSTRACT

Banks are formed to operate in the foreseeable future. However there are cases where a bank fails to fulfill its objectives or survive in its environment, forcing it to bankruptcy leading to great losses.

Various models like Altman Model are used in predicting bankruptcy. This paper seeks to test the applicability of the Altman's "Z score formula" model in Kenya's commercial banks and find out if it is used by the banks.

Financial statements of 10 banks between 1994 and 2003 were collected. Their Z score was calculated, compared with Z score cut off limit, and then grouped as either bankrupt or non-bankrupt. The grouping was then compared with the current bank situations.

Results show Altman's Model has prediction accuracy of 68.8% and 56.3% one-year and two years prior to failure respectively and it is applicable in Kenya. However, it is not utilized as most banks use Central bank standard ratios. This paper highly recommends the adoption of the Altman model.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Various attempts have been made to predict the failure of some companies. In the United States, it is said that three hundred companies close down every week due to corporate failure. A business core aim is to generate profit and by extension, maximization of wealth. In the course of operations however, a firm might experience financial problems caused by both internal and external environmental factors. These factors lead to what is referred to as financial distress, which may lead to bankruptcy of the company.

Prediction and analysis of corporate financial performance is thus a crucial phenomenon in a developing country like Kenya in the light of closure of businesses such as banks and insurance companies. Altman (1968) developed a model for predicting the bankruptcy of companies using the Z-score formula. It is a multivariate formula for measurement of the financial health of a company and a powerful diagnostic tool that forecasts the probability of a company entering bankruptcy within a two-year period.

Altman model (1968) used sixty-six companies initially, thirty-three companies that had failed and thirty-three successful. The first result was a formula with twenty-two functions. The function that contributed the least to discriminating between the failed and the successful companies was dropped. Finally, only five ratios remained. Z-Score bankruptcy predictor model combines these five ratios, which are: Working capital to total assets, retained earnings to total assets, earnings before interest to total

assets, Market Value equity to book value of total debt and sales to total assets.

In yet another study on prediction of corporate failure, Altman and Mcough (1974) carried out an analysis of the relationship between bankrupt companies and auditor's reports prior to bankruptcy. Their work resulted in the conclusion that Altman's Model can signal going concern problems with 94% and 72% correctly one year and two years respectively earlier than an auditor's opinion in a company that eventually enters bankruptcy.

While Altman's (1968) and the revised model (1983) work addresses the question of corporate failure, the treatment is far from being adequate in Kenyan banks. It is the stability of every ratio, overtime that is relevant as this may be a pointed to a firm's financial stability (Dambolena and Khoury 1980). However this may be problematic when industries differ with respect to factors of production, product life cycle, competitive structure and distribution mode, which causes industry differences in various measures of financial condition.

1.2 STATEMENT OF THE PROBLEM

The going concern principle of accounting is usually assumed to hold in all companies including banks. However, in reality banks do fail and the assumption of infinite life collapses. This leads to huge losses not only to the shareholders but also to the other stakeholders who look keenly to any sign of probable failure. If failure could be detected early, it would be possible to minimize failure-associated costs.

Corporate failure literature contains a number of methodologies used to discriminate between failed and non-failed firms. It may also be seen as an indication of resource

misallocation, which is undesirable from a social as well as economic point of view. Studies have been conducted with the view of predicting failure by trying to identify possible failures as far ahead as possible in time using various models. A previous study has established that failure can be predicted accurately for two years prior to failure (Keige 1991).

One of the most used models is Altman's model that is believed to have achieved an accuracy rate of 95%. It has been tested in many countries mostly in the United States and also in Thailand, Japan and South Africa and it has proved to be reliable. However, in Kenya 13 banks have gone under since 1994. Some of them had shown good financial statements report and had no indication of going under leading to both monetary and non-monetary losses. The questions asked at such times till now are; what led to the bankruptcy of the banks? Did the management foresee it or it was abrupt? Was the Altman's model ever used to determine their bankruptcy positions? If yes, did the results of the model prove false or true. If no, could the use of the model help in predicting the failure of banks in the future?

This paper seeks to answer the above questions as it find out whether the model is used by Kenya's banks as well as to test whether it can be used to predict bankruptcy position in Kenyan banks.

1.3 OBJECTIVES OF THE STUDY

The main objective of this study is to establish whether Altman's model can be used to predict bankruptcy position of the Kenya's banks. This will therefore necessitate a look into whether the current banks do use the model or not. It also aims at pointing the need of computing the Z score by banks. Finally it will shed light on the major

reasons behind the bankruptcy of banks in Kenya.

1.4 HYPOTHESIS

H I: The level of predictive accuracy of the Altman's Model when applied to Kenya's Commercial banks is less than or equal to 50%.

H II: The level of predictive accuracy of the Altman's model when applied to Kenya's Commercial banks is greater than 50 per cent.

1.5 IMPORTANCE OF THE STUDY

It is said that 'prevention is better than cure.' The findings of this study will be of importance in the following ways:

- a) To the current banks, it will be an enlightenment to use the Altman model to determine their bankruptcy position.
- b) Shareholders and potential investors can use the information to determine if the banks they are investing in are likely to be bankrupt soon saving them from losses.
- c) It will also shed light to the society on the causes of bank's failures.
- d) Other scholars interested in this topic for their research work can use these findings for their literature review.

CHAPTER TWO

LITERATURE REVIEW

2.1 BANKRUPTCY PREDICTIONS MODELS

The success or otherwise of any business is influenced by two major sets of factors. These are the internal factors also known as microeconomic factors or the external factors also known as the macroeconomic factors. The external factors are usually out of the control of the firm and the management can do little about them. The microeconomic factors on the other hand are within the control of the management. They include both the financial and the non-financial variables. With the financial variables, the financial statements are usually put into use as they are the only documents outsiders have access to and various ratios can be analyzed (Radloff 2002).

Various scholars have come up with different models of predicting the bankruptcy of companies. They include among many: Beaver (1966, 1967, and 1968), Meyer and Pifer (1970), Deakin (1972), Edmister (1972), Altman and McGough (1974), Altman, Haedeman, and Narayanan (1977). Some other notable contributions include: Martin (1977), Ohlson (1980), Zavgren (1985), and Lau (1987). Few are explained in details.

Beaver (1967) did a great job on ratio analysis and bankruptcy classification using the traditional method. This was a univariate analysis where each ratio was taken at a time and its effects on the total score checked. He found out that a number of indicators could discriminate between matched samples of failed and non-failed firms, for as long as five years prior to failure.

Gordon (1978) developed a model called the **Springate model**. It followed the procedures developed by Altman and used a step-wise multivariate discriminate

analysis to select four out of 19 popular financial ratios that best distinguished between sound business and those that actually failed. The Springgate model takes the following form -: $Z = 1.03A + 3.07B + 0.66C + 0.4D$.

If $Z < 0.862$; then the firm is classified as "failed." Where A = Working Capital/Total Assets, B = Net Profit before Interest and Taxes/Total Assets, C = Net Profit before Taxes/Current Liabilities, D = Sales/Total Assets

This model achieved an accuracy rate of 92.5% using the 40 companies tested by Springgate. Botheras (1979) tested the Springgate Model on 50 companies with an average asset size of \$2.5 million and found an 88.0% accuracy rate. Sands (1980) tested the Springgate Model on 24 companies with an average asset size of \$63.4 million and found an accuracy rate of 83.3%.

Fulmer model that was developed by Fulmer used step-wise multiple discriminate analyses to evaluate 40 financial ratios applied to a sample of 60 companies' where 30 had failed and 30 were successful. The average asset size of these firms was \$455,000. The model has the following form; $H = 5.528 (V1) + 0.212 (V2) + 0.073 (V3) + 1.270 (V4) - 0.120 (V5) + 2.335 (V6) + 0.575 (V7) + 1.083 (V8) + 0.894 (V9) - 6.075$. If $H < 0$; then the firm is classified as "failed". Where V1 = Retained Earning/Total Assets, V2 = Sales/Total Assets, V3 = EBT/Equity, V4 = Cash Flow/Total Debt, V5 = Debt/Total Assets, V6 = Current Liabilities/Total Assets, V7 = Log Tangible Total Assets, V8 = Working Capital/Total Debt, V9 = Log EBIT/Interest.

Fulmer reported a 98% accuracy rate in classifying the test companies one year prior to failure and an 81% accuracy rate more than one year prior to bankruptcy.

Blasztk (1984) developed **Blasztk system**. This is the only business failure prediction method outlined among the others that was not developed using multiple discriminate analysis. The essence of the system is that the financial ratios for the company to be evaluated are calculated, weighted and then compared with ratios for average companies in that same industry as given by Dunn & Bradstreet. One of this method's strengths is that it does compare the company being evaluated with companies in the same industry.

In 1987, **Ca-Score** model was developed having been recommended by the Ordre des compatibles agrees des Quebec (Quebec CA's) and according to its developer, it is used by over 1,000 CA's in Quebec. This model was developed under the direction of Jean Legault of the University of Quebec at Montreal, using step-wise multiple discriminate analyses. Thirty financial ratios were analyzed in a sample of 173 Quebec manufacturing businesses having annual sales ranging between \$1-20 million.

The model takes the following form:

$$\text{CA-Score} = 4.5913 \left(\frac{\text{*shareholders' investments (1)}}{\text{total assets (1)}} \right) + 4.5080 \left(\frac{\text{earnings before taxes and extraordinary items} + \text{financial expenses (1)}}{\text{total assets (1)}} \right) + 0.3936 \left(\frac{\text{sales (2)}}{\text{total assets (2)}} \right) - 2.7616.$$

If CA-Score < - 0.3; then the firm is classified as "failed"

- 1) Figures from previous period.
- 2) Figures from two previous periods.

* Shareholders' investment is calculated by adding to shareholders' equity the net debt owing to directors. This model, as reported in Bilanas (1987) has an average reliability rate of 83% and is restricted to evaluating manufacturing companies.

2.2 DEVELOPMENT OF THE ALTMAN'S MODEL

Edward I. Altman was the first one to use ratios' in order to determine the bankrupt position of a company. This was first done in 1968. He is known as the father of bankruptcy. He came up with a formula known as the Z-score formula for predicting bankruptcy using financial statement ratios. It is a multivariate formula for measurements of the financial health of a company and a powerful diagnostic tool that forecasts the probability of a company entering into bankruptcy within a period of two years or one year. This model is a statistical technique used to classify an observation or make predictions in problems where the dependant variable appears in qualitative form. It is therefore unlike in the tradition ratio analysis where each ratio was analyzed at a time, or the other models that were just a build up of Altman's work. It is able to consider an entire profile of characteristics common to the relevant firms as well as interactions of these properties (Heine 2000).

In his model, Altman (1968) had an original data sample consisting of 66 firms, half of which had failed due to bankruptcy. All businesses used were manufacturing firms, and small firms with assets of less than \$1 million were eliminated. An extensive research was done using various variables and those that did not have a great influence or significance to the formula when measured independently were dropped. This was done using several computer runs. In order to arrive at the final profile of variables, the following procedures were utilized:

- a) Observation of statistical significance of various alternatives functions; including determination of the relative contributions of each independent variable.
- b) Evaluation of inter-correlation among the relevant variables.
- c) Observation of the predictive accuracy of the various profiles.

d) Judgment of the analyst.

2.2.1 Initial Z-Score Model

It was developed in 1968 as follows:

$$Z = 1.2X_{\text{sub.1}} + 1.4X_{\text{sub.2}} + 3.3X_{\text{sub.3}} + 0.6X_{\text{sub.4}} + 1.0X_{\text{sub.5}}$$

Where $X_{\text{sub.1}}$ = Working Capital/Total Assets (WC /TA)

This measures liquid assets in relation to the firm's size. For example, it measures the net liquid assets of the firm relative to the total capitalization. Working capital is the difference between current assets and current liabilities.

Where $X_{\text{sub.2}}$ = Retained Earnings/Total Assets (RE/TA)

This is a measure of cumulative profitability that reflects the firm's age as well as earning power. Studies have shown failure rates to be closely related to the age of the business. The incidence of failure is much higher in a firm's early years. In 1993, approximately 50% of all firms in the US that failed did so in the first five years of existence (Dun and Bradstreet 1994). This is also true in many other countries.

Where $X_{\text{sub.3}}$ = Earnings before Income Taxes/Total Assets (EBIT/TA)

This is a measure of operating efficiency separated from any leverage effects. It recognizes operating earnings as a key to long-run viability.

Where $X_{\text{sub.4}}$ = Market Value of Equity/Book Value of Debt (MVE/TL)

This ratio gives look into market dimension. Equity is measured by combined market values of all shares of stock, preferred and common, while liabilities include both current and long term. The measure shows how much the firm's assets can decline in value (measured by market value of equity plus debt) before the liabilities exceed the

assets and the firm become insolvent. Studies from stock markets like the Nairobi Stock Exchange in Kenya suggest that security price changes may foreshadow upcoming problems. The reciprocal of X4 is a modified version of one of the variables used effectively by Fisher (1959) in a study of corporate bond yield- spread differentials. It appears to be more effective predictor of bankruptcy than a more commonly used ratio of net worth to total debt (book values).

Where $X_{sub.5} = \text{Sales/Total Assets (S/TA)}$

This is a standard turnover measure that varies greatly from one industry to another. It illustrates the sales generating capacity of the firm's assets and it is a measure of management's capacity in dealing with competitive conditions.

To assess any firm's likelihood of bankruptcy, we would compare their Z score with the predetermined cutoffs:

- a) Bankrupt if it is less than 1.81
- b) Zone of ignorance or gray area if it is within 1.81-2.99
- c) Non bankrupt if it is greater than 2.99

This Z score has been tested and proven successful in the real world. It can correctly predict 70% of bankruptcies two years prior to the event. Z score profiles for failing businesses often indicate a consistent downward trend as they approach bankruptcy.

After this model was developed, it was found to be wanting as it only represented the manufacturing, publicly owned companies those that had their shares listed in the stock markets. He (Altman) thus went further and developed two more formulas, which would accommodate the private firms and the non-manufacturing companies.

2.2.1.1 Privately Held Firms

If a company's stock is not publicly traded, the X4 term (Market Value of Equity/Book Value of Debt) cannot be calculated. To correct for this problem, the Z score can be re-estimated using book values of equity. This provides the following score: $Z.1 = .717X.sub.1 + .847X.sub.2 + 3.107X.sub.3 + .420X.sub.4 + .998X.sub.5$

The predetermined cutoffs for the Z.sub.1 score are as follows:

- a) Bankrupt if Z score is less than 1.23
- b) Zone of ignorance or gray area if Z score is within 1.23-2.90
- c) Non bankrupt if Z score is greater than 2.90

2.2.1.2 Non manufacturing Firms

The X.sub.5 (Sales/Total Assets) ratio is believed to vary significantly by industry. It is likely to be higher for merchandising and service firms than for manufacturers, since the former is typically less capital intensive. Consequently, non-manufacturers would have significantly higher asset turnover and hence, Z scores. The model is thus likely to under predict certain sorts of bankruptcy. To correct for this potential defect, Altman recommends the following correction that eliminates the X.sub.5 ratio to come up with: $Z.2 = 6.56X.sub.1 + 3.26X.sub.2 + 6.72X.sub.3 + 1.05X.sub.4$

The predetermined cutoffs for the Z score are as follows:

- a) Bankrupt if Z score is less than 1.10
- b) Zone of ignorance if Z score is within 1.10-2.60
- c) Non bankrupt if Z score is greater than 2.60

It is important to note that Altman's original data sample consisted of large firms with assets in excess of \$1 million. The most recent model had businesses with assets

averaging approximately \$100 million. If it is believed that smaller firms have significantly different ratios from larger entities, then the use of Z scores may not be appropriate. This therefore necessitated a revision of the initial model.

2.2. 2 A revised Z score model

Later in 1983, Altman modified the original Z score model by analyzing the characteristics and accuracy of a model without X1 (i.e., Sales/total assets). This was in order to minimize the potential industry, which is more likely to take place when such an industry- sensitive asset turnover is included. It was also used for small firms outside the U.S. and it uses the book value of equity in X4, thus be said to contain all the defects of the previous model. Nevertheless, the classification results are identical to the non-manufacturing Z score model but were taken to be applicable. The revised model is as follows; $Z=6.56(X1) +3.26(X2) +6.72(X3)+1.05(X4)$

Where, X1= Networking capital/Total Assets.

X2= Accumulated Retained Earnings/Total Assets.

X3= EBIT/Total Assets.

X4= Book Value Equity/Total Liabilities.

The critical categories used by Altman to predict financial distress, based on Z Model are:

- a) Bankrupt if Z is less than 1.10
- b) Zone of ignorance or gray area if Z is between 1.10-2.60
- c) Non bankrupt if Z is greater than 2.60.

Altman, Hatzell and Peck (1995) have greatly applied this model. It is said to be useful within an industry where the type of financing of assets differs greatly among

firms and important adjustments, like less capitalization are made, hence making it favorable for the small firms in the developing countries like Kenya.

In this paper therefore, the research will in the later chapters use the new developed model to assess the Kenyan situation in the commercial banks in relation to those that have gone bankrupt and those that are successful.

2.3 CAUSES OF BUSINESS FAILURES

This is an outline of some of the causes of business failures. Business failure can be defined as a business which have: ceased operations following assignment or bankruptcy; ceased operations with losses to creditors; has voluntarily withdrawn leaving unpaid debts; involved in court actions including reorganization or receivership, or voluntary compromised with creditors (Altman 1991).

Sundarajan and Tomas (1991) describes financial crises as a situation in which a significant group of financial institutions have liabilities exceeding the market values of their assets, leading to runs on the financial institutions, portfolio shifts, and corrupts of the same financial firms. Also mentioned is an increase in the share of non-performing loans; an increase in losses (because of foreign exchange exposure, interest rates mismatch, contingent liabilities etc.) and a decrease in the value of investments which causes solvency problems in the financial system leading to liquidation, merges and restructuring.

Altman (1991) gives three major factors as the causes of business failure and hence bankruptcy:

a) **Economic factors**- this may include factors like industry weakness, insufficient

profits, inadequate sales, lack of competitiveness, poor growth prospects, poor location, and inventory difficulties.

- b) **Financial factors**- they may include insufficient capital, heavy operating expenses, and burdensome institutional debts.
- c) **Managerial factors**- it involves lack of business knowledge, lack of line experience and lack of management experience.

Kenya has experienced major failures of banks and financial institutions over the past years. The table gives a number summary of the financial institutions and banks that have failed since the year 1984 to 2003.

TABLE 1. BANKS AND FINANCIAL INSTITUTIONS RATE OF CLOSURE IN KENYA

Year	Number of banks and other financial institutions that failed
1984-1990	11
1991-1995	16
1996-2000	10
2001-2003	3

Source: Central Bank of Kenya 2004

The major causes of these failures are as given below:

- a) **Non performing loans**- this is where banks have been completely unable to recover most of the loans it has advanced to its customers hence leading to financial problems in the bank.
- b) **Insider dealings or loans (unsecured)** - most banks advances loans to its employees without any security on the loan hoping to recover from the employee's salary. Some may leave the job or others are the senior managers who

refuse to repay the loan. The bank thus faces the risk of not recovering the amount.

- c) **Mismanagement**- some of the managers lack experience in the management field or lack knowledge in the business arena thus not being able to come up with proper strategies to be applied by the banks.
- d) **Ineffective boards**- if the Board of Directors of the bank is not business oriented or its' politically elected, they may fail to uphold the mission of the bank thus being ineffective or unable to administer the duties bestowed on them.
- e) **Under capitalization**- this is where a bank has less share capital than what is required for it to operate normally.
- f) **Poor credit facility**- in this case, a bank lacks qualified personnel who are able to deal with the issues of credit facilities.

Other factors

According to the Central Bank of Kenya (2004) the following are other factors of failures:

- a) Assets and liabilities mismatch- Liabilities being more than the assets.
- b) Credit concentration- Relying too much on credit facilities to its customers as the means of getting money.
- c) Violation of banking Act hence leading to license revocation.
- d) Malpractice in clearing house- Not following the required regulation at the clearinghouse.
- e) Malpractice in foreign exchange (forex).
- f) Domino effect
- g) Malpractice by directors
- h) Running the banks with Deposits from customers.

I) Cheque Kiting

2.4 FINDINGS OF PREVIOUS EMPIRICAL STUDIES

Scholars both in Kenya and outside Kenya have done research in the field of Z score model and the causes of business failure. They have come up with different findings in their studies. In Thailand, Buggakupta, in the paper 'The Development of a Thai Model': concluded that the findings of the paper were in consent with the Altman's study of bankruptcy. In relation to cause of business failure; Johnston (1991) explored the financial system in Thailand where financial crisis was experienced in the first half of 1980's largely due to poor financial management practices, inadequate regulation and supervision. The crisis was aggregated by the slow down in economic activity in the period. Thai authority had to intervene in 1993 and control the situation.

In Japan, Shirata (1998) who deviated from the Altman model calculations developed a Japan's bankruptcy prediction model but the two models are similar in their findings in relation to prediction ability. South Africa has also tested the Altman's model in the paper 'A two stage Model for the prediction of corporate failure in South Africa'. They found out that Z score should be added to the tradition tools to predict bankruptcy.

Canova (1994) establishes a historical analysis financial crisis in the United States by viewing hypothesis that have been put forward to explain the chain of events that leads to a crisis in the financial sector. He observes that banking panics occurred almost simultaneously with financial crisis and stock market crashes and traces the routes of such panics to liquidity difficulties experienced by the business sector. The study attempts to link financial distress to general economic conditions and states that

such crisis are more likely to occur in seasons when the money market is tight or at peak of the business cycle when profits are declining. A model from the study on the basis of microeconomic variables however, yields a poor predictive habit.

Frederikslust (1978) has developed a model for the prediction of corporate failure that attempts to predict distress on the basis of both a varieties of ratios from industry and economic variables. He introduces import industry variable and the general economic variables on financial distress in the study. Winakor and Smith (1935) in their studies on corporate failure concludes that the ratio of working capital to total assets was the most accurate and speedy indicator of failure with its decline beginning as early as 10 years before the occurrence of financial difficulty. This study however suffered shortcoming of lack of contrasting control group and as a result their result are generally not regarded as being conclusive. The earliest credible research however, was conduct by Menoin (1942) that concluded that three ratios were sensitive predictors of discontinuous with a predictive ability as many as five years before the occurrence of bankruptcy. These ratios were working capital to total assets, net worth to debt and the current ratio.

In Kenya, various researches have been done in the area of bankruptcy and financial ratios. Other researchers have tried to explain the causes of business failure and various conclusions have been achieved. Jonah (2000) in his seminar paper concluded that the multivariate models using Z score could be used to measure financial performance in Kenya. He suggests that there is need to compute the Z score on date from the Kenyan institutions such as banks. Research comparable to Bearer (1966) has been carried out in this country by Keige (1991) who was able to develop a

discriminate function that was able to predict failure with up to 90% accuracy up to two years before the event. The study identified three key categories of ratios that were crucial to bankruptcy prediction of the Kenyan context as liquidity, leverage and activity ratios.

Waciira (1996) in his study establishes a linear model to explain the relationship between computed measures of liquidity and three micro economic indicators (inflation, NSE index and interest rates) by use of ratios. He identified four major categories of sectors: agriculture, commercial, financial and industrial in the NSE. He found out that there exist moderate to strong relationship between liquidity and economic conditions and that substantial differences in their relationship described above exist as a result of the nature of operations undertaken by the funds which are reflected in their industry classification. The study further establishes that commercial, industrial and agricultural sectors have responses similar to each other but the financial sector appears to differ significantly from the other sectors.

Bett (1992) established a multivariate analysis model for predicting financial failure in the Kenyan banking system by discriminating against various financial performance ratios. He established that financial ratios are able to discriminate between failed and no failed banks perfectly and so the Kenyan authorities can develop an early warning system to detect future problem in banks. The study realized that liquidity and profitability ratios are significant discriminates and can be used to predict Kenyan bank failures.

Kathanje (2000) formulated a multivariate performance predictive model for the banking sector using financial ratios. The study established that liquidity, gearing, and

earning has the greatest influence on the sectors financial performance. This model can be used to signal performance trends in the sector paving way for a future detailed financial evaluation aimed at unearthing the financial problems in the respective institutions. Mugo (2001) in his Unpublished MBA thesis, on “applicability of financial crisis predictive model to bank failures in Kenya” concluded that financial models are useful in predicting the likelihood of bank failures in Kenya.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1. RESEARCH DESIGN

This section gives a preamble to the methodology that was adopted and used in this study. An explanatory research design was used in the study and the target was commercial banks in Kenya.

The population of interest comprises of the forty-three currently operating commercial banks in Kenya and the banks, which failed between the years 1994 to 2003.

The sample used includes 5 banks that failed and 5 banks that did not fail during the period 1994 to 2003.

The research used purposive sampling procedure. It focused on those banks whose financial statements for the years of interest were available

The project involved the use of document's analysis. This is the analysis of the Financial Statements of the selected banks by calculating their financial ratios as per Altman model. These ratios when weighted in the Z score formula gives the overall Z score that is checked against the Z score cut off limit.

3.2 DATA COLLECTION

The review of official documents was used. The study largely relied on secondary data obtained from the Central bank of Kenya and from the banks Financial Statements of various years. The data collected was two-year and one –year period prior to the year of failure. It was then matched with those of the banks that did not fail over the same period. Equally, there was the use of primary data obtained from the questionnaire that were self-administered. The questionnaire was structured

consisting of mainly closed-ended questions and a few open-ended questions.

3.3 DATA ANALYSIS TECHNIQUE

The data then went through the pattern matching technique where the results of the Z score of various banks were calculated. The Z score is the weighted sum of Networking capital/Total Assets, Accumulated Retained Earnings/Total Assets, EBIT/Total Assets, and Book Value Equity/Total Liabilities. These ratios differ from bank to bank and from year to year. The calculated Z score is then matched with the Z score set cut off point and a conclusion reached as to whether the two agree. It involved the use of a holistic analysis approach (i.e., where conclusions are drawn based on the text as a whole and not on various individual variables. In this case, conclusion is based on the total Z score value and not on the value of the individual ratios).

3.4 DATA ANALYSIS AND FINDINGS

3.4.1 Successful Banks

1) Fina Bank

FINA BANK

FINANCIAL YEAR: 1996

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$119140472/4717117691=0.0422$	*6.5	0.2744
X2	Accumulated retained earnings/Total assets	$52635984/4717117691=0.0112$	*3.26	0.0364
X3	EBIT/Total assets	$43505153/4717117691=0.0092$	*6.72	0.0620
X4	Book Value of Equity/Total liabilities	$260000000/44044481707=0.0590$	*1.05	0.0620
TOTAL WEIGHTED Z SCORE				0.4348

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is likely to face bankruptcy within the next twelve to eighteen months as its Z score is 0.43, which is below 1.10 level. It is in the bankruptcy zone and management should try to improve the situation.

FINA BANK

FINANCIAL YEAR: 1997

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$226631376/5100349147=0.0444$	*6.5	0.2889
X2	Accumulated retained earnings/Total assets	$98136613/5100349147=0.0192$	*3.26	0.0627
X3	EBIT/Total assets	$72014309/5100349147=0.0141$	*6.72	0.0945
X4	Book Value of Equity/Total liabilities	$260000000/4743212534=0.0548$	*1.05	0.0576
TOTAL WEIGHTED Z SCORE				0.5037

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is likely to face bankruptcy within the next twelve to eighteen months as it is in the bankruptcy zone. However, there is an improvement from the previous period performance.

FINA BANK

FINANCIAL YEAR: 1998

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$274373676/4330087158=0.0634$	*6.5	0.4119
X2	Accumulated retained earnings/Total assets	$147385494/4330087158=0.0340$	*3.26	0.1110
X3	EBIT/Total assets	$71547869/4330087158=0.0165$	*6.72	0.1110
X4	Book Value of Equity/Total liabilities	$260000000/3922701664=0.0663$	*1.05	0.0696
TOTAL WEIGHTED Z SCORE				0.7035

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is likely to face bankruptcy within the next twelve to eighteen months as it is in the bankruptcy zone. However, it recorded an improvement in performance from the previous period.

FINA BANK

FINANCIAL YEAR: 1999

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$228546247/4624440975=0.0494$	*6.5	0.3212
X2	Accumulated retained earnings/Total assets	$179261975/4624440975=0.0388$	*3.26	0.1264
X3	EBIT/Total assets	$55939881/4624440975=0.0121$	*6.72	0.0813
X4	Book Value of Equity/Total liabilities	$260000000/4185179000=0.0621$	*1.05	0.0652
TOTAL WEIGHTED Z SCORE				0.5941

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is likely to face bankruptcy within the next twelve to eighteen months as it is in the bankruptcy zone. There is a fall in performance.

FINA BANK

FINANCIAL YEAR: 2000

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$272804000/4649104000=0.0587$	*6.5	0.3814
X2	Accumulated retained earnings/Total assets	$214625000/4649104000=0.0462$	*3.26	0.1505
X3	EBIT/Total assets	$51163000/4649104000=0.011$	*6.72	0.0740
X4	Book Value of Equity/Total liabilities	$474625000/4174479000=0.1137$	*1.05	0.1194
TOTAL WEIGHTED Z SCORE				0.7253

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is likely to face bankruptcy within the next twelve to eighteen months as it is in the bankruptcy zone. There is however an improvement in performance.

FINA BANK

FINANCIAL YEAR: 2001

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$294919000/4642423000=0.0635$	*6.5	0.4129
X2	Accumulated retained earnings/Total assets	$157933000/4642423000=0.3400$	*3.26	0.1109
X3	EBIT/Total assets	$51592000/4642423000=0.0111$	*6.72	0.0747
X4	Book Value of Equity/Total liabilities	$507933000/4134490000=0.1094$	*1.05	0.1149
TOTAL WEIGHTED Z SCORE				0.7134

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is likely to face bankruptcy within the next twelve to eighteen months as it is in the bankruptcy zone. Its score is below 1.10 and management should work to improve this situation.

FINA BANK

FINANCIAL YEAR: 2002

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$435676000/5291397000=0.0823$	*6.5	0.5352
X2	Accumulated retained earnings/Total assets	$203831000/5291397000=0.0385$	*3.26	0.1256
X3	EBIT/Total assets	$72629000/5291397000=0.0137$	*6.72	0.0922
X4	Book Value of Equity/Total liabilities	$553831000/4737566000=0.1169$	*1.05	0.1227
TOTAL WEIGHTED Z SCORE				0.8757

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is likely to face bankruptcy within the next twelve to eighteen months as it is in the bankruptcy zone. There is a slight improvement from the previous period performance.

FINA BANK

FINANCIAL YEAR: 2003

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$512183000/5804906000=0.0882$	*6.5	0.5735
X2	Accumulated retained earnings/Total assets	$228578000/5804906000=0.0394$	*3.26	0.1284
X3	EBIT/Total assets	$105921000/5804906000=0.0182$	*6.72	0.1226
X4	Book Value of Equity/Total liabilities	$628578000/5176328000=0.1214$	*1.05	0.1275
TOTAL WEIGHTED Z SCORE				0.9520

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is likely to face bankruptcy within the next twelve to eighteen months as it is in the bankruptcy zone. However, there is an improvement from the previous period performance.

2) Commercial Bank of Africa (CBA)

COMMERCIAL BANK OF AFRICA

FINANCIAL YEAR: 1994

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$\frac{360004000}{273000} = 0.0843$	*6.5	0.5481
X2	Accumulated retained earnings/Total assets	$\frac{188352000}{273000} = 0.0441$	*3.26	0.1438
X3	EBIT/Total assets	$\frac{467980000}{273000} = 0.1096$	*6.72	0.7366
X4	Book Value of Equity/Total liabilities	$\frac{593034000}{239000} = 0.1613$	*1.05	0.1694
TOTAL WEIGHTED Z SCORE				1.5979

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is the gray zone area as its z score is more than 1.1. It therefore has a low probability of bankruptcy within the next twelve to eighteen months. The financial health of the bank is good.

COMMERCIAL BANK OF AFRICA

FINANCIAL YEAR: 1995

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$413597000/5618010000=0.0736$	*6.5	0.4785
X2	Accumulated retained earnings/Total assets	$210009000/5618010000=0.0374$	*3.26	0.1219
X3	EBIT/Total assets	$363342000/5618010000=0.0647$	*6.72	0.4346
X4	Book Value of Equity/Total liabilities	$710009000/4908001000=0.1447$	*1.05	0.1519
TOTAL WEIGHTED Z SCORE				1.1869

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is the gray zone area as its z score is more than 1.1. It therefore has a low probability of bankruptcy within the next twelve to eighteen months. The financial health of the bank is good.

COMMERCIAL BANK OF AFRICA

FINANCIAL YEAR: 1996

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$549972000/7876555000=0.0698$	*6.5	0.4539
X2	Accumulated retained earnings/Total assets	$289460000/7876555000=0.0367$	*3.26	0.1198
X3	EBIT/Total assets	$473324000/7876555000=0.0601$	*6.72	0.4038
X4	Book Value of Equity/Total liabilities	$989460000/6887095000=0.1437$	*1.05	0.1509
TOTAL WEIGHTED Z SCORE				1.1284

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is the gray zone area as its z score is more than 1.1. It therefore has a low probability of bankruptcy within the next twelve to eighteen months. The financial health of the bank is good.

COMMERCIAL BANK OF AFRICA

FINANCIAL YEAR: 1997

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$720265000/9288009000=0.0775$	*6.5	0.5041
X2	Accumulated retained earnings/Total assets	$336267000/9288009000=0.0362$	*3.26	0.1180
X3	EBIT/Total assets	$577733000/9288009000=0.0622$	*6.72	0.4180
X4	Book Value of Equity/Total liabilities	$1186267000/8101742000=0.1464$	*1.05	0.1537
TOTAL WEIGHTED Z SCORE				1.1938

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is the gray zone area as its z score is more than 1.1. It therefore has a low probability of bankruptcy within the next twelve to eighteen months. The financial health of the bank is good.

COMMERCIAL BANK OF AFRICA

FINANCIAL YEAR: 1998

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$895798000/12081042000=0.0741$	*6.5	0.4820
X2	Accumulated retained earnings/Total assets	$380908000/12081042000=0.0315$	*3.26	0.1027
X3	EBIT/Total assets	$561500000/12081042000=0.0465$	*6.72	0.3123
X4	Book Value of Equity/Total liabilities	$1380908000/10700134000=0.1291$	*1.05	0.1355
TOTAL WEIGHTED Z SCORE				1.0325

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankruptcy zone area as its z score is less than 1.10, this means that the bank is likely to face bankruptcy soon and so care should on its financial performance. There is a drop from the previous period performance.

COMMERCIAL BANK OF AFRICA

FINANCIAL YEAR: 1999

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$1019448000/11871932000=0.0859$	*6.5	0.5582
X2	Accumulated retained earnings/Total assets	$489168000/11871932000=0.0412$	*3.26	0.1343
X3	EBIT/Total assets	$455848000/11871932000=0.0384$	*6.72	0.2580
X4	Book Value of Equity/Total liabilities	$1469168000/10382764000=0.1429$	*1.05	0.1500
TOTAL WEIGHTED Z SCORE				1.1005

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the gray zone area as its z score is slightly above 1.10, this is an improvement from the previous period performance. There is therefore a low probability of bankruptcy.

COMMERCIAL BANK OF AFRICA

FINANCIAL YEAR: 2003

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$1494348000/18396440000=0.0812$	*6.5	0.5280
X2	Accumulated retained earnings/Total assets	$718056000/18396440000=0.0390$	*3.26	0.1272
X3	EBIT/Total assets	$568126000/18396440000=0.0309$	*6.72	0.2075
X4	Book Value of Equity/Total liabilities	$1779938000/16436502000=0.0968$	*1.05	0.1016
TOTAL WEIGHTED Z SCORE				0.9643

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankruptcy zone area as its z score is less than 1.10, it has dropped in performance and it is likely to face bankruptcy.

COMMERCIAL BANK OF AFRICA

FINANCIAL YEAR: 2004

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$1383317000/20189383000=0.0685$	*6.5	0.4454
X2	Accumulated retained earnings/Total assets	$953107000/20189383000=0.0472$	*3.26	0.1529
X3	EBIT/Total assets	$437092000/20189383000=0.0217$	*6.72	0.1454
X4	Book Value of Equity/Total liabilities	$1962408000/18226975000=0.1077$	*1.05	0.1130
TOTAL WEIGHTED Z SCORE				0.8567

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankruptcy zone area as its z score is less than 1.10, this means that the bank is likely to face bankruptcy within the next twelve to eighteen months.

3) Middle East Bank (MEB)

MIDDLE EAST BANK

FINANCIAL YEAR: 1995

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$278254000/3156519000=0.0882$	*6.5	0.5730
X2	Accumulated retained earnings/Total assets	$89214000/3156519000=0.0283$	*3.26	0.0921
X3	EBIT/Total assets	$145078000/3156519000=0.0460$	*6.72	0.3089
X4	Book Value of Equity/Total liabilities	$287539000/286898000=0.1002$	*1.05	0.1052
TOTAL WEIGHTED Z SCORE				1.0792

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankruptcy zone area as its z score is less 1.10. It therefore has a likelihood of facing bankruptcy within twelve to eighteen months

MIDDLE EAST BANK

FINANCIAL YEAR: 1996

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$272254000/3433307000=0.0793$	*6.5	0.5154
X2	Accumulated retained earnings/Total assets	$49915000/3433307000=0.0145$	*3.26	0.0473
X3	EBIT/Total assets	$162252000/3433307000=0.0473$	*6.72	0.3176
X4	Book Value of Equity/Total liabilities	$380457000/3052850000=0.1246$	*1.05	0.1309
TOTAL WEIGHTED Z SCORE				1.0112

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankruptcy zone area as its z score is less 1.10. It has the likelihood of facing bankruptcy soon within twelve to eighteen months and so the financial position should be improved.

MIDDLE EAST BANK

FINANCIAL YEAR: 1997

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$425188000/3967241000=0.1072$	*6.5	0.6966
X2	Accumulated retained earnings/Total assets	$49552000/3967241000=0.0125$	*3.26	0.0407
X3	EBIT/Total assets	$104309000/3967241000=0.0263$	*6.72	0.1767
X4	Book Value of Equity/Total liabilities	$556383000/3410858000=0.1631$	*1.05	0.1712
TOTAL WEIGHTED Z SCORE				1.0852

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankruptcy zone area as its z score is less 1.10. There is an improvement from the previous period performance, though there is still the likelihood of bankruptcy.

MIDDLE EAST BANK

FINANCIAL YEAR: 1998

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$421250000/4099877000=0.1027$	*6.5	0.6679
X2	Accumulated retained earnings/Total assets	$106987000/4099877000=0.0261$	*3.26	0.0851
X3	EBIT/Total assets	$182538000/4099877000=0.0445$	*6.72	0.2992
X4	Book Value of Equity/Total liabilities	$613818000/3486059000=0.1761$	*1.05	0.1849
TOTAL WEIGHTED Z SCORE				1.2371

DIAGNOSIS:

- If Z score is less than 1.10, then the bank is in a bankruptcy zone.
- If Z score is between 1.10 and 2.60, the bank is in the gray zone area.
- If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

This is an improvement from the previous period performance. The bank is the gray zone area as its z score is more than 1.1. It therefore has a low probability of bankruptcy within the next twelve to eighteen months. The financial health of the bank is good.

MIDDLE EAST BANK

FINANCIAL YEAR: 1999

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$337192000/4270857000=0.0790$	*6.5	0.5132
X2	Accumulated retained earnings/Total assets	$128000000/4270857000=0.0230$	*3.26	0.0977
X3	EBIT/Total assets	$110245000/4270857000=0.0258$	*6.72	0.1735
X4	Book Value of Equity/Total liabilities	$634831000/3636026000=0.1746$	*1.05	0.1833
TOTAL WEIGHTED Z SCORE				0.9677

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

There is a fall in performance from the previous period performance. The z score is in a bankrupt zone and so there is likelihood of facing bankruptcy in the near future of twelve to eighteen months.

MIDDLE EAST BANK

FINANCIAL YEAR: 2000

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$260179000/4142505000=0.0628$	*6.5	0.4082
X2	Accumulated retained earnings/Total assets	$154096000/4142505000=0.0372$	*3.26	0.1213
X3	EBIT/Total assets	$111191000/4142505000=0.0268$	*6.72	0.1804
X4	Book Value of Equity/Total liabilities	$660927000/3430895000=0.1926$	*1.05	0.2023
TOTAL WEIGHTED Z SCORE				0.9122

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

There is a fall in performance from the previous period performance. The Z score is in a bankrupt zone and this position should be improved.

MIDDLE EAST BANK

FINANCIAL YEAR: 2001

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$375461000/4074517000=0.0921$	*6.5	0.5990
X2	Accumulated retained earnings/Total assets	$170500000/4074517000=0.0418$	*3.26	0.1364
X3	EBIT/Total assets	$80100000/4074517000=0.0197$	*6.72	0.1321
X4	Book Value of Equity/Total liabilities	$677331000/3359174000=0.2016$	*1.05	0.2117
TOTAL WEIGHTED Z SCORE				1.0792

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is in a non bankruptcy zone.

CONCLUSION:

There is an improvement in performance from the previous period performance. However, the Z score is still in the bankrupt zone, thus still having the risk of becoming bankrupt.

MIDDLE EAST BANK

FINANCIAL YEAR: 2002

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$408702000/3918442000=0.1043$	*6.5	0.6780
X2	Accumulated retained earnings/Total assets	$180128000/3918442000=0.0460$	*3.26	0.1499
X3	EBIT/Total assets	$59857000/3918442000=0.0153$	*6.72	0.1027
X4	Book Value of Equity/Total liabilities	$686959000/3201073000=0.2146$	*1.05	0.2253
TOTAL WEIGHTED Z SCORE				1.1559

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone

CONCLUSION:

There is an improvement in performance from the previous period performance. The bank is the gray zone area as its z score is more than 1.10. It therefore has a low probability of bankruptcy within the next twelve to eighteen months. The financial health of the bank is good.

MIDDLE EAST BANK

FINANCIAL YEAR: 2003

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$450680000/3455340000=0.1304$	*6.5	0.8478
X2	Accumulated retained earnings/Total assets	$203290000/3455340000=0.0588$	*3.26	0.1918
X3	EBIT/Total assets	$790870000/3455340000=0.0229$	*6.72	0.1538
X4	Book Value of Equity/Total liabilities	$710826000/2714104000=0.2619$	*1.05	0.2750
TOTAL WEIGHTED Z SCORE				1.4684

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

There is an improvement in performance from the previous period performance. The bank is the gray zone area as its z score is more than 1.1. It therefore has a low probability of bankruptcy within the next twelve to eighteen months. The financial health of the bank is good.

4) K-Rep Bank

K-REP BANK

FINANCIAL YEAR: 2000

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$409491333/962638054=0.4254$	*6.5	2.7650
X2	Accumulated retained earnings/Total assets	$6834827/962638054=0.0071$	*3.26	0.0231
X3	EBIT/Total assets	$13499448/962638054=0.0140$	*6.72	0.0942
X4	Book Value of Equity/Total liabilities	$506834827/455803227=1.1120$	*1.05	1.1676
TOTAL WEIGHTED Z SCORE				4.0499

DIAGNOSIS:

- If Z score is less than 1.10, then the bank is in a bankruptcy zone.
- If Z score is between 1.10 and 2.60, the bank is in the gray zone area.
- If Z score is greater than 2.60, then the bank is a non bankruptcy zone

CONCLUSION:

This is the bank's first financial year of operation and it has a Z score of 4.0499. It is in the non bankrupt zone and has a good performance.

K-REP BANK

FINANCIAL YEAR: 2001

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$452204635/1173335398=0.3854$	*6.5	2.5051
X2	Accumulated retained earnings/Total assets	$49027850/1173335398=0.0418$	*3.26	0.1362
X3	EBIT/Total assets	$56889520/1173335398=0.0485$	*6.72	0.3258
X4	Book Value of Equity/Total liabilities	$549027850/624307548=0.8794$	*1.05	0.9234
TOTAL WEIGHTED Z SCORE				3.8905

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is above 2.60 and hence it is in the non-bankruptcy zone. These shows a good performance and it should continue like this or even do better.

K-REP BANK

FINANCIAL YEAR: 2002

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$\frac{511512597}{1673519861} = 0.3057$	*6.5	1.9867
X2	Accumulated retained earnings/Total assets	$\frac{109303572}{1673519861} = 0.0653$	*3.26	0.2129
X3	EBIT/Total assets	$\frac{86285785}{1673519861} = 0.0516$	*6.72	0.3465
X4	Book Value of Equity/Total liabilities	$\frac{609303572}{1064216289} = 0.5725$	*1.05	0.6012
TOTAL WEIGHTED Z SCORE				3.1473

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is the non bankruptcy zone and it is doing quite well though there is a slight decline from the previous year's performance.

K-REP BANK

FINANCIAL YEAR: 2003

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$592717000/2173973000=0.2726$	*6.5	1.7722
X2	Accumulated retained earnings/Total assets	$188890000/2173973000=0.0869$	*3.26	0.2832
X3	EBIT/Total assets	$114593000/2173973000=0.0527$	*6.72	0.3542
X4	Book Value of Equity/Total liabilities	$688890000/1485083000=0.4639$	*1.05	0.4871
TOTAL WEIGHTED Z SCORE				2.8967

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is doing fine with a Z score of 2.89 that puts it in the non-bankrupt zone. Its financial health is good.

5) Investments and Mortgages Bank limited (I&M)

INVESTMENTS & MORTGAGES BANK LIMITED

FINANCIAL YEAR: 2001

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$971403766/7100080070=0.1368$	*6.5	0.8893
X2	Accumulated retained earnings/Total assets	$327911601/7100080070=0.0462$	*3.26	0.1506
X3	EBIT/Total assets	$101103626/7100080070=0.0142$	*6.72	0.0957
X4	Book Value of Equity/Total liabilities	$1117911601/5982168469=0.1869$	*1.05	0.1962
TOTAL WEIGHTED Z SCORE				1.3318

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is the gray zone area and so it should work harder and get to the non-bankrupt zone as it is easy to drop to the bankrupt zone.

INVESTMENTS & MORTGAGES BANK LIMITED

FINANCIAL YEAR: 2002

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$1013788664/7176411133=0.1413$	*6.5	0.9182
X2	Accumulated retained earnings/Total assets	$342677559/7176411133=0.0478$	*3.26	0.1557
X3	EBIT/Total assets	$108765920/7176411133=0.0151$	*6.72	0.1018
X4	Book Value of Equity/Total liabilities	$1137677559/6038733574=0.1884$	*1.05	0.1978
TOTAL WEIGHTED Z SCORE				1.3735

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank has a z score of 1.37 which is between 1.10 and 2.60 putting it in the gray zone and it is doing well. However there should be more improvement in the future performance.

INVESTMENTS & MORTGAGES BANK LIMITED

FINANCIAL YEAR: 2003

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$1571984664/12130024720=0.1296$	*6.5	0.8424
X2	Accumulated retained earnings/Total assets	$437755653/12130024720=0.0361$	*3.26	0.1176
X3	EBIT/Total assets	$284833442/12130024720=0.0235$	*6.72	0.1578
X4	Book Value of Equity/Total liabilities	$1696080653/10433944067=0.1398$	*1.05	0.1468
TOTAL WEIGHTED Z SCORE				1.2646

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is the gray zone and it is doing well. There is however a drop from last year's performance.

3.4.2 Banks that went bankrupt

1) Bullion Bank Limited

BULLION BANK LIMITED

FINANCIAL YEAR: 1996

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$147073000/1544941000=0.0952$	*6.5	0.6187
X2	Accumulated retained earnings/Total assets	$37713000/1544941000=0.0244$	*3.26	0.0796
X3	EBIT/Total assets	$18446000/1544941000=0.0119$	*6.72	0.0802
X4	Book Value of Equity/Total liabilities	$197713000/1347228000=0.1468$	*1.05	0.1541
TOTAL WEIGHTED Z SCORE				0.9326

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankruptcy zone as it may face bankruptcy within twelve to eighteen months.

BULLION BANK LIMITED

FINANCIAL YEAR: 1997

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$164229000/192736000=0.0852$	*6.5	0.5639
X2	Accumulated retained earnings/Total assets	$62083000/192736000=0.0322$	*3.26	0.1050
X3	EBIT/Total assets	$40315000/192736000=0.0209$	*6.72	0.1406
X4	Book Value of Equity/Total liabilities	$222083000/1705277000=0.1302$	*1.05	0.1367
TOTAL WEIGHTED Z SCORE				0.9462

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankruptcy zone as it may face bankruptcy within twelve to eighteen months.

2) Daima Bank Limited

DAIMA BANK LIMITED

FINANCIAL YEAR: 1999

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$102576080/705984356=0.1453$	*6.5	0.9444
X2	Accumulated retained earnings/Total assets	(DEFICIT-NO RATIO CALCULATION)	*3.26	—
X3	EBIT/Total assets	(DEFICIT-NO RATIO)	*6.72	—
X4	Book Value of Equity/Total liabilities	$121962877/584021479=0.2088$	*1.05	0.2193
TOTAL WEIGHTED Z SCORE				1.1637

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

Though the bank may be in the gray zone area, the deficit in profits is pointing some warning that should be addressed.

DAIMA BANK LIMITED

FINANCIAL YEAR: 2000

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$76243517/796673653=0.9570$	*6.5	0.6220
X2	Accumulated retained earnings/Total assets	(DEFICIT-NO RATIO CALCULATION)	*3.26	—
X3	EBIT/Total assets	(DEFICIT-NO RATIO)	*6.72	—
X4	Book Value of Equity/Total liabilities	$89471793/707201861=0.1265$	*1.05	0.1328
TOTAL WEIGHTED Z SCORE				0.7548

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

✓ If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankrupt zone area and it may face bankruptcy within twelve to eighteen months.

DAIMA BANK LIMITED

FINANCIAL YEAR: 2001

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$32626406/750348231=0.0435$	*6.5	0.2826
X2	Accumulated retained earnings/Total assets	(DEFICIT-NO RATIO CALCULATION)	*3.26	—
X3	EBIT/Total assets	(DEFICIT-NO RATIO)	*6.72	—
X4	Book Value of Equity/Total liabilities	$38366404/711981831=0.0539$	*1.05	0.0566
TOTAL WEIGHTED Z SCORE				0.3392

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankrupt zone area and it may face bankruptcy within twelve to eighteen months.

DAIMA BANK LIMITED

FINANCIAL YEAR: 2002

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	(DEFICIT-NO RATIO)	*6.5	—
X2	Accumulated retained earnings/Total assets	(DEFICIT-NO RATIO CALCULATION)	*3.26	—
X3	EBIT/Total assets	(DEFICIT-NO RATIO)	*6.72	—
X4	Book Value of Equity/Total liabilities	(DEFICIT-NO RATIO)	*1.05	—
TOTAL WEIGHTED Z SCORE				—

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is already under statutory management as a result of the previous poor performances.

FINANCIAL YEAR: 2003

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	(DEFICIT-NO RATIO)	*6.5	_____
X2	Accumulated retained earnings/Total assets	(DEFICIT-NO RATIO CALCULATION)	*3.26	_____
X3	EBIT/Total assets	(DEFICIT-NO RATIO)	*6.72	_____
X4	Book Value of Equity/Total liabilities	(DEFICIT-NO RATIO)	*1.05	_____
TOTAL WEIGHTED Z SCORE				_____

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is already under statutory management as a result of the previous poor performances.

3) City Finance Bank Limited

CITY FINANCE BANK LIMITED

FINANCIAL YEAR: 1995

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$107365000/2161449000=0.0497$	*6.5	0.3229
X2	Accumulated retained earnings/Total assets	$90283000/2161449000=0.0418$	*3.26	0.1362
X3	EBIT/Total assets	$30030000/2161449000=0.0139$	*6.72	0.0934
X4	Book Value of Equity/Total liabilities	$215283000/1946166000=0.1106$	*1.05	0.1161
TOTAL WEIGHTED Z SCORE				0.6686

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankrupt zone and it may become bankrupt within twelve to eighteen months.

CITY FINANCE BANK LIMITED

FINANCIAL YEAR: 1996

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$126169000/3186128000=0.0396$	*6.5	0.2574
X2	Accumulated retained earnings/Total assets	$105532000/3186128000=0.0331$	*3.26	0.1080
X3	EBIT/Total assets	$26200000/3186128000=0.0082$	*6.72	0.0553
X4	Book Value of Equity/Total liabilities	$230532000/2955596000=0.0780$	*1.05	0.0819
TOTAL WEIGHTED Z SCORE				0.5026

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankrupt zone and it may become bankrupt within twelve to eighteen months.

CITY FINANCE BANK LIMITED

FINANCIAL YEAR: 1997

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$33429000/3549869000=0.0094$	*6.5	0.0612
X2	Accumulated retained earnings/Total assets	$26325000/3549869000=0.0074$	*3.26	0.0242
X3	EBIT/Total assets	(DEFICIT-NO RATIO)	*6.72	—
X4	Book Value of Equity/Total liabilities	$151325000/3398544000=0.0445$	*1.05	0.0468
TOTAL WEIGHTED Z SCORE				0.1322

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankrupt zone and it may become bankrupt within twelve to eighteen months.

4) Trust Bank

TRUST BANK

FINANCIAL YEAR: 1995

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$137927000/11296251000=0.0122$	*6.5	0.0794
X2	Accumulated retained earnings/Total assets	$447252000/11296251000=0.0396$	*3.26	0.1291
X3	EBIT/Total assets	$219831000/11296251000=0.0195$	*6.72	0.1308
X4	Book Value of Equity/Total liabilities	$747252000/10548999000=0.0706$	*1.05	0.0742
TOTAL WEIGHTED Z SCORE				0.4135

DIAGNOSIS:

- ✓ If Z score is less than 1.10, then the bank is in a bankruptcy zone.
- If Z score is between 1.10 and 2.60, the bank is in the gray zone area.
- If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankrupt zone and it may become bankrupt within twelve to eighteen months.

TRUST BANK

FINANCIAL YEAR: 1996

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$163797000/14305621000=0.0114$	*6.5	0.0744
X2	Accumulated retained earnings/Total assets	$295998000/14305621000=0.0207$	*3.26	0.0675
X3	EBIT/Total assets	$128807000/14305621000=0.0013$	*6.72	0.0083
X4	Book Value of Equity/Total liabilities	$795998000/14305621000=0.0556$	*1.05	0.0584
TOTAL WEIGHTED Z SCORE				0.2086

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankrupt zone and it may become bankrupt within twelve to eighteen months.

5) Delphin Bank Limited

DELPHIN BANK LIMITED

FINANCIAL YEAR: 1998

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$392882000/4233959000=0.0928$	*6.5	0.6032
X2	Accumulated retained earnings/Total assets	$174995000/4233959000=0.0413$	*3.26	0.1347
X3	EBIT/Total assets	$26427000/4233959000=0.0062$	*6.72	0.0419
X4	Book Value of Equity/Total liabilities	$474995000/3758964000=0.1264$	*1.05	0.1327
TOTAL WEIGHTED Z SCORE				0.9125

DIAGNOSIS:

- If Z score is less than 1.10, then the bank is in a bankruptcy zone.
- If Z score is between 1.10 and 2.60, the bank is in the gray zone area.
- If Z score is greater than 2.60, then the bank is a non bankruptcy zone

CONCLUSION:

The bank is in the bankrupt zone and it may become bankrupt within twelve to eighteen months.

DELPHIN BANK LIMITED

FINANCIAL YEAR: 1999

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	$492031000/4349491000=0.1131$	*6.5	0.7353
X2	Accumulated retained earnings/Total assets	$93455000/4349491000=0.0215$	*3.26	0.0700
X3	EBIT/Total assets	$35905000/4349491000=0.0083$	*6.72	0.0555
X4	Book Value of Equity/Total liabilities	$593455000/3756036000=0.1580$	*1.05	0.1659
TOTAL WEIGHTED Z SCORE				1.0267

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankrupt zone and it may become bankrupt within twelve to eighteen months.

DELPHIN BANK LIMITED

FINANCIAL YEAR: 2000

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets	(DEFICIT-NO RATIO)	*6.5	—
X2	Accumulated retained earnings/Total assets	(DEFICIT-NO RATIO)	*3.26	—
X3	EBIT/Total assets	(DEFICIT-NO RATIO)	*6.72	—
X4	Book Value of Equity/Total liabilities	$73387000/3552718000=0.0207$	*1.05	0.0217
TOTAL WEIGHTED Z SCORE				0.0217

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non bankruptcy zone.

CONCLUSION:

The bank is in the bankrupt zone and it may become bankrupt very soon as it has deficit in working capital and no reserves.

CHAPTER FOUR

SUMMARY, CONCLUSIONS, LIMITATIONS AND SUGGESTION FOR FURTHER STUDY

4.1 ANALYSIS AND RESULTS

The results has first been classified into three distinctive years (1998, 2001 and 2003) when the banks became bankrupt each having two tables due to the fact of different external factors existing in different periods. They are then merged into two final tables so as a conclusion can be drawn from the findings.

1998

TABLE 2: ONE YEAR PRIOR TO FAILURE

Predicted	Bankrupt	Non-Bankrupt	Total	Classification Accuracy
Actual				
Bankrupt	3	0	3	100%
Non-bankrupt	2	1	3	33%
Total	5	1	6	67%

TABLE 3: TWO YEAR PRIOR TO FAILURE

Predicted	Bankrupt	Non-Bankrupt	Total	Classification Accuracy
Actual				
Bankrupt	3	0	3	100%
Non-bankrupt	2	1	3	33%
Total	5	1	6	67%

2001

TABLE 4: ONE YEAR PRIOR TO FAILURE

Predicted	Bankrupt	Non-Bankrupt	Total	Classification Accuracy
Actual				
Bankrupt	2	0	2	100%
Non-bankrupt	2	1	3	33%
Total	4	1	5	60%

TABLE 5: TWO YEAR PRIOR TO FAILURE

Predicted	Bankrupt	Non-Bankrupt	Total	Classification Accuracy
Actual				
Bankrupt	1	1	2	50%
Non-bankrupt	2	1	3	33%
Total	3	2	5	40%

2003

TABLE 6: ONE YEAR PRIOR TO FAILURE

Predicted	Bankrupt	Non-Bankrupt	Total	Classification Accuracy
Actual				
Bankrupt	1	0	1	100%
Non-bankrupt	1	3	4	33%
Total	2	3	5	80%

TABLE 7: TWO YEAR PRIOR TO FAILURE

Predicted \ Actual	Bankrupt	Non-Bankrupt	Total	Classification Accuracy
Bankrupt	1	0	1	100%
Non-bankrupt	2	2	4	33%
Total	3	2	5	60%

Combined Table

TABLE 8: ONE YEAR PRIOR TO FAILURE

Predicted \ Actual	Bankrupt	Non-Bankrupt	Total	Classification Accuracy
Bankrupt	6	0	6	100%
Non-bankrupt	5	5	10	50%
Total	11	5	16	68.8%

TABLE 9: TWO YEARS PRIOR TO FAILURE

Predicted \ Actual	Bankrupt	Non-Bankrupt	Total	Classification Accuracy
Bankrupt	5	1	6	83%
Non-bankrupt	6	4	10	60%
Total	11	5	16	56.3%

4.2 QUESTIONNAIRE RESULTS' ANALYSIS

The questionnaire feedback showed that the Central bank of Kenya regulates and monitors closely the operations of the banks. It requires them to file their return every after 10 days and it has set certain standard ratios in which a bank should achieve. 30 banks were contacted through emails and also by dropping questionnaires in their offices. Only 20 banks responded giving a response rate of 67%, from which 33% of the banks did not have knowledge about the Altman model and just operates in the Central bank regulations. Others (54%) though they knew about the model, they do not use it but use liquidity ratios or economic trend analysis to check their bankruptcy which is done after every 10 days. 13% of the banks use the Altman model concept to evaluate their bankruptcy situation on a yearly basis. They agree that the model is applicable in their banks though they differ according to the degree of accuracy though on average, the model has an accuracy of 70% for the first

4.3 CONCLUSIONS

A keen look at the tables reveals a decline in prediction ability from year one to year two except for 1998 that is constant. Working with the figures of the combined tables, Altman's Model has 68.8% accuracy in predicting bankruptcy in Kenya's commercial banks in the first year. In the second year, there is a decline to 56.3% in the prediction. This can be put in a hypothesis tests table.

TABLE 10: HYPOTHESIS TESTS SUMMARY

	Hypothesis description	Decision
H I	The level of predictive accuracy of the Altman's prediction model when applied to Kenya's Commercial banks is less than or equal to 50%.	Rejected
H II	The level of predictive accuracy of the Altman's prediction model when applied to Kenya's Commercial banks is greater than 50%.	Accepted

The study therefore concludes that we can use the Altman's bankruptcy model in Kenya's commercial banks.

In regard to the use of Altman model in Kenya, though many banks do not use it, the few that use it agree that it is applicable. Banks should therefore take an active role in determining their bankruptcy position. This will help them be able to predict their position for the coming two years avoiding a repeat of a case of many banks liquidating as seen in the past for example in 1993 where 14 banks went into bankruptcy.

4.4 LIMITATIONS OF THE STUDY

The first limitation involves the sample size selection of historical data of this study, which is limited to banks listed in the central bank directory database whose financial data for the years from 1994 to 2003 was available.

Secondly, Altman's model involves the use of financial ratios as the key indicator to classify the bankrupt and the non-bankrupt banks. These ratios are calculated from the

banks financial statements thus calling for cautiousness as the figures maybe subject to manipulation by the management of the firm. The large reliance on secondary data as provided by the Central Bank of Kenya and the individual banks has its limitations. The data may not be accurate or lack bias, and its' also important to note that such data was written with a specific audience in mind and for a specific purpose.

The third limitation of this study is that the use of time-series data during 1994-2003 could cause a temporal bias. Since the sample comes from different periods with unequal pressures due to overall economic conditions, unsophisticated or poor management as a result of financial distress, it may be unwise to compare the data. An early-warning powerful tool that anticipates financial distress of banks has the ability to assist management in predicting corporate problems early enough so that the management realizes the seriousness of the situation and possibly can correct problems in time before they reach a failure situation. As pointed out by Fitzpatrick (1934) management is more prone to notice the traits of financial distress earlier than external parties.

Finally, the study was broad and could not exhaustibly address all the issues inherent in it. As thus, the "causes of banks failures" was not researched on but just highlighted. Other areas of interest like how Central bank regulates banks and how the banks apply this regulations could not be researched on. This was as a result of fixed duration of time in which the project was required to be done and also due to the high cost of the research as I wrote the project when in Korea necessitating the use of two research assistants.

4.5 SUGGESTIONS FOR FUTURE RESEARCH

Beginning with the mid-1960s extensive studies have been conducted in the realm of failure prediction models. From Beaver's (1966) seminal study, coming to Altman and his Z score model, a variety of methodologies and variables have increased and significantly expanded the scope of bankruptcy research. However, there are clearly several investigations in which additional research will add greatly to this important field especially in relation to Kenyan context. Since the implications of finance ratios intuitively appear to influence firms across all industries, it is suggested that future research could provide more insights on the interrelation of other industries in relation to financial distress.

The application of the models to other sectors of industry would be interesting. A variety of industries could be studied over a different time period such as; manufacturing sector, technology sectors and nonprofit organization where the existing bankruptcy models lack exploration. A Kenyan model for the bankruptcy prediction can be done to reflect to our own system. It should be an early warning system that should be in far advance of the failure event. There is also necessity for a deeper research to investigate into the major causes of bank's failures in Kenya especially in the year 1993 where fourteen (14) banks were liquidated.

For all stakeholders, employing the tools of failure prediction can help in the formulation of firm problems and possible early corrective actions. It will also help in improving critical decision making in the reallocation of resources towards more efficient ways.

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APPENDIXES

APPENDIX 1: LETTER TO THE BANKS

KENYATTA UNIVERSITY,
SCHOOL OF BUSINESS,
P.O BOX 43844,
NAIROBI.

TO: ALL RESPONDENTS,
24TH APRIL 2005.

Dear sir/madam,

RE: BANK'S FINANCIAL STATEMENTS AND FILLING OF QUESTIONNAIRE

My name is Freshia Mugo a second year, master student of Kenyatta University currently undertaking a project research work for the university academic requirements. My topic of research is; "Testing the applicability of the Altman's model to commercial banks in Kenya." In most countries, this model is believed to be in a position to predict if a firm is going to face financial difficulties and bankruptcy two years prior to its failure thus stimulating necessary actions to be taken.

According to Central bank's statistics, over 13 banks have gone into liquidation since the year 1994. However, I am glad your bank has not faced the same. I therefore wish to use information from financial statements of both the banks that have gone through the period 1994-2003 successfully and those that have failed in order to establish if the Altman's Model can be used to predict the bankruptcy positions of our banks. I would also wish to establish whether Kenya's banks use Altman Model. This information will be used solely for academics purpose and will be treated with confidentiality.

I believe the findings of this research will be of help to your bank in relation to its going concern aspect. I do therefore wish to humbly request you to avail to me your financial statements for the years 1994-2003 and also take some few minutes and fill the questionnaire attached.

Thanking you in advance and looking forward to your cooperation.

Yours faithfully,

Freshia Mugo.

**QUESTIONNAIRE ON THE USE OF ALTMAN'S "Z-SCORE FORMULA"
MODEL BY KENYA'S COMMERCIAL BANKS**

1. Bank name _____

2. Respondent _____

3. Under which category would you classify your bank?

- A. Large bank
- B. Medium size bank
- C. Small bank

4. Does your bank analyze or check its bankruptcy position?

- A. Yes
- B. No

5. If yes, how frequently do you do it?

- A. Every year
- B. Every second year
- C. Between 3 and 5 years
- D. Others (specify) _____

6. Do you use the "Z-Score formula" to establish the bankruptcy level?

- A. Yes go to 9.
- B. No go to 7

7. Which prediction model do you use?

8. Has the results obtained from this model consistently predicted the position of the Bank?

A. Yes ()

B. No ()

9. If you use the Z-score formula, has the results obtained been useful to predict the future bankruptcy position of your bank?

A. Yes ()

B. No ()

10. Basing on your banks experience, how can you rate Altman's" Z-score formula" prediction accuracy basing on the previous years financial statements?

A. Above 80% ()

B. 70%--80% ()

C. 60%--69% ()

D. 50%--59% ()

E. Below 50% (give the percentage) ()

11. Basing on your banks experience, how can you rate Altman's" Z-score formula" prediction accuracy basing on the second previous years financial statements?

A. 80%---100% ()

B. 70%--79% ()

C. 60%--69% ()

D. 50%--59% ()

E. Below 50% (give the percentage) ()

THANK YOU FOR YOUR CO-OPERATION

APPENDIX 2: GENERAL WORKING SHEET

NAME OF BANK _____

FINANCIAL YEAR _____

	FORMULA	RATIO	WEIGHTING FACTOR	WEIGHTED RATIO
X1	Net working capital/Total assets		*6.5	
X2	Accumulated retained earnings/Total assets		*3.26	
X3	EBIT/Total assets		*6.72	
X4	Book Value of Equity/Total liabilities		*1.05	
TOTAL WEIGHTED Z SCORE				

DIAGNOSIS:

If Z score is less than 1.10, then the bank is in a bankruptcy zone.

If Z score is between 1.10 and 2.60, the bank is in the gray zone area.

If Z score is greater than 2.60, then the bank is a non-bankruptcy zone.

CONCLUSION:

**APPENDIX 3: LIST OF COMMERCIAL BANKS IN KENYA AND THEIR
YEAR OF INCORPORATION**

	BANK	YEAR OF INCORPORATION
1	AFRICAN BANKING CORPORATION LTD.	1984
2	AKIBA BANK LTD.	1972
3	BANK OF AFRICA KENYA LTD. (FORMERLY CREDIT AGRICOLE INDOSUEZ)	2004
4	BANK OF BARODA KENYA LTD.	1953
5	BANK OF INDIA LTD.	1953
6	BARCLAYS BANK OF KENYA LTD.	1916
7	CHASE BANK KENYA LTD.	1991
8	CHARTERHOUSE BANK LTD.	1996
9	CITIBANK N.A.	1974
10	CITY FINANCE BANK LTD.	1984
11	COMMERCIAL BANK OF AFRICA LTD.	1967
12	CONSOLIDATED BANK OF KENYA LTD.	1989
13	CO-OPERATIVE BANK OF KENYA LTD.	1965
14	CFC BANK LTD.	1955
15	CREDIT BANK LTD.	1986
16	DAIMA BANK LTD.	1992
17	DEVELOPMENT BANK OF KENYA LTD.	1973
18	DIAMOND TRUST BANK OF KENYA LTD.	1965
19	DUBAI BANK LTD.	1982
20	EQUATORIAL COMMERCIAL BANK LTD.	1984
21	FIDELITY COMMERCIAL BANK LTD.	1992
22	FINA BANK LTD.	1986
23	FIRST AMERICAN BANK OF KENYA LTD.	1987
24	GIRO COMMERCIAL BANK LTD.	1993
25	GUARDIAN BANK LTD.	1994
26	HABIB BANK A.G. ZURICH	1978
27	HABIB BANK LTD.	1956
28	IMPERIAL BANK LTD.	1992
29	INDUSTRIAL DEVELOPMENT BANK LTD. (CONVERTED TO COMMERCIAL BANK ON 10.09.98)	1981
30	INVESTMENTS AND MORTGAGES (MERGED WITH BIASHARA BANK ON 31/12/2003)	1974
31	KENYA COMMERCIAL BANK LTD.	1896
32	K-REP BANK LTD.	1999
33	MIDDLE EAST BANK KENYA LTD.	1980
34	NATIONAL BANK OF KENYA LTD.	1968

35	NATIONAL INDUSTRIAL CREDIT BANK LTD.	1959
36	ORIENTAL COMMERCIAL BANK LTD. (FORMERLY DELPHIS BANK LTD.)	1991
37	PARAMOUNT UNIVERSAL BANK LTD.	1993
38	PRIME BANK LTD.	1992
39	SOUTHERN CREDIT BANKING CORPORATION LTD.	
40	STANBIC BANK KENYA LTD.	1970
41	STANDARD CHARTERED BANK KENYA LTD.	
42	TRANS-NATIONAL BANK LTD.	1985
43	VICTORIA COMMERCIAL BANK LTD.	1987

Sources: Central Bank.2005

APPENDIX 4: FAILED BANKS AND NON BANKS FINANCIAL INSTITUTIONS IN KENYA

NAME OF INSTITUTION	DATE CLOSED/ RESTRUCTURED	REASON(S) FOR FAILURE
RURAL URBAN CREDIT & FINANCE LTD (OFFICIAL RECEIVERSHIP)	DEC. 1984	NON-PERFORMING LOAN INSIDER LOANS(UNSECURED)
CONTINENTAL BANK OF KENYA LTD. (OFFICIAL RECEIVER.	AUG.1986	NON-PERFORMING LOANS. INSIDER LOANS.
CONTINENTAL CREDIT & FINANCE LTD (OFFICIAL RECEIVERSHIP)	AUG.1986	NON-PERFORMING LOANS. INSIDER LOANS (UNSECURED).
CAPITAL FINANCE LTD (OFFICIAL RECEIVERSHIP)	JAN 1987	MISMANAGEMENT.
BUSINESS FINANCE CO LTD. (UNDER CONSOLIDATION BANK).	DEC. 1989	INEFFECTIVE BOARD. NON-PERFORMING INSIDER LOANS.
ESTATE FINANCE CO OF (K) LTD (UNDER CONSOLIDATION BANK)	DEC. 1989	DEALINGS(UNSECURED) NON-PERFORMING LOANS.
HOME SAVINGS AND MORT. CO. LTD (UNDER CONSOLIDATED BANK.)	DEC. 1989	NON-PERFORMING LOANS INEFFECTIVE BOARD.
NATION WIDE FINANCE CO. LTD (UNDER CONSOLIDATION BANK)	DEC. 1989	INSIDER LOANS(UNSECURED) NON-PERFORMING LOANS
UNION BANK OF KENYA LTD (UNDER CONSOLIDATION BANK)	DEC. 1989	MISMANAGEMENT POOR CREDIT POLICIES.
JIMBA CREDIT CORP. LTD (UNDER CONSOLIDATION BANK)	DEC. 1989	ASSET/LIABILITIES MISMATCH CREDIT CONCENTRATION
KENYA SAVINGS & MORT. LTD (UNDER CONSOLIDATION BANK)	DEC. 1989	ASSET/LIABILITIES MISMATCH NON PERFORMING LOANS.

NAIROBI FINANCE CORP LTD (LIQUIDATED BY DPF)	APRIL 1993	NON-PERFORMING LOANS. UNDER CAPITALISATION.
INTERNATIONAL FINANCE CO LTD (LIQUIDATED BY DPF)	APRIL 1993	INSIDER LOANS(UNSECURED) MISMANAGEMENT.
EXCHANGE BANK LTD (VOLUNATARY LIQUIDATION)	APRIL 1993	VIOLATION OF BANKING ACT. LICENCE REVOKED.
POST BANK CREDIT LTD (LIQUIDATED BY DPF)	MAY 1993	MALPRACTICE IN CLEARING HOUSE. CREDIT CONCENTRATION.
INTER AFRICA CREDIT FINANCE LTD (LIQUIDATED BY DPF)	JUNE 1993	INSIDER LOANS(UNSECURED) NON PERFORMING LOANS.
CENTRAL FINANCE (K) LTD (LIQUIDATED BY DPF)	AUG. 1993	UNDER CAPITALISATION. NON PERFORMING LOANS.
MIDDLE AFRICA FINANCE CORP LTD (LIQUIDATED BY DPF)	AUG.1993	NON-PERFORMING LOANS. UNDER CAPITALISATION.
TRADE BANK LTD (LIQUIDATED BY DPF)	AUG.1993	MALPRACTICES IN FOREX. NON-PERFORMING LOANS.
TRADE FINANCE CO. LTD (LIQUIDATED BY DPF)	AUG.1993	NON-PERFORMING LOANS. MIS MANAGEMENT.
DINERS FINANCE LTD (LIQUIDATED BY DPF)	AUG.1993	UNDER CAPITALISATION. DOMINO EFFECTS/TRADE BANK.
ALLIED CREDIT LTD (LIQUIDATED BY DPF)	AUG.1993	UNDER CAPITALISATION. INSIDER LOANS(UNSECURED)
UNITED TRUSTEE FINANCE LTD (LIQUIDATED BY DPF)	AUG.1993	INSIDER LOANS(UNSECURED) UNDER CAPITALISATION

PAN- AFRICA CREDIT & FINANCE LTD (LIQUIDATED BY DPF)	OCT.1993	UNDER CAPITALISATION. VIOLATION OF BANKING ACT. LICENCE REVOKED.
PAN- AFRICA BANK LTD (LIQUIDATED BY DPF)	OCT.1993	VIOLATION OF BANKING ACT. LICENCE REVOKED
UNITED BANK LTD (RESTRUCTURED: NOW CHASE BANK.)	AUG.1994	SUCCESSFULLY RESTRUCTURED.
THABITI FINANCE CO.LTD (LIQUIDATED BY DPF)	DEC.1994	UNDER CAPITALISATION. INSIDER LOANS(UNSECURED)
MERIDIEN BIAO(K) LTD (LIQUIDATED BY DPF)	APRIL.1996	FOREX EXPOSURE. MALPRACTISE BY DIRECTORS.
KENYA FINANCE BANK LTD. (LIQUIDATED BY DPF)	JUL.1996	NON-PERFORMING LOANS. MISMANAGEMENT.
HERITAGE BANK LTD (LIQUIDATED BY DPF)	SEP.1996	NON-PERFORMING LOANS. MALPRACTISE BY DIRECTORS.
ARI BANKING CORP.LTD (LIQUIDATED BY DPF)	DEC.1997	NON-PERFORMING LOANS. MISMANAGEMENT.
RELIANCE BANK LTD (LIQUIDATED BY DPF)	SEP.1998	RUN ON DEPOSITS. CHEQUE KITING.
BULLION BANK LTD RE-OPENED ON 20.1.2000	SEP.1998	RUN ON CERT. OF DEPOSITS. NON-PERFORMING LOANS.
TRUST BANK LTD (LIQUIDATED BY DPF)	SEP.1998	RUN ON DEPOSITS. MISMANAGEMENT.
PRUDENTIAL BANK LTD (LIQUIDATED BY DPF)	NOV.1998	NON-PERFORMING LOANS. MISMANAGEMENT.
CITY FINANCE BANK LTD (RE-OPENED ON 17.4.2000	NOV.1998	RUN ON DEPOSITS. MISMANAGEMENT.
FORTUNE FINANCE LTD (LIQUIDATED BY DPF)	SEPT.1999	RUN ON DEPOSITS. MISMANAGEMENT.
DELPHIS BANK LTD Re-opened on 5.12.2002	JUNE.2001	RUN ON DEPOSITS. NON-PERFORMING LOANS.

EURO BANK LTD - LIQUIDATION	FEB.2002	NON-PERFORMING LOANS.
DAIMA BANK LTD - STATUTORY MGT	MAR.2003	NON-PERFORMING LOANS.
PRUDENTIAL BUILDING SOCIETY	OCT.2003	NON-PERFORMING LOANS.

Sources: Central Bank. 2004.