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MM Finance and Investments

The Relationship between Corporate Social Performance and Corporate Financial Performance: Empirical Evidence from the South African Market

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Submitted to WBS in partial fulfilment of the requirements for the degree of MM Finance and Investment

DECLARATION

I declare that this research report is wholly my own work, and I have duly acknowledged any ideas from the published or unpublished work of other persons.

It is being submitted in partial fulfilment of the requirements of the Master of Management in Finance and Investments at Wits Business School. This work has not been submitted before for any degree or examination in any other university.

I make this declaration to maintain both my own integrity and that of the school.

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Date: 5 February 2013

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1. INTRODUCTION

1.1. BACKGROUND

Corporate governance is becoming increasingly important in emerging markets. There are various reasons for this. Firstly, globalization has allowed investors to hold portfolios with foreign assets. So corporations need to improve their corporate governance in order to attract foreign investors. This fact has also been recognized by the Organization for Economic Cooperation and Development (OECD) Principles of Corporate Governance:
"*In an increasingly integrated world characterized by highly mobile capital, investors' expectations for more responsive corporate governance practices are something that governments and companies cannot afford to ignore. This is not simply an issue relevant to foreign investors. Strengthening the confidence of domestic investors in a country's own corporations and stock markets matters greatly to the long-term competitiveness of corporations and to the overall health and vitality of national economies*" (OECD, 1999, p 6).

Secondly, firms are becoming more and more exposed to market pressure, both in financial markets and products markets, because of globalization and trade liberalisation. Furthermore, companies have come under increasing social and ethical pressure from investors and the media to adopt best practices of corporate governance. However, in their attempt to move towards better corporate governance, corporations should be careful not to focus managerial attention solely on shareholder objectives. Managers must also take into account the interest of the other stakeholders of the firm. Corporate governance mechanisms should incorporate a wide range of stakeholders, both implicit and explicit. Thus, the concept of corporate social performance "evaluates how well firms have met expectations of stakeholders and environmental concerns" (McGuire et al., 2003, p 342).

The Johannesburg Securities Exchange (JSE) launched the Socially Responsible Investment (SRI) Index in South Africa in May 2004 to:

- Identify those companies listed on the JSE that integrate the principles of the triple bottom line and good governance into their business activities;
- Provide a tool for a broad holistic assessment of company policies and practices against globally aligned and locally relevant corporate responsibility standards;

- Serve as a facilitation vehicle for responsible investment for investors looking for non-financial risk variables to include in investment decisions, as such risks do carry the potential to have significant financial impacts; and
- Contribute to the development of responsible business practice in South Africa and beyond (JSE, 2010).

The Index philosophy is founded on the principles of the three pillars of the triple bottom line, namely environmental, social and economic sustainability, with good corporate governance underpinning each.

Social responsibility is considered an important corporate duty (Quinn et al., 1987). Given the significance of corporate social responsibility in corporate decision making, the relationship between a firm's social and ethical policies or actions and its financial performance is an important topic.

1.2. PROBLEM STATEMENT

Burke and Logsdon (1996) argue that a strategic implementation of social responsibility will result in customer loyalty, future purchases, new products, new markets, and productivity gains. Thus, corporate social performance may have an effect on the firm's reputation, and firms may use corporate social responsibility disclosures to attract customers, attract better employees, increase goodwill and improve relations with bankers and investors, and thus facilitate greater access to capital. Therefore, corporate social performance has strategic and financial implications for firms, especially given the increasing power of shareholder activists and increasing scrutiny by the media on public companies.

The growing interest in socially responsible investing has stimulated an interest in corporate social responsibility and how it affects, or how it is affected by, corporate social performance. While there is a large existing body of empirical literature which investigates the link between corporate social performance (CSP) and corporate financial performance (CFP), these studies focus on developed markets. Therefore, there is a need for a study that analyses the relationship between CSP and CFP from an emerging market perspective.

This study addresses the research question: Is there a correlation between corporate social performance and corporate financial performance? More specifically, the study investigates the relationship between CSP and corporate financial performance in South African companies listed on the JSE.

1.3. RESEARCH OBJECTIVES AND EXPECTED CONTRIBUTION

Institutional investors buy and hold stock with the aim of generating good risk-adjusted financial returns. Therefore, expectations concerning the relationship between corporate social and financial performance are expected to play a crucial role in influencing the pattern of institutional investment. Much of the literature suggests that many of the financial gains from improved social performance accrue in the long run while social performance initiatives may require companies to make significant investments in the short run. Many authors have argued that improved social performance can contribute positively to "long-term value creation" (Hillman and Keim, 2001, p 127). Cochran and Wood (1994), and Waddock and Graves (1997) have similarly argued that financial performance and social performance might be positively associated in the long run because improved social performance results in better resource competitiveness, lower transaction costs (Ruf et al., 2001), employee quality and motivation (Moskowitz, 1972) and customer goodwill (McGuire et al., 1988). Furthermore, low levels of social performance may increase a firm's financial risk (Ullmann, 1985) by signalling uncertain and possibly increased government regulation and fines (McGuire et al., 1988) and, as a result, increased uncertainty regarding the level and variability of future cash flow (Shane and Spicer, 1983).

All this suggests that long-term investors may be more likely to show a preference for firms with good social performance because of its potential impact on long-run risk and return (Graves and Waddock, 1994). Therefore, analysis of the link between CSP and corporate financial performance is an important issue for portfolio managers and ethical investors who are primarily interested in investing in socially responsible companies. However, all the studies cited were conducted in developed markets. Therefore, it is not certain whether there is an association between CSP and CFP in emerging markets such as South Africa.

Since the release of the King Report on corporate governance (1994), there has been unprecedented interest in corporate governance in South Africa. Through this study, the author hopes to provide insight into the relationship between CSP and CFP in South African companies, and the impact of CSP on financial returns and risk in the South African market.

1.4. OUTLINE OF THE STUDY

This study is structured into six chapters. Chapter 2 explores prior research into the relationship between CSP and CFP. This chapter establishes the theoretical basis for this study, as well as the attendant research design.

Chapter 3 outlines the research methodology and data collection approach used in the study. It specifies the model used to carry out the empirical investigation.

Chapter 4 is a presentation of the results obtained from the empirical investigation.

Chapter 5 analyses and discusses the findings of the empirical study. This chapter draws comparisons between the findings of the investigation and the findings of other researchers on similar topics.

Chapter 6 concludes the report with a summary of key findings and the implications thereof. It presents suggestions for direction of future research on the relationship between CSP and CFP.

2. LITERATURE SURVEY

2.1. CORPORATE GOVERNANCE

The ownership of large corporations is often widely dispersed as there may be many shareholders. This means that the ownership of the firm (principals) and the management of the firm (agents) become more and more separated. The shareholders are not involved in the day-to-day operations of the corporation and management effectively controls the company. This may lead to conflict of interest between the principals and the agents of the firm, thus giving rise to the agency problem. The concept of corporate governance resulted from the agency problem that arose when the ownership of companies became separated from the control thereof. Corporate governance ensures that the agents of the corporation act in the best interests of the principals.

Corporate governance covers many concepts and phenomenon. Nowadays companies operate in a very challenging business environment, which as Harshbarger and Holden (2004) point out, makes the governance issues they face even more challenging. According to Arjoon (2005), factors such as globalization, technology, and rising competition have placed greater emphasis on corporate governance and ethical issues. Byrne (2002) notes that corporate failures such as that of Enron have led to a re-evaluation of corporate goals, values and purpose. One of the core issues in the corporate governance debate is the issue of whether managers of corporations should focus only on the interests of shareholders, or whether they should serve the interests of all the stakeholders. This debate gives rise to two different models of corporate governance. The first model is based on shareholder wealth maximisation, and the second model is based on social responsibility.

2.2. STAKEHOLDER THEORY

According to Freeman (1984, p46), a stakeholder is “any group or individual who can affect or is affected by the achievement of the organization’s objectives”. Friedman and Miles (2001) state that the organization itself should be thought of as a grouping of stakeholders and the purpose of the organization should be to manage their interests, needs and viewpoints.

According to Freeman (1994), stakeholder theory is based on the assumption that values are essentially and explicitly a part of doing business, and rejects the separation thesis, which in turn is based on the assumption that economic performance and social performance can be separated. Freeman (1994) shows that the focal point of stakeholder theory is expressed in two core questions. Firstly, what is the purpose of the firm? "This encourages managers to articulate the shared sense of the value they create, and what brings its core stakeholders together. This propels the firm forward and allows it to generate outstanding performance, determined both in terms of its purpose and marketplace financial metrics" (Freeman et al., 2004). Secondly, what responsibility does management have to stakeholders? "This pushes managers to articulate how they want to do business - specifically, what kinds of relationships they want and need to create with their stakeholders to deliver on their purpose" (Freeman et al., 2004). Waddock et al. (2002) pointed out that companies receive pressure to adopt corporate governance practices that not only take primary stakeholders into consideration, but practices that also take into consideration secondary stakeholders, general social trends and institutional expectations. Clarkson (1995) defined primary stakeholders as those whose continuing participation is crucial to the continued existence of the company. Primary stakeholders include shareholders, employees, customers, suppliers and the natural environment. Secondary stakeholders are those that can influence and can be influenced by the company but "are not engaged in transactions with the corporation and are not essential for its survival" (Clarkson, 1995, p107). Waddock et al (2002) identified four secondary stakeholders, which are non-governmental organizations (NGOs), activists, communities and governments.

According to stakeholder theory, the satisfaction of various stakeholder groups is important for organizational financial performance (Donaldson and Preston, 1995; Jones, 1995). According to the theory, the relationships between management and stakeholders, as well as the negotiation and contracting that stem from those relationships, serve as monitoring and enforcement mechanisms. This prevents managers from redirecting their focus from the broad financial goals of the corporation (Hill and Jones, 1992; Jones, 1995). Additionally, by addressing and balancing multilateral stakeholder interests, managers are able to adapt to external demands. Hillman and Keim (2001) stated that by developing longer-term relationships with primary stakeholders, corporations expand the set of value-creating exchanges with them beyond that which would be possible with interactions limited to market transaction.

2.3. RESOURCE-BASED VIEW OF THE FIRM

Penrose (1959) suggested viewing the firm as a "pool of resources" (Hodgson, 1998). The resource-based perspectives (RBP) argue that the differentials in performance are due to valuable and rare firm-specific resources that cannot be easily imitated by competitors and that cannot be easily bought or sold. In order for a firm to use resources as a source of competitive advantage, the resources have to be used productively. Russo and Fouts (1997) assert that firms have capabilities, which are “abilities to assemble, integrate, and manage these bundles of resources" (Russo and Fouts, 1997, p. 537). These capabilities refer to the capacity of the firm to engage its organisational systems and processes to achieve its objectives, using its resources. Each firm has a different set of resources and capabilities, and according to Matthew (2002), these need to be used by firms to develop and implement their strategies.

Resources are the elements or assets that corporations use to transform inputs into outputs. Resources can be categorised into tangible and intangible resources. Tangible resources are the physical and financial assets of the corporation and intangible assets are things such as corporate reputation, intellectual capital and organisational assets (corporate culture, human resource management policies and organisational structure). Tangible assets are easier to imitate or substitute than intangible assets. Intangible assets are difficult and costly to imitate because they tend to be “historically contextualised, path dependent, socially complex, and causally ambiguous” (Barney, 1999). Therefore, the intangible resources and capabilities tend to be a source of competitive advantage than tangible resources and capabilities.

Orlitzky et al (2003) link corporate financial performance and corporate social performance using RBP. They argue that a corporation’s socially responsible activities may assist the corporation develop new resources and capabilities, which would lead to more efficient use of resources. There are empirical studies (Albinger and Freeman, 2000; Greening and Turban, 2000; Peterson, 2004) that have shown that the socially responsible firms have the ability to attract and retain better employees, which leads to reduced turnover, recruitment and training costs. Other studies (Russo and Fouts, 1997; Thorpe and Prakash-Mani, 2003; Wagner and Schaltegger, 2003) have shown that environmentally responsible firms may have more efficient processes, productivity improvements (as a result of redesigned

production processes and resources to reduce waste and increase operational efficiency), lower compliance costs and new market opportunities. Branco and Rodrigues (2006) contend that socially responsible firms may improve their corporate reputation, which in turn may improve relations with external stakeholders. McWilliams et al. (2006) argued that firms that engage in social responsibility activities can create sustainable competitive advantages by effectively controlling and manipulating their resources and capabilities.

2.3. THE TRADE-OFF HYPOTHESIS

There are two models predicting a negative relationship between CSP and CFP – the trade-off hypothesis and the managerial opportunism hypothesis. Social responsibility involves financial costs to the firm. This may cause the firm to use up capital and other resources and put it at a competitive disadvantage compared to other less socially responsible firms (Friedman, 1970). Vance (1975) found that companies with strong social credentials experience lower stock prices compared to the market average. Therefore, Preston and O'Bannon (1997) noted that the higher a firm's social performance, the lower its financial performance would be.

2.4. THE MANAGERIAL OPPORTUNISM HYPOTHESIS

Managers may pursue their own goals, which may lead to a negative relationship between CSP and CFP. The managerial opportunism hypothesis states that "when financial performance is strong, managers may attempt to "cash in" by reducing social expenditure in order to take advantage of the opportunity to increase their own short-term private gains. Conversely, when financial performance weakens, managers may attempt to offset, and perhaps appear to justify, their disappointing results by engaging in conspicuous social programs" (Preston & O'Bannon, 1997: 423).

2.5. CORPORATE SOCIAL PERFORMANCE AND CORPORATE FINANCIAL PERFORMANCE

Empirical findings on the relationship between corporate social performance and corporate financial performance have been mixed (Ullmann, 1985; Griffin and Mahon, 1997; Margolis and Walsh, 2003; McWilliams and Siegel, 2000; Wood and Jones, 1995).

One group of scholars (Friedman, 1970; McWilliams and Siegel, 1997; Jensen, 2002) has argued that corporate social responsibility (CSR) raises the costs of a firm, and therefore places it at an economic disadvantage relative to firms that are not socially responsible. This group points out that the additional costs and administrative burden of engaging in socially responsible practices impact negatively on the firm's profitability. Friedman (1962) states that management infringes on its responsibility to shareholders when they spend corporate funds on social causes. He asserts that these expenditures do not increase shareholder wealth. Aupperle et al. (1985) found a negative association between CSP and CFP because socially responsible firms incur costs that put them at an economic disadvantage.

Another group of scholars advocates CSR for various reasons. Some argue that corporations with better social performance can attract resources (Cochran and Wood, 1984; Waddock and Graves, 1997); obtain quality employees (Greening and Turban, 2000; Turban and Greening, 1996); market its products and services (Fombrun, 1996; Moskowitz, 1972); and create unforeseen opportunities (Fombrun et al, 2000). Others (Alexander and Bucholtz, 1978; Bowman and Haire, 1975) argue that strong social performance indicates that a firm possesses superior management talent that understands how to improve internal and external relationships through socially responsible activities. Thus, proponents of socially responsible investing (SRI) argue that CSR is not merely a cost but a wise investment because social relationships influence financial performance. This rationale is supported by stakeholder theory. Moskowitz (1972) ranked 67 selected firms in terms of their level of social responsibility. He observed that firms with higher social responsibility rankings had higher than average stock returns. However, in his study, Moskowitz (1972) failed to adjust the returns for risk. Preston and O'Bannon (1997) compared corporate social performance and financial performance for 67 large US corporations from 1982 to 1992 and found a positive link between CSP and financial performance. Stanwick and Stanwick (1998) conducted a regression analysis of multiple cross-sections for the period 1987 to 1992 with about 115 firms in each cross-section. They found a significant positive relationship between

corporate social performance and financial performance. Graves and Waddock's (2000) empirical study suggests that firms that invest in stakeholder relations have above-average financial performance over an 8-year window, as measured by return on equity, return on assets, and return on sales. Hillman and Keim (2001) studied the market value added (MVA) of 308 firms within the S&P 500 and found that effective stakeholder management was significantly correlated with, and preceded, improved financial performance. Studies examining the relationship between social responsibility and accounting-based performance measures have generally found positive results (Bragdon and Marlin, 1972; Bowman and Haire, 1975; Parket and Eibert, 1975).

Other studies have found no significant relationship between CSP and CFP. Alexander and Bucholtz (1978) used the firms listed in Moskowitz's (1972) study and found little relationship between social responsibility and risk-adjusted return on securities. Chen and Metcalf (1980) showed that the positive association between CSR performance and financial performance is eliminated when they control for size. Hamilton et al. (1993) investigated the returns of socially responsible portfolios versus that of conventional portfolios. They found no significant relationship between social responsibility and the expected stock return or companies' cost of capital. Balabanis et al. (1998) investigated found no significant relationship between social responsibility and economic performance of companies in the UK. McWilliams and Siegel (2000) investigated the correlation between CSR and R&D and estimated the impact of CSR on financial performance. They found no significant relationship between CSR and financial performance, even after controlling for R&D.

Orlitzky et al (1999) conduct a meta-analysis of 52 studies yielding a total sample size of 33,878 observations. The meta-analytic findings have shown that (1) across studies, CSP is positively correlated with CFP, (2) the relationship tends to be bidirectional and simultaneous, (3) reputation appears to be an important mediator of the relationship, and (4) stakeholder mismatching, sampling error, and measurement error can explain between 15 percent and 100 percent of the cross-study variation in various subsets of CSP–CFP correlations.

3. DATA ANALYSIS AND METHODOLOGY

3.1. DATA

Data was collected for 48 randomly selected companies listed on the FTSE/JSE All Share Index for the period from 2004 to 2010. In any year, some of the companies may be listed on JSE's Socially Responsible Investment (SRI) Index and some may not be listed. The JSE SRI Index was launched in May 2004, and focuses on the triple bottom line performance of companies on the FTSE/JSE All Share Index. The triple bottom line philosophy is based on the three pillars of doing business sustainably, namely environmental, social and economic sustainability, with good corporate governance underpinning each. The JSE SRI Index is reviewed annually and constituents are included or excluded accordingly.

Data on the accounting-based measures of firm performance and risk were obtained from the annual reports of the companies. The stock market-based measures of firm performance and risk were obtained and calculated from market data on Bloomberg.

Following the measures used by Waddock and Graves (1997), the accounting-based financial performance measures used for the purposes of this study were return on assets (ROA), return on sales (ROS) and return on equity (ROE). Appendix A defines the measures of firm performance and risk that were used in the study. The ratio of long-term debt to total assets served as the accounting-based measure of risk. The logarithm of total assets was used as a proxy for the size of the companies.

Daily closing prices were obtained from Bloomberg for each of the companies from 1 January 2004 to 31 December 2010, and this data was then used to calculate the daily returns. The average of the daily returns was then used to calculate the annual return as follows:

$$R = (1 + r)^n - 1$$

Where R is the annual return, r is the average daily return and n is the number of trading days per annum. Market risk measures used were beta, which is a measure of systematic risk, and the standard deviation of the daily returns. The logarithm of the market capitalization of each company each year was used as a proxy for size.

3.2. DESCRIPTIVE STATISTICS OF THE TEST VARIABLES

The starting point for the empirical analysis was getting acquainted with the data. Therefore, the following tables present the descriptive statistics for the accounting and market data for each of the years under review.

Table 1: Descriptive statistics – Accounting Data

		ROS	ROA	ROE	Size	Risk	CSP	Industry
2004	Mean	0.13	0.10	0.11	4.02	0.08	0.56	7.65
	Standard Error	0.02	0.02	0.06	0.12	0.01	0.07	0.52
	Median	0.10	0.11	0.19	3.89	0.08	1.00	8.00
	Standard Deviation	0.13	0.11	0.42	0.84	0.07	0.50	3.58
	Sample Variance	0.02	0.01	0.18	0.70	0.01	0.25	12.83
	Kurtosis	0.00	1.93	11.95	-0.57	-1.00	-2.02	-1.00
	Skewness	0.38	0.17	-3.21	0.31	0.42	-0.26	-0.38
2005	Mean	0.17	0.13	0.23	4.07	0.09	0.56	7.65
	Standard Error	0.03	0.02	0.04	0.12	0.01	0.07	0.52
	Median	0.10	0.12	0.24	3.94	0.07	1.00	8.00
	Standard Deviation	0.20	0.13	0.29	0.83	0.08	0.50	3.58
	Sample Variance	0.04	0.02	0.09	0.69	0.01	0.25	12.83
	Kurtosis	8.25	4.20	6.65	-0.65	-0.60	-2.02	-1.00
	Skewness	2.04	0.88	-0.23	0.38	0.75	-0.26	-0.38
2006	Mean	0.23	0.15	0.26	4.21	0.10	0.58	7.65
	Standard Error	0.04	0.02	0.03	0.12	0.02	0.07	0.52
	Median	0.16	0.13	0.24	4.07	0.07	1.00	8.00
	Mode	0.16	0.21	0.16	3.56	0.24	1.00	11.00
	Standard Deviation	0.25	0.12	0.18	0.82	0.11	0.50	3.58
	Sample Variance	0.06	0.01	0.03	0.67	0.01	0.25	12.83
	Kurtosis	5.01	0.56	0.79	-0.71	8.27	-1.96	-1.00
	Skewness	2.01	0.89	0.60	0.46	2.32	-0.35	-0.38
2007	Mean	0.22	0.15	0.25	4.30	0.08	0.60	7.65
	Standard Error	0.03	0.02	0.06	0.11	0.01	0.07	0.52
	Median	0.18	0.15	0.27	4.22	0.05	1.00	8.00
	Standard Deviation	0.23	0.16	0.38	0.80	0.10	0.49	3.58
	Sample Variance	0.05	0.02	0.15	0.63	0.01	0.24	12.83
	Kurtosis	2.52	5.15	26.60	-0.78	11.38	-1.89	-1.00
	Skewness	0.23	-0.67	-4.31	0.41	2.78	-0.44	-0.38
2008	Mean	0.21	0.15	0.30	4.43	0.10	0.60	7.65
	Standard Error	0.04	0.02	0.04	0.11	0.02	0.07	0.52
	Median	0.15	0.14	0.25	4.37	0.06	1.00	8.00
	Standard Deviation	0.25	0.16	0.29	0.79	0.14	0.49	3.58
	Sample Variance	0.06	0.02	0.09	0.63	0.02	0.24	12.83
	Kurtosis	4.18	2.78	7.97	-0.72	6.79	-1.89	-1.00
	Skewness	0.81	1.15	0.35	0.31	2.57	-0.44	-0.38

	Mean	0.15	0.10	0.22	4.44	0.11	0.65	7.65
	Standard Error	0.03	0.02	0.03	0.11	0.02	0.07	0.52
	Median	0.12	0.08	0.18	4.38	0.07	1.00	8.00
2009	**Standard Deviation**	0.18	0.11	0.22	0.77	0.15	0.48	3.58
	Sample Variance	0.03	0.01	0.05	0.59	0.02	0.23	12.83
	Kurtosis	3.41	4.14	2.72	-0.67	3.69	-1.68	-1.00
	Skewness	1.40	1.61	1.43	0.36	2.04	-0.63	-0.38
	Mean	0.18	0.11	0.24	4.36	0.11	0.69	7.65
	Standard Error	0.02	0.01	0.03	0.15	0.02	0.07	0.52
	Median	0.14	0.10	0.17	4.41	0.05	1.00	8.00
2010	**Standard Deviation**	0.14	0.08	0.24	1.01	0.14	0.47	3.58
	Sample Variance	0.02	0.01	0.06	1.02	0.02	0.22	12.83
	Kurtosis	-0.17	0.24	9.60	6.28	3.36	-1.36	-1.00
	Skewness	0.91	0.67	2.85	-1.44	1.94	-0.84	-0.38

Skewness indicates asymmetry and deviation from a normal distribution. The interpretation of skewness in distribution analysis is as follows:

- Skewness > 0 - Right skewed distribution - most values are concentrated on left of the mean, with extreme values to the right.
- Skewness < 0 - Left skewed distribution - most values are concentrated on the right of the mean, with extreme values to the left.
- Skewness = 0 - mean = median, the distribution is symmetrical around the mean.

Kurtosis is an indicator of flattening or "peakedness" of a distribution. Its interpretation is as follows:

- Kurtosis > 3 - Leptokurtic distribution, sharper than a normal distribution, with values concentrated around the mean and thicker tails. This means high probability for extreme values.
- Kurtosis < 3 - Platykurtic distribution, flatter than a normal distribution with a wider peak. The probability for extreme values is less than for a normal distribution, and the values are wider spread around the mean.
- Kurtosis = 3 - Mesokurtic distribution, for example a normal distribution.

As it can be seen from the Table 1, all the variables are asymmetrical. More precisely, skewness is positive for four of the variables, indicating the fat tails on the right-hand side of the distribution. On contrary, ROE, CSP and Industry have negative skewness, which indicates the fat tails on the left-hand side of the distribution. The skewness value calculated

will rarely be equal to zero, and for real data sets can be a positive or negative number. In order to check if the skewness is significant, one commonly used test is to check if the absolute skewness value is more than the value of two standard errors of skew. Tabachnick and Fidell (1996) state that the standard error of skew can be estimated as $\sqrt{6/n}$ where *n* is the sample size. So if the absolute skewness value is more than $2\times\sqrt{6/n}$ then there is significant skew in the distribution. Using this test, we can conclude that the ROS, ROA and accounting risk measures are all skewed to the right and the skewness is statistically significant. The skewness of the ROE, accounting size, CSP and Industry are not statistically significant.

The kurtosis values of all variables also show that the data is not normally distributed because values of kurtosis are deviated from 3. ROS, ROE and accounting risk are all leptokurtic, i.e. more peaked and fatter tails than the normal distribution. ROA, accounting size, CSP and Industry are all platykurtic, i.e. their distributions are less peaked and have thinner tails than that of a normal distribution. In order to check if the kurtosis is significant, one commonly used test is to check if the absolute kurtosis value is more than the value of two standard errors of kurtosis. Tabachnick and Fidell (1996) suggest that the standard error of kurtosis may be estimated as $\sqrt{24/n}$. Kurtosis is deemed to be significant when the absolute kurtosis value is greater than two standard error of kurtosis. Therefore, we can conclude that ROS, ROA, ROE, accounting risk and CSP have statistically significant kurtosis, and therefore have non-normal distributions.

Table 2: Descriptive statistics – Market Data

		Market Return	Size	Risk: Standard Deviation	Risk: Beta	CSP	Industry
2004	**Mean**	0.14	3.78	0.02	0.55	0.56	7.65
	Standard Error	0.06	0.16	0.00	0.07	0.07	0.52
	Median	0.19	3.93	0.02	0.41	1.00	8.00
	Standard Deviation	0.39	1.08	0.01	0.51	0.50	3.58
	Sample Variance	0.15	1.17	0.00	0.26	0.25	12.83
	Kurtosis	0.77	4.62	10.95	-0.12	-2.02	-1.00
	Skewness	-0.37	-1.79	2.89	0.83	-0.26	-0.38
2005	**Mean**	0.36	3.95	0.02	0.67	0.56	7.65
	Standard Error	0.04	0.14	0.00	0.07	0.07	0.52
	Median	0.36	4.01	0.02	0.65	1.00	8.00
	Standard Deviation	0.28	0.98	0.01	0.45	0.50	3.58

	Sample Variance	0.08	0.96	0.00	0.21	0.25	12.83
	Kurtosis	2.31	4.49	4.13	-0.23	-2.02	-1.00
	Skewness	0.03	-1.43	1.68	0.11	-0.26	-0.38
	Mean	0.36	4.13	0.02	0.73	0.58	7.65
	Standard Error	0.04	0.14	0.00	0.06	0.07	0.52
	Median	0.31	4.14	0.02	0.72	1.00	8.00
2006	**Standard Deviation**	0.30	0.98	0.01	0.43	0.50	3.58
	Sample Variance	0.09	0.96	0.00	0.18	0.25	12.83
	Kurtosis	2.57	5.65	2.46	-0.47	-1.96	-1.00
	Skewness	1.00	-1.58	-0.29	0.09	-0.35	-0.38
	Mean	0.18	4.27	0.02	0.71	0.60	7.65
	Standard Error	0.05	0.14	0.00	0.06	0.07	0.52
	Median	0.15	4.38	0.02	0.73	1.00	8.00
2007	**Standard Deviation**	0.32	0.98	0.00	0.39	0.49	3.58
	Sample Variance	0.10	0.96	0.00	0.16	0.24	12.83
	Kurtosis	0.97	6.67	5.52	0.31	-1.89	-1.00
	Skewness	0.79	-1.74	-0.52	-0.07	-0.44	-0.38
	Mean	-0.29	4.24	0.03	0.65	0.60	7.65
	Standard Error	0.05	0.14	0.00	0.06	0.07	0.52
	Median	-0.20	4.33	0.03	0.58	1.00	8.00
2008	**Standard Deviation**	0.37	0.98	0.01	0.43	0.49	3.58
	Sample Variance	0.13	0.97	0.00	0.19	0.24	12.83
	Kurtosis	-0.39	6.22	1.53	0.29	-1.89	-1.00
	Skewness	-0.46	-1.61	0.08	0.58	-0.44	-0.38
	Mean	0.23	4.19	0.03	0.66	0.65	7.65
	Standard Error	0.03	0.14	0.00	0.07	0.07	0.52
	Median	0.21	4.22	0.02	0.52	1.00	8.00
2009	**Standard Deviation**	0.24	0.96	0.01	0.51	0.48	3.58
	Sample Variance	0.06	0.92	0.00	0.26	0.23	12.83
	Kurtosis	0.27	6.70	2.20	0.11	-1.68	-1.00
	Skewness	-0.16	-1.68	0.21	0.89	-0.63	-0.38
	Mean	0.14	4.35	0.02	0.69	0.69	7.65
	Standard Error	0.03	0.11	0.00	0.07	0.07	0.52
	Median	0.13	4.29	0.02	0.56	1.00	8.00
2010	**Standard Deviation**	0.22	0.74	0.00	0.47	0.47	3.58
	Sample Variance	0.05	0.55	0.00	0.22	0.22	12.83
	Kurtosis	0.96	-0.30	6.53	-0.10	-1.36	-1.00
	Skewness	0.27	0.05	2.03	0.50	-0.84	-0.38

For the market data, the only significant skewness value is that of the market size. Therefore, we can conclude that the market size is significantly skewed to the left. The only variables with kurtosis that is statistically significant are market size and CSP. Therefore, we can conclude that market size and CSP have non-normal distributions.

3.3. CORRELATION

The correlation coefficient is often referred to as Pearson's product-moment r or r coefficient. It may take on a range of values from -1 to 0 to +1, where the values are absolute and non-dimensional with no units involved. A correlation coefficient of zero indicates that no association exists between the measured variables. The closer the r coefficient approaches ± 1, regardless of the direction, the stronger is the existing association indicating a more linear relationship between the two variables. Positive correlation coefficient indicates that an increase in the first variable would correspond to an increase in the second variable, thus implying a direct relationship between the variables. A negative correlation indicates an inverse relationship whereas one variable increases, the second variable decreases.

One of the basic assumptions of Ordinary Least Square (OLS) method is that independent variables are not mutually correlated. If one of them is correlated with another, multicollinearity is said to exist. When multicolinearity is present, the regression coefficients become imprecise and it becomes difficult to assign the change in the dependent variable precisely to one or the other of the correlated explanatory variables. Therefore, since this study uses multivariate regression analysis, the regression analysis should commence with the estimation of the correlation coefficients between all the variables to be included in the model. The tables below show the correlation coefficients between the accounting and market variables.

Table 3: Correlation coefficients – Accounting Data

		ROS	ROA	ROE	Size	Risk	CSP	Industry
2004	**ROS**	1.00						
	ROA	0.63	1.00					
	ROE	0.49	0.70	1.00				
	Size	0.24	-0.12	0.26	1.00			
	Risk	-0.17	-0.10	-0.39	-0.02	1.00		
	CSP	0.21	0.00	0.17	**0.74**	0.05	1.00	
	Industry	-0.21	0.00	-0.24	-0.21	0.28	-0.09	1.00
2005	**ROS**	1.00						
	ROA	0.59	1.00					
	ROE	0.37	0.65	1.00				
	Size	0.15	-0.26	-0.10	1.00			
	Risk	0.00	0.11	-0.18	-0.09	1.00		

	CSP	0.23	-0.07	0.00	**0.60**	-0.18	1.00	
	Industry	-0.22	-0.02	-0.36	-0.21	0.23	-0.22	1.00
	ROS	1.00						
	ROA	0.25	1.00					
	ROE	0.30	0.59	1.00				
2006	**Size**	0.39	-0.12	0.01	1.00			
	Risk	-0.11	0.02	-0.10	0.04	1.00		
	CSP	0.31	0.04	-0.08	**0.60**	0.16	1.00	
	Industry	-0.34	0.15	-0.28	-0.25	0.18	-0.24	1.00
	ROS	1.00						
	ROA	0.53	1.00					
	ROE	0.53	0.80	1.00				
2007	**Size**	0.33	-0.07	0.11	1.00			
	Risk	-0.05	-0.01	0.00	0.00	1.00		
	CSP	0.35	0.11	0.10	**0.63**	0.22	1.00	
	Industry	-0.27	0.01	-0.25	-0.28	0.19	-0.18	1.00
	ROS	1.00						
	ROA	0.50	1.00					
	ROE	0.32	0.52	1.00				
2008	**Size**	0.16	-0.17	-0.25	1.00			
	Risk	-0.09	-0.14	-0.20	0.11	1.00		
	CSP	0.21	-0.15	-0.33	**0.59**	0.27	1.00	
	Industry	-0.13	0.22	0.01	-0.29	0.12	-0.10	1.00
	ROS	1.00						
	ROA	0.39	1.00					
	ROE	0.16	0.61	1.00				
2009	**Size**	0.16	-0.33	-0.21	1.00			
	Risk	0.01	0.05	0.02	0.10	1.00		
	CSP	-0.01	-0.25	-0.17	**0.60**	0.27	1.00	
	Industry	-0.20	0.10	-0.11	-0.31	0.07	-0.10	1.00
	ROS	1.00						
	ROA	0.05	1.00					
	ROE	0.22	0.67	1.00				
2010	**Size**	0.43	-0.30	-0.13	1.00			
	Risk	0.04	0.12	0.19	0.13	1.00		
	CSP	0.09	-0.13	-0.09	**0.53**	0.26	1.00	
	Industry	-0.26	0.19	-0.17	-0.38	0.09	-0.03	1.00

Table 4: Correlation coefficients – Market Data

		Market Return	Size	Stdev	Beta	CSP	Industry
2004	**Market Return**	1.00					
	Size	0.01	1.00				
	Risk: Stdev	-0.05	-0.01	1.00			
	Risk: Beta	-0.32	**0.64**	0.14	1.00		
	CSP	0.00	**0.66**	-0.11	**0.53**	1.00	
	Industry	-0.52	-0.08	0.05	0.18	-0.09	1.00
2005	**Market Return**	1.00					
	Size	0.08	1.00				
	Risk: Stdev	0.38	-0.11	1.00			
	Risk: Beta	0.32	**0.67**	0.02	1.00		
	CSP	0.11	**0.57**	-0.27	**0.57**	1.00	
	Industry	-0.08	-0.06	0.27	-0.13	-0.22	1.00
2006	**Market Return**	1.00					
	Size	0.02	1.00				
	Risk: Stdev	0.20	0.37	1.00			
	Risk: Beta	0.11	**0.70**	**0.60**	1.00		
	CSP	-0.04	**0.59**	0.03	**0.48**	1.00	
	Industry	-0.07	-0.07	0.28	0.00	-0.24	1.00
2007	**Market Return**	1.00					
	Size	-0.06	1.00				
	Risk: Stdev	0.09	0.40	1.00			
	Risk: Beta	-0.07	**0.69**	**0.56**	1.00		
	CSP	-0.25	**0.61**	0.16	**0.58**	1.00	
	Industry	-0.04	-0.08	0.25	-0.10	-0.18	1.00
2008	**Market Return**	1.00					
	Size	-0.03	1.00				
	Risk: Stdev	-0.42	**0.50**	1.00			
	Risk: Beta	-0.40	**0.70**	**0.74**	1.00		
	CSP	-0.14	**0.54**	0.18	**0.41**	1.00	
	Industry	0.02	-0.05	0.34	0.10	-0.10	1.00
2009	**Market Return**	1.00					
	Size	0.08	1.00				
	Risk: Stdev	0.31	0.33	1.00			
	Risk: Beta	0.32	**0.58**	**0.60**	1.00		
	CSP	-0.09	**0.56**	0.19	**0.45**	1.00	
	Industry	0.14	-0.06	0.35	-0.01	-0.10	1.00
2010	**Market Return**	1.00					
	Size	0.06	1.00				
	Risk: Stdev	-0.39	-0.14	1.00			
	Risk: Beta	-0.24	**0.63**	0.25	1.00		
	CSP	-0.26	**0.50**	-0.16	**0.35**	1.00	
	Industry	-0.14	-0.06	**0.43**	-0.08	-0.03	1.00

The highlighted correlation coefficients indicate explanatory variables whose correlation is high, i.e. greater than 0.40. However, it must be determined whether these correlation coefficients are statistically significant.

A rule of thumb was used to determine whether the correlation between two variables is significant. The correlation between two normal random variables is considered statistically significant if the sample correlation coefficient *r* is sufficiently large or sufficiently small. For a bivariate data set $\{(x_i, y_i) : i = 1, \ldots, n\}$, the sample correlation coefficient , *r*, is defined by

$$r = \frac{\sum_{i=1}^{n} (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^{n} (x_i - \bar{x})^2 \sum_{i=1}^{n} (y_i - \bar{y})^2}}$$

If the data comes from a random sample of independent normal random variables *X* and *Y*, the random variable *T* with observed value

$$T = r\left(\frac{n-2}{1-r^2}\right)^{1/2}$$

Has Student's t-distribution with *n-2* degrees of freedom. Therefore, when testing $H_o : r = 0$ versus $H_a : r \neq 0$ using level of significance $\alpha = 0.1$, we reject H_o if the test statistic $|T| = |r|\left(\frac{n-2}{1-r^2}\right)^{1/2}$, exceeds $T_{0.975,n-2}$, the 0.975 quantile from the t-distribution with *n-2* degrees of freedom.

To derive the rule of thumb, we reject H_o if

$$|r|\left(\frac{n-2}{1-r^2}\right)^{1/2} > T_{0.975,n-2}$$

The 0.975 quantile of a t-distribution with *n-2* degrees of freedom is closely approximated by a function of *n*. Specifically, for $n \geq 5$

$$T \approx \sqrt{\frac{4(n-2)}{n-4}}$$

Therefore, using an approximation, if

$$|r|\left(\frac{n-2}{1-r^2}\right)^{1/2} > \sqrt{\frac{4(n-2)}{n-4}}$$

Solving for $|r|$ gives us $r^2(n-4) > 4(1-r^2)$ and, in turn, $r^2 > 4/n$. Thus we reject the null hypothesis of zero correlation if $|r| > 2/\sqrt{n}$.

It was found that for the accounting data, the correlation between size and CSP is statistically significant. Therefore, since CSP is the independent variable of interest, size will be removed from the set of independent variables for the regression analysis. For the market data, it was found that the correlation between beta and CSP, as well as the correlation between size and CSP, are both statistically significant. Therefore, size was removed from the set of independent variables. In addition, since CSP and beta are correlated, the only risk measure used in modeling the relationship between CSP and CFP using market data is standard deviation.

3.4. TESTS FOR NORMALITY

The standard assumption in linear regression is that the theoretical residuals are independent and normally distributed. Carefully assessing the residuals can tell us whether the model used and the assumptions underlying the model are appropriate. Departures from the assumptions usually mean that the residuals contain structure that is not accounted for in the model.

If the theoretical residuals are not exactly normally distributed, but the sample size is large enough then the Central Limit Theorem says that the usual inference based on the assumption of normality will still be approximately correct. However, because the sample size for this study is not large enough, it is important to test for normality. The residuals of the regression analysis were tested for normality using three tests – the Shapiro-Wilk test, the Anderson-Darling test and the Jarque-Bera test. The null hypothesis for each of the tests is that the variable from which the sample was extracted follows a normal distribution. The alternative hypothesis is that the variable from which the sample was extracted does not follow a normal distribution. If the null hypothesis cannot be rejected for any one of the tests, then it is assumed that the distribution is normal and the linear regression model can be used to model the data.

In addition to the above-mentioned tests for normality, diagnostic plots, such as quantile-quantile (Q-Q) plots and histograms, were used to detect normality in the residuals. The Q-Q plot compares ordered values of a variable with quantiles of a specified theoretical distribution such as the normal distribution. If the data distribution matches the theoretical distribution, the points on the plot form a linear pattern. Thus, a Q-Q plot can be used to determine how well a theoretical distribution models a set of measurements. Figures 1 to 4 below show the Q-Q plots for ROS, ROA, ROE and market return for the year 2004.

Figure 1: Q-Q Plot for ROS – 2004

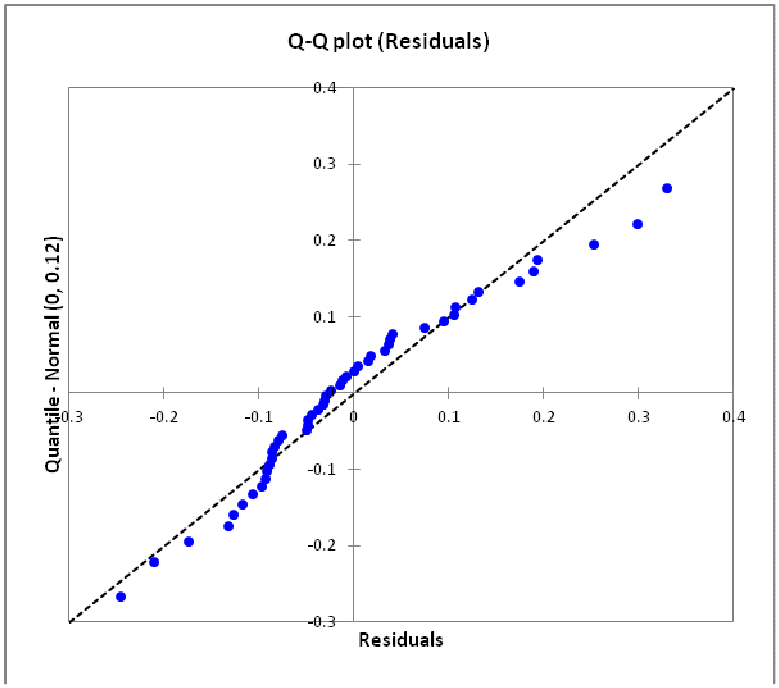


Figure 2: Histogram for ROS – 2004

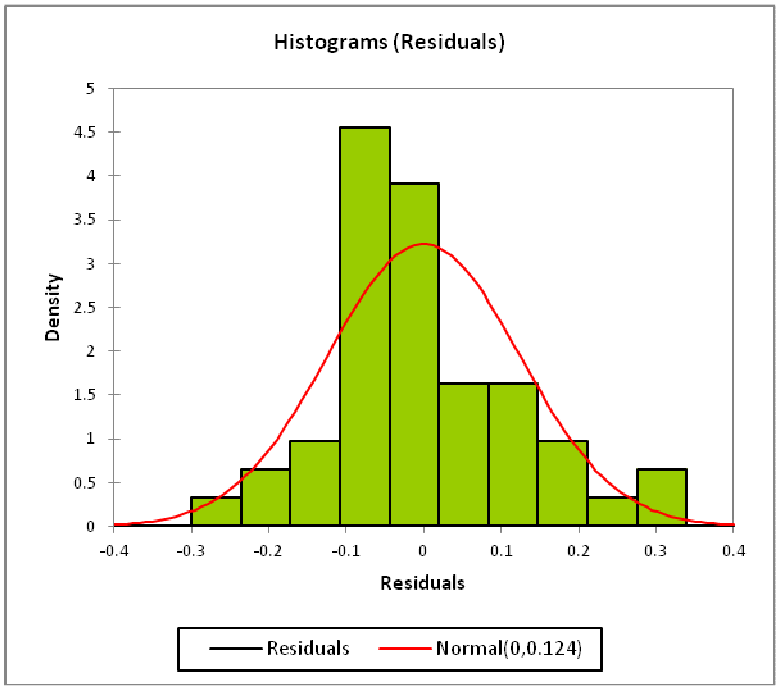


Figure 3: Q-Q Plot for ROA – 2004

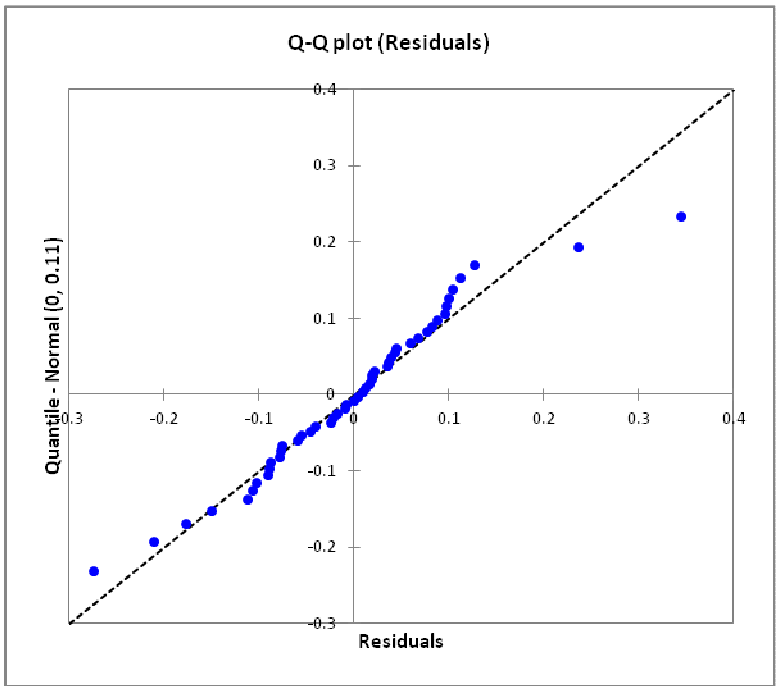


Figure 4: Histogram for ROA – 2004

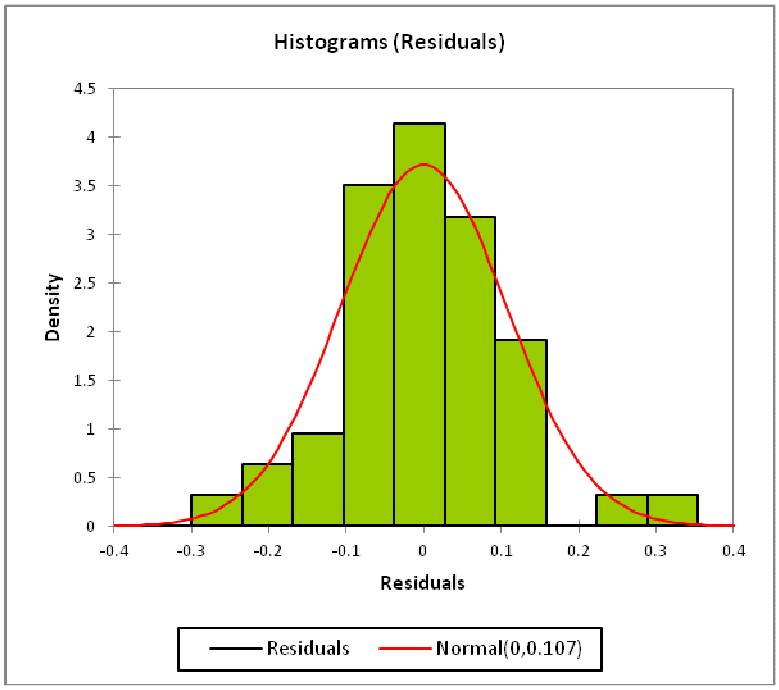


Figure 5: Q-Q Plot for ROE – 2004

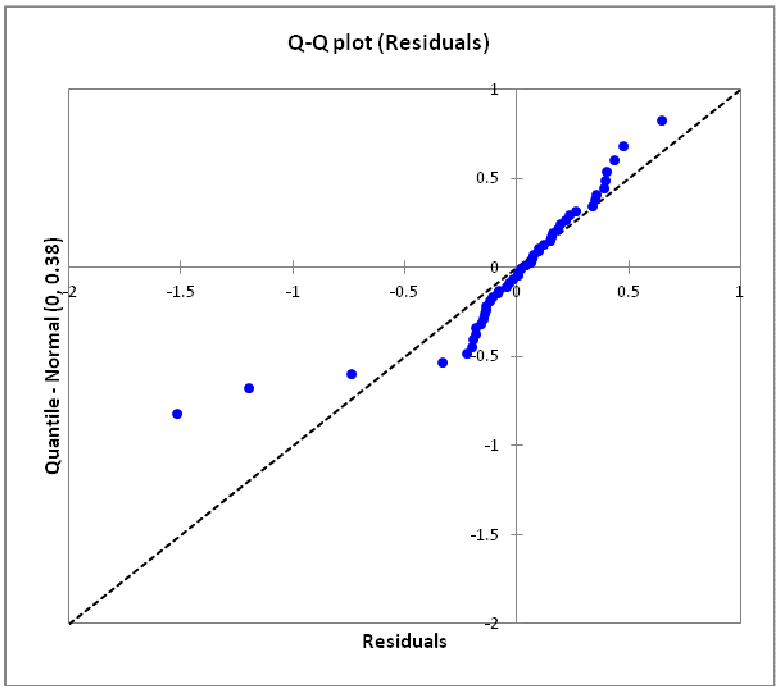


Figure 6: Histogram for ROE – 2004

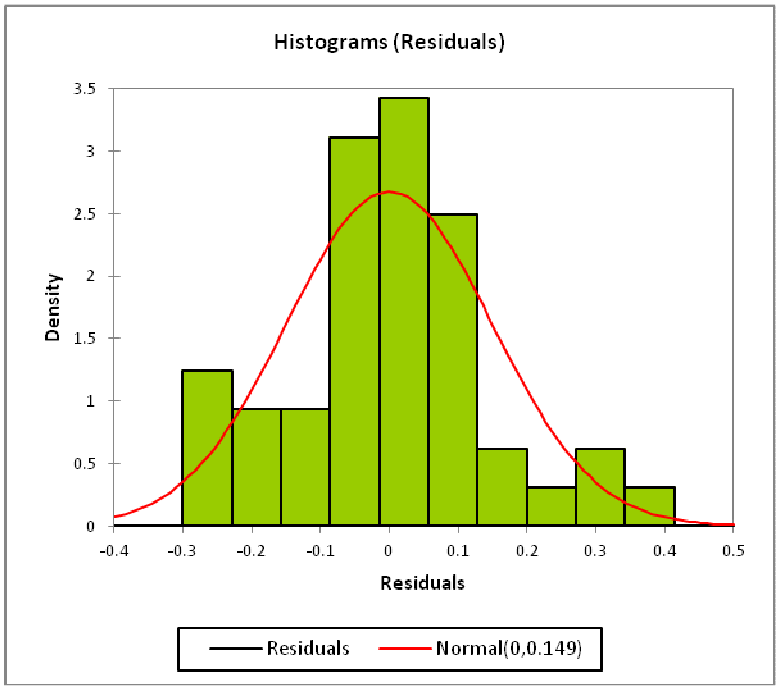


Figure 7: Q-Q Plot for Market Return – 2004

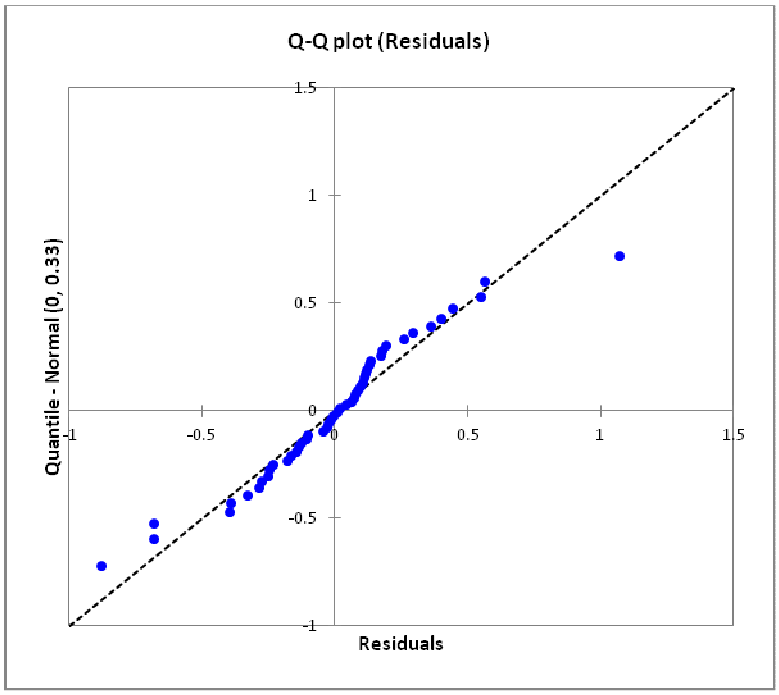
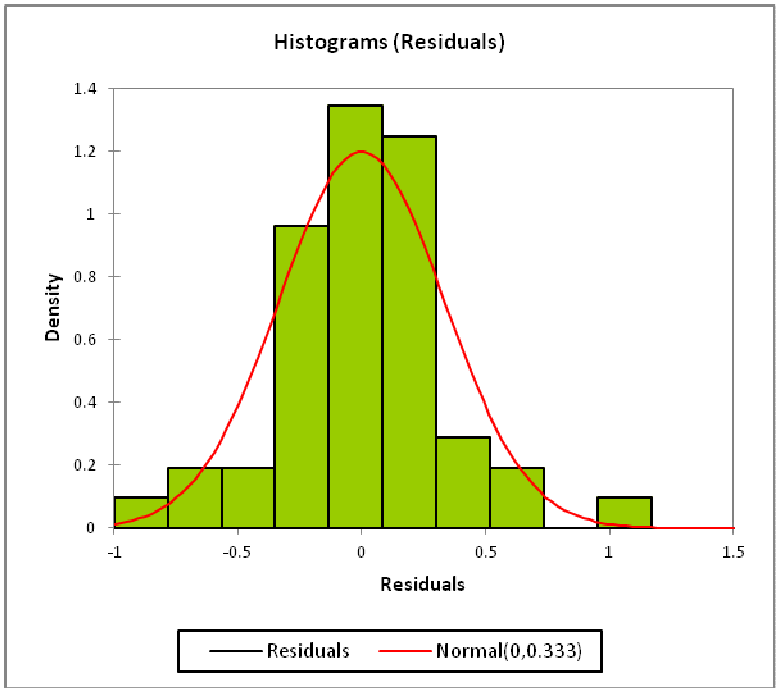


Figure 8: Histogram for Market Return – 2004



For ROS and ROA, the null hypothesis could not be rejected for at least one of the tests. In addition, the Q-Q plots display only small departures from the straight line in the normal probability plot. For ROE and market return, the null hypothesis was rejected for all the tests. The Q-Q plots for ROE and market return show indications of departure from normality in the residual distributions. This means that for ROE and market return, the normality assumption is either violated or there are outliers in the data.

Outliers are extreme values on either the independent or dependent variables or both. Outliers can occur as a result of observation errors, data entry errors, instrument errors based on layout or instructions or actual extreme values. Because outliers affect statistical analysis they must be explained, deleted or accommodated. The presence of outliers can lead to inflated error rates and substantial distortions of parameter and statistic estimates when using either parametric or nonparametric tests (Zimmerman, 1994). Outliers generally increase error variance and reduce the power of statistical tests, and, if non-randomly distributed, they can decrease normality (Rasmussen, 1988; Schwager & Margolin, 1982; Zimmerman, 1994). Therefore, for this study, the outliers were deleted from the dataset. In all cases, it was found that when outliers were removed, the null hypothesis for at least one of the tests for normality could not be rejected. Figures 5 to 8 show the Q-Q plots and

histograms of the residuals after the outliers were removed for ROE and market return in 2004.

Figure 9: Q-Q Plot for ROE after removal of outliers – 2004

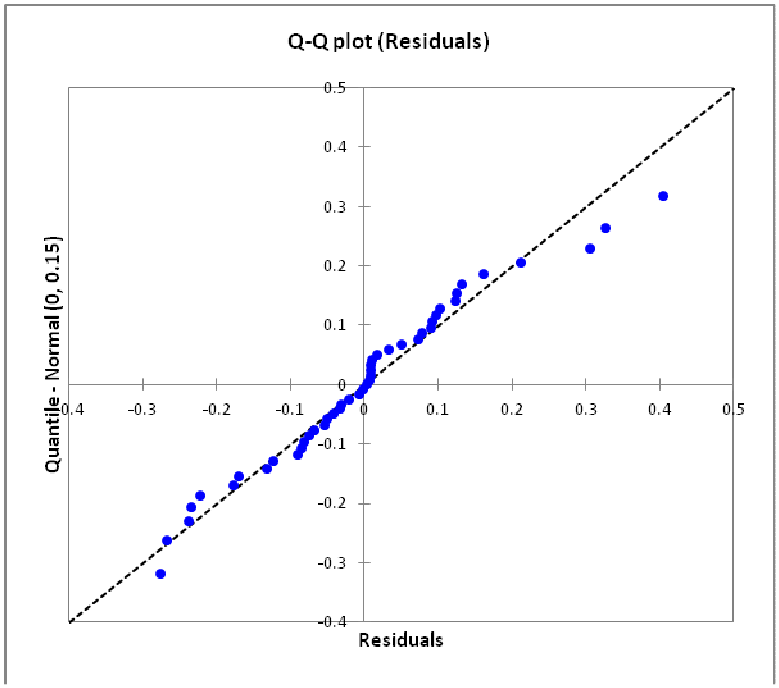


Figure 10: Histogram of residuals for ROE after removal of outliers– 2004

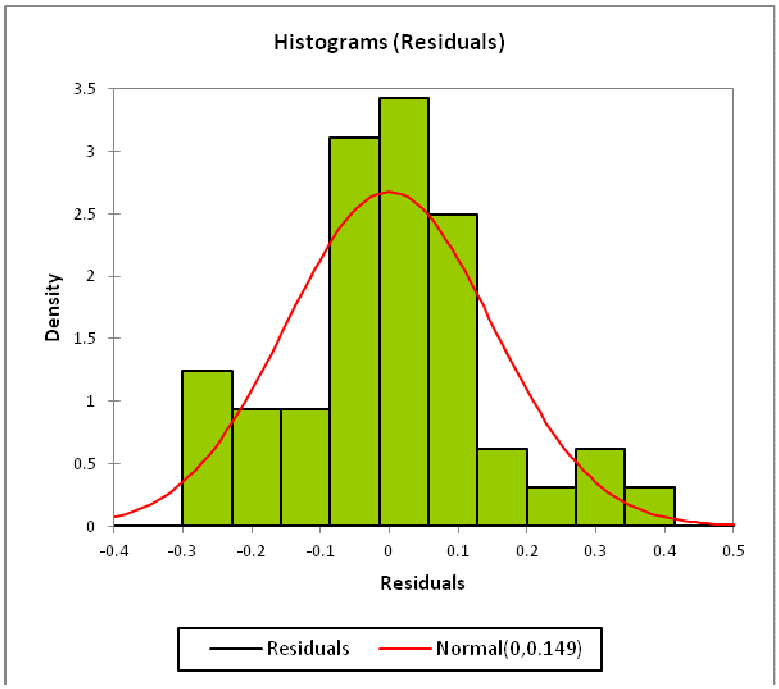


Figure 11: Q-Q Plot for Market Return after removal of outliers– 2004

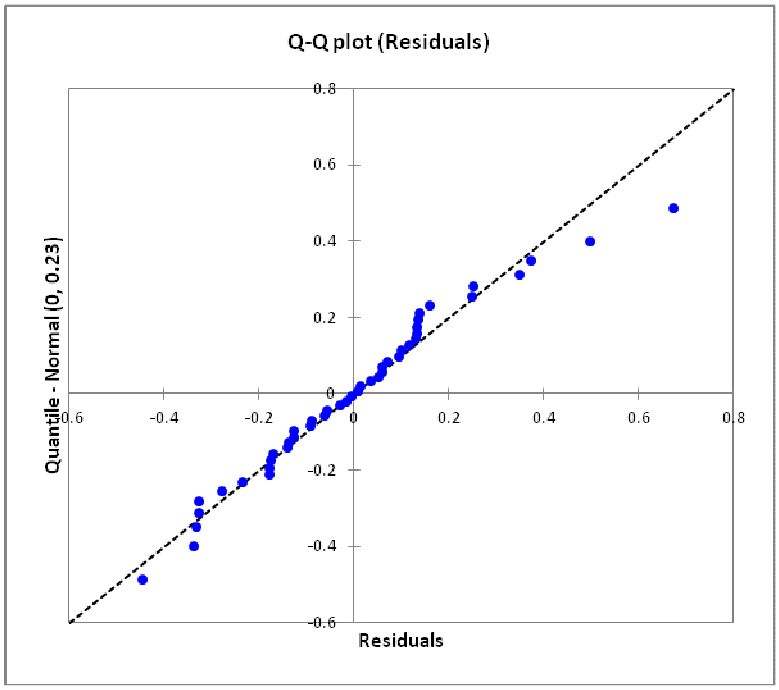
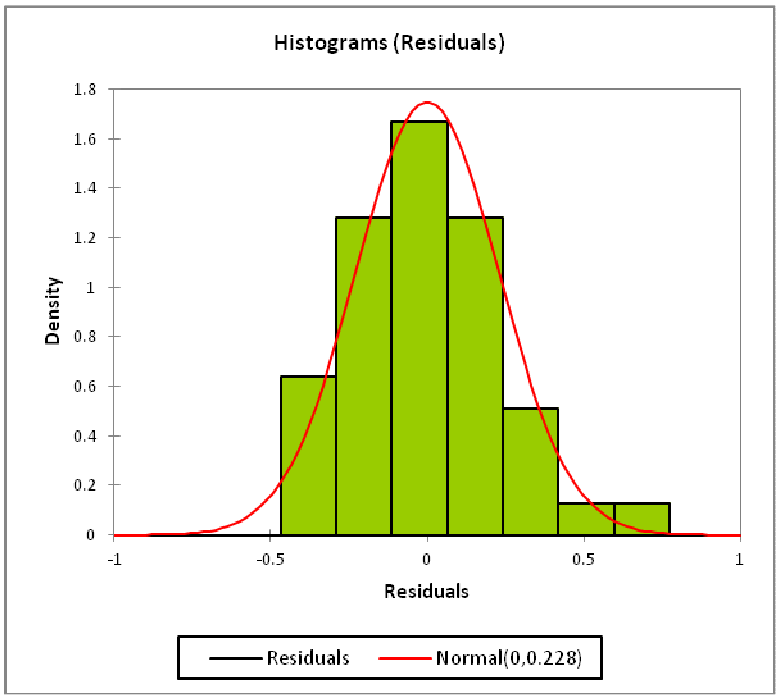


Figure 12: Histogram of residuals for Market Return after removal of outliers – 2004



3.5. MODEL SPECIFICATION

There has been a lack of consensus in literature about the appropriate measurement of corporate financial performance. Accounting-based measures and stock market-based measures of financial performance are subject to different biases. According to McGuire et al. (1988), accounting-based measures are subject to different accounting procedures and managerial manipulation. On the other hand, stock market-based measures may not reflect fair valuation of the company by different investors, especially where there is informational asymmetry. McWilliams et al. (2006) have noted that stock prices only relate to the valuation of the company by financial stakeholders and do not take into account the fact that a firm's non-financial stakeholders are also affected by its CSR activities. In this study, both accounting-based and stock market-based measures of corporate financial performance are used.

A regression model is used to investigate the relationship between corporate financial performance and corporate social performance. Margolis and Walsh (2001) reviewed a number of empirical studies and found that corporate social performance was used as the independent variable in most studies. This study also follows the same methodology, where corporate financial performance is the dependent variable and corporate social performance is the independent variable. The following regression model is used to assess the association between CFP and CSP:

$$Y_t = \alpha + \beta_{1,t} X_{1,t} + \beta_{2,t} X_{2,t} + \beta_{3,t} X_{3,t} + \beta_{4,t} X_{4,t} + \varepsilon_t$$

Where Y_t = financial performance in year t

$X_{1,t}$ = a proxy for corporate social responsibility in year t (based on the JSE SRI Index)

$X_{2,t}$=a proxy for firm firm risk in year t

$X_{3,t}$= industry of firm

ε_t = error term

Following the paper by Chatterji et al (2007), the time-dependent relationship between CFP and CSP can be assessed using a distributed lag model. However, according to Baltagi (1995) and Munoz (2005), when lagged dependent variables are included as explanatory variables estimators are biased and inconsistent, except when the number of time periods is large. Therefore, since the JSE SRI Index was launched in May 2004, the time period is too short to investigate the direction of causation between CFP and CSP.

3.6. CONTROL VARIABLES

Size, risk and industry have been used as control variables in previous empirical studies (Ullman, 1985; McWilliams and Siegel, 2000) as they affect both the firms' financial performance as well as the firm's corporate social performance.

Size is considered a relevant control variable because socially responsible behaviours of small and large firms are different. According to Burke et al. (1986), as firms mature and grow, they attract more attention from stakeholders, which may compel them to conduct their businesses in a more socially responsible fashion. Larger firms are generally thought to be inherently less risky than smaller firms. This is partly because larger firms can weather adverse economic shocks better than smaller firms can. However, size (both accounting size and market size) was found to be significantly correlated with CSP, and was therefore excluded from the model.

The model used for this study also controls for industry-specific factors that have been shown to have an impact on firm performance. Chand (2006) argues that since industries operate in different contexts, and therefore differ in the way in which they deal with social, environmental and financial issues, industry should be a control variable. Industry is represented by dummy variables, which in our case results in the construction of 13 dummy variables representing the following industries: banks, beverages, chemicals, construction and materials, financial services, fixed line telecommunications, food and drug retailers, food producers, general industrials, healthcare equipment and services, mining, mobile telecommunications, and software and computer services. The companies in the sample were split into industries using the Industry Classification Benchmark (ICB) industry classifications according to sectors.

Griliches (1979) and McWilliams and Siegel (2000) argued for the inclusion of research and development (R&D) intensity in the econometric model as this measure is believed to be associated with companies' long-run economic performance. However, Waddock and Graves (1997) contend that controlling for industry takes into account the differences in R&D intensity. Therefore, we follow this approach and do not control for R&D intensity.

4. RESULTS

4.1. ACCOUNTING DATA

Table 5 presents the results of the regression analysis using CSP as the independent variable and ROS as the dependent variable, controlling for risk and industry.

Table 5: ROS vs CSP

		Dependent Variable: ROS					
		t-Stat	**p-value**	**R^2**	**Adj R^2**	**F Stat**	**Significance F**
2004	**Independent Variable:** CSP	1.39	0.17	0.10	0.04	1.62	0.20
	Intercept	3.24	0.00				
	Control Variables						
	Risk	-0.94	0.35				
	Industry	-1.04	0.31				
2005	**Independent Variable:** CSP	0.48	0.63	0.07	0.01	1.10	0.36
	Intercept	3.34	0.00				
	Control Variables						
	Risk	0.85	0.40				
	Industry	-1.59	0.12				
2006	**Independent Variable:** CSP	1.40	0.17	0.05	-0.02	0.71	0.55
	Intercept	2.44	0.02				
	Control Variables						
	Risk	-0.42	0.67				
	Industry	-0.12	0.91				
2007	**Independent Variable:** CSP	3.55	0.00	0.26	0.20	4.55	0.01
	Intercept	2.14	0.04				
	Control Variables						
	Risk	-1.36	0.18				
	Industry	-0.18	0.85				
2008	**Independent Variable:** CSP	2.26	0.03	0.18	0.11	2.41	0.09
	Intercept	2.17	0.04				
	Control Variables						
	Risk	0.67	0.51				
	Industry	-0.12	0.91				
2009	**Independent Variable:** CSP	1.29	0.20	0.11	0.05	1.81	0.16
	Intercept	2.66	0.01				
	Control Variables						
	Risk	0.48	0.64				
	Industry	-1.63	0.11				
2010	**Independent Variable:** CSP	2.00	0.05	0.13	0.07	2.04	0.12
	Intercept	2.76	0.01				
	Control Variables						
	Risk	0.25	0.80				
	Industry	-0.99	0.33				

When ROS is used as a measure of financial performance, CSP is statistically significant in explaining financial performance in 2007, 2008 and 2010. The adjusted R^2 is very low in all the periods except 2007 and 2008, when CSP is statistically significant. This shows that the explanatory variables have very little explanatory power over the dependent variable. The F statistics also show that the multivariate regression model does not have validity in fitting the data at the 10% level of significance, i.e. the probability that the regression coefficients are zero is very high. The only period in which the null hypothesis that the regression coefficients are zero can be rejected is 2007.

Table 6 presents the results of the regression analysis using CSP as the independent variable and ROA as the dependent variable, controlling for risk and industry.

Table 6: ROA vs CSP

		Dependent Variable: ROA					
		t-Stat	**p-value**	**R^2**	**Adj R^2**	**F Stat**	**Significance F**
	Independent Variable: CSP	0.04	0.97				
	Intercept	2.46	0.02				
2004	**Control Variables**			0.01	-0.06	0.16	0.92
	Risk	-0.70	0.49				
	Industry	0.19	0.85				
	Independent Variable: CSP	0.24	0.81				
	Intercept	1.91	0.06				
2005	**Control Variables**			0.05	-0.02	0.71	0.55
	Risk	0.44	0.66				
	Industry	1.20	0.24				
	Independent Variable: CSP	0.25	0.80				
	Intercept	1.71	0.09				
2006	**Control Variables**			0.06	0.00	0.95	0.42
	Risk	0.18	0.86				
	Industry	1.60	0.12				
	Independent Variable: CSP	0.10	0.92				
	Intercept	2.25	0.03				
2007	**Control Variables**			0.07	0.00	1.01	0.40
	Risk	-0.30	0.76				
	Industry	1.73	0.09				
	Independent Variable: CSP	0.42	0.68				
	Intercept	1.61	0.11				
2008	**Control Variables**			0.11	0.05	1.71	0.18
	Risk	-0.60	0.55				
	Industry	2.25	0.03				

2009	**Independent Variable:** CSP	-1.75	0.09	0.09	0.02	1.30	0.29
	Intercept	3.03	0.00				
	Control Variables						
	Risk	0.03	0.98				
	Industry	0.68	0.50				
2010	**Independent Variable:** CSP	-1.63	0.11	0.15	0.08	2.38	0.08
	Intercept	3.16	0.00				
	Control Variables						
	Risk	0.08	0.94				
	Industry	2.01	0.05				

Using ROA as a measure of financial performance, industry is statistically significant in explaining financial performance in 2007, 2008 and 2010. CSP is only statistically significant in 2009. At the 10% level of significance, the model has no explanatory power in all the periods except 2010.

Table 7 presents the results of the regression analysis using CSP as the independent variable and ROE as the dependent variable, controlling for risk, size, and industry.

Table 7: ROE vs CSP

	Dependent Variable: ROE						
		t-Stat	**p-value**	**R^2**	**Adj R^2**	**F Stat**	**Significance F**
2004	**Independent Variable:** CSP	-1.76	0.09	0.12	0.06	1.94	0.14
	Intercept	5.24	0.00				
	Control Variables						
	Risk	-0.71	0.48				
	Industry	-1.12	0.27				
2005	**Independent Variable:** CSP	-0.52	0.60	0.14	0.07	2.08	0.12
	Intercept	5.17	0.00				
	Control Variables						
	Risk	-1.89	0.07				
	Industry	-1.08	0.29				
2006	**Independent Variable:** CSP	-0.55	0.59	0.10	0.03	1.37	0.27
	Intercept	5.78	0.00				
	Control Variables						
	Risk	-0.37	0.71				
	Industry	-1.85	0.07				
2007	**Independent Variable:** CSP	-1.30	0.20	0.12	0.05	1.68	0.19
	Intercept	8.09	0.00				
	Control Variables						
	Risk	0.45	0.65				
	Industry	-2.04	0.05				

2008	**Independent Variable:** CSP	-1.09	0.28	0.10	0.03	1.44	0.25
	Intercept	5.51	0.00				
	Control Variables						
	Risk	-1.40	0.17				
	Industry	0.23	0.82				
2009	**Independent Variable:** CSP	-1.83	0.07	0.10	0.04	1.56	0.21
	Intercept	4.72	0.00				
	Control Variables						
	Risk	0.33	0.74				
	Industry	-1.31	0.20				
2010	**Independent Variable:** CSP	-2.60	0.01	0.15	0.09	2.48	0.07
	Intercept	5.56	0.00				
	Control Variables						
	Risk	-0.01	0.99				
	Industry	-0.50	0.62				

When ROE is used as a measure of financial performance, risk is statistically significant in explaining financial performance in 2005; industry is statistically significant in 2006 and 2007 and CSP is statistically significant in 2004, 2009 and 2010. The R^2 and F statistics show that the model does not fit the data well in all the periods except 2010, at the 10% level of significance.

As can be seen in Tables 5 to 7, the models show that CSP is not statistically significant at the 10% level of significance for most of the periods. The models also have weak explanatory power, as can be seen from the low adjusted coefficients of determination (adj R^2) for all the periods. The F-statistics of the models also show that the models are not a good fit for the data in most of the periods at the 10% level significance. This shows that accounting-based measures of financial performance are less reliable when predicted by the independent variables and CSP.

4.2. MARKET DATA

Table 8 presents the results of the regression analysis using CSP as the independent variable and stock market return as the dependent variable, controlling for industry and risk as measured by standard deviation of returns.

Table 8: Stock market return vs CSP, using standard deviation as risk measure

	Dependent Variable: Market Return						
		t-Stat	p-value	R^2	Adj R^2	F Stat	Significance F
2004	**Independent Variable:** CSP	0.33	0.74	0.42	0.38	9.71	0.00
	Intercept	5.90	0.00				
	Control Variables						
	Risk	-2.74	0.01				
	Industry	-4.75	0.00				
2005	**Independent Variable:** CSP	1.46	0.15	0.22	0.16	4.03	0.01
	Intercept	0.67	0.51				
	Control Variables						
	Risk	3.35	0.00				
	Industry	-1.14	0.26				
2006	**Independent Variable:** CSP	0.44	0.66	0.11	0.05	1.72	0.18
	Intercept	0.92	0.36				
	Control Variables						
	Risk	2.01	0.05				
	Industry	-0.74	0.46				
2007	**Independent Variable:** CSP	-2.06	0.05	0.10	0.04	1.61	0.20
	Intercept	0.91	0.37				
	Control Variables						
	Risk	1.12	0.27				
	Industry	-0.93	0.36				
2008	**Independent Variable:** CSP	-0.21	0.83	0.21	0.16	3.97	0.01
	Intercept	0.74	0.46				
	Control Variables						
	Risk	-3.29	0.00				
	Industry	1.28	0.21				
2009	**Independent Variable:** CSP	-1.02	0.31	0.12	0.06	1.96	0.13
	Intercept	0.23	0.82				
	Control Variables						
	Risk	2.16	0.04				
	Industry	0.02	0.98				
2010	**Independent Variable:** CSP	-2.49	0.02	0.26	0.21	5.08	0.00
	Intercept	4.76	0.00				
	Control Variables						
	Risk	-3.16	0.00				
	Industry	0.33	0.74				

CSP is statistically significant in explaining stock market returns in 2007 and 2010 when standard deviation is used as a measure of risk. Risk is statistically significant in explaining stock market returns for all the years except 2007. Industry is significant in 2004. The F-statistics indicate that the regression model is a good fit for the data at the 10% level of significance in 2004, 2005, 2008 and

2010. For the same periods, the independent variables have strong explanatory power over market returns, as shown by the high adjusted R^2.

4.3. GOOD GOVERNANCE VS BAD GOVERNANCE PORTFOLIOS

To further compare the financial performance between firms that are socially responsible and those that are not considered socially responsible, we create two equally weighted portfolios based on the inclusion or exclusion of a firm from the JSE SRI Index. A good governance portfolio that includes firms in the sample that are included in the JSE SRI Index in a particular year and a bad governance portfolio that comprises firms in the sample that are not included in the index were constructed.

We then compare the average stock market returns of the constituents of the good governance and bad governance portfolios. The equal weighted good governance portfolio underperforms the equal weighted bad governance portfolio in all the periods but 2005, as shown in Table 9 below.

Table 9: Good governance vs bad governance portfolios

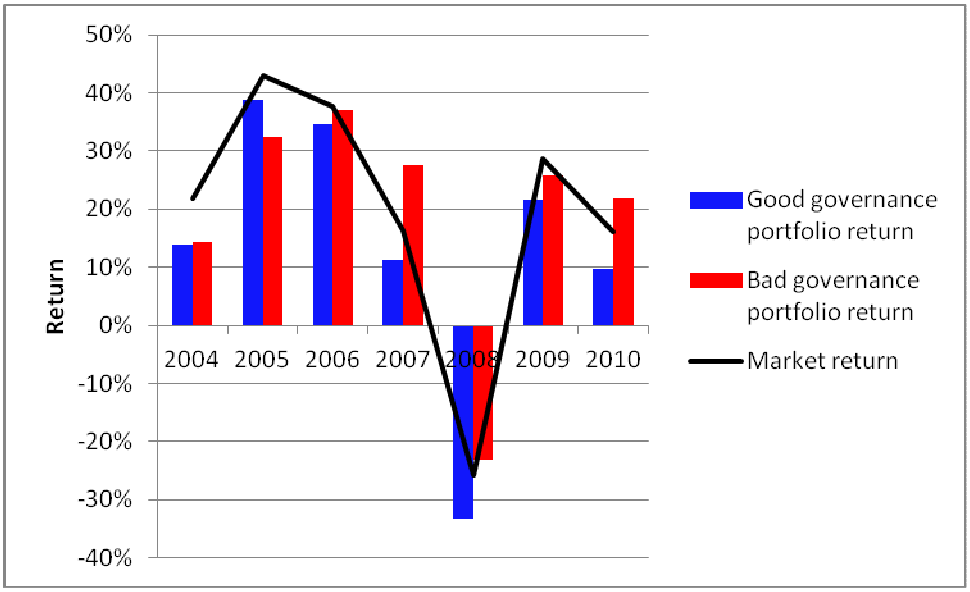
	2004	2005	2006	2007	2008	2009	2010
Risk-free rate	1%	8%	8%	8%	9%	8%	8%
Market return	22%	43%	38%	16%	-26%	29%	16%
Good Governance Portfolio							
Portfolio Return	14%	39%	35%	11%	-33%	22%	10%
Sharpe Ratio	0.35	1.67	1.35	0.11	-1.26	0.71	0.12
Treynor Measure	0.21	0.35	0.30	0.08	-0.35	0.20	0.08
Bad Governance Portfolio							
Portfolio Return	14%	32%	37%	27%	-23%	26%	22%
Sharpe Ratio	0.31	0.66	0.72	0.57	-0.78	0.57	0.50
Treynor Measure	0.21	0.35	0.30	0.08	-0.35	0.20	0.08

In order to determine whether the means of the two portfolios are statistically different, we conduct the two-sample mean difference test to test the null hypothesis that the population means of two groups are equal. There two versions of the two sample t-test – one assumes that the two portfolios have equal variances and the other assumes unequal variances. Therefore, before conducting the t-tests, we conduct the Fisher variance-ratio test (*F*-test) to determine if the variance of one portfolio is statistically significantly greater than the variance of the second portfolio. Thereafter, the appropriate t-test is performed.

We found that the variances of the two portfolios are statistically similar in 2004, 2007 and 2008. Therefore, for 2004, 2007 and 2008, the mean difference test assuming equal variance is used and the mean difference test assuming unequal variances is used for the rest of the periods under review. We found that the null hypothesis that the means of the two portfolios are equal cannot be rejected at the 10% level of significance for all the years except 2007. Therefore, it can be concluded that the good governance portfolio does not underperform the bad governance portfolio in all the periods except 2007.

In addition to this, the good governance portfolio underperforms the market in all the years, as shown in Figure 13 below.

Figure 13: Portfolio returns vs market return



It is important to note that the portfolios were not corrected for industry effects and the observed performance may, therefore, be driven by industry effects. However, a study by Bauer et al (2008) corrected for industry or sector effects by subtracting sector returns from the individual stock returns and adding back the market return. They found that the results for portfolios adjusted for industry effects were similar to those for portfolios without sector corrections.

We then compute the beta (systematic risk) of each portfolio using the Capital Asset Pricing Model (CAPM).

$$R_p = R_f + \beta(R_m - R_f)$$

Where R_p is the portfolio return, R_f is the risk-free rate and R_m is the market return. The risk-free rate in this case is the rate on the R157 bond.

We find that the systematic risk of the good governance portfolio is lower than that of the bad governance portfolio for all the periods except 2005 and 2008. The standard deviation of the returns of the constituents of the good governance portfolio is also lower than the standard deviation of the bad governance portfolio (see Table 10).

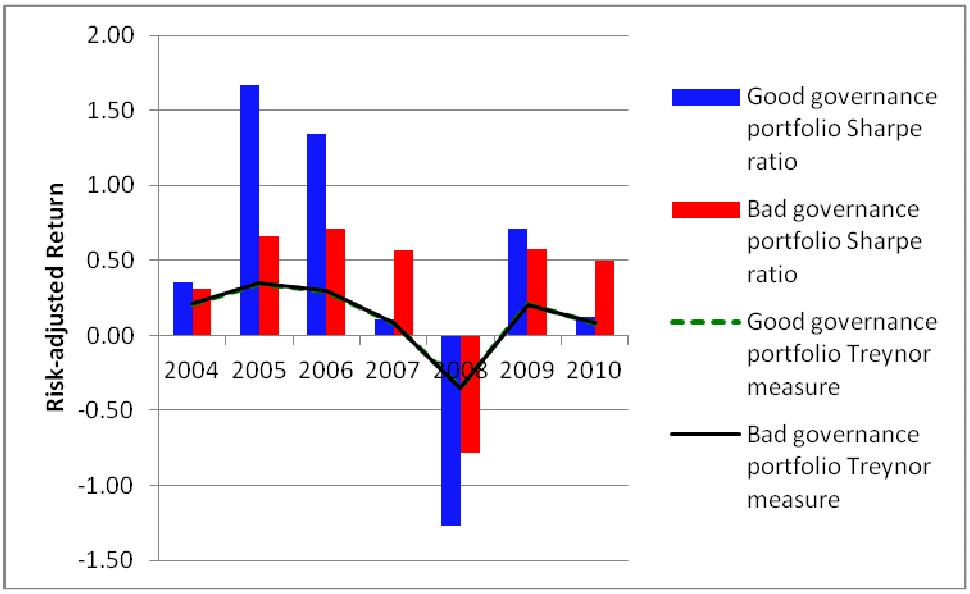
Table 10: Risk of the portfolios

	2004	2005	2006	2007	2008	2009	2010
Good Governance Portfolio							
Portfolio Beta	0.62	0.88	0.90	0.38	1.21	0.66	0.25
Standard deviation	0.37	0.18	0.20	0.29	0.33	0.19	0.17
Bad Governance Portfolio							
Portfolio Beta	0.64	0.70	0.98	2.39	0.92	0.86	1.68
Standard deviation	0.43	0.37	0.41	0.34	0.41	0.31	0.28

As mentioned before, it was found that the variances (or standard deviation) of the two portfolios are statistically similar in 2004, 2007 and 2008. Therefore, from a market perspective, it can be argued that firms that display social responsibility experience less volatility in their share prices compared to less socially responsible firms. Also, it seems that, in general, the returns of socially responsible firms are less correlated to the returns of the market, whilst firms that are not socially responsible tend to be more sensitive to market movements.

We also computed the risk-adjusted returns above the risk-free rate of return for the two portfolios in each period using systematic risk (Treynor measure) and total risk (Sharpe ratio). As shown in Figure 14, the two portfolios have the same systematic risk-adjusted returns in all the periods. In all the periods except 2007, 2008 and 2010, the good governance portfolio shows a higher Sharpe ratio than the bad governance portfolio. This shows that the good governance portfolio performs better than the bad governance portfolio even on a total risk-adjusted basis in most of the periods.

Figure 14: Risk-adjusted returns of the portfolios



5. DISCUSSION

5.1. ACCOUNTING DATA

Based on the results of the regression models, we can conclude that there is a weak relationship between CSP and financial performance of companies listed on the JSE. This weak relationship is positive between ROS and CSP and negative between ROA and CSP, as well as between ROE and CSP. The results also show a strong, positive correlation between the size of a company and CSP, and the correlation between them is statistically significant at the 10% level of significance. According to Chen and Metcalf (1980), CSP and firm size may be positively linked as larger firms have a greater visibility. This greater visibility leads larger firms to invest in CSR activities than small firms which are less visible. The empirical study of Van der Laan *et al*. (2008) confirms this direct link. Larger firms may also be under more pressure from stakeholders, and may need to respond to these demands more attentively (Waddock and Graves, 1997).

Ruf et al. (2001) found that change in CSR was positively associated with growth in sales and that ROS was positively associated with CSR for three financial periods. The positive relationship between ROS and CSP may be due to the fact that consumers of products and services are more predisposed to supporting companies with high CSP ratings. This finding is also supported by stakeholder theory, which proposes that a tension exists between the firm's explicit costs, such as debt repayments, and its implicit costs to other stakeholders, such as product quality and environmental costs. This theory predicts that a firm that attempts to lower its implicit costs by being socially irresponsible will incur higher explicit costs, resulting in competitive disadvantage. According to this argument, then, there should be a positive relationship between CSP and financial performance. Further, positive customer perceptions about the quality and nature of a company's products, its environmental awareness and its government and community relations are increasingly becoming bases of competition (Prahalad and Hamel, 1994). Such positive perceptions of the firm by outside stakeholders may lead to increased sales or reduced stakeholder management costs.

A weak negative relationship was found to exist between ROA and CSP, as well as between ROE and CSP. This is in line with the argument that socially responsible firms incur a competitive disadvantage (Aupperle et al., 1985) because they are incurring costs that might

otherwise be avoided or that should be borne by others. According to this line of thinking, which is fundamental to Friedman's (1970) and other neoclassical economists' arguments, there are few readily measurable economic benefits to socially responsible behavior while there are numerous costs. These costs have a negative impact on the firm's bottom line, reducing profits and, thus, shareholder wealth. Lankoski (2000) suggests that there exists an optimum level of CSP for firms and that deviations from this optimum may reduce CFP. This means that as CSP increases beyond a certain level, it begins to have a negative impact on financial performance. Salzmann (2008) agrees with this reasoning as excessive corporate social responsibility is extremely costly and would certainly reduce a firm's bottom line.

It is also interesting to note that the CSP-CFP relationship is only significant in later periods (predominantly 2009 and 2010). This may be because the very nature of CSP makes it more probable that its financial benefits will accrue in the long run. Hillman and Keim (2001) argue that improved CSP will result in *"long term value through socially complex resources".* Cox et al. (2004) state that "*there is a broad consensus in the conceptual literature that many financial gains from improved social performance accrue in the long run"*. This may also point to a lead-lag relationship between CSP and CFP.

We argue that the main reason for not finding a strong relationship between CSP and CFP is due to the complex, non-linear relationship between the two variables. Waddock and Graves (1997) argue that CFP and CSP are not directly linked due to the complex environment in which firms operate. Cobb et al (2001) and Boone and Rubenstein (1997) have also suggested that the CSP/CFP relationship is not direct. Corporate social performance is a multidimensional construct defined by Carroll (1979) as having four components: economic responsibility to investors and consumers, legal responsibility to the government or the law, ethical responsibilities to society, and discretionary responsibility to the community. Therefore, we argue that there may be aspects of CSP that are value-creating for the firm and aspects that do not enhance the value of the firm. This may lead to the inconclusive evidence when using different measures of CFP, such as was found in this study. Hillman and Keim (2001) divided CSP into the two dimensions – stakeholder management and social issue participation, where stakeholder management relate to measures that are directly related to primary stakeholders (employees, customers, community, environmental relations and suppliers). They found that the two CSP measures have opposing relationships to financial performance, and that this may partially explain why aggregating the two together into a measure of corporate social performance may lead

to ambiguous results. It may be useful, as Hillman and Keim (2001) suggest, to disaggregate the CSP measure. Furthermore, Hillman and Keim (2001) assert that their operationalisation of financial performance, using market value added, may be an improvement over accounting measures of return in understanding the effect of intangible assets such as stakeholder relationships. Therefore, we argue that, as used in this study, the CSP measure is too complex to be linearly related to CFP, and thus, to display a significantly strong relationship with CFP.

The conflicting results obtained when using accounting measures of CFP may be indicative of the inherent weaknesses of accounting measures of financial performance in this sort of analysis. First, accounting measures of firm performance are inherently more short term in nature (Fisher and McGowan, 1983), tap only historical aspects of performance (Hillman and Keim, 2001) and are subject to a great degree of manipulation by managers (McGuire et al., 1988; Watts and Zimmerman, 1990). Therefore, accounting measures of performance, such as ROA and ROE, may be less useful because they are not successful in capturing the long-term value of the company or value created for shareholders. In addition, accounting measures of performance have difficulty capturing intangible relationships (Barney, 1991), such as those with stakeholders. Watts and Zimmerman (1990) point out that it is extremely difficult to capture the value of customer service or reputation on a balance sheet. Therefore, Hillman and Keim (2001) contend that accounting measures of performance are better suited for measuring tangible asset utilization and, thus, are inadequate for capturing shareholder value creation.

The other reason we propose for the weak relationship between CSP and CFP in the South African market is that the investment universe in this market is small and the majority of investors in this market are institutional investors, and institutional investors are typically long-term investors. As a result, the evidence of the relationship between CSP and CFP may be very weak because investors may not change their investment holdings based on a company's CSP. Therefore, CSP may not be as significant in determining the constitution of investors' portfolios, and therefore, companies' financial performance as in larger markets. In support of this argument, Teoh and Shiu (1990) examined the attitudes of institutional owners toward CSP and sources of information about it. They found that institutional investors did not normally alter their investment decisions on the basis of company assertions about CSP contained in conventional financial information such as annual reports.

5.2. MARKET DATA

When using market data, we found that risk is statistically significant in explaining market return for most of the periods. This is consistent with portfolio theory developed by Markowitz (1959). According to this theory, an investor should only assess an investment opportunity in terms of risk and return. According to Leon (2007), if investors are risk averse, a positive relationship should exist between stock return and volatility. This is because risk-averse investors demand higher risk premiums to compensate for additional risk. Various researchers have examined and found a positive relationship between stock return and volatility (French, Schwert and Stambaugh, 1987; Chou, 1988). This may explain the explanatory power of risk in determining financial performance from 2004 to 2010 (excluding 2007).

On the other hand, CSP was only statistically significant in 2007 and 2010, and the relationship between CSP and CFP is negative. Brammer, Brooks and Pavelin (2006) find that companies with low (high) CSP scores outperform (underperform) the market. They found that both employment and environmental indicators are negatively correlated with stock returns. Their argument implies that investing in CSR is destructive of shareholder value. Vance (1975) found that corporations displaying strong social credentials experienced declining stock prices relative to the market average. Curran and Moran (2007) examined whether corporate financial performance is affected by public endorsement of environmental and social performance using an event study methodology. They used firms' inclusion in and deletion from the FTSE4Good UK Index as a proxy for good or poor corporate social responsibility. Their results show that the movements in the daily returns of the firms due to positive and negative announcements regarding environmental and social performance are not significant. Their data also do not suggest that a firm's presence on the index brings it any significant financial return for signaling its corporate social responsibility.

Albeit weak, this negative relationship between CSP and market return may be due to several reasons. Firstly, companies listed on the JSE SRI Index are required to demonstrate a commitment to black economic empowerment (BEE). However, operations of multinational companies outside of South Africa and companies without South African operations are not required to provide data on BEE indicators. Furthermore, whereas companies are required to meet more than one core indicator for other evaluation criteria, companies operating in South Africa must meet at least one core indicator in BEE. This means that the weighting

given to BEE may not be significant. In South Africa, BEE represents a CSR activity that benefits the previously disadvantaged population. Alessandri et al. (2011) investigated whether BEE can represent a value-creating CSR action and found that South African firms that engaged in BEE transactions that were completed at a discount experienced positive and significant average shareholder returns. This may mean that investors place more value on BEE statuses of companies listed on the JSE than on CSP as determined by listing on the JSE SRI Index. Secondly, investors in the South African market may see corporate social responsibility as a window dressing device. This may cause investors to penalise socially responsible companies for the cost of CSR activities, as they are perceived to be of little value. Thirdly, it may be that philanthropic shareholders may be willing to substitute potentially higher returns to feel morally at ease with the stocks they own. This would lead to lower required returns for socially responsible companies. Also, because of the costs associated with CSR activities, the earnings of socially responsible companies may be lower and the market may punish these companies, resulting in lower share prices. Finally, investors may be unwilling to pay a premium for socially responsible behavior.

Our study also showed that, on a non-risk adjusted basis, the good corporate governance portfolio underperformed the market in all the periods and underperformed the bad governance portfolio in most periods. However, the mean difference test showed that the means of the two portfolios are statistically equal in all the periods except 2007. Therefore, we can deduce that the bad governance portfolio only outperformed the good governance portfolio at the beginning of the economic recession. However, both portfolios have the same systematic risk-adjusted return and the good governance portfolio has a higher total risk-adjusted return that the bad governance portfolio in all the periods except 2007, 2008 and 2010. It is interesting to note that the periods when the good governance portfolio experienced lower total risk-adjusted returns coincide with the economic recession period. This may be an indication that investors place less value on CSP during periods of high volatility.

6. CONCLUSION

6.1. LIMITATIONS

The JSE SRI Index was constituted in 2004. Therefore, only 7 years of data were available for the study. As more CSP data become available and as time goes on, it would be useful to determine whether the results obtained in this study hold consistently over time. In the long term, the results may show a positive effect on the bottom line of companies included in the index. The limited time period also does not facilitate investigation of the variability of the CSP–CFP relationship across time. According to Hill et al (2007), the correlation between CSR and CFP is observable in the long term.

Another limitation of this study is the small sample size. The cross-sectional design of the study and limited time period also made it difficult to examine the direction of causality.

6.2. CONCLUSION

This study has attempted to address what has become a recurrent question: whether corporate social performance is linked to corporate financial performance. There is extensive debate concerning the legitimacy and value of being a socially responsible business. There are different views about the role of a company in society and disagreement as to whether wealth maximization for shareholders should be the sole goal of a corporation.

Agency theory suggests that companies with better corporate governance standards perform better. Therefore, the addition of a company to the JSE SRI Index should be a signal to the market that the company has reached a certain level of environmental and social performance. The expectation is that since stakeholders are increasingly looking beyond financial indicators when making investment decisions, companies listed on the JSE SRI Index should perform better financially. This study has shown, paradoxically, that firms listed on the JSE which are perceived as having met social responsibility and good corporate governance criteria do not have better financial performance than other firms. The findings indicate that, for all but one of the accounting measures of CFP and for market returns, CSP is not positively related to financial performance. The relationship between CSP and CFP was also found to be weak.

We argue that CSP is a complex, multidimensional construct. The key features of the JSE SRI Index are split along 3 dimensions – social, environmental and economic sustainability. Therefore, like Hillman and Keim (2001), we argue that using corporate resources to pursue social issues that are not directly related to the relationship with primary stakeholders may not create value for the firm. The relationship between CFP and CSP may also not be linear, due to the complex nature of the CSP measure used in this study. The conflicting results given by the different accounting measures of CFP may be an indication of the inherent weakness of accounting measures in capturing intangible relationships, such as social responsibility.

In all cases, CSP was found to be statistically significant in explaining CFP in the more recent of the periods coinciding with the period during and after the economic recession. There may be two reasons for this. Firstly, it may point to the fact that the financial benefits of CSP only accrue in the long term. Secondly, it may be an indication of a lead-lag relationship between CSP and CFP.

This study did not attempt to investigate the non-financial benefits of CSP. CSP may have positive external effects on a firm's reputation. According to the reputation perspective, firm's disclosure about its level of CSP may help build a positive image with customers, investors, bankers, and suppliers (Fombrun and Shanley, 1990). Furthermore, firms with high CSP reputation ratings may improve relations with bankers and investors and thus facilitate greater access to capital. Other benefits of CSP may include the ability to attract better employees and increase current employees' goodwill. Therefore, the results of this study do not negate the positive effects of good corporate governance and CSP.

6.3. FURTHER RESEARCH

A potentially informative study would be the assessment of the impact of companies' entries into or exits from the JSE SRI Index. The study would be beneficial in determining whether the event itself has an impact on the fundamental value of the stock.

In addition to this, we argue that the relationship between CSP and CFP may not be linear. Therefore, it may be useful to develop a non-linear model to investigate the relationship between CSP and CFP.

The role of a corporation in society and the perception of the relative importance of its CSR activities may be influenced by a country's unique cultural and economic environment. The country's specific cultural context may contribute to shaping investment behavior. Furthermore, there may be aspects of the CSP measure that stakeholders place greater value on than others. Therefore, although the comprehensiveness of the JSE SRI Index criteria is useful, it may be useful to investigate the effects of the different components of CSR, such as BEE and environmental pollution, on CFP rather than using an aggregate measure of CSP.

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APPENDIX A

Definitions of performance measures

Return on sales (ROS) ratio is widely used to evaluate a company's operational efficiency. ROS is also known as a firm's "operating profit margin". It is calculated using this formula:

$$ROS = \frac{PBIT}{Sales}$$

where *PBIT* is the profit before interest and tax.

Return on assets (ROA) is a measure of operating performance of how well assets have been employed since being received by a firm. For our purposes, it is measured as

$$ROA = \frac{PBIT}{Average\ Total\ \ Assets}$$

Return on equity (ROE) ratio measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested. It is computed as follows:

$$ROE = \frac{Net\ \ Income}{Average\ Shareholders'\ Equity}$$

Treynor developed a performance measure according to the post-capital market line (CML). However, he used the beta of a portfolio to measure systematic risk. The higher the Treynor indicator, the better the portfolio performs. The Treynor measure is computed as follows

$$T_p = \frac{R_p - R_f}{\beta_p}$$

where T_p is the Treynor indicator of the portfolio, R_p is the portfolio return, R_f is the risk-free rate and β_p is the beta of the portfolio.

The Sharpe ratio was proposed by Sharpe according to the post-CML. Sharpe used the standard deviation of the rate of return on an investment portfolio to measure total financial risk, as he assumed that investors had not diversified their risks. The higher the Sharpe indicator, the better the portfolio performs. The Sharpe measure is calculated as

$$S_p = \frac{R_p - R_f}{\sigma_p}$$

where S_p indicates the Sharpe measure of the portfolio and σ_p is the standard deviation of the portfolio.