Examining the relationship between ESG performance and financial performance of firms listed on the JSE

By

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Dedications

I would like to dedicate all the effort that went towards completing this dissertation to my family, each member having motivated me to no end.

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List of Abbreviations

B-BBEE: Broad-Based Black Economic Empowerment

BEE: Black Economic Empowerment

CAAR's: Cumulative Average Abnormal Returns

CFP: Corporate Financial Performance

CO_2: Carbon Dioxide

CSP: Corporate Social Performance

CSR: Corporate Social Responsibility

DTI: Department of Trade and Industry

EPS: Earnings per Share

ESG: Environmental, Social and Governance

ESGS: Environmental, Social & Governance score

FL: Financial Leverage

IoDSA: The Institute of Directors in South Africa

JSE: Johannesburg Stock Exchange

KLD: Kinder, Lydenberg, Domini

LSDV: Least Square Dummy Variable

MC: Market Capitalisation

MSCI: Morgan Stanley Capital International

OLS: Ordinary Least Squares

OMIG: Old Mutual Investment Group

P/E: Price to earnings ratio

R: Annual Stock Return

R&D: Research and Development

RI: Responsible Investment

ROA: Return on Assets

ROI: Return on Investment

SRI: Socially Responsible Investing

US: United States

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Abstract

This study investigates the relationship between the environmental, social and governance (ESG) performance of South African firms and their corresponding financial performance over the period 2012 to 2019. Operating with an ESG-based mindset has become of increasing importance for firms over the past two decades, as a result of increasing regulation as well heightened public scrutiny and pressure. There exists evidence in support of the theory that ESG-conscious firms that practice sustainably tend to financially outperform their peers.

This study employs a quantitative research methodology, using variations of panel regression models to investigate the ESG-corporate financial performance (CFP) relationship. Privately held proprietary ESG scores are used as a proxy for ESG performance and financial data is obtained from Bloomberg in order to assess financial performance.

The study does not find statistically significant evidence of a relationship between firm ESG performance and financial performance. Contrasting results emerge from the study, with positive relationships and correlation coefficients found between both the ESG performance of firms and their annual stock return, as well as the ESG performance and return on assets (ROA) ratio. A negative relationship and correlation were found to exist between firm ESG performance and their price earnings ratio. These contradicting results lead to a conclusion that no relationship exists between ESG performance and CFP.

Significant evidence was however found regarding certain firm characteristics leading to firms having higher ESG performance. Results show that the larger firms with greater financial leverage are higher ESG performers relative to their peers. This may imply that in order for ESG practices to be effective, firms themselves should be of a sufficient size and have access to a large amount of debt to fund relevant activities. It is recommended that further research be performed on the driving forces behind a firm's ESG performance, and the various factors that contribute most towards it, including varying levels of access to debt.

Chapter 1: Introduction

1.1: Background

Evaluating the level of importance that companies assign to ESG practices has become an important factor for investors when making investment decisions. Not only has it become more important for investors to invest sustainably and with a long-term orientation, but there is evidence that it can enhance the performance of one's portfolio as well. In a near-exhaustive examination of more than 2 000 studies on the topic, Friede, Busch & Bassen (2015) conclude that more than half of these studies found a nonnegative ESG performance - CFP relationship (Friede, Busch & Bassen, 2015: 211)

Operating with an ESG-orientated approach has been a strategy adopted by many entities based on research performed which proves that stocks of sustainable companies tend to outperform their less sustainable counterparts (Kell, 2018). Directors have therefore become more encouraged to take on ESG practices because it supports them in meeting their fiduciary duty.

A well-known theory in support of firms engaging in ESG activities is known as the stakeholder theory. Also known as the stakeholder inclusive approach, this theory can be defined as an approach taken by entities whereby, "the real purpose of the entity is to serve as a vehicle to coordinate the interests of stakeholders." (Evan & Freeman, 1993: 167). By taking all stakeholders into consideration, firms would be operating with an all-inclusive ESG approach and should, therefore, have a positive ESG performance.

It wasn't long ago that most market participants believed that this stakeholder inclusive approach was not appropriate and that, instead, the real purpose of the entity should be to generate profits whilst operating within the legal framework (Friedman, 1970). Many managers continue to practice in a manner consistent with the views provided by Friedman. These managers feel that engaging in ESG activities would deplete the company's profits in the long term and therefore ESG initiatives should be avoided (Chetty, Naidoo & Seetheram 2015: 196). The famous economist Adam Smith proposed a similar view, whereby social responsibility and philanthropy require business to take environmental and societal concerns into consideration at the expense of greater economic return, ultimately sacrificing economic profits (Ntoi, 2010).

The South African context is unique in that regulation states that certain ESG principles must be abided by in order for a company to be listed on the Johannesburg Stock Exchange (JSE) [The Institute of Directors in South Africa NPC (IoDSA), 2016]. There are also various Black Economic Empowerment (BEE) requirements in South Africa that companies are obliged to follow. Therefore, not all ESG decisions are voluntary, and are often in fact due to firms complying with BEE, King IV or other regulatory requirements.

There is a range of literature that explores the relationship between ESG and financial performance or Corporate Social Responsibility (CSR) and financial performance. CSR and ESG are closely interlinked, with both terms revolving around the broad theme of stakeholder inclusivity (Starks, 2018). The objective of this study is to examine the relationship between ESG performance and corporate financial performance (CFP) within the unique, South African context described above.

1.2: Relevance of topic/research problem

The large variation in opinions on the relevance of firms' ESG engagement was discussed in sub-section 1.1 and will be explored in greater detail under sub-section 2.5. The literature review in the next chapter also looks at empirical findings of previous studies on the topic, with the most significant observation being the inconsistency in results on the relationship between ESG performance and CFP.

There is a plethora of research that exists on the ESG performance - CFP relationship in developed countries. The sustainable investing industry in these countries has also become well established. In 2003 the United States' (US) Socially Responsible Investing (SRI) industry already involved more than US$2 trillion assets (Schueth, 2003: 191). The same cannot be said for developing countries, and African markets in particular. Firms in developing countries generally fail to approach ESG considerations with a systematic and focused approach and sustainability practices are yet to be fully evolved in Africa (Heese, 2005: 731; Jamali & Mirshak, 2007: 246).

A fair amount of research has also been conducted in developing and emerging markets. Saleh, Zulkifli, & Muhamad (2011) found a positive, significant relationship between CSR and CFP when looking at Malaysian listed companies (Saleh, Zulkifli, & Muhamad, 2011: 168). Employee relations was found to be the component of CSR with the strongest positive relationship with CFP. Another study performed using small-to-medium enterprises (SME's) in Delhi as an emerging market setting found a weak, positive relationship between CSR and CFP, with customer relations being the most significant contributor to this relationship (Sinha, Sachdeva & Yadav. 2018: 177). This is an example of a contradiction in findings for an emerging market setting, there are similar examples in developed market settings as well. Previous studies have asserted that not only can CSR have a negative or positive effect on CFP, but also no effect at all (Ntoi, 2010).

Not only is the ESG landscape in South Africa unique from a regulatory perspective, but the country's SRI market is significant, and it has the most progressive and developed corporate responsibility outlook in Africa and the Middle East (Baskin, 2006: 31; Ntoi, 2010). Plenty of evidence of ESG activity in South Africa therefore exists, yet sufficient research that attempts to determine how this activity affects financial performance does not. This report attempts to fill this gap in literature by specifically examining the ESG performance - CFP relationship of JSE-listed entities.

In an attempt to expand on existing literature on the topic, further research on the South African ESG performance - CFP relationship is also justified due to the various theories and opinions on whether it is necessary for modern-day firms to participate in ESG activities. This, as well as the vast array of findings on the ESG performance - CFP relationship from prior research. There are weaknesses in prior South African studies that have examined the nexus between ESG and CFP, these come to light in sub-section 2.5.3 and provide further justification for research on the topic. The main weaknesses highlighted are:

- Prior research has either only used the JSE SRI index as a proxy for positive CSR performing firms or measures created by the authors themselves. These two variations of ESG performance measurement are looked at in more depth in section 2; the literature review. The Sustainalytics ESG score provided by Bloomberg provides more insight into the ESG performance of firms. It splits CSR into its three sub-categories, namely the environment, society and governance and hence more information can be derived by using this measure. Sustainalytics only started providing this data to Bloomberg in 2014 and hence there are not many studies that have used it to date. ESG data created by Sustainalytics doesn't exist for many JSE listed companies and therefore it would be an inappropriate measure to use for this dissertation as the sample size of companies would not be sufficient.

This study utilises privately held, proprietary ESG data (provided by a large financial firm listed on the JSE) that has not yet been used in a study of this nature. The aim of using this new set of data is to provide new insights regarding the effects of corporate social performance (CSP) on CFP. The use of different data sources is supported by Nollet, Filis & Mitrokostas, (2016) who argue that "alternative measures of CSR performance should also be considered in the literature". An argument in support of the use of alternative measures of CSR is that it is desirable for the purpose of the robustness of the evidence (Nollet, J, Filis, G & Mitrokostas, 2016: 400).

1.3: RESEARCH OBJECTIVE

The aim of this research paper is to investigate the relationship between ESG performance and CFP of South African listed companies for the years 2012 - 2019. The nature of this relationship shall be investigated via the use of both market and accounting-based CFP measures.

1.4: STUDY STRUCTURE

The remainder of this study is organized as follows:

Chapter 2 explores theories and related empirical findings of previous research on the topic. The various methodologies that have been used are summarized and a detailed theoretical background is provided. This is all done in the form of a literature review.

Chapter 3 provides the research methodology and outlines the procedure used for selecting the study sample and the sources of data used in the study. The various hypotheses to be tested in the study are presented in this chapter alongside the respective empirical models used to test them. The definitions of variables, measurement of variables and the control variables included in the model are included in this chapter as well as the rationale for the choice of these variables and research methods used.

Chapter 4 provides an analysis of the data and outlays the regression results. The descriptive statistics of the data are briefly examined as well as the correlations among variables included in the models.

In chapter 5 the study is reviewed and avenues for further research on the topic are provided.

Chapter 2: Literature review

2.1: Overview

The literature review first explores the concept of ESG and CSR and the unique ESG environment that exists in South Africa. In general, there have been mixed results when it comes to the relationship between ESG performance and CFP. There have been many attempts to try and determine both the existence and direction of the relationship. A possible reason for the variation in results may be due to the various methodologies that have been used to test the relationship (Orlitzky, Schmidt & Rynes, 2003: 435; Van Beurden & Gossling, 2008: 418). The various measures of ESG and CFP that make up the foundation of these methodologies are explored across the three different market settings, namely: developed and emerging markets as well as the South African market. The findings from research in these three different settings are then discussed. Lastly the theories that argue for and against firms integrating ESG considerations into their operations are explored and the common control variables that have been included in existing literature are discussed.

2.2: ESG and Corporate social responsibility (CSR)

For the purposes of this study's review of literature, the terms ESG and CSR shall be used interchangeably. The justification of this is provided in the following subsection.

2.2.1: Defining ESG performance and CSR

ESG as an acronym stands for environmental, social and governance factors, the three categories of factors investors consider with regard to an investment's sustainable practice [Old Mutual Investment Group (OMIG), 2018]. CSR stands for corporate social responsibility, and refers to how a company engages with its stakeholders through committing to practicing through an environmental, social and governance conscious approach (YouMatter, n.d.). Therefore, although different, the terms revolve around the same themes. Many studies have decided to examine the relationship between ESG performance and financial performance whilst others have focused on a CSR – financial performance relationship. Findings from both fields of literature shall be reviewed.

The term ESG performance was originally popularized by the consultancy firm Goldman Sachs and can be described as an entity's achievement in, or failure to reach environmental, social and governance outcomes (Garcia, Mendes-Da-Silva & Orsato, 2017: 137). An entity's ESG performance ranges from being negative to positive and depends on their ability to meet certain ESG criteria (for example reducing their CO_2 emissions relative to sales).

A basic definition of CSR is "The treatment of all stakeholders in a responsible and ethical manner" (Hopkins, 2003). This describes CSR in its most basic form but excludes an important element that is worthwhile highlighting. An alternative definition of CSR provided by Portney (2005) is, "a consistent pattern, at the very least, of private firms doing more than they are required to do under applicable laws and regulations governing the environment, worker safety and health, and investments in the communities in which they operate" (Portney, 2005: 118)

This definition includes the fact that CSR is in fact about what firms do above and beyond what is required of them. It is important to bear this in mind after examining subsection 2.2.3, "CSR in South Africa," because many firms actively participate in CSR activities merely because it is what is legally required of them. CSR activities can also be defined as "voluntary actions that go beyond a firm's interests and legal requirements to promote a social good" (McWilliams & Siegel, 2001: 605).

CSR and ESG performance revolves around firms focusing on the so-called 'triple bottom line' which incorporates the environment and society as well as financial performance. Many of the socially responsible investment indices that have been created globally focus on whether certain ESG criteria have been met by companies. Such indices include the FTSE4Good, JSE SRI index and the Domini-400. These indices provide reassurance for investors and fund managers that the constituent companies are screened, monitored and assessed according to the objective ESG criteria (Gladysek & Chipeta, 2012: 434). When referring to CSR it is therefore important to remember it's underlying themes, namely the environment, society and the firm's governance.

2.2.2: Increasing relevance of ESG performance

It has become a topic of increasing importance over the years, in light of scandals such as the Enron debacle and, closer to the area of interest, the collapse of Steinhoff International. Other examples of either fraud or misrepresentation by big corporates include Tongaat Hulett, the South African sugar giant who, like Steinhoff International, have been accused of accounting irregularities as well as EOH Holdings Ltd., where suspicious insider transactions took place. Internationally, Volkswagen Company was fined millions of dollars for misleading information regarding the diesel consumption of their vehicles. CSR has become more relevant because of various theories that state that when companies consciously measure their environmental, social and governance impacts and operate with a triple bottom line approach, they progressively become responsible corporate organizations (Hindle, 2008; Costa & Menichini, 2013: 152).

Heal (2004) argues that many corporate-social conflicts arise from high external costs that are transferred from businesses onto society. He concludes that CSR helps reduce these externalized costs and ultimately avoid these tensions. If ESG principles are embedded into the value system of the company and in its governance framework, the negative impacts of a firm's operations are less likely to have an effect on external parties, and companies are generally going to be held accountable for their own actions (IoDSA, 2016).

As stated in the introduction, evidence from prior research has shown that selecting stocks of companies that practice with an ESG conscience can in fact provide investors with favourable financial returns. More than half of studies on the ESG performance - CFP nexus find a nonnegative relationship between the two variables (Friede, Busch & Bassen, 2015: 211). This ultimately pays off for investors in the long-run and is a major reason for the spotlight being shone on ESG in recent years.

CSR and SRI are said to be strong economic performance drivers. Sustainable operations from corporates may be a powerful driver for modern-day competitiveness. Ignoring or resisting this emerging theme would be at a great expense to all stakeholders and, according to Lagoarde-Segot (2012), proactive strategies that have this underlying theme are likely to yield competitive advantages (Lagoarde-Segot, 2012: 42).

2.2.3: ESG in South Africa

The South African context is unlike any other when it comes to ESG. Regulation states that certain ESG principles must be adhered to in order for a company to be listed on the JSE, or if the company is a public or a state body (IoDSA, 2016; JSE, 2007). Certain social and governance practices are also required to be followed by private companies in order for them to participate in business transactions with the state or public enterprises (SEESA, 2018; JSE, 2007).

These recommendations and regulation form part of the King IV report on corporate governance (King IV) and the Black Economic Empowerment Act.

The King IV Report:

In order to be listed on the JSE, firms must operate in an ethical manner by following recommendations provided in the King IV Report. For example, the 3rd principle provided by the King IV report is, "The governing body (board of directors) should ensure that the organization is and is seen to be a responsible corporate citizen." Provided further are areas in which the firm should monitor and have measures against which a benchmark is provided, namely the workplace, economy, society and the environment (IoDSA, 2016: 45).

It is easy to see that King IV's recommendations take into account all those stakeholder affected by a company's activities. They help guide firms to become aware of and responsible for their actions. The underpinning philosophies of King IV are (IoDSA 2016: 23):

- Integrated thinking: Here, directors are encouraged to take account of the connectivity and interdependence between various factors that affect a firm's ability to create value over time.
- The organisation as an integral part of society: Directors must remember that their firms operate in a societal context. This context affects them and is affected by their operations.
- Stakeholder inclusivity: There is a constant, interdependent relationship between the organisation and its stakeholders.
- Corporate citizenship: Because all companies are an integral part of society, they have corporate citizenship status.

These philosophies ultimately lead to sustainable, socially beneficial development for a company.

All public corporations and state bodies are required to follow the recommendations provided in King IV, as are all private companies that wish to be listed on the JSE (JSE, 2007). One can therefore conclude that the firms included in this study's sample are already required to engage in bettering their ESG performance, not out of preference but because it is obligatory in order for them to be listed on the stock exchange.

Black Economic Empowerment (BEE)

BEE was implemented after South Africa achieved democracy in 1994 and was a strategy implemented by the government of South Africa to not only redress the past inequality in the country but also as a growth strategy that intended to realize the country's economic potential, whilst at the same time promoting black participants into the economic mainstream (Pillay, 2014). Broad-based Black Economic Empowerment (B-BBEE) is more recent and includes a wider range of targets by not only focusing on righting the injustices of the past, but also distributing the wealth of South Africa across all races and genders (Pillay, 2014).

The South African minister of trade and industry issued 'codes of good practice,' introduced in 2013 as an amendment to the B-BBEE Act of 2003 (B-BBEE Amendment act, No. 36528 of 2013). These codes require that entities operating in the South African economy contribute towards the objectives of BEE. This act makes these codes binding on all state bodies and public companies. Private companies must also abide by these codes if they desire doing any form of business with a government enterprise or organ of state, for example tendering for business (Pillay, 2014).

The act aims at correcting racial imbalances of the past but also strives to promote investing in society as well as empowering communities. In complying with the act, the governing body will consider their communities' interests and give effect to the triple-bottom line approach when managing a company (Esser & Dekker, 2008: 158).

Due to firms being required to comply with King IV recommendations and BEE regulations, the South African market has a unique, existing CSR environment. Not all ESG decisions are voluntary. The corporate sector in South Africa is also very established; this is evidenced by South Africa having the second highest market capitalization of listed domestic companies to GDP ratio in the world, second only to Hong Kong (World Bank, 2018). This is contrasted by another economic indicator, the Gini coefficient. South Africa has the highest Gini coefficient in the world, meaning that is the most unequal society (World Bank). This unique environment increases the need for companies participating in the economy to take ESG considerations into account in order to create a more sustainable, inclusive economy and society.

Because of this very particular corporate landscape in South Africa, the following definition of CSR shall be used for this paper: "a consistent pattern, at the very least, of private firms doing more than they are required to do under applicable laws and regulations governing the environment, worker safety and health, and investments in the communities in which they operate" (Portney, 2005: 112).

Good ESG performers are entities that go above and beyond what is required of them in terms of all ESG factors.

2.3: Measures of ESG performance

Exactly how to measure a firm's ESG performance is subjective, and likely a reason for the variation in findings on the relationship between ESG performance and CFP. The measures can broadly be split up into two groups: Those that are provided by third parties (such as Bloomberg and the JSE), and those that are internally generated and created by the authors themselves.

2.3.1: Measures provided by third parties

Previous studies have used SRI indices such as the JSE SRI, the FTSE4Good and the Domini-400 index. These indices aim at providing investors with both the opportunity to trade in shares of companies that are considered to be socially responsible as well as providing assurance that constituents of these indices have been screened and assessed according to certain ESG objectives (Du Toit & Lekoloane, 2018: 6). Making use of these indices has been the most popular method used to date. The indices have generally been used as a dummy variable in order to perform a regression analysis, whereby a value of 1 is assigned to firms that are included in the index and a value of 0 is assigned to firms that are not constituents of the index (Chetty, Naidoo & Seetharam, 2015: 195).

Disclosure scores provided by firms such as Bloomberg have also been used. These provide more information as they include a spectrum of CSR performance measures on each component of ESG instead of simply stating which entities are 'good' CSR performers and which are 'bad' CSR performers (Nollet,, Filis & Mitrokostas, 2016: 405). These scores however do not measure the CSR performance of firms, but rather the quality of CSR disclosure (Bloomberg). This measure is fairly robust and reputable, but, yet again, is subject to its limitations as the credibility of the scores is subjective and depends on the accuracy of information available to the assessors (Balabanis, Phillips & Lyall, 1998: 30; Chetty, Naidoo & Seetharam, 2015: 196).

2.3.2: Internally generated measures

Other studies, for example the study conducted by Abdo & Fisher (2007) use their own CSR score. A governance disclosure scorecard was designed specifically for their study and was assigned to companies. In this case the CSR measure encompassed various governance disclosures (Abdo & Fisher, 2007: 44). The scores are generally derived from CSR disclosures as stated in annual reports. This method can also be rendered subjective due to the researchers' choice of variables to measure.

Firms may also choose not to actually implement their prospective actions as originally reported (Chetty, Naidoo & Seetharam, 2015: 197).

Another example of an internally generated measure of CSR is authors creating CSR surveys. Information from these surveys has been collected from the set of firms included in the relevant sample. This method has been scrutinized mainly due to the subjectivity and discrepancy in results arising from it (Moskowitz, 1972: 73).

2.4: Measures of financial performance (FP)

Not dissimilar to measures of CSR, there has been a general lack of consensus when it comes to the optimal financial performance measure to use. Past research has generally included both accounting-based measures as well as market-based measures.

2.4.1: Accounting-based measures

Many studies have utilized at least one accounting-based measure to determine a firm's financial performance. Nollet, Fillis & Mitrokostas (2015), Saleh, Zulkifli & Muhamad (2011) as well as Chetty, Naidoo & Seetharam (2015) all use ROA as their main accounting-based measure. These studies represent the South African market, an emerging market setting (specifically Malaysian listed companies) as well as a developed market setting (S&P 500) respectively.

A comprehensive meta-analytic study found that CSR is more highly correlated with accounting-based measures of CFP than with market-based indicators (Orlitzky, Schmidt & Rynes, 2003: 414). Results do however vary across studies. Nollet, Fillis & Mitrokostas (2015) found no significant relationship between CSP and ROA, whilst Chetty, Naidoo & Seetharam (2015) found a significant, negative relationship between the CSP and ROA. Nonetheless, ROA is a widely accepted measure.

Other common accounting measures that have been used include (Du Toit & Lekoloane, 2018: 7; Saleh, Zulkifli & Muhamad, 2011: 173; Wu, 2006: 164; Orlitzky, Schmidt & Rynes, 2003: 413):

- Return on Equity;
- Return on Sales; and
- Earnings per share (EPS)

Accounting-based measures have been both praised and criticized. It has been said that they help to provide a good reflection of the overall efficiency of a firm (Van Beurden & Gossling, 2008: 411). This is important in measuring the sustainable financial performance of companies. They have also however been criticized for only capturing historical aspects of firm's financial performance. Not only are they backward-looking, but they are also subject to bias as they can be affected by either different accounting measures being used, or managerial manipulation (Chetty, Naidoo & Seetharam, 2015, 195; Aras, Aybars & Kutlu, 2009: 230).

2.4.2: Market-based measures

Accounting-based measures have been widely used, and for good reason. There are however certain elements of financial performance that they fail to cover. External stakeholders in the broader society also affect a company's operations, and therefore their financial performance. The full extent of these external influences isn't captured by accounting-based measures alone. It is therefore suggested that market-based measures are used, as they are more useful measures when it comes to capturing the effect of these external influences (Eccles, Pillay & De Jongh, 2009: 22).

The most common market-based measure of firm performance that has been used in previous literature is the stock price performance of the companies being assessed. The stock price performance can be captured by measuring the overall stock market return for the time period in question (Saleh, Zulkifli & Muhamad, 2011: 173). Other methods include measuring excess stock return as the dependent, market-based return measure (Nollet, Fillis & Mitrokostas, 2015: 402). This is the stock return above (or below) the return of the country's corresponding risk-free rate. Whatever the method used, the stock's performance is affected by market sentiment and is therefore a valid market-based measure to use. One problem with using the stock's return as a measure is that it fails to account for dividends. The total return that an investor will receive by holding stock includes dividends received from that stock, but not all stock's pay dividends. This issue shall be addressed in more detail under chapter 3, where the methodology of this study is described.

Stock price performance can either be measured over the long-term horizon (or measurement period in question), as is the case with Saleh, Zulkifli & Muhamad (2015) as well as Nollet, Fillis and Mitrokostas (2015), or it can be measured over a short-term horizon. The latter method is used for studies utilizing an event study methodology. This methodology aims at assessing what the short-term impact of CSR events is on financial performance (McWilliams & Siegel, 2000: 604), for example the financial effect of the inclusion into, or exclusion from an SRI index.

Chetty, Naidoo and Seetharam (2015) use both methods. Firstly, they attempt to determine the short-term financial impact of CSR announcements of firm's either being announced as included into or excluded from the JSE SRI. They do this by measuring daily abnormal share returns within a window of 41 days. 20 days prior to the announcement of a firm being included into/excluded from the JSE SRI, and 20 days following the announcement date. This study found that shareholders generally aren't rewarded in the short term for announcements of inclusions into the JSE SRI index. For long term performance, instead of using the raw stock price return over the measurement period, they use earnings per share (EPS) as the accounting measure for financial return (Chetty, Naidoo & Seetharam, 2015: 194). Mixed results were obtained over the long term, in terms of EPS there was no significant relationship found with CSR.

Another event study methodology performed was by focusing on how BEE announcements affect the share price of firms. Wolmarans and Sartorius (2009) found that BEE announcements and shareholder value creation (measured by movements in the stock price) have a positive relationship with each other (Wolmarans & Sartorius, 2009: 187).

A variation of EPS is the price to earnings (P/E) ratio. Du Toit and Lekoloane (2018), as well as many others have opted to use the P/E ratio as a market-based measure. The P/E as well as EPS can however be a described hybrid measures because of the nature of their components. The stock price is determined by the market and therefore the market component, whilst the earnings is derived from historical performance and accounting treatment and hence makes up the accounting component of the ratio (Isaacs, 2015).

2.4.3: Other measures of financial performance

Viviers et al. (2008) investigated the risk-adjusted performance of responsible investment funds in South Africa. Responsible Investment (RI) can be described as, “a set of approaches which includes moral as well as ESG considerations along with conventional financial criteria in decisions regarding the selection, retention and realization of particular investments” (Mansley, 2000: 3). The performance measures used in their study included the well-known Sharpe ratio as well as the Sortino ratio. Both measures account for risk which is an important consideration to make and one that other studies generally haven’t considered (Viviers et al., 2008: 41). The Sharpe ratio accounts for risk by taking the difference between a portfolio’s return (R_p) and the return of the risk-free rate (R_f), and dividing this difference by the standard deviation of the portfolio’s excess return (σ_p). The Sortino ratio is similar, but it isolates downside volatility by dividing this difference by the downside standard deviation instead of the total standard deviation of the portfolio’s excess return (Kenton, 2019). These other studies have either ignored risk or have included a measure of risk as a control variable, such as the financial leverage of companies (Nollet, Fillis and Mitrokostas, 2015: 403).

2.5: Prior empirical studies on the relationship between ESG performance and CFP

As stated previously, existing literature on the topic provides various conclusions regarding the relationship between ESG performance and CFP. This may be due to many reasons, which include, but are not limited to (Waworuntu, Dewi & Rusmanto, 2014: 494; Chapple et al., 2005: 416; McWilliams and Siegel, 2016: 347):

- The ambiguity arising from the various measures of ESG performance
- The ambiguity arising from the various measures of CFP used
- The various regions in which studies examined the relationship
- The control variables used in studies

This subsection explores the empirical findings of studies performed on companies from developed markets, emerging markets and South Africa.

2.5.1: Empirical studies conducted in developed markets

Nollet, Fillis and Mitrokostas (2015) performed both a linear and non-linear regression to test the relationship between CSP and CFP for firms listed on the S&P500 between the years 2007-2011. These firm's CSR performance was measured by using Bloomberg's ESG disclosure score whilst their financial performance was measured using ROA, return on invested capital and excess stock return. The regressions revealed contradictory results. After testing 5 different hypotheses it was concluded that the CSR engagement doesn't pay off immediately, but rather only after a specific point of CSR investment has been surpassed by the firm. More specifically, the governance component of ESG displays this relationship most significantly and it was therefore concluded that CSR investments should be directed towards governance (Nollet, Fillis and Mitrokostas, 2015: 405).

Lins, Servaes & Tamayo (2017) used the Morgan Stanley Capital International (MSCI) ESG stats database of 1673 nonfinancial firms over the global financial crisis period of August 2007 – March 2009. The objective was to assess how social capital and trust impact firm performance. The social performance of firms was measured by examining the CSR ratings provided by the MSCI ESG database. The CSR activities of firms were then compared to the firm's stock return during this period. They found that firms with high social capital outperformed firms with low social capital. These high CSR firms also experienced higher profitability, growth and sales per employee relative to low CSR firms. It was concluded that trust between firms, investors and stakeholders is key for firms to succeed financially, especially during times like the global financial crisis (Lins, Servaes & Tamayo, 2017: 1820).

Michelon, Boesso & Kumar (2013) used ratings provided by Kinder, Lydenberg, Domini (KLD) Analytics of 188 US-listed companies between 2005 and 2007 to measure CSR performance. KLD has subsequently been replaced by the MSCI ESG stats database. The study used both accounting and market-based measures for financial performance and several areas of CSR were considered from the KLD database. After including firm size and industry as control variables it was found that when firms pursue CSR initiatives that are linked to stakeholder preferences and allocate sufficient resources to these initiatives in a strategic manner, financial performance strengthens. This was observed both with accounting and market-based measures of CFP (Michelon, Boesso & Kumar, 2013: 92).

Callan & Thomas (2009) found a positive CSP-CFP relationship from a final sample of 441 firms that were either constituents of the Russell 3000, the S&P500, and/or the Domini 400 Social Index (Callan & Thomas, 2009: 75). The motivation behind this piece of research was to confirm whether CSP is in fact an independent or dependent variable in the CSP-CFP relationship. Margolis, Orlitzky and Walsh (2002) reviewed 90 papers on the topic that were published between 1972 and 2000 and concluded that 80 of these reflect that CSP predicts, or helps determine CFP (Margolis, Orlitzky & Walsh, 2002: 192) and they therefore be considered CSP to be the independent variable in the relationship.

2.5.2: Empirical studies conducted in emerging markets

Less research on the topic has been conducted using emerging market companies as the sample in comparison to studies performed in developed markets. Many emerging market countries face the same problems as South Africa such as inequality, poverty and unemployment. For that reason, it is also important to consider the effect of ESG performance on CFP in an emerging market context. ESG factors are also an increasing part of public policy and global corporate strategies can't ignore them any longer. Developing countries are needing to follow suit and create responsible investment opportunities for investors (Lagoarde-Segot, 2012: 47). Previous studies have rendered mixed results.

Saleh, Zulkifli and Muhamad (2011) found a positive, significant relationship between CSR and CFP in Malaysian listed companies. Of the several components making up CSR that they used, it was discovered that employee relations and community engagement contributed to this relationship most significantly. The CFP measures used in the study were ROA, the stock return and Tobin's Q ratio. Due to the delayed impact of CSR on CFP and in accordance with prior studies, a one-year lag was used for the independent variable (CSR). By doing this they were able to also conclude that there is limited evidence of CSR and CFP in the long-term (Saleh, Zulkifli & Muhamad, 2011: 182). These findings are consistent with those of Waworuntu, Dewi & Rusmanto (2014) who also found a positive correlation between CSR and CFP present when investigating Asian companies. It was discovered however that Malaysian companies have a weak correlation between these two elements (Waworuntu, Wantah & Rusmanto, 2014: 498).

Sinha, Sachdeva & Yadav (2018) used SME's in Delhi as their sample of companies. A weak, positive relationship was found to exist between CSR and CFP with customer-based CSR having the greatest effect on CFP. The CSR measures used were created by the authors themselves and related to the four main aspects of CSR, namely customer relations, employee relations, the environment and the community. The CFP measures used were based on the bottom line profitability of the companies, sales revenue and changes in companies' return on investment (ROI). An interesting conclusion made was that small businesses generally aren't concerned with CSR. It was inferred that this is likely due to their small size, peculiar characteristics and lack of resources (Sinha, Sachdeva & Yadav, 2018: 188). It may therefore be necessary to include size as a control variable, which is discussed further under subsection 2.7.

It is worth noting that three out of the four above-mentioned studies used internally generated measures of CSR in their research such as surveys and questionnaires. There is therefore likely to be an element of subjectivity present in their results (Moskowitz, 1972). This could be a reason for the inconsistency observed in their findings.

2.5.3: Empirical studies conducted in South Africa

South Africa is one of the most sophisticated and diverse emerging markets in the world [The South African Department of Trade and Industry (DTI)]. As previously stated, it has the second highest Market capitalization of listed domestic companies to GDP ratio in the world (World Bank). With this being said, there is still limited research that has been conducted on this topic using South African companies as the sample base.

Unless otherwise stated, all studies have used the JSE SRI as a measure of CSR. If firms are constituents of the JSE SRI they are ‘good’ social performers and assigned the dummy variable 1. If they aren’t included in the index, they are ‘bad’ social performers and assigned the dummy variable 0 (Du Toit and Lekoloane, 2018: 7; Chetty, Naidoo & Seetharam, 2015: 198)

The JSE launched the JSE SRI Index in 2004. This was done in an effort to promote managers’ incorporation of environmental, societal and governmental aspects into their decisions. It was viewed as an incentive for firms to implement CSR policies and was the first socially responsible investment index to be launched in an emerging market setting. Companies qualify for inclusion into the index if they meet the relevant requirements in environment, society, governance, and climate change (Lagoarde-Segot, 2012: 48).

Du Toit and Lekoloane (2018) examined the CSR-CFP relationship of JSE-listed companies between the years 2009-2014. The CFP measures used in this study were ROE, the P/E ratio and the stock’s return. A logistic regression was used, as this doesn’t assume the distribution of scores of the various predictor variables. The study found that there wasn’t a clear relationship between CSR and CFP over this period. It was however found that there was a relationship between company size and being listed on the JSE SRI, with the majority of constituents being large companies (Du Toit & Lekoloane, 2018: 8).

Chetty, Naidoo and Seetharam (2015) tested two hypotheses. These two hypotheses assessed the effect that CSR has on CFP in the short and long term respectively. The short-term impact was examined through the use of an event study methodology, using announcements into/exclusions from the JSE SRI as the event. The long-term effect of CSR on CFP was measured using an ordinary least squares (OLS) regression model. The measures of CFP used were ROE, ROA and EPS. The findings obtained were that shareholders generally aren’t rewarded in the short term for announcements of inclusions into the JSE SRI. There were however mixed results over the long term, and no conclusive evidence of a positive CSR-CFP relationship (Chetty, Naidoo & Seetharam, 2015: 208).

Another study in which two hypotheses were tested was that of Gladysek & Chipeta’s (2012). The first hypothesis was the same as Chetty, Naidoo and Seetharam’s; the test for a relationship between CSR and CFP in the short-term. This study however included cumulative average abnormal returns (CAARs) on top of plain stock returns. Barring one year (2005), investors didn’t earn any significant abnormal returns in the short run from announcements of inclusion into the SRI. The two studies’ findings were therefore consistent with each other. The second hypothesis tested whether sustainable indices outperform their equivalent counterpart. For this study the JSE SRI was used as the sustainable index and the JSE ALSI as the counterpart. No significant outperformance was found barring the year of 2004. This was however when the SRI was first founded, and this outperformance could perhaps be attributed to early investor enthusiasm (Gladysek & Chipeta, 2012: 437).

Rather than having a broad focus on CSR, Abdo and Fisher (2007) narrowed their focus down to the reporting of corporate governance by South African firms and the relationship that this has with financial performance. The authors created their own "G-score" designed specifically for this research study. This is what they used to measure the 97 JSE listed firms' corporate governance disclosure with. It encompassed 7 broad corporate governance categories namely; discipline, transparency, independence, accountability, responsibility, fairness and social responsibility. These are the seven characteristics of good corporate governance as provided by the King committee (IoDSA, 2016). The study found that corporate governance was positively correlated with share price returns during the period July 2003 – July 2006 (the time period used for this study). The conclusion drawn from this study was that investors place a premium on South African companies with good corporate governance (Abdo & Fisher, 2007: 54).

Viviers et al. (2008) examined the risk-adjusted performance of South African responsible investment funds. They found the topic to be relevant due to empirical evidence that showed that responsible investing had been gradually moving from a fringe investment strategy to a mainstream consideration in the global investment arena (Knoll, 2002: 681; Schueth, 2003:189). Three main findings were obtained from the study (Viviers et al, 2008: 52):

1) South African responsible investment funds underperformed relative to their benchmark indices from 1992 – 2002, but significantly outperformed these same indices between 2002 – 2006.
2) South African responsible investment funds performed on par with the JSE ALSI between 1992 – 2006, barring years 1998 – 2002 where these funds significantly underperformed.
3) The responsible investment funds' performance improved consistently over time compared to their corresponding benchmark indices and the JSE ALSI over the same period of time.

2.6: Theoretical background

In 1970, Milton Friedman, a world-renowned economist questioned the relevance of firms engaging in CSR activities. He argued that, "the social responsibility of business is to increase its profits." (Lagoarde-Segot, 2012: 38). Many managers feel that partaking in CSR activities depletes the profits of their businesses and that they should resist these initiatives. Instead they feel that shareholders' interests are top priority, and this renders other ethical considerations irrelevant (Friedman, 1970). This theory introduced by Friedman in 1970 is known as the trade-off hypothesis. In short, the argument is based around the premise that increasing the involvement of companies in CSR activities increases the amount of resources spent by the company and hence profitability is reduced (Saleh, Zulkifli

& Muhamad, 2011: 168). Ullman (1985) put forward a similar statement theorising that ESG activities dampen financial performance for similar reasons as stated above (Ullman, 1985: 546). These theories are backed by rational arguments but, over time, investors and firms alike have taken a broader view of how to invest and conduct business by considering all stakeholders and the broader community. CSR has grown in importance for firms and this is as a result of the pressure that various stakeholders place on firms to engage in additional CSR investments and activities (McWilliams & Siegel, 2000: 603). Friedman's trade-off hypothesis theory argues that there should be a negative relationship between CSR and CFP, there are however many other theories that support CSR-CFP relationship including, but not limited to:

- The social impact hypothesis;
- The stakeholder inclusive approach; and
- The enlightened value maximisation theory

These are each described in turn in their respective subsections below.

2.6.1: The social impact hypothesis

Originally constructed by Cornell and Shapiro (1987), this theory suggests that a firm engaging in ESG activities will reap benefits through improved financial performance. Contrary to the belief of Friedman (1970), the theory suggests that the expected benefits derived from carrying out ESG activities will outweigh the costs of doing so (Steger, Somers, & Salzmann, 2007: 175). Through committing to practicing with an ESG conscience, the reputation of firms is improved via two main channels, namely improved relationships with financial institutions and reduced company risks. By unlocking these benefits, it is revealed that CSR can have a positive impact on CFP (Waddock & Graves, 1997, 305).

2.6.2: The stakeholder inclusive approach

The stakeholder inclusive approach, referred to as the 'stakeholder theory' by Du Toit and Lekoloane (2018), challenges the approach taken by Milton Friedman and argues that a company should be managed in the interests of all of its stakeholders (Du Toit & Lekoloane, 2018: 2). Evan and Freeman (1993) pitched the most well-known definition of stakeholder theory, 'the real purpose of a company is to serve as a vehicle to coordinate the interests of stakeholders' (Evan & Freeman, 1993: 168). In terms of ESG, a firm's responsibility towards stakeholders comes to the fore as per the stakeholder theory. Some managers believe that by communicating their better social performance with stakeholders such as investors and employees, the firm's reputation and performance may improve (Margolis, Orlitzky & Walsh, 2002: 192; Orlitzky, Schmidt & Rynes, 2003: 405). ESG performance can be measured through the stakeholder inclusive approach which has 4 main components: Customer relations, employee relations, the environment and the community. These components are discussed in further detail below.

Customer relations

Customer satisfaction and loyalty has become an important factor that managers need to consider in their corporate strategy. Sinha, Sachdeva & Yadav (2018) found that customer-related CSR has the most significant effect on a firm's financial performance. It is a key ingredient to a firm's long-term profitability and increased market value. As customer satisfaction increases, so too do future cash flows. The variability of cash flows reduces too (Gruca & Rego, 2005: 127). Lichtenstein, Drumwright & Braig (2004) confirmed that when companies engage in CSR activities, their customers become more satisfied. Customers are more likely to remain loyal and in turn steer new customers towards the firm if their needs are met and the firm provides a product or service which does not harm society, this in turn leads to better and more sustainable CFP (Lichtenstein, Drumwright & Braig, 2004: 26; Sinha, Sachdeva & Yadav, 2018: 178).

Employee Relations

Employee satisfaction and loyalty is just as, if not more important than, customer satisfaction and loyalty. Saleh, Zulkifli. & Muhamad (2011) found a positive, significant relationship between employee relations and CFP (Saleh, Zulkifli. & Muhamad, 2011: 184). Employees of firms that operate in an ethical manner and that are committed to CSR are most likely to share this positive experience with external parties. The very same CSR helps enhance employee creativity which in turn stimulates practical, original ideas. Ultimately job satisfaction, employee morale and employee retention are linked together by a firm's CSR activities which in turn lead to better, long-term financial performance (Sinha, Sachdeva & Yadav, 2018: 178).

The Environment

In light of climate change, more pressure has been applied to firms to operate in a more environmentally-friendly manner. Armitage & Marston (2009) concluded that firms which focus on operating in an environmentally-sustainable manner generate a strong reputation and hence yield greater financial performance (Armitage & Marston, 2009: 333). This is one of the few studies that found a positive relationship between environment-related ESG performance and CFP. The main reason for this may be the greater costs (or lack of cost-saving) and greater consumption of financial resources needed to apply environmental integrity (Sinha, Sachdeva & Yadav, 2018: 179). Nonetheless there is no doubt that firms are under pressure to protect the environment in which they operate, whether it be due to legal obligation or pressure from society.

The Community

Firms that demonstrate commitment to their community, through either event sponsorships, funding community projects, charitable donations or other community-related activities have an improved business reputation, through this, CFP can be enhanced (Sinha, Sachdeva & Yadav, 2018: 179). Some firms may use this as a form of marketing, others do it in good spirit, not expecting anything in return. Community-based CSR is quite closely related to employee-CSR due to the employee loyalty and positivity created through community-based ESG activities (Filho et al., 2010: 298).

2.6.3 The enlightened value maximization theory

The enlightened value maximisation theory is an advanced version of Freeman's (1984) original stakeholder theory. The idea behind it is that using positive CSR activities as a strategic investment could eventually translate into higher profits and ultimately greater shareholder value. By strategically investing in ESG activities, firms have the power to influence the competitive environment in which they find themselves in a favourable way (Porter & Kramer, 2002: 61). It is argued that specific ESG investments such as brand reputation and human capital become unique, valuable resources that belong to the firm and provide them with a competitive advantage (McWilliams and Siegel, 2011: 118). McWilliams and Siegel (2001) came up with a variation of this theory and named it the supply and demand theory which suggests that the demand for a firm's involvement in ESG activities maximizes their profits.

2.7: Control Variables

The majority of prior literature examining the relationship between ESG performance and CFP assigns ESG performance as the independent variable and CFP as the dependent variable in the various models. As stated previously, ambiguity in findings of prior research may be due to either inconsistency in either ESG or CFP measures being used (Waworuntu, Wantah & Rusmanto, 2014: 494; McWilliams & Siegel, 2000: 604). McWilliams and Siegel (2000) agree with this rationale; however, they state that the large inconsistency in results of previous studies is due to flawed analysis. They believe that including the correct control variables in the analysis is just as important, if not more so, than including the correct measures of ESG performance or CFP (McWilliams & Siegel, 2000: 605).

Waddock and Graves (1997) found it necessary to include firm size (measured by market capitalisation), Risk (measured by total debt/assets) and the industry to which the firm belongs as control variables (Waddock & Graves (1997: 306).

Nollet, Filis & Mitrokostas (2015) decided against including using firm size measured by market capitalisation and industry as control variables, yet they also felt it necessary to include leverage (a measure of risk). Instead of controlling for firm size by using market capitalisation, they included sales as a control variable, this can also be used as a measure of firm size. Instead of industry they used Research and Development (R&D) expenditure. This is consistent with McWilliams and Siegel (2000) who recommend that it is imperative to include both R&D intensity (as measured by R&D expenditure/sales) as well as advertising intensity of the firm. There is a long-standing theoretical literature that links investment in R&D to improvements in long-run economic performance (Griliches, 1979: 113). R&D investment and CSR were found to be highly correlated. This is likely because both are associated with product and process innovation (McWilliams and Siegel, 2000: 605).

Firm size is a consistent control variable used in models that determine the relationship between ESG performance and CFP. There are various ways to account for firm size including market capitalisation or annual revenue. Michelon, Boesso & Kumar (2013) argue however that size should instead be measured by number of employees if the sample contains firms from different industries because different industries have varying sales and revenue patterns (Michelon, Boesso & Kumar, 2013: 85). Regardless of how size is measured, it is important to include it as a control variable. One could argue that as companies grow, they are more likely to adopt CSR initiatives as a result of increased pressure from stakeholders (Michelon, Boesso & Kumar, 2013: 82). Various studies, including that of Du Toit and Lekoloane (2018), found that there was a direct link between a firm's size and being listed on socially responsible indices, as well as between a firm's size and their financial performance (Du Toit and Lekoloane, 2018: 8). The average cost of implementing CSR activities is also likely proportionately less for large firms compared to smaller ones since large size can often facilitate economies of scale (McWilliams & Siegel, 2001: 123; Roberts & Dowling, 2002: 1080).

Another control variable that has been included in models of prior studies is the industry to which firms belong. Different industries face different pressures from various different stakeholder groups. For example, industries such as consumer goods, utilities and oil and gas face substantial pressure and scrutiny from a broad range of stakeholders (Michelon, Boesso & Kumar, 2013: 85). These same stakeholders may not place the same pressure on industries such as that of financial services.

Chapter 3: Research Methodology

This chapter first describes the research design that was used for this study including how the sample of firms was selected and the sources from which the data was gathered. An overview of the variations of the empirical model is then provided, after which the hypotheses are presented along with the corresponding models used to test them. Lastly, the process in which the data was analysed is described.

3.1 Research Design

In order to achieve the objective of this study as set out in chapter 1.3, the research methodology takes a quantitative approach by investigating the relationship between the ESG performance, measured by an ESG score, of 90 JSE-listed companies' and their corresponding financial performance, measured using both market and accounting-based CFP measures, for the years 2012 through to 2019 This study does not attempt to establish causality between the two variables, instead it aims to determine whether any relationship between the two exists, as well as the nature of this relationship.

3.1.1 Sample selection procedures

An attempt was made to include as many observations as possible as the results were more likely to be significant if there were sufficient data points in the regression analysis. The two main limiting factors on the size of the sample were the financial data available for firms as well as their ESG data. The ESG data supplied included data on firms from January 2012 through to September 2019, this is therefore the time period used for the study.

The sample was selected via the following process:

1) A list of all firms that have been constituents of the JSE ALSI during the period 01 January 2012 – 30 September 2019 was compiled. Only firms that have been constituents of the JSE ALSI for the entirety of this time were included in the sample.
2) Year-end financial data for these firms was obtained from Bloomberg, namely:
    - Return on assets
    - P/E ratio
    - Annual Stock Returns
3) Privately held, proprietary ESG data for these firms was obtained from a financial institution.
4) The final sample of companies was narrowed down to include only firms that had been constituents of the JSE ALSI consecutively for the past 6 years (as stated above) and that had the necessary financial and ESG data available. An exhaustive list of this population of 90 firms is provided in appendix 1.

3.1.2 Data Sources:

The relevant financial data of firms was collected from Bloomberg, the global leader in business and financial data. More specifically, the data was pulled from one of UCT's Bloomberg terminals which contains financial data on all JSE listed companies (Bloomberg).

The ESG data was sourced from a private and JSE listed South African financial institution. The data is privately held and for the sake of protecting the source's intangible resource, their name shall not be disclosed. The scores are used for the institutions quantitative equity strategies and envelop a wide range of ESG criteria for each company included in the sample. The criteria included in the score includes all three ESG factors:

- Environmental: Whether the entity is aware of and assesses the environmental risks that arise from its operations. Are there processes in place that do this and how are these risks mitigated?
- Social: What is the entity's impact on communities and other stakeholders? Do their operations adversely affect society and if so how does the firm address this?
- Governance: Does the entity follow good corporate governance practices and routinely disclose transactions that involve conflicts of interest or other matters that originate from the board of directors?

The scores are derived from both quantitative and qualitative analysis regarding the above factors and they provide in depth insight into the ESG performance of companies used in the sample.

The alternative approach would have been to use the Sustainalytics ESG score provided by Bloomberg. As mentioned in section 1.2, the Sustainalytics scores are only available from 2014 onwards and the data provided doesn't include many JSE listed companies. The resulting sample size would therefore be too small.

Using the privately held data therefore results in a larger sample which is desirable, and also contributes further to literature by examining the relationship with new, privately held data.

3.2: Empirical models

In order to assess the relationship between CSR and CFP, the use of sophisticated models is required, a number of different models have been used in prior studies. The two main approaches have been to use either a multiple regression model or panel regression model. In their studies, both Callan and Thomas (2009) and Ntoi (2010) use multiple regression models. The main benefit of this technique is that one is able to analyse and observe the nature of the ESG-CFP relationship during different periods. Studies by Nollet, Filis and Mitrokostas (2016) and Michelon, Boesso & Kumar (2013) used panel regression models to analyse the relationship. The main benefit of this approach is that it simplifies computational and statistical inference (Hsiao, 2007: 4). One is able to interpret the overall relationship over the time period and conclude whether or not a relationship exists.

The following extensive explanations of the models available for use on panel data, and information included was obtained from the UCT FTX5044H lecture notes and additional information was gathered from Hsiao (2007) as well as Longhi & Nandi (2015). The cross-sectional and time-series nature of the data allows for a panel regression model to be utilized. The three variations of panel regressions available for use are (UCT FTX4044H Lecture notes):

- The pooled OLS regression model;
- The fixed effect or LSDV model; or
- The random effect model

The basic linear panel regression model can be expressed as follows:

$Y_{it} = \alpha_0 + \beta_1 X_{it} + V_t + \alpha_i + \varepsilon_{I,t},$

for i = 1, 2, …, k and n = 0, 1, …, N

Where:

- Y_{it} : The dependent variable of firm i at time t.
- α_0 : Represents the constant term
- X_{it} : The independent variable of firm i at time t
- V_t: A time dependent factor that partly explains Y_{it}
- α_i: A cross sectional (i.e company) dependent factor that partly explains Y_{it}
- $\varepsilon_{I,t}$,: Represents the idiosyncratic error term

The pooled OLS regression model

This is the simplest panel regression model available and easiest to implement, but it neglects the cross-sectional and time series nature of the data. By using this model, and hence pooling the sample of companies together, the heterogeneity or individuality that may exist between the firms is ignored. It would only be suitable to perform a pooled OLS if the independent and control variables were independent of the error term, expressed as (UCT FTX4044H Lecture notes):

- $Cov(\alpha_i + \varepsilon_{I,t}| X_{it}) \neq 0;$

This is almost never the case. For that reason, performing a pooled OLS regression would result in results being biased and inconsistent. The three remedies for getting around the problem are as follows (UCT FTX4044H Lecture notes):

1) Use cross-sectional specific dummy variables to allow for different intercept terms:
    - N degrees of freedom are used up by doing so and this remedy is therefore more applicable for longer panels. A panel of 6 years is not considered long and therefore this remedy isn't suitable for the model used in this study
2) Take time-series first differences of the dependent and independent variables (the first differences transformation):
    - This results in all data now being "within a cross-section"
    - The constant term (α_0) and unobserved heterogeneity (α_i) are effectively removed from taking the first differences and this results in estimates produced from an OLS regression being consistent.
    - The main issue with this remedy is that there are no time independent factors present in the equation. All the data lies within a cross section and because there are many cross-sectional data points (firms) in the study's data sample, a lot of explanatory power would be lost.
3) Take cross sectional differences from each cross-sectional mean:
    - This is the most robust method and is the remedy that is used most in practice.
    - The proportion of cross-sectional mean that is removed depends on a fraction (λ) that is calculated. The value of λ tells us which method is most appropriate. An in-depth discussion of this figure is provided under the heading "Fixed vs Random effects estimators".

Fixed vs Random effects estimators

The fixed effect or least square dummy variable (LSDV) model accounts for the heterogeneity or individuality that may exist between firms. It does this by allowing each firm to have its own intercept value. The downside to this model is that it removes time constant variables as these individual intercepts do not move over time. In a fixed effects model, random variables are treated as though they are non-random (fixed). Fixed effects models also can't control for variables that vary over time.

The last possible model, the random effect model, would result in all firms within the sample having a common mean value for the intercept. The random effects model is more efficient because the models have smaller standard errors, but they risk having more omitted-variable bias.

If there is correlation present between each cross-sectional's intercept term (α_i) and the independent variable, then a fixed effects estimator is required. If there is no correlation present between the terms, then at least a random effects estimator is required as there would still be serial correlation present in the residuals (UCT FTX4044H Lecture notes). Explained alternatively:

If

- $\text{Cov}(\alpha_i \mid X_{it}) \neq 0$:

Then a fixed effects estimator is required. If

- $Cov(\alpha_i \mid X_{it}) = 0$;

then at least a random effects estimator is required.

The random effects adjustment (λ) corrects for the serial correlation present in the random error as follows:

$Y_{it} – Y_i = \alpha_0(1 - \lambda) + \beta_1(X_{it} - \lambda X_i) + (\eta_{it} - \lambda\eta_i)$

Where $\eta = \alpha_i + \varepsilon_{I,t}$, and $\lambda = 1 – [\sigma_\varepsilon^2/(\sigma_\varepsilon^2 + T\sigma_\alpha^2)]^{1/2}$

- If $\lambda = 0$ then a pooled OLS regression is acceptable
- If $\lambda = 1$ then a fixed-effects model is most appropriate
- If $0 < \lambda < 1$ then a random effects adjustment is required

The Hausman test is applied to the data in order to determine which model is most appropriate (UCT FTX4044H Lecture notes). This test is discussed in more detail in the following section.

3.3: Model specification and hypothesis development

By reviewing literature that explores the ESG - CFP relationship in previous sections, it was evidenced that the ESG performance of a company is, in certain cases, capable of affecting, in some way or another, it's CFP. Ultimately this study aims at investigating the ESG - CFP relationship of South African firms by looking at both accounting and market-based returns. Firstly, the variables included in the various models are described and subsequent to that the hypotheses are presented along with the models that are utilized to test them.

3.3.1: Model variables

The three categories of variables included in the models are:

- The measure of financial performance;
- The ESG score at time T-1; and
- The control variables

Financial performance

In order to measure the financial performance of firms, both accounting and market-based measures have been included in the models. Accounting-based measures have been included because:

- It would be short-sighted to only rely on measures that are determined by the market. Market participants can act irrationally and therefore a firm's market-based return (based on their share price) may not reflect the entire financial position of a company. The fundamental financial performance and health of a firm may be overlooked by the market.
- Accounting-based measures help to provide a good reflection of the overall efficiency of a firm and this is important in measuring the sustainable financial performance of firms (Van Beurden & Gössling 2008: 411).

Relying on accounting-based measures alone would however not provide enough information on the ESG - CFP relationship, and they have their shortcomings. Market-based measures have therefore also been included in this piece of research because:

- Accounting-based measures are backward-looking whilst market-based measures provide more information about a company's expected future performance. This is mostly due to market sentiment being intrinsically included into these figures.
- Accounting-based measures have also been criticized for being subject to manipulation by management.

Therefore, both accounting and market-based financial performance measures have been included in this study so as to provide a more comprehensive overview of the relationship.

The three different financial performance measures used in this study are the ROA and P/E ratios as well as the stock price return. How they have been measured and a brief description of each is provided below.

Return on Assets (ROA):

The ROA ratio is provided by Bloomberg and calculated as follows:

- ROA = Net Income/Total Assets

The ratio is an indicator of how profitable a company is relative to its asset base, it shows how efficient a company is in using its assets to create earnings. The ratio has been used in many previous studies including those of Nollet, Fillis & Mitrokostas (2015) and Saleh, Zulkifli & Muhamad (2011). It is included as a variable in order to assess whether the underlying financials of a firm improve alongside improved ESG performance. It is an accounting-based measure and is said to provide a good reflection of the overall efficiency of a firm (Van Beurden & Gossling 2008: 411).

Price Earnings Ratio (P/E):

The P/E ratio of a firm is provided by Bloomberg and calculated as follows:

- P/E = Market value per share/Earnings per share (EPS)
- Where EPS = (Net Income – Preferred dividends)/Number of common shares outstanding

The ratio is a hybrid mix between a market-based measure and an accounting-based measure of financial performance. The stock price is the market-based component and the earnings included in the earnings per share denominator is the accounting-based component. Du Toit and Lekoloane (2018) utilized this measure, the main reason being that it aids investors in determining the value of a company's shares relative to its peers. The measure is included as a variable in order to reveal whether investors are willing to pay a premium on firms that operate with an ESG conscience. Lower P/E ratios are generally assigned to low-growth, higher risk firms (Kriek & Beekman, 2002). If companies with higher ESG scores have higher P/E ratios than the companies with lower ESG scores, it would indicate that investors perceive them to be safer investments with more growth potential. The opposite is true for if these companies with higher ESG scores have lower P/E ratios.

The annual stock return (R):

The annual stock return is calculated by using stock price figures provided by Bloomberg. It accounts for the capital appreciation or depreciation in the stock price of a firm. This is a purely market-based measure of financial performance and has been used in most prior studies, including those of Nollet, Filis and Mitrokostas (2016), Nkomani (2013) and Du Toit and Lekoloane (2018). It is a popular financial performance measure to include mostly because this is ultimately the capital return to holders of a firm's stock and therefore represents overall market-based financial performance. The annual stock return is calculated by taking the difference between the stock price of firms at time t, and time t-1, and then dividing this difference by the stock price at time t-1. For example, the annual stock return (R) of firm i in 2012 would be calculated as follows:

$R_{i,2012} = (P_{i,2012} – P_{i,2011})/P_{i,2011}$

Where:

- $R_{i,2012}$ = Annual Stock return of firm i for 2012;
- $P_{i,2012}$ = The stock price of firm i on the last business day of 2012; and
- $P_{i,2011}$ = = The stock price of firm i on the last business day of 2011

ESG Performance

The ESG performance of the various companies was measured by means of an ESG performance score, abbreviated to, 'ESGS.' The source of this score was revealed under subsection 3.1.2. More specifically, the variable used is the 1 year lagged ESG score of a company. The variable is described in more detail below.

One-year lagged ESG score ($ESGS_{T-1}$):

The ESG scores assigned to firms are relative, rather than being absolute. Each company is assigned a score between 0 and 10. A firm with a score of 0 has the worst possible ESG performance whilst a firm with a score of 10 has the best possible ESG performance, relative to its peers. Using a lagged ESG score is consistent with prior studies including those of Saleh, Zulkifli and Muhamad (2011) and Mahoney and Roberts (2007). The reason for including the lagged variable is to assess the financial performance of firms in the future when they are already engaged (or not engaged) in ESG activities.

Control Variables

Two control variables have been included in the various models in an attempt to remove their effects from the equations in consideration. The control variables included in this study are the financial leverage of firms and their market caps. The use of these measures is justified by recent studies that find firm size (measured by market cap) and risk (represented by financial leverage) are essential control variables when assessing the effects of ESG performance on CFP because of their individual effects on firm financial performance (Margolis, Walsh & Elfenbein, 2009: 192; McWilliams & Siegel, 2000: 605).

Financial leverage (FL):

The financial leverage of a company is the proportion of a firm's assets that are funded by debt. The ratio is provided by Bloomberg and is simply calculated as follows:

- FL = Total debt/Total assets

This measure will control for company risk. The higher the financial leverage of a firm, the greater it's risk of bankruptcy.

Market Cap (MC):

The market cap of a company is a measure of firm size. The figure is provided by Bloomberg and is calculated as follows:

- MC = Number of common shares outstanding x share price

Including this measure in the various models will control for the effect of firm size on a firm's financial performance.

Both of the above control variables have been split up into categories in order to try and control for their effects as accurately as possible. This process is known as the dichotomisation of continuous variables. This data analysis technique has various benefits as well as drawbacks. By splitting up the these control variables, one can interpret the results more intuitively, for example one can compare large cap stocks directly to small cap stocks. In other words, the quantitative scale of values reflects meaningful qualitative differences (Grace-Martin, n.d.). It is also worth noting that only the control variables have been split up into categories, all other variables remain continuous. The major drawback of this process is that a certain amount information is lost, this is mentioned in more detail in sub-section 5.2.

The range of values for both market cap and financial leverage is very large as is evidenced by their min and max values in table 1 and 2 in chapter 4. The standard deviation of both is also high, this is reduced when outliers have been removed but is still significant. The sample of firms are split up into three categories based on size (small cap, mid cap and large cap firms), and two categories based on financial leverage (firms with low financial leverage and firms with high financial leverage). The control variables have been split up into their respective categories based on values defined in this study in an effort to disperse observations as evenly as possible. The upper and lower bounds of values for each category as well as the number observations belonging to each are found in the appendix.

The base category that shall be used is large cap and high financial leverage. This category of firms is used in order to explain results in a more intuitive manner. This means that the effects of being a large cap stock with high financial leverage will be included in the intercept term, and the coefficients of the other categories (e.g. Small cap stock with low financial leverage) will all be relative to a large cap stock with high financial leverage.

Some previous studies have also used the industries that the various firms belong to as a control variable and for good reason. Graph 1 in the appendix presents the volatility of annual stock returns of all 11 industries included in the study. Firms belonging to the telecommunication services sector display large volatility and a decision needed to be made whether to exclude telecommunication firms from the sample of companies used in the model. The other consideration was whether or not to exclude financial firms from the sample due to their unique legal and financial requirements. For example, their financial leverage ratios are much higher than those of firms from other industries. Graph 2 in the appendix displays the mean financial leverage ratio for each of the 6 years that corresponds to each industry. These unique features could result in findings being distorted and an untrue picture of the ESG-CFP relationship being presented.

The main consideration should however be whether the ESG performance across industries varies considerably. For example, a company belonging to the industrials or energy industry would likely have a poorer ESG score in comparison to firms belonging to the healthcare industry. This however is not an issue in this study because the ESG scores assigned to each firm included in the sample for this study, which represent the respective firms' ESG performance, are relative to the ESG scores of its peers (i.e.

intra industry comparisons). The cross-industry discrepancy in scores is therefore not present. Consistent with the studies of Du Toit and Lekoloane (2018) and Viviers et al. (2008), all industries have been included in this study. Prior South African studies mentioned in 2.5.3 all included the financial industry in their studies as well.

In order to reduce the potential problem of some industries having very unique features (such as financials having much larger financial leverage ratios), outliers have been excluded from the sample. This is discussed in detail under section 4.1. It was therefore decided to not exclude specific industries from the sample or use industries as a control variable.

3.3.2: Hypothesis Development and Associated Model Specification

In order to best determine the relationship between the ESG performance of companies and their CFP, four hypotheses have been developed. The first three hypotheses investigate the relationship by including ESG performance as the independent variable, and the last hypothesis transforms the equation to having ESG performance as the dependent variable. An attempt is therefore made to determine the direction of the ESG-CFP relationship. In order to test the different hypotheses, different models are required. The models used are similar in most aspects but change slightly in terms of which variables are included/excluded. The basic panel regression equation of $Y_{it} = \alpha_0 + \beta_1 X_{it} + V_t + \alpha_i + \varepsilon_{I,t}$ is the underlying model used (UCT FTX4044H Lecture notes). The following symbols are applicable for all relevant models:

General symbols:

- α_0 : Represents the constant term;
- V_t: A time dependent factor that partly explains Y_{it};
- α_i: A cross sectional (i.e company) dependent factor that partly explains Y_{it}; and
- $\varepsilon_{I,t,}$: Represents the idiosyncratic error term

Financial performance measures:

- ROA_{it}: The ROA ratio of firm i at time t.
- P/E_{it}: The P/E ratio of firm i at time t.
- R_{it}: The annual stock return of firm i at time t.

ESG performance measures:

- $ESGS_{it}$: The ESG score of firm i at time t.
- $ESGS_{it-1}$: The ESG score of firm i at time t-1 (i.e. in lagged terms)

Control variables:

- $X_{i,t}$: A vector which includes the control variables namely risk (measured by leverage) and firm size (measured by market cap) both at time t.

Hypothesis 1

The first research objective is to determine the relationship between ESG performance and CFP by using ROA as the financial performance measure. The resulting model used to test this hypothesis, adopted from Nollet, Filis & Mitrokostas (2016) is specified as follows:

$$ROA_{it} = \alpha_0 + \beta_1 ESGS_{it-1} + \beta_2 X_{it}\ \alpha_i + \varepsilon_{I,t} \qquad \text{[Model 1]}$$

The null hypothesis associated with this objective is: There is no significant, linear relationship between a firm's ESG performance and its financial performance, as measured by the ROA ratio.

The alternative hypothesis associated with this objective is: There exists a significant, positive, linear relationship between a firm's ESG performance and its financial performance, as measured by the ROA ratio.

Written alternatively, the null and alternative hypothesis can be presented as follows in respect of model 1:

$H1_0$: $\beta_{ESG(T-1)} = 0$

$H1_a$: $\beta_{ESG(T-1)} > 0$

Hypothesis 2

The second research objective is to determine the relationship between ESG performance and CFP by using the P/E ratio as the financial performance measure. The resulting model used to test this hypothesis, adopted and altered from Nollet, Filis & Mitrokostas (2016) is specified as follows:

$$P/E_{it} = \alpha_0 + \beta_1 ESGS_{it-1} + \beta_2 X_{it}\ \alpha_i + \varepsilon_{I,t} \qquad \text{[Model 2]}$$

The null hypothesis associated with this objective is: There is no significant, linear relationship between a firm's ESG performance and its financial performance, as measured by the P/E ratio.

The alternative hypothesis associated with this objective is: There exists a significant, positive, linear relationship between a firm's ESG performance and its financial performance, as measured by the P/E ratio.

Written alternatively, the null and alternative hypothesis can be presented as follows in respect of model 2:

$H2_0$: $\beta_{ESG(T-1)} = 0$

$H2_a$: $\beta_{ESG(T-1)} > 0$

Hypothesis 3

The third research objective is to determine the relationship between ESG performance and CFP by using the annual stock return of a firm as the financial performance measure. The resulting model used to test this hypothesis, adopted from Nollet, Filis & Mitrokostas (2016) is specified as follows:

$$R_{it} = \alpha_0 + \beta_1 ESGS_{it-1} + \beta_2 X_{it} \alpha_i + \varepsilon_{I,t} \qquad \text{[Model 3]}$$

The null hypothesis associated with this objective is: There is no significant, linear relationship between a firm's ESG performance and its financial performance, as measured by the annual stock return.

The alternative hypothesis associated with this objective is: There exists a significant, positive, linear relationship between a firm's ESG performance and its financial performance, as measured by the annual stock return.

Written alternatively, the null and alternative hypothesis can be presented as follows in respect of model 3:

$H3_0$: $\beta_{ESG(T-1)} = 0$

$H3_a$: $\beta_{ESG(T-1)} > 0$

Hypothesis 4

The fourth and final research hypothesis is to determine the relationship between ESG performance and CFP, with ESG performance being the dependent variable. The ROA, P/E ratio and annual stock return of a company are all included as independent variables. Models 4.1; 4.2; 4.3 and 4.4 are all used to test this hypothesis. In the case of Model 4.1, the ESG score is included as the dependent variable and all three financial performance measures, namely the ROA ratio, the P/E ratio and the annual stock return are included as the independent variables. Du Toit and Lekoloane (2018) used a similar approach by examining whether there was a relationship between either the return on sales, P/E ratio or stock returns of firms and being listed on the JSE SRI. The resulting model is specified as follows:

$$ESGS_{it} = \alpha_0 + \beta_1 ROA_{it} + \beta_2 P/E_{it} + \beta_3 R_{it} + \beta_5 Xit\ \alpha_i + \varepsilon_{I,t} \qquad \text{[Model 4.1]}$$

Models; 4.2; 4.3 and 4.4 have also been used to test the fourth hypothesis. In each case only one financial performance measure is included as the only independent variable. This was done in an attempt to isolate the direct effect that the respective financial performance measure may have on the ESG performance of firms. The resulting models are specified as follows:

$$ESGS_{it} = \alpha_0 + \beta_1 ROA_{it} + \beta_5 Xit\ \alpha_i + \varepsilon_{I,t} \qquad \text{[Model 4.2]}$$

$$ESGS_{it} = \alpha_0 + \beta_1 P/E_{it} + \beta_5 Xit\ \alpha_i + \varepsilon_{I,t} \qquad \text{[Model 4.3]}$$

$$ESGS_{it} = \alpha_0 + \beta_1 R_{it} + \beta_5 Xit\ \alpha_i + \varepsilon_{I,t} \qquad \text{[Model 4.4]}$$

The null hypothesis associated with this objective is: There is no significant, linear relationship between a firm’s financial performance and its ESG performance.

The alternative hypothesis associated with this objective is: There exists a positive, linear relationship between a firm’s financial performance and its ESG performance.

Written alternatively, the null and alternative hypotheses can be presented as follows in respect of models 4.1; 4.2; 4.3 and 4.4:

$H4_0$: β_{ROA}; and $\beta_{P/E}$; and $\beta_R = 0$

$H4_a$: $\beta_{ROA} > 0$; or $\beta_{P/E} > 0$; or $\beta_R > 0$

All Hypotheses being tested are one sided, as the null hypotheses state that no linear relationship exists, whilst the corresponding alternative hypotheses state that a positive, linear relationship exists.

3.4: DATA ANALYSING PROCESS

Statistical analysis is conducted on the data in order to determine the relationship, if any, between ESG and Financial performance. The hypothesis testing shall take the form of the following process (UCT FTX5044H Lecture notes; Longhi & Nandi, 2015):

1) The Hausman test shall be performed on the data in order to determine whether the fixed effects or random effects model is more appropriate.
2) Depending on the result from step 1, the appropriate model is applied, and the independent variables are regressed against the relevant dependent variable. The coefficients of each independent variable are assessed as well as their significance (P-values).

The p-values corresponding to each coefficient represent the following hypothesis:

- H_0: $\beta = 0$ (No relationship exists between the relevant variable and the model's dependent variable).
- H_a: $\beta \neq 0$ (A relationship exists between the relevant variable and the model's dependent variable. Note that this alternative hypothesis is two-sided, allowing for a positive or negative relationship).

Lastly, the F-statistic for overall significance of the regression analysis represents the following hypothesis:

- H_0: A model with no independent variables fits the data as well as the model used in the regression analysis
- H_a: The model used in the regression analysis fits the data better than a model with no independent variables, containing only an intercept.

Chapter 4: Data analysis and Research Results

4.1: Descriptive Statistics

Table 1 and 2 display the descriptive statistics of the variables under investigation whilst table 3 provides a more in-depth examination of the ESG score. From table 1 and 2 it can be observed that out of the three financial performance measures, the annual stock return is significantly more stable compared to both the ROA and P/E ratios, this is deduced from the large variation in their standard deviations. It is also important to note that the standard deviation of $ESGS_{T-1}$ is relatively low, indicating that the scores are fairly stable over time. This score is examined in more detail in table 3.

DESCRIPTIVE STATISTICS - OUTLIERS INCLUDED[1]

	Stock Return	*ROA*	*P/E*	*Finl Lev*	*Market Cap*	*$ESGS_{T-1}$*
Obs.	717	709	655	710	716	627
Mean	0.1019	6.814187%	24.2843	6.42941	8.518E+10	5.2973
Std. Dev	0.38251	10.03474	77.33056	67.25825	1.864E+11	2.8191
Min.	-0.95369	-48.89608%	1.364317	1.035105	2276392960	0
Max	3.17213	120.8124%	1600	1790	1.9026E+12	10

As is usually the case when dealing with many financial data points, outliers are present in the data and should be dealt with to provide more consistent data and avoid basing the analysis on skewed data (Richardson et al., 2005). The outliers may exist due to data being entered incorrectly, complex accounting treatments, but most likely due to out-of-the-ordinary events or transactions that lead to data point considerably different from the norm.

The two main methods of dealing with outliers are to either apply Windsorisation to data whereby one multiplies the defined outliers by a factor in order to get them back into a predetermined upper and

[1] For clarification purposes, the stock return figures are in decimal format whilst the ROA and financial leverage figures are in percentage format. The P/E figures represent the ratio of the price of a firm's stock to its EPS. The Market cap figures are expressed in absolute terms.

lower bound or removing the outliers completely. Du Toit and Lekoloane (2018) applied Winsorising of 5% in order to reduce the extreme values. Nkomani (2013) excluded outliers from their data, any data that was more than three standard deviations away from the mean was considered an outlier and removed.

It was decided to rather remove the outlying data points, partly in an effort to account for differences across industries. For the purposes of this study, the Tukey 2.2 rule was used in order to determine the lower and upper bound of values to be included. The method is robust to extreme values and is recommended as best practice after the findings of Hoaglin and Iglewitz (1987). Their study found that the common 1.5 multiplier used in practice was in fact in inaccurate approximately half of the time and a factor of 2.2 should instead be used. Table 2 below presents the descriptive statistics of the data excluding outliers.

TABLE 1: DESCRIPTIVE CHARACTERISTICS OF ALL VARIABLES UNDER INVESTIGATION (EXCLUDING OUTLIERS)

	Stock Return	*ROA*	*P/E*	*Finl Lev*	*Market Cap*	*$ESGS_{T-1}$*
Obs.	702	683	617	617	659	627
Mean	0.11708	6.295099	15.08414	2.248318	4.40E+10	5.29729
Std. Dev	0.37300	6.550307	6.129738	0.909034	4.73E+10	2.81914
Min.	-0.9537	-15.6341	1.364317	1.035105	22763930	0
Max	1.25789	28.54988	37.24947	6.03131	2.34E+11	10

The standard deviation of all financial performance measures and control variables was reduced significantly after removing the outliers, as was their range. This more consistent and less skewed set of data is desirable as the results are now likely to be less biased due to them no longer being affected by data points that differ significantly from the norm. Table 3 below provides a more in-depth analysis of the ESG performance variable, $ESGS_{T-1}$.

TABLE 2: DESCRIPTIVE CHARACTERISTICS OF ESGST-1 THROUGH TIME

	Year	Obs	Mean	Std. Error	Std. Dev	Min	Max
ESG_{T-1}	2012						
	2013	90	4.9772	0.3090	2.9313	0	9.65
	2014	89	5.0730	0.3009	2.8382	0.17	9.83
	2015	89	5.3034	0.2936	2.7698	0	9.92
	2016	89	5.4821	0.2915	2.7504	0	10
	2017	89	5.5094	0.2898	2.7344	0	10

	2018	89	5.6221	0.2905	2.7405	0	10
	2019	88	5.3459	0.3042	2.8536	0	9.92

The mean of the ESGS T_{-1} for firms showed a steady increase from 4.9772 in 2013 to 5.6221 in 2018 and subsequently dipped in 2019. Apart from the dip in ESG performance in 2019 this indicates that firms' commitment to their ESG performance is increasing steadily over time, relative to their peers. This may be due to either increased public scrutiny and pressure applied on firms to practice more sustainably or because managers believe that increased ESG performance benefits the firm financially as well.

4.2: CORRELATIONS AMONG VARIABLES

Table 4 presents the unconditional correlations between the different variables. The results suggest that the variables are not highly correlated amongst each other. Financial leverage and the P/E ratio have the highest correlation of 0.342. This figure is also significant at the 0.1% level of confidence. It is interesting to note that the market cap control variable has positive correlations with all three of the financial performance measures, and all are significant at the 0.1% level of confidence barring the correlation between market cap and the P/E ratio, which is significant at the 5% level of confidence. These figures support the use of market cap as a control variable and suggest that there may be an existing relationship between all three financial performance measures and this firm specific variable. It is also worth noting that the $ESGS_{T-1}$ variable has correlations that are close to zero with the three measures of financial performance, and only the coefficient corresponding to the ROA ratio is statistically significant. This is an early indication that higher ESG scores may not in fact lead to greater financial performance. When referring to correlation figures there is no mention of causality, this will be referred to in the regression equation outputs.

TABLE 3: UNCONDITIONAL CORRELATIONS OF THE VARIABLES UNDER INVESTIGATION

	STOCK RETURN	ROA	P/E	FINL. LEV.	MARKET CAP.	ESGS (T-1)
STOCK RETURN	1					
ROA	***0.215	1				
P/E	-0.030	-0.065	1			
FINL. LEV.	-0.013	***-0.249	***0.342	1		
MARKET CAP.	***0.156	***0.167	**0.122	0.023	1	
ESGS (T-1)	0.004	***0.168	-0.035	***0.050	0.157	1
P-values: * p < 0.1; ** p < 0.05; *** p < 0.01						

4.3: Regression Results

4.3.1: Hausman Tests

The Hausman test is applied in order to determine which model is most appropriate for each equation and it is based on following hypothesis (UCT FTX5044H Lecture notes; Longhi & Nandi, 2015); :

H_0: Cov(α_i | X_{it}) = 0

- i.e. The cross-sectional intercept term (a_i) is uncorrelated to the independent variables and/or the control variables (X_{it}) and hence the random effects model is appropriate
- In this case, X_{it} represents any of the independent or control variables included in the model

H_1: Cov(α_i | X_{it}) $\neq$ 0

- The cross-sectional intercept term (a_i) is correlated to the independent variables and/or the control variables (X_{it}) and hence the fixed effect model is needed.

The outputs from the Hausman tests performed on each of the first three models are presented in table 5 below:

TABLE 4: HAUSMAN TEST OUTPUTS FOR MODELS 1; 2 AND 3

	Chi-Sq. Statistic	Prob.
ROA (Model 1)	17.736773	0.0069
P/E (Model 2)	7.299671	0.294
STOCK RETURN (Model 3)	9.117861	0.1671

The p-values of each test are of most interest and are used to determine which model is most appropriate for use. At the 5% level of significance, only the null hypothesis of the ROA equation (model 1) can be rejected. This means that for the ROA regression, the fixed effects model is needed. The null hypothesis fails to be rejected for both the P/E and Stock Return models (model 2 and 3), and hence the random effects model is most appropriate.

4.3.2: Hypothesis Testing

Each of the four hypotheses shall be tested individually using the appropriate model and their regression results shall be provided and subsequently analysed.

Hypothesis 1:

The first hypothesis examines the relationship between ROA as the dependent variable at time T and the EGS score at time T-1 as the independent variable. The market cap and financial leverage of firms are included in the model as control variables. The relationship shall be examined through the use of model 1. A fixed effects model is applied to the data as per the Hausman test. The regression output is provided below in Table 6:

$$ROA_{it} = \alpha_0 + \beta_1 ESGS_{it-1} + \beta_2 X_{it}\ \alpha_i + \varepsilon_{I,t} \qquad \text{[Model 1]}$$

TABLE 5: MODEL 1 REGRESSION RESULTS

Variable	Coefficient	Prob.
CONSTANT	5.908327	0
$ESGS_{T-1}$	-0.040025	0.7731
LARGE CAP, LOW FINANCIAL LEVERAGE	4.255457	0.001
SMALL CAP, HIGH FINANCIAL LEVERAGE	-2.973181	0.0125
SMALL CAP, LOW FINANCIAL LEVERAGE	0.577568	0.6517
MID CAP, HIGH FINANCIAL LEVERAGE	-1.130617	0.2897
MID CAP, LOW FINANCIAL LEVERAGE	2.015642	0.1076
R-SQUARED	0.590579	
PROB (F-STAT)	7.482833	

The $ESGS_{T-1}$ displays a very small, negative relationship with ROA. The coefficient is however not significant even at the 10% level of confidence and so one cannot reject the null hypothesis that in fact no relationship exists between a company's ESG performance over the prior year and its ROA.

This is inconsistent with the findings of Saleh, Zulkifli and Muhamad (2011) who, in their study, found that the one year lagged CSR score of Malaysian listed companies had a positive, yet weak, relationship with ROA. These results are possibly inconsistent due to the studies taking place during different time periods and using companies from different countries as the sample base. The negative coefficient in the above equation is however consistent with the findings of Chetty, Naidoo Seetharam (2015), who found a significant, negative relative relationship existing between ESG performance and the ROA. This negative relationship supports the theory presented by Ullman (1985) which states that ESG activities dampens financial performance.

Of the control variable coefficients, the most noteworthy is the 4.255 coefficient that corresponds to large cap stocks with low financial leverage. This can be interpreted in relation to large cap stocks with high financial leverage because that is the base category. At each point on the regression output, large cap stocks with low financial leverage will have an ROA ratio that is 4.255 units greater than that of a large cap stock with high financial leverage. When looking at the probability density function, this coefficient is significant even at the 0.1% confidence level. When keeping financial leverage constant with that of the base category (i.e. high financial leverage), one observes that the smaller the market cap, the lower the company's ROA is likely to be. Highly leveraged, mid and small cap companies will on average have an ROA figure that is 1.131 and 2.973 units less than highly leveraged, large cap companies respectively. Neither of these coefficients are however significant even at the 10% level of confidence and hence the null hypothesis of no relationship existing fails to be rejected. It can therefore be deduced that a company with a higher market cap and lower financial leverage will have a larger ROA figure than those with lower market caps and higher financial leverages. These coefficients from the above regression are consistent with the findings of both Chetty, Naidoo and Seetharam (2015) as well as Waddock and Graves (1997) who's regression analysis provided evidence that size (measured by the log of market cap) and risk (measured by long term debt/asset ratio) both have positive relationships with a firm's ROA ratio.

Lastly, the R^2 figure of 0.591 is an indication that the variables included in the model have strong explanatory power. The F-test statistic however is insignificant, even at the 10% confidence level and so model 1, with all relevant variables included, fits the data no better than a model containing no independent variables.

In conclusion, there is insufficient evidence to accept the hypothesis of a positive relationship existing between the ESG performance of a company and its ROA. The independent variable of $ESGS_{T-1}$ is negative and insignificant. It can however be concluded that the greater the market cap of a firm and the lower its financial leverage, the greater its ROA will be.

Hypothesis 2:

The second hypothesis examines the relationship between the P/E ratio at time T as the dependent variable and the EGS score at time T-1 as the independent variable. Again, market cap and financial leverage are included as control variables. The relationship shall be examined through the use of model 2. A random effects model is applied to the data as per the Hausman test**.**

$P/E_{it} = \alpha_0 + \beta_1 ESGS_{it-1} + \beta_2 X_{it}\ \alpha_i + \varepsilon_{I,t}$ [Model 2]

TABLE 6: MODEL 2 REGRESSION RESULTS

Variable	Coefficient	Prob.
CONSTANT	16.77591	0
$ESGS_{T-1}$	-0.002719	0.9806
LARGE CAP, LOW FINANCIAL LEVERAGE	-2.102226	0.0494
SMALL CAP, HIGH FINANCIAL LEVERAGE	-2.023596	0.0548
SMALL CAP, LOW FINANCIAL LEVERAGE	-2.384448	0.0306
MID CAP, HIGH FINANCIAL LEVERAGE	-0.350294	0.7183
MID CAP, LOW FINANCIAL LEVERAGE	-1.586305	0.1327
R-SQUARED	0.014954	
PROB (F-STAT)	0.239173	

Consistent with the regression results from model 1, the $ESGS_{T-1}$ coefficient is small and negative and lacks statistical significance, even at the 10% level of confidence. Therefore, the null hypothesis of no relationship existing between the ESG performance of firms and their P/E ratio cannot be rejected. This finding is consistent with the findings of Nkomani (2013) and Ntoi (2010), both of whom found insufficient evidence to reject the null hypothesis of a relationship existing between the relevant financial performance variables and ESG performance at all.

When looking at the control variables, the most significant observation is a coefficient of -2.384 belonging to small cap companies with low financial leverage. Interpreted directly this means that small cap companies with low financial leverage will have a P/E ratio that is on average 2.384 units lower than that of large cap companies with high financial leverage. The coefficient's p-value tells us that the figure is significant at the 5% level of confidence, meaning that the null hypothesis of no relationship being present can be rejected. All of the control variable's coefficients are in fact negative, meaning that a large cap company with high financial leverage will likely have a P/E ratio that is larger than its peers with smaller market caps and lower financial leverage. This result is consistent with the findings of Du Toit and Lekoloane (2018) who obtained a positive Beta in their logistic regression between Market Cap and financial performance.

The resulting R^2 figure from the regression of 0.015 is very small, meaning that the model has minimal explanatory power. Its corresponding F-statistic of 0.239 also tells us that a model containing no independent variables fits the data just as well as model 2.

The negative relationship existing between a firm's ESG performance and it's P/E ratio evident in table 7 is supported by the negative correlation coefficient between the P/E ratio and the $ESGS_{T-1}$ presented in table 4. Because of the high p-values however, one cannot conclude that a relationship exists at all. One can however conclude that the smaller a firm's market cap and the lower its financial leverage, the lower it's corresponding P/E ratio will be.

Hypothesis 3:

The third hypothesis examines the relationship between annual stock return over the period T-1 to T as the dependent variable and the ESG score at time T-1 as the independent variable. Market cap and financial leverage are included in the model as control variables. The relationship shall be examined through the use of model 3. A random effects model is applied to the data as per results from the Hausman test.

$$R_{it} = \alpha_0 + \beta_1 ESGS_{it-1} + \beta_2 X_{it}\ \alpha_i + \varepsilon_{I,t} \qquad \text{[Model 3]}$$

TABLE 7: MODEL 3 REGRESSION RESULTS

Variable	Coefficient	Prob.
CONSTANT	0.177622	0.0003
$ESGS_{T-1}$	0.004665	0.4182
LARGE CAP, LOW FINANCIAL LEVERAGE	-0.001947	0.9709
SMALL CAP, HIGH FINANCIAL LEVERAGE	-0.106733	0.0489
SMALL CAP, LOW FINANCIAL LEVERAGE	-0.152352	0.0059
MID CAP, HIGH FINANCIAL LEVERAGE	-0.097848	0.0725
MID CAP, LOW FINANCIAL LEVERAGE	-0.062487	0.2513
R-SQUARED	0.021888	
PROB (F-STAT)	0.033186	

The independent variable of $ESGS_{T-1}$ displays a small, positive relationship with the stock return figure. The coefficient however is insignificant, even at the 10% level of confidence and so even though the coefficient is positive, the null hypothesis of no relationship existing between a firms ESG performance and the annual stock return cannot be rejected. This is consistent with the findings of Saleh, Zulkifli and Muhamad (2011) who found that the one year lagged CSR score of Malaysian listed companies had a positive relationship with stock returns. The results are however inconsistent with a similar local study, that of Gladysek and Chipeta (2012), who found that investors aren't rewarded by earning higher returns on their investments by holding high ESG-performing stocks.

As was the case with the P/E regression, all control variable coefficients are negative, with small cap companies that have low financial leverage having the most negative figure with the most statistical significance. Interpreted literally, this means that small cap companies with low financial leverage will have an annual stock return for the year that is on average 0.152 units lower than that of large cap companies with high financial leverage. The coefficient's p-value tells us that the figure is significant at the 5% confidence level, meaning that the null hypothesis of no relationship existing can be rejected. Because all the control variables coefficients are negative, it can be deduced that a large cap company with high financial leverage will likely have, for any given year, an annual stock return that is larger than its peers with smaller market caps and lower financial leverage. These findings are consistent with those of Nollet, Filis and Mikrokostas (2016) who found significant evidence of a negative relationship existing between firm size and stock performance as well as financial leverage and financial performance.

Not dissimilar to the regression output from hypothesis 2, the R^2 value of the model is small, the model therefore has very low explanatory power. In this case it is however significant at the 5% level of confidence, and so model 3 fits the data well – better than a model containing no independent variables.

One can conclude that higher ESG performance leads to higher share price performance for a firm. Contrasting evidence is found in the correlation matrix in Table 4 where the independent variable of ESG_{T-1}'s correlation coefficient with the firm's stock return is slightly negative. The coefficient however lacks statistical significance and therefore one cannot conclude that a relationship exists at all. Not dissimilar to the findings of model 2's regression results, the greater the market cap of a firm and the higher its financial leverage, the greater its stock price performance will be.

4.6: Hypothesis 4

The Last hypothesis is intended to test the direction of the relationship between ESG and financial performance and whether financial performance could be used to predict a firm's ESG performance. The testing of this hypothesis also made use of a panel regression model, however, the variables from models 1; 2 and 3 swapped sides of the equation in order to make the ESG score at time T ($ESGS_T$) the dependent variable in the model and the three measures of financial performance, namely ROA, P/E and annual stock return, the independent variables. Both market cap and financial leverage were kept as control variables in the respective models. All three financial variables were regressed against $ESGS_T$ in one, comprehensive model, and subsequent to that each variable was regressed against $ESGS_T$ individually so as to isolate their effect on the dependent variable. The relationship is examined through the use of models 4.1; 4.2; 4.3 and 4.4. The outputs from the Hausman tests on these models are provided in table 9 below.

$$ESGS_{it} = \alpha_0 + \beta_1 ROA_{it} + \beta_2 P/E_{it} + \beta_3 R_{it} + \beta_5 Xit\ \alpha_i + \varepsilon_{I,t} \quad \text{[Model 4.1]}$$

$$ESGS_{it} = \alpha_0 + \beta_1 ROA_{it} + \beta_5 Xit\ \alpha_i + \varepsilon_{I,t} \quad \text{[Model 4.2]}$$

$$ESGS_{it} = \alpha_0 + \beta_1 P/E_{it} + \beta_5 Xit\ \alpha_i + \varepsilon_{I,t} \quad \text{[Model 4.3]}$$

$$ESGS_{it} = \alpha_0 + \beta_1 R_{it} + \beta_5 Xit\ \alpha_i + \varepsilon_{I,t} \quad \text{[Model 4.4]}$$

TABLE 8: HAUSMAN TEST OUTPUTS FOR MODELS 4.1; 4.2; 4.3 AND 4.4

	Chi-Sq. Statistic	Prob.
ALL VARIABLES (Model 4.1)	5.471778	0.7062
ROA (Model 4.2)	11.214325	0.082
P/E (Model 4.3)	6.782554	0.3414
STOCK RETURN (Model 4.4)	15.362288	0.0176

The P-value for models 4.1; 4.2 and 4.3 are not significant at the 5% level of confidence and therefore the use of a random effects model is most appropriate for these models. The P-value for model 4.4 is however significant at the 5% level of confidence, meaning that a fixed effects model is required. The regression results of all four models are summarized in table 10 below.

TABLE 9: MODEL 4.1; 4.2; 4.4 AND 4.4'S REGRESSION RESULTS

	Model 4.1	Model 4.2	Model 4.3	Model 4.4
CONSTANT	6.15908	5.6201	6.1880	5.75532
ROA	0.003516	0.0178		
P/E	-0.017762		-0.0160	
STOCK RETURN	0.018243			0.014732
LARGE CAP, LOW FINANCIAL LEVERAGE	-0.329961	-0.2601	-0.5031	-0.426652
SMALL CAP, HIGH FINANCIAL LEVERAGE	-0.732741	-0.4576	*-0.715722	-0.545762
SMALL CAP, LOW FINANCIAL LEVERAGE	*-0.779679	-0.5773	*-0.72104	-0.487437
MID CAP, HIGH FINANCIAL LEVERAGE	*-0.675455	*-0.57950	*-0.678663	*-0.60923
MID CAP, LOW FINANCIAL LEVERAGE	**-0.841672	-0.5880	*-0.805196	-0.410378
R-SQUARED	0.012013	0.0096	0.0103	0.763678
PROB (F-STAT)	0.631594	0.4620	0.4814	0.003
P-values: * p < 0.1, ** p < 0.05, *** p < 0.01				

From a high-level analysis of the regression results, one can observe that the ROA and stock return variables display a positive relationship with the ESG performance of companies whilst a firm's P/E ratio displays a negative relationship. This is observed in model 4.1, containing all three financial performance measures as independent variables as well as when the financial measures are included individually in their own separate models (models 4.2; 4.3 and 4.4) as well. There is therefore no clear evidence that ESG performance can be linked to financial performance. With this being said, none of the coefficients are significant, even at the 10% level of confidence and hence the null hypothesis of no relationship existing between either the ROA ratio of a firm, their P/E ratio or their stock return and the firm's corresponding ESG performance cannot be rejected. Du Toit and Lekoloane (2018) found no clear relationship between financial performance and ESG performance either.

An interesting observation is that all of the control variable's coefficients are negative, in all 4 models. With the base category remaining, 'Large cap firms with high financial leverage,' this means that on average, the smaller a companies' market cap and the lower their financial leverage, the lower their expected ESG score. Only 9 out of these 20 negative coefficients are statistically significant (8 of them only at the 10% level of confidence) and therefore on most occasions the null hypothesis of no relationship existing between either firm size and ESG performance or financial leverage and ESG performance fails to be rejected. These findings are consistent with both those of Du Toit and Lekoloane (2018) and Aras, Aybars and Kutlu (2009). In their research study, Du Toit and Lekoloane found that even though there wasn't a clear relationship between CSR (based on ESG performance) and CFP, there was however a relationship between company size and being listed on the JSE SRI and hence being a high ESG performer. Aras, Aybars and Kutlu (2009) were not able to find any link between CSR and financial performance but found a positive relationship between firm size and CSR.

The last area of interest is the R^2 and F-test statistic values. Models 4.1; 4.2 and 4.3 have very low R^2 values, meaning that only a very small amount of the variation in the ESG score is explained by the model itself. The F-test statistic values of these models are also far from being significant and so models containing no independent variables and only containing an intercept term fit the data just as well as the models used above. Model 4.4 on the other hand has a high R-squared value of 0.76 that is significant at the 1% level of confidence. The variables included in model 4.4 therefore fit the data well and the model explains a large proportion of the variation in ESG performance.

4.4: FURTHER ANALYSIS

It is interesting to note that the regression results of model 3, where annual stock return is the dependent variable, are very similar to those of model 2, where P/E is the dependent variable. This is evidenced by all control variables' coefficients being negative and small cap companies with low financial leverage having both the lowest coefficient and corresponding p-value, making it the most significant.

A possible explanation for this may be that the price at time T in the P/E figure corresponds to the share price at time T intrinsic in the stock return figure. Explained in an alternative manner:

- The annual stock return for the year starting at t-1 and ending at t is equal to the stock price of the company at time t, less the stock price of the company at time t-1, all over the stock price of the company at time t-1:
    - $(P_t – P_{t-1})/P_{t-1}$
- The price earnings ratio at time t is equal to the stock price at time t over the earnings per share figure at time t:
    - $P/E_t = P_t/EPS_t$

The common factor in both variables is P_T and this could be a reason for the very similar results arising from their regression analyses. For that reason, it was considered necessary to conduct a further analysis by including P_t as the dependent variable on its own in a regression analysis. The creation of a fifth model is therefore required and is specified as follows:

$P_{it} = \alpha_0 + \beta_1 ESGS_{it-1} + \beta_3 X_{it}\ \alpha_i + \varepsilon_{I,t}$ [Model 5]

Where:

- P_{it}: The stock price of firm i at time t.

The formation of a fifth hypothesis is presented:

Hypothesis 5:

An additional, fifth research objective, is to determine the relationship between ESG performance and the stock price of firms. The relationship is examined through the use of model 5.

The null hypothesis associated with this objective is: There is no significant, linear relationship between a firm's ESG performance and its stock price.

The alternative hypothesis associated with this objective is: There exists a significant, positive, linear relationship between a firm's ESG performance and its stock price.

Written alternatively, the null and alternative hypothesis can be presented as follows in respect of model 5:

$H5_0$: $\beta_{ESG(T-1)} = 0$

$H5_a$: $\beta_{ESG(T-1)} > 0$

The same process is followed as with the other four hypotheses. Firstly the Hausman test must be conducted in order to determine whether a fixed or random effects model is most appropriate. The results of the Hausman test are presented in table 11.

TABLE 10: HAUSMAN TEST OUTPUTS FOR MODEL 5

	Chi-Sq. Statistic	Prob.
PRICE (T)	9.117861	0.1671

The null hypothesis of there being no correlation existing between the intercept term (a_i) and any of the independent or control variables fails to be rejected at the 5% level of confidence due to the p-value of the test being 0.1671. Therefore, a random effects model is most appropriate to use in order to analyse the relationship. The resulting regression output is displayed in table 12.

TABLE 11: MODEL 5 REGRESSION RESULTS

Variable	Coefficient	Prob.
CONSTANT	10032.09	0.0032
$ESGS_{T-1}$	431.9899	0.1186
LARGE CAP, LOW FINANCIAL LEVERAGE	2565.73	0.3047
SMALL CAP, HIGH FINANCIAL LEVERAGE	-4504.447	0.0622
SMALL CAP, LOW FINANCIAL LEVERAGE	6855.731	0.0073
MID CAP, HIGH FINANCIAL LEVERAGE	-673.1746	0.7573
MID CAP, LOW FINANCIAL LEVERAGE	2223.852	0.3685
R-SQUARED	0.46925	
PROB (F-STAT)	0.000044	

It is not surprising to note that results in table 12 are similar to the results that were observed when regressing the independent and control variables against the P/E ratio and annual stock return in models 2 and 3 respectively. The independent variable, $ESGS_{T-1}$ displays a positive relationship with P_T as the dependent variable. The $ESGS_{T-1}$ coefficient of 432 however is not statistically significant, even at the 10% level of confidence, meaning that that null hypothesis of no relationship existing between the ESG performance and a firm’s stock price fails to be rejected.

The most noteworthy result arising from the control variables’ coefficients is the coefficient of 6855.731 corresponding to small cap companies with low financial leverage. This figure is also statistically significant at the 1% level of confidence, therefore conclusive evidence exists that the smaller the market cap of a firm and the lower its financial leverage, the higher its stock price will be. Interpreted literally this means that small cap companies with low financial leverage will on average have a stock price at time T that is 6855.731 units higher than the stock price at time T of a large cap company with high financial leverage. When keeping financial leverage constant with that of the base category (i.e. high financial leverage), both the mid cap and small cap companies display negative coefficients. Companies with low financial leverage that are either large cap, mid cap or small cap both have positive coefficients relative to highly leveraged, large cap companies. The results from this model therefore indicate to us that the stock price at time t for a company with low financial leverage will be higher on average, regardless of market cap, than the stock price of a company with high financial leverage.

When looking at the overall model itself, the R-squared value of 0.469 is statistically significant even at the 1% level of confidence. Ultimately, just less than half of the variation of P_T is explained by the model, it therefore has fairly strong explanatory power.

Conducting this further analysis does not provide investors with ground-breaking information that may enhance their portfolios, for it is not so much the stock price alone of firms that one is most interested in, but rather the change therein. It is however interesting to note that certain firm characteristics can lead to a firm having either a higher or lower stock price relative to its peers.

4.5: Implications of Results

Models 1; 2; 3 and 5: The ESG-CFP relationship

It would seem that there are very mixed results when it comes to examining the ESG-CFP relationship, depending on the dependent variable used in the model. The coefficients from the regressions are summarized in table 13 below.

TABLE 12: SUMMARY OF ESGT-1 COEFFICIENTS

	ROA (Model 1)	P/E (Model 2)	STOCK RETUN (Model 3)	PRICE (Model 5)
ESGS (T-1)	-0.0400	-0.0027	0.004665	431.9899

One must be reminded that even though all three of the dependent variables represent a firm's financial performance, individually they each represent a different aspect of it.

ROA is a backward-looking, accounting-based measure of financial performance. Model 1's regression results indicate that higher ESG performance leads to a lower ROA ratio and therefore decreased efficiency in the use of a firm's assets as this is what the ratio represents. A firm's ESG performance is unlikely to affect the asset-base of firms that is intrinsic in this measure but is more likely to effect it's net income. This relationship would therefore be inconsistent with the stakeholder inclusive approach, a branch of which states that improved customer relations through commitment to good ESG practices will lead to higher earnings. It is however consistent with the trade-off hypothesis introduced by Friedman (1970) which states that firms' profitability is reduced upon increasing their engagement in CSR activities.

The P/E ratio contains both a market and an accounting-based component. The numerator of the ratio, a firm's stock price, being market-based and the denominator, the firm's earnings, being the accounting-based component. The variable's coefficient is negative meaning that an increase in the ESG performance of a company corresponds to a decrease in the P/E of a company. Lower P/E ratios tend to correspond to low-growth companies that investors aren't willing to pay a premium for. There is constant debate around whether a low P/E ratio is more preferable in comparison to a high P/E ratio, based on the premise that high P/E firms are overvalued whereas if you hold a stock with a low P/E ratio, you generally obtain more earnings per unit of your investment - this can be deduced by simply investigating the P/E ratio calculation. The negative coefficient contradicts the social impact hypothesis theory and prior literature whose findings lead one to believe that investors value a company with higher ESG performance over companies with lower ESG performance. The results from this study lead us to believe that the higher a firm's ESG score, the less value investors place on that firm. A possible explanation for this is that investors in South Africa either aren't aware of a firm's ESG performance or they do not yet place value on it. The lower P/E ratios for high ESG performers suggest that investors perceive these firms as higher risk. Market participants may have the belief that resources directed towards ESG practices are resources that should instead have been directed towards increasing profits and shareholder value alone, and high ESG-performing firms are therefore riskier investments, this is consistent with the theories provided by Friedman (1970) and Ullman (1985).

$ESGS_{T-1}$'s coefficient in model 3 is positive when regressed against firms' stock return. This indicates that potential investors can use the ESG performance of a company as an indicator for future returns. According to the results from the model, good ESG performance translates into positive share price performance and hence a positive return for investors. These results are in line with the theories presented in section 2.6, that higher ESG performance leads to increased financial performance through various channels. The stock return measure of financial performance is strictly market-based meaning that investors value high ESG performing firms more than low ESG performers, which is contradictory to the findings of model 2.

Lastly, a positive relationship is observed between the firms ESG score at time T-1 and the stock price at time T in model 5. The model used to test this relationship also had a fairly high R-squared value that was statistically significant at the 1% level of confidence. As stated in section 4.4, this doesn't have a major implication for investors, but it is simply interesting to note that higher ESG performing firms will generally have a higher share price in comparison to its peers.

It must be however be remembered that the $ESGS_{T-1}$ coefficients in all four models fail to be statistically significant, even at the 10% level of confidence. Therefore, all of the above-mentioned relationships between ESG performance and their respective financial performance measures may not in fact exist. The contrasting regression results and their associated lack of significance indicate that the ESG performance of firms does not affect a firm's underlying financial performance, whether it be accounting or market-based.

Models 4.1; 4.2; 4.3 and 4.4: The CFP-ESG relationship

Of most interest from the above models' regression results are the resulting coefficients between the various firm characteristics (size and leverage) and their ESG performance. The regression results of all four models revealed the same result: The smaller a firm's size (measured by market cap) and the lower their level of debt (measured by financial leverage), the lower their expected ESG performance. A theory presented by Du Toit and Lekoloane (2018) as to why this may be the case is that generally, the larger a firm and the greater their debt facilities, the greater their ability to invest sustainably and practice with an ESG-conscious mindset. Smaller firms have fewer resources at their disposal, the precious resources that they do have are utilized only in an effort to increase their financial performance rather than distribute them towards ESG-based projects and practices.

Overall Discussion

As was discussed in section 2, the Literature Review, prior literature on the topic has rendered mixed results, for various reasons. The findings from this study are consistent with those of some prior studies, but contradictory to the findings of others.

The weak correlations and inconsistent relationships found in this study contradict Waworontu et al (2014) who discovered a moderate to strong positive correlation between CSR and various financial performance measures when analysed as a whole. Sinha et al (2018) found a similar weak relationship between CSR and CFP as did Jain, Vyas and Chalasani (2016). A possible reason for the inconsistency in findings between this study and the findings of prior, similar studies that were based on samples of firms from other countries is the unique ESG landscape in South Africa. This was discussed in detail in section 2.2.3. Investors may see firms engaging in ESG activities and practicing sustainably not as an opportunity for excess returns, but merely a practice by the firms in an attempt to comply with the various regulations. The unique set of data used in this study is likely a reason for inconsistency between findings of this study and previous studies conducted locally, on JSE-listed firms. There are many different ways of measuring ESG performance, these were discussed in section 2.3. The use of privately held data is motivated by the fact that using these scores would provide new, fresh insights regarding the effect of ESG performance on CFP.

Consistent with the findings of Nollet, Filis and Mitrokostas (2015) and Du Toit and Lekoloane (2018), this study failed to find conclusive evidence that a relationship exists between ESG performance and financial performance. When reversing the equation around, it is however evidenced that certain firm characteristics have a direct effect on ESG performance. These findings are consistent with those of Du Toit and Lekoloane (2018) as well as Aras, Aybars and Kutlu (2009).

Chapter 5: Conclusion

5.1: Review of the Study

The purpose of this study was to investigate the relationship between ESG and financial performance. This study focused on a sample of 90 companies listed on the JSE between 2012 and 2019. This research was motivated by the need to inform market participants on the investment opportunities available to them by focusing on the ESG performance of firms and whether this translates into material financial performance. The study was further motivated by the need to add to existing literature on the topic in a South African context, using unique, privately held data that has not yet been used in a study of this nature.

The ESG landscape in South Africa is unique and the ESG performance of firms has, over time, become an increasingly important factor for investors to consider. This study failed to find conclusive evidence that a relationship exists between the ESG performance (measured using privately held ESG scores) and financial performance (measured using both market and accounting-based CFP measures) of the 90 JSE-listed companies included in this study between the years 2012 and 2019. A positive relationship was found between the ESG performance of firms and their stock return. This indicates that higher ESG performing firms have increased market-based financial performance. A negative relationship was however found between firms' ESG performance and both their ROA and P/E ratio, indicating that higher ESG performing firms have decreased accounting-based financial performance and that investors don't in fact place a premium on high ESG-performing firms.

These contradictory results, as well as the fact that none of them were statistically significant, lead us to believe that the ESG performance of firms does not in fact have any significant effect on their financial performance. The practical implication of this conclusion is that investors should not necessarily use the ESG performance of firms as an indication of current or future financial performance, or use this in combination with other criteria.

When changing around the direction of the relationship in the models and switching the variables in order to have the ESG performance of firms as the dependent variable, it was evidenced that firms that are larger in size, with greater financial leverage will, on average, be higher ESG-performers. This is consistent with the findings of other studies and it is suggested that this is likely because firms of this nature have a greater amount of resources at their disposal to engage in ESG activities. Another reason could possibly be that firms of this nature tend to be more in the spotlight and hence are at greater risk of being scrutinized if they don't practice sustainably.

5.2: Avenues for further Research

An insufficient amount of research was put into investigating the direction of the relationship between ESG and CFP in this study. The theory proposed by Du Toit and Lekoloane (2018) explaining that because a firm has more resources at their disposal, they have the ability to invest in sustainable practices and have an altogether more ESG-based mindset is most likely the driving factor behind firm size having a direct effect on ESG performance.

Obtaining the necessary data for a study of this nature is always going to be one of the most limiting factors. Future studies should, however, attempt to use larger data samples. The panel used in this study was short, only containing 7 years' worth of data. A longer panel is more likely to assist in obtaining more statistically significant results. The ESG score used in this study does not consider the various types of ESG activities that firms engage in. Theory proposed by Baron (2001) outlined that different types of ESG activities can have different effects on financial performance. When the different types of ESG activities are aggregated into a single score, their respective effects might be cancelled out, and the actual effects may be understated. It is therefore recommended to use longer panel data sets that split ESG scores up into their various components.

The model used in this study also has its flaws. Both the fixed effects and random effects models have assumptions that need to be met. The fixed effects model controls for most of the omitted-variable bias, but because of this it limits what you can estimate by being unable to control for variables that vary over time. The random effects model is more efficient in that it has smaller standard errors, but it generally has a higher risk of being subject to omitted-variable bias. Further research could split the sample data set into its time-series and cross-sectional components, therefore avoiding the need to perform a panel regression. The cross-section of firms' ESG performance could be regressed against their financial performance in isolation each year separately. In doing so the assumptions of random or fixed effects models would not be required. This method would also provide insight into the changes in the relationship between ESG and CFP over different time period intervals.

The control variables of size and financial leverage were split up into categories in an effort to more easily interpret results, and their quantitative nature reflected meaningful qualitative information. The dichotomising process also reduced the effect that the large variation in figures (especially market cap) had on the results. Even though the main intention wasn't to investigate the relationship between these control variables and ESG performance, more meaningful information between this relationship would, however, likely be obtained by leaving the data in its continuous, quantitative form. By leaving the data in its continuous form, no information would be lost. The large variation in market cap figures could be avoided by using the log of market cap.

Lastly, a large reason for the variation in results on the topic is the vast array of data that is used to assess a firm's ESG performance. This study used privately held, proprietary data that has not been used in a study of this nature to date. This data is likely to differ to the ESG data from another source. Du Toit and Lekoloane (2018) provide a high-level overview of the prior studies on the topic and their various sources of ESG data, however a more in-depth analyses could be performed on the previous

South African studies themselves and possible explanations for the inconsistent results could be obtained from this.

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Appendices

APPENDIX 1: LIST OF FIRMS IN THE SAMPLE

FIRM	INDUSTRY	SECTOR
ABSA GROUP LTD	Banks	Financials
ADCOCK INGRAM HOLDINGS LTD	Pharmaceuticals	Health Care
ADVTECH LTD	Diversified Consumer Services	Consumer Discretionary
AECI LTD	Chemicals	Materials
AFRICAN OXYGEN LTD	Chemicals	Materials
AFRICAN RAINBOW MINERALS LTD	Metals & Mining	Materials
ANGLO AMERICAN PLATINUM LTD	Metals & Mining	Materials
ANGLO AMERICAN PLC	Metals & Mining	Materials
ANGLOGOLD ASHANTI LTD	Metals & Mining	Materials
ASPEN PHARMACARE HOLDINGS LTD	Pharmaceuticals	Health Care
AVI LTD	Food Products	Consumer Staples
BARLOWORLD LTD	Trading Companies & Distributors	Industrials
BIDVEST GROUP LTD	Industrial Conglomerates	Industrials
BLUE LABEL TELECOMS LTD	Commercial Services & Supplies	Industrials
BRAIT SE	Capital Markets	Financials
BRITISH AMERICAN TOBACCO PLC	Tobacco	Consumer Staples
CAPITAL & COUNTIES PROPERTIES PLC	Real Estate Management & Development	Real Estate
CASHBUILD LTD	Specialty Retail	Consumer Discretionary
CIE FINANCIERE RICHEMONT SA	Textiles Apparel & Luxury Goods	Consumer Discretionary
CITY LODGE HOTELS LTD	Hotels Restaurants & Leisure	Consumer Discretionary
CLICKS GROUP LTD	Food & Staples Retailing	Consumer Staples

CLOVER INDUSTRIES LTD	Food Products	Consumer Staples
CORONATION FUND MANAGERS LTD	Capital Markets	Financials
DATATEC LTD	Electronic Equipment & Instruments & Components	Information Technology
DISCOVERY LTD	Insurance	Financials
EMIRA PROPERTY FUND LTD	Equity Real Estate Investment Trusts (REITs)	Real Estate
EOH HOLDINGS LTD	IT Services	Information Technology
EXXARO RESOURCES LTD	Oil Gas & Consumable Fuels	Energy
FAMOUS BRANDS LTD	Hotels Restaurants & Leisure	Consumer Discretionary
FIRSTRAND LTD	Diversified Financial Services	Financials
FOSCHINI GROUP LTD/THE	Specialty Retail	Consumer Discretionary
GOLD FIELDS LTD	Metals & Mining	Materials
GRINDROD LTD	Marine	Industrials
GROWTHPOINT PROPERTIES LTD	Equity Real Estate Investment Trusts (REITs)	Real Estate
HARMONY GOLD MINING CO LTD	Metals & Mining	Materials
HUDACO INDUSTRIES LTD	Trading Companies & Distributors	Industrials
HYPROP INVESTMENTS LTD	Equity Real Estate Investment Trusts (REITs)	Real Estate
IMPALA PLATINUM HOLDINGS LTD	Metals & Mining	Materials
INTU PROPERTIES PLC	Equity Real Estate Investment Trusts (REITs)	Real Estate
INVESTEC LTD	Capital Markets	Financials
INVESTEC PLC	Capital Markets	Financials
JSE LTD	Capital Markets	Financials
KUMBA IRON ORE LTD	Metals & Mining	Materials

LEWIS GROUP LTD	Specialty Retail	Consumer Discretionary
LIBERTY HOLDINGS LTD	Insurance	Financials
LIFE HEALTHCARE GROUP HOLDINGS LTD	Health Care Providers & Services	Health Care
LONMIN PLC	Metals & Mining	Materials
MASSMART HOLDINGS LTD	Food & Staples Retailing	Consumer Staples
MEDICLINIC INTERNATIONAL PLC	Health Care Providers & Services	Health Care
METAIR INVESTMENTS LTD	Auto Components	Consumer Discretionary
MONDI LTD	Paper & Forest Products	Materials
MONDI PLC	Paper & Forest Products	Materials
MPACT LTD	Containers & Packaging	Materials
MR PRICE GROUP LTD	Specialty Retail	Consumer Discretionary
MTN GROUP LTD	Wireless Telecommunication Services	Telecommunication Services
MURRAY & ROBERTS HOLDINGS LTD	Construction & Engineering	Industrials
NAMPAK LTD	Containers & Packaging	Materials
NASPERS LTD	Media	Consumer Discretionary
NEDBANK GROUP LTD	Banks	Financials
NETCARE LTD	Health Care Providers & Services	Health Care
OMNIA HOLDINGS LTD	Chemicals	Materials
PICK N PAY STORES LTD	Food & Staples Retailing	Consumer Staples
PPC LTD	Construction Materials	Materials
RAND MERCHANT INVESTMENT HOLDINGS LTD	Insurance	Financials
RAUBEX GROUP LTD	Construction & Engineering	Industrials
REDEFINE PROPERTIES LTD	Equity Real Estate Investment Trusts (REITs)	Real Estate

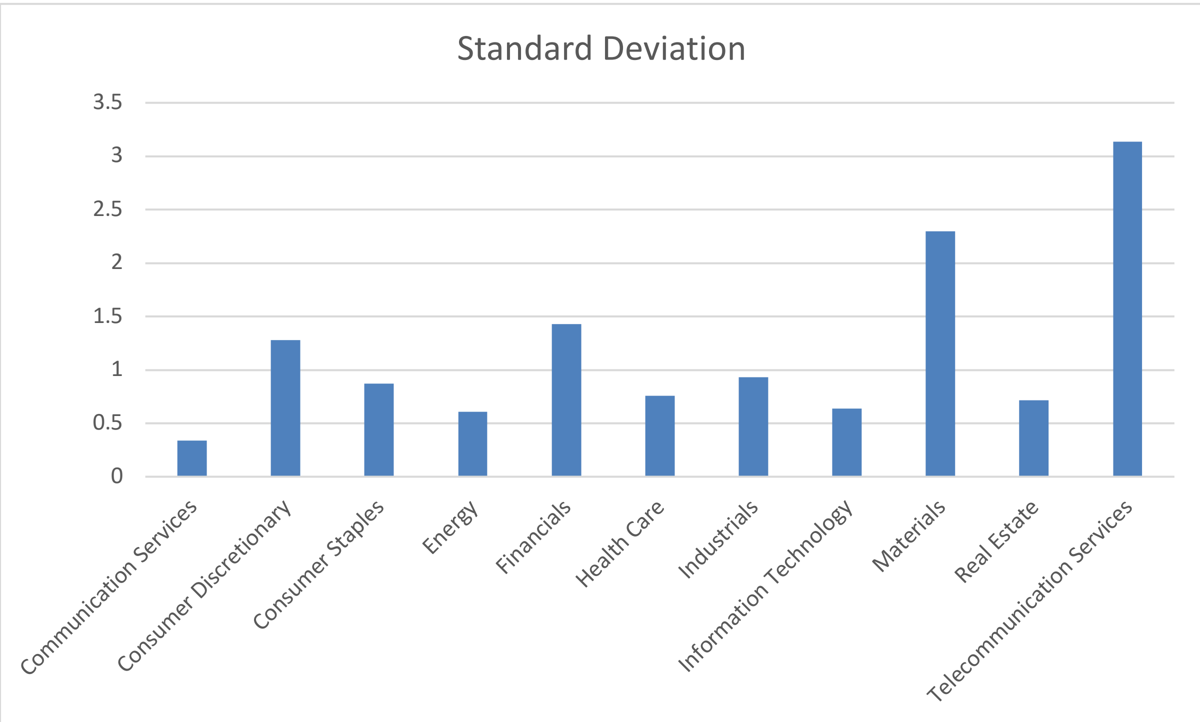
REMGRO LTD	Diversified Financial Services	Financials
RESILIENT REIT LTD	Equity Real Estate Investment Trusts (REITs)	Real Estate
REUNERT LTD	Industrial Conglomerates	Industrials
RMB HOLDINGS LTD	Diversified Financial Services	Financials
ROYAL BAFOKENG PLATINUM LTD	Metals & Mining	Materials
SA CORPORATE REAL ESTATE LTD	Equity Real Estate Investment Trusts (REITs)	Real Estate
SANLAM LTD	Insurance	Financials
SAPPI LTD	Paper & Forest Products	Materials
SASOL LTD	Chemicals	Materials
SHOPRITE HOLDINGS LTD	Food & Staples Retailing	Consumer Staples
SPAR GROUP LTD/THE	Food & Staples Retailing	Consumer Staples
STANDARD BANK GROUP LTD	Banks	Financials
STEINHOFF INTERNATIONAL HOLDINGS NV	Household Durables	Consumer Discretionary
SUN INTERNATIONAL LTD/SOUTH AFRICA	Hotels Restaurants & Leisure	Consumer Discretionary
SUPER GROUP LTD/SOUTH AFRICA	Specialty Retail	Consumer Discretionary
TELKOM SA SOC LTD	Diversified Telecommunication Services	Telecommunication Services
TIGER BRANDS LTD	Food Products	Consumer Staples
TONGAAT HULETT LTD	Food Products	Consumer Staples
TRUWORTHS INTERNATIONAL LTD	Specialty Retail	Consumer Discretionary
VODACOM GROUP LTD	Wireless Telecommunication Services	Telecommunication Services
VUKILE PROPERTY FUND LTD	Equity Real Estate Investment Trusts (REITs)	Real Estate

WILSON BAYLY HOLMES-OVCON LTD	Construction & Engineering	Industrials
WOOLWORTHS HOLDINGS LTD/SOUTH AFRICA	Multiline Retail	Consumer Discretionary
ZEDER INVESTMENTS LTD	Capital Markets	Financials

APPENDIX 2: UPPER AND LOWER BOUNDS USED FOR CONTROL VARIABLE CATEGORIES

	Financial Leverage		Market Cap (Rands)
Low Financial Leverage	FL < 1.9	Small Cap	MC ≤ 10 Bn.
High Financial Leverage	FL ≥ 1.9	Mid Cap	10 Bn. < MC < 40 Bn.
		Large Cap	MC ≥ 40 Bn.

APPENDIX 3: FIGURE 1 - STANDARD DEVIATIONS OF IINDUSTRIES IINCLUDED IN THE STUDY



APPENDIX 4: FIGURE 2 - INDUSTRY FINANCIAL LEVERAGE RATIOS