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UNIVERSITY OF THE WITWATERSRAND

THE VALUE RELEVANCE OF CORPORATE RESPONSIBILITY REPORTING IN SOUTH AFRICA

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Adrian Marcia

2014

DECLARATION

I hereby declare that this research report is my own unaided work. It is submitted in partial fulfilment of the degree Masters of Commerce by Coursework and Research Report at the University of the Witwatersrand, Johannesburg. It has not been submitted elsewhere for the purpose of being awarded another degree or for examination purposes at any other university

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Adrian Michael Marcia

20 February 2014

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ABSTRACT

This dissertation assesses whether corporate responsible reporting (CRR) is value relevant in determining the market value of a JSE listed equity. In doing so, relevant literature surrounding value relevance is explored and, in addition to the theoretical underpinnings, statistically assessed to add robustness to the value relevance model.

This research adds to the volume of academic literature surrounding CRR in a South African context. Using a normative metric, which incorporates recent changes to the South African corporate governance landscape, namely King-III, this paper further explores elements of South African value relevance. The aforementioned assessment is based off a modified Ohlson (1995) model – allowing an incremental assessment between the predictive capacities of a model which incorporates purely financial information versus one which includes both CRR and financial information. Value relevance, in the context of this study, is the increase in the predictive power of the model when CRR information is added.

The above assessment is based on quantitative findings, which assess the relationship between the predictor variables, opening book value of equity, net income through the period and CRR information, on the dependent variable, market value of equity at the end of the period. Therefore, this research does not attempt to explain the underlying social phenomena which create the statistical relationship.

The findings of the dissertation, after satisfying all the relevant assumptions of hierarchical linear regression, indicate the CRR, when based off the normative metric, does not add to the predictive capacity of a South African value relevance model.

LIST OF ABBREVIATIONS USED

Companies Act	South African Companies Act No. 71 of 2008
CRR	Corporate responsible reporting
CSR	Corporate social responsibility
GRI	Global Reporting Initiative
IFRS	International Financial Reporting Standards
IOD	Institute of Directors in Southern Africa
IRC	Framework for Integrated Reporting and the Integrated Report
JSE	Johannesburg Stock Exchange
King	King Report on Corporate Governance
SRI	Socially Responsible Investment

1. INTRODUCTION

1.1. PURPOSE OF THE STUDY

Corporate social responsibility (CSR) primarily looks at a companies' social, economic, environmental and ethical impacts (Solomon, 2011). This type of reporting is believed to lessen the information asymmetry between the company and its shareholders (Carroll, 1999). This dissertation examines the relationship that corporate responsible reporting (CRR) disclosures have upon the value of an equity, specifically the additional predictive power of a CRR variable in a regression analysis. In addition, the potential relationship which CRR disclosures have upon a share price is tested for statistical significance, using a robust statistical methodology, to assess whether there is a business case for the active management of CRR information (Dhaliwal et al., 2009).

1.2. CONTEXT OF THE STUDY

Research into the effects of CRR reporting has provided fruitful insight for both companies and stakeholders. The third King Report on Corporate Governance (2009) (King-III) and the Framework for Integrated Reporting and the Integrated Report (IRC) (2011) are of the opinion that only those companies mindful of their social and environmental impact will be able to continue operating in a sustainable fashion into the long-term. The benefits which stem from CSR disclosure, as encouraged by King-III and the IRC, have been shown to be realised in the form of competitive advantage, gains from risk reduction and reputation benefits for the companies who provide the disclosure (Carroll and Shabana, 2010). Furthermore, it addressed the growing needs of stakeholder - reducing the information asymmetry which exists between the two parties (Solomon, 2011, IRC, 2011).

Specifically, this paper aims to assess the value relevance of CRR disclosure on equity prices in the context of a developing economy, namely South Africa. Prior research has shown, in a South-African context, that higher levels of CRR disclosure are likely to lead to higher share prices (de Klerk and de Villiers, 2012). Although the relationship between the two variables has been assessed in the South African context, a number of areas remain unexplored. The inherent lack of consensus surrounding a single CRR metric brings forward a need to explore the relationships which exist between financial information and different CRR measures. In addition, inherent ambiguity creates a need for robust statistical measures to mitigate additional uncertainty obscuring the relationship. This study broadens the CSR metric to include South African measures, such as King-III (2009), in addition to the established international metric of the Global Reporting Initiative (GRI). Furthermore, this research includes robust statistical tests to increase the reliability of the model used and the validity of the results obtained.

This thesis will therefore add to the volume of academic literature surrounding value relevance - specifically that which is concerned with the relationship between CRR information and the respective share price. The addition of a new *normative metric*, including specific South African measures, as well as robust statistical analysis of the relationship, will add to the business case for CRR in South Africa.

1.3. OBJECTIVE OF THE RESEARCH

This research explores the relationship between CRR disclosures and share prices for a sample of companies which are listed on the Johannesburg Stock Exchange (JSE). In doing so, the study provides a base for future research into the relevance of CRR in the context of developing economies. In addition, much of the prior finance literature focuses primarily on financial performance and business risk measures (For example Carroll and Shabana, 2010, De Meuse et al., 1994). This paper, therefore, seeks to add to the understanding of the corporate-financial paradigm by considering CRR, in addition to traditional financial metrics, as a relevant component of share price. In accession, the analysis between CRR disclosure and the share price used in this study can be applied in future studies which aim to critically and interpretively analyse the different components of CSR activities and their impact on equity values in developing economies. The importance attached to a company's share price creates an additional driver for good – management within a company may be incentivised to act in a corporately responsible manner to increase the value of their shares.

1.4. SIGNIFICANCE OF THE STUDY

Financial information, as shown by Collins et al. (1997) and Ali and Hwang (1999), as well as non-financial information, as explored by Aboody and Lev (1998) and Hassel et al. (2005), have been shown to impact value relevance. Holistically, however, a mixed measure, incorporating both financial and non-financial information, is believed to be most representative of the value of an equity (Ohlson, 1995). This paper will therefore add to the volume of literature surrounding value relevance by offering additional empirical evidence for the relationship between CRR and an equity value.

From a business perspective, where the equity maximising financial and non-financial measures would want to be actively managed, it is important to identify which information has the greatest impact on the value of an equity (Dhaliwal et al., 2009, Solomon, 2011). Therefore, while the exploration of value relevance is taking place (for example Aboody and Lev, 1998, Ali and Hwang, 1999, Hassel et al., 2005), the significance is also statistically assessed (de Klerk and de Villiers, 2013).

In a South African context, value relevance is growing in prominence with research into the impact of governance styles being explored by Ntim et al. (2012). In addition, the significant study by de Klerk and de Villiers (2012) explored, for the first time, the value relevance of CRR in a South African context. Founded on a respected survey performed by KPMG, de Klerk and de Villiers (2012) assessed the statistical relevance of CRR information for JSE listed companies, ultimately finding a strong correlation between CRR and the value of an equity instrument. The aforementioned study, however, was done before the release of King-III, leaving the most recent changes to South African CRR unexplored.

This study takes place in the midst of the South African value relevance exploration, analysing how CRR disclosure affects value. Research into these areas appears to be lacking in a South African context which, traditionally, overemphasises financial metrics. In accession, the study adds to the business case for CRR management by exploring the statistical significance of the relationship between value and CRR disclosure. The practical benefits being that decisions surrounding CRR investment can be better understood and the impact predicted to a greater extent.

1.5. DELIMITATIONS AND UNDERLYING ASSUMPTIONS

The study aims to explore whether CRR is a value relevant factor in the determination of a company's equity price. In addition, value relevance will be assessed in terms of its statistical significance in relation to the equity valuation. The study does not intend to explain the social drivers behind why CRR is/ is not value relevant, nor does it intend to explain why the information may/ may not be statistically significant in South Africa. In the context of this study, the statistical link between the variables tested does not explain causality, but rather shows relevance, which, in the modified Ohlson model, is value relevance.

Secondly, the data set used to measure CRR holds potential bias as it is a subjective metric derived by the researchers Makiwane and Padia (2011) (see Section 3.1.1.3.). This, however, is not a unique problem as there is no universally accepted measure for CRR, nor a way to assess the relative performance without a degree of subjectivity. In addition, each of the elements used in the *normative metric* has been given the same weighting in the model. As a result, the model may not accurately represent the importance that each section holds to users of CRR information.

Thirdly, the research in this paper only considers financial and CRR information for a sample of companies for a specific time frame. Namely, a sample of 82 companies (see Section 3.1.3.1.) from the JSE was used within the research. Furthermore, the data sets used to create the modified Ohlson model were drawn from the company's financial years ending in the 2010 and 2011 periods only. A detailed longitudinal analysis is deferred for future research.

Finally, this paper specifically explores the impact of CRR. As the link between CSR and CRR is not clear from an academic context, it is important to note that there is a possible disconnection between a company

performing CSR activities and their disclosure of these activities. Therefore, this study cannot be generalised to explain the impact of CSR on a share price as all data relates to the reporting of these activities and not the actual performance .

1.6. DEFINITION OF TERMS

Corporate Social Responsibility (CSR): is a theory of business governance whereby companies include social responsibility into their business models and strategic plans (McWilliams et al., 2006). Social responsibility is broadly seen as the selection of policies and strategies which are desirable, not only for the shareholders but for the greater society as well. Underpinning these policies and strategies is a strong emphasis on transparency and accountability of management for the actions of the company (Carroll, 1999).

Corporate Responsible Reporting (CRR): is the public disclosure of a company's CSR activities. Disclosure in this manner may or may not be in conformity with the Global Reporting Initiative, UN Global Compact and other CSR disclosure guidelines (Chen and Bouvain, 2009).

Stakeholders: in relation to a company include, but are not limited to, owners, customers, employees, community members, competitors, suppliers, social activist groups and the greater public which are impacted by the actions of a company (Carroll, 1991).

2. LITERATURE REVIEW

Psychopathic - the term used by Montague Ullman to describe 'the corporation' appears to be slowly losing its poignancy (Ullman, 2004) . Although a fairly new concept, CRR has its green-roots in the classic principle-agent debate (Carroll, 1991). The concept of CSR, and the disclosure thereof, seems to have answered the question posed by Lee (2005): "Is there a cure for corporate 'psychopathy'?", as companies are moving towards a more holistic approach to business - incorporating the economic, environmental, ethical and social issues of broader society into their business strategies (IOD, 2009, IRC, 2011, Solomon, 2011). The CSR disclosure reduces information asymmetries which exist between management, stockholders and stakeholders of a company, essentially acting as a method of checks and balances for all the parties involved (Carroll and Shabana, 2010).

2.1. AGENCY AND STAKEHOLDER THEORY

Since the dawn of the legal personality, companies have been faced with a dilemma: the interests of the owners of a company may differ to those interests which management of that same company hold (Jensen and Meckling, 1976, Laffont and Martimort, 2009). The aforementioned dilemma is known as the principle-agent problem and is particularly relevant when determining what strategic course of action a company should take (Myerson, 1982). As a result, there is a dichotomy of views regarding the macro-strategy of the organisation; namely to follow a stakeholder- or stockholder-theory of management.

According to agency theory, in its strictest sense, management of a company have an obligation only to those who own the company - namely the stockholders. This obligation arises as the owners of the company have entrusted their capital contribution to the management, with the expectation of a return through capital growth and/ or dividends (Friedman, 1970). As management has the obligation to the owners of the company, and those owners expect returns, it follows that management have one objective: to maximise profits of the company, without deception or fraud, to create value for the owners (Friedman, 1970). Within the principle-agent paradigm, the above dilemma is highlighted when management, who are assumed to be utility-maximisers, embark on activities, such as the production of financial reports and the use of external auditors, which direct resources away from profit maximisation (Laffont and Martimort, 2009, Solomon, 2011).

In contrast, stakeholder theory adopts a broader definition of corporate governance. Management have an obligation to a multitude of different stakeholders, in addition to the company's shareholders (Freeman, 1984). Each of these parties have an interest in the organisation and its activities, resulting in these companies being expected to report on more than its financial performance (Carroll, 1999). Corporate reports are published in the public domain and, increasingly, take cognisance of the relevance of non-financial information, including social, health and environmental issues (Brennan and Solomon, 2008, Solomon, 2011). In this context, under King-III (2009), the JSE Listing Requirements (2012) and the IRC (2011), companies are expected to provide integrated insights into the short- and long-term sustainability of their organisations.

This has resulted in an increased emphasis of the relevance of non-financial reporting, including, for the purpose of this research, CRR disclosures (Solomon, 2011, Freeman, 1984).

2.2. THE RELEVANCE OF CORPORATE GOVERNANCE AND CRR IN SOUTH AFRICA

The interest of different stakeholders, such as employment equity and environmental protection, within an organisation have highlighted the importance of CSR practices and initiatives undertaken by corporate citizens (IOD, 2009, IRC, 2011, Solomon, 2011). From the 1960's up to the start of the 1990's, corporate social responsibility was seen as a theoretical and ethical debate rather than a business practice; neither required nor actively encouraged by stakeholders (Carroll, 1999). Juxtaposed to this idea, the twentieth century brought about a new wave of pragmatism; globally, companies have increased their corporate social responsibility reporting to align to the needs of their stakeholders (Antonites and De Villiers, 2003). The KPMG International Survey on Corporate Responsible Reporting shows an increasing percentage of the 250 largest, global companies reporting their CSR activities – from 64% in 2005, to 83% in 2008 and finally 95% in 2011 (KPMG, 2008, KPMG, 2005, KPMG, 2011). CRR reporting consists mainly of voluntary disclosures, a company's action to embrace the reporting indicates a clear business case for CRR – the disclosures would never have been implemented unless there was a derived benefit flowing from the information (Dhaliwal et al., 2009).

The focus on CRR activities has been heightened by the ongoing financial crisis, which has highlighted the inadequacies of the current financial reporting standards (IRC, 2011, Karaibrahimoğlu, 2010). Following the sovereign debt crisis, companies globally have acknowledged that the existing standards of financial reporting do not adequately disclose companies strategic actions, nor the effect which they have on their stakeholders (Karaibrahimoğlu, 2010). The spate of financial calamity has created a push from external parties to demand higher levels of CRR from companies. The abovementioned trend is not exclusively seen in developed economies, quite the contrary is shown where CSR investments in developing economies provide fruitful returns for the companies who embark upon them (Dhaliwal et al., 2009, Lin and Walker, 2000, McGee, 2009). In addition, firms who partake in CRR activities in these developing economies are perceived to be less risky, thus attracting higher degrees of both local and foreign investment (McGee, 2009). Therefore, CSR has evolved from a business theory into a strategic consideration for companies listed on the JSE. This is in line with global trends which are moving towards sustainability reporting and good corporate citizenship (Garriga and Melé, 2004, Roberts, 1992)

In a South African context, 1994 saw the publication of the first King Report on Corporate Governance (IOD, 1994) (King-I). The report adopted a conceptual approach to corporate governance, and recommended best practice to boards of directors while emphasising a stakeholder-centric views of governance. This message was reaffirmed by King-II (2002), which stressed the relevance of comprehensive disclosure, including the provision of non-financial information, with the aim of providing 'triple-bottom-line' reports (IOD, 2002).

During 2009, King-III was released to combat the increased negligence in financial reporting, with the goal of introducing a more holistic reporting system. King-III stresses that, while financial and non-financial information is highly relevant, what must not be lost sight of is the integration of these metrics for effective communication of short- and long-term corporate sustainability. Although not acts of parliament, the King Codes have been indirectly enforced, for example, through aspects which are legislated in the Companies Act No. 71 of 2008 (Companies Act) , or those which are mandated by the JSE (IOD, 2002).

The main provisions of King-III include ethical leadership and corporate citizenship, management of the boards and directors, audit committees, governance of risk, governance of information technology, compliance with laws, rules, codes and standards, internal audit, governing stakeholder relationships and integrated reporting and disclosure. In turn, each of these have become focal points for South African CRR disclosures (IOD, 2009, Luthans et al., 2004). Collectively, through JSE listing requirements, legal enforceability of certain Companies Act provisions and a global movement towards heightened CSR actions and disclosure, a new culture of corporate leadership is emerging in South Africa. This culture is not limited to South African literature and best practice, but rather through mixed measures - incorporating international governance codes, such as the Global Reporting Initiatives (GRI) Index and the newly released International Integrated Reporting Framework.

2.3. ESTABLISHED EFFECTS OF CORPORATE SOCIAL RESPONSIBILITY

In the opinions of both the King-III (2009) and the IRC (2011), only those companies mindful of their social and environmental impact will be able to continue operating in a sustainable fashion into the long-term. Prior research, conducted by Carroll and Shabana (2010), confirm the opinions of both the King-III and the IRC. In their research, the effects of CRR and its impact on financial performance showed a tangible win-win relationship for both equity holders and other stakeholders. These benefit are believed to arise through increased competitive advantage, gains from risk reduction and reputation benefit of the company performing the CSR activities (Carroll and Shabana, 2010).

As the effects of a growing population, climate change, worker-unrest and ever scare natural resources become more pronounced, new threats and opportunities will arise that organisations need to respond to (IOD, 2009, IRC, 2011, Solomon, 2011). To meet the information needs of a growing body of stakeholders, companies will be expected to find new and innovative ways of doing business. In addition, the communication of both the financial, as well as the social implications, of their chosen strategies will take the foreground in their reporting (IRC, 2011). In this context, those companies with more evolved CSR initiatives and better associated disclosures are predicated to be better received by the market-place as they come to be associated with more ethical, responsible and sustainable business practice (Solomon, 2011).

The acceptance of CRR disclosure by the market was investigated, in a South African context, by Marcia and Maroun (2012). In this study, the correlation between CRR disclosure and the effects on a company's Beta, a market measure of risk, were tested. Prior studies, conducted by De Meuse et al. (1994), Paleari and Redondi (2005), Rowe (2005) and Karaibrahimoğlu (2010), have shown that beta is a suitable measure in assessing the impact of a company's strategic action. The impact of the CRR disclosure, on a sample of 69 JSE listed companies, were shown to have a statistical impact upon the Beta of the companies, indicating that the market assimilates CRR information into their risk measure of an equity (Marcia and Maroun, 2012, Solomon, 2011). Finally, the research by de Klerk and de Villiers (2012) investigated how CRR impacts the value relevance – a topic discussed in more detail below.

2.4. VALUE RELEVANCE

The topic of value relevance is primarily concerned with the empirical relation between accounting information and stock market value of an equity (Holthausen and Watts, 2001). The basic premise for value relevance, being the primal link between accounting information alone and stock market value, has been explored in depth (for example Ali and Hwang, 1999, Holthausen and Watts, 2001). As accounting standards attempt to move away from book value and align more towards a system of fair value (a more market based measure), the value relevance of accounting information alone, as shown by the research of Ali and Hwang (1999), has increased. In addition, a longitudinal study by Collins et al. (1997) investigated the changes in value relevance research. The aforementioned study has shown an increase in the relevance of earnings and book values when pricing an equity - a finding consistent with that of Ali and Hwang (1999).

Having established the primal link in value relevance studies, namely financial information, additional explanatory power is given to information of a non-financial nature (Ohlson, 1995). As the value of an equity is not perfectly explained by financial information alone, additional factors must come into play when determining the stock price (Lev and Sougiannis, 1996). A study by Lev and Sougiannis (1996) shows that research and development costs, which are not fully capitalised per International Financial Reporting Standards (IFRS), add to the explanatory power of a value relevance model. A similar study, conducted by Aboody and Lev (1998), show the value relevance of software intangible assets on the price of an equity – again, increasing the value relevance through non-financial information. Looking more towards measures of CRR, the value relevance of environmental performance was explored by Hassel et al. (2005) which indicated that the market does take environmental strategy and performance into account when assessing equity investments.

In a South African context the value relevance of shareholder-centric information has been shown to outweigh that of stakeholder-centric information (Ntim et al., 2012). Following on from this finding, a study conducted by Makiwane and Padia (2011) explored non-financial disclosures, ultimately assessing how CRR has developed from 2009 to 2011. In accession to the assessment, the study created a metric that can reliably measure CRR

and the changes thereto. As discussed further in Section 3.1.1.3., the metric incorporates both international and South African measures, however the related value relevance of these disclosures remains unexplored.

Quite relevant to the study at hand, the insightful research by de Klerk and de Villiers (2012) explores the value relevance of CRR disclosure. This study, based on the KPMG International Survey on Corporate Responsible Reporting 2008, found that there is greater predictive power in a model that includes both financial and CRR information when compared to a purely financial one. The study assessed the value relevance of CRR on 100 of South Africa's listed companies. Similar to the research presented in this paper, a modified Ohlson model was used to determine if CRR is a significant predictor of an equities market value. The financial data required to build the model used by de Klerk and de Villiers (2012) was obtained from the McGregor BFA database, whereas the CRR information was obtained from the KPMG survey. Discussed in more depth within the methodology (see Section 3.1.1.2.), the KPMG survey lacks uniquely South African metrics. In addition, the study conducted by de Klerk and de Villiers (2012), although excellent in its own respect, does not include data validity tests on the assumptions of the model, leaving it open to invalidity through assumption violation. Specifically, the modified Ohlson model is a valid tool in predictive studies but the conformity of the data and the assumptions to the model need to be satisfied for the output from the model to be considered reliable. This leaves a grey area in the value relevance debate of CRR in South Africa as, although known to impact value, the explanatory power of the relationship may be skewed based on assumption violation or through the metric used to measure CRR.

Based on the discussion presented above, this research shall test two hypotheses. The first assessing whether there is value relevance associated with South African CRR metrics, as shown in *Hypothesis 1* below.

Hypothesis 1: CRR is value relevant in a South African context.

Secondly, the change in value relevance between purely financial information and that of both financial and CRR shall be statistically tested for significance, after satisfying the assumptions of the regression models, hence *Hypothesis 2,* which is presented below, is derived.

Hypothesis 2: CRR is significantly associated with market value of an equity.

3. METHODOLOGY

The following data sets and testing model, as discussed in more detail below, are used to determine the effects of CRR on a company's share price. The methodology is broken up into two parts – Section 3.1. discusses the data sets used within the model and Section 3.2. discusses the testing m, including all assumptions of the model and their respective testing.

3.1. DATA

To test the impact of CRR on the share price of a company, two data sets are needed, one that measures the level of CRR and another to measure the share price and provide financial information about South African companies. Finally, the data sets chosen were examined for their validity in the study.

3.1.1. CORPORATE RESPONSIBLE REPORTING DATA

To measure the impact of CRR, three potential data sets existed, the first being the Johannesburg Stock Exchange's (JSE) Socially Responsible Investment (SRI) Index (JSE, 2004 to 2012), the second being the KPMG International Survey on Corporate Responsible Reporting 2008 (KPMG, 2008) and the final one being the normative rating by Makiwane and Padia (2011). The three CRR data sets are discussed in greater depth below.

3.1.1.1. JOHANNESBURG STOCK EXCHANGE: SOCIALLY RESPONSIBLE INVESTING INDEX

Commencing in 2004, the JSE have published the Socially Responsible Investment (SRI) Index, a rating process for companies which are required to, or who have opted to comply with, the provisions of King III (JSE, 2004 to 2012). The JSE, in addition to an advisory committee of independent experts, assessed the companies on three broad categories: (1) environmental, (2) societal and (3) governance and related sustainability concerns. These components of triple bottom line reporting are used to rank the companies, with an underlying focus on the implementation of each within the company's policy and strategy, management and performance and reporting (JSE, 2011).

Although a respected index, the data available from the SRI index is of limited use in this study. The exact processes used to evaluate the companies, detailed score sheets, expert commentary and validity-reliability safeguards are not disclosed. In addition, the sub-categories within the three broad assessment categories are not discussed, the weighting of each category, scale and range of scores are also not freely available.

Upon request, the author was denied the additional information discussed above. In summary, only two ranks are shown by the SRI: 'Top Performers' and 'Consistently Top Performers' (JSE, 2004 to 2012) which, in the context of this study, are of limited use.

3.1.1.2. KPMG INTERNATIONAL SURVEY ON CORPORATE RESPONSIBLE REPORTING 2008

The KPMG International Survey on Corporate Responsible Reporting 2008 is a comprehensive study on CRR, compiled by a reliable and independent source. The report assimilates relevant CSR information from 2007 to 2008 from 100 of the largest companies in each of the 22 countries included in the study - South Africa being one. The data was compiled from information found in annual reports, standalone CSR reports and the companies websites (KPMG, 2008). The report discusses two metrics which were used to measure the level of CRR, one a composite measure and the other a dummy variable, which are discussed in greater depth below.

The first measure, being the composite measure, was used to score the company's compliance in terms of the Global Reporting Initiative (GRI) criteria. The composite measure adds one point for each of the possible 87 disclosure areas under the broad categories of climate change, supply chain management, governance, overall environmental strategy, stakeholder engagement reporting and corporate management systems. The survey assigned the point for each disclosure area that the company complied, with and a nil point for any areas not met in totality. The second measure is a dummy variable, which indicates whether the reporting entity uses the GRI guidelines for their CRR (de Klerk and de Villiers, 2012, KPMG, 2008).

Although, arguably, the most comprehensive global report on CRR, the KPMG database was of limited use in this study. The availability of in-depth technical information around the nature of the questionnaire used, the controls to mitigate the bias of the companies completing the survey and the details of the companies surveyed was not available - largely invalidating the use of the data. Upon request for more technical information, the author was denied access by KPMG. In addition, when contacting an author who has previously used the KPMG data, access was again restricted with the proviso of co-authoring the work to gain access to the data. In accession to the above criticism, the KPMG (2008) survey does not take into account uniquely South African information, such as King-III, making the analysis derived from the study lack relevance in the South African context (KPMG, 2008).

3.1.1.3. NORMATIVE METRIC

The journal article presented by Makiwane and Padia (2011) provides a unique view on CSR and CRR, tailored specifically for South Africa. The basis for the rating system was derived from three sources; (1) the King-III report, (2) the Global Reporting Initiative (2011) and (3) the Researcher's own research indicators. The three sources were compiled from information available at the end of the company's financial years, each falling within the 2010 to 2011 years.

The study undertaken by Makiwane and Padia (2011) involved rating 92 JSE listed companies on their compliance with 14 broad categories and 111 identified sub-categories of CRR. These are discussed in greater depth below.

The 14 broad categories used in the *normative metric* are: ethical leadership and corporate citizenship, boards and directors, audit committee, risk management committee, remuneration committee, nomination committee, internal audit function, the governance of information technology, compliance with laws, rules, codes and standards, governing stakeholder relationships, integrated reporting, sustainability – economic, sustainability – social, sustainability – environmental and other indicators. Included in the abovementioned categories are 111 sub-categories. These sub-categories, including the reference from where the rating was derived, are available in *Appendix A: Standard corporate social responsibility rating criteria.*

The compliance levels used are summarised in the table below.

Table 1: Compliance level, percentage and score for CSR activities[1]

Compliance level	Percentage compliance range	Numerical compliance score
No compliance	0%	1
Little detail provided	0% to 25%	2
Some detail provided	25% to 50%	3
More detailed provided	50% to 75%	4
Much detail provided	75% to 100%	5

Although the scale developed by Makiwane and Padia (2011) is subjective, as discussed in Section 1.5., it is appropriate for the purpose of this study. To mitigate the abovementioned threat to external independence, the research presented by Makiwane and Padia (2011) has been peer reviewed and, in addition, the author examined each of the compliance levels and categories to ensure that they were informed by the researcher's understanding of the prior literature (Creswell, 2013). The accessibility to the metric, paired with the researcher being granted access to all the data and commentary, allows detailed analysis to be drawn from the study. Furthermore, the metric includes South African measures, namely the King III code, into the assessment of CRR.

3.1.1.4. CHOICE OF CRR DATABASE

Based on the discussion of the three potential CRR databases presented above, the research in this paper is based on the *normative metric* (see Section 3.1.1.3.). As access to both the JSE's SRI Index and the KPMG International Survey on Corporate Responsible Reporting 2008 were denied, the usefulness of these datasets

[1] Reproduced with the permission of Makiwane and Padia.

was heavily impeded. In accession, the *normative metric* incorporates South African measures, which hold high relevance for the study at hand. Therefore it appears that this metric provide the greatest benefit in the South African context.

3.1.2. SHARE PRICE AND FINANCIAL INFORMATION DATA

The second data set, used to collect financial data from a sample of South African companies, was obtained through the McGregor BFA database. This database houses all relevant financial information, namely the financial statements and share price information of JSE listed companies, which were needed for the value relevance analysis discussed in greater detail below.

3.1.3. VALIDITY OF THE DATABASES

The databases used in this study are discussed in more technical detail below, increasing its reliability and validity for the study at hand.

3.1.3.1. SAMPLE SELECTION

Due to high stratification of industries represented on the JSE, care was taken to include a representative portion of each industry into the selection process. As a result, the entire population was split into their respective industries and, from these sub-groups, a number of companies were selected up until the 92 samples were chosen (Makiwane and Padia, 2011).

After the 92 companies were randomly selected, an additional test was performed. Each company was assessed, per the McGregor BFA database, for their individual availability of financial and non-financial information required by Makiwane and Padia (2011). If any data was unavailable, another company from the same sector was randomly selected (Makiwane and Padia, 2011).

Care was taken in the sample selection to preserve the weighting of the companies based on their original proportion in the population. Namely, the size of the industries represented in the sample approximates the size of the respective population in the JSE.

The process described above adds validity to the study at hand as, based on a representative sample, the findings of this study can be generalised across the population.

3.1.3.2. SAMPLE SIZE

Drawn from the *normative metric*, the original sample size used in this research was 92 companies out of the 401 companies listed on the JSE at the date of publication. Following the approach recommended by Leedy and Ormrod (2001), where a population has less than 100 observations it is recommended to take the entire population. Conversely, when the population is over 100 observations a sample may be determined, which, in the case of this research, led to a sample of 92 companies being selected (Makiwane and Padia, 2011). After performing data verification, namely testing whether information existed for all of the 92 companies, the sample was reduced to 82 companies.

For the purposes of this study, the number of companies selected is consistent with the sample size used in other studies, namely Hassel et al. (2005) and de Klerk and de Villiers (2012). In addition, the number of companies included in the sample allows inferential statistics to be performed and a p-value to be determined (Colin Cameron and Windmeijer, 1997).

3.2. TESTING MODEL

To test the value relevance of CRR disclosure on the share price of a company, a model capable of variable discriminating was needed. In numerous prior studies (for example de Klerk and de Villiers, 2012, Hassel et al., 2005, Lo and Lys, 2000, Ota, 2002) discrimination between random noise and a specific factors, namely CRR disclosure in this study, has been successfully shown through the use of Ohlson's (1995) model, modified for the specific phenomenon tested. The intricacies of both the original Ohlson model, as well as the modified model, are discussed in greater depth below.

3.2.1. THE ORIGINAL OHLSON MODEL

The Ohlson (1995) model is a valuation technique based on accounting information, namely the book value of equity and future abnormal earnings, which is capable of incorporating non-accounting information into the valuation (Lundholm, 1995, Ohlson, 1995). Similar to the model proposed by Gordon (1959), where equity prices are a function of future dividends, Ohlson uses abnormal earnings, being current period earnings less a capital charge for generating these earnings, in place of dividends (Gordon, 1959, Ohlson, 1995). The replacement of dividends with abnormal earnings is an accepted measure, as discussed in further detail by Peasnell (1982) and Edwards and Bell (1961). The model, in its most simple form, attempts to show a relationship between the book value of equity, being book value of assets less book value of liabilities, and the present value of future abnormal earnings, to the market value of a firm's equity (Ohlson, 1995).

The Ohlson (1995) valuation model has three underlying assumptions which are highlighted below.

(i) The present value of future abnormal earnings, initially defined by Ohlson as dividends and subsequently redefined, discounted at a risk free rate (the assumption of risk neutrality is not contentious and, if the need arises, can be incorporated into the model through the use of expected values or in an adjustment of the discount rate) can be used to determine the value of a share. This is mathematically expressed below.

Equation 1:

$$MVE_t = \sum_{\tau=1}^{\infty} (1+r)^{-\tau}\ E_t[D_{t+r}]$$

Where MVE_t is the market value of the firm's equity at time *t*, $E_t[D_{t+\tau}]$ is the expected dividend at time *t+τ* and *r* is a constant discount rate.

(ii) The use of regular owners' equity accounting applies. The crux being that transactions with equity participants are excluded from profit and loss, thus excluded from earnings. It therefore follows that there is a relationship between dividends and the book value of equity – a decrease in assets, without a corresponding decreasing in earnings. This relationship is mathematically expressed below.

Equation 2:

$$BV_t = BV_{t-1} + NI_t - D_t$$

Namely the book value of the firm's equity at time *t*, BV_t, is a function of the book value of equity at time *t-1,* BV_{t-1} (the opening balance of the firm's equity), adjusted for the net income earned in period *t*, NI_t, less dividends declared in period *t*, D_t.

(iii) Abnormal earnings behave in a stochastic time-series manner, which is linear in nature. Other information (see Section 3.2.2.) can be used to better explain the scalar nature of the abnormal earnings. This phenomenon is mathematically expressed in two parts below.

Equation 3:

$$AE_{t+1} = \omega AE_t + v_1 + \varepsilon_{1,t+1}$$

Where AE_{t+1} represents the time series process of abnormal earnings at time *t+1,* which is a function of the abnormal earnings at time *t*, AE_t, and additional value relevant information, v_1, as well as an unobserved random variable or error term, $\varepsilon_{1,t+1}$. Finally ω acts as a statistical parameter for AE_t.

Equation 4:

$$V_{t+1} = \gamma v_1 + \varepsilon_{2,t+1}$$

Where the value relevant information at time *t+1,* V_{t+1}, is a function of the value relevant information at time *t,* v_1, as well as an unobserved random variable or error term at time *t+1*, $\varepsilon_{2,t+1}$. Finally γ acts as a statistical parameter for v_1.

Based on the three abovementioned assumptions, Ohlson (1995) derives the following model.

Equation 5:

$$MV_t = BV_t + \alpha_1 AE_t + \alpha_2 v_t$$

where

$$\alpha_1 = \frac{\omega}{(1+r-\omega)} \; and \; \alpha_2 = \frac{1+r}{(1+r-\omega)(1+r-\gamma)}$$

Equation 5 expresses Ohlsons valuation model, which is the basis for the model used in this study. For clarity sake MV_t, being the market value of a firms equity at time *t,* is equal to the book value of the firm's equity at time *t*, BV_t, added to the abnormal earnings over time *t*, AE_t, as well as to other value relevant information over time *t*, v_t.

3.2.2. THE MODIFIED OHLSON MODEL

For the purposes of this study, the model proposed by Ohlson (1995), as discussed above, requires an estimation of the required rate of return, which is needed to calculate abnormal earnings. Due to data constraints, there is a lack of consensus over how to calculate the required rate of return needed in the model. As a result, *Equation 6* is restated in terms of cum-dividends market value of a share, opening book value of equity, earnings and other information (Hassel et al., 2005). In addition, linear coefficients are added into the model. The aforementioned approach is consistent with that of Collins et al. (1999) and Lin and Walker (2000), and results in the Ohlson (1995) model being restated as shown in *Equation 6.*

Equation 6:

$$MV_t + DI_t = \beta_0 + \beta_1 BV_{t-1} + \beta_2 NI_t + \beta_3 v_t + \varepsilon_t$$

Equation 6 shows that cum-dividends market value of a share, $MV_t + DI_t$, is equal to opening book value of equity, BV_{t-1}, net income over period *t*, NI_t, value relevant information during time *t*, v_t, and finally an unobserved element or error term, ε_t.

The second modification to the Ohlson (1995) model is a measure to control for the size of the companies in the sample. To make this modification, all variables, bar the value relevant non-financial information, are deflated by the opening book value of the firm's equity, BV_{t-1}. This is consistent with the findings of both

Easton (1999) and Kothari and Zimmerman (1995), in which they found the Ohlson (1995) model, when based on a price, as in this study, to be susceptible to scaling issues. This modification is expressed below.

Equation 7:

$$\frac{MV_t + DI_t}{BV_{t-1}} = \beta_0 \frac{1}{BV_{t-1}} + \beta_1 + \beta_2 \frac{NI_t}{BV_{t-1}} + \beta_3 v_t + \varepsilon_t$$

The final adjustment made to the Ohlson (1995) model was to incorporate a specific measure for value relevant information in place of the generic v_t. As the impact of CRR upon the value of a company's equity price is studied, v_t is replaced by the variable CRR_t, denoting the value relevance of CRR on an equity's value at time *t*.

Therefore the model used in this study is finally expressed in *Equation 8* below.

***Equation 8*:**

$$\frac{MV_t + DI_t}{BV_{t-1}} = \beta_0 \frac{1}{BV_{t-1}} + \beta_1 + \beta_2 \frac{NI_t}{BV_{t-1}} + \beta_3 CRR_t + \varepsilon_t$$

The final model, shown in *Equation 8,* represents cum-dividend market value of an equity, $MV_t + DI_t$, as a linear function of the opening balance of a the firm's equity, $\frac{1}{BV_{t-1}}$, and net income at time t, $\frac{NI_t}{BV_{t-1}}$. These variables have been deflated by opening book value of equity to control for size, as per the findings of Easton (1999) and Kothari and Zimmerman (1995). In continuance, the model includes other value relevant information, represented by CRR disclosure at time *t,* CRR_t, and a random error term, ε_t.

3.2.3. TEST METHODOLOGY

The methodology to test the perceived relationship is split into three parts – (1) the modified Ohlson model (see Section 3.2.3.1.), (2) a discussion of the regression model (see Section 3.2.3.2.) and, finally, (3) the assumptions of the regression model (see Section 3.2.3.3.).

3.2.3.1 THE USE OF THE MODIFIED OHLSON MODEL

The premise of the Ohlson model is to compare the degree of correlation between financial information alone and that of both financial and non-financial information, to the price of an equity. This process is followed by using the modified Ohlson model expressed in *Equation 8.* Value relevance is therefore determined in a three

step process, similar to that of Hassel et al. (2005) and de Klerk and de Villiers (2012), described in detail below.

VALUE RELEVANCE ASSESSMENT

The first step in the value relevance assessment is to regress purely financial information against the cum-dividends market value of a firm's equity. This process is done using *Equation 9,* identical to *Equation 8* in most regards, bar the exclusion of relevant non-financial information (CRR), below.

Equation 9:

$$\frac{MV_t + DI_t}{BV_{t-1}} = \beta_0 \frac{1}{BV_{t-1}} + \beta_1 + \beta_2 \frac{NI_t}{BV_{t-1}} + \varepsilon_t$$

The data required to perform the valuation, namely cum-dividend market value, book value of equity and net income, were available through the McGregor BFA database. Using the aforementioned data, a regression of the financial information alone yields a correlation coefficient (R), being a statistical measure of linear dependency. The square of the correlation coefficient (R^2), being the coefficient of determination, is then used to determine how well the observed outcome is explained by the model – an important factor in predictive studies, such as value relevance research.

The second step of the value relevance assessment involves regressing both financial and non-financial information. Following a process similar to that in the first step, *Equation 8* is used to determine the correlation coefficient and coefficient of determination of both financial and non-financial information. To perform the regression two sets of data are required, one being financial and the other being relevant CRR information.

The requirements for the financial data are identical to that followed in the first step, namely all available from the McGregor BFA database. The second data set, being the CRR information, is drawn from the research by Makiwane and Padia (2011). Using both these data sets the regression was repeated on the 82 companies, yielding another set of correlation coefficients and coefficient of determinations, representing both financial and CRR information.

The final stage in determining whether there is value relevance in CRR involves comparing the coefficient of determination derived from the financial information alone, step one, and that derived from both financial and CRR information, step two. As the coefficient of determination describes the explanatory strength (value in prediction) of the variables, the information with the most value relevance will be that with the highest coefficient of determination (Colin Cameron and Windmeijer, 1997).

3.2.3.2. THE REGRESSION MODEL

As per the discussion surrounding the Ohlson model, a regression analysis is performed to show the value relevance of CRR on the price of an equity. The following section discusses the regression technique used, starting off with simple linear regression and moving onto a discussion of hierarchical linear regression – the technique used in this study. The final section (see Section 3.2.3.3.) highlights the underlying assumptions of regression analysis.

LINEAR REGRESSION

Simple linear regression, or least square regression, is a statistical technique used in predictive studies which aim to show a relationship between an independent variable and a dependent one. Simplistically, the model aims to produce a linear function which minimises the sum of the squared deviations between the variables (Chatterjee and Hadi, 2006). The mathematical form of the model is shown in *Equation 10* below.

Equation 10:

$$Y_i = \beta_0 + \beta_1 x_i + \varepsilon_i$$

Where Y_i is the dependent variable, x_i is the independent variable and the beta coefficients (β_0 and β_1) are non-random, but unknown quantities. The error term, ε_i, is assumed to be statistically independent with a mean of zero and an unknown standard deviation (Chatterjee and Hadi, 2006, Kenney and Keeping, 1962).

As seen in *Equation 10*, simple linear regression can only show the relationship between the independent variable and one dependent variable. Consistent with the studies conducted by de Klerk and de Villiers (2012), de Klerk and de Villiers (2013) and Hassel et al. (2005), as well as taking into account the limitations of the regression model, simple linear regression cannot be used in this study (Chatterjee and Hadi, 2006, Kenney and Keeping, 1962).

Similar to simple linear regression discussed above, multiple regression analysis is used to predict the impact of multiple variables, being the predictor variables, on the dependent variable. The relationship between the predictor variable and the dependent variables are then assessed to determine which of the predictors' best explains the dependent variable (Draper et al., 1966). The mathematical model for the multiple regression is shown below.

Equation 11:

$$Y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} + \ldots + \beta_k x_{ki} + \varepsilon_i$$

Where Y_i is the dependent variable, the predictor variables (x_{1i}, x_{2i}, x_{3i} and x_{ki}) and the beta coefficients (β_0, β_1, β_2, β_3 and β_k) are non-random but unknown quantities. The error term, ε_i, is assumed to be statistically independent with a mean of zero and an unknown standard deviation (Draper et al., 1966). In addition, the error terms, included as additional independent terms, are not expected to line up in a perverse way and, thus, creating deceptive results (Chatterjee and Hadi, 2006, Kenney and Keeping, 1962).

As seen in *Equation 11*, multiple regression analysis is capable of including more predictors than that of simple linear regression, making the model more suited towards the study at hand. More specifically, as seen in *Equation 8,* the modified Ohlson model includes three predictive variables – opening book value of equity, net income through the period and CRR information. Hence, the base correlation between the predictors and the dependent variable will be established using multiple regression analysis (Draper et al., 1966). A notable limitation of the model, however, prevents the significance of the CRR information being established through the multiple regression analysis presented above (Draper et al., 1966).

Using the same principles as multiple regression analysis, hierarchical regression differs slightly in that the input of the predictors is staggered to assess the additional explanatory power of the independent variable in the model. The two stage process involves, firstly, assessing the predictive power of the base inputs, in this study the opening book value of equity and net income through the period, through the yielded R^2. The second step involves repeating the regression analysis, including into the assessment the variable to be tested for significance – in this study, CRR information. The change in the explanatory power, assessed through an incremental change in R^2, is determined through the Fisher-Snedecor distributional (F-stat) change which yields a significance value for the R^2 change (Draper et al., 1966, Kenney and Keeping, 1962).

Therefore, based on the discussion above, it would appear that hierarchical linear regression is the most suited testing model for the study at hand.

3.2.3.3. ASSUMPTIONS OF THE REGRESSION MODEL

The following section discusses the four main assumptions, being those most sensitive to violation, pertaining to linear regression – (1) the normal distribution of the variables, (2) the assumption of a linear relationship between the predictive variables and the dependent variables, (3) the independent variable is unrelated to the error term and, finally, (4) that there is homoscedasticity of the variances. The assumptions are discussed in more detail below.

NORMAL DISTRIBUTION OF THE VARIABLES

To maximise the reliability of the regression analysis, the data sets input into the model should aim to approximate normal distribution (Colin Cameron and Windmeijer, 1997). To increase the robustness of this research, the sample of JSE listed companies used in this study have been tested for normality using two goodness of fit tests: (1) Kolmogorov-Smirnov and (2) Shapiro-Wilk.

Following prior research (for example de Klerk and de Villiers, 2012, Hassel et al., 2005) and statistical best practices (as described by Colin Cameron and Windmeijer, 1997, Kenney and Keeping, 1962, Stephens, 1974) the data used within the study has been tested for normality in (1) the original form, (2) the square rooted form and (3) the logarithmic form. These data transformations are performed to each element in every data set, assessing which transformation best achieves a normal distribution on a consistent basis (Colin Cameron and Windmeijer, 1997). The three data transformations are shown below, followed by a discussion of the results and the selection of the data.

ORIGINAL FORM

The following results stem from the Kolmogorov-Smirnov and Shapiro-Wilk tests, which were applied to the original data collected.

Table 2: Tests of normality on original data

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
MVShareEoY	.300	82	.000	.576	82	.000
BVEquityBoY	.362	82	.000	.429	82	.000
NetIncome	.342	82	.000	.453	82	.000
CRRScore	.098	82	.048	.950	82	.003

Where MVShareEoY represents the market value of shares at the end of the year, BVEquityBoY represents the opening book value of equity, NetIncome represents the net income earned through the period and, finally, CRRScore represents the CRR score based on the *normative metric*.

SQUARE ROOT FORM

The following results stem from the application of the Kolmogorov-Smirnov and Shapiro-Wilk tests to the original data after all elements in each set were square rooted (Stephens, 1974).

Table 3: Tests of normality on original data square rooted

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
SqrtMvShareEoY	.157	82	.000	.841	82	.000
SqrtBVEquityBoY	.221	82	.000	.692	82	.000
SqrtNetIncome	.221	82	.000	.717	82	.000
SqrtCRRScore	.110	82	.016	.936	82	.000

Where the variables SqrtMvShareEoY, SqrtBVEquityBoY, SqrtNetIncome and SqrtCRRScore represent the square root of each element within the variable sets MVShareEoY, BVEquityBoY, NetIncome and CRRScore respectively.

LOGARITHMIC FORM

The following results stem from the application of the Kolmogorov-Smirnov and Shapiro-Wilk tests to the original data after all elements in each set were put to a logarithmic function with a base of 10 (Stephens, 1974).

Table 4: Tests of normality on the logarithm of the original data to base 10

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Log10ShareEoY	.082	82	.200*	.976	82	.130
Log10BVEquityBoY	.055	82	.200*	.990	82	.792
Log10NetIncome	.059	82	.200*	.989	82	.707
Log10CRRScore	.120	82	.005	.917	82	.000

Where the variables Log10MvShareEoY, Log10BVEquityBoY, Log10NetIncome and Log10CRRScore represent the logarithmic function to a base 10 of each element within the variables sets MVShareEoY, BVEquityBoY, NetIncome and CRRScore respectively.

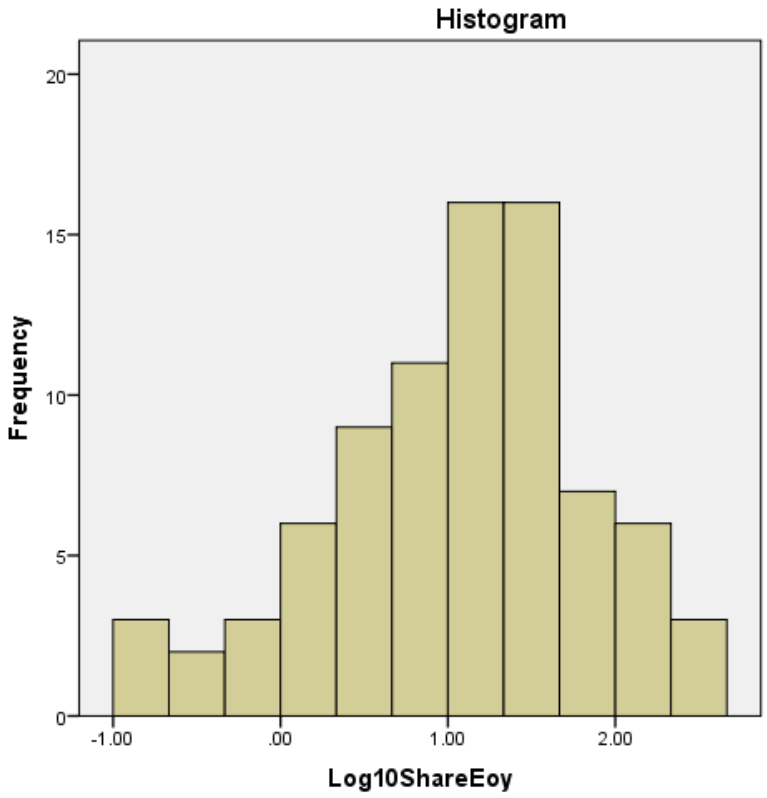
The critical significance scores of the three transformations above, each assessed using both the Kolmogorov-Smirnov and Shapiro-Wilk tests, are summarised in *Table 5* below.

Table 5: Summarised significance scores

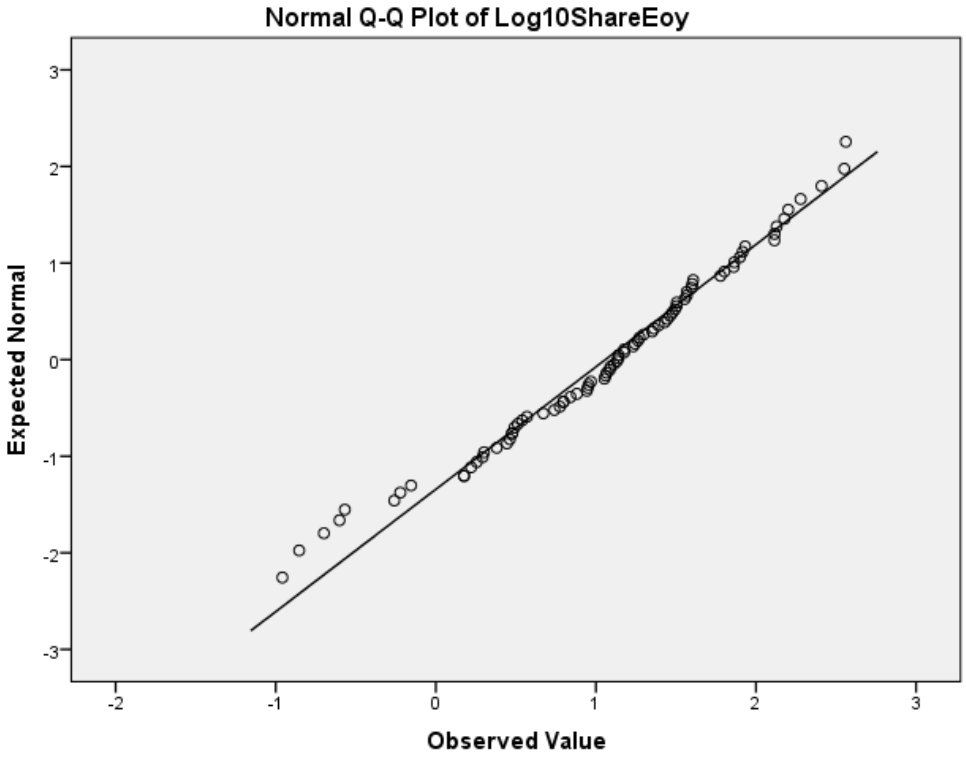
Tests of Normality						
	Kolmogorov-Smirnov Significance			Shapiro-Wilk Significance		
	Original	Square Root	Logarithm to base 10	Original	Square Root	Logarithm to base 10
ShareEoY	.000	.000	.200*	.000	.000	.130
BVEquityBoY	.000	.000	.200*	.000	.000	.792
NetIncome	.000	.000	.200*	.000	.000	.707
CRRScore	.048	.016	.005	.003	.000	.000

As indicated in *Table 5,* the significance scores are maximised under both the Kolmogorov-Smirnov and Shapiro-Wilk tests when the data is transformed to a logarithm of base 10. Shown below are the histograms and normal Q-Q plot for each of the logarithmic transformations, namely: Log10ShareEoY, Log10BVEquityBoY, Log10NetIncome and finally Log10CRRScore.

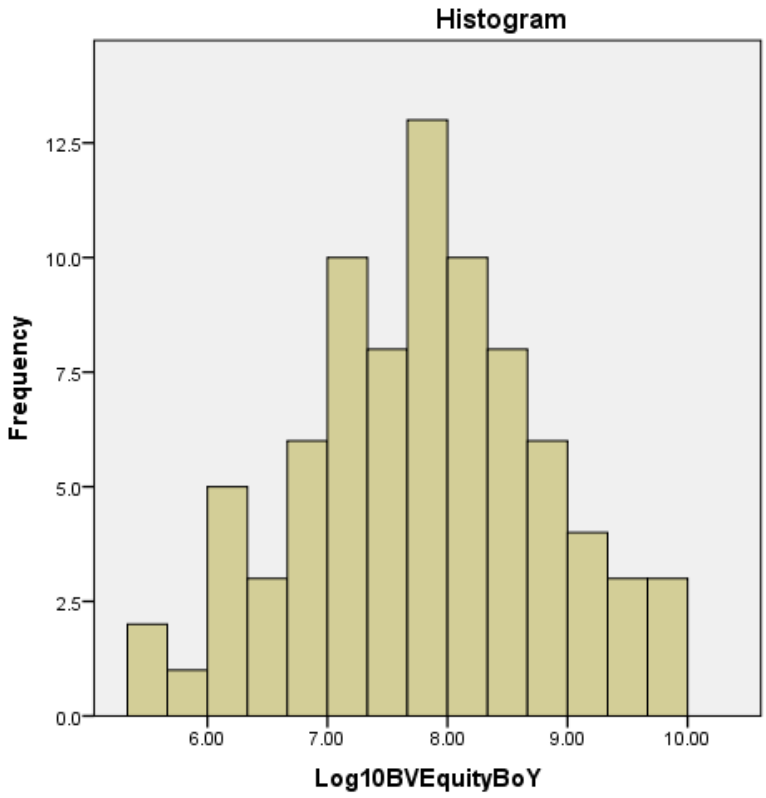
Histogram 1: Log10ShareEoY



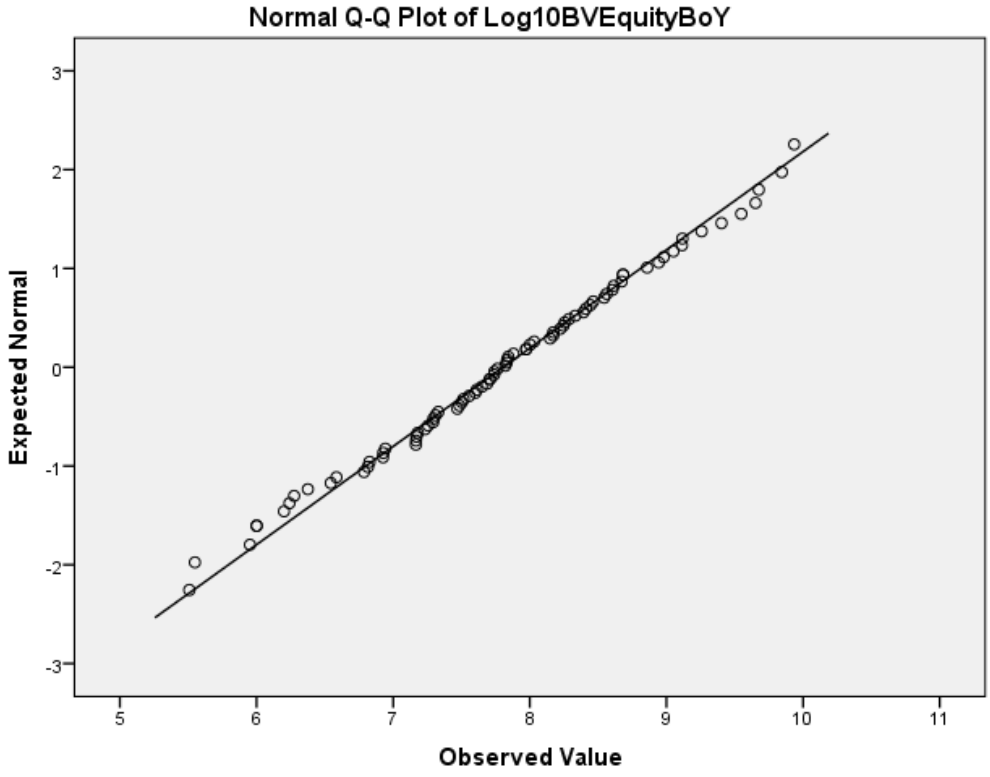
Normal Q-Q plot 1: Log10ShareEoY



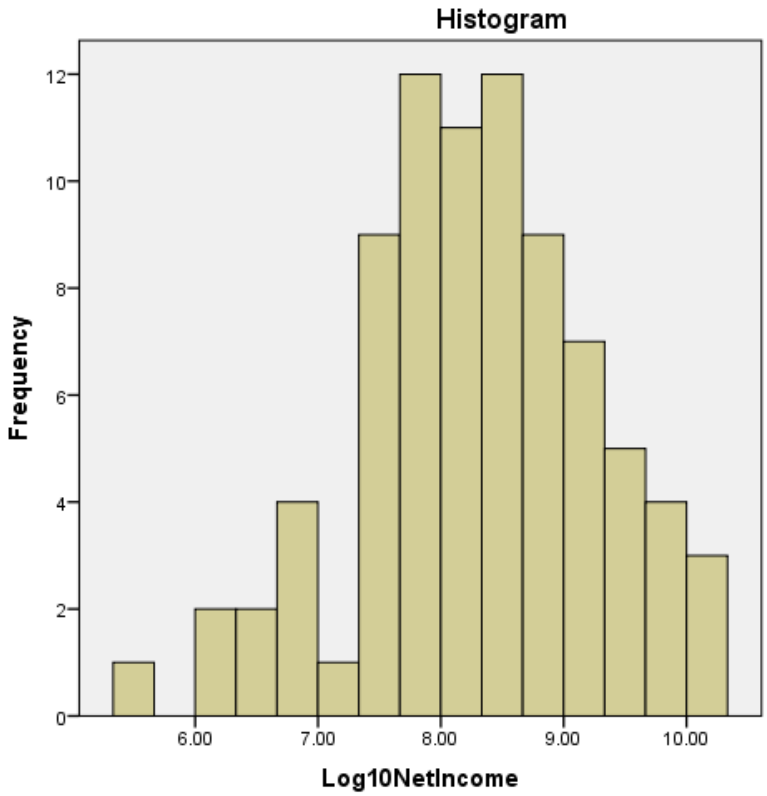
Histogram 2: Log10BVEquityBoY



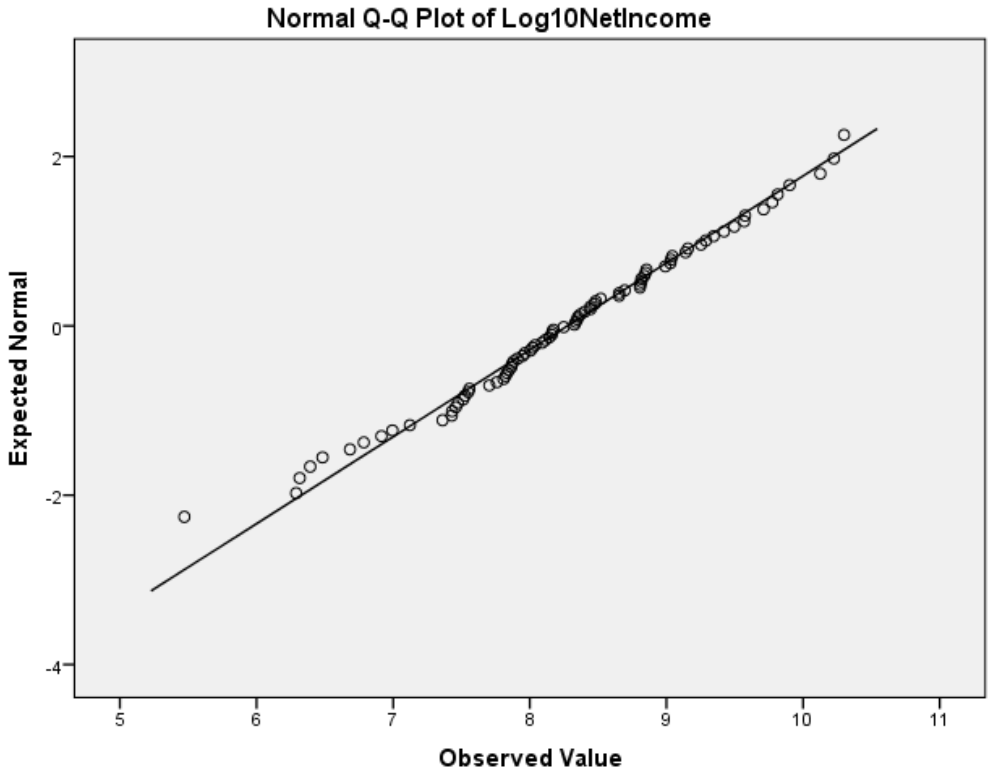
Normal Q-Q plot 2: Log10BVEquityBoY



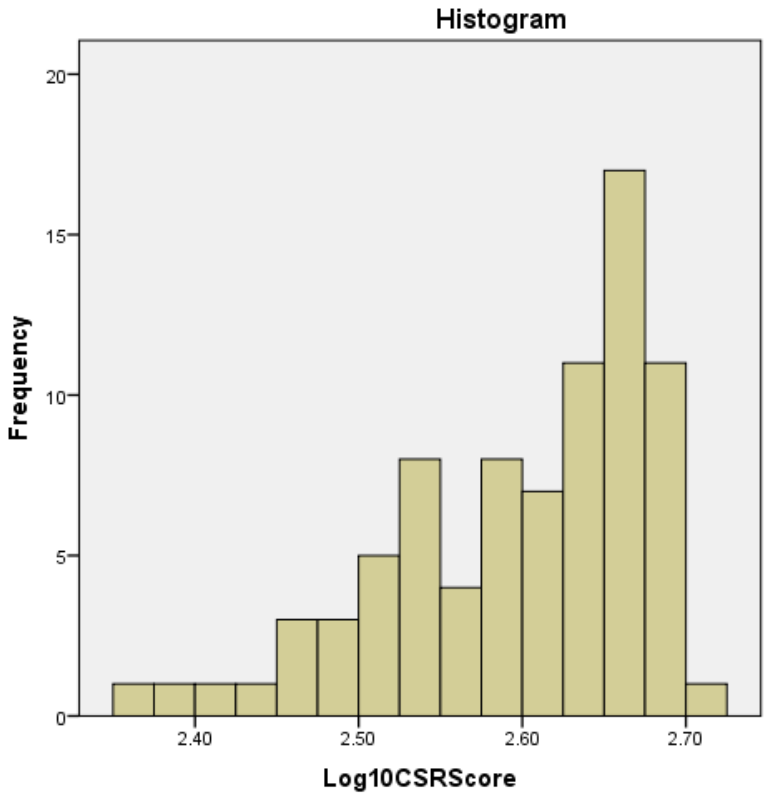
Histogram 3: Log10NetIncome



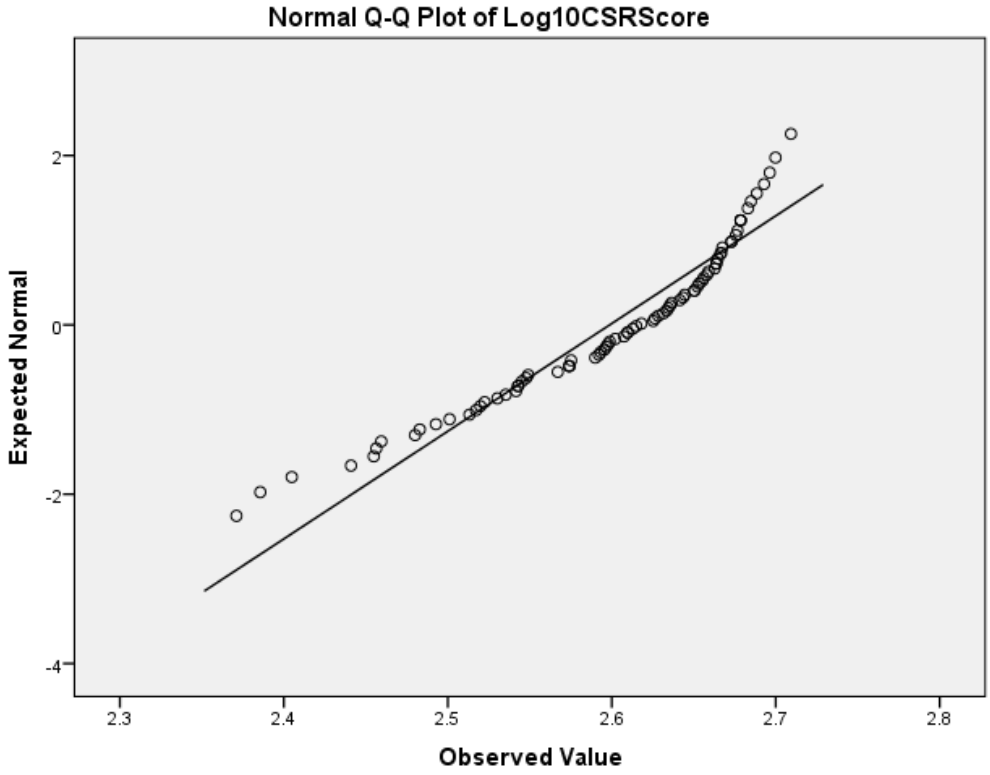
Normal Q-Q plot 3: Log10NetIncome



Histogram 4: Log10CRRScore



Normal Q-Q plot 4: Log10CRRScore



FINDINGS FROM THE NORMALITY TESTING

As indicated in the results displayed above, normality is best achieved in the variables logarithmic form to a base of 10. Consistent with the findings of Stephens (1974), normality should not be assessed purely on statistical tests but used in conjunction with standard visual techniques, based on a frequency histogram. Stephens (1974) further indicated that the use of the Kolmogorov-Smirnov tests for normality is antiquated, not holding as much validity as the Shapiro-Wilk test. As a result the significance scores based on the Shapiro-Wilk test are used, in addition to visual techniques, as a measure of goodness of fit.

Two of the four sets of data, namely Log10BVEquityBoY and Log10NetIncome, show strong form normality with significances of 0.792 and 0.707 respectively. In addition to the significance score, the histograms of the two data sets show similarities to that of a standard normal distribution, as seen in *Histogram 2* and *3* and *Normal Q-Q plot 2* and *3.*

The remaining two data sets, Log10ShareEoY and Log10CRRScore, indicate a respective 'weak' (significance of 0.130) and 'no conformity' (significance of 0.000) to normality based on the Shapiro-Wilk tests. Based on the histographic layouts of both Log10ShareEoY and Log10CRRScore, it would appear that normality is achieved but with a higher inlaid skewness. Both Stephens (1974) and Colin Cameron and Windmeijer (1997) discuss the impact of skewness on a goodness of fit test and conclude that skewness severely impacts the Shapiro-Wilk significance test. In addition, Stephens (1974) explains that a skewed distribution does not significantly affect the validity of a regression model. Therefore, it appears that the two variables, Log10ShareEoY and Log10CRRScore, each fall into the category describes by Stephens (1974) and Colin Cameron and Windmeijer (1997) with a skewness of -0.472 and -0.963 respectably.

In conclusion to this section, it appears that the four variable sets, Log10BVEquityBoY, Log10ShareEoY, Log10NetIncome and Log10CRRScore, satisfy the normality criteria for the regression model.

LINEAR RELATIONSHIP BETWEEN THE PREDICTIVE VARIABLES AND DEPENDENT VARIABLES

As previously discussed, tests of value relevance assume a linear relationship between the predictor variables and the dependent variable (Ohlson, 1995). Specifically applied to the study at hand, there is an assumed linear relationship between the cum dividends value of an equity and the predictor variables; opening book value of equity, net income over the period and CRR information.

To test the assumed linearity discussed above, a bivariate analysis, based on a Spearman's rank correlation coefficient, was performed. A discussion of the Spearman's rank correlation coefficient test, the underlying assumptions of the test, the application of the test to the four variables analysed in this research and, finally, a discussion of the results follow.

THE SPEARMAN'S RANK CORRELATION COEFFICIENT TEST

The Spearman's rank correlation coefficient is a non-parametric statistical technique, which assesses the dependency of two variables. Unlike ordinary correlative statistics, the Spearman's rho assesses dependency based on a monotonic relationship between the variables - a +1 indicating a perfectly positive correlation, a -1 indicating a perfectly negative correlation and a 0 indicating no correlation (Savage, 2012, Siegel, 1957). The Spearman's rho equation is expressed below.

Equation 12: Spearman's rho

$$\rho = \frac{\sum_i (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_i (x_i - \bar{x})^2 \sum_i (y_i - \bar{y})^2}}$$

Where ρ is the Spearman's rank correlation coefficient (rho), x_i is the ranking order of the independent variable i, $\bar{x}$ is the mean of the observed independent variables, y_i is the ranking order of the dependent variable i and, finally, $\bar{y}$ is the mean of the observed dependent variables.

In addition to the formula expressed in *Equation 12,* the Spearman's rho calculation requires tied ranks to be assigned an average ranking order. The mathematical expression for the tied ranking value is shown below.

Equation 13: Spearman's rho tied rank assignment

$$\bar{r} = \frac{\sum_n r}{n}$$

Where $\bar{r}$ is the ties rank score, $\sum_n r$ is the sum of the n tied ranks and n is the number of tied ranks.

ASSUMPTIONS OF THE SPEARMAN'S RANK CORRELATION COEFFICIENT TEST

For the Spearman's rank correlation coefficient test to be validly applied, two data assumptions need to be met – (1) ordinality and (2) monotonicity (Siegel, 1957).

ORDINALITY

Ordinality refers to a datasets ability to be ranked, namely that data can be assigned a score based on its relative position within its set. The application of ordinality requires that any result in a test, when compared to other results within that same test, can be assigned a rank differentiating a 'better score 'from a 'worse score' (Savage, 2012, Siegel, 1957). As discussed previously, data with the same numeric scores are assigned a tied rank per the application of *Equation 13*.

The four data sets examined in this research are capable of being distinguished from 'best' to 'worse' based on their inter-set relationship. The method of differentiation is discussed in *Table 6* below.

Table 6: Ordinality discrimination table

	Log10ShareEoY	Log10BVEquityBoY	Log10NetIncome	Log10SCRScore
Best rank (rank of 1)	Highest Rand value share price at year end.	Highest Rand value of equity at the beginning of the year.	Highest Rand value of net income through the financial period.	Highest numeric CRR score per the *normative metric*.
Worst rank (rank of 82)	Lowest Rand value share price at year end.	Lowest Rand value of equity at the beginning of the year.	Lowest Rand value of net income through the financial period.	Lowest numeric CRR score per the *normative metric*.

Therefore, as shown in *Table 6*, all the datasets used within this research are ordinal in nature.

MONOTONICITY

Data conforms to monotonicity when it preserves a given order; namely an order that either decreases, increases or stays the same (Siegel, 1957).

The four data sets used in this study are, unarguably, monotonic as each of the ranking tests would result in the data set following and upward-constant or downward-constant trend. None of the data sets would exhibit a change in directional base, namely moving in an upward trend and then inverting into a downward trend or vice versa.

Therefore the datasets used in this study are monotonic in nature.

APPLICATION OF THE SPEARMAN'S RANK CORRELATION COEFFICIENT TEST

The application of the Spearman's correlation coefficient test on the dependent variable, the cum dividends market value of an equity, and each of the three predictor variables: opening book value of equity, net income over the period and CRR information, yielded the following Spearman's rho's and significance results.

Table 7: Spearman's rho and significance test results

	Correlation coefficient	2-tailed significance
	Log10ShareEoY	Log10ShareEoY
Log10ShareEoY	1.000	-
Log10BVEquityBoY	0.739	0.000
Log10NetIncome	0.660	0.000
Log10SCRScore	0.461	0.000

Based on the correlation coefficients, all the variables tested for monotonic correlation against Log10ShareEoY show a positive correlation - as seen in *Table 7* (the correlation of Log10ShareEoY to itself is of no meaning as a variable is always perfectly correlated to itself). The 2-tailed significance tests for the three variables all yield a score of 0.000 on a significance level of 0.01 - thus all significant.

FINDINGS FROM THE SPEARMAN'S RANK CORRELATION COEFFICIENT TEST

Based on the findings from *Table 7,* it would appear that the three predictor variables, Log10BVEquityBoY, Log10NetIncome and Log10CRRScore, each hold a linear relationship to the dependent variable, Log10ShareEoY, on an individual basis. In addition, this relationship is significant to the ninety-nine percent confidence interval, showing a high statistical significance in the results obtained.

It would therefore appear that the linear relationship, as discussed by Ohlson (1995), does indeed hold true when assessed using a ranking coefficient. This indicates that there is a linear relationship between the monotonic ratings of each of the three predictor variables against that of the dependent variable (Savage, 2012).

INDEPENDENCE OF THE VARIABLES TO THE ERROR TERM

In regression analysis, and increasingly more prevalent in multiple regression analysis, the explanatory power of each predictor variable is at risk of manipulation by an unexplained error variance of another predictor variable. If this is the case, there is an increasing risk of a statistical Type-II error occurring, namely the failure of the model to reject an incorrect null hypothesis (Draper et al., 1966, Kenney and Keeping, 1962).

To mitigate the occurrence of interdependence, the nature of the model is examined for theoretical rigour – namely that the unexplained error terms of one predictor are not attributed to another of the predictor variables in the model (Draper et al., 1966). As seen in the studies performed by Ohlson (1995), Hassel et al. (2005) and de Klerk and de Villiers (2012) the use of these models is accepted as robust, indicating that there is little to no perversion of the error terms expected within this research.

To further test this belief, the Durbin-Watson test is used to show the degree of independence of the error terms (Neter et al., 1996). A discussion of the Durbin-Watson test, the results of the test and a discussion of these results follows.

DURBIN-WATSON TEST

The Durbin-Watson analysis tests for independence of the error terms by correlating the error terms in an autoregressive model and the immediately preceding estimated value. The test returns a value between zero and positive four. When the error terms are independent, the Durbin-Watson score (D-score) tends towards two, values close to zero indicate that the error terms cluster, creating a positive autocorrelation and finally values closer to four indicate that the error terms alternate, shifting between positive and negative autocorrelation (Neter et al., 1996). The formula for the D-score is shown below.

Equation 14: Durbin-Watson test

$$D = \frac{\sum(e_t - e_{t-1})^2}{\sum e_t^2}$$

The application of the Durbin-Watson test to the data sets used within this research is shown in the section below.

APPLICATION OF THE DURBIN-WATSON TEST

The application of the Durbin-Watson test to the independent variables, Log10BVEquityBoY, Log10NetIncome and Log10CRRScore, and the dependent variable, Log10ShareEoY, produced the following results.

Table 8: Durbin-Watson statistic

Model Summary	
Model	Durbin-Watson
1	2.076
a. Predictors: (Constant), Log10CRRScore, Log10BVEquityBoY, Log10NetIncome	
b. Dependent Variable: Log10ShareEoY	

The Durbin-Watson test score of 2.076, shown in *Table 8* above, is discussed in greater depth below.

FINDINGS FROM THE DURBIN-WATSON TEST

As previously discussed, the Durbin-Watson test is used to test the independence of error terms in an autoregressive model. In business and economic research, the error terms tend to be positively correlated to the preceding estimated value; nevertheless, this has been shown not to affect the validity of the regression model. The D-score has a critical value, namely where the assumption of independence of error terms hold most true, between 1.5 and 2.5 – the closer to two the higher the degree of error term independence.

The critical value obtained upon applying the Durbin-Watson test to the four variables in this research is 2.076. This falls within the critical range for the D-score of 1.5 – 2.5, and falling very close to the ideal statistic of 2. It would therefore appear that the error terms in this research are relatively independent, based on the Durbin-Watson test.

The theoretical modelling of the error term independence, as well as the statistical assessment of this independence, increases the robustness of the testing performed in this research. As a result, the error terms in this research are not assumed to line up in a perverse way, thus not affecting the validity of the results obtained.

HOMOSCEDASTICITY OF THE VARIANCES

The final assumption of linear regression is that of homoscedasticity – namely that the variance of the error terms remain constant across all levels of the predictive value (Draper et al., 1966). To test whether the three predictor datasets, Log10BVEquityBoY, Log10NetIncome and Log10CRRScore, are homoscedastic in conjunction with the dependent variable, Log10ShareEoY, a one-way analysis of variance (ANOVA) and error term plot are used (Hoaglin and Welsch, 1978). A discussion of the one-way ANOVA, the main assumption for its use, the results of its application and, finally, a discussion of those results follow.

AN ANALYSIS OF VARIANCE (ANOVA)

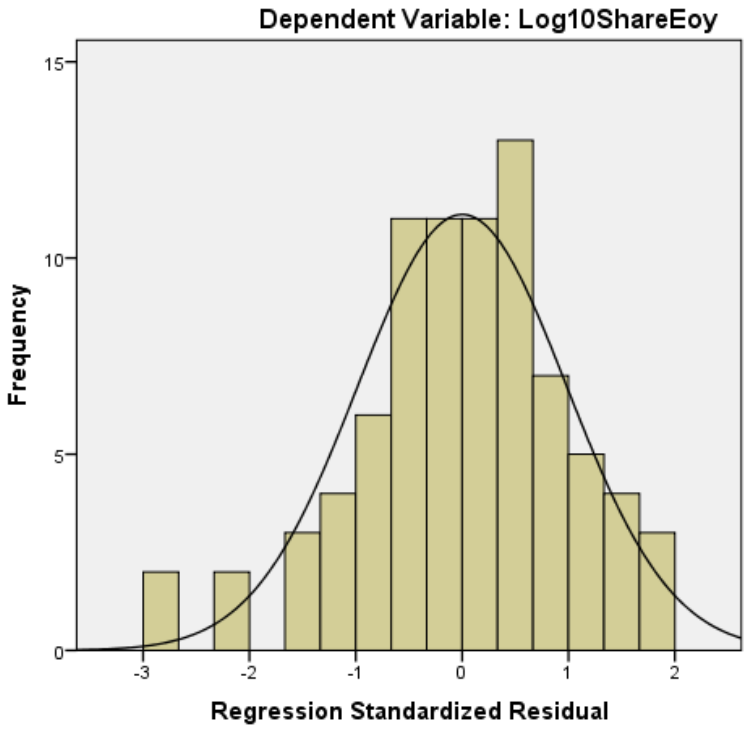
The statistical technique of an ANOVA is used to compare the means (and associated variances) of two or more samples, returning a significance as to whether the predictor variables, and more specifically their associated error terms, produce variances which do not differ significantly from each other (Tabachnick et al., 2001).

Applied specifically to this study, the ANOVA is used to analyse the variances, rather than the mean, of the predictor terms. The ANOVA tests the null hypothesis that the predictor variables and the dependent variable come from populations which have statistically similar means and variances (Hoaglin and Welsch, 1978). Based on this significance, at the ninety nine percent level, the ANOVA concludes whether the data is homoscedastic (test significance which is less than 0.01) or heteroscedastic (test significance which is greater than 0.01) (Draper et al., 1966, Hoaglin and Welsch, 1978).

MAIN ASSUMPTION OF THE ANOVA

The most fundamental assumption of the ANOVA relies on the normal distribution of the variables tested. In this dissertation, the predictor variables on the dependent variable, including the related error terms, are assessed. As the data is, in its own right, normally distributed the only observation remaining is that of the error terms. To fully satisfy this assumption, the error terms are mapped on a normal-histogram and assessed for normality in their own right (Hoaglin and Welsch, 1978). This mapping is shown below.

***Histogram 5*: Distribution of error terms**



Histogram 5 indicates that the error terms of the predictor variable on the dependent variable, Log10ShareEoY, are largely normally distributed.

It would therefore appear that the ANOVA results should not be distorted by the distribution of either the predictor variables or their related error terms, as both are normally distributed.

The application of the ANOVA to the independent variables, Log10BVEquityBoY, Log10NetIncome and Log10CRRScore, and the dependent variable, Log10ShareEoY, produced the following ANOVA results.

Table 9: ANOVA output table

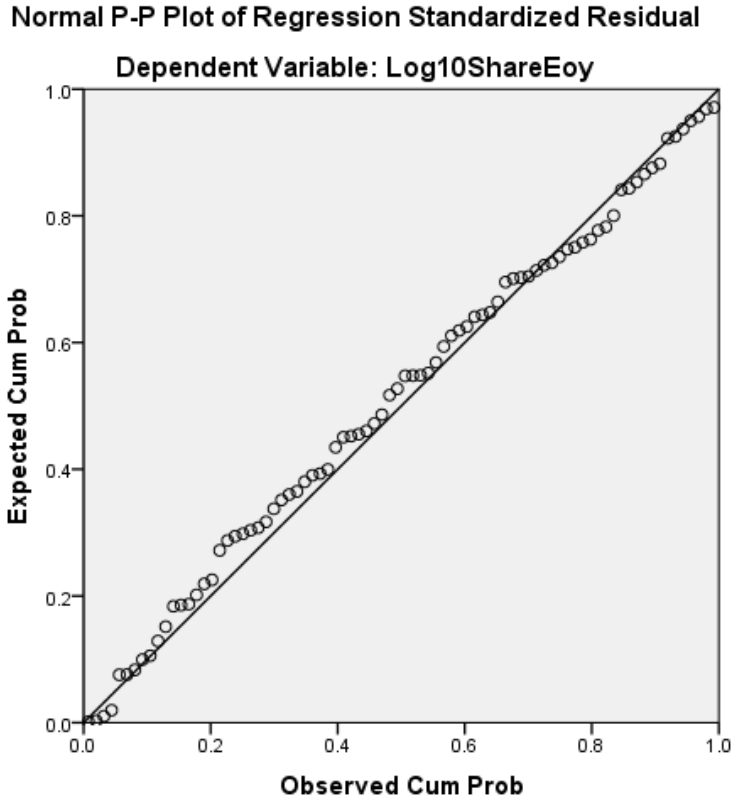
ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.176	3	8.059	23.923	.000b
	Residual	26.275	78	.337		
	Total	50.452	81			

The information in *Table 9* shows that the sum of the regression squares, being the squared difference between the mean of the regression model and the estimated value ($\sum(\hat{y} - \bar{y})^2$), is 24.176 and that the sum of the residual squares, being the sum of the squared difference between the actual observation and the estimated observation ($\sum(y_i - \hat{y})^2$), is 26.275. It therefore follows that the sum of squares for the total model is the sum of the regression sum of squares and the residual sum of squares, being 50.452. This is also the sum of the squared difference between the actual observation and the mean score ($\sum(y_i - \bar{y})^2$).

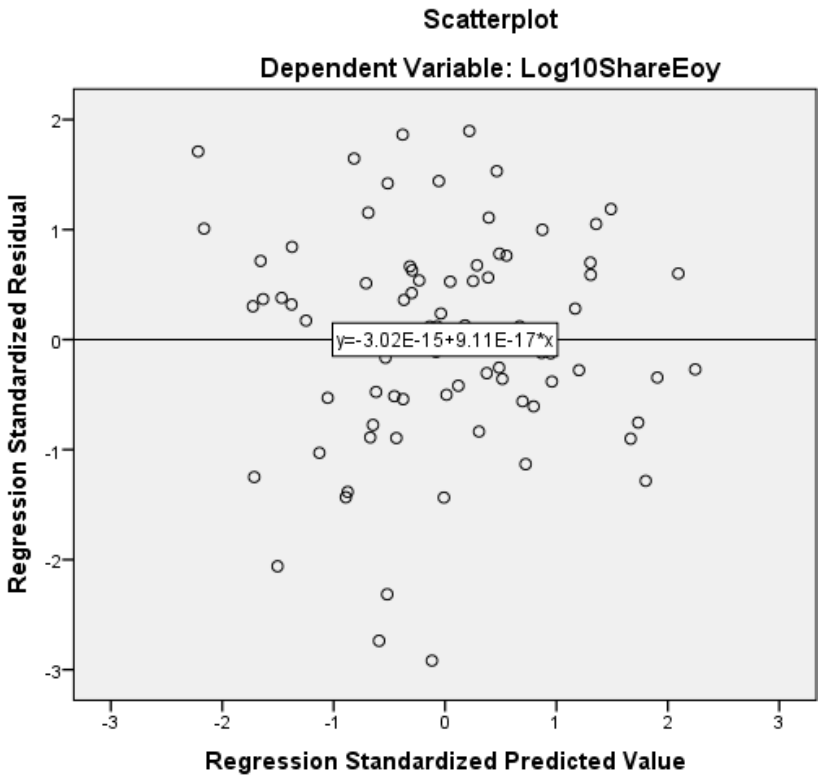
Based on the sum of squares discussed above, the *Mean Square* column, used to get the F-statistic, is the sum of the squares, divided by the degrees of freedom (*df* column). The *F* column is the F-statistic, being the returned score tested on the Fisher-Snedecor distribution. Specifically looking at the *Sig.* column, the ANOVA has produced a significance of 0.000, which is less than the tested level of significance, 0.01.

To further elaborate, a normal P-P plot and scatterplot of the results, each with the dependent variable of Log10ShareEoY, are shown below.

Normal P-P plot 1: Variance analysis



Scatterplot 1: Variance analysis



The graphs above, namely *Normal P-P plot 1* and *Scatterplot 1,* indicate that the variances of the predictor variables are largely constant.

FININGS FROM THE ANOVA

The assumption of homoscedasticity, unless markedly violated, is fairly robust, indicating that heteroscedasticity, being the non-constant variance in an predictor term across the predictive value, does not mar the significance of the regression analysis (Draper et al., 1966). Nevertheless, the data has been tested for homoscedasticity to further add robustness to the testing methodology.

As indicated in *Table 9,* the significance of the ANOVA, illustrated in the column with heading *Sig.*, is 0.000. This is lower than the test statistic of 0.01. As a result the null hypothesis of the ANOVA, namely that the variances are statistically similar, is accepted. This indicates that the variables come from a population with significantly similar variances - a homoscedastic variance (Draper et al., 1966, Hoaglin and Welsch, 1978).

Normal P-P plot 1 and Scatterplot 1, which illustrates visually the discrepancy in the variances, further show this point. As per *Normal P-P plot 1,* the variance, indicated by the circular points, hugs tightly to the linear cumulative probability for the entirety of the graph. This point is again iterated in *Scatterplot 1,* where the predictor equation is not highly volatile.

In conclusion, it would appear that the data sets used within this study tend towards homoscedasticity. This, therefore, adds to the richness of the testing performed in this research as the results hold more reliability through the satisfaction of the assumption of homoscedasticity of variance.

CONCLUSION AROUND THE ASSUMPTION TESTING

The four assumptions, which are critical to the validity of an output in a hierarchical linear regression model, were set out as: (1) the normal distribution of the variables, (2) the assumption of a linear relationship between the predictive variables and the dependent variables, (3) that the independent variable is unrelated to the error term and, finally, (4) that there is homoscedasticity of the variances. The results of the assumption testing, discussed in depth in the preceding sections, indicate that there is sufficient data validity to perform the hierarchical linear regression.

4. APPLICATION AND RESULTS OF THE MODIFIED OHLSON MODEL

Having satisfied the assumptions for using hierarchical linear regression, and thus satisfying the assumptions for the modified Ohlson model, the next stage of the research is to test whether there is a more predictive power in a model which includes CSR information, as opposed to one which is based purely on financial information.

As discussed in the methodology section of this research, the application of the Modified Ohlson Model requires a two stage regression, known as a hierarchical regression analysis. The first stage regression is based purely on financial information, returning how well the price of an equity is explained when based purely on financial information. The second stage is to assess the explanatory power of the regression model which incorporates both financial and non-financial information.

The application of both the first and second stage regression analysis, as well as their respective results, is shown below. The final section then discusses the incremental change in the predictive power of the regression model, based on the CRR information - this is done through the use of hierarchical linear regression.

4.1. REGRESSION OF FINANCIAL INFORMATION

The regression of financial information is broken up into two parts – (1) the results of the stage one regression and (2) a discussion of the results.

4.1.1. RESULTS OF THE FINANCIAL INFORMATION REGRESSION

The results of the regression analysis performed using the independent variables Log10BVEquityBoY and Log10NetIncome to predict the dependent variable, Log10ShareEoY, are shown below.

Table 10: stage one model summary table

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.690a	.476	.463	.57837

Table 10 indicates, through the *Adjusted R Squared* column, how much of the variability in the dependent variable is explained by the two independent variables. *Table 11* below further elaborates on the outputs.

Table 11: stage one regression table

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.304	.554		-5.968	.000
	Log10BVEquityBoY	.475	.122	.605	3.905	.000
	Log10NetIncome	.079	.126	.098	.631	.530

Table 11 shows a constant term of -3.304, and coefficient for Log10BVEquityBoY of 0.475 and finally a coefficient of 0.079 for Log10NetIncome. In addition, the standard error terms, being the difference between the actual values and those produced by the regression model, are 0.554, 0.12 and 0.126 respectively.

The final table below, being the ANOVA table, is included to evidence that the outputs of the model are not caused by statistical chance.

Table 12: stage one ANOVA table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.025	2	12.013	35.910	.000b
	Residual	26.427	79	.335		
	Total	50.452	81			

The output from the ANOVA table, specifically from the *Sig. column,* shows a value of 0.000, which is less than the chosen critical value of 0.01.

4.1.2. DISCUSSION OF THE RESULTS

Firstly, by examining the output from *Table 10,* the *Adjusted R Squared* column indicates that approximately 46% of the change in Log10ShareEoY is attributable to the two predictor variables, Log10BVEquityBoY and Log10NetIncome.

The second table examined, namely *Table 11,* shows the equation for the predictive model for the independent variable. The equation is remodelled below.

Equation 15: stage one regression function

$$Log10\widehat{ShareEoY} == -3.304 + (0.475 \times Log10BVEquityBoY) + (0.079 \times Log10NetIncome)$$

Where $Log10\widehat{ShareEoY}$ is the estimated market value of a share, in its logarithmic form to base 10, at the end of the financial period.

Table 11 indicates that there is positive predictive power placed on the opening book value of equity and on net income, indicating that they increase the market value of an equity. This is consistent with the findings of Ohlson (1995), Ali and Hwang (1999) and Collins et al. (1997) in which they predicted a positive relationship between earnings and book value of equity, albeit that the null hypothesis is accepted for the t-statistic on *Log10NetIncome,* indicating that it is not a significant contributor in the model. Therefore, this indicates that the model proposed by Ohlson (1995) does give predictive capacity to financial information when determining the market value of an equity instrument.

Finally, *Table 12* shows whether the model used is robust. As stated above, the significance of the model, shown in the *Sig.* column, is 0.000. This is lower than the critical value chosen of 0.01 and, as a result, the ANOVA null hypothesis is accepted, showing that the model is reliable in its predictive capacity.

4.2. REGRESSION OF BOTH FINANCIAL AND CSR INFORMATION

The regression of both financial and CRR data is broken up into two parts – (1) the results of the stage two regression and (2) a discussion of the results.

4.2.1. RESULTS OF THE FINANCIAL AND CSR INFORMATION REGRESSION

The results of the regression analysis performed using the independent variables Log10BVEquityBoY, Log10NetIncome and Log10CRRScore to predict the dependent variable, Log10ShareEoY, are shown below.

Table 13: stage two model summary table

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.692a	.479	.459	.58040

Table 13 indicates, through the *Adjusted R Squared* column, how much of the variability in the dependent variable is explained by the two independent variables. *Table 14* below further elaborates on the outputs.

Table 14: stage two regression table

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.647	2.534		-.650	.518
	Log10BVEquityBoY	.478	.122	.609	3.916	.000
	Log10NetIncome	.121	.141	.149	.860	.392
	Log10CRRScore	-.781	1.165	-.078	-.670	.505

Table 14 shows a constant term of -1.647, and coefficient for Log10BVEquityBoY of 0.478, 0.121 for Log10NetIncome and finally -0.781 for Log10CRRScore. In addition, the standard error terms, being the difference between the actual values and those produced by the regression model, are 2.534, 0.122, 0.141 and 1.165 respectively.

The final table below, being the ANOVA table, is again included to evidence that the outputs of the model are not caused by statistical chance.

Table 15: stage two ANOVA table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.176	3	8.059	23.923	.000b
	Residual	26.275	78	.337		
	Total	50.452	81			

The output from the ANOVA table, specifically from the *Sig. column,* shows a value of 0.000 which is less than the chosen critical value of 0.01.

4.2.2. DISCUSSION OF THE RESULTS

Firstly, by examining the output from *Table 13,* the *Adjusted R Squared* column indicates that approximately 50% of the change in Log10ShareEoY is attributable to the three predictor variables, Log10BVEquityBoY, Log10NetIncome and Log10CRRScore.

The second table examined, namely *Table 14,* shows the equation for the predictive model for the independent variable. The equation is remodelled below.

Equation 16: stage two regression function

$$Log10\widehat{ShareEoY} = = -1.647 + (0.478 \times Log10BVEquityBoY) + (0.121 \times Log10NetIncome) + (-0.781 \times Log10CSRScore)$$

Where $Log10\widehat{ShareEoY}$ is the estimated market value of the share, in its logarithmic form to base 10, at the end of the financial period.

Table 14 indicates that there is positive predictive power placed on the opening book value of equity and on net income, similar to that shown in the stage one regression. This is in contrast to the predictive power placed on Log10CRRScore, which appears to detract from the explanatory power of the model. In addition, the significance scores of both Log10NetIncome and Log10CRRScore are greater than the critical value, again indicating that they are not significant factors in the model. The fact that the CRR information detracts from the predictive capacity of the model may indicate that CRR is perceived to be a waste of valuable resources.

This is consistent with the belief of Friedman (1970), in which a company has an obligation to its shareholders to maximise profits, not pursue social goals such as CRR.

Finally, *Table 15* shows, through the use of a one way ANOVA, whether there is robustness to the model used. As stated above, the significance of the model, shown in the *Sig.* column, is 0.000. This is lower than the critical value chosen of 0.01 and, as a result, the ANOVA null hypothesis is accepted, showing that the model is robust in its predictive capacity.

4.3. HIERARCHICAL LINEAR REGRESSION

The final stage of the analysis is to assess the incremental changes in the predictive capacity of the financial model when CSR information is added into the equation. To do this a hierarchical linear regression was performed, with first round contributors of Log10BVEquityBoY and Log10NetIncome and second round contributors Log10BVEquityBoY, Log10NetIncome and Log10CRRScore. The dependent variable remains Log10ShareEoY.

This hierarchical linear analysis is broken up into two parts – (1) the results and (2) a discussion of the results.

4.3.1. RESULTS OF THE HIERARCHICAL LINEAR REGRESSION

The hierarchical regression, which assesses the incremental change in the predictive capabilities of the model based on the addition of CRR information, is shown below.

Table 16: correlation table of hierarchical regression

		Log10ShareEoY	Log10BVEquityBoY	Log10NetIncome	Log10CRRScore
Pearson Correlation	Log10ShareEoY	1.000	.688	.612	.406
	Log10BVEquityBoY	.688	1.000	.851	.620
	Log10NetIncome	.612	.851	1.000	.710
	Log10CRRScore	.406	.620	.710	1.000
Sig. (1-tailed)	Log10ShareEoY	.	.000	.000	.000
	Log10BVEquityBoY	.000	.	.000	.000
	Log10NetIncome	.000	.000	.	.000
	Log10CRRScore	.000	.000	.000	.

Table 16 shows the linear correlation between each variable in the model. Based on the first row, *Pearson Correlation,* it can be seen that each variable in the model holds positive predictive capacity in relation to each of the variables, on an individual basis. In addition, each of the contributors is statistically significant.

Table 17: model summary table of hierarchical regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.690a	.476	.463	.57837	.476	35.910	2	79	.000
2	.692b	.479	.459	.58040	.003	.449	1	78	.505
a. Predictors: (Constant), Log10NetIncome, Log10BVEquityBoY									
b. Predictors: (Constant), Log10NetIncome, Log10BVEquityBoY, Log10CRRScore									

Table 17 shows the change in the predictive capabilities of the model based on CRR information. The first row*, 1,* under the column *Model* shows the results of the first round regression, yielding R Squared and Adjusted R Squared of 0.476 and 0.463 respectively. The second row, *2*, under the column *Model* shows the results of the second round input, including CRR information - R Squared and Adjusted R Squared of 0.479 and 0.459 respectively. Of specific importance is the incremental change in the R Squared, under the column of *Change Statistics,* which shows an R Squared Change of 0.003 with a related significance of 0.505, an amount above the critical value of 0.01.

Table 18: ANOVA table of hierarchical regression

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.025	2	12.013	35.910	.000a
	Residual	26.427	79	.335		
	Total	50.452	81			
2	Regression	24.176	3	8.059	23.923	.000b
	Residual	26.275	78	.337		
	Total	50.452	81			
a. Predictors: (Constant), Log10NetIncome, Log10BVEquityBoY						
b. Predictors: (Constant), Log10NetIncome, Log10BVEquityBoY, Log10CRRScore						

Table 18 shows the robustness of the model through the use of the ANOVA table. The significance of both the models, in their totality and not in their incremental change value, is shown through *Sig.* values of 0.000, lower than the chosen critical value of 0.01.

Table 19: Coefficient table of hierarchical regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.304	.554		-5.968	.000
	Log10BVEquityBoY	.475	.122	.605	3.905	.000
	Log10NetIncome	.079	.126	.098	.631	.530
2	(Constant)	-1.647	2.534		-.650	.518
	Log10BVEquityBoY	.478	.122	.609	3.916	.000
	Log10NetIncome	.121	.141	.149	.860	.392
	Log10CRRScore	-.781	1.165	-.078	-.670	.505

Table 19 shows the coefficient values of the financial model, *1*, and mixed model, *2*. The only variable with a *Sig.* value less than the critical value, under both models, is Log10BVEquityBoY.

4.3.2. DISCUSSION OF THE RESULTS

By examining *Table 16,* the correlations which exist between the variables, on an individual basis, used within this study indicate an interesting correlation to those which were predicted by prior academic literature. For example, the research of Dhaliwal et al. (2009) indicated that there was a positive correlation between the CSR level of a company and their net income – a fact iterated by the 0.710 correlation between Log10CRRScore and Log10NetIncome. To further elaborate, the correlation between the market value of an equity and net income, as well as the correlation between equity value per accounting records and market value of equity, as discussed by Ali and Hwang (1999), appears to hold true when examining the correlation of 0.688 and 0.612 respectively. This is consistent with the underlying beliefs of the researchers discusses above – namely that financial performance of a company is a key determinant of stock market value.

In accession to the above, the correlations per *Table 16* under the column *Log10ShareEoY* all indicate a positive correlations to the market value of a share, namely that there is a similarity in the movements of the predictor variables and the dependent variable – this does not, however, establish causality, but rather indicates a relationship in the movement patterns (Tabachnick et al., 2001). In addition, the significance of the correlations for each of the variables, based on the information in *Table 16*, is less than the critical values of 0.01 - therefore each correlation is statistically significant.

Table 17 shows the predictive capabilities of the models. Both R Squared and Adjusted R Squared give us a measure of how well the variables input into the model describe the total variance in the model. Based on the stage one inputs, namely those which are purely financial, the predictive capabilities, based on R Square, is 0.476 and, when based on Adjusted R Squared, is 0.459. As the hierarchical analysis is based on the

incremental movements in R Squared this will be the focal point in this research (Kenney and Keeping, 1962). Therefore, before moving onto the incremental analysis, it would appear than 47.6% of the variance in the purely financial information is accounted for by the predictor variables Log10BVEquityBoY and Log10NetIncome. Again, this is consistent with the research of Ali and Hwang (1999) in which financial information is given paramount weighting in predictive share price models.

When assessing the stage two inputs, namely those which include CRR information, the predictive capability of the model increase slightly to 47.9%. The incremental change, found under the *Change Statistic* column of *Table 17,* indicate that the R Squared change is 0.003. The significance associated with this change is 0.505, a score greater than the critical value. This indicates that there is an additional predictive power placed on CSR information, but that the increase in R Squared is not significant and, thus, not a unique contributor to the explanatory power of the model (Kenney and Keeping, 1962). This may indicate that equity maximising individuals do not believe that CRR information has any influence on the value of a company and, as a result, not a factor which influences a share price model. This is consistent with the belief of Friedman (1970), in which a company has an obligation to its shareholders to maximise profits, not pursue social goals such as CSR.

In the context of this research, it would appear that CRR information has slightly increased the predictive capacity of the model. The increase, however, does not appear to be significant and, as a result, possibly due to chance rather than the statistical relationship assessed in this dissertation.

Table 18, being the ANOVA table for the hierarchical regression analysis, indicates that both the models, namely purely financial and mixed, are statistically robust models. This is different to the above determination of significance per *Table 17* as the ANOVA assesses the robustness of the entire model, including all variables, whereas the aforementioned significance related only to the incremental change in explanatory power of the model (Chatterjee and Hadi, 2006, Hoaglin and Welsch, 1978, Kenney and Keeping, 1962).

Finally *Table 19* explains the change in the model, namely the linear equations, for the two cases. The areas of importance are the significance levels of each of the variables, specifically the fact that only Log10BVEquityBoY appears to be a significant contributor to the variance explained by the regression model. This indicates that the variations in the model are best explained by Log10BVEquityBoY and that the other variables, both in the stage one and stage two regression, do not add a significantly unique explanation to the variance accounted for by the opening book value of equity (Chatterjee and Hadi, 2006, Kenney and Keeping, 1962). This observation is iterated by the decrease in the Adjusted R Squared of the model including both financial and non-financial information. As shown in Table 17, there was a decrease in the predictive power of the model, as illustrated by the Adjusted R Squared of 0.459 shown in the first and second models respectively. This phenomenon indicates that the increase in predictive capacity, as shown by R Squared, was due to the addition of extra variables – a fact that is eliminated when using the Adjusted R Squared technique (Kenney and Keeping, 1962).

5. CONCLUSION

The field of value relevance is concerned with how non-financial information, as opposed to purely financial information, can explain the predictive capacity of a model. Ohlson (1995) showed that the value of an equity consists of two elements – one being the financial information and the other being 'value relevant' non-financial information. Prior research has explored what elements constitute 'value relevant' non-financial information, with significant contributions including the research of Hassel et al. (2005), Ali and Hwang (1999) and Aboody and Lev (1998) on their contributions to environmental performance, movements towards fair value and intangible assets respectively.

The research performed in this report follows a path set by de Klerk and de Villiers (2012), in which the value relevance of CRR information, in a South African context, is explored. The assessment of value relevance presented in this research has furthered the field by including robust statistical assumption testing and sophisticated data modelling, which allows for an assessment of value relevance, and its related significance, to equity pricing. In accession, this study has explored an additional metric of CRR disclosure, one which includes both South African and international measures of CRR reporting, thus furthering our academic understanding of relevant CRR measures.

To assess the value relevance of CRR on the market value of an equity, two hypotheses were explored: the first being that CRR will be value relevant in determining an equity price. The second being that CRR is significantly associated with the market value of an equity. The conclusion reached for each of these hypotheses is discussed in greater depth below, followed by some final remarks on the research.

5.1. CONCLUSION SURROUNDING HYPOTHESIS ONE

Hierarchical linear regression allows an analysis of the incremental change in predictive power of a model, based on the addition of a new variable (Kenney and Keeping, 1962). This technique addressed the concerns of the hypothesis, as it allows for an assessment of whether the model explains the market value of a share better with CRR information.

Based on the findings of the analysis, as seen in Table 17, there is a marginal increase in the predictive power of the model when CRR information is added. This change, when assessed with the respective Adjusted R Squared change, indicates that the increase in predictive capacity was due to the addition of another variable and not to an increase in predictive capacity.

It would therefore appear that there is no value relevance associated with the inclusion of CRR information, but rather a misleading increase in predictive power due to the increased number of variables.

These findings are different from those obtained by de Klerk and de Villiers (2012), in which it was found that CRR reporting is value relevance in a South African context. This is a noticeable departure as the predictive

capabilities found by de Klerk and de Villiers (2012) appear to indicate a strong relationship between the CRR variable and the market value of the equity. Given the similarity of the models used (both studies have applied a modified Ohlson model) this departure in results would appear to have been caused by one of two factors – either the source of the CRR data or invalid inputs into the modified Ohlson model.

The CRR data used within this study was compiled from a *normative metric* which includes both international and South African CRR measures (see Section 3.1.1.3.). This is different to the data used by de Klerk and de Villiers (2012), in which the data was obtained from the KPMG International Survey on Corporate Responsible Reporting 2008 (see Section 3.1.1.2.). An unexplored difference in compilation and weighting of the different CRR metrics may be an area for insightful future research. As neither study explored which individual elements of CRR information are value relevant, exploration at this level of disaggregation may provide a greater understanding of value relevance. Future research examining the value relevance of CRR over an extend time period is also needed and may be complemented by repeating this study in other developing markets.

In addition to the departure discussed above, the difference in the results may have been caused by the susceptibility of the Ohlson model to statistical violations. As the methodology (see Section 3) used in this research paper includes detailed assumption testing of the modified Ohlson model, it appears that the statistical reliability of the model and data are more rigorous than the model used by de Klerk and de Villiers (2012). This is not to say that the method used in this study is without limitations. In particular, the Ohlson model does not prove causality. This research has also limited the number of specific variables included in the model. Future research could, therefore, consider how social, cultural or other macroeconomic variables are correlated with CRR. Future research may also provide insight into whether or not the modified Ohlson model is susceptible to either a statistical error of the first kind or a statistical error of the second kind (when the null hypothesis is false, but erroneously failed to be rejected), based on the degree and nature of the assumption violated.

5.2. CONCLUSION SURROUNDING HYPOTHESIS TWO

The second hypothesis explored was that of the statistical significance between CSR information and the market value of an equity. By analysing the incremental change in the R Squared, with specific reference to its incremental shift in the F-statistic, significance at the one percent level was assessed.

Table 17 shows a change in the F-stat of 0.449 with an associated degree of freedom of 1 and 78 for the numerator and denominator respectively. This returned a significance of 0.505, a value far in excess of the critical value of one percent. As a result it appears that the statistical significance of the CSR information is weak.

Therefore, the second hypothesis is rejected in favour of its null hypothesis – CRR is not significantly associated with the market value of an equity. This finding indicates that the *normative metric* used in this study may not

aptly represent what equity-maximising individuals deem value relevant CRR information. Furthering the discussion of the limitations and future research discussed in Section 5.1., the rejection of the significance may be due to the level of aggregation of the CRR information. As this study considered CRR information obtained from over 111 sub-categories in aggregate, the significance of the study may have been marred due to poor predictors being included in the aggregated CRR measure. Future research into the individual assessment of the different elements included in the *normative metric* (see *Appendix A: Standard corporate social responsibility rating criteria*) may provide valuable insight for companies engaged in CRR activities. Specifically, a disaggregated assessment would allow for companies to focus resources on CRR activities which maximises the value of their equity, therefore increasing the business case for the disclosures.

Furthermore, as discussed in Section 1.5, there is a lack of consensus surrounding the relationship of CSR and CRR. Given the null finding of this paper, the underlying difference between the value relevance of the CRR and that of CSR become ever more apparent. Future research may be able to identify the relationship (or lack thereof) between CSR and CRR, potentially indicating which element the market gives more weighting to.

5.3. FINAL REMARKS ON THE RESEARCH

The results of this research should be read with the overriding remembrance that the techniques used in the dissertation are highly quantitative. The most important limitation being that the results cannot necessarily demonstrate causality, but rather a relationship between the variables. Further research into the conceptual aspects which drive the statistical findings of this research are encouraged for future areas of research. As discussed in Section 1.5., the psychological and sociological elements which drive the statistical finding are unexplored in this research. Investigation into what equity-maximising individuals perceive as 'value relevant' CRR disclosures, in addition to the perspective of broader society, would provide qualitative context to the findings of this research.

In addition to the above, the sample size used represents approximately twenty percent of the JSE's main board – a limitation in both the size of the sample and its relation to non-JSE listed companies. This limitation is amplified through the lack of longitudinal analysis, giving a snapshot assessment as at the period of study – namely, financial years ending within the 2010 and 2011 years. The approach which this study took can be furthered by additional research into the potentially evolving phenomenon of CRR. In addition, an increase in sample size and inclusion of non-listed companies would further increase the generalisability of the assessment shown in this study.

With the above delimitations in mind, it appears that there is no additional predictive power, let alone a significant predictive power, placed on CRR information in a South African context. This furthers our understanding of the value relevance associated with CRR, suggesting that the relationship between the market value of an equity and CRR information is largely independent.

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EQUATIONS, HISTOGRAMS, PLOTS AND TABLES

EQUATIONS LIST

EQUATION 1: OHLSONS FIRST ASSUMPTION

$$MVE_t = \sum_{\tau=1}^{\infty}(1+r)^{-\tau}\ E_t[D_{t+r}]$$

EQUATION 2: OHLSONS SECOND ASSUMPTION

$$BV_t = BV_{t-1} + NI_t - D_t$$

EQUATION 3: OHLSONS MODIFIED FIRST-ORDER AUTO REGRESSIVE FUNCTION

$$AE_{t+1} = \omega AE_t + v_1 + \varepsilon_{1,t+1}$$

EQUATION 4: STANDARD FIRST-ORDER AUTO REGRESSIVE FUNCTION

$$V_{t+1} = \gamma v_1 + \varepsilon_{2,t+1}$$

EQUATION 5: OHLSONS VALUATION MODEL

$$MV_t = BV_t + \alpha_1 AE_t + \alpha_2 v_t$$

where

$$\alpha_1 = \frac{\omega}{(1+r-\omega)}\ and\ \alpha_2 = \frac{1+r}{(1+r-\omega)(1+r-\gamma)}$$

EQUATION 6: RESTATED OHLSON MODEL

$$MV_t + DI_t = BV_{t-1} + NI_t + v_t + \varepsilon_t$$

EQUATION 7: SIZE CONTROLLED LINEAR OHLSON MODEL

$$\frac{MV_t + DI_t}{BV_{t-1}} = \beta_0 \frac{1}{BV_{t-1}} + \beta_1 + \beta_2 \frac{NI_t}{BV_{t-1}} + \beta_3 v_t + \varepsilon_t$$

EQUATION 8: FINAL MODEL

$$\frac{MV_t + DI_t}{BV_{t-1}} = \beta_0 \frac{1}{BV_{t-1}} + \beta_1 + \beta_2 \frac{NI_t}{BV_{t-1}} + \beta_3 CRR_t + \varepsilon_t$$

EQUATION 9: FINAL MODEL EXCLUDING NON-FINANCIAL INFORMATION

$$\frac{MV_t + DI_t}{BV_{t-1}} = \beta_0 \frac{1}{BV_{t-1}} + \beta_1 + \beta_2 \frac{NI_t}{BV_{t-1}} + \varepsilon_t$$

EQUATION 10: SIMPLE LINEAR REGRESSION MODEL

$$Y_i = \beta_0 + B_1 x_i + \varepsilon_i$$

EQUATION 11: MULTIPLE REGRESSION ANALYSIS MODEL

$$Y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} + \ldots + \beta_k x_{ki} + \varepsilon_i$$

EQUATION 12: SPEARMAN'S RHO

$$\rho = \frac{\sum_i (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_i (x_i - \bar{x})^2 \sum_i (y_i - \bar{y})^2}}$$

EQUATION 13: SPEARMAN'S RHO TIED RANK ASSIGNMENT

$$\bar{r} = \frac{\sum_n r}{n}$$

EQUATION 14: DURBIN-WATSON TEST

$$D = \frac{\sum (e_t - e_{t-1})^2}{\sum e_t^2}$$

EQUATION 15: STAGE ONE REGRESSION ANALYSIS

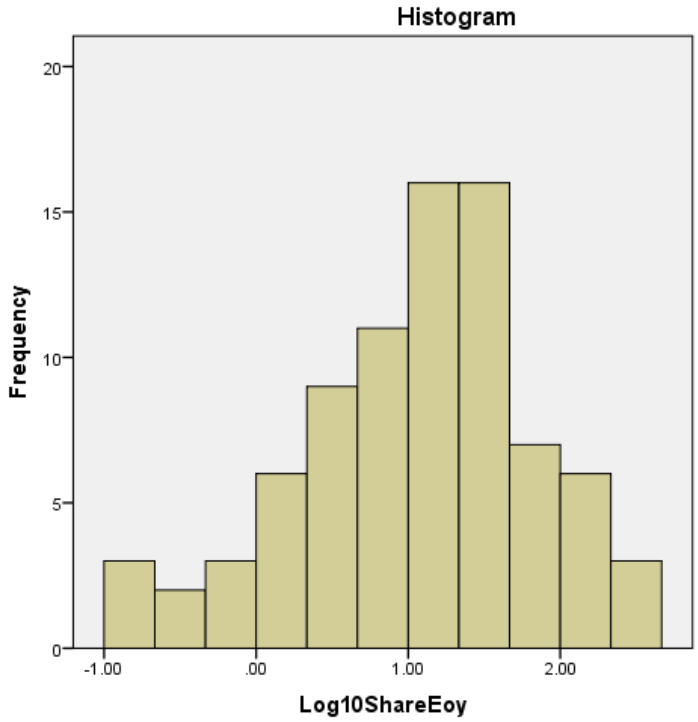
$$Log10\widehat{ShareEoY} == -3.304 + (0.475 \times Log10BVEquityBoY) + (0.079 \times Log10NetIncome)$$

EQUATION 16: STAGE TWO REGRESSION FUNCTION

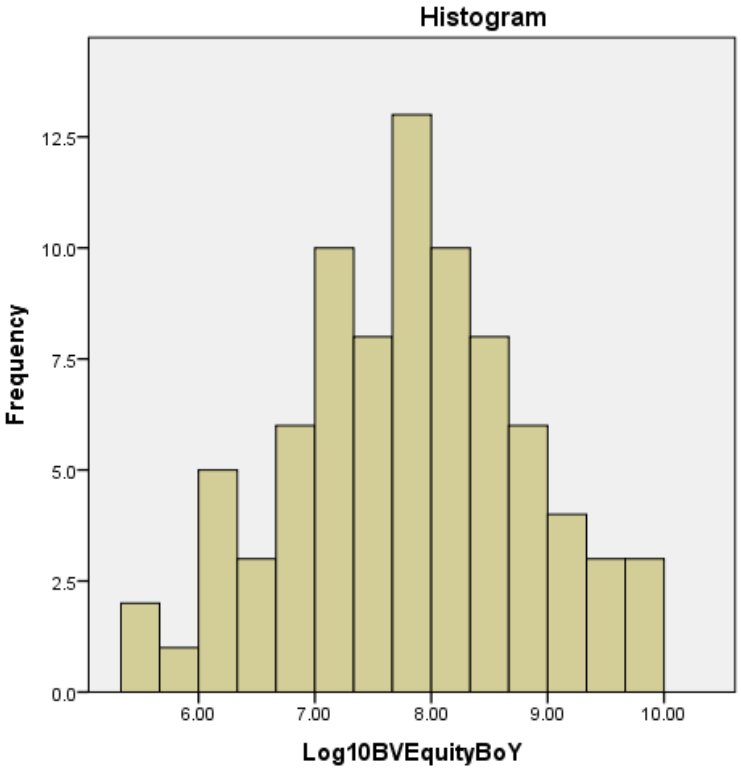
$$Log10\widehat{ShareEoY} == -1.647 + (0.478 \times Log10BVEquityBoY) + (0.121 \times Log10NetIncome) + (-0.781 \times Log10CSRScore)$$

HISTOGRAM LIST

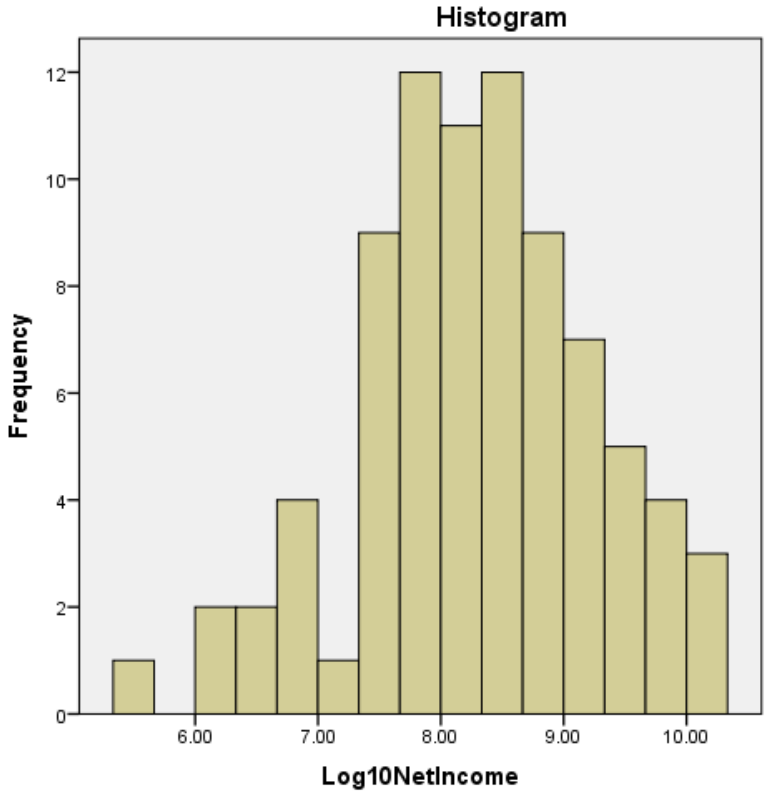
HISTOGRAM 1: LOG10SHAREEOY



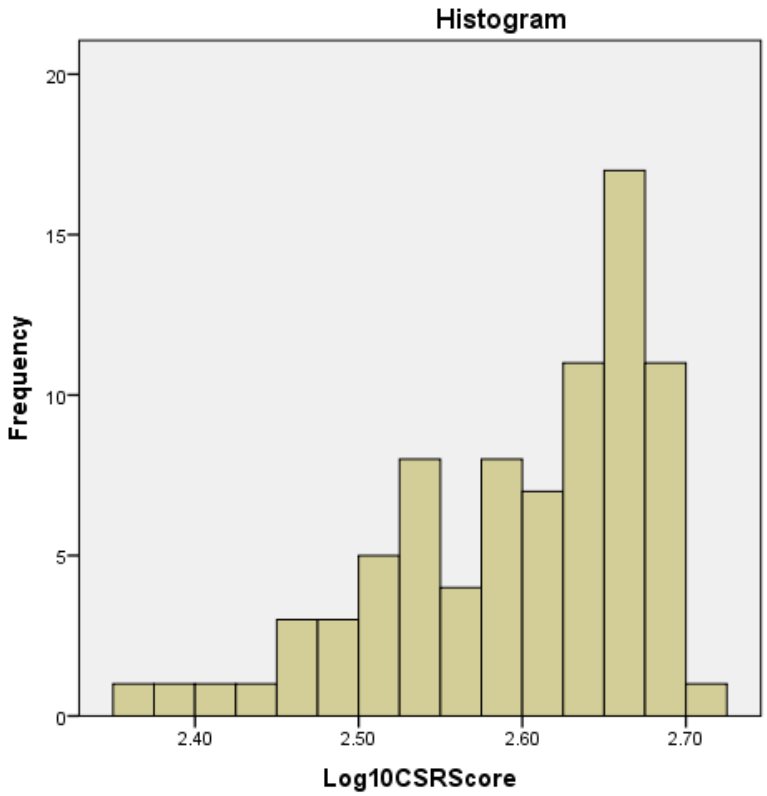
HISTOGRAM 2: LOG10BVEQUITYBOY



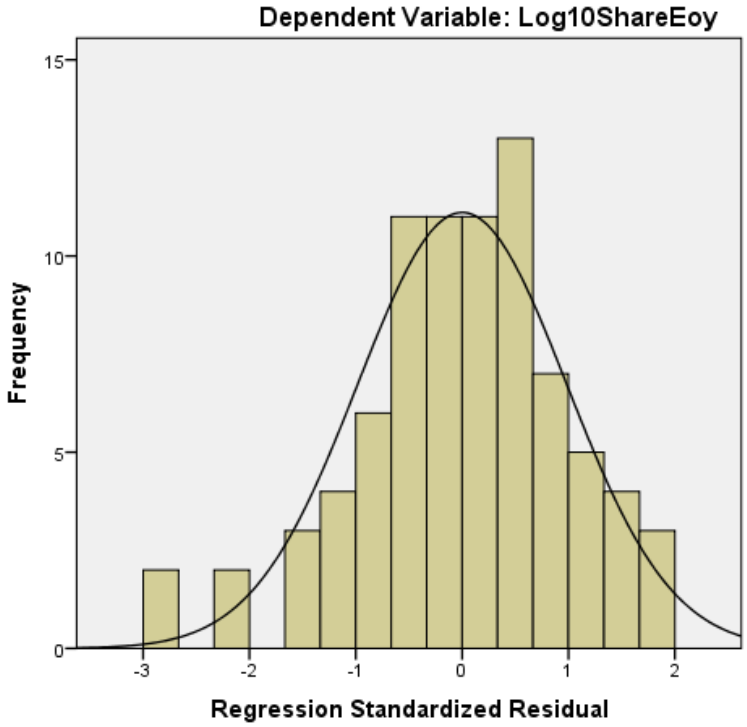
HISTOGRAM 3: LOG10NETINCOME



HISTOGRAM 4: LOG10CRRSCORE

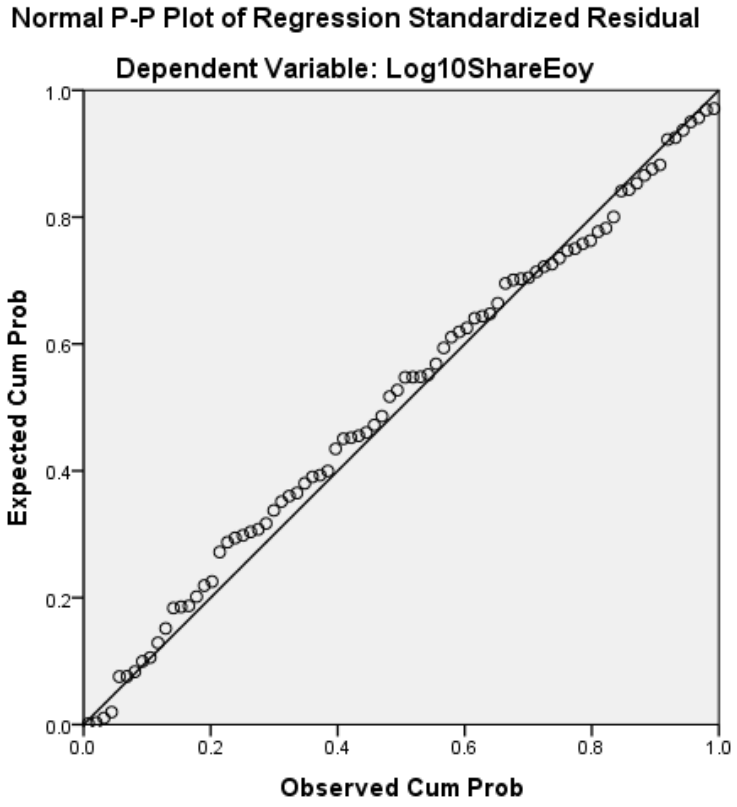


HISTOGRAM 5: DISTRIBUTION OF ERROR TERMS



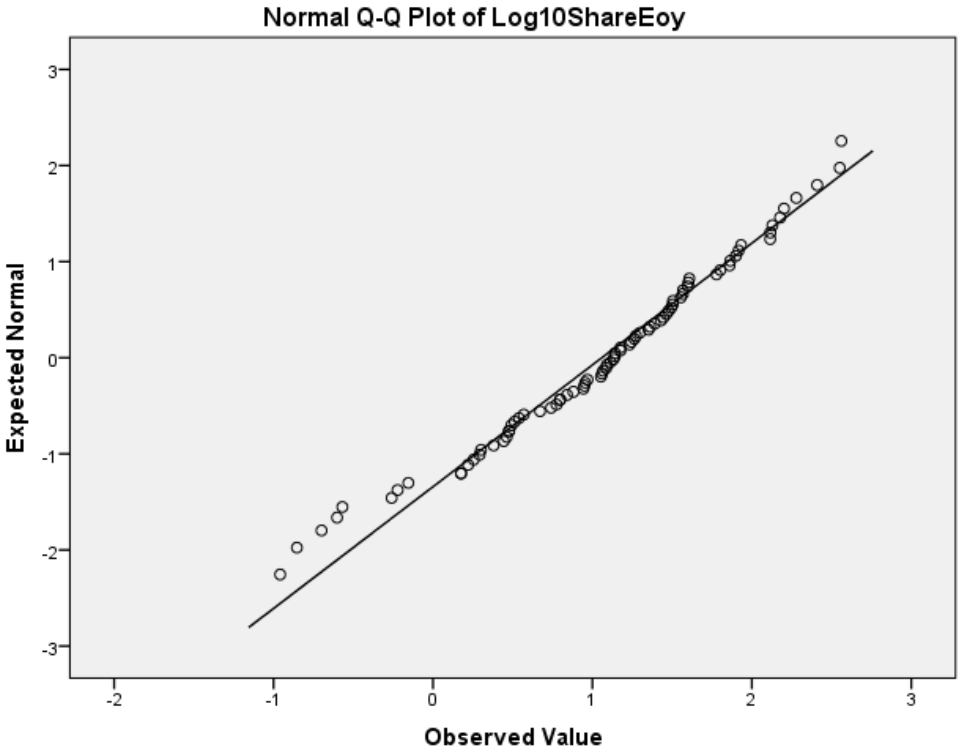
NORMAL P-P PLOT LIST

NORMAL P-P PLOT 1: VARIANCE ANALYSIS

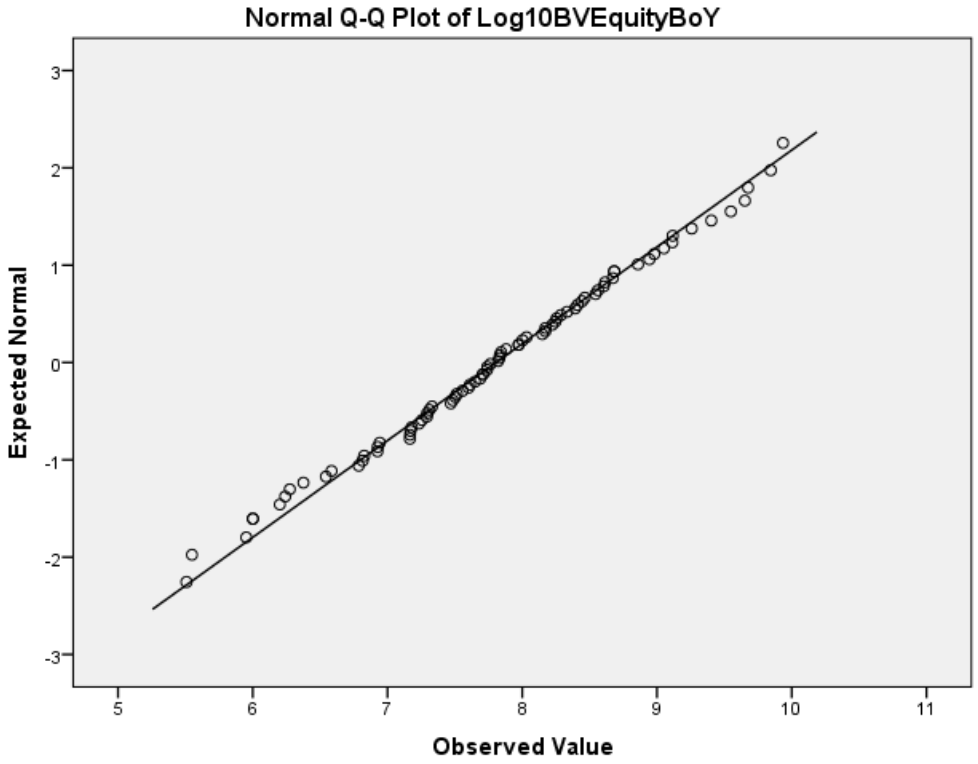


NORMAL Q-Q PLOT LIST

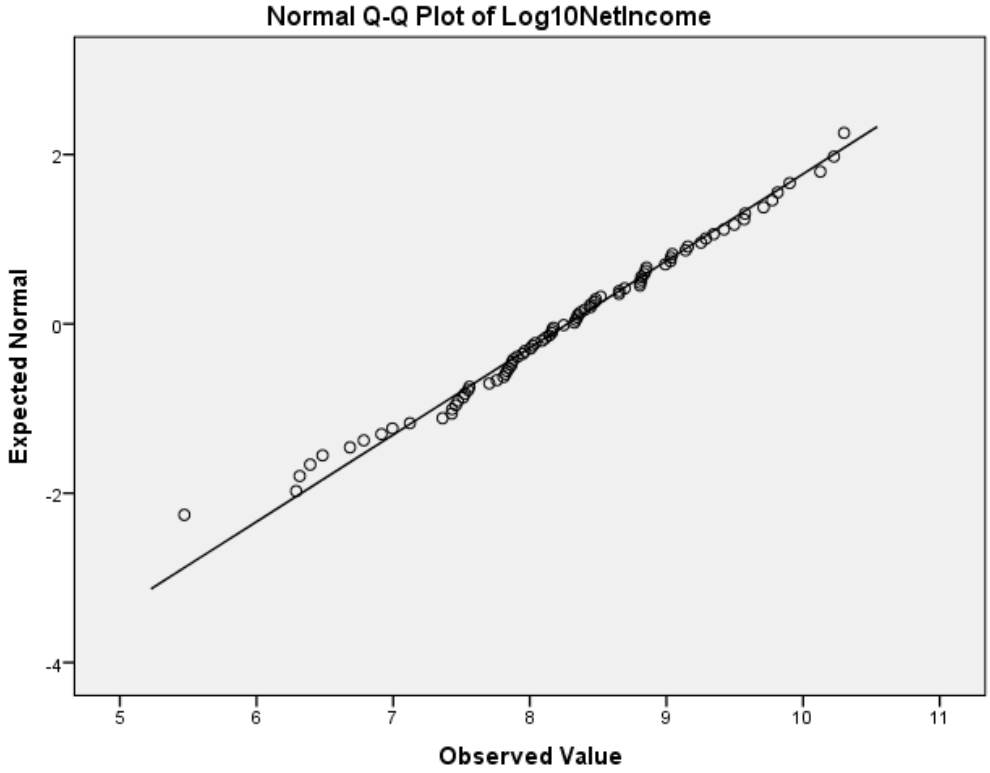
NORMAL Q-Q PLOT 1: LOG10SHAREEOY



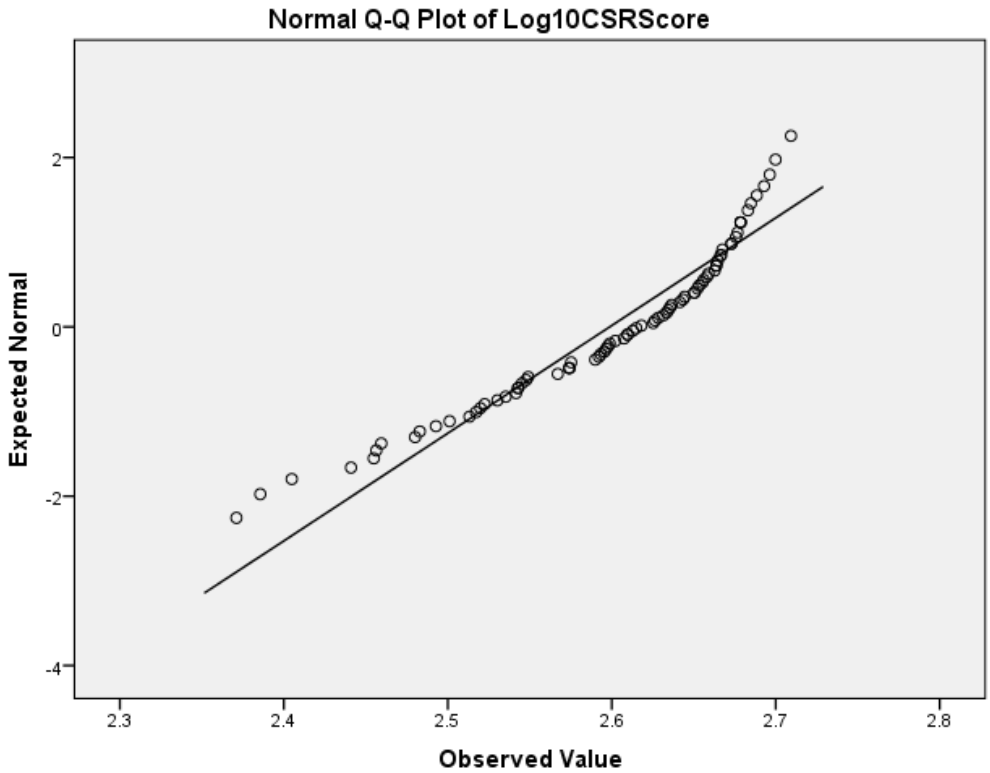
NORMAL Q-Q PLOT 2: LOG10BVEQUITYBOY



NORMAL Q-Q PLOT 3: LOG10NETINCOME



NORMAL Q-Q PLOT 4: LOG10CRRSCORE



SCATTERPLOT LIST

SCATTERPLOT 1: VARIANCE ANALYSIS

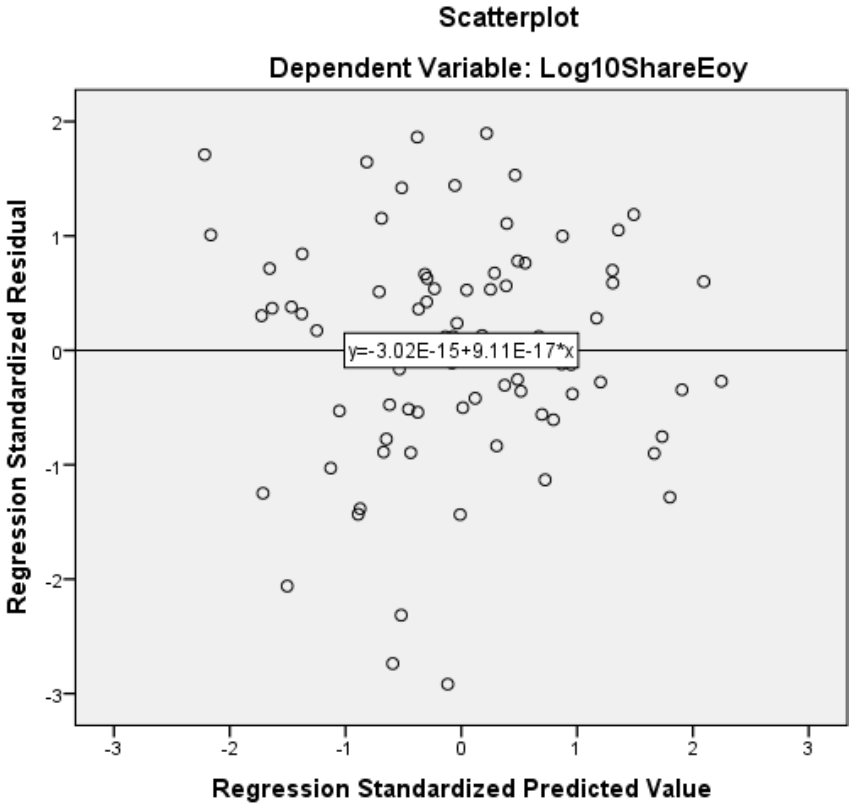


TABLE LIST

TABLE 1: COMPLIANCE LEVEL, PERCENTAGE AND SCORE FOR CSR ACTIVITIES

Compliance level	Percentage compliance range	Numerical compliance score
No compliance	0%	1
Little detail provided	0% to 25%	2
Some detail provided	25% to 50%	3
More detailed provided	50% to 75%	4
Much detail provided	75% to 100%	5

TABLE 2: TESTS OF NORMALITY ON ORIGINAL DATA

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
MVShareEoY	.300	82	.000	.576	82	.000
BVEquityBoY	.362	82	.000	.429	82	.000
NetIncome	.342	82	.000	.453	82	.000
CRRScore	.098	82	.048	.950	82	.003

TABLE 3: TESTS OF NORMALITY ON ORIGINAL DATA SQUARE ROOTED

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
SqrtMvShareEoY	.157	82	.000	.841	82	.000
SqrtBVEquityBoY	.221	82	.000	.692	82	.000
SqrtNetIncome	.221	82	.000	.717	82	.000
SqrtCRRScore	.110	82	.016	.936	82	.000

TABLE 4: TESTS OF NORMALITY ON THE LOGARITHM OF THE ORIGINAL DATA TO BASE 10

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Log10ShareEoY	.082	82	.200*	.976	82	.130
Log10BVEquityBoY	.055	82	.200*	.990	82	.792
Log10NetIncome	.059	82	.200*	.989	82	.707
Log10CRRScore	.120	82	.005	.917	82	.000

TABLE 5: SUMMARISED SIGNIFICANCE SCORES

Tests of Normality						
	Kolmogorov-Smirnov Significance			Shapiro-Wilk Significance		
	Original	Square Root	Logarithm to base 10	Original	Square Root	Logarithm to base 10
ShareEoY	.000	.000	.200*	.000	.000	.130
BVEquityBoY	.000	.000	.200*	.000	.000	.792
NetIncome	.000	.000	.200*	.000	.000	.707
CRRScore	.048	.016	.005	.003	.000	.000

TABLE 6: ORDINALITY DISCRIMINATION TABLE

	Log10ShareEoY	Log10BVEquityBoY	Log10NetIncome	Log10SCRScore
Best rank (rank of 1)	Highest Rand value share price at year end.	Highest Rand value of equity at the beginning of the year.	Highest Rand value of net income through the financial period.	Highest numeric CSR score per the *normative metric*.
Worst rank (rank of 82)	Lowest Rand value share price at year end.	Lowest Rand value of equity at the beginning of the year.	Lowest Rand value of net income through the financial period.	Lowest numeric CSR score per the *normative metric*.

TABLE 7: SPEARMAN'S RHO AND SIGNIFICANCE TEST RESULTS

	Correlation coefficient	2-tailed significance
	Log10ShareEoY	Log10ShareEoY
Log10ShareEoY	1.000	-
Log10BVEquityBoY	0.739	0.000
Log10NetIncome	0.660	0.000
Log10SCRScore	0.461	0.000

TABLE 8: DURBIN-WATSON STATISTIC

Model Summary	
Model	Durbin-Watson
1	2.076
a. Predictors: (Constant), Log10CRRScore, Log10BVEquityBoY, Log10NetIncome	
b. Dependent Variable: Log10ShareEoY	

TABLE 9: ANOVA OUTPUT TABLE

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.176	3	8.059	23.923	.000b
	Residual	26.275	78	.337		
	Total	50.452	81			

TABLE 10: TAGE ONE MODEL SUMMARY TABLE

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.690a	.476	.463	.57837

TABLE 11: STAGE ONE REGRESSION TABLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-3.304	.554		-5.968	.000
	Log10BVEquityBoY	.475	.122	.605	3.905	.000
	Log10NetIncome	.079	.126	.098	.631	.530

TABLE 12: STAGE ONE ANOVA TABLE

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.025	2	12.013	35.910	.000b
	Residual	26.427	79	.335		
	Total	50.452	81			

TABLE 13: STAGE TWO MODEL SUMMARY TABLE

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.692a	.479	.459	.58040

TABLE 14: STAGE TWO REGRESSION TABLE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.647	2.534		-.650	.518
	Log10BVEquityBoY	.478	.122	.609	3.916	.000
	Log10NetIncome	.121	.141	.149	.860	.392
	Log10CRRScore	-.781	1.165	-.078	-.670	.505

TABLE 15: STAGE TWO ANOVA TABLE

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.176	3	8.059	23.923	.000b
	Residual	26.275	78	.337		
	Total	50.452	81			

TABLE 16: CORRELATION TABLE OF HIERARCHICAL REGRESSION

		Log10ShareEoY	Log10BVEquityBoY	Log10NetIncome	Log10CRRScore
Pearson Correlation	Log10ShareEoY	1.000	.688	.612	.406
	Log10BVEquityBoY	.688	1.000	.851	.620
	Log10NetIncome	.612	.851	1.000	.710
	Log10CRRScore	.406	.620	.710	1.000
Sig. (1-tailed)	Log10ShareEoY	.	.000	.000	.000
	Log10BVEquityBoY	.000	.	.000	.000
	Log10NetIncome	.000	.000	.	.000
	Log10CRRScore	.000	.000	.000	.

TABLE 17: MODEL SUMMARY TABLE OF HIERARCHICAL REGRESSION

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.690a	.476	.463	.57837	.476	35.910	2	79	.000
2	.692b	.479	.459	.58040	.003	.449	1	78	.505
a. Predictors: (Constant), Log10NetIncome, Log10BVEquityBoY									
b. Predictors: (Constant), Log10NetIncome, Log10BVEquityBoY, Log10CRRScore									

TABLE 18: ANOVA TABLE OF HIERARCHICAL REGRESSION

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.025	2	12.013	35.910	.000a
	Residual	26.427	79	.335		
	Total	50.452	81			
2	Regression	24.176	3	8.059	23.923	.000b
	Residual	26.275	78	.337		
	Total	50.452	81			
a. Predictors: (Constant), Log10NetIncome, Log10BVEquityBoY						
b. Predictors: (Constant), Log10NetIncome, Log10BVEquityBoY, Log10CRRScore						

APPENDICIES

APPENDIX A: STANDARD CORPORATE SOCIAL RESPONSIBILITY RATING CRITERIA.

The following 14 categories and 111 sub-categories form the basis for the *normative metric* derived by Makiwane and Padia (2011).

NOTES ON HOW TO FIND THE SOURCE OF RESEARCH INDICATORS

1. The research indicators were extracted from the three sources, namely, (1) King III report; (2) Global Reporting Initiative (2011); and (3) Researcher's own research indicators.
2. The source of each research indicator is provided next to that research indicator.
3. Most of the paragraphs, for example, Par. 7 or Principle 2.23, refer to the paragraph or principle quoted in a chapter from the King III report. Otherwise, a different source such as Global Reporting Initiative or Researcher's own research indicators will be provided.
4. Whenever a paragraph or principle referring to the King III report is provided, it is also important to note the chapter from which the paragraph or principle was extracted. Each chapter is provided next to the main category.

ETHICAL LEADERSHIP AND CORPORATE CITIZENSHIP [KING III – CHAPTER 1]

1. Effective leadership based on ethical values such as integrity, honesty, independence, accountability and trust can be ascertained from the integrated report. [Par. 1]
2. Company strategies and vision are clearly outlined. [Par. 7, 9, 35]
3. Mission statement and company values are provided. [Par. 9, 10]
4. Ethical standards are articulated in the code of conduct. [Par. 12-15]
5. Independent assurance of ethics by internal audit or external assurance providers. [Par. 52]

BOARDS AND DIRECTORS [KING III – CHAPTER 2]

6. Company is governed by a unitary board of directors. [Par. 62]
7. Directors are appointed through a formal process. [Principle 2.19, Par. 80-82]
8. Board is comprised of the majority of non-executive directors. [Par. 64]
9. Of the non-executive directors, the majority are independent. [Par. 64]
10. Board is chaired by a non-executive independent director. [Par. 38]
11. Board has appointed a lead independent director, if the chairman is not independent. [Par. 38]
12. The CEO is a board member. [Par. 47, 73]
13. The financial director (or CFO) is a board member. [Par. 47, 73]
14. Qualifications and experience of directors are disclosed. [Par. 88]
15. Board is assisted by a competent, suitably qualified and experienced company secretary. [Principle 2.21]
16. Board is regulated by a formal charter which sets out the role of the board and each director. [Par. 1]
17. Appointment of well-structured committees to deal with key functions of the board, which include separate audit, risk, remuneration and nomination committees as a minimum. [Principle 2.23, par. 130]
18. Committees are regulated by formal charters which set out the role of individual committees. [Par. 125-126]
19. Board meets at least 4 times a year. [Par. 1]
20. Satisfactory attendance of board meetings as per the attendance register. [Researcher's own indicator]
21. Induction programme for new directors is in place. [Par. 89-90]
22. Ongoing training for all directors is in place. [Par. 92]
23. Performance of the board, individual directors and committees is evaluated on a regular basis. [Par. 109-114]
24. Share option scheme is not available to non-executive directors. [Par. 154]

25. Remuneration of directors and senior executives is disclosed. [Par. 180]
26. Remuneration of the three most highly-paid employees (other than directors) is disclosed. [Par. 180]
27. Remuneration policy regarding directors is approved by the shareholders. [Par. 186]

AUDIT COMMITTEES [KING III – CHAPTER 3]

28. Audit committee is appointed by the board (through the nomination committee) and is approved by the shareholders. [Par. 3]
29. Formal charter and processes are in place outlining the functions of the audit committee. [Par. 6 of Audit Committees, Par. 125,126,129&134 of Boards & Directors]
30. Suitably skilled and experienced independent non-executive directors. [Principle 3.2, Par. 12-15]
31. Comprised of at least three non-executive, independent directors. [Par. 10]
32. Chairman of the Board is not a member of the audit committee. [Par. 11]
33. Chaired by a non-executive, independent director, other than the chairman of the Board. [Principle 3.3]
34. Meets at least 2 times a year. [Par. 7]
35. Satisfactory attendance of audit committee as per attendance register. [Par. 7]
36. Oversees internal and financial controls. [Par. 30, 64, 66-70]
37. Oversees internal audit function. [Par. 66-70, Principle 7.4 of Internal Audit Function]
38. Oversees financial risk management (and other risks if necessary). [Par. 64, 65]
39. Assesses the performance, expertise and skills of the financial function including financial director. [Par. 51, 52]
40. Oversees the preparation of the integrated report (including sustainability issues). [Principle 3.4, Par. 24-29]
41. Audit committee (or company as a whole) applies a combined assurance model in providing assurance on activities such as risk, compliance, internal audit and governance. [Principle 3.5, Par. 46-48]
42. Evaluates independence and credentials of the external auditor. [Par. 77]
43. Evaluates performance of the external auditor. [Par. 77]
44. Reports to the board and shareholders how it carried out its responsibilities. [Principle 3.10, Par. 83-85]

RISK MANAGEMENT COMMITTEE [KING III – CHAPTER 4; RESEARCHER'S OWN INDICATOR]

45. Board appoints risk and/or audit committee to oversee risk management. [Par. 16]
46. Risk (or audit) committee consists of at least 3 directors (both executive and non-executive). [Par. 20, 21]
47. It is chaired by an independent non-executive director, other than chairman of the board or the executive director (not required by King III but considered necessary for the purposes of this research). [Researcher's own indicator]
48. Formal charter and processes are in place outlining the functions of the risk/audit committee. [Par. 5]
49. Risk (or audit) committee meets at least 2 times a year. [Par. 22]
50. Satisfactory attendance of risk (or audit) committee as per attendance register. [Researcher's own indicator]
51. Risk committee (or audit/board) identifies key financial risks and quantify them, if possible. [Par. 31-34, 40, 41-43]
52. Risk committee (or audit/board) identifies key non-financial risks and quantify them, if possible. [Par. 31-34, 41-43]
53. Risk committee (or audit/board) explains how the identified financial risks will be addressed. [Par. 31-34, 40, 41-43]
54. Risk committee (or audit/board) explains how the identified non-financial risks will be addressed. [Par. 31-34, 41-43]
55. Risk committee (or audit/board) sets levels of risk tolerance. [Principle 4.2, Par. 11-15]
56. Risk committee (or audit/board) expresses its views on the effectiveness of the company's risk management processes. [Par. 4]

REMUNERATION COMMITTEE [KING III – CHAPTER 2]

57. Remuneration committee comprises at least 2 non-executive and independent directors. [Researcher's own indicator]
58. It is chaired by an independent non-executive director, other than the chairman of the Board or executive director. [Par. 131 of Boards & Directors]
59. Formal charter and processes are in place outlining the functions of the remuneration committee. [Par. 125,126&134 of Boards & Directors]
60. Remuneration committee meets at least 2 times a year (not required by King III but considered necessary for the purposes of this research). [Researcher's own indicator]
61. Satisfactory attendance of remuneration committee as per attendance register. [Researcher's own indicator]
62. Remuneration committee or other structure determines remuneration of executive and non-executive directors. [Par. 150 of Boards & Directors]

NOMINATION COMMITTEE [KING III – CHAPTER 2]

63. Nomination committee comprises at least 2 non-executive and independent directors. [Researcher's own indicator]
64. It is chaired by an independent non-executive director, who can also be the chairman of the Board, other than the executive director. [Par. 131 of Boards & Directors]
65. Formal charter and processes are in place outlining the functions of the nomination committee. [Par. 125,126&134 of Boards & Directors]
66. Nomination committee meets at least 2 times a year (not required by King III but considered necessary for the purposes of this research). [Researcher's own indicator]
67. Satisfactory attendance of nomination committee as per attendance register. [Researcher's own indicator]
68. Nomination committee or other structure recommends the appointment and dismissal of executive and non-executive directors. [Par. 79 of Boards & Directors]
69. Directors nominated by the committee or other structure are presented for approval by the shareholders. [Par. 80 of Boards & Directors]

INTERNAL AUDIT FUNCTION [KING III – CHAPTER 7]

70. Internal audit function has been set up (within the company or externally). [Par. 1]
71. Internal audit function reports to the audit committee. [Par. 24, 33]
72. Internal audit is headed by the chief audit executive (CAE) or external company. [Par. 11]
73. Internal audit (or its CAE) / external company attends audit committee meetings, board meetings by invitation. [Par. 28, 29, 34]
74. Internal audit/other structure provides assurance on the effectiveness of internal control environment. [Principle 7.3, Par. 2, 12-17]
75. Internal audit/other structure provides assurance on the effectiveness of risk management. [Principle 7.3, Par. 2, 12-17]
76. Internal audit/other structure provides assurance on the effectiveness of governance (including ethics). [Par. 2]
77. Internal audit is subjected to an independent quality review. [Par. 23]
78. Internal audit follows a risk-based approach to its plan. [Principle 7.2, Par. 7, 18]

GOVERNANCE OF INFORMATION TECHNOLOGY [KING III – CHAPTER 5]

79. Board or other structure monitors and evaluates significant IT investments and expenditure. [Principle 5.4]
80. A suitably qualified and experienced chief information officer (CIO) is appointed to manage IT. [Par. 20]
81. Board or other structure ensures that IT complies with IT related laws, rules, codes and standards. [Par. 33]
82. Risk committee or other structure oversees overall risk implications of IT. [Par. 30-34; 43-47]
83. Audit committee or other structure oversees financial risk implications of IT. [Par. 47]
84. Board receives an independent assurance on the effectiveness of IT through internal audit function and/or external assurance providers. [Par. 28]

COMPLIANCE LAWS, RULES, CODES AND STANDARDS [KING III – CHAPTER 6]

85. Compliance function has been set up by the company. [Par. 16]
86. Compliance function/other structure oversees compliance with laws, rules, codes and standards. [Principle 6.1]
87. Company discloses non-binding rules, codes and standards to which it adheres. [Par. 6]

GOVERNING STAKEHOLDER RELATIONSHIPS [KING III – CHAPTER 8; GLOBAL REPORTING INITIATIVE, 2011]

88. Board identifies key stakeholders and their interests on a regular basis. [Par. 7, 8 of King III]
89. Interests of key stakeholders are taken into account in the integrated report. [Par. 7, 9 of King III]
90. Explanation of the process used for rating topics in the order of priority. [Global Reporting Initiative, 2011]

INTEGRATED REPORTING [KING III – CHAPTER 9; GLOBAL REPORTING INITIATIVE, 2011; RESEARCHER'S OWN INDICATORS]

91. Financial and sustainability issues on economic, social and environmental impacts all covered in one or more documents of integrated report. [Par. 1]
92. Tone on integrated reporting components is articulated, hinted or summarised in the introductory section, chairman's report or CEO's report within the integrated report. [Researcher's own indicator]
93. Information on integrated reporting components is harmonised and a link drawn to show interdependencies between these components in the integrated report. [Researcher's own indicator]
94. Sustainability issues and disclosures are independently assured (under the auspices of the audit committee or other structure). [Principle 9.3; Par. 17-21]
95. Report clearly indicates whether King III / II guidelines have been followed. [Researcher's own indicator]
96. Report clearly states areas of improvement on King III / II guidelines. [Researcher's own indicator]
97. Report clearly indicates whether Global Reporting Initiative (GRI) guidelines have been followed. [Global Reporting Initiative, 2011]
98. Report clearly states areas of improvement on Global Reporting Initiatives (GRI) guidelines. [Researcher's own indicator]
99. Index is provided as per Global Reporting Initiatives (GRI) guidelines. [Global Reporting Initiative, 2011]
100. Glossary of Terms provided as per Global Reporting Initiatives (GRI) guidelines or other guidelines. [Global Reporting Initiative, 2011]
101. Report provides proper referencing with page numbers for each major issue covered. [Global Reporting Initiative, 2011]

ECONOMIC SUSTAINABILITY [GLOBAL REPORTING INITIATIVE, 2011; RESEARCHER'S OWN INDICATORS]

102. Value-add statement and other economic/value-add information are provided. [Page 25-26 of Global Reporting Initiative, 2011]
103. Quantification of economic efforts. [Researcher's own indicator]
104. Report is easy to read. [Researcher's own indicator]

SOCIAL SUSTAINABILITY [GLOBAL REPORTING INITIATIVE, 2011; RESEARCHER'S OWN INDICATORS]

105. Involvement in CSI programmes for employees and communities such as training, education, sports, HIV/AIDS, donations, bursaries. [Page 29-37 of Global Reporting Initiative, 2011]
106. Quantification of costs as well as the number of social projects/programmes. [Researcher's own indicator]
107. Report is easy to read. [Researcher's own indicator]

ENVIRONMENTAL SUSTAINABILITY [GLOBAL REPORTING INITIATIVE, 2011; RESEARCHER'S OWN INDICATORS]

108. Implementation of sound environmental programmes. [Page 27-29 of Global Reporting Initiative, 2011]
109. Quantification of costs incurred and efforts to curb environmental damages. [Researcher's own indicator]
110. Report is easy to read. [Researcher's own indicator]