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The Field of Research

Earnings Manipulation by firms in South Africa

An Analysis of Earnings Manipulation by firms in South Africa (2000-2016)

An empirical report

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ABSTRACT

This report investigated, incidences of earnings manipulation by firms listed on the Johannesburg Stock Exchange (JSE). The empirical analysis was based on three forensic accounting models namely modified Jones model, Beneish M-score and the Altman model. South Africa has not been immune from such financials scandals, with notable examples being Unifer, Leisurenet, Saambou, Fidentia. Sharemax, Randgold, First Strut (FirstTech Group), African Bank and most recently Steinhoff. The report also investigates whether or not market participants levy any penalty to firms that engage in earnings manipulation. . For the purpose of this analysis the report employs the Capital Asset Pricing Model

The approach of this report is that any firm year flagged by at least two of the model, will be classified as having engaged in earnings manipulation. Empirical analysis reveal that on the whole 6.76% firm years in the sample engaged in earnings manipulation. In particular financial years 2013, 2014 & 2015 exhibited high incidences of firms flagged for earnings management. The report concludes, (after controlling for determinants of cost of capital in accounting and finance literature that have not been subject of this report) that there is no evidence to suggest that JSE stock exchange investors demand a higher expected required return from earnings manipulator firms relative to non-manipulators.

1. CHAPTER 1

1.1 INTRODUCTION

The accounting profession has endured excessive scrutiny owing to the much publicised financial scandals such as WorldCom, Global Crossing and Enron. South Africa has not been immune from such financials scandals, with notable examples being Unifer, Leisurennet, Saambou, Fidentia. Sharemax, Randgold, First Strut (FirstTech Group), African Bank and most recently Steinhoff. Unsuspecting investors had to bear the burden of substantial losses suffered as a result of these financial scandals.

With notable financial scandals within the boundaries of South Africa, this report makes contribution in creating awareness on the extent of earnings manipulation on JSE stock exchange. This will also assist JSE regulators in crafting policy that are tailored to nip this practice. The scandals raises questions regarding the competence and ethics of accounting professionals, and ultimately results in investors and potential investors losing confidence in financial statements. The South African Institute of Chartered Accountants has already instituted the Ntsebeza inquiry (November 2, 2017) to look into the conduct of some professional accountants implicated in some of the financial scandals. Those tasked with financial statements preparation are conflicted, which raises reasonable doubt regarding the completeness, accuracy and validity of financial statements.

Earnings manipulation negatively affects a country's growth prospects as it involves illegal and unethical transfer of wealth. Flourishing capital markets are based on companies producing complete, accurate and valid results of their financial performance and position. This calls for financial reporting standard setting bodies to squeeze the leeway for earning's manipulation and for auditors to be engaged to bridge the information asymmetry gap between a firm's top executives who possess private information regarding a company's underlying economic performance and the outside investing world.

Extant studies have long documented incidences of financial statements manipulation. This is so because of opportunities/incentives presented to top executives should they engage in earnings manipulation. Earnings manipulation is defined as the violation of accounting rules by management to positively reflect the company's financial performance through illegal earnings management schemes (Beneish, 1999). According to Paul Healy and James Wahlen earnings management relates to an event that occurs when management uses judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers. It should be noted that the earnings manipulation does not necessarily equate to fraud, though in some instances it will evolve to fraud.

In this report, the sample is comprised of all firm years for firms listed on the JSE stock exchange between year 2000 and 2016. The firms are drawn from all the different sectors listed on the JSE stock exchange with the exception of financial and insurance services firms which have been excluded from the sample. Financial services and insurance sectors are highly regulated, which might have a direct bearing on outcomes of the models. The report used Bloomberg terminal to extract the data and obtained 2 768 firm years.

This report is investigating incidences of earnings manipulation in South Africa. The earnings manipulation investigation in this report are based on Modified Jones Model, Beneish M-score model and the Altman model. Furthermore the report through the use of the augmented Capital Asset Pricing Model (CAPM) will also seek to establish whether there is any evidence to suggest that JSE stock exchange investors demand a higher expected required return from earnings manipulator firms relative to non-manipulators. Manipulators typically overstate earnings by recording fictitious, unearned, or uncertain revenues, recording fictitious inventory, or improperly capitalizing costs (Beneish, 1997)).

1.2 RESEARCH PROBLEM

Central to the problem, top management are manipulating accounting earnings with the hope of swaying equity valuation. They strategically and intentionally distort financial statements due to their conflicted position. In corporate set up, preparation of financial statements is the responsibility of those charged with governance, that is top management. For instance when it comes to Management Buy Out (MBO) transactions, there is a conflict of interest which raises reasonable doubt about the fairness to existing shareholders. Insider managers have a fiduciary duty to negotiate fair value for the current stockholders, whilst at the same time they are the acquirers of the stocks in question. In light of the influence of financial statements results on securities pricing, management who are charged with the responsibility for preparation of financial statements have an incentive to engage in negative earnings manipulation with the hope to acquire the company on the cheap.

On the other hand, when a firm goes public, its accounting statements carry a great amount of weight due to a general lack of information about the firm (Titman & Trueman, 1986; Brau & Fawcett, 2006). IPO firms has incentive to engage in positive earnings management to window-dress its performance and boost the IPO offer price. Highly indebted firms are always under immense pressure trying to avoid breach of debt covenants, this again prompts managers to choose accounting policy that increase earnings. This is particularly common to those firms that nearing the limit as per the debt covenant

Firms are also prompted to engage in earnings manipulation by regulatory requirements, for instance the Basel Accords in the financial services have led to financial re-engineering in the sector to avoid non-compliance. Extant studies have documented the advantages that accrue to firms that are able to meet/or exceed expectations. Thus analyst expectations is also another factor that contributes to earnings manipulation as managers would be trying to reach/or slightly be above the target.

Mergers and acquisitions (M&A) transactions also creates earnings manipulation opportunities for both firms, particularly where the deal involves swapping of equity shares. Both the acquirer and the acquiree are motivated to increase their security price in order to realize value in the M&A deal. Given all the earnings manipulation opportunities and motivations as well as the financial scandals witnessed in South Africa this report explored the extent of such incidences.

1.3 RESEARCH QUESTIONS

The overarching research question in the report is – Do South African firms manipulate earnings?

- i. What is the extent of earnings manipulation incidences by firms listed on the JSE stock exchange?
- ii. What are the implications of earnings manipulation by South African firms on capital markets efficiency?
- iii. What can be done to alleviate the practice of earnings manipulation?
- iv. Is there evidence to suggest that JSE stock exchange investors demand a higher expected required return from earnings manipulator firms relative to non-manipulators?

1.4 OBJECTIVES OF THE REPORT

The primary objective of the report is to establish the existence of the practice of earnings manipulation in South Africa. The specific objectives include:

- i. To establish the existence of earning manipulation practices.
- ii. Establish whether there is any consequences to earnings manipulation.
- iii. Based on the empirical results articulate recommendation to capital markets regulators.

2. CHAPTER 2

2.1 LITERATURE REVIEW

Governance of economic entities is almost inconceivable without accounting information systems. Accounting information systems are key to governance of economic entities as they foster accountability. The accounting information space has been plagued with dysfunctional manager behaviors, which takes the form of earnings manipulation, off balance sheet transactions, fraudulent financial reporting and under reporting of liabilities. Accounting information is of paramount importance to economic entities as it forms, the internal reporting and control mechanism, enables security price formation on the capital markets and measures the sustainability of the economic entity (going concern).

South Africa's standard of accounting information systems are highly regarded globally. This is attributed to comprehensive curriculum of the chartered accountants qualification as well as the processes that one has to go through to attain such qualification. Furthermore, the majority of listed firms are audited by global network audit firms, however the South African offices of KPMG and Deloitte are under investigation following allegations of financial irregularities at their respective clients. The Ntsebeza probe into misconduct by KPMG employees was conducted during the period between November 2, 2017 and April 30, 2018. In World Economic Forum's Global Competitiveness Report South Africa is consistently found on the upper end, suggesting that the likelihood of earnings management practice should be minimal. According to Lemma and Negash (2011) empirical evidence shows that the JSE is unable to detect on time firms that manage their earnings.

Firms engage in earnings manipulation with the view that accounting earnings influences equity price formation. Capital markets information dissemination and interpretation is complex, unpredictable and unobservable. The work of Verrecchia (1981) demonstrated that though security price changes and trade volume changes points out to information processing by capital markets these are not exhaustive in explaining capital markets information dissemination and interpretation. Security price and trade volume changes are also influenced by information that is not specific to that particular security for instance movement on the capital markets might be informed by changes in risk profile of investors, level of resources at the disposal of investors at each point in time.

The interplay between stock prices and reported accounting earnings have extensively dominated accounting and finance studies. Earlier literature (Ball & Brown, 1968) concluded that positive earnings are coupled with positive stock prices (positive Earnings Response Coefficient (ERC)). However, the work of Kothari, Lewellen, and Warner (2006); Ball, Sadka, and Sadka (2009) and Cready and Gurun (2010) found negative correlation between earnings and stock prices. He and Hu (2013) found that only four countries have negative coefficients for aggregate earnings changes and none of these negative coefficients are statistically significant.

The perplexing interplay between earnings and stock prices, (varying ERC) is attributable to two factors viz stock market regulations affecting information environment of the stock market, which, in turn, affects the investors' perception of the value of firm disclosure (Bailey, Li, Mao, C, & Zhong, 2003 ; Heflin, Subramanyam, and Zhang, 2003 ; Eleswarapu, Thompson, and Venkataraman, 2004) and macroeconomic conditions and business cycles affecting aggregate uncertainty and preferences (Chen, 1991; Menzly, Santos, & Veronesi, 2004; Henkel, Martin, & Nardari, 2011).

Accounting earnings are widely recognized as having implications for the growth potential of stocks and, therefore, as a plausible measure of aggregate cash flows (Campbell & Shiller, 1988a, 1988b; Fama & French, 1989; Hecht & Vuolteenaho, 2006; Kothari, Lewellen, & Warner, 2006). Literature also suggests that earnings contain information on firm risk (Easton & Zmijewski, 1989; Ball, Kothari, and Watts, 1993). Kothari et al. (2006) provide evidence that earnings and discount rate news move together.

Shivakumar (2010) proposes that earnings surprises could signal unexpected inflation that can be directly linked to discount rate movements and other macroeconomic variables.

It is envisaged that with improved information environment and quality accounting earnings disclosure, stock prices will efficiently factor in all new information yielding a positive ERC.

Yunhao Chen, Xiaoquan Jiang, and Bong-Soo Lee (2015) argue that earnings convey information on both growth (cash flows) and risk (discount rates) and that the relative importance of each effect varies over time. If aggregate earnings are dominated by cash flow effects, the report observe a positive ERC. However, if aggregate earnings are dominated by discount rate effects, the report find a negative ERC.

The above extant studies provides overwhelming evidence that accounting earnings have a bearing on capital markets security pricing. Next, focus is on what prior studies found and documented regarding earnings management. Teoh, Welch and Wong (1998) investigated 1649 American Initial Public Offering (IPO), the results of their work indeed confirmed the prevalence of earnings management practice. The findings overwhelmingly confirmed the view that the desire to obtain an inflated IPO price motivates prospective IPO firms to distort accounting earnings. Aharony, LIN, & Loeb (1993), documented that accounting earnings management is more prevalent among small firms, and highly leveraged firms as they are all driven by the desire to depict favorable prospects in IPO which invites higher offer price.

(Teoh, Wong & Rao, 1998; DuCharme, Malatesta & Sefcik, 2001) in their work they noted a negative link between discretionary accruals during the period preceding IPO and post-issue stock price performance and highlighted that the negative relationship possibly points to earnings management. This is consistent with other extant research work that documented evidence of under-performance of IPO firms relative to non-issuing firms during periods after IPO, confirming the hypothesis that higher accounting earnings results in higher equity valuation irrespective of the quality of reported accounting earnings.

Most literature on accounting earnings management assumes positive ERC, with minimal regard given to earnings management aimed at underpricing of securities. The MBOs and IPOs opportunism view envisages that higher reported accounting earnings results in higher equity valuation irrespective of the quality of reported accounting earnings. However, as the quality of accounting earnings decrease they become more opaque. Firm's that engage in earnings manipulation are faced with unstable security pricing.

Research on the link between security valuation and earnings quality noted evidence of firms with opaque earnings having the highest likelihood of being discounted. Bhattacharya, Daouk & Welker, (2003) noted a positive relationship between a country's overall opacity and cost of equity on the country's stock markets. Boulton, Smart, & Zutter (2011) found evidence of lower incidences of IPO underpricing in jurisdictions with high quality accounting earnings. This corroborate the view that earnings manipulation that increases the opacity of reported earnings will have the unintended effect of security price underpricing.

According to IASB Framework for the Preparation and Presentation of Financial Statements the objective of financial statements is to provide financial information about the reporting entity that is useful to present and potential investors and creditors in making decisions in their capacity as capital providers. Management in firms engaged in MBOs and IPOs can exploit accounting information asymmetry to their benefit. Healy and Wahlen (1999) survey studies on earnings management in MBOs, IPOs and to meet financial analysts' earnings expectations or management's own forecasts, and conclude that there is compelling evidence that managers manage earnings.

Teoh et al. (1998) suggest that IPO firms manage accruals upwards to inflate earnings. Murdoch and Madura (2011), in the work on whether firms that wish to be acquired manage their earnings found evidence of downward earnings management. A report of Chinese listed firms from 1998 through 2002 by Aharony, Wang and Yuan (2010) found that listed firms prop up earnings by using abnormal related party transactions.

In a related report of earnings management during periods preceding stock-financed mergers and acquisitions Mohammad A Karim and Sayan Sarkar (2016), documented that in mergers and acquisitions cases with acquirers stock as the elected method of payment they found evidence of significant increase in both abnormal and unexplained current accrual as reported by stock-financing acquirers between announcement and effective dates. On the contrary when cash was agreed as the method of payment both abnormal and unexplained current accruals remained unchanged. Based on this empirical report Mohammad A Karim and Sayan Sarkar (2016), concluded that through earnings management stock-financing acquirers can temporarily inflate their stock price creating value to existing shareholders.

The results of Mohammad A Karim and Sayan Sarkar (2016) are consistent to the work of Erickson and Wang (1999) who also noted earnings management by stock-financing acquirers in the U.S. Botsari and Meeks (2008) and Higgins (2013) also found evidence of earnings management by stock-financing acquirers in United Kingdom, and Japan respectively.

Ball and Shivakumar (2008) and Chang, Chung and Lin (2010) in their work around earnings management, found no evidence in support of the view that firms manipulate earnings prior IPO and MBOs. They concluded that investors' due diligence as well as underwriters' reputation inhibit high-quality firms from engaging in earnings manipulations. Armstrong, Foster and Taylor (2015) reports

that US IPO offer price is uncorrelated with pre-IPO accrual-based earnings management. DeAngelo (1986) highlighted the prevalence of incidences where MBOs generates litigation by current stockholders, disputing the fairness of the MBO transaction. Even in cases of disputes the courts and investment bankers employ earnings based valuation measures, which again incentivises insider managers to engage in earnings manipulation.

It should be noted the mechanisms employed by earnings manipulators evolves as new laws and regulations are enacted. Cohen, Dey and Lys (2008) noted evidence of evolving from accrual to real earnings management in the US after Sarbanes–Oxley Act (SOX). The effects of these earnings manipulation mechanisms differs, earnings management based on accrual management have no consequence of a firms cash flows whereas earnings management based on real activities alters cash flows of firms. Roychowdhury (2006), documented that firms employ various earnings management tools notably price discounts, deferment of discretionary expenditures.

Graham, Harvey and Rajgopal (2005) found evidence that real earnings management is gaining prominence over accrual earnings management. They credited the prominence of real earnings management over accrual earnings management to the fact that real earnings management are more likely to be undetected compared to accruals earnings management. Firms that engage in real earnings management deviate from the acceptable business norms, for instance over production, generous returns terms and discount terms that are inconsistent with firms policy on margins.

Firm's management are incentivized to engage in negative earnings management, if they are faced with the prospect of participation in MBOs. However, if the transaction is a leveraged MBO negative earnings manipulation has to be done with caution as understating earnings will negatively affect extent of external finance that can be obtained on reasonable terms. Fisher and Louis (2008) argue that managers overstate their earnings to get favorable debt contract terms in highly levered buyouts. Linck, Netter and Shu (2013) noted that for firms with limited financial resources and viable investment opportunities, positive earnings management can entice investors thereby securing the much needed external finance. Bebchuk and Fried (2003) documented that management are prodded to engage in positive earnings management should they discover positive ERC, and they have equity based compensation contracts.

Yaping Mao and Luc Renneboog (2015) found evidence that non-buyout engage in upward earnings manipulation whilst buyout firms engage in downward earnings management. They also noted that both non-buyout and MBO firms employ a combination of accrual and real earnings management mechanisms.

They also found that the primary driver for downward earnings management in MBOs is to understate pre-MBO security price so that they acquire the firm on the cheap. The work of Wu (1997) found evidence that on downward earnings manipulation understate pre-MBO security price by 18.6%

Despite successful attempts to nab fraudulent financial reporting companies, numerous corporations committing financial statement fraud remain well-camouflaged from detection by the enforcement authorities (Association of Certified Fraud Examiners 2012; Chen, Firth, Gao & Rui 2006). Even upon the discovery of financial statement fraud, it will take a year and a half for it to be made public (Beneish, Lee & Nichols 2013)

In addition, capital markets regulators might be selective in pursuing only those fraud cases subjected to decline in share performance after revelation of manipulation due to larger losses inflicted to shareholders (Dechow, Ge, and Larson & Sloan 2011). Furthermore, without the assistance of internal whistle blowers in highlighting potential fraud scandal in a company, financial statement fraud detection by enforcement authorities will be challenging (US Securities and Exchange Commission 2014). However, the rate of whistleblowing relating to accounting misstatements is minimal, which means that the majority of potential accounting fraud cases remain unreported.

One tool that can thus help capital markets regulators, to address the challenges of earnings manipulation will be the Beneish M-score model. The model will assist with early detection of possible financial statement irregularities. It should be noted that though the Beneish M score model was tested in countries such as the US and Malaysia, it has not been extensively applied on the JSE. The model has the added advantage that it can be used by firms as a financial statement quality checking tool before final submission to capital markets regulators. Different stakeholders can also apply the M-score model identify suspicious firms.

3 CHAPTER 3

3.1 RESEARCH METHODOLOGY

Empirical literature highlights discretionary accrual levels as an acceptable proxy for accounting earnings manipulation. (Jones 1991; Dechow, Sloan, & Sweeney, 1995; Kothari et al 2005). This approach to earnings management detection poses challenges in that after determining the total accruals, models have to be employed to disaggregate it into its constituent discretionary and non-discretionary components. The specification of these models are such that discretionary accruals are estimated as the residual, in a linear function of change in revenues and gross property, plant and equipment. The models uses financial statement information to map variables that captures effects of earnings management and elements that prods firms to engage in the practice of earnings manipulation.

The preference of one accrual model over the next, is a factor of the expected form of earnings management. In cases where the predominant form of earnings management is not known, adoption of more than a single model will minimize the probability of making both type I and type II errors. Peasnell, Pope and Young (2000) noted the significance of employing more than a single model in approximating discretionary accruals

The robustness of these models varies depending on earnings manipulation mechanisms employed by firms. The US SEC documents its policy on accruals as: The Accounting Quality Model extends the traditional approach [often based on the popular Jones Model or the Modified Jones Model] by allowing discretionary accrual factors to be a part of the estimation’.

Consistent with the above, this report will employ more than a single model in estimating discretionary accruals. In addition to the Modified Jones model which has been adapted by Kothari et al (2005), this report will also make use of the Beneish M-score model (Beneish, 1999) and Altman Z-score model to answer the research question.

The report will conclude by employing the Augmented Capital Asset Pricing Model to investigate whether or not market participants levy any penalty to firms that engage in earnings manipulation

Modified Jones Model adapted by Kothari et al (2005)

This model is a modification of the Jones model (1991) by Dechow, Sloan and Sweeney (1995). Dechow et al (1995) version was later adapted by Kothari et al (2005). Dechow et al (1995) noted a limitation of the Jones model (1991) in that it failed to capture earnings management were the predominant earnings manipulation mechanism used was recognition of fictitious sales. Furthermore Beneish (1997), highlighted the weakness of both Jones model (1991) and Modified Jones model (1995), as they fail to incorporate performance indicators. Young (1998) documented that the models cannot be used for firms with non-random economic performance. Kothari et al (2005), concurred with Beneish and argued that accruals of firms that experience periods of abnormal performance are expected to be systematically non-zero. This argument suggest that firm performance is interconnected with accruals. In their bid to capture the interconnectedness of firm performance and accruals Kothari et al (2005) added Return On Assets (ROA) to the Modified-Jones Model giving us the adapted model below:

$$ACC_t = \alpha + \beta_1 (1/Assets_{t-1}) + \beta_2 \left[(\Delta Sales_t - \Delta AR_t) / Assets_{t-1} \right] + \beta_3 \left[PPE_t / Assets_{t-1} \right] + \beta_4 (ROA_t) + \epsilon_t \quad \text{EQ.1}$$

- ACC_t – Current accruals, which are defined as the increase in account receivables plus the increase in inventory minus the increase in account payable minus the increase in tax payable minus the net change in other current assets
- $Assets_{t-1}$ – Lagged total assets
- $\Delta Sales_t$ – Change in sales from year t-1 to t scaled by lagged total assets
- ΔAR_t – Change in accounts receivables from year t – 1 to t scaled by lagged total assets
- ROA_t – Return On Assets measured as income before extraordinary items scaled by lagged total assets
- PPE_t – Net property, plant and equipment scaled by lagged total assets

The report adopted the cross sectional approach, and regression coefficients are estimated on the basis of data from firms in the same sector (Industry) and periods as the sample being studied. Johl, Jubb and Houghton (2007) noted the superiority of this approach in that individual year variations in economic conditions altering expected accruals are eliminated, as the model is re-estimated yearly. Estimated regression coefficients are then employed to compute the non-discretionary component of

individual firms' accruals. Discretionary accruals is given as the residuals from the estimation. It should be noted that linear regression, has a drawback in that it cannot map non-linear relationships hence negatively affecting the superiority of this model.

Beneish M-score model (Beneish, 1999)

Beneish (1999), is highly acclaimed in the financial forensics space, owing to his contribution in the form of Beneish M- score model. The model gauges the risk of earnings manipulation in financial statements. The M- score model has attained some notoriety for flagging Enron Corporation well in advance of its eventual demise D. Beneish et al (2013). This model seeks to distinguish manipulators from non-manipulators. It has considerable predictive power to identify earnings manipulation prior public discovery, as such it is a helpful tool for Investment professionals. The model has gained much prominence such that the CFA Institute included it in the 2017 Level II curriculum as one of the quantitative tools for assessing the likelihood of misreporting in financial statements.

The dominance of the Beneish M-score model comes from its close ties to accruals and its ability to provide information on earnings quality. Earnings quality information is extracted from the model's ability to predict directional change in current accruals. Beneish M-score model is comprised of 8 variables that are designed to detect financial statement distortions from earnings manipulation as well as identification of susceptibility to engage in earnings manipulation.

According to the work of Beneish (1999), earnings manipulators exhibit peculiar characteristics. Below are the notable characteristics and the associated M-score model variable that captures how these characteristics contributes to financial statements distortion.

First and second category gauges financial statements distortion emanating from susceptibility to commit fraud whilst the last category relates to financial statements manipulation through accruals.

- i. Abnormal growth (SGI)
- ii. Unstable economic environment (AQI, GMI, SGAI)
- iii. Aggressive accounting (DSRI, DPEI, TATA)

Beneish M-Score

$$\text{M-score} = -4.84 + 0.920 (\text{DSRI}) + 0.528 (\text{GMI}) + 0.404 (\text{AQI}) + 0.892 (\text{SGI}) + 0.115 (\text{DEPI}) - 0.172 (\text{SGAI}) + 4.670 (\text{Accruals}) - 0.327 (\text{LEVI})$$

EQ.2

Where:

- M-score = Score indicating probability of earnings manipulation
- DSRI (Days Sales Receivable Index) = $(\text{Receivables}^t / \text{Sales}^t) / (\text{Receivables}^{t-1} / \text{Sales}^{t-1})$.
- GMI (Gross Margin Index) = $\text{Gross margin}^{t-1} / \text{Gross margin}^t$.
- AQI (Asset Quality Index) = $[1 - (\text{PPE}^t + \text{CA}^t) / \text{TA}^t] / [1 - (\text{PPE}^{t-1} + \text{CA}^{t-1}) / \text{TA}^{t-1}]$
- SGI (Sales Growth Index) = $\text{Sales}^t / \text{Sales}^{t-1}$.
- DEPI (Depreciation Index) = $\text{Depreciation rate}^{t-1} / \text{Depreciation rate}^t$, where Depreciation rate = $\text{Depreciation} / (\text{Depreciation} + \text{PPE})$.
- SGAI $\left[(\text{Sales, General and Administrative Expenses}_t / \text{Sales}_t) / (\text{Sales, General and Administrative Expenses}_{t-1} / \text{Sales}_{t-1}) \right]$
- LVGI $\left[(\text{Long term debt} + \text{Current Liabilities}_t / \text{Total Assets}_t) / (\text{Long term debt} + \text{Current Liabilities}_{t-1} / \text{Total Assets}_{t-1}) \right]$
- TATA $\left[(\Delta \text{Current Assets}_t - \Delta \text{Cash}_t - \Delta \text{Current Liabilities}_t - \Delta \text{Current maturities of LTD} - \Delta \text{Income tax payable} - \text{Depreciation and Amortisation}) / \text{Total Assets} \right]$

Table 1: Beneish M-score Variable definition

Variable	Distortion effects captured by the variable
DSRI	DSRI has a positive coefficient. Less negative or positive M-score number suggest likelihood of earnings manipulation. Captures the degree to which revenues and receivables are in or out of balance for two consecutive periods. Disproportionate increases in receivables relative to sales may possibly suggest recognition of fictitious revenue.
GMI	GMI has a positive coefficient. Less negative or positive M-score number suggest likelihood of earnings manipulation. Deterioration of gross margin is a negative signal about a company's prospects.
AQI	AQI has a positive coefficient. Less negative or positive M-score number suggest likelihood of earnings manipulation. Captures the proportion of total assets for which future benefits are potentially less certain. Uncertainty on an assets' future economic benefits suggest a firm's inclination to capitalize expenses, thus deferring income statement charges.
SGI	SGI has positive coefficient. Less negative or positive M-score number suggest likelihood of earnings manipulation. Growth exerts pressure on management to maintain or exceed current rates. In periods of deceleration there is a high likelihood of growth firms to engage in earnings manipulation.
DEPI	DEPI has a positive coefficient. The variable gauges the existence of income increasing change in policy for instance increase in assets useful life or adoption of a aggressive depreciation method. Beneish (1999) noted the coefficient not to be significant, and suggest that the variable captures earnings management rather than earnings manipulation.

Variable	Distortion effects captured by the variable
SGAI	SGA has a negative coefficient. SGA are expected to move in line with sales. A disproportionate increase in sales not matched by an increase in SGA is indicative of earnings manipulation.
TATA	TATA has a significant positive coefficient. Less negative or positive M-score number suggest likelihood of earnings manipulation. Consistent with Sloan (1996), that cash backed earnings are more persistent relative to accrual backed earnings. Predominantly accrual backed earnings are more likely to suggest earnings manipulation.
LVGI	LVGI has a negative coefficient. Debt covenants exerts pressure on firms, leading to earnings manipulation.

Beneish M-score 8 variables benchmarks

Each of the 8 variables in the Beneish M-score model above, can further be independently investigated thereby isolating problematic financial statement elements. In addition to the model threshold, Beneish thus included thresholds for each of the 8 variables of his model based on mean scores that also help quarantine potential manipulators from non-manipulators.

Table 2: Beneish M-score variable indicator threshold

Index Type	Manipulators	Manipulation pressures/incentives	Non-Manipulators
Days Sales in Receivables Index	>1.465	Possible revenue inflation	≤ 1.031
Gross Margin Index	>1.193	Gross margin is deteriorating and company is more likely to manipulate earnings	≤ 1.014
Asset Quality Index	>1.254	Tendencies of capitalizing and deferring costs that should have been expensed. Pressure becomes the case when value is too small	≤ 1.039
Sales Growth Index	>1.607	Firms under possible pressure to manipulate earnings so as to keep up appearances	≤ 1.134
Depreciation Index	>1.077	Tendencies of Assets being depreciated at a slower rate to boost earnings.	≤ 1.001
Sales, General, Administrative Expenses Index	>- 1.041	Company possible Manipulation of earnings to defer costs	≤ 1.054

Index Type	Manipulators	Manipulation pressures/incentives	Non-Manipulators
Leverage Index	> -1.111	Reflecting pictures of Increase in leverage. An increase in the metric subjects a firm to a greater risk of violating debt covenants and the need to manipulate earnings to avoid a breach.	≤ 1.037
Total Accruals to Total Assets	> 0.031	Higher positive accruals than the given benchmark could be associated with a higher likelihood of earnings manipulation	≤ 1.018

Beneish, Lee and Nichols (2013) have applied a score greater than -1.78 based on Beneish (1999) to test the ability of the M-score model to detect financial statement fraud among prominent fraudulent financial reporting scandals with 71% accuracy rate. It has also assisted in identifying potential fraudulent companies prior to enforcement action taken by the authority in the United States such as in the case of Enron (Warshavsky 2012). This report will thus flag firms higher than the -1.78 threshold as manipulators.

Altman Z-Score Model

Ratio analysis has traditionally been popularised as an analytical tool in firm evaluation, however the usefulness of this tool has been questioned by modern literature. Critiques of ratio analysis cites ambiguity and confusing interpretation of independent ratio analysis, and the determination of which

ratio category (Profitability, liquidity and Solvency) is key in firm evaluation. Instead of discrediting the relevance of ratio analysis as a firm evaluation analytical tool Altman (1968) sort to improve it. Noting the popularisation of statistical techniques Altman (1968) incorporated financial and economic ratios in a multiple discriminant statistical model. This multivariate framework developed by Altman carries with it statistical significance, hence superior over the traditional independent ratio analysis.

Altman Z-Score model incorporates liquidity, profitability, leverage, and activity ratios into a statistical model that aims to gauge the probability of firm bankruptcy. Altman's studies concluded that distressed firms exhibit distinguishable ratio measurements than stable firms. Based on the distinguishable ratio measurements the model classify firms into bankrupt and non-bankrupt firms. The multiple discriminant analysis model adopted by Altman (1968) has the primary advantage that it analyses entire variable profile of object simultaneously rather than sequentially examining its individual characteristics.

The **Altman Z-Score model** function is computed as follows:

$$Z = 1.2X_1 + 1.4X_2 + 3.3X_3 + 0.6X_4 + 1.0X_5$$

EQ.3

Where

- X₁ = Working capital/Total assets
- X₂ = Retained Earnings/Total assets
- X₃ = before interest and taxes/Total assets
- X₄ = Market value equity/Book value of total debt
- X₅ = Sales/Total assets
- Z = Overall Index

Table 3: Altman Z model variable definition

Altman Z model Variable	Bankruptcy pressures captured by the variable.	Relative Contribution of Variables
Before interest and taxes/Total assets	Measure of the true productivity of the firm's assets, abstracting from any tax or leverage factors. Firm's ultimate existence is based on the earning power of its assets.	1
Sales/Total assets	Sales generating ability of the firm's assets. Measure of management's capability in dealing with competitive conditions	2
Market value equity/Book value of total debt	Measure shows how much the firm's assets can decline in value (measured by market value of equity plus debt) before the liabilities exceed the assets and the firm becomes insolvent.	3
Retained Earnings/Total assets	Measure of cumulative profitability over time. Relatively young firm will probably show a low RE/TA ratio because it has not had time to build up its cumulative profit. Incidence of failure is much higher in a firm's earlier years	4

Altman Z model Variable	Bankruptcy pressures captured by the variable.	Relative Contribution of Variables
Working capital/Total assets	Measure of the net liquid assets of the firm relative to the total capitalization. Firm experiencing consistent operating losses will have shrinking current assets in relation to total assets. Rated the net working capital to total asset ratio as the best indicator of ultimate discontinuance	5

The model has been noted to be able to flag distressed firms up to two years prior bankruptcy, and that its predictive power diminishes as the years' prior bankruptcy increases. The Altman Z-Score model distinguishes firms as follows:

< 1.81	High probability of bankruptcy
$\geq 1.81 \leq 2.99$	Susceptibility to error classification zone
> 2.99	Low probability of bankruptcy
2.675	Z value that discriminates best between the bankrupt and non-bankrupt firms

Augmented Capital Asset Pricing Model

Using the results of earnings manipulation models documented above, the report further investigates whether capital markets levy a penalty in the form of higher cost of capital to earnings manipulators. For the purpose of this analysis the report employs the Capital Asset Pricing Model. We seek to establish ceteris paribus whether firms flagged as earnings manipulators are associated with higher cost of capital relative to those flagged as non-earnings manipulators.

The quality of a firm's disclosures and cost of equity are inversely related (Botosan 1997; Botosan & Plumlee 2002). This implies that *ceteris paribus*, investors reward firms that produce high quality disclosures through lower cost of equity. The work of (Hribar & Jenkins 2004; Dechow, Sloan & Sweeney, 1996) documented that low quality disclosure attracts an increase in cost of capital.

As documented in this report the level and nature of accruals have been popularised as a measure of the quality of disclosures. However there still exist some debate, as to the acceptability of accrual quality as a priced risk factor. Asset pricing theory dictates that diversifiable risk is not priced, and there is strong argument that firm-specific information risk (Firm disclosure risk) is diversifiable hence cannot be priced into cost of equity. (Easley & O'Hara 2004; O'Hara 2003) put forward firm-specific information risk as non-diversifiable risk factor that affects the cost of capital. Bearing this debate in mind, this report takes the view that controlling the characteristics of the firm, quality of disclosure have effect on cost of capital.

Furthermore extant studies (Cohen D 2006; Francis, Khurna, & Pereira, 2005) have documented that *ceteris paribus* firms with lower quality disclosures display larger earnings-price ratios relative to those that make quality disclosures. Thus each Rand of earnings attracts relatively lower price multiple in case of low quality disclosure firms, indicating that the lower the quality of firm disclosures the lower the market is willing to pay for each Rand of reported earnings. This translates to higher cost of capital for lower quality disclosure firms.

Based on the empirical studies documented above, there is reason to anticipate higher cost of capital on firms flagged as earnings manipulators. This report will thus investigate the following: *Ceteris paribus*, JSE stock exchange firms flagged as earnings manipulators are associated with higher cost of capital relative to non-earnings manipulators as displayed by factor loadings to the CAPM.

The CAPM employed in this report will be based on the following model.

$$R_i - R_f = \alpha + \beta_i (E(r_m) - R_f) + \beta_{AQ} \text{factor} + \epsilon_t$$

EQ.4

- R_e – Expected return of stock
- R_f – Lagged total assets
- $E(r_m)$ – Expected return of the market portfolio
- β_i – Beta

CAPM is premised on investors that can earn risk free rate by investing in a risk free asset. $\beta (E(r_m) - R_f)$ denotes the required risk premium for a stock. $(E(r_m) - R_f)$ is universal across all stocks on the market, β_i is the only term unique to a particular asset i in determination of expected rate of return (cost of capital)

4. CHAPTER 4

4.1 EMPIRICAL RESULTS

SAMPLE AND DATA COLLECTION

In this report, the sample is comprised of all firm years for firms listed on the JSE stock exchange between year 2000 and 2016. JSE sector groupings are cognizant by the homogeneity in characteristics. The firms are drawn from all the different sectors listed on the JSE with the exception of financial and insurance services firms which have been excluded from the sample. Financial services and insurance sectors are highly regulated, which might have a direct bearing on the outcomes of the models. Based on the 488 firms listed on the JSE stock exchange each sector except financial services and insurance sectors will be represented. The report used Bloomberg terminal and obtained 2 768 firm years.

Consideration was not given to private firms, owing to the difficulty in obtaining information associated with private firms. Data used in this research report have been obtained from the Bloomberg Terminal Database (Bloomberg, 2018). The report dropped those firms without sufficient information to estimate probability of earnings manipulation.

One of the key identification mark of firms engaged in earnings manipulation, relates to those firms that has been requested to restate their financial statements to comply with GAAP by auditors or by Johannesburg Stock Exchange regulatory authorities. Consideration will also be given to firms that have been publicly flagged as earnings manipulators.

Table 4: Firm years sample distribution

Financial year	Firm years	Financial year firm years as a % of total firm years in the sample
2014	212	7.66
2013	206	7.44
2012	204	7.37
2011	198	7.15
2010	192	6.94
2009	190	6.86
2008	179	6.47
2007	170	6.14
2006	155	5.60
2015	149	5.38
2005	142	5.13
2004	134	4.84
2016	134	4.84
2003	131	4.73
2002	130	4.70
2001	125	4.52
2000	117	4.23
Grand Total	2768	100.00

Modified Jones Model adapted by Kothari et al (2005)

In this report the Modified Jones model discretionary accruals have been calculated using the SPSS statistics software. This has been achieved by measuring discretionary accruals as a portion of the total accruals, and non- discretionary accruals has been measured by subtracting discretionary accruals from total accruals. Alphas, coefficients or parameters are estimated by means of an ordinary least squares regression (OLS).

Descriptive Statistics

Adjusted R Squared of 98.9% indicate the robustness of the relationship in the variables with the dependant data set. The variables explains the variability in the dependant data set. B gives the alphas of the terms in the regression, and as can be noted all the P-values are less that the 1% hence all the terms are strongly significant.

The residuals in the regression model indicates the discretionary accruals (proxy for earnings manipulation) that we have been ascertaining, and the non-discretionary accruals will be computed by subtracting discretionary accruals from total accruals. Below are the computational steps followed in this report:

Step 1: Calculation of total accruals

$$TACC_t = \Delta CA_t - \Delta Cash - \Delta CL_t + \Delta DCL_t - DEP_t$$

EQ.5

$TACC_t$ = Total accruals in year t ,

ΔCA_t = Change in current assets in year t ,

$\Delta Cash$ = Change in cash and cash equivalents in year t ,

ΔCL_t = Change in current liabilities in year t ,

ΔDCL_t = Change in short term debt included in current liabilities in year t ,

DEP_t = Depreciation and amortization expense in year t .

Step 2: Estimate the Modified Jones Model

$$\frac{TACC_t}{A_{t-1}} = \alpha_1 \frac{1}{A_{t-1}} + \alpha_2 \frac{(\Delta REV_t - \Delta REC_t)}{A_{t-1}} + \alpha_3 \frac{PPE_t}{A_{t-1}} + \alpha_4 (ROA) + \varepsilon_t$$

EQ.6

$TACC_t$ = Total accruals in year t divided by total assets in year $t - 1$,

ΔREV_t = Revenues in year t less revenues in year $t - 1$,

ΔREC_t = Delta revenues in year t less delta net receivables in year $t - 1$,

PPE_t = Gross property plant and equipment in year t ,

A_{t-1} = Total assets in year $t - 1$,

ROA = Return On Assets measured as income before extraordinary items scaled by lagged total assets

$\alpha_1, \alpha_2, \alpha_3$ and α_4 = Parameters to be estimated, namely alphas,

ε_t = Residuals in year t .

Step 3: Computation of discretionary accruals

$$DACC_t = TACC_t - NDACC_t$$

EQ.7

Step 4: Computation of non-discretionary accruals

$$\frac{NDACC_t}{A_{t-1}} = \hat{\alpha}_1 \frac{1}{A_{t-1}} + \hat{\alpha}_2 \frac{(\Delta REV_t - \Delta REC_t)}{A_{t-1}} + \hat{\alpha}_3 \frac{PPE_t}{A_{t-1}} + \alpha_4 (ROA)$$

EQ.8

$NDACC_t$ = Non-discretionary accruals divided by total assets in year $t - 1$,

The sample consisted of 2 768 firm years, and 282 firm years were flagged for possible earnings manipulation. This equates to 10.19% of the sample firm years being flagged for possible earnings manipulation according to the modified Jones model. In **Table 5** it can be noted that there are high incidences of possible earnings manipulation in firms in the following JSE sector groupings – 1. Electricity 2. Technology Hardware & Equipment 3. Industrial Engineering 4. Industrial Transportation 5. Tobacco 6. Pharmaceuticals & Biotechnology. On the other extreme there were no firms flagged for possible earnings manipulation in the following JSE sector groupings - Mobile Telecommunications, Health Care Equipment & Services and Forestry & Report.

This report also analyzed years in which there were high incidences of possible earnings manipulation according to the modified Jones model. The findings are concerning in that the last decade witnessed a high number of firms flagged for possible earnings manipulation. **Table 6:** The year 2013 recorded the highest number of firms flagged for possible earnings manipulation with years 2014, and 2015 coming second and third highest respectively.

TABLE 5: Modified Jones model - flagged firm years as a % of sample firm years

JSE sector groupings	Sample firm years	Firm years flagged for possible earnings manipulation	Flagged firm years as a % of sample firm years
Electricity	4	1	25.00
Technology Hardware & Equipment	121	28	23.14
Industrial Engineering	49	10	20.41
Industrial Transportation	90	16	17.78
Tobacco	17	3	17.65
Pharmaceuticals & Biotechnology	29	5	17.24
Mining	353	59	16.71
Oil & Gas Producers	74	11	14.86
Electronic & Electrical Equipment	50	7	14.00
Construction & Materials	175	21	12.00
Industrial Metals & Mining	260	29	11.15
Support Services	266	28	10.53
General Industrials	98	10	10.20
Fixed Line Telecommunications	50	5	10.00
Aerospace & Defense	11	1	9.09
Software & Computer Services	104	9	8.65
Media	44	3	6.82
General Retailers	229	14	6.11
Automobiles & Parts	17	1	5.88
Food Producers	173	9	5.20
Personal Goods	43	2	4.65
Travel & Leisure	164	5	3.05
Food & Drug Retailers	79	2	2.53
Beverages	40	1	2.50
Chemicals	104	2	1.92
Forestry & Report	43	0	0.00
Health Care Equipment & Services	49	0	0.00
Mobile Telecommunications	32	0	0.00
Grand Total	2768	282	10.19

Table 6: Modified Jones model - number of firms flagged for possible earnings manipulation per year

Firm year	Number of firms flagged per year
2013	37
2014	30
2015	28
2009	25
2011	20
2012	19
2008	17
2003	15
2010	14
2016	14
2002	12
2007	12
2001	11
2004	11
2005	10
2006	7
Grand Total	282

Beneish M-score model (Beneish, 1999)

Firm years data used to estimate discretionary accruals in the modified Jones model above is the same firm years data the report continue to explore, though this time using the famous Beneish model. Again the report used SPSS software to assist with Beneish M- score computation.

Beneish M-Score

$$\text{M-score} = -4.84 + 0.920 (\text{DSRI}) + 0.528 (\text{GMI}) + 0.404 (\text{AQI}) + 0.892 (\text{SGI}) + 0.115 (\text{DEPI}) - 0.172 (\text{SGAI}) + 4.670 (\text{Accruals}) - 0.327 (\text{LEVI})$$

EQ.9

Based on the Beneish model, analysis of JSE sector groupings rankings in respect of possible earning manipulation came as follows: 1. Tobacco 2. Pharmaceuticals & Biotechnology 3. Industrial Metals & Mining 4. Oil & Gas Producers 5. Mining 6. Industrial Engineering.

It can be noted that Tobacco and Pharmaceuticals & Biotechnology featured again in the top six rankings of the modified Jones model which gives credence to the predictive power of the models. In **Table 7:** The Beneish model flagged 178 firms' years for possible earnings manipulation. This translates to 6.43% of the 2 768 firm years in the sample. The 6.43% flagged by the Beneish model is less than the 10.19% that have been flagged by the modified Jones model above.

The report's analysis of the 178 firm years flagged for possible earnings manipulation, yielded results that are consistent with findings in the modified Jones model above. In **Table 8:** The year 2015 recorded the highest number of firms flagged for possible earnings manipulation with years 2014, and 2013 coming second and third highest respectively. Again it is concerning to note that the most recent years are the ones that have high incidences of firm years flagged for possible earnings manipulation. This points to a decline in quality of financial information produced by JSE stock exchange listed firms.

TABLE 7: Beneish M- score model - flagged firm years as a % of sample firm years

JSE sector groupings	Sample firm years	Firm years flagged for possible earnings manipulation	Flagged firm years as a % of sample firm years
Tobacco	17.00	3.00	17.65
Pharmaceuticals & Biotechnology	29.00	5.00	17.24
Industrial Metals & Mining	260.00	32.00	12.31
Oil & Gas Producers	74.00	9.00	12.16
Mining	353.00	37.00	10.48
Industrial Engineering	49.00	5.00	10.20
Personal Goods	43.00	4.00	9.30
Health Care Equipment & Services	49.00	4.00	8.16
Industrial Transportation	90.00	7.00	7.78
Technology Hardware & Equipment	121.00	9.00	7.44
General Industrials	98.00	6.00	6.12
Electronic & Electrical Equipment	50.00	3.00	6.00
Support Services	266.00	14.00	5.26
Construction & Materials	175.00	9.00	5.14
Software & Computer Services	104.00	5.00	4.81
Travel & Leisure	164.00	7.00	4.27
General Retailers	229.00	9.00	3.93
Chemicals	104.00	3.00	2.88
Beverages	40.00	1.00	2.50
Forestry & Report	43.00	1.00	2.33
Food Producers	173.00	4.00	2.31
Media	44.00	1.00	2.27
Aerospace & Defense	11.00	-	0.00
Automobiles & Parts	17.00	-	0.00
Electricity	4.00	-	0.00
Fixed Line Telecommunications	50.00	-	0.00
Food & Drug Retailers	79.00	-	0.00
Mobile Telecommunications	32.00	-	0.00
Grand Total	2,768.00	178.00	6.43

Table 8: Beneish model - number of firms flagged for possible earnings manipulation per year.

Firm year	Number of firms flagged
2015	23
2014	19
2013	18
2016	18
2009	14
2010	14
2012	13
2007	12
2011	10
2004	9
2005	7
2008	6
2006	5
2001	4
2002	4
2003	2
Grand Total	178

Beneish M-score 8 variables benchmarks

The Beneish model results can also be decomposed into its constituent variables. Three variables are worth noting here viz leverage Index, depreciation Index and the Total accruals to assets. **Table 9:** Illustrates that 2 541 flagged by the leverage Index, this indicates high bankruptcy risk of firms listed on the JSE stock exchange. This has also been corroborated by the analysis of the Altman model below. An increase in this metric subjects a firm to a greater risk of violating debt covenants and the need to manipulate earnings to avoid a breach. The depreciation index variable have flagged the second highest firm years, which is indicative of possible tendency of assets being depreciated at a slower rate to boost earnings. Consistent with the modified Jones model the Beneish M-score model recognizes the positive relationship between accruals and earnings manipulation. Higher positive accruals could be associated with a higher likelihood of earnings manipulation, and this variable have flagged the third highest firm years.

Table 9: Beneish M-score 8 variables benchmarks

Beneish M -score model variable	Manipulator	Firm years flagged by the Beneish model variable	Manipulation pressures/incentives
Days Sales in Receivables Index	>1.465	46	Possible revenue inflation
Gross Margin Index	>1.193	203	Gross margin is deteriorating and company is more likely to manipulate earnings
Asset Quality Index	>1.254	121	Tendencies of capitalizing and deferring costs that should have been expensed. Pressure becomes the case when value is too small
Sales Growth Index	>1.607	171	Firms under possible pressure to manipulate earnings so as to keep up appearances
Depreciation Index	>1.077	683	Tendencies of Assets being depreciated at a slower rate to boost earnings.
Sales, General, Administrative Expenses Index	>- 1.041	150	Company possible Manipulation of earnings to defer costs
Leverage Index	> -1.111	2541	Reflecting pictures of increase in leverage. An increase in this metric subjects a firm to a greater risk of violating debt covenants and the need to manipulate earnings to avoid a breach
Total Accruals to Total Assets	>0.031	519	Higher positive accruals than the given benchmark could be associated with a higher likelihood of earnings manipulation

Altman Z-Score Model

The Altman model does not necessarily measure earnings manipulation, however it does measure the susceptibility of a firm to declare bankruptcy. In the Beneish model the variable leverage index which tries to capture the possibility of bankruptcy documented that an increase in leverage subjects a firm to a greater risk of violating debt covenants and raises the need to manipulate earnings to avoid a breach. This report thus takes the view that firms flagged as highly likely to file for bankruptcy have a greater need/or incentive to manipulate earnings to avoid breach of debt covenants. Based on the Altman model 19.91% of the firm years in the sample display bankruptcy risk.

Table 11: Bankruptcy risk is most prevalent in the following JSE sector groupings 1. Tobacco 2. Industrial Transportation 3. Beverages 4. Mining 5. Oil & Gas Producers 6. Forestry & Paper. Tobacco sector grouping has featured in the top six of all the three models used in this report. It will be interesting to do a research report on this sector, to gain a deeper understanding of the business environment that impacts on firms in this sector. **Table 10:** In terms of years with the highest earnings manipulation incidences, 2013, 2014 & 2015 are among the top six. It should be noted though that the years 2014, 2013 & 2012 have the first, second and third highest firm years in the sample respectively.

Table 10: Altman model - number of firms flagged as highly likely to file for bankruptcy per year

Firm year	Number of firms flagged
2009	81
2012	44
2013	42
2014	40
2015	40
2011	38
2010	36
2016	36
2001	29
2002	29
2008	26
2003	25
2007	24
2004	23
2006	21
2005	17
Grand Total	551

Table 11: Altman model - flagged firm years as a % of sample firm years

JSE sector groupings	Sample firm years	Firm years flagged for possible earnings manipulation	Flagged firm years as a % of sample firm years
Tobacco	17	12	70.59
Industrial Transportation	90	41	45.56
Beverages	40	18	45.00
Mining	353	156	44.19
Oil & Gas Producers	74	32	43.24
Forestry & Report	43	13	30.23
Industrial Metals & Mining	260	76	29.23
Health Care Equipment & Services	49	13	26.53
Fixed Line Telecommunications	50	12	24.00
Industrial Engineering	49	11	22.45
Technology Hardware & Equipment	121	25	20.66
Software & Computer Services	104	19	18.27
General Industrials	98	15	15.31
Construction & Materials	175	25	14.29
Electronic & Electrical Equipment	50	6	12.00
Support Services	266	29	10.90
Aerospace & Defense	11	1	9.09
Food Producers	173	15	8.67
Personal Goods	43	3	6.98
Travel & Leisure	164	11	6.71
Mobile Telecommunications	32	2	6.25
General Retailers	229	11	4.80
Media	44	2	4.55
Pharmaceuticals & Biotechnology	29	1	3.45
Chemicals	104	2	1.92
Automobiles & Parts	17	0	0.00
Electricity	4	0	0.00
Food & Drug Retailers	79	0	0.00
Grand Total	2768	551	19.91

As documented in the methodology section the report adopted the view that firm year flagged by at least two of the models above is indicative of earnings manipulation. Overall the results of report flagged 187 firm years for earnings manipulation. This translates to 6.76% of firm years in the sample. Having ascertained the extent of earnings manipulation by firms listed on the JSE stock exchange, the report investigates whether or not market participants levy any penalty to firms that engage in earnings manipulation. Extant studies documented some negative consequences to earnings management in the form of high cost of capital and high cost of debt. The **Table 12** below displays firms that have been flagged for earnings manipulation across the two models and also for risk of bankruptcy.

Table 12: firm years flagged for earnings manipulation

Fyear	Company_name	Jones model - DACC	Beneish model M-score	Altman Z score
	Flagging criteria	DACC	>-1.78	<1.81
2010	Andulela Investment Holdings Limited	0.38	3.17	-1.16
2009	British American Tobacco Plc	0.08	-1.28	0.83
2009	Consolidated Infrastructure Group Ltd	0.28	-1.08	0.77
2015	Efora Energy Limited	0.20	5.27	0.03
2015	Ellies Holdings Limited	0.04	-0.46	1.54
2002	ELB Group Limited	0.16	4.31	1.55
2008	eXtract Group Limited	0.12	0.22	0.45
2016	eXtract Group Limited	0.44	-1.53	0.44
2007	Firestone Energy Limited	0.08	56.02	-71.09
2015	Grindrod Limited	0.00	0.77	1.24
2001	Hosken Consolidated Investments Ltd	0.03	12.66	1.19
2014	Labat Africa Limited	0.49	-1.47	-3.65
2013	Miranda Mineral Holdings Limited	0.04	0.81	-1.89
2012	Net 1 UEPS Technologies Inc	0.35	-1.74	1.59
2014	Net 1 UEPS Technologies Inc	0.03	-1.75	1.77
2013	Oando Plc	0.10	-1.17	0.73
2015	Oando Plc	0.16	-1.09	-0.31
2009	Randgold & Exploration Company Ltd	0.35	-1.22	-0.22
2015	Total Client Services Limited	1.95	12.46	-11.93
2010	The Waterberg Coal Company Limited	0.07	1.53	-4.01

Fyear	Company_name	Jones model - DACC	Beneish M-score model
	Flagging criteria	DACC	>-1.78
2010	Andulela Investment Holdings Limited	0.38	3.17
2016	Ansys Limited	0.16	-1.70
2014	Ascendis Health Limited	0.24	-1.59
2014	Aspen Pharmacare Holdings Limited	0.16	-1.27
2015	Basil Read Holdings Limited	0.04	2.41
2009	British American Tobacco Plc	0.08	-1.28
2013	Cartrack Holdings Limited	0.14	-1.55
2010	Compagnie Financiere Richemont SA	0.06	-1.51
2009	Consolidated Infrastructure Group Ltd	0.28	-1.08
2015	Consolidated Infrastructure Group Ltd	0.04	-1.15
2016	Consolidated Infrastructure Group Ltd	0.06	-1.41
2010	Eastern Platinum Limited	0.13	-1.48
2015	Efora Energy Limited	0.20	5.27
2002	ELB Group Limited	0.16	4.31
2015	Ellies Holdings Limited	0.04	-0.46
2008	enX Group Limited	0.07	-0.25
2015	enX Group Limited	0.16	-1.72
2016	enX Group Limited	0.27	-1.18
2008	eXtract Group Limited	0.12	0.22
2016	eXtract Group Limited	0.44	-1.53
2007	Firestone Energy Limited	0.08	56.02
2016	Grand Parade Investments Limited	0.03	-0.69
2011	Grindrod Limited	0.22	-1.18
2015	Grindrod Limited	0.00	0.77
2010	Homechoice International Plc	0.03	-1.40
2011	Homechoice International Plc	0.00	-1.29
2012	Homechoice International Plc	0.16	-1.19
2014	Homechoice International Plc	0.00	-1.39
2016	Homechoice International Plc	0.05	-1.34
2001	Hosken Consolidated Investments Ltd	0.03	12.66
2004	Hosken Consolidated Investments Ltd	0.66	0.55
2016	Imbalie Beauty Limited	0.12	-1.08
2009	ISA Holdings Limited	0.29	-0.96
2004	KAP Industrial Holdings Limited	0.41	-1.38
2014	Labat Africa Limited	0.49	-1.47
2013	Lewis Group Limited	0.07	-1.74
2009	Mazor Group Limited	0.31	-0.81
2004	Metrofile Holdings Limited	0.02	5.37

2004	Miranda Mineral Holdings Limited	0.15	96.45
2013	Miranda Mineral Holdings Limited	0.04	0.81
2014	Mustek Limited	0.10	-1.75
2012	Net 1 UEPS Technologies Inc	0.35	-1.74
2014	Net 1 UEPS Technologies Inc	0.03	-1.75
2013	Oando Plc	0.10	-1.17
2015	Oando Plc	0.16	-1.09
2011	Pbt Group Limited	3.21	40.00
2005	PSV Holdings Limited	0.08	3.70
2007	PSV Holdings Limited	32.90	14638.17
2015	Quantum Food Holdings Limited	0.05	-1.46
2009	Randgold & Exploration Company Ltd	0.35	-1.22
2007	South Ocean Holdings Limited	0.26	-1.01
2009	Taste Holdings Limited	0.63	0.61
2012	Tawana Resources NL	0.04	7.56
2014	The Foschini Group Limited	0.12	-0.86
2010	The Waterberg Coal Company Limited	0.07	1.53
2013	Torre Industries Limited	0.29	1.35
2014	Torre Industries Limited	0.27	0.80
2015	Total Client Services Limited	1.95	12.46
2007	Wesizwe Platinum Limited	0.12	-0.74
2003	York Timber Holdings Limited	0.17	-1.64

In **Table 13** below, the report analyses the number of times firms have been flagged for earnings manipulation. Firms have been ranked on the basis of the number of years a firm has been flagged for earnings manipulation. The higher the number of years a firm has been flagged for earnings manipulation, the higher the prevalence of earnings manipulation practice. In chronological order the following firms have been flagged as the main culprits in this practice of earnings manipulation.

1. Homechoice International Plc
2. Consolidated Infrastructure Group Ltd
3. enX Group Limited
4. eXtract Group Limited
5. Grindrod Limited
6. Hosken Consolidated Investments Ltd
7. Miranda Mineral Holdings Limited
8. Net 1 UEPS Technologies Inc
9. Oando Plc
10. PSV Holdings Limited

Table 13: Number of years a firm has been flagged for earnings manipulation

Company_name	Frequency
Homechoice International Plc	5
Consolidated Infrastructure Group Ltd	3
enX Group Limited	3
eXtract Group Limited	2
Grindrod Limited	2
Hosken Consolidated Investments Ltd	2
Miranda Mineral Holdings Limited	2
Net 1 UEPS Technologies Inc	2
Oando Plc	2
PSV Holdings Limited	2
Torre Industries Limited	2
Andulela Investment Holdings Limited	1
Ansys Limited	1
Ascendis Health Limited	1
Aspen Pharmacare Holdings Limited	1
Basil Read Holdings Limited	1
British American Tobacco Plc	1
Cartrack Holdings Limited	1
Compagnie Financiere Richemont SA	1
Eastern Platinum Limited	1
Efora Energy Limited	1
ELB Group Limited	1
Ellies Holdings Limited	1
Firestone Energy Limited	1
Grand Parade Investments Limited	1
Imbalie Beauty Limited	1
ISA Holdings Limited	1
KAP Industrial Holdings Limited	1
Labat Africa Limited	1
Lewis Group Limited	1
Mazor Group Limited	1
Metrofile Holdings Limited	1
Mustek Limited	1
Pbt Group Limited	1
Quantum Food Holdings Limited	1
Randgold & Exploration Company Ltd	1
South Ocean Holdings Limited	1
Taste Holdings Limited	1
Tawana Resources NL	1
The Foschini Group Limited	1
The Waterberg Coal Company Limited	1
Total Client Services Limited	1
Wesizwe Platinum Limited	1
York Timber Holdings Limited	1

The report analysed the relationship between risk and earnings manipulation. **Table 14**, illustrates that for both models there was a 34% joint flagging. This implies that there is a 34% probability that a firm flagged for bankruptcy risk will also be flagged for earnings manipulation.

Table 14: Relationship between bankruptcy risk and earnings manipulation.

Relationship between bankruptcy risk and earnings manipulation.		
Flagged by Jones model	383	100%
Jointly flagged Jones model/Altman model	132	34%
Unique to Jones model	251	66%
Flagged by Beneish model	178	100%
Jointly flagged Beneish/Altman model	60	34%
Unique to Beneish model	118	66%

Augmented Capital Asset Pricing Model

The report further investigates effects of earnings manipulation on a firm's cost of capital as displayed on the factor loadings of the augmented CAPM model. In this report the augmented CAPM makes use of average ex post returns to approximate cost of capital. Studies by Botosan (1997) as well as Easley and O'Hara (2004) documented that information quality and disclosure policy lowers cost of capital. It is argued that ceteris paribus high quality financial information decrease information asymmetries and ultimately cost of capital. Francis (2005) documented that as the quality of financial information declines, the less investors are prepared to pay for a dollar of reported earnings, which is indicative of a higher cost of capital for firms with poor quality financial information.

On the basis of factor loadings the report seek to establish ceteris paribus whether firms flagged as earnings manipulators are associated with higher cost of capital relative to those flagged as non-earnings manipulators.

$$R_i - R_f = \alpha + \beta_i(E(r_m) - R_f) + \epsilon_t$$

EQ.10

$$R_i - R_f = \alpha + \beta_i(E(r_m) - R_f) + \beta_i AQ_{factor} + \epsilon_t$$

EQ.11

CAPM is premised on investors that can earn risk free rate by investing in a risk free asset. $\beta(E(r_m) - R_f)$ denotes the required risk premium for a stock. $(E(r_m) - R_f)$ is universal across all stocks on the market, β_i is the only term unique to a particular asset i in determination of expected rate of return (cost of capital)

The analysis starts by estimating one factor model for the 113 firms, with monthly returns data, **Table 15** in appendix below displays the mean values of the coefficients and adjusted R²'s from these CAPM tests, and reports t-statistics of whether the mean coefficient estimate equals zero. The results show a mean beta of 0.64 (t-statistic of 10.80) and a mean adjusted R² of 36.33%.

In addition the report add a variable that captures earnings manipulation (difference in total accruals for non-earnings manipulator firms and earnings manipulators). This procedure imitates the way the Fama and French (1993) construct the Size and book to market portfolios. **Table 16** in appendix shows the results of the regressions which include AQ factor as an additional explanatory variable. The mean loading on the AQ factor (beta - 0.0000) zero and t-statistics (t -0.4775) P-value (0.6336). After additional of the earnings management capturing variable AQfactor the traditional CAPM beta remained positive (beta 0.6395) though it slightly declined. The same applies to the t-statistic (9.9671). The AQfactor contributed again to the slight decline in adjusted R² from 36.33% to 36%.

Since the factor loadings on the market risk premium was not significantly altered by the addition of an explanatory variable that captures earnings management, the report thus conclude, (after controlling for determinants of cost of capital in accounting and finance literature that have not been subject of this report) that there is no evidence to suggest that JSE stock exchange investors demand a higher expected required return from earnings manipulator firms relative to non-manipulators.

This conclusion is also supported by adjusted R2 which only changed by the slightest of margins. It should be noted that this report did not test Earnings Response Coefficient on the JSE stock exchange. This also implies that there is no evidence that supports the view that JSE firms that provides decision useful financial information are seen in positive light by investors, as indicated by lower cost of capital.

5. CHAPTER 5

5.1 SUMMARY AND MAIN CONCLUSIONS OF THE REPORT

The report investigated incidences of earnings manipulation by firms listed on the JSE stock exchange. The empirical analysis flagged 6.76% of the firm years in the sample for earnings manipulation. The report further pointed out that firms in Tobacco, Pharmaceuticals & Biotechnology and Mining displayed high incidences of earnings manipulation. In terms of years with the highest earnings manipulation incidences, 2013, 2014 & 2015 featured prominently across the three models used in this report. With the exception of Steinhof and Randgold, most notable financial scandals in South Africa have been confined to the financial services space. Steinhof and Randgold were both flagged by the models though the firm years flagged were not simultaneously flagged by at least two of the models hence could not be included in the group of earnings manipulators. The analysis also revealed that earnings manipulation is not a permanent feature for firms flagged as earnings manipulators, it is a random practice that is probably motivated by the circumstances of the firm. The report also discovered high bankruptcy risk among firms listed on the JSE stock exchange.

Earnings manipulation negatively affects a country's growth prospects as it involves illegal and unethical transfer of wealth. Flourishing capital markets are based on companies producing complete, accurate and valid results of their financial performance and position. One of the negative implication of earnings manipulation is that it results in sub-optimal resource allocation by the capital markets, thereby hampering economic development. There is no evidence to suggest that JSE stock exchange investors demand a higher expected required return from earnings manipulator firms relative to non-manipulators. This also implies that there is no evidence that supports the view that JSE firms that provides decision useful financial information are seen in positive light by investors, as indicated by lower cost of capital. It should be noted that this report did not test Earnings Response Coefficient on the JSE stock exchange, and this an area for further research.

As the report have identified incidences of earnings manipulation by firms listed on the JSE stock exchange, the focus should then be on how JSE stock exchange regulatory authorities stop such practices. It is the view of the authors of this report that they should set up robust forensic teams. These teams should employ the models documented in this report among other tools, and should keep abreast with new developments in the forensic accounting space.

6. REFERENCES



Aboody, D., Hughes, J., & Liu, J. (2005). Earnings quality, insider trading, and cost of capital. *Journal of Accounting Research*, 43(5), 651-673.

Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The journal of finance*, 23(4), 589-609.

Ball, R., & Shivakumar, L. (2008). Earnings quality at initial public offerings. *Journal of Accounting and Economics*, 45(2-3), 324-349.

Bebchuk, L. A., & Fried, J. M. (2003). Executive compensation as an agency problem. *Journal of economic perspectives*, 17(3), 71-92.

Beneish, M. D. (1999). The detection of earnings manipulation. *Financial Analysts Journal*, 24-36

Botosan, C. A. (1997). Disclosure level and the cost of equity capital. *Accounting review*, 323-349.

Botsari, A., & Meeks, G. (2008). Do acquirers manage earnings prior to a share for share bid?. *Journal of Business Finance & Accounting*, 35(5-6), 633-670.

Cohen, D. A., Dey, A., & Lys, T. Z. (2008). Real and accrual-based earnings management in the pre-and post-Sarbanes-Oxley periods. *The accounting review*, 83(3), 757-787.

Cohen, D. A., & Zarowin, P. (2010). Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of accounting and Economics*, 50(1), 2-19.

Cohen, D. A. (2008). Does information risk really matter? An analysis of the determinants and economic consequences of financial reporting quality. *Asia-Pacific Journal of Accounting & Economics*, 15(2), 69-90.

DeAngelo, L. E. (1986). Accounting numbers as market valuation substitutes: A study of management buyouts of public stockholders. *Accounting review*, 400-420.

Mbuthia, E., & Ward, M. (2003). The reliability of pre-listing earnings forecasts on the JSE. *Investment Analysts Journal*, 32(57), 33-40

Francis, J., LaFond, R., Olsson, P., & Schipper, K. (2005). The market pricing of accruals quality. *Journal of accounting and economics*, 39(2), 295-327.

Graham, J. R., Harvey, C. R., & Rajgopal, S. (2005). The economic implications of corporate financial reporting. *Journal of accounting and economics*, 40(1-3), 3-73.

Healy, P. M., & Wahlen, J. M. (1999). A review of the earnings management literature and its implications for standard setting. *Accounting horizons*, 13(4), 365-383.

Higgins, H. N. (2013). Do stock-for-stock merger acquirers manage earnings? Evidence from Japan. *Journal of Accounting and Public Policy*, 32(1), 44-70.

Jones, J. J. (1991). Earnings management during import relief investigations. *Journal of accounting research*, 193-228.

Peasnell, K. V., Pope, P. F., & Young, S. (2000). Detecting earnings management using cross-sectional abnormal accruals models. *Accounting and Business research*, 30(4), 313-326.

Charfeddine, L., Riahi, R., & Omri, A. (2013). The determinants of earnings management in developing countries: A study in the Tunisian context. *The IUP Journal of Corporate Governance*, 12(1), 35-49.

Lemma, T. T., & Negash, M. (2011). Rethinking the antecedents of capital structure of Johannesburg Securities Exchange listed firms. *Afro-Asian Journal of Finance and Accounting*, 2(4), 299-332.

Karim, M. A., Sarkar, S., & Zhang, S. (2016). Earnings management surrounding M&A: Role of economic development and investor protection. *Advances in accounting*, 35, 207-215.

Sloan, R. G. (1996). Do stock prices fully reflect information in accruals and cash flows about future earnings?. *Accounting review*, 289-315.

Roychowdhury, S. (2006). Earnings management through real activities manipulation. *Journal of accounting and economics*, 42(3), 335-370.

Perry, S. E., & Williams, T. H. (1994). Earnings management preceding management buyout offers. *Journal of Accounting and Economics*, 18(2), 157-179.

Mao, Y., & Renneboog, L. (2015). Do managers manipulate earnings prior to management buyouts?. *Journal of Corporate Finance*, 35, 43-61.

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7. APPENDIX

Table 15: Factor loadings in one-factor asset-pricing model

<i>Regression Statistics</i>	
Multiple R	0.6053
R Square	0.3664
Adjusted R Square	0.3633
Standard Error	4.0900
Observations	204.0000

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1.0000	1954.1696	1954.1696	116.8203	0.0000
Residual	202.0000	3379.0553	16.7280		
Total	203.0000	5333.2248			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-2.1716	0.6148	-3.5321	0.0005	-3.3840	-0.9593	-3.3840	-0.9593
Rm-Rf	0.6421	0.0594	10.8083	0.0000	0.5249	0.7592	0.5249	0.7592

Table 16: Factor loadings in two-factor asset-pricing models

<i>Regression Statistics</i>	
Multiple R	0.6062
R Square	0.3675
Adjusted R Square	0.3601
Standard Error	4.2862
Observations	174.0000

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	2.0000	1825.4592	912.7296	49.6809	0.0000
Residual	171.0000	3141.5819	18.3718		
Total	173.0000	4967.0411			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-2.0272	0.6620	-3.0621	0.0026	-3.3340	-0.7204	-3.3340	-0.7204
X Variable 1	0.0000	0.0000	-0.4775	0.6336	-0.0001	0.0000	-0.0001	0.0000
X Variable 2	0.6395	0.0642	9.9671	0.0000	0.5128	0.7661	0.5128	0.7661

Table 17: Modified Jones model – discretionary accruals

<i>Regression Statistics</i>								
Multiple R	0.9943							
R Square	0.9886							
Adjusted R Square	0.9886							
Standard Error	1.4216							
Observations	2768.0000							

<i>ANOVA</i>								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	4.0000	484871.8598	121217.9650	59981.8503	0.0000			
Residual	2763.0000	5583.7764	2.0209					
Total	2767.0000	490455.6362						

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	-0.1294	0.0273	-4.7458	0.0000	-0.1829	-0.0759	-0.1829	-0.0759
X Variable 1	4.3213	0.1307	33.0565	0.0000	4.0650	4.5776	4.0650	4.5776
X Variable 2	0.1588	0.0006	288.4328	0.0000	0.1577	0.1599	0.1577	0.1599
X Variable 3	0.1283	0.0055	23.1556	0.0000	0.1174	0.1392	0.1174	0.1392
X Variable 4	0.0298	0.0020	15.1868	0.0000	0.0260	0.0336	0.0260	0.0336