EFFECT OF CREDIT RISK ON THE FINANCIAL PERFORMANCE OF CEMENT INDUSTRY IN KENYA

By

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DECLARATION

I declare that this is my original work and has not been presented in any other University or College for Examination or Academic purposes.

Signed: _____ Date _____

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This proposal has been submitted for examination with my approval as the university supervisor.

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DEDICATION

This work is dedicated to my loving wife Teresiah Mwandotto, Sister Ruth Nyambura and my mother Mary Wanjiru for their moral support, encouragement and understanding. Thanks to the Almighty God for his blessings without which it would have been impossible to accomplish this project.

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ABSTRACT

The overall objective of this study was to establish the effects of credit risk on the financial performance of cement firms in Kenya. This was achieved by looking at the effect of credit risk exposure rate, default rate, and recovery rate on the return on asset of cement firms in Kenya. Cross-sectional survey design was used to collect the data from the field. The researcher carried out a census survey where all the listed cement firms and regulated by the Capital Markets Authority as at the time of the study were studied.

Descriptive statistics and inferential analysis of the data were done using measures of central tendency and Pearson correlation analysis. This study induced and actualized better understanding of credit risk effect on cement firms' performance. Secondary data collected from the cement firms' quarterly reports for the period 2009 to 2014 was used in this study. The data collected from the annual report was analyzed using the multiple regression analysis. The regression output was obtained using statistical package for social sciences. In the model, the dependent variable return on asset was used as an indicator of financial performance while the independent variables credit risk exposure rate, default rate, and recovery rate were used as credit risk indicators. The findings of the study showed that there is a significant relationship between financial performance and credit risk. The dependent and the independent variables in the study indicated a relationship with credit risk exposure rate and default rate showing a positive relationship with the return on asset while recovery rate showing a negative relationship with return on asset. The regression results shows that exposure rate have a higher significant effect on return on asset than the default rate. The regression results is significant since both the independent variables (ER, DR, and RR) can reliably predict the independent variable return on asset. The study concludes that credit risk exposure rate, default rate and recovery rate have a significant relationship with the return on asset of cement firms in Kenya. The recommendation from the findings of the study suggests that all cement firms in Kenya should implement credit risk measurement system such as credit ranking and credit scoring to customers to avoid incurring more cost on customers who have proved to be not credit worthy.

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ABBREVIATIONS

Mt	Million Tons
EAPC	East Africa Portland cement
ARM	Arthi River Mining
EU	European Union
IMF	International Monetary Fund
CSFB	Credit Suisse First Boston
PD	Probability of Default Probability of default
LGD	loss given default
EAD	exposure at default
RR	Recovery Rate
ROA	Return on Assets
VIF	Variance Inflation Factor
ANOVA	Analysis of Variance

CHARPTER ONE

INTRODUCTION

1.1 Background of the study

Credit risk embedded in a financial transaction is the risk that at least one of the parties involved in the transaction will suffer a financial loss due to decline in the creditworthiness of the counterparty to the transaction or perhaps of some third party. The extension of credit involves several types of risk, in credit risk there is the potential that an obligor may not make the coupon payments or may fail to pay back the principal, this is the most fundamental risk typically associated with credit known as the risk of default. When a credit event occurs the lender has a legal claim on the borrower's assets for the principal and any accrued interest, this amount may not fully be recovered from the assets held as security, thus another important risk to the lender is exposed to and the amount that they are able to recover should the borrower default on their obligation, The fraction of principal recovered has been shown to vary with whether there are other claims on the borrower's assets, the type and condition of the borrower's assets, economic conditions, geography and other factors Terry Benzschawel (2012)

The health of the financial system has important role in the country Das & Ghosh (2007) as its failure can disrupt economic development of the country. Financial performance is company's ability to generate new resources from day-to-day operation over a given period of time, its measure can be divided into traditional measures and market based measures Aktan & Bulut, (2008). The major type of risks involving Cement Industry is the credit risk, its management involves identification of risks, assessment, developing strategies to manage it and hence mitigation of risk using managerial resources Appa, (1996) whereas credit risk is the risk of loss -due to debtor's non-payment of a loan or other line of credit either the principal or interest or both Campbell (2007). Default rate is the possibility that a borrower will default, by failing to repay principal and interest in a

timely manner. The three main variables affect the credit risk of a financial asset are the credit risk exposure rate, the default rate and the recovery rate.

1.1.1 Credit risk

Credit is defined by the Economist Dictionary of Economics as the use or possession of goods or services without immediate payment, it enables a producer to bridge the gap between the production and sale of goods. Virtually all exchange in the manufacturing industry and services is conducted on credit. Colquitt (2007). Credit generates debt that a party owes the other, the former is called a debtor or borrower, the latter is a creditor or lender. The debtor will have to pay an extra amount of money for delaying the payment as is opportunity cost to the lender, thus in the circle both debtor and creditor expect a return which is worth their paying more and waiting.

Parties dealing with cement industry firms such as distributors, whole sellers, middle men or large retailers may face liquidity challenges or as part of their policy not deal with cash purchases only but also require to be extended credit facility by acquiring the goods with payments made on a later date probably after a portion of the goods are sold, as a result the firms that have a good rapport with the cement firm will be extended the credit facility, the effect on cement firm on this credit extension is significant as it affects its liquidity and to some extent in the long run its solvency. Credit risk occurs when the debtor of the firm cannot repay part or whole of the debt due to insolvency, bankruptcy, character or condition; thus unable to pay the creditor as agreed in the mutual contract. More formally, credit risk arises whenever a lender is exposed to loss from a borrower, counterparty, or an obligor who fails to honor their debt obligation as they have agreed or contracted. This loss may derive from deterioration in the counterparty's credit quality, which consequently leads to a loss to the value of the debt. Colquitt (2007) in the worst case, the borrower defaults when he or she is unwilling or unable to fulfill the greece debt crisisobligations Crouhy et al. (2006). The credit transactions enable parties dealing with the cement firms increase sales as they record higher sales as they are able get goods on credit that could otherwise not have managed to pay in cash thus creating more demand for cement, on the other hand the more the cement firm gives credit, the more the risk of default it is exposed to, Sharpe (1964) in his study states that one of the major doctrines

of portfolio analysis is that risks and return are positively correlated. When the risks of default is considered, as it rises the firm is exposed to liquidity problems due to insufficient cash inflows, Bowman (1980) in his study found out that risks and returns are negatively correlated.

The amount of trade debt that is given to a borrower may have a cumulatively negative effect on the cement firm or any other firm in general when there are no proper debt management strategies, on a global scale Greece is facing debt crisis when the Greek government on behalf of the country, is a debtor to a lot of banks in Germany, France and other international lenders, the funds they borrowed cannot be serviced by the current funds that the country generates, this lead to the country defaulting and is not able to pay the debts, EU and IMF had to interfere to prevent the country from going bankrupt and also to help the European banks avoid big losses. The Wall Street Journal (2010). In Cement Industry in Kenya, credit failures are not rare and they critically affect the Industry's liquidity, cash flows and eventually, profit and shareholders' dividends, the default risk changes from one trade debtor to another, those not serviced are written off as bad debts. This makes credit risks the biggest threat to any Cement Industry performance, therefore, a sound credit risk mitigation framework is indispensable to a healthy and profitable industry.

The credit facility mostly do not match to meet either the lenders or the borrowers' conditions in the industry, the lenders would preferably lend for a shorter period and to a less risky party to default and charge a lower interest; however if need be to a more risky borrower more interest, on the other hand the borrower would prefer to repay over a longer period of time to be able to generate the cash from the sale of all the goods in order to repay, this lead to financial intermediaries who act as the bridge between credit suppliers and clients. Now in this innovative phase of the global financial-services industry, numerous types of financial institutions have joined the credit supplier group: insurance companies, mutual funds, investment finance companies, Colquitt (2007) Nevertheless, banks are still the dominant source that both individuals and corporates seek financing from. However with the rising interest rates on loans firms are looking for other ways that are cheaper but achieve the same objective, trade credit among corporates

in Cement Industry have proven to be the better option with lower interest charged on repayment, the major factor being setting up credit contracts that are agreeable to both the lenders and borrowers in the industry. The two types of trade credit is based on customer categories offered: retail credit and wholesale credit. Lending in retail involves individuals who borrow in small amounts unlike in wholesales whose volumes are of significantly higher value.

1.1.2 Financial Performance

The health of the financial system has important role in the country Das and Ghosh (2007) as its failure can disrupt economic development of the country. Financial performance is company's ability to generate new resources, from day-to-day operation over a given period of time and it is gauged by net income and cash from operation. The financial performance measure can be divided into traditional measures and market based measures Aktan and Bulut (2008).

Financial soundness is a matter of great concern for the stakeholders of a business firm, for the owners or shareholders it is very important to understand whether the concerned firm can pay off their required rate of return or not. The creditors will be interested to know the payment capacity of the firm for pricing and collection of credits. Financial sustainability of businesses can be of great importance for the firms doing business with them, it is also important for the management and employees as a going concern and sustainability of operations. Judging the financial capacity of businesses carries enormous information for the institutions and people around it as it shapes the decisions of them. However, accounting data that is used in determining financial performance uses historical data that is usually subjected to bias due to managerial manipulation and earning management to produce differing results due to different accounting policies used, this phenomenon poses risks that should be taken into account when using accounting based measures McGuire (1988).

The cement firms play an important role in the contributing to County's economic growth and development, the Kenyan economy being pegged in the development of infrastructure through road networks and the standard gauge railway, these developments are to enable easy movement of goods and services at a lower cost hence having a net

effect of increasing the country's GDP, this places the cement industry in a critical path of development due to massive consumption of cement in infrastructural development. If the cement industry does not perform well the effects to the economy could be huge and broad. Therefore, the study of the determinants of cement industry profitability becomes an important issue that could help firms in the cement industry understand current issues and the significance of trade credit in their operations; in addition critical factors to consider when making decisions or creating policies that have positive financial effects.

The financial performance measure of any firm in the industry should reflect an entity's performance with no regard to its size by establishing a simple way of comparison across firms and industries. The return on Asset is a ratio that measures the company earnings against its asset. ROA is an important indicator to measure the profitability of firms. Foong (2008). The ratio is considered as an indicator of how efficient is the company on the return on shareholders wealth both equity and debt, being the primary objective of maximization of shareholders wealth, this measures the return on investment in terms of assets, ROE is measured by taking the company's net income after tax and dividing it by shareholder's equity. Jensen Investment Management (2008) stated that ROE provides useful gauge of profit generating efficiency as it measure how much earnings a company can get on the equity capital.

1.1.3 Credit Risk and Financial Performance

The extension of credit involves several types of risk, there is the potential that an obligor may not make the coupon payments or may fail to pay back the principal. The most fundamental risk typically associated with credit is the risk of default, if a default occurs the lender has a legal claim on the borrower's assets for the principal and any accrued interest. Thus, there risk to the lender that the amount that they are able to recover should the borrower default on their obligation, the effect on the cement firm is poor financial performance due to increased bad debts, However on the other hand trade creditors mostly cannot be able to service gods on cash basis due to huge capital requirements that would limit the supply of cement to few firms.

The financial performance of a company is in terms of profitability, liquidity and solvency, these are the key drivers to the running of the business and its going concern,

business which do not generate profit will eventually fail and hence lead to their closure. Investors require a return on their investments which will be measured in terms of return on assets, a firm that has higher returns on assets will attract more investors to the firm therefore leading to increased investments, market share, profitability and hence value of the firm.

Credit risk knowledge is very important to industry as it is an integral part of the lending process. It maximizes industry risk, adjusted risk rate of return by maintaining credit risk exposure with view to shielding the industry from the adverse effects of credit risk. There is need to investigate whether this investment in credit risk is viable to the Cement Industry. This study therefore seeks to investigate the effect of credit risk on cement industry's financial performance.

The trade credit is expect to have a positive relationship with the financial performance as more sales will be recorded due to increase in credit sales.

There are numerous researches on the effect of credit risk on financial performance, Aduda and Gitonga (2011) found that the credit risk effected on profitability at a reasonable level. Aruwa and Musa (2012) investigated the effects of the credit risk, and other risk components on the banks' financial performance. They found a strong relationship between risk components and the banks' financial performance. Kaaya and Pastory (2013) showed that credit risk indicators negatively effected on the bank performance. Kolapo, Ayeni and Oke (2012) showed that the effect of credit risk on bank performance measured by ROA was cross-sectional invariant, though the degree to which individual banks were affected was not captured by the method of analysis employed in the study.

1.1.4 Cement Industry in Kenya

Kenya's building and construction sector is amongst the most rapidly growing in the region, experiencing an average growth rate of 14.2% for the period 2006 –2011. Over the same period, Kenya's economic growth, as measured by the real Gross Domestic Product rate averaged only 4.3% declining to 4.38% in 2011 from 6.33% in 2006.

While the cement industry, cement consumption in particular is highly correlated to a country's economic performance, cement consumption experienced superior growth that was more than twice the rate of GDP growth during the period. Growing in tandem with the construction sector, cement consumption increased at an average rate of 14.1% for the period 2006 – 2011, with consumption reaching 3.43 million tons (Mt) in 2011, up from 1.57mT in 2006.

With an estimated installed capacity of 4 million metric tons per year, Kenya is the leading cement producer in East Africa, with the installed capacity set to increase to 10 million metric tons per year by the end of 2015. Despite the associated energy costs from cement and the availability of cheap imports from China and Pakistan, demand for cement in East Africa has continued to rise. The need to increase cement production to feed the region's booming construction industry. Additionally, financing costs for cement manufacturers in East Africa remains high compared to Europe, which creates opportunities for firms based in the European Union to finance expanded cement production in East Africa.

The key drivers of this growth in consumption included rising demand for housing which triggered an upsurge in private sector funded housing developments, the commercial construction boom fuelled by increased foreign investment, and extensive government and donor-funded spending on the country's mega infrastructure projects. As a result, per capita consumption (PCC) of cement increased at an average rate of 10.7% for the period to 83.9 kilograms (Kg) in 2011 from 50.0Kg in 2006 despite relative stagnation in annual population growth.

Some of the projects consuming huge volumes of cement include construction of the standard gauge railway, the Lamu Port South Sudan-Ethiopia, Construction of roads, Terminal Four at Jomo Kenyatta International Airport in Nairobi, and the booming property market, especially retail malls.

The 'Standard Gauge Railway Project' (SGR) is Kenya's biggest investment in infrastructure since it gained independence from Britain in 1963. The SGR project requires 1Mt of cement, all to be sourced in Kenya. ARM and other producers, including

Lafarge's unit Bamburi Cement, have upgraded their plants to produce the 52.5 grade cement required by the contractors.

Cement production expanded at an average rate of 11.6% for the period 2006 – 2011 to 4.09mT in 2011 from 2.41mT in 2006. This rise in production was driven by the entry of new cement producers and extensive capacity expansion by existing players in response to increasing competition. This rise in production led to the consistent oversupply of cement during this period. Given an estimated industry capacity utilization rate of about 72%, this glut supply could be much higher were installed capacity fully utilized.

The local cement industry included six cement companies namely; Bamburi Cement Limited (BMBC) Athi River Mining Limited (ARML) East African Portland Cement Company Limited (EAPC) National Cement Company Limited (NCC) Mombasa Cement Limited (MCL) Savannah Cement Company (SCC)

1.2 Research problem

Credit risk as a measure of administering credit to trade borrowers is very important to all forms of business. When a firm does not manage its credit it will experience cash shortage due to much of its cash tied outside in form of debtors. Debt that is not honored goes down as bad debt hence making a firm suffer losses from the transactions. Bowman (1980) found that there may be a negative correlation between accounting measures of risk and the financial return of the firm. Credit risk is very important because of its effect on the firm's profitability and consequently its value. High credit risk translate to higher sales of the firm's goods hence increase in profitability. Credit risk is crucial to the sales chain as most traders such as wholesalers or distributors have no access to long term financing or huge funds to acquire large volumes of goods such as cement which is very expensive as a unit ranging as from Ksh. 600, trade credit enable the final finished goods to reach the consumer across the country though exposing the firm to a credit risk. Tradeoff between risk and return is that higher return comes with higher risk Sharpe (1964).

In the Kenyan economy, the cement industry have been struggling to ensure good financial performance some cement firms such as Bamburi Cement which recorded profit

before taxation of 7.2 billion in 2009 to 5.5 Billion in 2013, this being a worrying trend considering some international firms such as Dangote based in Nigeria are preparing to enter the Kenyan market painting a different picture of how viable the market is despite the lowering profits recorded. Dyer and Blair (2012). If the trend continues it can lead to closure of these firms hence leading to unemployment thus impacting the GDP negatively and increasing the dependence on imports. A lot of credit risk increases the risk of default as the change for a bad debt increases which also could negatively affect profitability and hence reduce the market share in the country while less credit risk would reduce the sales made hence reducing profitability and consequently the market share. Therefore leading to a credit risk level that would positively affect the financial performance of the firm.

Credit risk in Kenya has been an important factor in making decisions in most firms in Kenya, the development of Credit reference bureau have gone a long way in sharing credit information not only in financial institutions but also in non-financial institutions, these has enabled firms to make an informed decision regarding credit risk. Firms such as Uchumi have negatively been affected by credit risk which lead to its poor financial performance and eventually led to its receivership in June 2006. On the other had good financial performance was recorded by its competitors; Naivas and Tuskys which expanded their number of chains.

The effect of credit risk on financial performance globally have been researched by the following studies; According to Fuser and Meier, (1999), institutions use various credit risk methods such as credit limits, taking collateral, diversification, loan selling, syndicated loans, credit insurance, and securitization and credit derivatives. Al-Tamimi and Al-Mazrooei (2007) show positive relationships between risk management practices and the various aspects of risk management process, findings by Boston Consulting Group (2001) Al-Tamimi, (2002); KPMG, (2003); Parrenas (2005); Al-Tamimi and Al-Mazrooei (2007) show the important aspect of risk management practices by various financial institutions. Fallon, (1996), states that each organization must apply a consistent evaluation and rating scheme to all its investment opportunities in order for credit decisions to be made in a consistent manner and for the resultant aggregate reporting of credit risk exposure to be meaningful.

In Kenya, Local studies that have been done credit risk have concentrated largely on financial sector by looking into the effects of credit risk on performance of commercial banks in Kenya. This includes: Kithinji (2011) in her study on credit risk and profitability of commercial banks in Kenya. Musyoki (2011) and Ogilo (2012) separately conducted an empirical study on the impact of credit risk management on financial performance of Kenyan banks. Ngetich (2011) also analyzed the effects of interest rates spread on the level of non-performing assets on commercial banks in Kenya. Other non-financial studies include survey of credit risk management practices by pharmaceutical manufacturing firms in Kenya Nduku (2007) and assessment of credit risk management techniques adopted by microfinance institutions in Kenya Mwirigi (2006) with non-known by the researcher on the cement sector.

This leads to the following research question: Does credit risk affect the financial performance of Cement Industry firms in Kenya?

1.3 Objectives of the study

The objective of the study is to establish the effects of credit risk on the financial performance of Cement Industry.

1.4 Value of the Study

The study findings will benefit the management and staff of the cement sector under study by gaining insight into how credit risk management can be effectively executed to enhance financial performance.it will shed light on the credit risk in the sector of which non known by the researcher in Kenya has been done. The study will also form the backbone of credit structure of the cement sector and assist in the formulation of policies that govern credit sales.

The distributors and the wholesalers will be able to benefit from the study as a positive correlation between financial performance and credit risk will greatly enhance credit risk and hence increase credit sales.

The scholars will greatly benefit on the study of credit risk on the financial performance of cement industry since no other studies done before unknown by the researcher have been done.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents theoretical background and defines the process of Credit risk by the Cement Industry. It will help the researcher clarify the strengths and guide each stage of research from the formulation of topics to the utilization of literature on credit risk and performance of Cement Industry.

2.2 Theoretical Background

Theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge, within the limits of the critical bounding assumptions. A theory consists of concepts, together with their definitions, and existing theory/theories that are used for the particular study Torraco (2011).

2.2.1 The Merton theory

The first category of credit risk models are the ones based on the original framework developed by Merton (1974) using the principles of option pricing Black and Scholes (1973). In such a framework, the default process of a company is driven by the value of the company's assets and the risk of a firm's default is therefore explicitly linked to the variability of the firm's asset value. The basic intuition behind the Merton model is relatively simple: default occurs when the value of a firm's assets that is in terms of the market value of the firm is lower than that of its liabilities. The payment to the debt holders at the maturity of the debt is therefore the smaller of two quantities: the face value of the debt or the market value of the firm's assets. Assuming that the company's debt is entirely represented by a zero-coupon bond, if the value of the firm at maturity is greater than the face value of the bond, then the bondholder gets back the face value of the bond. However, if the value of the firm is less than the face value of the bond, the shareholders get nothing and the bond holder gets back the market value of the firm. The payoff at maturity to the bondholder is therefore equivalent to the face value of the bond minus a put option on the value of the firm, with a strike price equal to the face value of

the bond and a maturity equal to the maturity of the bond. Following this basic intuition, Merton derived an explicit formula for risky bonds which can be used both to estimate the probability of default of a firm and to estimate the yield differential between a risky bond and a default-free bond.

In addition to Merton (1974), first generation structural-form models include Black and Cox (1976), Geske (1977), and Vasicek (1984). Each of these models tries to refine the original Merton framework by removing one or more of the unrealistic assumptions. Black and Cox (1976) introduce the possibility of more complex capital structures, with subordinated debt; Geske (1977) introduces interest-paying debt; Vasicek (1984) introduces the distinction between short and long term liabilities which now represents a distinctive feature of the KMV model.

Under these models**,** all the relevant credit risk elements, including default and recovery at default, are a function of the structural characteristics of the firm: asset levels, asset volatility in terms of business risk and leverage in terms of financial risk. The RR is therefore an endogenous variable, as the creditors' payoff is a function of the residual value of the defaulted company's assets. More precisely, under Merton's theoretical framework, probability of default and RR tend to be inversely related. If, for example, the firm's value increases, then its Probability of Default tends to decrease while the expected RR at default increases (ceteris paribus). On the other side, if the firm's debt increases, its Probability of Default increases while the expected RR at default decreases. Finally, if the firm's asset volatility increases, its Probability of Default increases while the expected RR at default decreases, since the possible asset values can be quite low relative to liability levels.

Although the line of research that followed the Merton approach has proven very useful in addressing the qualitatively important aspects of pricing credit risks, it has been less successful in practical applications. This lack of success has been attributed to different reasons. First, under Merton's model the firm defaults only at maturity of the debt, a scenario that is at odds with reality. Second, for the model to be used in valuing default risky debts of a firm with more than one class of debt in its capital structure that is a firm

with complex capital structure, the priority or seniority structures of various debts have to be specified.

Also, this framework assumes that the absolute-priority rules are actually adhered to upon default in that debts are paid off in the order of their seniority. However, empirical evidence**,** such as in Franks and Torous (1994), indicates that the absolute-priority rules are often violated. Moreover, the use of a lognormal distribution in the basic Merton model instead of a more fat tailed distribution tends to overstate recovery rates in the event of default.

2.2.2 Second-generation theory

In response to such difficulties, an alternative approach has been developed which still adopts the original Merton framework as far as the default process is concerned but, at the same time, removes one of the unrealistic assumptions of the Merton model**;** namely, that default can occur only at maturity of the debt when the firm's assets are no longer sufficient to cover debt obligations. Instead, it is assumed that default may occur anytime between the issuance and maturity of the debt and that default is triggered when the value of the firm's assets reaches a lower threshold level. These models include Kim, Ramaswamy and Sundaresan (1993), Hull and White (1995), Nielsen, Saà-Requejo, and Santa Clara (1993), Longstaff and Schwartz (1995) and others.

Under these models**,** the Recovery rate in the event of default is exogenous and independent from the firm's asset value. It is generally defined as a fixed ratio of the outstanding debt value and is therefore independent from the Probability of Default. For example, Longstaff and Schwartz (1995) argue that, by looking at the history of defaults and the recovery rates for various classes of debt of comparable firms, one can form a reliable estimate of the Recovery rate. In their model, they allow for a stochastic term structure of interest rates and for some correlation between defaults and interest rates. They find that this correlation between default risk and the interest rate has a significant effect on the properties of the credit spread. This approach simplifies the first class of models by both exogenously specifying the cash flows to risky debt in the event of

bankruptcy and simplifying the bankruptcy process. The latter occurs when the value of the firm's underlying assets hits some exogenously specified boundary.

Despite these improvements with respect to the original Merton's framework, second generation structural-form models still suffer from three main drawbacks, which represent the main reasons behind their relatively poor empirical performance. First, they still require estimates for the parameters of the firm's asset value, which is non-observable. Indeed, unlike the stock price in the Black and Scholes formula for valuing equity options, the current market value of a firm is not easily observable. Second, structural-form models cannot incorporate credit-rating changes that occur quite frequently for default-risky corporate debts. Most corporate bonds undergo credit downgrades before they actually default. As a consequence, any credit risk model should take into account the uncertainty associated with credit rating changes as well as the uncertainty concerning default. Finally, most structural-form models assume that the value of the firm is continuous in time. As a result, the time of default can be predicted just before it happens and hence, as argued by Duffie and Lando (2000), there are no sudden surprises. In other words, without recurring to a jump process, the Probability of Default of a firm is known with certainty.

2.2.3 The KMV-Merton Theory

The KMV-Merton model applies the framework of Merton (1974), in which the equity of the firm is a call option on the underlying value of the firm with a strike price equal to the face value of the firm's debt. The model recognizes that neither the underlying value of the firm nor its volatility are directly observable. Under the model's assumptions both can be inferred from the value of equity, the volatility of equity and several other observable variables by solving two nonlinear simultaneous equations. After inferring these values, the model specifies that the probability of default is the normal cumulative density function of a z-score depending on the firm's underlying value, the firm's volatility and the face value of the firm's debt.

The KMV-Merton default forecasting model produces a probability of default for each firm in the sample at any given point in time. To calculate the probability, the model subtracts the face value of the firm's debt from an estimate of the market value of the firm

and then divides this difference by an estimate of the volatility of the firm scaled to reflect the horizon of the forecast.

The resulting z-score, which is referred to as the distance to default, is then substituted into a cumulative density function to calculate the probability that the value of the firm will be less than the face value of debt at the forecasting horizon. The market value of the firm is simply the sum of the market values of the firm's debt and the value of its equity. If both these quantities were readily observable, calculating default probabilities would be simple. While equity values are readily available, reliable data on the market value of firm debt is generally unavailable. The KMV-Merton model estimates the market value of debt by applying the Merton (1974) bond pricing model. The Merton model makes two particularly important assumptions. The first is that the total value of a firm is assumed to follow geometric Brownian motion,

$$dV = \mu V\, dt + \sigma V\, dW$$

Where V is the total value of the firm, μ is the expected continuously compounded return on V, σV is the volatility of firm value and dW is a standard Weiner process. The second critical assumption of the Merton model is that the firm has issued just one discount bond maturing in T periods. Under these assumptions, the equity of the firm is a call option on the underlying value of the firm with a strike price equal to the face value of the firm's debt and a time-to-maturity of T. Moreover, the value of equity as a function of the total value of the firm can be described by the Black-Scholes-Merton Formula. By put-call parity, the value of the firm's debt is equal to the value of a risk-free discount bond minus the value of a put option written on the firm, again with a strike price equal to the face value of debt and a time-to-maturity of T.

$$E = V\, N(d1) - e^{-rT} FN(d2),$$

where E is the market value of the firm's equity, F is the face value of the firm's debt, r is the instantaneous risk-free rate, $N(\cdot)$ is the cumulative standard normal distribution function, d is given by

$$d_1 = \frac{\ln (V/F) + (r + 0.5\sigma^2 v)\, T}{\sigma V \sqrt{T2}}$$

2.3 Factors of financial performance

For a long time, financial performance has been perceived only through its ability to obtain profits, this changed over time, today the concept of performance having different meanings depending on the user perspective of financial information. A company can be categorized as global performance if it can satisfy the interests of all stakeholders: managers are interested in the welfare and to obtain profit, because their work is appreciated accordingly; owners want to maximize their wealth by increasing the company's market value which can only be based on profit; current and potential shareholders perceive performance as the company's ability to distribute dividends for capital investment, given the risks they take; commercial partners look for the solvency and stability of the company; credit institutions want to be sure that the company has the necessary capacity to repay loans on time (solvency); employees want a stable job and to obtain high material benefits; the state seeks a company to be efficient, to pay its taxes, to help creating new jobs.

2.3.1 Value Addition Indicators

Stern Stewart consulting company proposed new performance indicators, based on value added: economic value added (EVA) and market value added (MVA). Boston Consulting Group and HOLT Value Associates in Chicago promoted as efficiency indicators; Total Shareholder Return and rate of return on cash flow - Cash Flow Return on Investment. Applied Finance Group proposed economic margins (EM) as a means of measuring performance. Other modern financial ratios used for the evaluation of corporate financial performances are: profit per share (EPS), price / income (PER), the market value ratio (MBR), dividend yield.

2.3.2. Classical Indicators

The classic indicators is that their use provides information regarding the performance of the company from the past, thus these indicators do not take into account the cost of capital, showing only the results of using capital. Therefore, by using only this type of

indicators we can find companies that obtain performance by using the existing value, Classic indicators include the rates of return (ROA, ROE, and ROI), gross profit margin, net profit margin, debt ratio, current ratio, and acid test ratio.

2.3.3. Non-Financial means

A growing concern in recent studies has been observed, in finding non-financial means to measure the financial performance. This type of measurement is considered to be a more efficient way to define enterprise performance, putting together more important parts of the organization such as quality management, quality of intellectual capital. The report of FASB (Financial Accounting Standards Board) used in 2001 new nonfinancial indicators to measure performance.

2.4 Empirical Literature Review

During the last several years, new approaches explicitly modeling and empirically investigating the relationship between Probability of Default and Recovery rate have been developed. These models include Bakshi et al. (2001), Jokivuolle and Peura (2003). Frye (2000a and 2000b), Jarrow (2001), Hu and Perraudin (2002), and Carey and Gordy (2003), Altman, Brady, Resti and Sironi (2001, 200**3** and 2005), and Acharya, Bharath and Srinivasan (2007).

Bakshi et al. (2001) enhance the reduced-form models allowed for a flexible correlation between the risk-free rate, the default probability and the recovery rate. Based on some evidence published by rating agencies, they force recovery rates to be negatively associated with default probability. They find some strong support for this hypothesis through the analysis of a sample of BBB-rated corporate bonds: more precisely, their empirical results show that, on average, a 4% worsening in the (risk-neutral) hazard rate is associated with a 1% decline in (risk-neutral) recovery rates.

A rather different approach is the one proposed by Jokivuolle and Peura (2003). The authors present a model for bank loans in which collateral value is correlated with the Probability of Default. They use the option pricing framework for modeling risky debt: the borrowing firm's total asset value triggers the event of default. However, the firm's

asset value does not determine the Recovery rate. Rather, the collateral value is in turn assumed to be the only stochastic element determining recovery. Because of this assumption, the model can be implemented using an exogenous Probability of Default, so that the firm's asset value parameters need not be estimated. In this respect, the model combines features of both structural-form and reduced-form models. Assuming a positive correlation between a firm's asset value and collateral value, the authors obtain a similar result as Frye (2000), that realized default rates and recovery rates have an inverse relationship.

The model proposed by Frye draws from the conditional approach suggested by Finger (1999) and Gordy (2000). In these models, defaults are driven by a single systematic factor – the state of the economy - rather than by a multitude of correlation parameters. These models are based on the assumption that the same economic conditions that cause defaults to rise might cause Recovery rates to decline, i.e. that the distribution of recovery is different in high-default periods from low-default ones. In Frye's model, both Probability of Default and Recovery rate depend on the state of the systematic factor. The correlation between these two variables therefore derives from their mutual dependence on the systematic factor.

The intuition behind Frye's theoretical model is relatively simple: if a borrower defaults on a loan, a bank's recovery may depend on the value of the loan collateral. The value of the collateral, like the value of other assets, depends on economic conditions. If the economy experiences a recession, Recovery rates may decrease just as default rates tend to increase. This gives rise to a negative correlation between default rates and Recovery rates.

While the model originally developed by Frye (2000a) implied recovery to be taken from an equation that determines collateral, Frye (2000b) modeled recovery directly. This allowed him to empirically test his model using data on defaults and recoveries from U.S. corporate bond data. More precisely, data from Moody's Default Risk Service database for the 1982-1997 period were used for the empirical analysis. Results show a strong negative correlation between default rates and Recovery rates for corporate bonds. This evidence is consistent with U.S. bond market data, indicating a simultaneous increase in

default rates and LGDs for the 1999-2002 period. Frye's (2000b and 2000c) empirical analysis allows him to conclude that in a severe economic downturn**,** bond recoveries might decline 20-25 percentage points from their normal-year average. Loan recoveries may decline by a similar amount, but from a higher level. In all cases, Frye, and others, compare defaults and recoveries just after default, not the ultimate recovery after the restructuring, or recovery period. Jarrow (2001) presents a new methodology for estimating Recovery rates and Probability of Defaults implicit in both debt and equity prices. As in Frye, Recovery rates and Probability of Defaults are correlated and depend on the state of the macro economy. However, Jarrow's methodology explicitly incorporates equity prices in the estimation procedure, allowing the separate identification of Recovery rates and Probability of Defaults and the use of an expanded and relevant dataset. In addition to that, the methodology explicitly incorporates a liquidity premium in the estimation procedure, which is considered essential in light of the high variability in the yield spreads between risky debt and U.S. Treasury securities.

Using four different datasets Moody's Default Risk Service database of bond defaults and LGDs, Society of Actuaries database of private placement defaults and LGDs, Standard & Poor's database of bond defaults and LGDs, and Portfolio Management Data's database of LGDs ranging from 1970 to 1999, Carey and Gordy (2003) analyze LGD measures and their correlation with default rates. Their preliminary results contrast with the findings of Frye (2000b): estimates of simple default rate-LGD correlation are close to zero. They find**,** however**,** that limiting the sample period to 1988-1998, estimated correlations are more in line with Frye's -results (0.45 for senior debt and 0.8 for subordinated debt). The authors postulate that during this short period the correlation rises not so much because LGDs are low during the low-default years 1993-1996, but rather because LGDs are relatively high during the high-default years 1990 and 1991. They therefore conclude that the basic intuition behind Frye's model may not adequately characterize the relationship between default rates and LGDs. Indeed, a weak or asymmetric relationship suggests that default rates and LGDs may be influenced by different components of the economic cycle.

Using defaulted bonds' data for the sample period 1982-200**2**, which includes the relatively high-default years of 2000-2002, Altman, Brady, Resti and Sironi (2005), following Altman, Resti and Sironi (2001), find empirical results that appear consistent with Frye's intuition: a negative correlation between default rates and Recovery rates. However, they find that the single systematic risk factor, that is the performance of the economy - is less predictive than Frye's model would suggest. Their econometric univariate and multivariate models assign a key role to the supply of defaulted bonds that is the default rate and show that this variable, together with variables that proxy the size of the high-yield bond market and the economic cycle, explain a substantial proportion of close to 90% of the variance in bond recovery rates aggregated across all seniority and collateral levels. They conclude that a simple market mechanism based on supply and demand for the defaulted securities drives aggregate recovery rates more than a macroeconomic model based on the common dependence of default and recovery on the state of the cycle. In high default years, the supply of defaulted securities tends to exceed demand, thereby driving secondary market prices down. This in turn negatively affects Recovery rate estimates, as these are generally measured using bond prices shortly after default.

A recent article Altman (2007), argues that there was a type of credit bubble causing seemingly highly distressed firms to remain non-bankrupt when, in more normal periods, many of these firms would have defaulted. This, in turn, produced an abnormally low default rate and the huge liquidity of distressed debt investors bid up the prices of both existing and newly defaulted issues. As we had predicted, a regression to the long-term mean, i.e., lower recoveries, and a huge increase in default rates began in 2008 and culminated in record high first-half 2009 defaults and near record low recovery rates Altman and Karlin (2009).

Using Moody's historical bond market data, Hu and Perraudin (2002) also examine the dependence between recovery rates and default rates. They first standardize the quarterly recovery data in order to filter out the volatility of recovery rates due to changes over time in the pool of rated borrowers. They find that correlations between quarterly recovery rates and default rates for bonds issued by US-domiciled obligors are 0.22 for

post-1982 data (1983-2000) and 0.19 for the 1971-2000 periods. Using extreme value theory and other non-parametric techniques, they also examine the effect of this negative correlation on credit VaR measures and find that the increase is statistically significant when confidence levels exceed 99%.

Credit Risk requires four types of input; obligors' credit exposures, default rates and their volatilities, and recovery rates. Furthermore, to determine default probabilities of the obligors and their volatilities over time, CSFB (1997) suggests the use of credit spreads in the market or use of obligors' ratings as a proxy by deriving a common default rate and volatility for each credit rating from historical data of rating changes. Therefore, Credit Risk tries to combine the discrete nature of rating transitions with the continuous nature of default rates while CSFB (1997) emphasizes that one-year default rates change simultaneously with the state of economy and several other factors resulting in a deviation from average default rates

2.5. Summary of Literature Review

Using the market-based measure of Moody's KMV as an indicator of default probability the expected return is not positively related to default probability. These findings complement the existing evidence in the literature on the relation of stock returns to alternative measures of default probability. Through a simple strategic bargaining model built on Fan and Sundaresan (2000), it argue that the opportunity for equity-holders of distressed firms to renegotiate and extract benefits, in violation of the absolute priority rule, is essential for explaining the counter-intuitive empirical regularity in a rational context with proper risk-return trade-off. The empirical investigation, using a variety of proxies for shareholder advantage, has provided consistent support for our conjectures and demonstrated that market mispricing is not likely to be the primary reason for the observed relationship between default risk and returns.

The basic intuition behind the Merton model is relatively simple: default occurs when the value of a firm's assets that is in terms of the market value of the firm is lower than that of its liabilities. The second generation theory assumed that default may occur anytime between the issuance and maturity of the debt and that default is triggered when the value of the firm's assets reaches a lower threshold level.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter explained the research design that was used in this study, it defines the research population and sample size the study is based on. The instruments used for measuring data validity and reliability are also discussed together with how the data was collected and analyzed.

3.2 Research Design

In this study Cross-sectional survey design was used. This is because cross sectional survey can be used to describe odd ratios, absolute risks, and relative risk among prevalence risk ratio. They may also support inferences of cause and effect (Kohlmann, 2008). This study entails the relationship between credit risk and financial performance of industry firms in Kenya which can be determined better by this type of design.

3.3 Population of the study

There are six Cement Industries operating in Kenya are regulated by Capital Market Authority

3.4 Sample

The research conducted was a census survey of three Cement Industries that are listed in the Nairobi Stock Exchange, their financial records are published on an yearly basis as required by the laws of Kenya and shall be used in the analysis. These companies are regulated by Capital Markets Authority which requires them to public audited financial reports, it also requires the International Accounting Standards to be adhered when preparing the financial statements.

3.5 Data Collection

This study used secondary data which was obtained from the quarterly financial records for the periods 2009 to 2014 of the three Cement companies. The study variables included the independent variables which consisted of default credit risk, credit risk

exposure rate and recovery rate, and the dependent variable which is return on Asset (ROA). Credit risk measurement consisted of credit risk exposure, default probability, and recovery rate.

3.5.1 Data Validity and Reliability

In reliability according to classical test theory, any score obtained by a measuring instrument that is the observed score is composed of both the true score, which is unknown, and error in the measurement process. The true score is essentially the score that a person would have received if the measurement were perfectly accurate. The process of developing and validating an instrument is in large part focused on reducing error in the measurement process. There are different means of estimating the reliability of any measure. According to Crocker and Algina, the test developer has a responsibility to identify the sources of measurement error that would be most detrimental to useful score interpretation and design a reliability study that permits such errors to occur so that their effects can be assessed. Reliability estimates will be used to evaluate the stability of measures administered at different times to the same individuals or using the same standard, reliability coefficients range from 0.00 to 1.00, with higher coefficients indicating higher levels of reliability.

Validity is often defined as the extent to which an instrument measures what it purports to measure. Validity requires that an instrument is reliable, but an instrument can be reliable without being valid. Reliable data is dependable, trustworthy, unfailing, sure, authentic, genuine, reputable and the reputation of the source is critical.

3.6 The Model

Linear regression analysis model was used in this study. The analysis has one dependent variable and three independent variables and the linear regression equation is;

$$\mathbf{Y = a + b_1X_1 + b_2X_2 + b_3X_3}$$

Y The dependent variable (ROE)

$\mathbf{X_1}$ the independent variable (credit risk exposure rate)

$\mathbf{X_2}$ the independent variable (default credit risk)

X_3 the independent variable (recovery rate)

a- represents the constant (intercept), and

b_1, b_2 and b_3 represents the slope of the regression lines; the variables are measured below in operationalization of variables.

3.7 Operationalization of the variables

The return on asset was used to measure the financial performance of the firm, it represents the dependent variable. The return on asset is the ratio of net income to asset and represent how efficient management is at using its assets to generate earnings. The return on Asset was measured by taking the average annual net income of the industry and dividing it with the average assets as shown below:

$$\text{Return on Asset} = \frac{\text{Average Net Income}}{\text{Average Assets}}$$

Credit risk exposure rate was calculated by finding the average credit advanced to the customers divided by average net sales of the industry as shown below;

$$\text{Credit risk exposure rate} = \frac{\text{Average credit advanced}}{\text{Average Net Sales}}$$

Default rate was calculated by finding the average total impaired receivables of industry and then dividing it with the total receivables of the firm as shown below;

$$\text{Default rate} = \frac{\text{Average impaired receivables}}{\text{Average Total receivables}}$$

Recovery rate was calculated by finding the average of the total amount recovered after default then dividing it with the total bad debts of the firm as shown below;

$$\text{Recovery rate} = \frac{\text{total amount recovered after default}}{\text{Average Total bad debts}}$$

3.8 Test of significance

Analysis of Variance (ANOVA) is a statistical method used to test differences between two or more means, and therefore generalizes the t-test to more than two groups. Whereas the independent t tests compares two groups by testing H_o: $u_1=u_2$, it tells us if the variation between two groups is significant, however doing multiple two-sample t-tests would result in an increased chance of committing a statistical type I error, ANOVA tests k groups, where k represent any integers greater than 1 for statistical significance.

The P-value for the data analysis shall be 0.05. These values correspond to the probability of observing such an extreme value by chance. The test of significance carried out for all the variables using t-test at a 95% level of significance, furthermore the coefficient of determination R^2 shall be used in the analysis.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents the analysis of data collected and discusses the findings in regard with the objective of the study. Full data was obtained from the three (3) cement firms which are registered by the Capital Market Authority and were in full operation between the periods of 2009 to 2014 quarterly data.

4.2 The relationship between credit risk and the financial performance of cement firms in 2009 to 2014

This part explains the descriptive and inferential statistics that was obtained from the study. The descriptive statistics shows the mean and standard deviation of the dependent variable (return on asset) and the independent variables (exposure rate, default rate, and recovery rate).

Measurement of correlation between the variables are also illustrated and discussed together with the summary model showing the regression coefficients and the relationship between the variables.

Table 4.2.1: Descriptive statistics table for research variables

Descriptive Statistics

	Mean	Std. Deviation	N
Return on Assets	.0228135	.02519404	54
Credit Risk Exposure	.0667728	.04183062	54
Default Rate	.0436200	.05527934	54
Recovery Rate	.0281838	.02290260	54

Table 4.1 above shows the dependent variable return on asset against the independent variables exposure rate, default rate and recovery rate.

Return on asset represents the three cement firms with a mean of 0.0228135 and standard deviation of 0.02519404, while credit risk exposure rate has a mean of 0.0667728 and a standard deviation of 0 .04183062, default rate has a mean of 0.0436200 and a standard

deviation of 0.05527934, and recovery rate has a mean of 0.0281838 and a standard deviation of 0.02290260.

4.2.2 Measurement of Correlation between Variables

Table 4.2: Correlations Matrix

Correlations

		Return on Assets	Credit Risk Exposure	Default Rate	Recovery Rate
Pearson Correlation	Return on Assets	1.000	.803	-.483	-.064
	Credit Risk Exposure	.803	1.000	-.450	-.031
	Default Rate	-.483	-.450	1.000	-.017
	Recovery Rate	-.064	-.031	-.017	1.000
Sig. (1-tailed)	Return on Assets	.	.000	.000	.322
	Credit Risk Exposure	.000	.	.000	.413
	Default Rate	.000	.000	.	.450
	Recovery Rate	.322	.413	.450	.
N	Return on Assets	54	54	54	54
	Credit Risk Exposure	54	54	54	54
	Default Rate	54	54	54	54
	Recovery Rate	54	54	54	54

The findings from research as shown in the table above demonstrates a positive relationship between the dependent variable return on asset and the independent variable credit risk exposure rate and a negative relationship between return on asset and the independent variables default rates and recovery rate.

The Pearson's correlation coefficient between return on asset and credit risk exposure rate is 0.803, this means that the two variables move in the same direction. This implies that an increase in credit risk exposure increases the returns on asset of cement firms.

Return on asset and default rate shows Pearson's correlation coefficient of -0.483 which implies that an increase in default rate decreases return on asset. From the two independent variables, credit exposure rate affects return on asset more than default rate.

Recovery rate affects return on asset negatively with a Pearson's correlation coefficient of -0.064, this implies that an increase in recovery rate after default leads to a decrease in return on asset.

Table 4.2.3 Model summary table 2009 to 2014

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.815[a]	.665	.645	.01502029	.665	33.038	3	50	.000

a. Predictors: (Constant), Recovery Rate, Default Rate, Credit Risk Exposure

b. Dependent Variable: Return on Assets

Model summary table above (table 4.3) shows the coefficient correlation of 0.815 (P=0.000) which indicates that the points lie moderately close to the line of best fit in the scatter diagram. The model shows that the three credit risk indicators which are Credit risk Exposure Rate (ER), Default Rate (DR) and Recovery Rate (RR) have a significant relationship (R=0.815, P=0.000) with performance. It also shows they can predict up to 33.038 percent of the variance in performance. Model summary table above (table 4.3) shows the coefficient correlation of 0.815 (P=0.000) which indicates that the points lie moderately close to the line of best fit in the scatter diagram. The model also shows that the three credit risk indicators which are Credit risk Exposure Rate (ER), Default Rate (DR) and Recovery Rate (RR) have a significant relationship (R=0.465, P=0.000) with performance. It also shows that they can predict up to 66.5 percent of the variance in performance. This means that 66.5 percent of Return on Asset can be predicted by Recovery Rate, Default Rate and Credit Risk Exposure. The data collected considered a period of four years (2009 -2014) within which most of the cement firms in Kenya started experiencing financial problems in terms of profitability and high cost of operation.

Table 4.2.4 ANOVA Summary table 2009 to 2014

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.022	3	.007	33.038	.000[b]
	Residual	.011	50	.000		
	Total	.034	53			

a. Dependent Variable: Return on Assets

b. Predictors: (Constant), Recovery Rate, Default Rate, Credit Risk Exposure

The table above (table 4.4) shows the analysis of variance test of the fitness of the model. With an F statistics of 33.038 and P= 0.000, shows that the regression as a whole is significant. The result in the table means that Recovery Rate, Default Rate and Credit Risk Exposure reliably predicts Return on Assets. The F-value linked with the P-value proves that there is a significant relationship between the profitability (ROE) and credit risk factors (ER, DR, and RR).

Table 4.2.5 Summary of Regression Results year 2009 to 2014

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-.002	.006		-.370	.713	-.014	.010					
	Credit Risk Exposure	.441	.055	.732	7.973	.000	.330	.552	.803	.748	.653	.796	1.25
	Default Rate	-.070	.042	-.154	-1.679	.099	-.154	.014	-.483	-.231	-.137	.796	1.25
	Recovery Rate	-.049	.090	-.044	-.542	.591	-.230	.132	-.064	-.076	-.044	.998	1.00

a. Dependent Variable: Return on Assets

b. Independent variables: exposure rate, default rate, and recovery rate

The theoretical model regression equation: $Y = a + b1X1 + b2X2 + b3X3$

The established regression equation is:

ROE = -0.002 + 0.441*Exposure Rate – 0.070*Default Rate - 0.049*Recovery Rate

Table 4.5 above presents the regression results for the profitability of the three cement firms under the study. The result shows that credit risk exposure rate (ER) affects the return on asset (ROA) positively. The beta coefficient of ER is 0.441 which means that one unit increase in ER increases ROA by 0.441 units holding other two variables (default rate and recovery rate) constant. Credit risk exposure rate has the most significant and positive relationship with the profitability of cement firms as compared with the other credit risk indicators. Default rate has a negative beta coefficient of –0.070. This indicates that one unit increase in Default rate will decrease return on asset (ROA) by 0.070 units with the other indicators (exposure rate and recovery rate) remaining constant. Recovery rate has a negative relationship with return on asset; the beta coefficient of recovery rate is -0.049. This indicates that one unit increase in the recovery rate decreases the return on asset by 0.049 units with the other indicators (exposure rate and default rate) remaining constant. The result of the analysis shows that recovery rate and default rate affect the return on asset negatively, with the exposure rate having a higher significant effect. The result also shows that credit risk exposure rate has a positive effect on the return on asset.

4.3 Summary and Interpretation of the findings

Table 4.2 above shows the correlation matrix of credit risk indicators (exposure rate, default risk and recovery rate) to financial performance indicator (return on asset).

Table 4.2 shows that credit risk exposure rate has r = 0.803 at p=0.000. The relationship being positive indicates that credit risk and financial performance move in the same direction. Default rate in table 4.2 shows that r=-0.483 at p=0.000, this indicates that default rate has a weak relationship with the financial performance. The relationship being negative indicates that default rate and financial performance move in opposite direction. Recovery rate on the other hand shows that r=-0.064 at p=0.322, this indicates that recovery rate has an average relationship with the financial performance. The relationship being negative means that recovery rate and financial performance move in

opposite direction. This implies that credit risk exposure rate has an average relationship with the financial performance.

Table 4.3 shows a model summary from the year 2009 to 2014 with a correlation coefficient of 0.815 (P=0.000). The credit risk factors indicate an average relationship (R=0.815, P=0.000) with the financial portfolio also shows that the independent variables which are exposure rate, default rate and recovery rate can predict 66.5percent of the dependent variable return on asset.

Table 4.4 shows the analysis of variance, the table shows that the sum of squares due to regression (0) explained by the three variables is more than the sum of the squares due to residuals (0.011). This implies that the relationship of the variables according to the degree of freedom of the variables is accurate. The result in the table means that exposure rate, default rate, and recovery rate reliably predicts return on asset.

The F-value linked with the P-value proves that there is a significant relationship between the profitability measured in terms of return on asset and credit risk factors which are credit risk exposure rate, default rate and recovery rate.

Table 4.5 is a summary table of regression analysis in the period of 2009 to 2014. The results shows that if credit risk exposure rate, default rate and recovery rate are held constant then the financial performance of cement firms will be -0.02. Recovery rate and default rate have negative coefficients of -0.049 and -0.070 respectively. Credit risk exposure rate have a positive correlation of 0.441. The established linear regression equation is: Return on Asset = -0.002 + 0.441*Exposure Rate – 0.070*Default Rate – 0.49*Recovery Rate.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

This chapter presents the summary of the main findings of the study, the conclusions and also provides recommendations for policy as well recommendations for further research.

The objective of the study was to establish the effect of credit risk (credit risk exposure rate, default rate, and recovery rate) on the financial performance (return on asset) of cement firms in Kenya. The study was able to find the relationship between credit risk factors and the financial performance indicator of cement firms in Kenya. The regression analysis shows recovery rate and default rate have a negative effect on the profitability of cement firms while that credit risk exposure rate has a positive effect.

The effect of credit risk exposure rate on the financial performance of cement firms as shown in correlation matrix table 4.2 indicates r=0.803 at P=0.000 under one tail significance level. The result implies that credit risk exposure rate has an average effect on financial performance of cement firms in Kenya. The positive effect indicates that credit risk exposure rate and financial performance (return on asset) move in the same direction.

The effect of default rate on the financial performance of cement firms as shown in correlation matrix table 4.2 indicates r = -0.483 at P = 0.000 under one tail significance level. The result implies that default rate has a weak effect on financial performance of cement firms in Kenya. The negative effect indicates that default rate and financial performance (return on asset) move in opposite direction.

The effect of recovery rate on the financial performance of cement firms as shown in correlation matrix table 4.2 indicates r = -0.064 at P = 0.322 under one tail significance level. The result implies that recovery rate has an average effect on the financial performance of cement firms in Kenya. The negative effect indicates that recovery rate

and financial performance (return on asset) move in opposite direction. From the regression analysis, the model obtained was:

Financial Performance=-0.002 + 0.441*Exposure Rate – 0.070*Default Rate - 0.049*Recovery Rate

5.2 Conclusion

The overall objective of the study was to establish the effect of credit risk (credit risk exposure rate, default rate, and recovery rate) on the financial performance (return on asset) of cement firms in Kenya. This was achieved by looking at the relationship of credit risk indicators (credit risk exposure rate, default rate, and recovery rate) against the financial performance indicator (return on asset). In Kenya trade credit has been there for generations with its inception it has numerous effects to the business with some collapsing along the way while others succeeding, with time weak credit policies have been adopted that has no correlation with firms financial performance, Cement industry being a capital intensive with a unit of the product retailing at an average of Ksh 600, bulk buying for wholesale, retail and distribution becomes necessary factor for the sale of the product, in a third economy like Kenya there was bound to be trade credit hence leading to how this way of doing business impacted on the financial performance of the sector. By establishing the relationship, the firms are able to know how credit impacts in their financial performance hence used as a basis in the formulation of credit policies and practices. Credit policy is also helpful in assessing the credit worthiness of a borrower that would prevent them from accessing the credit facilities for those who have a poor record in terms of default and recovery.

The study established that credit risk indicators (credit risk exposure rate, default rate, and recovery rate) have an average effect ($r=0.815$, $p=0.000$) on the financial performance of cement firms in Kenya. The credit risk indicators used in the study can predict return on asset by 66.5 percent. The study concludes that credit risk exposure rate, default rate, and recovery rate have a significant effect on the financial performance of cement firms in Kenya, thus credit risk affect the financial performance of cement firms.

Besides, strong credit risk measurement is therefore essential not only to firms' prosperity, but also to a country's overall economic growth. The study established that financial performance is rated with credit risk with the latter causing the former.

5.3 Recommendations

Cement firms in Kenya extend credit to distributers and wholesalers in the form of inventory. All cement firms should have established credit policies that clearly outline the terms and conditions that must be adhered to before any credit facilities are offered. These guidelines need to be updated in every annual meeting to ensure that they are in line with the current affairs. The firms should also put in place stringent internal credit control measures for them to able to recover all the debts from their accounts receivables. These firms need to implement credit risk measurement system such as credit ranking and credit scoring to customers to avoid incurring more cost on customers who have proved to be not credit worthy.

The lending guidelines of the cement firms need to be approved by the Managing Director and Board of Directors and endorsed by the Manufacturers Board. Every cement firm should define the credit risk profile of their clients to ensure that necessary measures are taken before credit facilities are granted. This empirical work shows that high exposure rate leads to high default rate, cement firms should try to keep their exposure rate low by ensuring that there is a certain percentage that can be granted as credit so as to limit the effect of credit risk.

The study suggests that more independent variables to be added in the regression model to help improve the results of the study. This study used return on asset as an indicator of profitability, the study recommends use of another profitability indicator such as return on asset, and this will help in understanding the variation between the different indicators in measuring profitability of cement firms.

The study also recommends the use of credit reference beurals in the assessment of credit worthiness of a trade borrower, the reference helps to pull out the credit history of the client whether he or she has defaulted on previous lending or not with the financial

institutions. This helps reduce the default risk as those with a poor credit history shall be denied the trade credit.

5.4 Limitations of the study

Like most empirical done by various scholars, this research work had limitations. The researcher had a challenge in obtaining information from the cement firms which are not listed with Nairobi securities exchange. There is only three listed cement firm (Bamburi Cement, Arthi River Mining and East Africa Portland Cement) with the Nairobi securities exchange. Those cement firms which are not listed in the stock market did not want their financial statement to be made public thus the researcher worked on generalization of the financial results of these cement firms by finding the quarterly values of their financial statements.

The study is also limited to the degree of precision of the data obtained from the cement firms' financial reports. To mitigate the challenge, the study accepted a confidence level of 95%.

Cement firms examined in this study had a difference in terms of experience as Bamburi cement showing some good profits Arthi River Mining showing negative profits. This research work may therefore be influenced.

The researcher also faced financial constraints as most of the cement firms are delocalized, the researcher had to spend a lot in terms of transport in order to get financial report from cement firms that are not listed.

5.5 Suggestion for Further Studies

The study also recommends that the credit system needs to be enhanced to allow cement firms as well as non-cement entities retailers and utility companies access to credit history of borrowers to determine the default risk so as to know which clients to serve and what differential price to charge to cover the credit risks to ensure good financial performance.

The results of the study will be valuable to cement organization in Kenya in getting reliable insights on impact of credit risk on financial performance. The study is useful to the management in that it provides an insight into improving organizational performance

through credit risk. The study will broaden the knowledge on impact of credit risk on financial performance and provide a basis to academicians for future research.

More research on the variables of credit risks in addition to the variables used in this study, more research on the variables that affect credit risk need to be done in order to improve the model to have better results that increase the level of confidence.

The study recommends further research on ways in which financial performance of cement firms can be enhanced through credit risks. Exploration of ways in which financial performance of Kenyan cement firms can be enhanced through credit risk will supplement the findings of this study by enabling the cement firms and manufacturing associations to structure a good economic environment for cement firms.

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APPENDIX 1

List of the local cement industry

Cement	Company Mines	Cement
Bamburi Cement Limited (BMBC)	Mombasa	Nguvu
Athi River Mining Limited (ARML)	Athi River	Rhino
East African Portland Cement Company Limited (EAPC)	Athi River	Blue Triangle
National Cement Company Limited (NCC)	Lukenya	Simba
Mombasa Cement Limited (MCL)	Athi River	Nyumba
Savannah Cement Company (SCC)	Athi River	Savannah

APPENDIX 2

SUMMARY OF DATA COLLECTION FORM

DATA COLLECTED FROM THE FINANCIAL REPORT OF CEMENT FIRMS IN KENYA (2009-2014)

	ROA	CRE	DR	RR
ARM	0.015956737	0.07491507	0.015748998	0.01683
2009	0.026594562	0.12485845	0.02624833	0.02805
	0.010637825	0.04994338	0.010499332	0.01122
2010	0.025964974	0.11813475	0.018345408	0.0704
	0.019473731	0.088601063	0.013759056	0.0528
	0.019473731	0.088601063	0.013759056	0.0528
2011	0.016823475	0.09622756	0.015077246	0.00312
	0.028039125	0.160379267	0.025128744	0.0052
	0.01121565	0.064151707	0.010051498	0.00208
2012	0.009343111	0.02489181	0.010809677	0.01728
	0.018686221	0.04978362	0.021619355	0.03456
	0.018686221	0.04978362	0.021619355	0.03456
2013	0.013621863	0.078743016	0.004684227	0.02592
	0.018162484	0.104990688	0.006245636	0.03456
	0.013621863	0.078743016	0.004684227	0.02592
2014	0.012137269	0.054311297	0.004095734	0.02523
	0.020228781	0.090518828	0.006826224	0.04205
	0.008091512	0.036207531	0.00273049	0.01682

Bamburi	0.065115845	0.09809962	0.004952476	0.003120357
2009	0.065115845	0.09809962	0.004952476	0.003120357
	0.086821126	0.130799493	0.006603302	0.004160475
2010	0.031820092	0.075768477	0.02514828	0.004464286
	0.063640185	0.151536955	0.05029656	0.008928571
	0.063640185	0.151536955	0.05029656	0.008928571
2011	0.069954033	0.095006131	0.005508799	0.072222222
	0.052465524	0.071254598	0.004131599	0.054166667
	0.052465524	0.071254598	0.004131599	0.054166667
2012	0.034030392	0.068496439	0.004915794	0.010758621
	0.022686928	0.045664293	0.003277196	0.007172414
	0.05671732	0.114160732	0.00819299	0.017931034
2013	0.02561605	0.052469936	0.006430007	0.025945946
	0.02561605	0.052469936	0.006430007	0.025945946
	0.034154733	0.069959915	0.008573342	0.034594595
2014	0.028564807	0.068070166	0.004580153	0.052884615
	0.038086409	0.090760221	0.00610687	0.070512821
	0.028564807	0.068070166	0.004580153	0.052884615
EAPC	0.045714348	0.096084962	0.092283494	0.026022
2009	0.045714348	0.096084962	0.092283494	0.026022
	0.060952464	0.128113282	0.123044658	0.034696
2010	-0.004863143	0.009144356	0.066279352	0.0352
	-0.009726286	0.018288711	0.132558704	0.0704

	-0.009726286	0.018288711	0.132558704	0.0704
2011	0.00005076	0.038961634	0.115353089	0.00496
	0.00002030	0.015584654	0.046141235	0.001984
	0.00000812	0.006233862	0.018456494	0.0007936
2012	-0.017493414	-0.007872818	0.165578841	0.010962
	-0.011662276	-0.005248545	0.110385894	0.007308
	-0.02915569	-0.013121363	0.275964735	0.01827
2013	0.009964692	0.036302185	0.093711619	0.00528
	0.009964692	0.036302185	0.093711619	0.00528
	0.013286256	0.048402914	0.124948826	0.00704
2014	-0.006886106	0.023075374	0.069353197	0.0558
	-0.009181475	0.030767165	0.092470929	0.0744
	-0.006886106	0.023075374	0.069353197	0.0558