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Title: Cash Flow Management and Prediction of Financially Distressed South African Listed Firms

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LIST OF ACRONYMS

ACF	: Adjusted Cash Flows
BRR	: Business Rescue Regime
CEO	: Chief Executive Officer
CA	: Current Assets
CL	: Current Liability
EBIT	: Earnings Before Interest and Tax
FFO	: Fund from Operations
GDP	: Gross Domestic Product
GNP	: Gross National Product
JSE	: Johannesburg Stock Exchange
MDA	: Multiple Discriminant Analysis
MVE	: Market Value Equity
NOI	: Net Operating Income
RE	: Retained Earnings
ROE	: Return on Equity
ROA	: Return on Assets
SPSS	: Statistical Package for Social Scientist
TA	: Total Assets
TL	: Total Liabilities
TDR	: Total Debt Ratio
UCF	: Unadjusted Cash Flows
WC	: Working Capital

DECLARATION

I, Vusumuzi Innocent Sibiya, wish to hereby declare that this academic piece is my original work, except where otherwise mentioned. It has never been submitted in part or whole in any Degree, University and for any type of examination. It is originated to be submitted in partial fulfilment of the requirement for the degree of Master of Management in Finance and Investment in the University of the Witwatersrand, Johannesburg.

Signature:  **Date:** 28 February 2020

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ABSTRACT

This study focused on Cash flow Management and predictions of financial distress and bankruptcy of South African firms listed on the JSE. The primary objective was to determine whether adjusted cash flow or unadjusted cash flow is a more effective predictor of financial distress. Fifty-four JSE listed firms were examined, using the Ohlson Model and the Altman Z-score model for ascertaining financial distress. The findings of the study are that using adjusted cashflows is more accurate in predicting bankruptcy than unadjusted cashflows. From the findings the study concludes that a true measure of performance which produced favourable results was based on adjusted cash flows. Unadjusted cashflows produced relatively lower accuracy; therefore, depending on them would be unwise. The recommendation from this finding is to use adjusted cashflows as a predictor of bankruptcy or failure, and thus have them serve as a basis for decision making. Furthermore, in predicting the future of a firm, cash flow ratios must be complemented by balance sheet ratios to produce a more robust prediction. The study concluded by making suggestions for future research.

CHAPTER ONE

INTRODUCTION

1.1 Introduction and Background of the Study

Cash and cash equivalents, an important item on firms' statements of financial position, receives much attention from companies, investors, and analysts. Financial managers and analysts consider cash flow very important for the financial wellbeing of a business. Corporate failure and financial distress can be possibly avoided if the early signals are identified through prediction models. The early warning by prediction can help management to take corrective action to avoid the dire consequences of financial distress. The Steinhoff case is one such case which could have been avoided if the financial distress was predicted by investors and analysts, it does seem that most analysts missed it. When the Steinhoff share price fell in December 2017, after the resignation of CEO Markus Jooste, it was almost two years since the first signs had shown when German authorities pounced the offices of a Steinhoff's subsidiary (Naude *et al.* 2018)

Steinhoff International had been a thriving firm in international retail business for years. Over a 50-year period the firm was able to transform from a small-time furniture business into a global giant. The firm used to source low-valued equipment from Eastern Europe then traded it in West Germany. At its peak Steinhoff had a completely unified supply chain inclusive of sourcing and procuring, manufacturing, supply, logistics and selling. The success was achieved through verdicts to grow, vary and vertically integrate the business. The collapse of Steinhoff in South Africa caused shocks in global financial markets. In the United States of America, four investment banks namely Bank of America, JPMorgan Chase, Goldman Sachs and Citigroup had in excess of more than $1 billion in credit extended to Steinhoff. Steinhoff owed international banks in excess of $22 billion.

Most companies set performance targets and objectives for the top management to meet. Failure to perform often involves punitive action such as not renewing contracts or the termination of contracts. At times, targets do not take cognisance of the prevailing operating environment; so, to achieve targets, senior managers collude with auditors to misrepresent financial data. This was revealed by the Steinhoff scandal, where the push for unrealisable targets resulted in management colluding with the finance department to overstate financial

performance. Information was falsified to satisfy shareholder expectations with the intention to safeguard their contracts.

Despite the recognition of the importance of cash flow or its lack thereof as a significant contributor to business failures (Zapalska *et al*, 2004) cash flow management has often been neglected. Firms can adjust cash flows for various reasons especially when submitting financial statements to banks and creditors. The manipulated cash flows often lead to more debt and as a result financial distress and insolvency. Finance discourse is pregnant with instances of business insolvencies, insolvencies and near failures of lucrative companies owing to poor working-capital management. The fall of Steinhoff in 2017 is ascribed to weak working-capital management because an adverse operating cashflow was incurred for most of the final years of its corporate life (Brown, 2017).

1.2 Problem to be resolved/Problem statement

Corporate failure is problematic to both developed and developing economies. Experts and scholars have widely studied corporate failure prediction without drawing corresponding conclusions. The failure of Steinhoff in 2017 is the biggest corporate failure of firms listed on the JSE Main Board. According to Wierzycka (2017), many active Asset managers in South Africa missed predicting this failure despite plenty research, scrutiny of balance sheets and income statements. There is minimal research that has focussed on evolving financial distress early warning models for developing markets, especially those in Africa. By developing a financial distress forecasting model for South African firms, this study identifies the significant attributes of firms and verifies whether adjusted or unadjusted cashflow is a superior forecaster of corporate failure. The developed model and the pertinent variables will play a pivotal role in providing localised early warning signals for financial distress in a developing economy and the South African environment in particular.

1.3 Aim/Purpose of the Study

The determination of this work is to evaluate cashflow management as an important input in ascertaining financial distress and insolvency of organizations. The study will determine whether Adjusted Cash Flows or Unadjusted Cash Flows should be used as an important predictor of financial distress.

1.4 Research Objectives

The objectives of this study are to:

- Analyse the working capital financing practices of South African businesses.
- Determine whether adjusted cash flows or unadjusted cash flows are a more appropriate predictor of corporate failure.

1.5 Significance of the study

Corporate financial distress and bankruptcy is a key problem for an economy because it is regarded as a restrictive aspect for economic growth. Business collapse and financial distress affect the banks and socio-economic environment within a country. Banks and other lenders rely on financial information to make lending decisions and cash flows are one such variable. Predicting financial distress and bankruptcy helps to avoid lending to risky firms and, ultimately, avoid banking crises which may result, and its potential contagious effects across national and international borders. Investors and other stakeholders are also interested in predicting financial distress or evaluating how financially sound companies that they have an interest in are.

1.6 Conclusion

The section highlighted the problem at hand, in which this paper will be based on. It also stated the study aims, justification of the study, significance of the research as well as its limitations, scope of the investigation, and the assumptions under which the study was done.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Financial distress prediction remains an essential central topic for exploration due to its critical importance in the lives of producing agents in an economy. This section will therefore analyse, examine, and synthesize literature on prior research on the subject of cashflow management and forecasting of financial distress and bankruptcy. Predictive models will be stated and some of their exactitude, limitations, and gaps will be highlighted.

2.2 Definition of Terms

This section contains definitions of key terms from different authors who have defined the terms to incorporate all the aspects of cash flow management, financial distress and bankruptcy.

2.2.1 Cash flow Management

In its modest state cashflow is the movement of cash in and out of a business. Cashflow is the essence of all rising companies and it is the main pointer of corporate health. Rose *et al* (2007) mentions that the consequence of cashflow is tangible, instantaneous and, if mishandled, usually hit completely hard. Cash has to be observed, secured, meticulously handled, and usefully used. Cash flow information supports stakeholders in finding the applicable data regarding the use and source of almost the complete financial resources for a specified period.

Centrality of a cashflow scrutiny towards insolvency forecasting of a company has been extended by an analysis completed by Ward *et al* (1997). These authors studied the patterns in the numerous components of an income statement, investing cashflow, operating cashflow and financing cashflow. This was an investigation that comprised of wide-ranging organizations and firms that had been declared as failed.

2.2.2 Financial Distress and Bankruptcy

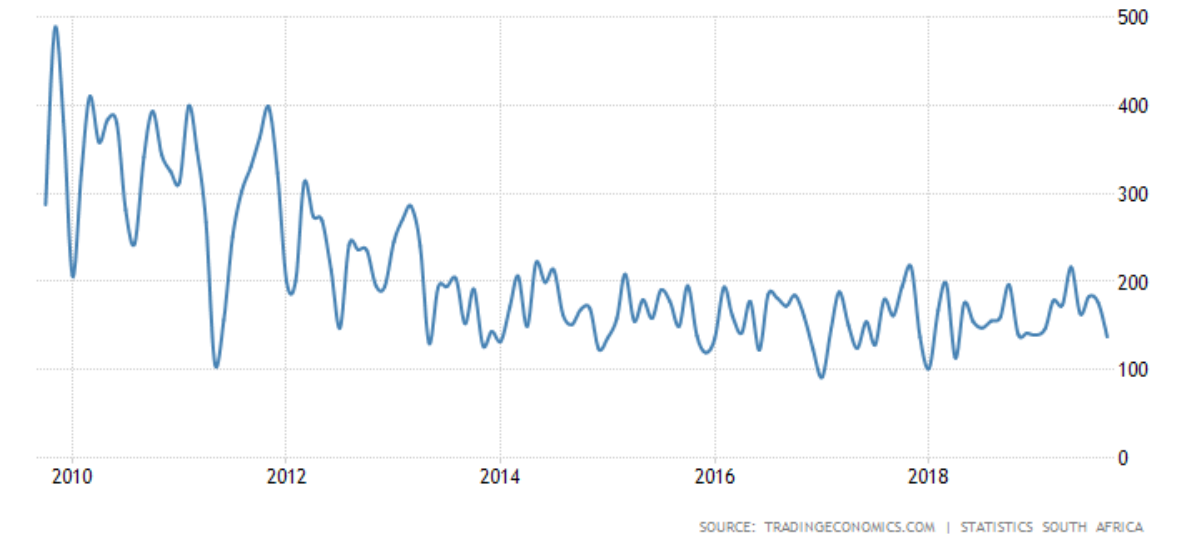
According to Jantadej (2006), financial distress has been defined as firms that suffer adverse cashflow from operational activities, adverse cashflow from investing activities and adverse cashflow from financing activities. Adnan *at al* (2006) as cited in Hamid *et al* (2008) direct this to a condition where the cash inflows of a company are inadequate to cater for the day-to-day operational expenses. Ognjan *et al* (2015) further states that it starts when a firm fails to pay its arranged expenses or when the forecast of future cashflows points to an incapability to do so in a foreseeable future.

Karles *et al* (1987) defines bankruptcy as a course which instigates monetarily and is concluded legally. Mareike (2013) further states that the reason why the legal explanation is frequently quoted is because it is an unbiased measure permitting scholars to categorize a precise populace.

2.2.2.1 Bankruptcy in South Africa

According to tradingeconomics.com, for the past ten years dating back to the beginning of 2010, bankruptcy has been on a downward fluctuating trend in South Africa. Karl *et al* (2008) attributes this to lessons learnt from failed businesses or firms which went bankrupt in the previous years and their actions which led to bankruptcy. Figure 2.1 depicts a graphical representation of the bankruptcy trends in South Africa.

Figure 2.1: The history of Bankruptcy in South Africa



Source: Tradingeconomics.com

2.2.2.2 Bankruptcy Factors

Maryam (2014) divided bankruptcy into three groupings which are **Normal bankruptcy,** where a business is involved in its' normal trade and due to unexpected and unpredictable reasons the business has no control over such as war, depression, inter alia, **intentional bankruptcy** where businesses try to or rout the rules or Acts in their jurisdiction **and bankruptcy due to fraud** when a business, in fact, is not bankrupt but pretends to be bankrupt.

Blazy *et al* (1997) suggests a germane list of these main reasons as **accidental causes** such as malfeasance, passing on of an influential person, fraud; **market complications** which include failure of clients, loss of market share, insufficient products; **financial woes** such as cost of

capital, under-capitalization, default on payment; and **information and managerial issues** which include prices and stocks, incompetency, macroeconomic factors of fragility inter alia.

Charan *et al* (2002) concurred that reasons of bankruptcy are not all monetary and some bankruptcies are as a result of vis major, relaxation due to previous successes, managerial blunders, risk overdose, and competition.

Norton (1989) further states that the main factors that are predominantly associated with bankruptcy, apart from management failure, are economic recession and change in technology. The study further expands that firms can be under stress and the possibility of bankruptcy may be compounded by new technologies which obsoletes the demand for old products or services, cultural trends may reduce demand for products or services which firms would have invested in dearly, and a change in government policy or regulation which may affect competition. Habtom (2004) agreed by stating that lack of sound credit and evaluation policies results in financial problems which eventually lead to bankruptcy, this assertion was also in agreement with Shin *et al* (2002) who mentioned that many firms are paying a hefty price for these indiscriminate practices which in most circumstances have resulted in bankruptcy and left several institutions on the brink of insolvency.

Bruno *et.al* (1988) in a research indicated that business failure most times results from definable causes and that an understanding of these causes can help thwart financial distress. In concluding their research, they mentioned that:

- Bankruptcy is a development that occurs over time; it is not an unexpected death;
- Within failing companies, specific identifiable factors are present that cause the failure, and these factors are both external and internal factors and;
- After acknowledging the presence of these factors', these factors can be rated based on their severity and steps intended to avoid or prevent failure can be implemented.

They also mentioned that, the single most prevalent factor is management failure, which usually appears in a variety of ways. They went on to state that most of these factors can be universal to most businesses, however they are factors which are industry specific and affect firms within that industry.

2.2.2.3 Bankruptcy Mitigation

Moyer *et al* (2001) discussed options which can be considered by failing businesses as solutions to redeem their operations. The options they brought forth were voluntary or informal basis that is an attempt to resolve its difficulties with the creditors, petitioning the courts for assistance and formally declare bankruptcy. The creditors may also petition the courts and this may result in the company being involuntarily declared bankrupt.

This is where the court assigns a liquidator to determine business's liquidation value and its going-concern value. Barniv *et al* (2002), further supports by stating that the court confirms a reorganization or rehabilitation plan following the bankruptcy filing, with three options on offer which are:

- Acquisition by other viable businesses or;
- Emerged as independent entities or;
- Liquidation

2.3 Financial Distress Prediction Models

Sumaira (2019) states that financial distress forecast is big and diverse, in terms of descriptive variables and procedural systems. Altman (1968) further added that preceding to the adoption of quantifiable actions of business presentation, agencies were formed to bring forth a qualitative form of information measuring the soundness of specific business. Analysis founded on this failed up until the introduction of the traditional ratio analysis method.

2.3.1 Ratio Models

Authors have also, in turn, grouped these models into categories**.** Zhi (2009) as cited in Ognjan (2015) grouped the approaches and methods of prior studies on bankruptcy forecasting as: **Univariate ratio models, Multiple discriminant analysis, Linear probability models, Multivariate conditional probability models** like the Probit and Logit , Recursive partitioning approaches, Survival analysis (proportional hazard model), Expert systems, Mathematical programming, Neural networks, Artificial Intelligence and Rough sets approach.

Financial ratios are clustered into different classes such as profitability, liquidity, debt management and asset management and they are utilised by financial specialists to forecast the financial variables of a firm.

Mossman (1998) adds that the ratio analysis was advanced by amongst others Altman (1968); Collins (1980); Haldeman *et al* (1977); Olson (1980); and Platt *et al* (1991). Experts and

Auditors frequently use ratio approaches as a fragment of factfinding and appraisal steps to quantify the relevance of the going concern of a firm.

Mossman (1998) further stated that ratio models have been effectively and positively employed, and a slight agreement has been reached with regards to the best accounting ratios to foresee possibility of financial distress. This is contrasted by Ognjan (2015) who stated that ratio analysis was used fruitfully but still was not successful in noticing severe liquidity complications that ultimately lead to insolvency of a business.

After continued occurrences of bankruptcies there was some divergence by some researchers such as Bum (2003) who stated that the traditional ratio analysis was no longer a significant investigative approach in the theoretical setting due to the relatively outdated method in which it has been presented. Baimwera *et al* (2014) adds on that it was because of this that Beaver (1966) and Altman (1968) led a research trying an evaluation of the value of ratio examination as an investigative method.

Baimwera *et al* (2014) further states that a number of approaches have been brought up in the past applying methods such as multiple discriminant analysis (MDA), probit, logit, recursive partitioning, neural networks and hazard models and have been used to forecast financial distress and or the health of an institution.

Regardless of the diversity of approaches available, mutually the corporate community and scholars frequently depend on the approaches advanced by Beaver (1966) and Altman (1968) who then stretched the univariate analysis by augmenting it with additional financial ratios. Wang *et al* (2011) adds that these models are focused on the going concern of a business entity. Kuruppu *et al* (2002) furthers this by stating that the research effort by Altman (1968), amongst others, examines the practicality of bankruptcy forecasting models for evaluating business going concern position.

2.3.1.1 Multi-Discriminant Analysis

Altman (1968) describes it as a statistical procedure used to categorize a scrutiny into one of numerous apriori groups reliant on the observations of distinct features. This came about as a critique to Beaver's (1966) univariate approach. According to Kleinert (2014) a business with a weak profitability and/or creditworthiness may be viewed as a probable bankruptcy aspirant, but not so if its' liquidity is above average. This led to Elliot *et al* (2006) recommending the use of the Z-score as it eliminates the boundaries and confines of the traditional ratios.

Altman undertook a study of 66 manufacturing firms between 1946 and 1965. In order to make certain that his approach could separate a failing and a thriving firm, he used a combination of five very significant ratios and the linear function he used was:

$$\boldsymbol{z = 1.2x1 + 1.4x2 + 3.3x3 + 0.6x4 + 0.999x5}$$

where **X1 =** working capital/total assets, which is considered to be the liquidity ratio and show a superior statistical importance on the univariate and multivariate basis in relation to other insolvency prediction approaches.

X2 = Retained Earnings/Total Assets,

X3 = Earnings Before Interest and Taxes/Total Assets,

X4 = Market Value Equity/Book Value of Total Debt,

X5 = Sales/Total Assets

2.3.1.2 Logit and Ohlson Model

The Logit and Ohlson Model is also an accounting ratio founded on the bankruptcy prediction approach put forth by Ohlson (1980). In the model, Ohlson investigated 105 failed firms relative to 2058 thriving firms for a period of 6 years extending 1970-1976. The general exactness rate for the approximation firm populace was 96% and for the hold-out sample 85%.

Ohlson's outcomes presented that three reasons – i.e., magnitude of a company, financial build-up of a business, and current liquidity, are of utmost importance in noticing bankruptcy Ohlson (1980). His prediction model is as below:

$$Ohlson = -1.3 - 0.4x1 + 6.0x2 - 1.4x3 + 0.8x4 - 2.4x5 - 1.8x6 + 0.3x7 - 1.7x8 - 0.5x9$$

Where: **X1** = Log (Total Assets/GNP price-level Index)

X2 = Total Liabilities/Total Assets

X3 = Working Capital/Total Assets

X4 = Current Liabilities/Current Assets

X5 = 1 if Total Liabilities>Total Assets, 0 otherwise

X6 = Net Income/Total Assets

X7 = Funds Provided by Operations/Total Liabilities

X8 = 1 if Net Income is negative for past two years, 0 otherwise

X9 = (NI_t – NI_{t-1})/(INI_t I + INI_{t-1} I),

Where : NI_t = net income for recent period; and

t= is the number of years

In the model Ohlson (1980) as stated in Kleinert (2014) depicts the six most vital ratios which are in tandem with the ideas of Altman (1968). The model plots the worth to a likelihood constrained between 0 and 1; where the ideal spot is 0.38. A firm facing a point below 0.38 is assumed to have failed while an ideal point above is for a firm that is not facing bankruptcy.

Mossman (1998) in comparison with MDA by Altman (1968), later scholars have proved to lean more to the Logit approach because it needs fewer restrictive statistical assumptions and offers better experimental judgement.

Wang *et al* (2005) further stated that practical evidence has also shown that the logit model and Ohlson (1980) is an appropriate model for forecasting company de-listing in China. These academics considered listed Chinese firms for the period extending from 2000 to 2008 and discovered that, the correctness of Ohlson's 1980 model was 95%. In almost a similar study in Thailand researchers Pongsgat (2004) also investigated a matched pair sample of 60 failed and 60 thriving companies during the years 1998 up-to 2003. They concluded that while each of the two models i.e. Altman's (1968) approach, and Ohlson's (1980) approach have predictive ability, the Ohlson (1980) model has a higher predictive aptitude in all 3 years prior to bankruptcy than that of Altman (1968) MDA approach.

Pongsgat *et al* (2004) added that "the overall comparison between Ohlson's model and Altman's model respectively was 69.6% to 58.9% for the first year prior to insolvency, 69.6% and 62.5% for the second year prior to insolvency and 69.6% to 62.5% for the third year to insolvency". Additionally, Begley *et al* (1997) used the Ohlson's model to 1365 industrial businesses and realised that a total 98% sorting correctness.

2.4 Return and Return Variation Models

Beaver (1968) is one breakthrough scholar to deliberate on the effects of corporate bankruptcy on stock returns, and discovered that equity returns frequently foresee bankruptcy earlier than financial ratios which is consistent with market efficiency. Altman *et al* (1981) also

concur with Beaver as they also realise that bankrupt firms experience weakening capital market returns for at least a year preceding to failure.

Clark *et al* (1983) detected adverse market returns at least three years preceding to failure. However, they also observed that the pronouncement of bankruptcy still issues new material to the market.

Aharony *et al* (1980) recommends a bankruptcy forecasting approach based on the discrepancies of market returns. They find discrepancies in the behaviour of total and firm-specific discrepancies in returns four years before formal bankruptcy is declared.

2.5 Cash flow Models

In financial analysis of a firm, cashflow ratios are more informing and reliable than balance sheet and income statement ratios. This is because, according to Mills *et al* (1998) balance sheet facts are passive since they measure a single instance in time and the income statement comprises several non-cash item transactions. Mossman (1998) then cements that the worth of a business is therefore well-defined as the sum of the streams of discounted cashflows to and from operations, government, investors and other stakeholders.

Mossman (1998) also adds on that, while ratio models are resultant of financial statements, cashflow approaches are founded on the important business principle that the worth of a business is total to the net-present-value of its expected future cashflows. Bankruptcy will therefore occur if a business has inadequate cash accessible to honour its obligations when they become due. Therefore, if present cashflows correctly predict future financial status of a firm, then past and present cashflows must be a perfect identifier of company's worth and possibility of insolvency.

Cash flow ratios are essential tools in financial analysis, this is solely because cash is used to settle obligations when they are due. Beaver (1966) is the first of several scholars on bankruptcy forecasting. After him there has been a steady influx of studies on the same focus. Beaver (1969) and Deakin (1972) amongst others researched on the capability of financial ratios and approaches premised on ratios to forecast bankruptcy. The underlying investigations considered cashflow as net-income plus depreciation and amortisation.

Largay *et al* (1980), and Casey *et al* (1985) amongst other researchers later concentrated on approaches of cashflows and required a more extensive measure of cashflow, which was

determined as cash received from operating activities less cash from the cash flow statement. From there on many scholars such as Giacomino *et al* (1993) and Mills *et al* (1988) inter alia pursued studies on cashflow derived from the cashflow statement and the study is still ongoing.

Foster (1982) called attention to past observed studies in bankruptcy prediction and employed a historical founded evidence method to validate the ratios preferred for the investigations. The observed results were sample exact and incapable of showing the possibility of firm failure. This was realised by Gentry *et al* (1985) who added that to defeat this subject, cash-based reserve stream model formed by Helfert (1972), was picked as reason for their bankruptcy forecasting investigation. Laitinen (1994) then brings to attention that cash based and income escorted by balance sheet-based ratios may result in a diverse cataloguing in bankruptcy forecasting.

The essential target of the scrutiny conducted by Gentry *et al* (1985), was to test by surveying whether cash-based cashflow ratios can sufficiently and or satisfactorily group fizzled and non-fizzled firms and fill in as an option in contrast to financial ratios calculated using the income and balance sheet. Their discoveries were that cash-based cashflow ratios presented a possible option for grouping fizzled and non-fizzled firms.

Ohlson (1980) discovered that company size was a critical adverse indicator of insolvency, as failed companies will in general be smaller than thriving firms. A point of concern raised by Ohlson, was that in the event that one utilizes statements retrieved from articulation that were discharged after the date of liquidation, at that point the proof demonstrates that it will be simpler to predict bankruptcy.

Largy *et al* (1980) demonstrated and showed that the net income with depreciation depletion and amortisation of W.T Grants was moderately constant till the year preceding to its failure. The cashflow from operations, then again was adverse in eight of the ten years preceding its demise. Under comparable conditions, Lee (1982) saw that in spite of the fact that Laker Airways was in a difficult situation three years before financial bankruptcy, their profit was expanding. In such manner, cash flow is a superior marker of bankruptcy than net income.

Aziz *et al* (1988) explored insolvency forecast by utilizing a cash flow model advanced by Lawson (1971) which presented that all cashflows for solvent firms were reliably higher than for bankrupt firms. Overall the researcher discovered that the cash flow model was better than most different models and expressed that it is probably going to anticipate insolvency as long

as 5 years preceding the occasion. Sharma (2001) also led a research to give a far-reaching survey of the cash flow failure forecast writings since Beavers in 1966. Sharma reasoned that cash flow information comprises possibly noteworthy substance over income and balance sheet ratios for separating among bankrupt and non-bankrupt firms, especially in the assurance of beneficial liquidation.

2.6 Empirical Evidence

Mossman *et al* (1998) in his research titled *"An empirical comparison of bankruptcy Models"*, compares four categories of bankruptcy forecasting approaches founded on cashflows, financial statement ratios, stock returns, and return standard deviations. The conclusion Mossman reached showed that not a single approach that is available in literature is completely satisfying at separating between bankrupt and non-bankrupt businesses. The biased aptitude of the cashflow model remains comparatively dependable over the last two-to-three financial years prior to bankruptcy, while the ratio approach provides the finest prejudiced aptitude in the year instantly or previous to insolvency.

This is because stakeholders might be mainly concerned with cash flow variables as they are easy to work with than the statistical methods, and as such prefer to use income-based models as an early-warning of possible financial distress. However, a large negative swing in accounting ratio variables might be a worthy pointer of an approaching financial failure.

They also concluded that no model is mostly reliable in forecasting more than 3 years prior to bankruptcy. They also stated that, the realism of ratio and cashflow variables is significant in contrast with the usage of market returns in separation.

Market return and return variation models don't integrate financial ratio and cashflow models. The test for new examination is consequently to use all readily obtainable data inside an improved model of the bankruptcy procedure.

Kleinert's (2014) study titled *"Comparison of accounting based bankruptcy prediction models"* of Altman (1968), and Ohlson (1980), amongst others to German and Belgian listed businesses from 2008 to 2013; concluded that Ohlson (1980), and Logit Model achieved the utmost accuracy; meaning that the chosen financial ratios of the Ohlson model of 1980 are the most accurate in predicting insolvency likelihood. In totality, the precision of Altman, Ohlson, and Zmijewski (1984) on German listed businesses are lesser compared to Belgium

listed businesses which can be clarified by the low proportion of bankrupt to non-bankrupt businesses.

In this investigation a sample from Belgium listed businesses was used thus 5646 listed and 140 bankrupts businesses and another sample on German listed firms 1432 active and twenty-one bankrupt businesses.

Madonna *et al* (2015) resolved from their results that Altman's model, used with a single cut-off, is capable of detecting symptoms of distress and to differentiate between a weak and a thriving business, even when it is used outside the framework and used in a varied sample of businesses. Altman's model also seems to meet the claim to be used in a broad-spectrum, and this is suitable for large-scale surveys.

2.7 Summary

Many variations of the above approaches have been suggested for forecasting and/or forecasting bankruptcy, and in most studies, there is empirical evidence supporting the accuracy or failure to predict, and the extent to which these models can predict as well as their limitations. From the preceding reviews, it is also noted that most researchers, when conducting their studies, usually use firms in the same field (e.g., Altman used firms in the manufacturing sector, Singh *et al* (2015) used firms in the banking sector); however Siqi *et al* (2018) investigated firms listed on different stock markets in NYSE, AMEX and NASDAQ from 1993 to 2013, and in the study the logit regression was used to approximate the limits, and appraise the performance of the two models by ROC curve and CAP curve. This study is being executed to bridge the gap in South Africa and more specifically to the Johannesburg Stock Exchange. This will be conducted by using a model to forecast failure of firms and prevent that failure from occurring.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Let us recall that the main objective of this investigation was to determine whether adjusted cash flows or unadjusted cash flows are a better forecaster of financial distress. In that regard this chapter sets out to describe how the research was piloted and clarifies the research design, the hypothesis of the study, the basis of sample selection, the sort secondary data being used, and the techniques of data analysis being applied. The Statistical Package for Social Sciences (SPSS) was applied to analyse the statistics.

3.2 Study Population

The populace was composed of firms listed (Non-Distressed) and delisted (Distressed) in the Johannesburg Stock exchange. At the duration of the study a total of 356 firms were listed in the Johannesburg Stock Exchange as at September 2019 which was a record low compared to an all-time record high of 485 in September 2002.

3.3 Sample and Sampling Procedure

To answer the main research questions and sub-questions and obtain a descriptive sample from the populace, the sieves below were used to select the firms. The industry or sector of the firm.

- Availability of financial statements for at least five consecutive years.
- Availability of financial statements with unadjusted financial statements and adjusted financial statements.

Using these filters and due to some constraints, a total of 80 firms were used for the research. There were 54 Non-Distressed and 26 Distressed firms had financial statements which were readily available for the study, at the time of completing the research.

3.3.1 Distressed/Delisted Firms

The selected sample was chosen from a pool of all entities de-listed or suspended from the Johannesburg Stock Exchange between the years 2009 to 2018. Firms which were included had to satisfy the following conditions:

- The Firm must have traded on the Johannesburg Stock Exchange, and had been delisted due to financial distress;
- The Firm should have financial statements readily accessible.

3.3.2 Non-Distressed/Listed Companies

These firms were chosen from a populace of all entities listed and traded on the JSE for the period 2009 and 2018. These firms will be selected from the list randomly, with some exceptions. According to a research by Beaver (1966), financial institutions have been excused because their ratios and cashflows are always large, and are unlike those of other groups of organisations, even if they are not at risk of distress. Ohlson (1980) also removed financial organizations from a research on bankruptcy forecasting such as companies in the banking and investment sectors as these industries have systemic differences.

In accordance with this analysis was Kleinert (2014) who excluded financial, insurance, and very small firms, stating that these could lead to influenced outcomes since for instance insurance firms have a diverse structure of capital.

3.4 Data Collection

The data employed in this research was from the financial statements of both the delisted and listed firms for the period 2009 to 2018. Using the financial statements, non-adjusted and adjusted cash flows, financial ratios were calculated. The financial statements are obtained from the Johannesburg Stock Exchange and the businesses themselves – i.e. their websites. For each of the companies the financial statements for at least five consecutive years within the period of 2009 to 2018 up to at most ten consecutive years (thus 2009-2018) was examined.

3.5 Research Design

The research employed a **logit regression analysis** approach, i.e. the Ohlson (1980) model, to transform the likelihood of bankruptcy and to categorize companies as either bankrupt or non-bankrupt. The statistical technique was used mainly to categorise and make prediction in snags where dependent variables appear in a dichotomous state – such as bankrupt or non-bankrupt. The variety of original clusters can be two or more. After the clusters were set, data was amassed for the items in the clusters. The logit regression model then tried to determine a linear blend of these traits which "best" distinguished between the clusters.

3.6 Conceptual Model

The Ohlson logit model was adopted and this is because some researchers have in the past reported the model as applicable and dependable. Wang *et al* (2005) in their research on Chinese firms during the period 2000-2008 discovered that the Ohlson model of 1980 was “an applicable measure for predicting firm delisting in China” with an accuracy rate of 95%.

This observation was in agreement with Pongsgat *et al* (2004), after they examined a matched pair sample of 60 bankrupt and 60 non-bankrupt firms over the years 1998 to 2003, and concluded that although the Altman's MDA (1968) could predict bankruptcy the Ohlson Model was more favourable when applied to Thai organizations. To add on to the above researches Begley *et al* (1997) also used the Ohlson model on 1365 industrial businesses and informed an overall 98% sorting accuracy.

3.7 Ohlson (1980) Model

For accomplishment of this study the model according to Kleinert (2014) is as follow:

$$Ohlson = -1.3 - 0.4x1 + 6.0x2 - 1.4x3 + 0.8x4 - 2.4x5 - 1.8x6 + 0.3x7 - 1.7x8 - 0.5x9$$

Where, **X1** = Log (Total Assets/GNP Price-Level Index)

X2 = Total Liabilities/Total Assets

X3 = Working Capital/Total Assets

X4 = Current Liabilities/Current Assets

X5 = 1 if Total Liabilities>Total Assets, 0 otherwise

X6 = Net Income/Total Assets

X7 = Funds provided by Operations/Total Liabilities

X8 = 1 if Net Income is negative for past two years, 0 otherwise

X9 = $(NI_t - NI_{t-1})/(INI_t I + INI_{t-1} I)$,

Where, NI_t = Net Income for recent period; and

t = is the number of years

The Ohlson method describes the six significant financial ratios being in tandem with available literature of Altman (1968). The model by Ohlson (1980) charts the value to a likelihood encircled from 0 to 1; where the cut-off point is 0.38. A firm with a cut-off point below 0.38 is understood to be insolvent whereas a cut-off, point above it entails that a company does not face financial challenges.

3.8 Variables and Variable Measurement

To assess the reliability of financial statement cash flows before and after adjustments, the independent variables observed were:

Variable (1) Adjusted cash flows ratios

Variable (2) unadjusted cash flows ratios.

The ratios considered for the study were:

i. **X1 = Debt Ratio**

The ratio was used because it is an expression of a firm's financial stability and a common evaluation for any investment; the lower the ratio the less the risk of insolvency and the higher the ratio the higher the bankruptcy risk, as this leads to a high repayment burden.

ii. **X2 = Working Capital to Asset Ratio**

This is a Financial sustainability ratio which indicates the aptitude of a business to finance its short-term financial obligations. This ratio can provide some insight as to the liquidity of the firm, because this ratio can unearth the proportion of the remaining liquid assets within its working capital.

iii. **X3 = Current Ratio**

This is also referred to as liquidity or efficiency ratio that measures a company's ability to pay off its short term liabilities with its current assets, and it is a significant measure of liquidity because short term liabilities are due within the year. Firms with higher quantities of current assets will more easily be able to pay-off current liabilities when they become due without having to dispose long-term, revenue generating assets.

iv. **X4 = Return on Asset Ratio**

Often referred to as the return on total assets, ROA is a profitability ratio that quantifies the net income from total assets during a financial year by relating net income to the average total assets. In other words, the ratio quantifies how capably a firm can bring together its assets to make gains within a financial year.

v. **X5 = Funds from Operations to Total Debt Ratio**

This is a leverage ratio that a credit rating agency or an investor can apply to evaluate a firm's financial risk. The ratio measures the ability of a firm to pay-off its obligations using net operating income (NOI) unaided. The lower the ratio, the less viable the firm is and a ratio lower than 1 indicates the firm will need additional loans to keep afloat or dispose some of its assets.

The dependant variables are:

Variables (1) Distressed/bankrupt firms

Variables (2) Non-Distressed/ Non-bankrupt firms

3.9 The Z-Score Model

The z-score model was also used to determine whether adjusted cash flows or unadjusted cash flows are a more appropriate predictor of financial distress.

$$\boldsymbol{Z = W1X1 + W2X2 + W3X3 + \cdots + WnXn}$$

Where Z = Discriminant score.

$\boldsymbol{W1, W2, W3, \ldots \ldots \ldots Wn}$. Are the Discriminant Score

$\boldsymbol{X1, X2, X3, \ldots \ldots \ldots Xn}$. Are the independent variable

and, X2 = Debt Ratio

X3 = Working Capital to Asset Ratio

X4 = Current Ratio

X6 = Return on Asset Ratio

X7 = Funds from operations to Total Debt Ratio

The model was developed using the data gathered from the 80 Firms and it was used for testing the reliability and accuracy in predicting corporate failure of bankruptcy.

3.10 Limitations

Kleinert (2014) states that Ohlson´s model fails by not including time varying changes. Furthermore, the second point of criticism is critical since Grice et al (2001) emphasize that the relation between financial ratios as those mentioned above, and its effect on bankruptcy, changes across industries and over time.

The study adopted Abdullah *et al* (2008) who used the logit approach averages data whereby, a thriving company was given the value of 0 and a failing firm the value of 1. The Logit approach, therefore treats failing firms as if they were insolvent from the beginning onwards. Studies by Collins *et al* (1982) and Ingram *et al* (1988) came to the same conclusion, stating that mostly the logit model is superior to the multi-discriminant approach (MDA) by Altman (1968).

However, Wang et al (2005) found that the Ohlson (1980) model is "an appropriate measure for forecasting firm delisting in China" and added that the Ohlson model of 1980 has a higher predictive ability than the Altman MDA model.

3.11 Conclusion

The aforementioned steps and procedures were guidelines that were applied or followed to attain the research findings and to obtain a research conclusion of this study.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter analyses, presents in diagrams and discusses the results. These results will be converted to frequencies and percentages and represented using charts, and tables and an analysis that intends to give a clear meaning of the results obtained from the research. Data analysis was done using IBM SPSS, Eviews and Microsoft Excel 2013.

4.2 Data analysis

Data was examined using SPSS statistic software package and Eviews. The first preliminary stage of analysis was the identification of the two clusters – i.e., the Listed and the Delisted firms. Then the seven cash flows ratios were computed using excel and the financial statements information (i.e. unadjusted and the adjusted cashflows) of the two sets of companies.

4.2.1 Data gathered

Table 4.1 is the summary of the firm data which was used for the analysis:

Table 4.1 Sample Details listed companies 1

Sector	No. of Companies Taken as Samples
Beverages	5
Construction & Material	4
Electronic and Material	4
Fixed line Telecoms	4
Food and Drug Retailers	4
Food producers	5
Health care equipment	4
Industrial Metals and Mining	4
Media	4
Oil and Gas	4
Real Estate Investment	4
Software and Computer	4
Leisure and Travel	4
Total	54

Source: Researcher findings (2019)

The delisted companies which were used were a list of 26 firms which were delisted in the period 2009 to 2018. The mean of each ratio for each group of companies was then calculated. This was used to test whether there was a noteworthy variance between the two clusters of the companies

Table 4.2: Cluster/Group Statistics

	Adjusted Cash flows n=54		Unadjusted Cash flows n=54	
Listed or Delisted	Mean	Standard Deviation	Mean	Standard Deviation
Listed				
X2	0.502455	0.198575	0.497871	0.199741
X3	0.139789	0.179319	0.177577	0.183277
X4	0.913919	0.634791	0.782165	0.497778
X6	0.017828	0.126227	0.061392	0.130754
X7	0.189026	0.565710	0.271265	1.092469
	Adjusted Cash flows n=26		**Unadjusted Cash flows n=26**	
Delisted	Mean	Standard Deviation	Mean	Standard Deviation
X2	0.987502	0.285462	1.009603	0.426585
X3	0.076529	0.098542	0.096852	0.125461
X4	0.134645	0.310215	0.195478	0.246587
X6	0.015624	0.106584	0.049896	0.125489
X7	0.096587	0.432568	0.105640	0.445162

Source: Research Finding (2019)

X2 is the Debt ratio which is total liabilities/total assets. From the table above we realize that the ratio of listed firms is below that of delisted companies in both scenarios of unadjusted cash flows and adjusted cashflows. This was because the delisted firms had more liabilities in comparison to the assets of the firms. The research also realized that for the years leading to the delisting of firms the firms could barely meet their obligations.

X4 is the current ratio, or the liquidity ratio which quantifies a business's competence to honour its short-term commitments or those which are due within one year. For the listed firms the mean for the ratio was 0.9139 for the adjusted cash flows and 0.7822 for the unadjusted cash flows which could be relied upon as it shows the listed firms have capacity to meet their short-term obligations. For the Delisted firms their mean is close to zero (0) which is 0.1346 and 0.1955 for the adjusted and unadjusted cashflows respectively. This reflects that the delisted firms were operating on a dangerously low capacity to continue operations.

X3 is the Working capital to assets Ratio is almost similar to the current ratio/liquidity ratio but this one mainly showed the net current assets or working capital of a firm as a fraction of its total assets. The higher the ratio the healthier the firm's ability to match its account payable commitments on time and this gives the clients or stakeholder the confidence to continue their engagements with such firms which also boosts the firm's going concern.
This is the case with listed firms which have a high mean of 0.1398 and 0.1776 for the adjusted and the unadjusted cash flows respectively. However for the delisted firms have lower means for both adjusted and unadjusted cash flows which to some extent may not be a reflection of failure but rather company policy which avoid tying money as working capital as working capital frequently obtains a very low rate of return, and as such, companies pursue minimizing working capital levels, with the idea of zero or minimal working capital.

X6 is the Return on assets (ROA) ratio is a ratio which expresses the proportion of profit earned by a firm in relation to its total assets. This is also used to quantify the effectiveness or efficiency of the Companies' assets in relation to the industry. This is more of an internal tool which is used to measure capacity utilization.
X7 is the funds from operations (FFO) to total Debt Ratio or the operating cash to Debt Ratio which quantifies the fraction of a firm's total obligations that are covered by its operating cashflow for a specified accounting period. It is a leverage ratio that a stockholder can use to assess a firm's financial risk. The operating cashflow denotes the cash realized by a firm through its operating activities and it regularly represents the mainstream of cash that a firm generates. A high ratio denotes generating more cash relative to the debt a firm and designates the business is well-positioned to reimburse its arrears. It is thus believed to be a safer debt investment by creditors. For the listed firms the ratio is much higher than that of the delisted firms in both scenarios which indicates that the listed firms have a better going concern.

4.3 The Ohlson Model

To determine whether adjusted cash flows or unadjusted cash flows are a more appropriate predictor of financial distress the Ohlson approach was used for testing the dependability of either Adjusted Cash flows or Unadjusted Cash flows.

The Econometrics model:

$$Ohlson = -1.3 - 0.4x1 + 6.0x2 - 1.4x3 + 0.8x4 - 2.4x5 - 1.8x6 + 0.3x7 - 1.7x8 - 0.5x9$$

4.3.1 Adjusted Cashflows

The Ohlson approach was used to examine the reliability and accurateness adjusted cashflows which were later compared with the results of unadjusted cashflows. The firms with an Ohlson score of less than 0.38 [(0)<0.38] were predicted or regarded as a failed firm and firms with an Ohlson score greater than 0.38 [(0)>0.38] were regarded or predicted as a viable firm.

The equation below was used to compute the correctness of the approach and it's multiplied by 100 to express the accuracy as a percentage.

$$\text{Accuracy rate} = \left[\frac{\text{Firms correctly predicted}}{\text{n=Total number of firms}}\right] * 100$$

Twenty (20) listed firms and Twenty (20) delisted firms were used to conduct the tests. Table 4.3 shows the tests which were conducted using the Ohlson model. For the firms which were tested, it represented a total accuracy of 95%.

Table 4.3: Adjusted Cashflows Matrix

Group	N	**Predicted Failed** Ohlson (o)<0.38	**Predicted Viable** Ohlson (o)>0.38	**Percentage correct**	**Percentage Error**
Listed	20	2	18	90%	10%
Delisted	20	20	0	100%	0%
Total	40	38	2	95%	5%

*The cells highlighted in blue are the correct prediction, and the cells highlighted in yellow are the error prediction.

Source: Research Finding (2019)

Using the Adjusted cashflow, the 20 firms which were used for the test one year before failure produced a total impressive accuracy of 95% was achieved during the testing thus

$$\text{Accuracy rate} = \left[\frac{(18+20)}{20+20}\right] * 100 = 95\%$$

For the listed firms eighteen (18) out of twenty (20) were predicted viable which gave an accuracy of 90%, and all the delisted firms (thus 20 out of 20) were predicted as failed thus an accuracy of 100%, giving an average accuracy of 95% for both failed and viable.

4.3.2 Unadjusted Cashflows

The Ohlson model was also used on the unadjusted cashflows to test the reliability depending on the cashflows. Table 4.4 is a depiction matrix of the unadjusted cashflows showing the accuracy of the model on unadjusted cashflows.

Table 4.4: Unadjusted Cashflows Matrix

Group	N	Predicted Failed Ohlson (o)<0.38	Predicted Viable Ohlson (o)<0.38	Percentage correct	Percentage Error
Listed	20	8	12	60%	40%
Delisted	20	14	6	70%	30%
Total	40	26	14	65%	35%

*The cells highlighted in blue are the correct prediction, and the cells highlighted in yellow are the error prediction.

Source: Research Finding (2019)

Using the unadjusted cashflow the same 20 firms which were used for adjusted cashflows were used in this test one year before failure and produced a total accuracy of 65% thus

$$\textbf{Accuracy rate} = \left[\frac{(12+14)}{20+20}\right] * 100 = 65\%$$

For the listed firms twelve (12) out of twenty (20) were predicted viable which gave an accuracy of 60%, and for the delisted firms fourteen (14) out of twenty (20) were predicted as failed thus an accuracy of 70%, giving an average accuracy of 65% for both failed and viable.

4.4 Comparing the Adjusted and Unadjusted cashflows

The Table 4.4 (unadjusted cashflows) compared to the results of table 4.3 (adjusted cashflows) shows a reduced total accuracy of 65% and a margin of error of 35% compared to an accuracy of 95% with just a margin of error of 5%. These levels of accuracy therefore compel stakeholders to depend more on adjusted cashflows than unadjusted cashflows as they are more likely to benefit and predict better the going concern of a firm so as to realise better returns without making losses

4.5 Testing for the Equality of Group Means

To examine whether the independent variable contributed meaningfully to the discriminant function, the Wilks Lambda was used and the results are as shown in Table 4.5.

Table 4.5: Test for equality

Ratios	Wilk's Lambda	Df1	F	Sig
X2	33.86646797	1	850.885	0.011
X3	3.424512859	1	103.808	0.016
X4	97.80778264	1	298.802	0.010
X6	0.213377486	1	12.648	0.029
X7	7.203509197	1	9.568	0.036

Source: Research Finding (2019)

From the table above the research deduced that Wilk's Lambda was significant by the F test for all variables. The X2, X3 and X4 ratios are the most significant at 99% level of confidence and the X6 and X7 ratios at 95% level of confidence.

4.6 Using the Z-Score Model

The z-score approach was also applied to test and supplement the effort of the Ohlson Model and testing whether to rely on the adjusted cashflows of the Unadjusted Cashflows.

4.6.1 Standardized Discriminant Function Coefficients

To develop a cashflow model the standard discriminate function coefficients had to be extracted which serve the same purpose as the beta weights regression. In the process of analyzing the data, the coefficients in the table below were identified as the best to be used to develop the cash flow model.

Table 4.6: Function Coefficients

Indicator	Function
	1
cX2	0.724
cX3	-0.935
cX4	-0.177
cX6	0.847
cX7	0.695

Source: Research Finding (2019)

From the coefficients we realize that the X1, X4 and X5 ratio coefficients which are the Debt Ratio, Return on Investment (ROA) and FFO to total Debt Ratio have a positive co-efficient which translate to their relevance in the failure of a firm or has a bearing on the going concern of a firm.

4.6.2 The Model

Table 4.5 above shows the coefficients which will be used in the construction of the model to be used in the classification of firms.

$$Z = W1X1 + W2X2 + W3X3 + \cdots WnXn$$

Where Z = Discriminant score.

$W1, W2, W3 \ldots \ldots Wn$ Are the Discriminant Score

$X1, X2, X3 \ldots \ldots Xn$ Are the independent variable

4.6.3 Actual Model

In the actual model the actual variables are:

X2 = Debt Ratio

X3 = Working Capital to Asset Ratio

X4 = Current Ratio

X6 = Return on Asset Ratio

X7 = Funds from operations to Total Debt Ratio

The weights which are W1, W2, W3……. Wn are as calculated in Table 4.5, and are denoted with cX1, cX2, cX3…. CXn

Substituting these variables onto the conceptual framework it gives the function below

$$Z = 1.724x2 - 0.935x3 - 0.177x4 + 0.847x6 + 0.695x7$$

The above model was then used to calculate the Z-score for each individual company and a firm with a z-score of less than 0 being considered to have failed and the one with a z-score above 0 was healthy depending on how much further the score is from 0.

4.7 Testing

The z-score was calculated using the model to deduce the health of the firms. The firms were grouped into listed and delisted firms and the testing was done for adjusted cashflows and unadjusted cash flows and the results which we produced are as deduced in the table below. The same 20 listed and 20 delisted firms which were tested using the Ohlson model were used for the z-score model.

4.7.1 Using the Adjusted Cashflows

Table 4.5 shows the total of tested firms, the ones which were predicted as Failed and viable one year prior to failure. Adopted from Altman (1968) as cited in Kleinert (2014) was the cut-off point (z-score) of 2.675. The z-score higher that 2.675 is a non-bankrupt firm and a z-score lower than 2.675as bankrupt.

Table 4.7: Adjusted Cash flow Result Matrix

Group	N	Predicted failed	Predicted Viable	Percentage Correct	Percentage Error
Listed	20	2	18	90%	10%
Delisted	20	16	4	80%	20%
Total	**20**	**34**	**6**	**85%**	**15%**

*The cells highlighted in blue are the correct prediction, and the cells highlighted in yellow are the error prediction.

Source: Research Finding (2019)

Table 4.7 is the level of accuracy expressed as a percentage of correctness and the percentage of error. The model produced satisfying total accuracy of 85% when testing using the adjusted cashflows, which was after producing a correct percentage of 90% on listed firms and 80% on delisted firms.

4.7.2 Using the Unadjusted Cashflows

The unadjusted cashflows were also used in the Z-Score testing.

Table 4.8: Unadjusted Cashflow Result Matrix

Group	N	Predicted failed	Predicted Viable	Percentage Correct	Percentage Error
Listed	20	6	14	70%	30%
Delisted	20	10	10	50%	50%
Total	**40**	**24**	**16**	**60%**	**40%**

*The cells highlighted in blue are the correct prediction, and the cells highlighted in yellow are the error prediction.

Source: Research Finding (2019)

Table 4.8 shows the unadjusted cashflow results which show a relatively low accuracy of 60%. Comparing this level of accuracy with the one of adjusted cash flows we realise that the accuracy can fairly be depended on but with much emphasis on the adjusted cash flows

4.7.3 Two Years Prior to Failure

The z-score approach was also used to test for 2 years prior to failure and the outcomes produced a weakening accurateness for the model especially in detecting bankruptcy in the future, which was even worse when using the unadjusted cashflows.

4.8 Conclusion

From the above observations in the research the researcher realized that the results were in tandem with other research studies by Metho (2007) in a research entitled “cash flow ratios as a predictor of corporate failure” who observed that cashflow ratios can be applied in predicting corporate failure with a predicting accuracy of 85% within a year to bankruptcy and around

65% within 2 years to bankruptcy. Merwin (1942) as stated in Kleinert, (2004) even predicted corporate failure to a period of even 5 years prior to failure.

From the observations also done above we realise that a true measure of performance which produced favorable results was dependent on Adjusted Cashflows. Unadjusted cashflows produced relatively lower accuracy results and therefore depending on them would be a risky activity, and it becomes worse as we go further from the period of failure.

CHAPTER 5

SUMMARY AND CONCLUSIONS

5.1 Summary

The secondary data in the study encompasses an 8-year timeline from 2011 to 2018. The populace of research included of 54 Johannesburg Stock Exchange listed firms from different sectors, and 26 delisted firms to give a total of 80 firms being used for the study. During the selection process, only companies whose accounts were readily available in all the years of study were selected and those whose financials were not readily available during the research period or were not in operation over the years selected.

The means for the ratios were presented and the study realized that for some ratios the difference between the listed firms means and the delisted means were very relevant especially the debt ratio to current ratio; working capital to assets ratio; and the funds from operations (FFO) to total debt ratio

The Ohlson Model which is premised on cashflow ratios was applied in the study. The adjusted cash flows ratios (Variable 1) and the unadjusted cash flows ratios (Variable 2) were used by the model as independent variables and the relevant ratios were the debt ratio, current ratio, working capital to assets ratio, return on assets (ROA) and the funds from operations (FFO)**,** and the dependent variables were the distressed/bankrupt firms (Variable 1) and non-distressed/ non-bankrupt firms (Variable 2). This model was adopted to test the dependability of cashflows as a forecaster of financial distress.

The z-score approach was also applied in testing the reliability of both adjusted and unadjusted cashflows as a forecaster of financial failure. The approach was based on the same ratios with the ones which were used in the Ohlson Model.

5.2 Conclusions

This study attempted to analyze how cashflows can be used to forecast financial failure, and whether or not the cashflows can be depended upon as a forecaster of financial distress. The study went further (as an important innovation of this work) to test whether or not the unadjusted vis-à-vis adjusted cashflows would be better able to foresee financial failure of companies.

5.2.1 The Ohlson Model

The study unearthed that using the adjusted cashflow for the firms which were used for the test one year before failure; the model had a prediction accuracy of 95%, which was very impressive. This was after nine (9) out of ten (10) listed firms were predicted as viable and all the delisted firms were predicted as failed

When using the unadjusted cashflows for the firms which were tested the accuracy was 65%, which was very low compared to the accuracy of predicting using the adjusted cashflows; this was realized after six (6) out of ten (10) listed firms were predicted as viable and seven (7) out of ten (10) delisted firms were predicted as failed. This result therefore questions the reliance on unadjusted cashflows.

5.2.2 The Z-score model

The model was also used to do the tests on the same firms which were tested using the Ohlson Model; and it produced satisfying total accuracy of 85% when testing using the adjusted cashflows, which was after producing a correct percentage of 90% on listed firms and 80% on delisted firms.

The unadjusted cashflow ratios showed a relatively low accuracy of 60%. Comparing this level of accuracy with the one of adjusted cashflows we note that the accuracy can fairly be relied upon, but with much more emphasis placed on the adjusted cashflows

Tests were also conducted for two years prior to failure using both models and the results produced showed that as we go further from failure the level of accuracy reduces gradually, especially for unadjusted cashflows, which makes it difficult to depend on unadjusted cashflows in the long-run.

Of the ratios which were used, the Wilks Lambda was also used to test which independent variable (cashflow ratio) contributed significantly to the discriminant function, and the results showed that the return on assets (ROA) ratio and funds from operations (FFO) to total debt ratio were the ratios with the greatest significance for the prediction of viability or failure of a firm.

In conclusion it can be noted that the results produced by the adjusted cashflows have a higher accuracy compared to the unadjusted cashflows. It therefore implies that more emphasis or reliance should be placed on the adjusted cashflows as they are likely to produce a more correct prediction. However, unadjusted cashflows produced a relatively lower accuracy which is to

some level dependable given that the adjusted cashflows are not available although with a lower level of accuracy.

5.3 Recommendations

This examination reinforces the application of cashflows in the forecasting corporate failure. In foreseeing the future of a company, cashflow ratios should be complemented by balance sheet ratios to produce a more reliable prediction.

The debt ratios will take care of the elements missed by the quick and current ratios. If debt and stocks rise and cash decline, it won't be reflected in the current and quick ratios. When the quick and the current ratios are below 1, cashflows from other activities will have to be utilized to cater for critical current obligations. The debt ratio can therefore be used as a supplementary measure of liquidity, but it is useful to measure in combination with quick and current ratios. A number of cashflow ratios from the cashflow statements are possible. Cashflow material is homogenous in the cashflow statement internationally. In this regard, cashflow founded ratios may become valuable complements to balance sheet and income statement ratios, and the full probable capacity of the cashflow statement will be utilized.

The study also recommends stakeholders to rely more on the adjusted cashflows when dealing with predicting corporate failure, as the results produced by adjusted cashflows are more accurate than the unadjusted cashflows; and firms need to make the financial statements of firms to be readily available for stakeholders at any point such that they can make informed decisions.

5.4 Limitations to the Study

The major limitation to the study was lack of access about the delisted firms. The information on the delisted firms is not easily accessible. And this made it difficult and time consuming to find the names of the delisted firms as there is no list that is easily accessible.

For some listed firms, some financial statements for some years of study were not available and that led to them being dropped from the study. The researcher had to spend more time searching for firms with all financial statements readily available for all the years of study.

The above-mentioned limitation leads to the second limitation of the study which was the absence of relevant and analyzed cash flow ratios for both the viable and failed firms by Johannesburg Stock Exchange. This is a somber deficiency for the Johannesburg Stock Exchange since some studies which also used similar ratios to this one in other countries utilized data that had already been gathered and analyzed by similar organizations in their

countries. The Johannesburg Stock Exchange is the only organization with access to the data, manpower and the capacity to scrutinize such high volume of data and preserve them for future use. The researcher had to collect final accounts and calculate the ratio himself. This was a great task to the researcher and was time consuming.

5.5 Suggestions for Future Study

Future research can, endeavor into a research of using, non-financial measures of performance which are increasingly becoming important in decision making and performance evaluation be considered in future studies.

The study used both listed (viable) and delisted (failed) entities and evaluated the use of adjusted cashflows and unadjusted cashflows by using models whose inputs are cashflow ratios to evaluate if the potential to forecast financial failure exists. However, cashflow ratios in separation are not the sole predictor of financial distress as there are other non-financial factors which are more relevant.

A study can also be conducted on developing the benchmarks for separate ratios against which ratio of distinct firms can be likened to. The comparison of a firm to industry ratio or yardstick ratio will sieve out mutual doubts and will leave only firm specific. In such an assessment some firms in the same business will offer information about the exact performance of a firm.

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